



Submission of Information, Industry Analysis and Opinions on Patents and Standards

**Response to DG Enterprise/DG GROWTH request for
comments on the matter of “a modern framework for
standardisation involving intellectual property rights”**

13th February 2015

Submitted by:

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1 Summary

DG Enterprise (now 'DG GROWTH') should be cautious when discussing and proposing changes to rules and practices, including disclosures and licensing for patented technologies in interoperability standards. Changing the dynamics of standardisation, participation in which remains voluntary, may impair innovation and reduce contributions to standards setting. This is particularly true if policy recommendations or changes undermine the evidently well-functioning aspects of standardisation processes.

The system of licensing interoperability standards is working remarkably well, as exemplified in mobile phones, to the benefit of consumers with vibrant competition which has resulted in extensive innovation, increasing product choice, falling prices and massive adoption with 7 billion connections worldwide. It has attracted large and increasing R&D expenditures which have grown 50 percent since 2008 to \$42 billion in 2013. Licensing fees paid for mobile standard-essential patent (SEP) royalties remain below 5 per cent (\$19 billion) of Morgan Stanley's estimated \$377 billion in 2013 handset sales. And these figures are dwarfed by the \$1.1 trillion in mobile operator service revenues which are also very dependent on mobile 2G, 3G and 4G technologies.

Manufacturers have also benefitted from the open availability of advanced standardised technologies which result in low barriers to market entry. Companies who develop and own the majority of the standard-essential patented technology in mobile phones have largely exited the large downstream market in mobile phone products in face of competition from these new market entrants. Licensing for royalty payments is therefore increasingly important to sustain R&D and innovation in standard-essential technologies.

Alleged problems and harms in standard-essential patent (SEP) licensing remain unsupported with evidence. Nor have the impact of proposed "remedies" on R&D, investment or long-term innovation been assessed in any meaningful way. The danger of proposing reforms that do not address quantifiable harm is dire unintended consequences. Standard-setting Organization (SSOs) participation is voluntary with rules and procedures determined by members in accordance with the law. As indicated above, imposing change could have adverse effects such as discouraging members to invest in R&D, contribute patented technologies to standards or outright departure from SSOs with reversion to more proprietary implementations. For example, the Institute of Electrical and Electronics Engineers (IEEE) has



recently changed its standards-related patent policy.¹ This will jeopardise its position as an attractive venue for setting standards and will result in its members contributing less or withdrawing altogether.²

Research presented by DG GROWTH is largely based on a limited number of interviews, many of which are outside the industry sectors where interoperability standards are most commonly used. There is no overall empirically-based assessment of information costs, transaction costs or overall costs in licensing SEPs, or how these are actually trending in the market. The Report's findings are very subjective and speculative. Quantitative data from desk research such as that on the extent of patenting and disclosures neither measure any of the purported problems, such as allegedly excessive transaction costs, nor measure the effects they have in the marketplace, for example, on market entry costs or market shares.

¹ https://www.ieee.org/about/news/2015/8_february_2015.html

² <http://ipfinance.blogspot.co.uk/2015/02/ieee-will-jeopardise-its-attractiveness.html> and <http://www.sddt.com/Technology/article.cfm?Sourcecode=20150211czc&t=Qualcomm+says+it+won+t+follow+new+WiFi+rules+on+patents#.VNx1rRtFDns>



2 Respondent profile and publication consent

This written response (the "Response") is to the DG GROWTH consultation, including questionnaire, on the matter of patents and standards (the "Consultation")³ and the associated study report prepared on behalf of and presented by DG GROWTH (the "Report").⁴ As requested, respondent Keith Mallinson (the "Respondent") provides information about himself as an "individual contributor" with significant expertise in analysing market trends for standardised technologies.

As the Report correctly notes, "[t]he area of mobile communication (including mobile data) is the industry where the issue of patent-standardization is most prominent." Principles and practices in FRAND-based licensing for standard-essential patents have prevailed in mobile communications for at least 15 years. As this is also my area of expertise, I base most of my responses on my knowledge and experience in this sector.

The Response is based on my skills and experience as an industry analyst specializing in ICT and in mobile communications, especially, for more than 25 years. I have limited my answers to parts of the Consultation questionnaire (the "Questionnaire") where I have particular competence and experience. I have supplemented my direct answers to the Questionnaire with analysis based on market facts and figures. This includes already-published material of mine which goes right to the heart of many issues which are, or should be, recognized as being central to this Consultation and the continuing wellbeing of standard-based technology markets for the benefit of consumers, service providers, manufacturers and technology developers alike.

Throughout, I include material from and cite with footnotes to various pre-existing publications of mine which are also based on extensive independent market facts and figures in mobile communications, and in ICT more generally. My contribution is therefore based on clear and solid evidence. Since 2011, I have been a regular contributor to the IP Finance blog as an expert on matters to do with technical standards, SEPs and (F)RAND licensing in mobile communications and elsewhere in ICT. I stand by the publications of mine which I cite in this Response with footnote references

3 Patents and Standards: A modern framework for standardisation involving intellectual property rights; Questionnaire, 14 October 2014

4 Patents and standards: A modern framework for IPR-based standardization; Report Ref. Ares(2014)917720-25/03/2014



and hyperlinks. Several of these have also been included in Appendix A. These publications should also be considered part of my Response. Appendix B includes market updates to some of the publications reproduced in Appendix A.

Name or the name of the submitting organization:

The Respondent is Keith Mallinson, Managing Partner and Principal Consultant, WiseHarbor. WiseHarbor is the trading name for Wiseharbor LLP, a UK-based limited liability partnership.

Type of respondent (enterprise, association, citizen, public authority, judge/law firm, other):

I am an industry analyst and commercial consultant in mobile communication and ICT. I am the founder and majority owner of WiseHarbor.

Country of residence or location of headquarters:

I live and work in the United Kingdom. WiseHarbor is headquartered in Poole, United Kingdom, with a branch office in Boston, Massachusetts in the United States.

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As an enterprise, please also indicate:

Your main field of business activity and the field of activity related to the consultation's topic (if not identical to the overall business activity)

I, [Keith Mallinson](#) am founder of [WiseHarbor](#), providing expert commercial consultancy since 2007 to technology and service businesses in wired and wireless telecommunications, media and entertainment serving consumer and professional markets. Among various consulting engagements I am retained as a testifying expert witness in patent licensing agreement disputes and in other litigation including asset valuations, damages assessments and in antitrust cases. I am also a [regular columnist](#) with mobile communication trade publication [FierceWireless Europe](#) and IP Finance – “where money issues meet intellectual property rights.” A biography is included as Appendix C.



Whether your enterprise can be classified as a "small or medium sized enterprise" (SME) according to the EU definition. In case of doubt in this regard, please make a judgement call.

WiseHarbor is an SME.

Keith Mallinson and WiseHarbor give consent that this Response may be published in full by DG GROWTH.



3 Falsely assumed problems, spurious remedies

This section on my Response is a broad and general response to the Report and Consultation including various statements and assertions not specifically associated with the “eight key issues” and specific questions in the Questionnaire. This part of my Response therefore spans several sections. If DG GROWTH needs to pair this uniquely to one of the eight key issues/questions in the Questionnaire, Section 2 would be most applicable.

3.1 Consultation objectives and misconceptions

DG GROWTH states that “[t]he objective of this consultation is to gather information and views on the interplay between standardisation and intellectual property rights (IPR) such as patents.” It also states that the purpose of the Consultation “is to allow stakeholders interested in standardisation involving patents, to bring to the Commission's attention their views on:

- how the current framework governing standardisation involving patents performs and on
- how it should evolve to ensure that standardization remains efficient and adapted to the fast-changing economic and technological environment.”

In the document DG GROWTH asserts that “*harmonisation standards* are particularly important for the EU,” and that, “furthermore, an efficiently performing standardization system is also crucial for the EU's objectives in the areas of industrial policy, innovation, services and technological development.”

However, the Consultation’s mission is ill-conceived because it is based on some false premises. For example, the Report makes the introductory statement that “[t]o ensure that Europe is well positioned in today’s global competitive environment, unnecessary barriers in the market for IPR licensing need thus to be removed. This requires a successful balancing of the incentives to invest in innovation against the benefits for the economy at large of a wide diffusion of knowledge.” Patenting, standard setting and licensing are not presenting barriers. On the contrary, wide diffusion of knowledge is precisely what the patent system provides through patent disclosures while providing intellectual property protection to patentees. Standard-setting organisations also foster dissemination of information in many ways including publication of standards and many other working



documents, open participation in SSO working groups, conferences and educational sessions. Extensive, useful and valuable SEP-based technologies are made available for implementation by all comers in conjunction with FRAND licensing. One result of this is extreme ease of entry into product markets, as illustrated in subsequent sections of this Response.

DG GROWTH should be very wary of giving policy signals that undermine this unsurpassed information flow and open availability of technology to new market entrants and other competitors in product markets by making any changes which might, for example, make patent holders feel less inclined to contribute their efforts and technologies to standard setting.

The Consultation and the accompanying Report presuppose a variety of problems with alleged barriers to efficient licensing. The Report (page 9) states that “[t]he licensing of such standard essential patents (SEPs) is however prone to market failures such as externalities (positive and negative), information problems, market power and free-riding. The various forms of market failure can result in barriers obstructing the efficient licensing of SEPs and can thus hinder the realization of the economic and societal benefits of the affected standards.” These allegations are without merit or proof of their existence, let alone significant harm.

Allegations such as these are nothing new. In fact these are old refrains which first appeared prior to the initial standardisation of UMTS with WCDMA technologies 15 years ago and which have been repeated time and time again, up until the first commercial introductions of LTE and 4G from around 2010, and ever since. This is dealt with in greater detail below. Such allegations of actual, expected and possible market failure and harm have never been adequately supported with evidence because none has ever been found over this very long period.

In fact, the above-alleged problems and barriers are not merely conjecture—the formation or expression of an opinion or theory without sufficient evidence for proof – they are simply incorrect. Evidence suggests commercial conditions are improving for licensees versus licensors, as indicated with supporting evidence in the following sections to this Response.

Nevertheless, various remedies are proposed in the Report. These might be in accordance with alleged problems and barriers; but they are spurious to countervailing facts, objective analysis, logic and reason. Proposing ‘solutions’ to theoretical and unproven problems is not the way to generate sound policy and regulatory certainty.



3.2 Inadequate and absent empirical data

It is remarkable that despite the Report being 280 pages long, and purporting to be quantitatively and qualitatively based, it actually contains no such analysis on the functioning of the markets including efficacy of patent licensing. Instead, the report is based on the limited input from 37 interviews with what it describes as practitioners.

These do not provide reliable or accurate measures:

- Only 6 to 10 out of 37 (35 identified in Report Annex I) individual interviewees were actually experts or stakeholders in communications technologies. The rest were from industries with totally different technologies, competitive landscapes and propensities to employ interoperability standards with SEPs and FRAND-based licensing.
- No quantification is provided of alleged barriers and market failures or purported adverse consequences such as delays (how much longer?) in standardization, implementation or impairments in innovation (how much less R&D, or how many fewer inventions?) How bad are things supposed to be or how much are they deteriorating, and how would we know this to be true?
- Neither the names of the interviewees nor are their responses provided for review. Consequently, it is not possible to consider or verify responses, analysis and conclusions.

These are most fundamental shortcomings: rather than being based on quantitative and qualitative evidence, the interview responses seem merely to reflect a limited selection of perspectives and opinions. These might or might not be representative of all opinions. Either way, this is no basis to confirm (or refute) that such opinions reliably and representatively reflect what is actually occurring in the industry with standard setting and patent licensing. However, concluding remarks reflect bias and prejudice in support of the Report's preconceived aims to "fix" the system.

The following subsections analyze and refute some false assertions in the Report and underlying the Consultation.

3.3 All signs are of extraordinary success, not market failure

Market facts and figures show how remarkably and increasingly well the mobile ecosystem has developed in terms of innovation, competition,



subscriber adoption and usage, reducing costs (including licensing fees) and end-user prices over an extended period. This includes the 15 years since standardization of 3G with WCDMA in 1999, and as patent disclosures including those for SEPs have increased substantially. Here are some highlights in mobile communications developments and successes:

- 7 billion connections, exceeding the global population
- 1 billion smartphone sales annually
- Handset prices (before subsidies) declining:
 - Less than \$30 for ultra-low-cost mobile phones since around 2005
 - Less than \$100 for low-end smartphones since 2014
 - a few hundred dollars for a high-end 4G smartphone today
- 4G operator deployments and user uptake faster than with 3G
- 1,000 times faster data speeds than with 2G less than 15 years ago
- Capabilities include high-level operating systems, multi-touch screens and multimedia
- Handset market supply has been severely disrupted. Supply has become much less concentrated horizontally and less vertically integrated:
 - Alcatel, Ericsson, Motorola, Nokia, Nortel, Qualcomm and Siemens exited the handset business (some of these as phone brands only continue under entirely different ownership following parent company divestitures)
 - Market entry includes all current leaders Apple (2007), Samsung (2009/10) for smartphones, and Xiaomi (2011)
 - Other rising stars include Huawei, Lenovo, Coolpad, ZTE
- Handset manufacturer operating profits since 2007 have tripled to \$51 billion on \$326 billion revenues in 2013.⁵
- \$1.1 trillion in operator services annually, starting from nothing 30 years ago

⁵ Credit Suisse: https://doc.research-and-analytics.csfb.com/docView?language=ENG&source=emfromsendlink&format=PDF&document_id=805847640&extdocid=805847640_1_eng_pdf&serialid=VKIqPfyGKvPXILC6%2bF%2bpFCXU1PjBAqhenh6L1IN6AVE%3d



Much of the above was illustrated in greater detail in my May 2013 posting to *IP Finance* entitled "*Theories of Harm with SEP licensing do Not Stack up*."⁶ By way of update, smartphone product specification and price comparisons in Appendix B show how smartphone product performance has continued to improve significantly (e.g. with faster application processing) while smartphone prices have fallen dramatically and manufacturer market concentration has continued to decline following the 2011 market entry of Chinese Smartphone manufacturer Xiaomi, for example. In addition to relatively new entrants Apple and various Chinese companies, the Financial Times recently reported that local brands are commanding substantial smartphone market shares, for example almost 60 percent in the Philippines and almost one third of sales in Vietnam.⁷

The health and vibrancy of the market, including the fact that royalty costs are not a barrier to market entry, is graphically illustrated in Figure 1 by the severe market share declines and market exits by previous handset market leaders and with the rapid rise of many new smartphone manufacturers.⁸ These changes account for the substantial reductions in handset supplier market concentration referred to above. Significantly, however, it is the parent companies of the former who continue to be the major developers of standard-essential technologies, contributors to the interoperability standards, owners and licensors of mobile SEPs. This is despite them no longer having direct participation in the handset product and operator services markets where the vast majority of economic value is generated.

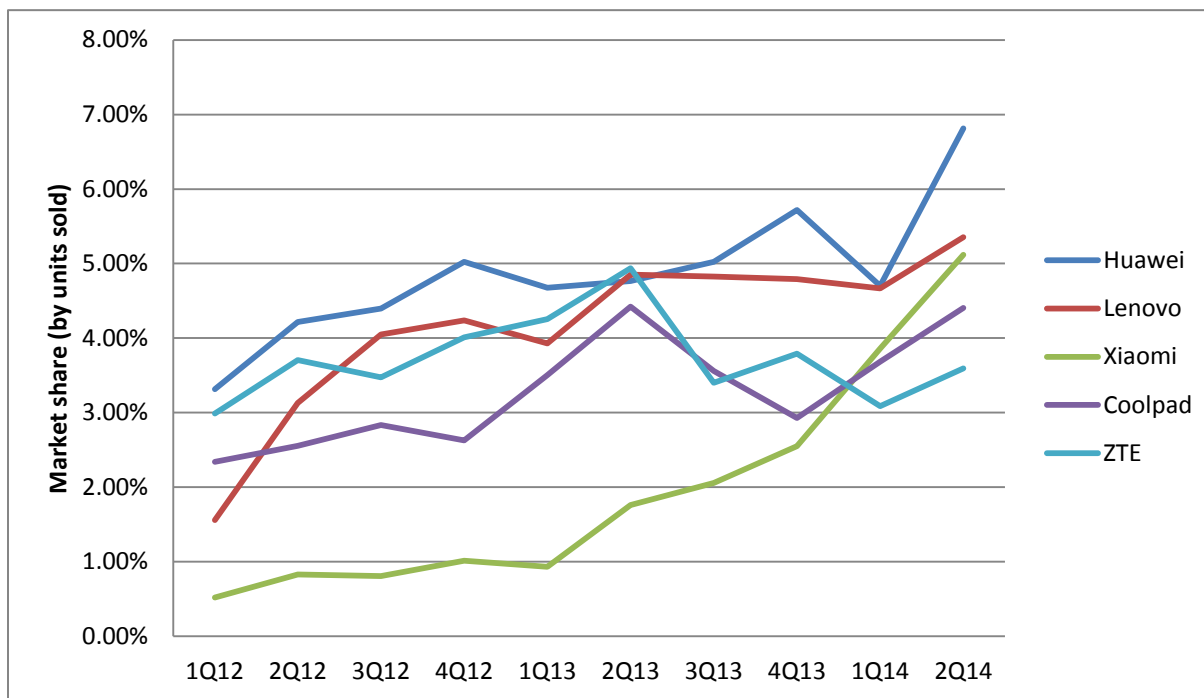
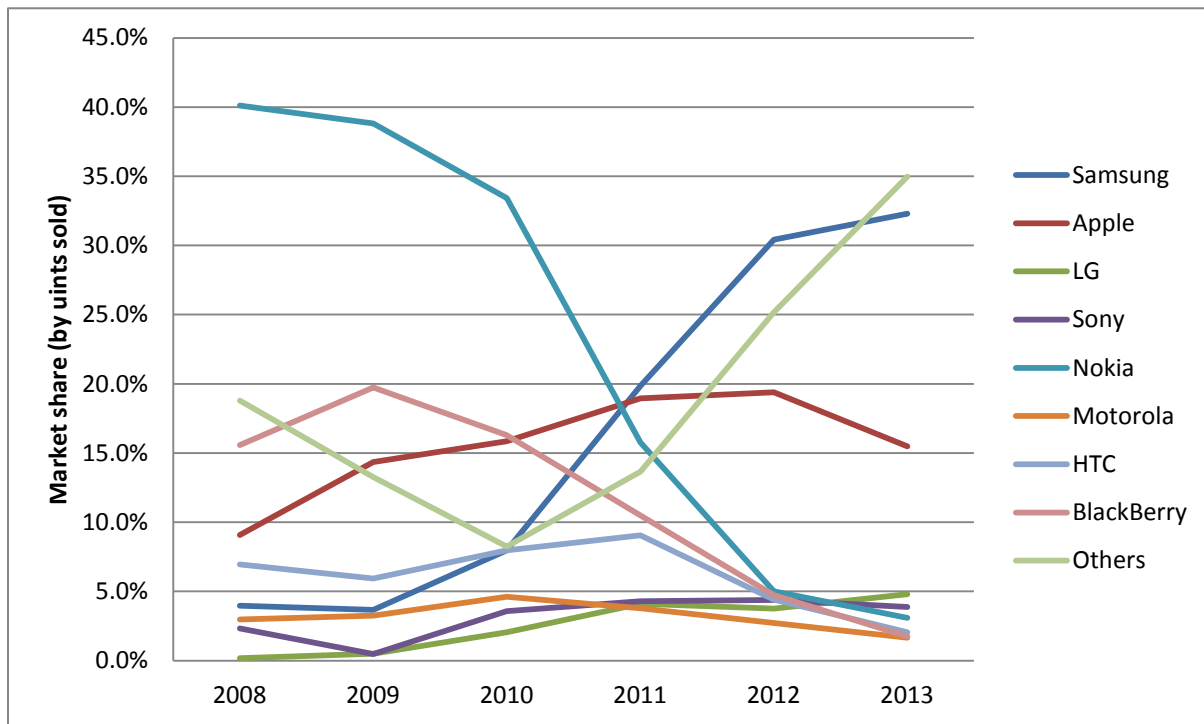
⁶ As published by Keith Mallinson, see <http://ipfinance.blogspot.com/2013/05/theories-of-harm-with-sep-licensing-do.html>.

⁷ <http://www.ft.com/intl/cms/s/0/fee4503e-85d1-11e4-b11b-00144feabdc0.html>

⁸ As published by Keith Mallinson, see <http://ipfinance.blogspot.co.uk/2014/09/nokia-blackberry-left-behind-amid.html> and <http://www.fiercewireless.com/europe/story/mallinson-nokia-blackberry-left-behind-amid-untold-disruption-smartphone-re/2014-09-24>



Figure 1: Market shares of former leaders in decline, and rising stars in mobile phones



Source: Industry Market Tracking Figures



With reference what the Report regards as “information problems” concerning disclosures of SEPs including updates, transfers and with blanket disclosures it states (page 122) “[i]f an industry fails to properly deal with the information problems, these problems will eventually translate into a slower take-up of the standard (lower volumes) and higher end-user prices. A second order effect is that the rate of innovation (notably based on these standards) is hampered as well.” These alleged problems are not having any of the adverse effects predicted; on the contrary, evidence actually points to improvements on the basis of these criteria.

3.4 Manufacturers are not being harmed, they are benefitting

As correctly stated in the Report (Page 62) with respect to mobile technologies, “the high degree of open standardization of the industry has allowed Chinese manufacturers, such as Huawei and ZTE to gain access to IP, to enter the market, and to assume an increasing share of infrastructure supplies.” This principle also applies to the market entry of these and other companies in the handset market, as indicated above.

To the extent to which the Report (Page 69) is correct by stating that “[t]he traditional leadership of mobile network equipment cum device vendors is being replaced by a leadership of mobile device operating systems providers and their network of device manufacturers, which implies a shift from European-based leadership to USA-based leadership,” that also means that the supplier power of the SEP holders is diminishing versus those who instead own significant other IP in smartphones (e.g. non-SEPs and other IP in defacto-standard operating systems) and smartphone manufacturers, such as market entrants, including local companies in developing nations, who in many cases own little or no IP.

At the Patents in Telecoms conference in Washington, DC, in November 2014, while questioning from the floor I asked speaker Eliana Garces-Tolon, Deputy Head of Unit, DG GROWTH to name who is actually being harmed with the status quo in telecoms standards and licensing. She did not answer my question directly on the basis that she could not recall details. Instead, she made a general reference to existence of a study on the matter. If such evidence does exist it should be presented for public review in this Consultation. However, from what I describe above it seems that in the downstream market for design and manufacture smartphones, many Asian new-entrants are benefitting greatly from accessing and implementing mobile and non-mobile standards based on SEP technologies, and are doing rather well for themselves in the market.



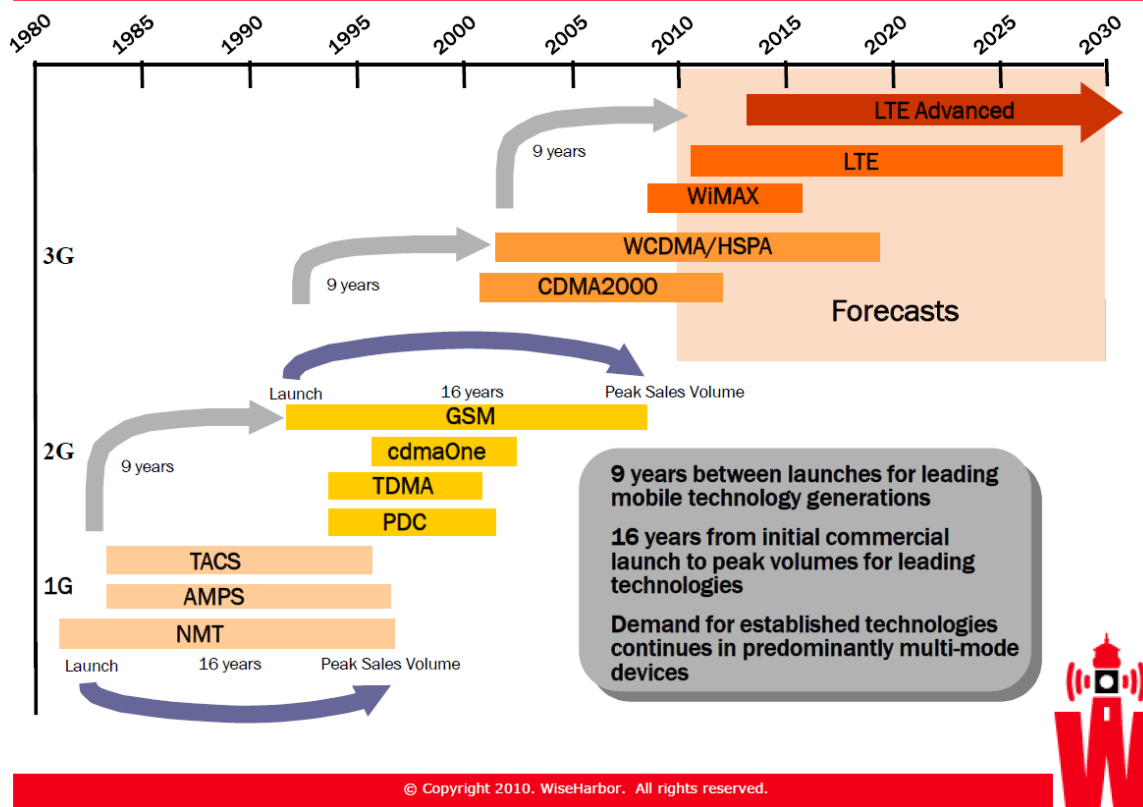
3.5 Scope and pace of standardization increasing

According to the Report (page 15) “[w]here barriers to IPR licensing exist, they typically they typically slow down both the process of developing standards as well as the adoption of standards and, consequently, slow down the innovative process in an industry as well as the innovative process of the economy at large.” Nothing could be further from the truth in mobile communications including smartphones.

No evidence was presented to confirm the alleged “slow down.” On the contrary, there is abundant evidence that development and adoption of standards has expanded and accelerated in recently years. For example, among 3GPP standards:

- The rate at which new technologies are offered to or added to 3GPP standards and other standards is increasing. The growing number of SEPs, as indicated in the Report (Section 4.1.1 from page 110) and other evidence confirms this.
- The time between the commercial introductions of significantly new mobile standards has not increased while new standards releases have been issued as frequently as ever. Analogue cellular services were first introduced in the early 1980s. GSM was launched 9 years later, in 1992. UMTS was launched 9 years after that in 2001. LTE was launched 9 years later in 2010. LTE Advanced first appeared 4 years thereafter in 2013.



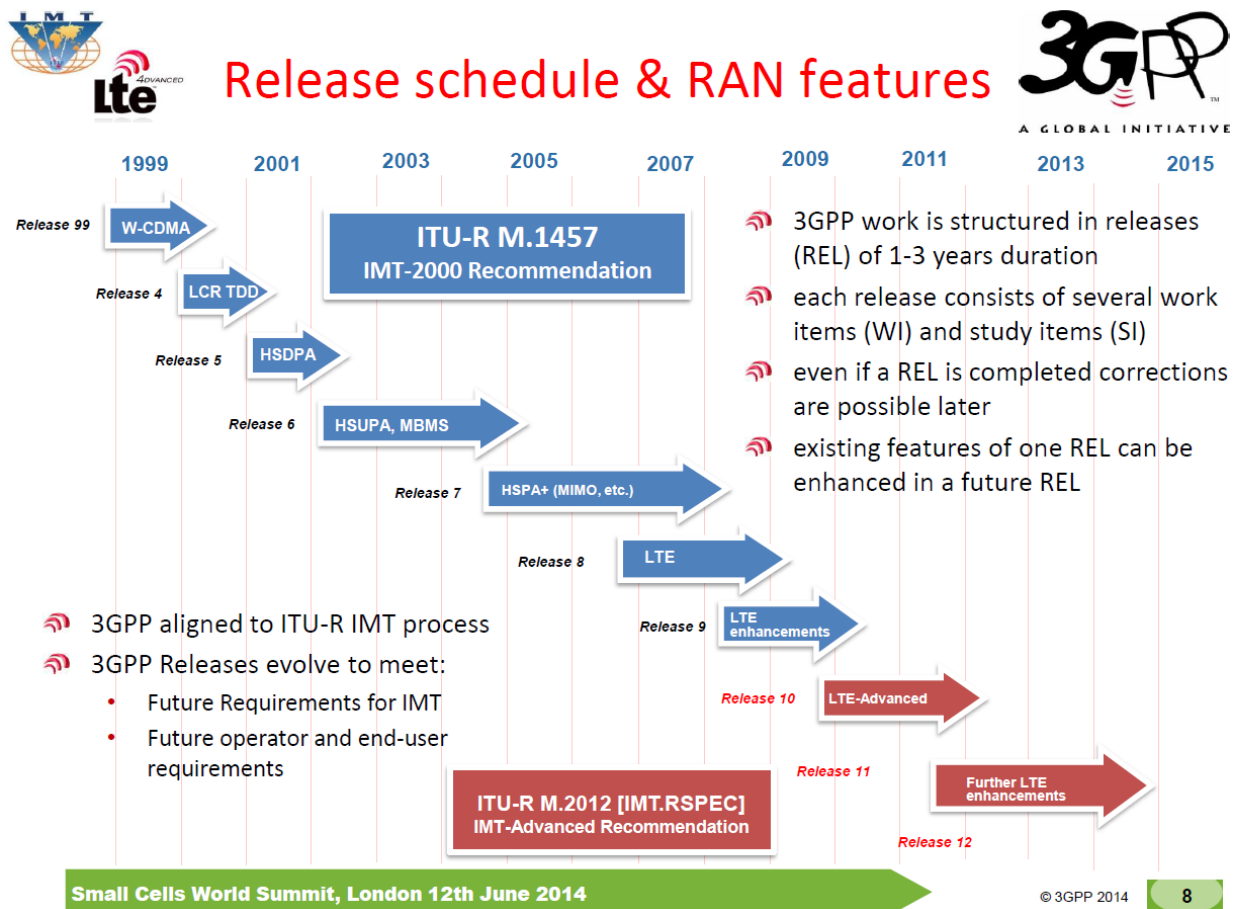
Figure 2: 3GPP Standardization Roadmap**Mobile Technology Adoption Lifecycles – From Launch to Peak Demand**

Source: Presentation by Keith Mallinson at LTE North America conference in November 2010, and as republished in my IP Finance Posting entitled "Are there too Many Patents?", 3rd September 2012⁹

- Each successive standard has included more and more new features, including GPRS and EDGE for packetized data communication in 2G GSM; HSDPA and HSPA+ for fast data communication and MIMO to improve radio performance in UMTS; carrier aggregation, HetNets, eICIC, CoMP, MTC in LTE and LTE Advanced. Figure 3 is a simplified standardization roadmap from 3GPP.

⁹ <http://ipfinance.blogspot.co.uk/2012/09/are-there-too-many-patents.html>



Figure 3: 3GPP Standardization Roadmap

Source: Presentation by Adrian Scrace, Head of Mobile Competence Centre, ETSI CTO as speaker at the above-referenced conference

- The pace of adoption is accelerating. Figures 4 and 5 show that subscriber growth rates, from date of launch, in absolute terms and as a percentage of total subscribers, have increased with successive new standards.



Figure 4: Handsets shipped including analogue, ETSI and 3GPP standards

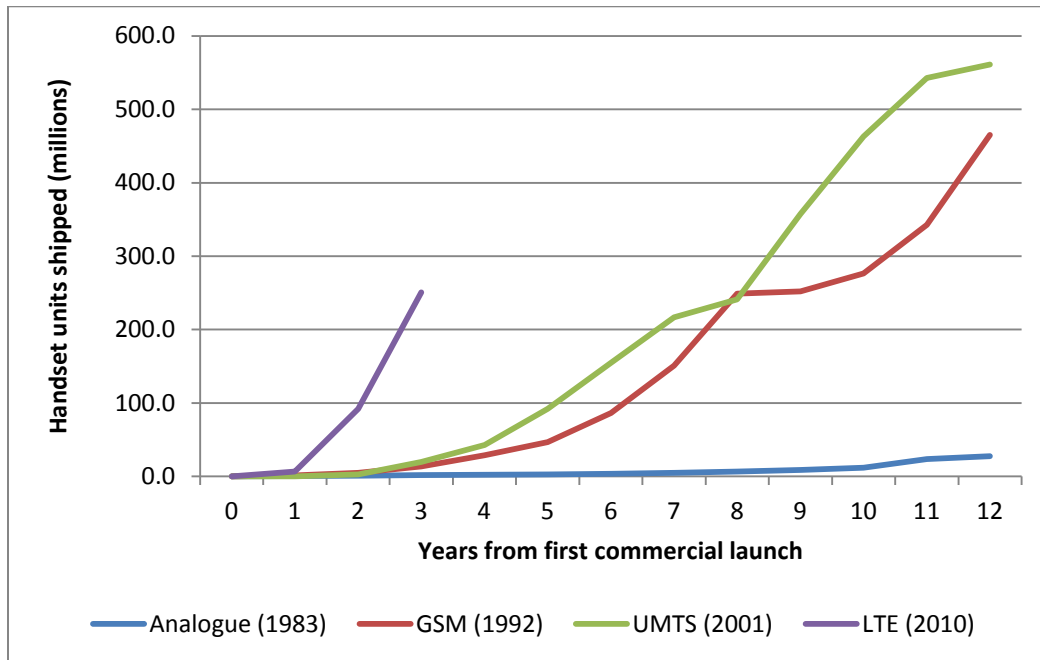
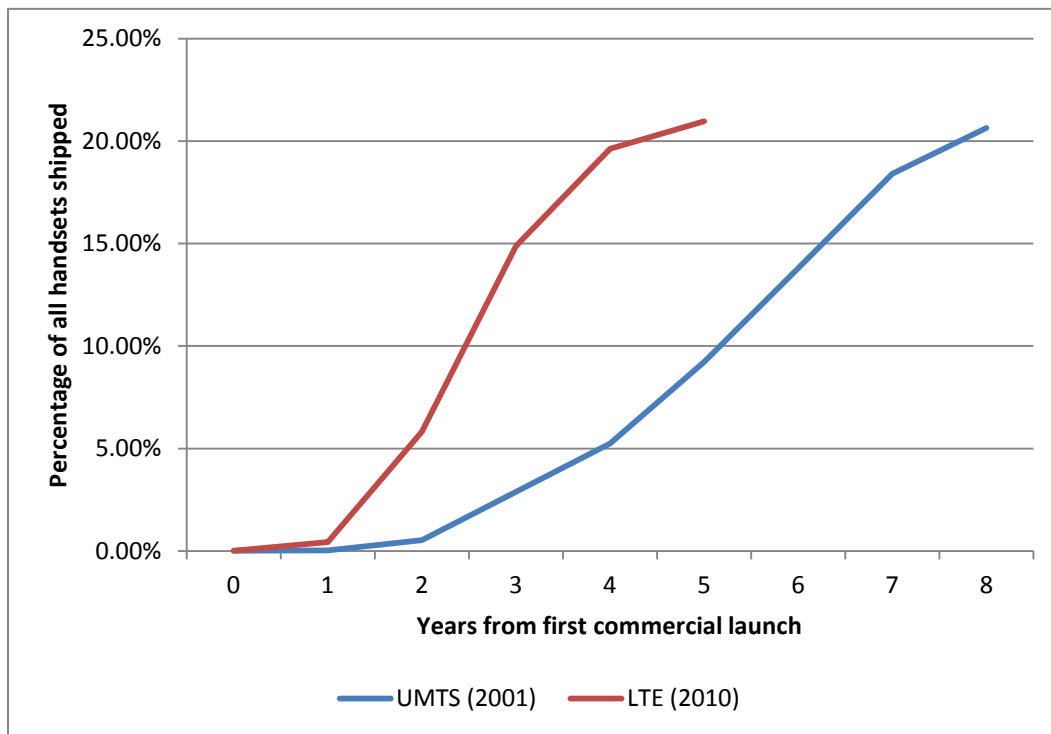


Figure 5: Proportion of handsets shipped including 3GPP standards



The Report indicates that notwithstanding concerns about time-to-market prior to introduction of GSM, this did not turn out to be a problem. As stated in the Report (page 113), “[s]ome SEP owners of the GSM standard were concerned that the take-up of the standard (and thus the time-to-market) could be hampered by transaction costs for implementers, the failure to form a pool as to deal with these risks did not eventually obstruct a quick mass market take-up of the technology, notably because there were no competing standards in Europe (see section 3.1.2)” (Footnote omitted). The Report does not explain why standards competition might cause delays. There is plenty of evidence to the contrary that competition among standards actually speeds-up time-to-market and subscriber adoption. For example, LTE was introduced most rapidly in the US, in competition to WiMAX.

Subsequent standards came to market rapidly, including 4G LTE in particular. LTE was first standardised by 3GPP in December 2008 with Release 8.¹⁰ The first commercial launches of LTE were in Scandinavia at the end of 2009 with large-scale deployments starting in the US by Verizon Wireless one year later.¹¹ This very short time-to-market was unprecedented.

There are patent pools for WCDMA and LTE, but these are totally irrelevant to time-to-market for commercial deployments and to subscriber adoption rates. These pools have attracted few licensors and account for only a very small proportion of SEPs. Bilateral rather than patent pool SEP licensing is overwhelming in all mobile standards.

The Report’s time-to-market analysis for different standards in different geographic markets is flawed. It reveals the authors’ lack of understanding or disregard for what is actually occurring versus their unsubstantiated assertions of problems and harm. For example, the Report states (Page 20) that the “US has been lagging behind the EU since 1995” and that “the EU has gained over the US due to having a single standard instead of multiple standards.” This is a very narrow and simplistic diagnosis which draws a false conclusion.

¹⁰ <http://www.3gpp.org/technologies/keywords-acronyms/98-lte>

¹¹ <http://www.fiercewireless.com/story/teliasonera-launches-first-commercial-lte-network/2009-12-14>
and <http://www.verizonwireless.com/news/article/2010/12/pr2010-11-30a.html>



By other measures Europe was behind. For example, monthly minutes of use per subscriber were four times greater in the US than in Europe since around the turn of the millennium and for more than a decade. Subscriber adoption for 3G with CDMA2000 (i.e. 1X and then EV-DO) by mobile operators in the US, Korea and Japan was generally 18-24 months ahead of subscriber adoption at operators offering UMTS (i.e. WCDMA and then HSDPA/HSPA/HSPA+) in those nations, and ahead of all operators in Europe who only use UMTS.

Europe is also behind the US, Japan and Korea in 4G. Notwithstanding the outstanding success of GSM with its monopolistic 2G deployment in Europe and in many other nations, competition against this standard has been highly efficient and effective. It was the competition among rival technologies for inclusion in standards that came from CDMA-based 2G (i.e. cdmaOne) that prompted GSM's evolution to the WCDMA standard which was also based on CDMA radio modulation. WCDMA incorporated much of the standard-essential technology that was developed for cdmaOne and CDMA2000. The widespread uptake of WiMAX (touted as 4G) by Sprint and Clearwire in the US is one of the reasons why LTE standardization was accelerated by 3GPP and why operator deployment and user uptake in the US is several years ahead of Europe. Japan and Korea have also been very quick to deploy LTE and subscriber adoption has also been rapid.

The Report provides no explanation of why competition among standards should contribute to the alleged problems and harms it describes. I wonder whether the Report authors are trying to resurrect an old and tired ideological debate about whether or not it is better to have a free market with competition among standards or dirigisme with one standard? Either way, this issue probably has little or no bearing on the alleged problems and harms under consideration in this Consultation.

3.6 No evidence of increased or harmful licensing costs

While expressing a desire for efficient licensing, the Report and Consultation reveal clear preference for low or lower licensing costs. Patent pools are regarded as desirable means of reducing licensing costs to implementers. Lower costs are only partially due to the transaction cost efficiency savings patent pools promise. The Report does not attempt to determine what licensing costs are, and whether these are sufficient or excessive with the need both to incentivize technology developers and deal fairly with downstream product implementers.



The Report (page 110) relies on quantitative data on increasing patent disclosure rates to infer increasing transaction costs in SEP licensing. However, it presents no evidence to show that that licensing costs have actually increased or are burdensome, even though thousands of patents have been disclosed as being potentially essential to numerous standards. The Report acknowledges that “*for a number of very successful standards (and standards play a great role in society), we are flooded with essential patents.*”¹² However, with no supporting evidence or analysis, they disparage developments by stating it is “*hard to believe*” so many patents are necessary, and that SSOs should promote a “*new culture*” for including patented technologies in standards.¹³

One of my most recent publications in IP Finance and in the mobile communications trade press with *FierceWireless Europe* reveals that aggregate SEP licensing costs for mobile phones appear to be a small fraction of those claimed by those who propagate royalty stacking theories.¹⁴ By my latest reckoning on the basis of licensing fees generated, the market size for mobile standard-essential patent (SEP) royalties paid remains below 5 per cent (\$19 billion) of Morgan Stanley’s estimated \$377 billion in 2013 handset sales.

Ericsson, Nokia and Qualcomm are widely regarded as holding, in total, a substantial proportion, and quite likely the majority, of SEPs reading on 3GPP standards. The basis for this includes company disclosures of patents which are considered possibly essential to 3GPP standards,¹⁵ third-party assessments of SEPs in 3GPP standards,¹⁶ and other assessments of patent strength.¹⁷ Qualcomm's licensing revenues of \$7.9 billion in 2013 are equivalent to a royalty rate yield of 1.77 per cent of total global handset revenues, as indicated above. Ericsson's 2013 licensing income was around \$1.6 billion, which corresponds to a royalty rate of 0.42 per cent on the

¹² *Id.* at page 195.

¹³ *Id.* at pages 195, 199.

¹⁴ As published by Keith Mallinson, see <http://ipfinance.blogspot.co.uk/2014/11/licensing-mobile-technologies-becomes.html> and <http://www.fiercewireless.com/europe/story/mallinson-licensing-mobile-technology-will-become-even-more-essential/2014-11-26>

¹⁵ <http://www.etsi.org/services/ipr-database>

¹⁶ <http://www.frlicense.com/LTE%20Final%20Report.pdf> and <http://eeweb.poly.edu/dgoodman/wirelesscom2005.pdf>

¹⁷ http://www.ericsson.com/res/docs/2010/101220_lte_contribution_whitepaper.pdf



same basis as for Qualcomm. Corresponding figures for Nokia were \$650 million and 0.17 per cent, respectively.

On this basis, and the fact that Qualcomm has a far more well-developed patent licensing programme than any other company, a total aggregate SEP royalty across all handsets worldwide is most likely to be no more than a mid-single-digit percentage. Five per cent is conservatively more than double the total of 2.36 per cent in royalty rates I have calculated for Ericsson, Nokia and Qualcomm. Other significant SEP holders account for only relatively small licensing revenues. For example, InterDigital Communications, with a business model entirely focused on patent licensing, reported \$264 million in patent licensing revenues in 2013. That corresponds to a comparable royalty rate of only 0.07 per cent.

Smartphones designers also seek to include features which are subject to non-mobile SEPs and which might be subject to non-SEPs. But the latter are more easily ignored or worked around with alternative technologies, and some features might be omitted if this is not possible. In the case of SEPs, it is at least in theory not possible to implement the standard or part thereof without infringing.

On the basis of financially audited royalty incomes from leading licensors, my estimate that total mobile SEP royalties amount to less than a mid-single-digit percentage of handset revenues is in marked contrast to the erroneous aggregate royalty rate estimates of Intel and others of \$120 on an average \$400 smartphone, including SEPs and non-SEPs.¹⁸ That would correspond to a 30 per cent royalty rate, or around \$100 billion per year in total royalties. This is more than five times my estimate of less than \$19 billion, which includes all mobile SEPs, many non-cellular SEPs and many non-SEPs also thrown in to the licensing bundles.

Royalties paid on non-cellular SEPs (e.g. H.264 video and 802.11 Wi-Fi) and non-SEPs amount to no more than additional single-digit billions of dollars. It has been disclosed that Samsung, with 2013 smartphone revenue share of 34 per cent, paid Microsoft an annual \$1 billion in licensing fees to

¹⁸ <https://www.wilmerhale.com/pages/publicationsandnewsdetail.aspx?NewsPubId=17179872441>



implement Android.¹⁹ This is exceptional and accounts for a significant proportion of all non-SEP royalties paid.

My full rebuttal of the above "Smartphone Royalty Stack" allegations by Intel and others was also published in IP Finance.²⁰

As correctly stated in the Report (Page 25) "[s]tandardization has evolved from the definition of interface specifications enabling interoperability to the joint development of large technological platforms including critical technologies" and also noting that a "typical example is the mobile cellular industry with the GSM and LTE standards." That means that the R&D costs and risks have also expanded enormously. Royalty fees are needed accordingly, particularly by those who no longer generate revenues in the major market for handset products but who seek to continue developing standard-essential technologies.

The \$19 billion total in royalties is less than half the mobile industry's R&D spending, and yet the top few and several other major investors in standard-essential technologies for mobile are no longer direct participants in the \$377 billion handset market. Despite this, mobile R&D spending, of approximately \$42 billion in 2013, has grown 50 percent since 2008, as indicated in Figure 6. Figures include twelve large technology companies with a predominant or exclusive focus on mobile communications, including several named above. Some of these are quite diversified and do not break-out wireless R&D expenditures in public disclosures; so these figures include some R&D related to other technologies and product markets. However, my total excludes many companies who also invest significantly in cellular R&D; so I believe the table provides a fair, yet approximate, and consistent representation of total R&D investments and their growth by the mobile technology industry as a whole.

19 <http://www.fiercewireless.com/story/samsung-paid-microsoft-1b-last-year-patent-royalties-related-android/2014-10-06>

20 As published by Keith Mallinson, see <http://ipfinance.blogspot.co.uk/2014/09/stacking-deck-in-analysis-of-smartphone.html>



Figure 6: Total Sales and R&D for Leading Cellular Technology Companies

	2008	2009	2010	2011	2012	2013
Total Sales (millions)	\$399,917	\$353,836	\$401,722	\$510,840	\$559,173	\$582,011
Total R&D (millions)	\$27,990	\$27,854	\$30,829	\$37,922	\$39,970	\$41,927
R&D/Sales	7.0%	7.9%	7.7%	7.4%	7.1%	7.2%

Sources: Includes public disclosures for Alcatel-Lucent, Apple, BlackBerry, Ericsson, Huawei, LG Electronics, MediaTek, Nokia, Qualcomm, Samsung, Electronics and ZTE.

With respect to alleged harm with costs resulting from SEPs being bought up, the Report (Page 123) refers to “[t]he example of Google buying SEPs inter alia to support its vendors during the bargaining games, even in court. Eventually, these risks and costs translate (one way or another) into higher end-user prices and/or into a higher time-to-market. Again, a second order effect is that the rate of innovation of (notably on top of these standards) is hampered as well,” it alleges. However, as already shown, evidence indicates lowering prices and reducing time-to-market. The pace of innovation is increasing with ongoing standardization with many new features and growing R&D as also indicated above. Instead of erroneous speculation that innovation is being hampered, the secondary market in SEPs which publicly reveals clear and substantial value, for example, Google paid \$4.5 billion (Report footnote 253) for patents in the Motorola acquisition, is more likely to have the opposite effect of encouraging development of new standard-essential technologies in competition.

The Report (page 124) states, without foundation, that the “[reverse hold-up] situation seems counter-intuitive, since SEP owners enjoy undisputed market power over implementers, provided that their (patented) innovations have been included in the standard.” To the contrary, there is considerable dispute over whether or not the SEP owners have market power. Instead, the size and success of the \$326 billion handset market with \$51 billion profits, according to Credit Suisse, in contrast to less than \$19 billion in mobile SEP licensing revenues undermines that notion.

3.7 But what might go wrong in future?

In this subsection I anticipate which new “concerns” might be voiced in this debate as the mobile ecosystem develops and expands in the coming years. I can see no reason why market failure should occur in the foreseeable future of the next five years or so than in the past 15 years. Competition can be brutal – look what happened with Nokia plunging from handset market



leadership to market exit within six years, despite being a leader in mobile SEP ownership. But competition is working well in mobile communications with consolidation towards 3GPP standards, FRAND-based SEP licensing and a thriving ecosystem overall.

What is conceived or might be contrived to be the next new threat or concern following such exemplary smartphone market development so far? While not mentioned explicitly in the Consultation or Report, I expect certain new areas for innovation and growth might be singled out for particular scrutiny when it is finally recognized that the historical record in mobile communications disproves allegations in the Consultation and Report.

Notwithstanding the enormous success of 3G with WCDMA and 4G with LTE, the same scaremongering is likely to continue despite accelerating and expanding developments in smartphones, due to market expansion into new areas including:

1. Internet of Things (IoT)- consumer electronics in the connected home, automotive including drive-assisted and eventually driverless cars, industrial and medical applications
2. Wearables such as smart watches and health monitoring
3. 5G next generation networks: with faster speeds, lower latencies (less packet delay) and longer battery life to better support the above, for example

The above developments will increase the number of manufacturers incorporating mobile technologies, and many of these will also need to be licensed for use of standard-essential and other technologies. However, the enormous success of standards such as H.264/AVC for video streaming, with more than 1,000 companies licensed²¹ to use most of that standard's SEPs, illustrates that FRAND licensing can work extremely well when left to the free market without regulatory intervention, even when manufacturers implementing the technologies are so numerous. The standard's SEPs are largely licensed through a patent pool; but that is entirely voluntary and bilateral licensing outside the pool also remains possible, as a requirement under competition law.

My Response, including my cited publications, also shows that industry and markets are likely to continue flourishing as they did with and since the introduction WCDMA and LTE. In fact, there is strong evidence to indicate

²¹ From MPEG LA web site <http://www.mpegla.com/main/programs/AVC/Pages/Licensees.aspx>



that the pace of innovation is accelerating, competition is intensifying, consumer-adoption and usage is accelerating, while costs and prices are plummeting.

3.8 Difficult licensing and likely litigation

The Report states (page 11) that "Difficult SEP-licensing negotiations and resulting litigation seem widespread."

There is no reason why bilateral negotiations should need to be easy. It is not the ease of negotiations, but the fairness, reasonableness and non-discriminatory terms resulting that matter.

No evidence is presented about litigation, let alone a representative analysis of its harm. Evidence actually shows that litigation is relatively rare, with only around 1.5% of patents ever litigated.²² Although the fabled "smartphone patent wars" have drawn a lot of press attention, cases have dragged on for many years with very little money actually changing hands in damages awards.

According to Florian Mueller's analysis of 222 smartphone patent assertions, as published in the FOSS patents blog in October 2014, 90% have gone nowhere, the rest lack impact:²³

- 109 assertions (49%) failed (so far), 93 assertions (42%) dropped without comprehensive settlement or suffered other negative fate
- Motorola still has not taken an Android patent license from Microsoft after 48 months
- Samsung has not yet paid Apple after 40 months of litigation
- Ceasefire in Motorola litigation with Apple, but no licensing deal

The Report states (page 12) "[t]he study analyses notably patent ambushes and submarining, hold-up and reverse hold-up, categorical discrimination against new entrants and unsolicited bundling of SEPs with other patents." However, evidence is that the former major incumbent mobile phone manufacturers who own most of the mobile SEPs have fared poorly against many new and successful market entrants.

²² Lemley, Mark A., and Carl Shapiro. "Probabilistic Patents." *Journal of Economic Perspectives* (2005): 75-98.

²³ As reported by Florian Mueller in FOSS Patents blog
<http://www.fosspatents.com/2014/10/analysis-of-222-smartphone-patent.html>



3.9 Unintended consequences

'Trivial' patents

The Report (page 197) expresses concern about over-inclusion of 'trivial' SEPs. "If (numerous) patented technologies are included without contributing substantially to the standards' value, it could be considered suboptimal from the public perspective (yet perhaps optimal from the individual patent owner's perspective). Such patents, which we will coin as 'trivial' patents in this report, can unnecessarily raise the cost of implementing the standard (costs that may or may not be passed on to the consumer) and have consequences for competition, market entry and more. It may reduce the incentive for 'real' innovators, as it is easier and cheaper to benefit from opportunistic strategies to get trivial patents included in the standards, than to invest in R&D and aim to make significant contributions to the technical state of the art. There are strong incentives for firms to engage in opportunistic strategies in order to get the technology covered by trivial patents into a standard, since it is most beneficial to obtain ownership of essential patents" (citations omitted).

The Report also suggests there is tacit or overt collusion to include trivial patents. "In such a setting, firms may bargain for the inclusion of their own trivial patents and may offer favours to others that support this inclusion, such as support to include patents of those other companies as well. As such, a relatively small group of participants facilitates each in generating large SEP portfolios, while patented technologies of 'outsiders' might be avoided as much as possible."

This is speculative scaremongering. No evidence for these practices is presented and the alleged harms are not apparent – quite the reverse is occurring with plentiful market entry and increasing R&D. With total mobile SEP royalty costs at less than 5% of handset prices, royalty charges for trivial patents among non-trivial patents are inevitably very small. It is vital to ensure that attempts to exclude trivial patents do not undermine R&D incentives for the non-trivial technologies.

Injunctions

The possibility of seeking injunctions is indispensable. Patent owners need some leverage over prospective licensees where, for example, the prospective licensees steadfastly refuse to negotiate. If a prospective licensee's worst outcome is payment of FRAND royalties it will have no incentive to agree to these terms straight away and it will have every



incentive to drag out negotiations, including through litigation with challenges to patents and licensing terms.

Prohibiting injunctions for SEP infringements will cause rent shifting from patent holders to manufacturers. This will stifle investment because the inevitable effect of prohibiting injunctions will be to reduce or delay royalty payments to licensor patent owners.

The effects might have been less damaging a decade or more ago when most SEP owners were vertically integrated including product businesses. In those days, major SEP owners were more interested in protecting their product businesses than generating cash royalties. SEP owners are increasingly dependent upon cash royalties to fund ongoing R&D and innovation. The possibility of obtaining injunctions is an important means of ensuring that manufacturers agree to be licensed, and do so in a timely manner on a FRAND basis.

As indicated above and in my recent published articles in FierceWireless Europe and IP Finance, the aggregate royalty burden on smartphone manufacturers for all mobile-SEPs, and including non-mobile SEPs and some non-SEPS is probably less than \$19 billion last year, representing only 5% of \$377 billion in 2013 handset sales revenues.²⁴

²⁴ As published by Keith Mallinson, see <http://ipfinance.blogspot.co.uk/2014/11/licensing-mobile-technologies-becomes.html> and <http://www.fiercewireless.com/europe/story/mallinson-licensing-mobile-technology-will-become-even-more-essential/2014-11-26>



4 Selected responses to the Questionnaire

Questions 1-6 in the Consultation questionnaire are reproduced below. My Response answers these where I have significant knowledge and experience. I “pass” on and leave unanswered other questions where I have less knowledge and familiarity.

4.1 Scope of standardisation involving patents

Q 1.1.1 Fields of standardisation involving patents: *To your knowledge, in which technological areas and/or fields of on-going standardisation work are patents likely to play an increasingly important role in the near future? What are the drivers behind this increase in importance?*

Patents in standards will become increasingly prevalent and important broadly across the ICT industry and into other industry verticals as ICT extends into almost everything electrical or including electronics that we touch and use. Interoperability standards will, for example, be employed in domestic and industrial appliances, connected cars and eHealth. For example, washing machines used to be electro-mechanical, have become electronic with incorporation of microprocessors and will soon commonly become connected devices which can be controlled remotely using interoperability standards and in accordance with varying “smart-grid” electricity pricing, for example.

Some standards and associated software will be opensourced, but in many cases technologies used, including opensource software solutions, will be based on SEPs. By way of example, there are numerous collaborating and competing initiatives underway in development of Internet of Things (IoT) technologies, standards and products. Participants include hundreds of companies in ICT and from various industry verticals. For example: the AllSeen Alliance²⁵ and the Open Interconnect Consortium (OIC)²⁶ are working to standardize IoT and make devices interoperable. Google is promoting its notion of the physical web,²⁷ and the Thread Group²⁸ for home

25 <https://allseenalliance.org/news/blogs/2014/12/just-one-year-we-ve-come-long-way>

26 <http://www.fiercewireless.com/tech/story/open-internet-consortium-adds-new-members/2014-10-05>

27 <http://techcrunch.com/2014/10/02/google-the-physical-web/>

28 <http://www.fiercewireless.com/tech/story/google-backed-thread-group-racks-new-members-work-internet-things/2014-11-17>



automation. Whereas some of these are opensource projects with collaborators contributing royalty free, it is inevitable that standards will infringe some patents.

The world is going virtual (e.g. with network feature virtualization and software-defined networks in communications equipment) and cloud based. Collaborative standards and common software including OpenDaylight²⁹ and OpenStack³⁰ manage and operate disparate computing hardware resources and workflows.

Q 1.1.2 Trends and consequences: *Do you see a general trend towards more/less standards involving patents? Are there any practical consequences of this trend? Are business models changing?*

Overall, more standards including more patents will develop so long as the current well-functioning norms with patents in standards with FRAND licensing are not harmed through intervention. As indicated above, new standards are being created to support relatively new phenomena such as IoT and cloud computing. However, competition has caused some consolidation or attrition among rival standards (e.g. WiMAX gave way to LTE), but what is standardized is expanding and increasing. LTE is generally regarded as a single standard, but there are two modes of operation (FDD and TDD), and it includes subsidiary technologies and functions which are also subject to specific standardization including MIMO, eICIC, CoMP, MTC and others.

Business models are changing as many major ICT companies, as well as smaller ones, become more specialised. This is particularly the case in cellular technologies. The mobile phone industry is only 30 years old and has been subject to massive technological change throughout. The industry developed for the first decade or so with technology suppliers who were vertically and horizontally integrated. They developed analogue and then digital radio technologies, they designed and in some cases (e.g. Motorola) manufactured their own silicon chips, they made handsets and network equipment. The industry has subsequently become vertically disintegrated. Alcatel, Ericsson, Motorola, Nokia, Qualcomm and Siemens have divested their handset businesses. Ericsson, Motorola and Nokia have also sold off their communications chip operations. Whereas Alcatel-Lucent, Ericsson and

29 <http://www.opendaylight.org/project/technical-overview>

30 <http://www.openstack.org/software/>



Nokia retain network equipment businesses, these companies are increasingly dependent on patent licensing to fund technology developments. Qualcomm spends more on R&D than it earns from its product business in chipsets. InterDigital is entirely dependent on its licensing income.

Q 1.1.3 Standardisation prevalence/complexity: *In general, do you observe an increasing role of (any type of) standardisation in your fields of activity/interest? Are standards becoming more, or less, detailed and comprehensive? How does this trend impact on the functioning of the standardization system?*

Standards are usefully becoming more prevalent, more detailed and specific, and more comprehensive. However, if it does not remain worthwhile for patented technology owners to contribute to the standards their contributions will, instead, diminish or cease to occur. As major contributors to standards have gotten out of the business of selling mobile phones and other terminal equipment, their ability to license their SEP technology has become increasingly important and of paramount importance for some companies in order to continue to develop technology that is contributed to standardisation efforts.

Q 1.1.4 Standardisation in support of innovation: *Do you consider that standardisation involving patents contributes to innovation and to the uptake of new technologies? If so, in which areas? Would technologically neutral standardization promote innovation equally well in these areas? Should standardisation be less specific by excluding those elements that are covered by patents?*

Evidence shows that patented technologies are prevalent in the most innovative, rapidly and widely-adopted technologies. Mobile phones including smartphones are the most standard-intensive products ever invented. And yet this is the most successful consumer product ever with 7 billion connections worldwide and more than 1 billion smartphones sold each year. As also indicated in Section 3.3 the market is highly innovative and fiercely competitive with reducing prices and decreasing concentration in supply with major shifts in market share over recent years.

Appropriately, some technologically-neutral standardization is possible and is employed. However, technologically-specific standardization is also essential given the indispensable interdependencies and need for interoperability among devices and, and among many different technology product vendors.



Some technologies and systems methods, which are patented, are irreplaceable.

SSOs have the important objective of including in standards technologies which will continue to improve performance and reduce costs. In many cases patented technologies should be implemented because these provide the best performance or the only means of achieving certain useful and desired functionality.

Q 1.2.1 Issue of over-/under-inclusion: *Are there fields of standardisation in which you consider that standards include too many patented technologies? Are there areas in which standards would benefit from including more patented technologies? Please explain.*

It should not be a question of determining the optimum number of patents; the objective should be and generally is to employ the best and most cost-effective technologies. The number of patented technologies included is simply a consequence of achieving the latter.

Patent protection is an important mechanism. This enables the patentee to keep technologies to itself during the life of the patents, or to reap a return on such investments through licensing fees in exclusive licensing arrangements, or non-exclusive licensing such as required in FRAND commitments with participation in SSOs. In a free market with competition, open standards including patented technology can compete with standards which might include less or possibly even no patented technology, or royalty-free patents, and with proprietary standards.

Q 1.2.2 Criteria for inclusion decision: *What should be the criterion/criteria to use when deciding on whether or not to base a standard on a patented technology and/or to include a further patent-protected technology into a standard? How can a possible cost and benefit analysis be done? What could be used as benchmarks?*

SSO IPR policies rightly require that technologies are selected on the basis of technical merit. Speculation and discussion about prospective licensing charges is not permitted in SSO working groups such as those in 3GPP.

It seems likely SSO participants might also – outside of SSO meetings – consider licensing implications of including patented technologies which might require royalty payments from implementers. They should do this with



care because there is so much misinformation and bias in statements about the net and aggregate costs of licensing SEPs.

Realistic and facts-based royalty-cost estimates should be used, not speculative, unrepresentative, biased and refuted figures such as those presented in the Intel "Royalty Stack" report. The value of most new and patented technologies flow through to manufacturers and consumers. If the overall value of the patented technology is significant in comparison to status quo or alternatives, it will therefore only be a small proportion of this which will need to be paid in royalties. And in many cases, patents are used to cross-license with substantially reduced or even zero net payments.

For example, as already indicated, Intel's Royalty Stack report erroneously estimates \$120 royalty charges on a \$400 smartphone. Its analysis is theoretical flawed and the \$120 figure is around five times higher than what is actually paid. No evidence is presented that fees *actually paid* are anywhere near such a level. On the basis of royalty income earned, as indicated in audited company accounts, I estimate total royalties as follows: Qualcomm, 1.7%; Ericsson 0.42%; Nokia, 0.17%; and interDigital Communications 0.07%. These figures total to 2.43%.

As indicated in Section 3.6, I estimate that aggregate mobile-SEP royalties amount to less than 5% of handset prices. This equates to a licensing fee market of less than \$19 billion in total, in comparison to a total handset market of \$377 billion in 2013. Intel's Royalty Stack percentage, including mobile SEPs, non-mobile SEPs and non-SEPs, equates to an implausible licensing fee market total of \$100 billion. Such a large amount would be evident in the publicly reported accounts of major companies. There is no such evidence.

Q 1.2.3 Process for deciding on inclusion: *Who should take the decision of including (or not) patented technologies into a standard? Should the entity suggesting the patented technology for inclusion be asked to justify the inclusion? If so, what elements should be covered, at minimum, in the justification?*

The SSO workgroup members responsible for the standard or relevant part thereof should decide which technologies to include or exclude.

Decisions should be primarily made for technical performance and cost-savings (i.e. in product production or network service operation)



considerations. Financial benefits from new technologies tend to be shared with the economic surplus largely flowing from upstream technology developers to manufacturers and end users. Licensing costs are important but will, therefore, generally be of secondary significance.

Hold-up theories claim that licensors may take more than the value of their technology contribution in licensing fees; but there is no proof that this is occurring. Total mobile SEP licensing fees at 5% of total handset sales revenues are quite modest, as indicated above and as detailed in Section 3.6.

Q 1.2.4 Disputes over inclusion: *Are you aware of legal disputes over a decision to include (or not) a patented technology into a standard? What were the main facts and what was the outcome of the dispute?*

Pass.

Q 1.3.1 Pertinence of these two situations: *To your knowledge, has any of the two situations occurred? If yes, where and how often? In your answer, please explain in detail why the respective conditions specified above were fulfilled. What were the consequences?*

- 1. a standard does not refer to any particular patented technology (in other words it is technologically neutral) but where the standard can in practice only be implemented by using one or more technologies that are patent-protected.*
- 2. product implements a standard but also includes patent-protected technologies which cumulatively (1) cannot be designed around technically and (2) are so important to the customer that the product cannot be sold without the patent-protected technology.*

An exceptional example of 2., above, was when, in 2006, RIM (BlackBerry) agreed to pay NTP \$612.5 million to settle a four-year patent dispute. The patented technology at issue was not standard essential, but it was incorporated in BlackBerry smartphones, could not easily and rapidly be designed around and was crucial to the BlackBerry's email service capabilities. Though it never admitted wrongdoing, RIM acknowledged that customers had delayed placing new orders due to the threat of a court-ordered shutdown of BlackBerry service in the U.S. RIM passed up the opportunity to end the case for around \$58 million in damages and costs by appealing the award.³¹ However, RIM backed itself into a corner which

³¹ http://en.wikipedia.org/wiki/NTP,_Inc.



resulted in it paying the much higher figure.

Q 1.3.2 Defences by the patent holder: Do you see a risk that a standard setting process could be abused to obtain (preferential) access to patent-protected technologies? Has this happened? Please explain. How can the patent holder defend his/her rights?

Pass.

4.2 Best rules and practices

Q 2.1.1 Best rules and practices: *A variety of rules and practices govern standardisation involving patents. Which elements of these rules and practices are working well and should be kept and/or expanded? Which elements on the other hand can be improved? Would you consider it helpful if standard setting organizations would be more explicit about the objectives of their patent policies?*

Things are generally working very well, as indicated in Section 3 and in my response to Q1.1.4. DG GROWTH should be very wary of unexpected adverse effects in making changes.

The biggest problem is that many implementers are taking a free ride. Many manufacturers pay no licensing fees, and so have an unfair advantage over those who do. Authorities should do what they can to help ensure full compliance instead of widespread infringement which is a major problem in many nations - particularly developing nations.

Q 2.1.2 Trends and initiatives: *The pertinent rules and practices are constantly evolving. Do you see any particular trends? What are recent improvement initiatives that you find promising or worthwhile of attention? Are there initiatives outside the SSO domain that you find helpful (e.g. patent quality initiatives by patent offices)?*

Yes: patent quality is vital. Initiatives to improve this at the patent offices are welcome. In addition, DG GROWTH should be wary of incentivising technology developers to "game the system" by making as many patent applications as possible. If patent value is determined on the basis of the number of SEPs owned, as is typically the case in patent pools, for example, technology developers will tend to maximize the number of applications rather than the quality of these. This will lead to excessive patenting, about which DG GROWTH appears to be concerned.



Q 2.1.3 Differences in SSO rules and practices: Do you see significant differences between SSOs in terms of their patent policies and/or treatment of standard essential patents in practice? If so: What are the practical consequences of these differences? Which of these differences (if any) pose problems? Which of these differences are justified?

Pass.

4.3 Patent transparency

Q 3.1.1 Scope of transparency issue/Priority areas: Is there sufficient patent transparency in the fields of standardisation that are of interest to you? In which of these standardisation field(s) is patent transparency particularly good and in which field(s) is it insufficient? Please explain.

Pass.

Q 3.1.2 Ex-ante transparency: In your experience, is there sufficient knowledge about the relevant patent situation during the discussions leading to the setting of standards? Have you experienced a situation where a standard was decided based on significantly incorrect assumptions about the relevant patent situation? What were the causes of such incorrect assumptions and what were the consequences? Could all relevant stakeholders participate in the discussions?

Pass.

Q 3.1.3 Ex-post transparency: Either as licensor or as licensee, how do you initiate the licensing of the relevant patents? What are the means of identifying the relevant patents, the patent holders, the potential licensees, etc.? What are the respective costs of collecting information on the patent situation?

Pass.

Q 3.1.4 Non-transparent aspects: In those areas where you deem patent transparency insufficient, what aspects of the patent situation are insufficiently transparent: (1) existence of patents, (2) validity of patents, (3) essentiality of the patents for the pertinent standard, (4) ownership of



the patents, (5) enforceability of the patents, (6) coverage of patent by existing licences/pass through and (7) others? Please explain.

There is a need for realistic expectations about how transparent all the above could ever be. It is only the courts who can definitively determine validity, infringement and essentiality. Otherwise, it might be impossible to make determinations with more than a relatively low level of certainty (e.g. less than 50 per cent) that a patent is valid, essential or infringed. Such preliminary views would be costly and open to challenge in any event. It is impractical for more than a very small proportion of patents to be litigated to court judgments or through appeals; rather it is better to ensure rigour in validity *ex ante*, at the patent grant level at the patent offices. SSOs generally do not determine essentiality, and SSO members can only indicate which of their patents and patent applications might be essential. Licensors and licensees need to focus on facts and figures they can verify and manage, not on the fantasy of obtaining perfect information about everything that might seem relevant, desirable or important.

Transparency is worse than useless if the information provided is biased, distorted or otherwise inaccurate. Such information can provide a spurious basis for decision-making and give highly-misleading impressions. One example of this kind of shortcoming was in the totally unrepresentative results obtained when the NGMN organisation used a “trusted third party” to collect LTE SEP licensor royalty rates and then to determine aggregate royalties from these.³² The aggregate figures in tens of percent were far higher than the single digit figures, which would ever actually be paid, because the analysis did not reflect the results of negotiation, for example, with identification of weak portfolios and cross-licensing. In this instance, it was the process that was fundamentally flawed rather than its execution by the TTP. This initiative is now defunct.

Third-party expert judgments can also be subjective, highly-susceptible to bias and unreliable. For example, there are major inconsistencies in findings of studies on essentiality. I published an article in IP Finance which showed that two different assessments of LTE patent essentiality yielded such different results that there was almost zero correlation between the two sets of results, as summarized in Figure 7.³³ That means that at least one of these two assessments was totally inaccurate. I have yet see evidence that

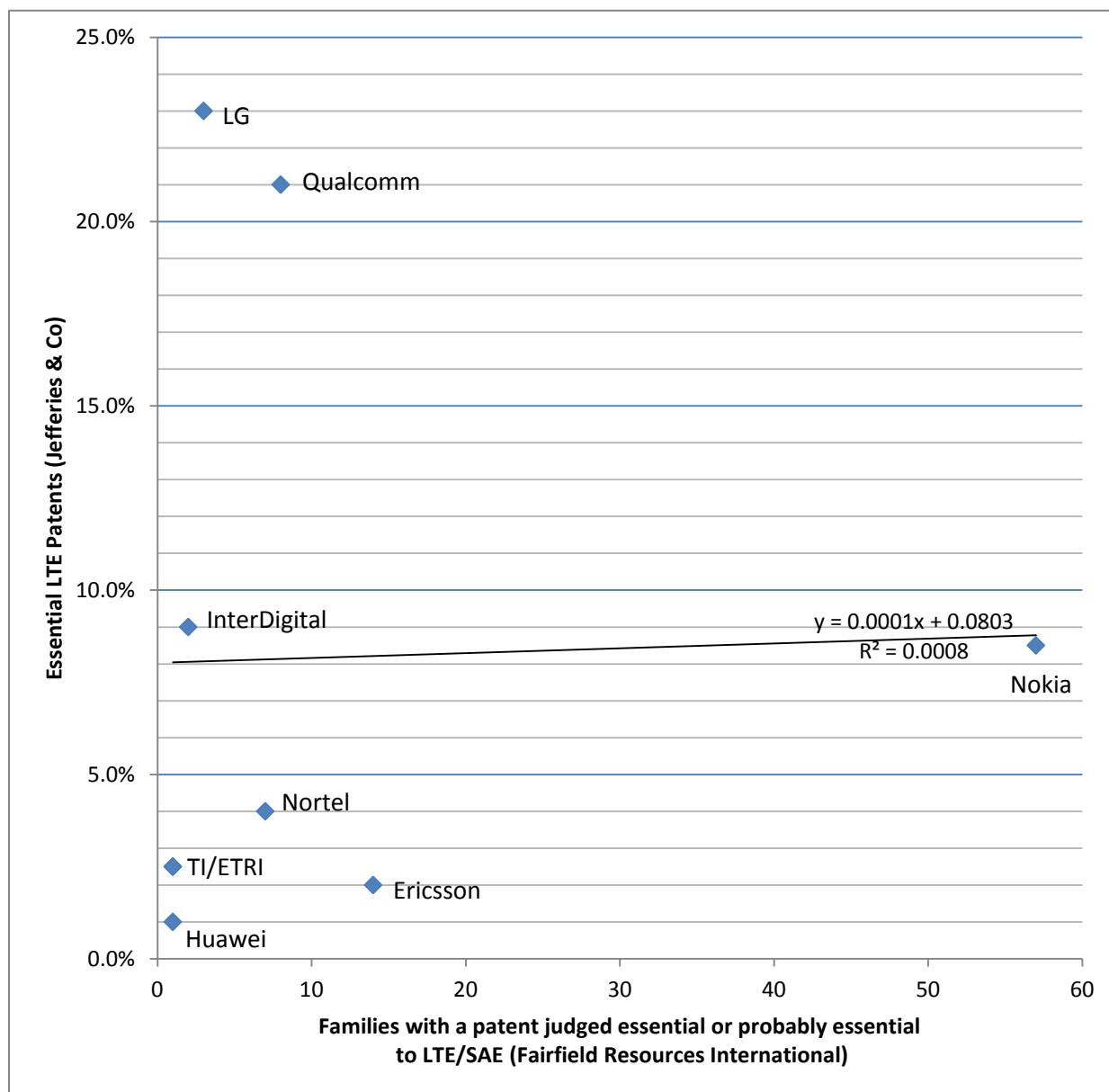
³² <http://www.ngmn.org/workprogramme/closedprojects/ipr.html>

³³ Reported by Keith Mallinson: <http://ipfinance.blogspot.co.uk/2011/11/valuing-ip-in-smartphones-and-lte.html>



essentiality can be assessed with reliable consistency among different assessors, which begs the question of how confident can one ever be to rely on any particular check?

Figure 7:
Extremely Weak Correlation between two Expert Studies' LTE Essentiality Determinations



Source: WiseHarbor using data sets identified. Graph includes 9 plots (ETRI and TI coincide)



The Report (page 148) indicates that the cost of making essentiality determinations can vary by a factor of 20 or more. I am unable to validate or dispute these figures. However, on the basis of these it is unsurprising that the highest costs might be incurred (>€20,000 per patent) in determinations made for litigation determinations are typically for relatively small numbers of patents, the lowest costs (€600- €1,800) when very large numbers of patents might be assessed by SSOs (although they tend not to do that at all), and intermediate costs (€5,000- €15,000) when deciding which among many patents are eligible for patent pools, for example.

The Report (page 148) also states that “[t]he costs of an essentiality check of a given patent for a given standard strongly depends on the desired confidence level and the availability of prior information (for instance from the patent owner). This confidence level relates to the ‘quality’ of the assessment: how likely is the outcome identical to the hypothetical ‘perfect’ assessment? With increasing standards for the confidence levels, the costs grow quickly, as illustrated below. An ‘optimum’ confidence level is not necessarily the perfect one, but one for which the costs are legitimate in terms of the goal that one tries to achieve.” However, the Report presents no analysis of what accuracy is achieved on any essentiality checks, or what confidence levels would be acceptable.

It might be far more important and effective to evaluate a few patents really well than to do a mediocre or poor job on all or most of them. The Report has no sound basis for asserting that the goal is to make mediocre assessments across all patents (which is likely to be acceptable and necessary for reasons of cost with patent pooling), rather than do a good job in making determinations on the rather small number of patents that are typically the focus in bilateral PLA negotiations or in litigation. Bilateral patent-licensing agreements are typically negotiated, not on the basis of exhaustive lists of patents which have been determined to be essential, but on the basis of detailed consideration of patent-owner “proud lists” comprising a small number of patents from among rather larger portfolios including applications and grants of patents which have been declared, by their owners, possibly essential to various specific standards.

Until patent assessors can be shown to make reliable and consistent determinations of essentiality among hundreds or even thousands of patents, DG GROWTH should be wary of fostering false hopes on exhaustive transparency and accuracy with essentiality determinations.



Patent pool administrators need to make essentiality assessments in order to operate the pool; but these determinations are likely not to be as controversial as in bilateral licensing. One reason for this is that patent pool licensors tend also to have strong downstream interests with the need to be licensees for SEPs owned by many other companies. They tend to regard pool participation defensively. As will be discussed in responses to questions about patent pools, this tends to significantly depress royalties charges. Consequently, patent pool participants, including licensors and licensees, might regard moderate inaccuracies, resulting from over-disclosure as an acceptable cost of doing business that way. That there are 2,500 SEPs rather than 1,500 SEPs reading on the H.264 standard in an MPEG LA patent pool is of no great significance to the licensees. It is the total rate they must pay which matters. From the licensor's perspective, royalties are broadly a pie-sharing exercise. If patent pool essentiality checks are somewhat inaccurate but are consistently so among everybody's patents, it will probably be a matter of 'swings and roundabouts', with a net result which is fair.

See also my response to Q. 3.3.4.

Q 3.1.5 Consequences/risks: *What are the consequences of insufficient patent transparency? What risks occur, and what are the (financial) impacts if these risks materialize? If appropriate, distinguish between ex-ante/ex-post transparency and between the different aspects of patent transparency above.*

It all depends. See Q 3.1.4.

Q 3.1.6 Cost of coping individually: *How do you deal with situations where you perceive that patent transparency on one or several aspects of interest to you is insufficient? Do you gather information pro-actively or do you wait to be contacted (e.g. by patent holders requesting royalties, by implementers asking for licences)? What costs are involved in dealing with situations of low patent transparency?*

Pass.

Q 3.2.1 Trigger of obligation: *Patent declaration obligations could be triggered either by membership of a standard setting organization, or by participating in a specific standardisation project or by having directly suggested a (patented) technology for a draft standard. What are your views on the respective triggers (advantages, disadvantages)?*



Pass.

Q 3.2.2 Required effort: *What effort should be required from a patent holder in identifying relevant patents in his portfolio? Should these efforts be contingent on the degree to which the patent holder participates in a specific standard setting process (for example whether or not he has actively contributed the technology in question)?*

Pass.

Q 3.2.3 Process of declaration: *If you are a patent holder active in a standard setting body that requires patent declarations, how do you comply, in practice, with the obligation to declare specific patents? What are the concrete steps undertaken to identify such specific patents, and what parts of your organization are involved?*

Pass.

Q 3.2.4 Costs of declaration: *What are the costs involved in complying with an obligation to declare specific patents? What are the respective costs of (1) identifying patents and (2) informing the standard setting organization? Would you search for patents in your own portfolio that relate to a standard, even when there is no obligation from the SSO patent policy? If yes, would your approach differ in process and thus in cost? Please be as specific as possible.*

Pass.

Q 3.2.5 Blanket declarations: *Some standard setting organizations require their participants to declare that, in general, they hold essential patents over a standard without requiring that these participants identify each of these patents specifically. Do you believe that such declarations provide for enough transparency? Please justify your answer, where necessary distinguishing situations where you consider that this approach is sufficient from those where you do not.*

Pass.

Q 3.2.6 Scope/detail: *Where standard setting organizations require that patent holders identify the relevant patents individually, what information about the patent should be transmitted? Only the patent number or other*



aspects? What are the respective benefits and costs of requiring that the patent holder also (1) specifies to which part of the respective standard the declared patent belongs and/or (2) explains why the patent is relevant for the standard?

Pass.

Q 3.2.7 Consequence of non-compliance: *What should be the consequences if a patent holder has failed to comply with its declaration obligation (for the standard, for the patent holder, for licensing negotiations)? Should the respective standard setting organizations take action and what should this action be? Are the consequences of non-compliance sufficiently clear in your experience?*

Pass.

Q 3.3.1 Initial accuracy: *In your experience, what is the reliability of patent declarations at the time when they are made? In which fields of standardisation and on which aspects of the declaration would initial accuracy need to be improved? What causes of initial inaccuracy are particularly detrimental to the usefulness of patent declarations?*

Pass.

Q 3.3.2 Updating requirement: *Should declarants be asked to update their patent declarations at key events such as those mentioned above? What would be the respective advantages and disadvantages?*

Pass.

Q 3.3.3 Check of declarations: *Should the quality of patent declarations be submitted to a check by someone other than the declarant? Who should perform this check (peer review by members of the standard setting organization; standard setting organizations themselves; third parties on behalf of the standard setting organizations; patent offices; etc.)? What should be the scope of the check (essentiality for the standard; validity; enforceability; other)? Who should bear the cost of such a check? If you think the declarant should bear (part of) the cost, how can it be prevented that this creates an incentive to disrespect the declaration obligation?*



As indicated in my response to Q3.1.4, it is only the courts that can make definitive assessments of patent validity, infringement and essentiality. Other assessments have not proven consistent or reliable. Consequently, it might not be possible to determine meaningfully how accurate or reliable self-declarations are.

However, it is likely there are biases in declarations due to SSO rules. Penalties such as compulsory royalty-free licensing for not disclosing inevitably encourage over-disclosure – just to be on the safe side.

The presumed preeminent desire to determine the number or proportion patents which are essential is questionable because:

- Some experts claim that even standard-essential patents can be worked around, in some instances. This means that what constitutes a SEPs can be very difficult to determine, subjective and subject to change.
- Value can vary enormously from SEP to SEP within the same standard. In these circumstances, it is far more important to value the more valuable SEPs than to determine the number or proportion of SEPs.

Q 3.3.4 Essentiality check (in particular): *Depending on your answer to the above question, how can the essentiality check be performed in practice? What are the average cost of checking essentiality (for third parties) and what could be done to minimize these costs? Do you see a set-up of such a check that is particularly cost and time efficient? How can it be avoided that this check creates incentives for not respecting the declaration obligation?*

The question of costs in checking essentiality should only be answered with due consideration for the reliability and accuracy of those assessments. It is unproven that essentially can be reliably checked and there is plenty of evidence that independent assessments are inaccurate, which means that only the Courts can ultimately make determinations unless patentees volunteer to be bound by independent determinations (e.g. with patent pool participation). As indicated in Q 3.1.4, I compared the results of two separate essentially determinations only to find that there was almost no correlation between the findings of each. That means that either one or both of them is totally wrong in its determinations.

A substantial proportion of essentiality declarations are for patent applications they may never end up being granted, due to existence of prior



art, lack of novelty etc. Report 5.2.2 recognizes the difficulty without quantifying accuracy in determinations.

It is acceptable for patent owners to opt-in to subjecting their patents to essentiality determinations (e.g. if they voluntarily decide to join a patent pool); however, it would be inappropriate and unfair to mandate any such determinations outside of court litigation. This is particularly the case unless and until such determinations are shown to be more consistent and dependable.

Given the above, the current approach taken by various SSOs of requiring standards group participants to declare patents which they believe might be essential is most appropriate. Prospective licensors and licensees must negotiate accordingly, including all the uncertainties.

Q 3.4.1 Publication: *Should standard setting organizations make the declared patent information publicly available? Do you see any impacts on the protection of personal data? Under what conditions would it be justifiable to restrict access or to charge for access?*

Yes, SSOs should make declared patent information publicly available.

Q 3.4.2 Ease of access: *What are your views about the various methods used by standard setting organizations to make the declared information available? Which methods do you find particularly useful and why?*

This should be down to the SSOs themselves to decide. My personal preference is that they should be free on the web. Make the standards and information about them as free and inexpensive as possible to stimulate adoption of the standards. Any charges levied should not greatly exceed recovery of publishing the costs. The real return for SSOs and their members will be through commercial success of the standard with product sales and through royalties levied on those.

Q 3.4.3 Combining information: *Some standard setting organizations combine declared information with information drawn from other sources, such as patent offices. What are your views on this? In what forms and to what fields of standardization could this be expanded? What sources of information (in addition to patent offices) could be used and what types of information could be added?*

Pass.



Q 3.5.1 General question: *What can be done to increase standardisation-related patent transparency other than to strengthen the system of patent declarations used by standard setting organizations?*

Pass

Q 3.5.2 Public patent landscaping: *Public patent landscaping in the context of standardisation would be an exercise where (1) patents that are relevant to the particular technological/product area to which the standard relates are identified and (2) this information is then shared with all interested parties. Do you see benefits of such public patent landscaping and in which areas would this be particularly useful? Who should perform this exercise (e.g. patent offices, commercial service providers, public authorities) and how could this exercise be financed?*

Pass.

4.4 Transfer of standard essential patents (SEPs)

Q 4.1.1 Prevalence: *How common is it, in your area of activity or interest, that standard essential patents are transferred? Are standard essential patents transferred more, or less, often than other patents? Do you see any trend in the transfer rate? Do transfers usually concern individual patents or larger patent portfolios?*

Pass

Q 4.1.2 Issues and consequences: *In your experience, what are the typical issues that arise in the context of transfers of standard essential patents? Are such transfers leading to more or less fragmentation of SEP ownership? Are these transfers leading to more or less disputes/litigation? What is their impact on royalty rates for the transferred patents and on the total royalty rate for all patents essential for a standard?*

Pass.

Q 4.1.3 Non-practising entities: *Have you encountered transfers of standard essential patents to entities that do not produce or market products including the technologies covered by these standard essential patents? What particular consequences have you observed?*

Pass.



Q 4.2.1 Impact on effectiveness: *Is there a risk that SEP transfers circumvent existing patent policy rules of standard setting organizations or render them less effective? Please explain and if possible cite specific examples.*

Pass.

Q 4.2.2 Specific rules: *In your area of interest, are there specific rules governing SEP transfers and what is your experience with them? Where there are no specific rules, would you see a need for such rules? What should be their objectives (achieving transparency about ownership, providing legal/business certainty, reducing litigation risks, facilitating smooth licensing process, fostering research and innovation activity, etc.)?*

Pass.

Q 4.2.3 Transfer of FRAND commitment: *How can it be ensured that the new owner of the transferred SEP is bound by the FRAND licencing commitment given by the initial owner? What can standard setting organizations do in this regard? What do the sellers of the SEPs need to do? Should the licencing terms (including royalty rates) practiced by the initial owner influence the interpretation of the concept of "FRAND" for the new owner?*

Pass.

Q 4.2.4 License of right: *Have you been involved in the use of a License-of-Right system? What benefits and risks are, in your opinion and experience, linked with this? Are there important differences across national jurisdictions that reduce the reliability of License-of-Right provisions?*

Pass.

4.5 Patent Pools

This is a field in which I have worked as a commercial consultant. In addition, I have published articles as a business analyst about technologies



which are licensed in patent pools, about the business models of patent pool participants and non-participants, and about licensing terms.³⁴

Q 5.1.1 Target areas: *What are the situations/external factors which render a patent pool useful? Are you aware of specific standards for which a patent pool would be useful but where there has been a failure to create one?*

Useful to whom? Patent pools tend to be attractive to licensees because pools tend to be downstream oriented. By this I mean that these patent owners tend to be most willing to contribute their patents to the pool, and may do so for relatively low licensing fees, where they are also implementers.³⁵ The list of H.264 patent pool licensors illustrates this.³⁶ In the case of Japanese manufacturers (i.e. Fujitsu, Mitsubishi, NEC, Sharp, Panasonic), their customer DoCoMo strongly encouraged them to join the 3G patent pool platform WCDMA, but they were virtually the only manufacturers who joined.

Q 5.1.2 Benefits of patent pools: *What are the benefits of patent pools in the above situations (Q 5.1.1) respectively for patent holders and/or patent users? What aspects in patent pool governance are particularly relevant in practice to ensure the realization of these benefits?*

Patent pools can reduce transaction costs. They can be useful when there are many SEP holders, and even more so when there are many licensees for a particular standard. However, any given patent pool can only license the SEPs for one particular standard. The alternative one-stop-shop where one can negotiate a license for all a licensor's SEPs to several standards together with many non-SEPs can be more cost efficient and compelling in many cases.

Patent pool governance tends to be dominated by patent holders. Where these are also manufacturers, their interests are most likely to align with

³⁴ <http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html> and <http://ipfinance.blogspot.co.uk/2011/07/fixing-ip-prices-with-royalty-rate-caps.html> and <http://www.fiercewireless.com/europe/story/mallinson-uncertain-outlook-patent-pool-licensing/2010-08-25>

³⁵ <http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html>

³⁶ <http://www.mpegla.com/main/programs/AVC/Pages/Licensors.aspx>



other licensees (e.g. H.264 AVC). If not, it is unlikely major patent owners will join (e.g. the PlatformWCDMA pool which had very poor participation: mostly by only Japanese manufacturers, who had been coaxed into membership by their overwhelming customer NTT DoComo).

The possibility of bilateral licensing outside of the pools is vital to ensure effective competition overall and tends to be required by competition authorities. This also helps ensure pools are operated fairly with balance between the interests of licensors and licensees.

Q 5.1.3 Alternatives to patent pools: *What alternatives to patent pools do you see to achieve efficient licensing in situations where ownership of patents which are essential to a standard is widely dispersed?*

Each patent pool is inherently limited to licensing a single standard. In circumstances where manufactures need to license multiple standards and other non-standardized technologies for the same product it can be more efficient and effective to negotiate bilaterally with major patent owners on a multi-standard portfolio basis covering all those technologies. This also enables the inclusion of non-SEPs in these portfolios. In contrast, non-SEPs are not allowed by competition law to be included with pooled patents.

Q 5.1.4 Difficulties of pool creation: *What are the main difficulties in setting up a patent pool and how can they be addressed? Are there differences in national law or its application across countries of the EU/EEA or worldwide that make patent pool creation more difficult?*

Pass.

Q 5.1.5 Costs of pool creation: *What are the costs involved (do you have estimates)? What do these costs depend on? How are they usually (pre-) financed?*

Pass.

Q 5.2.1 Decision to participate in pool: *What factors influence a patent holder's decision to participate in a pool or not?*

It depends crucially on the patent holders' business model. Pools are most attractive where SEP ownership is widely and evenly dispersed among many owners (e.g. the H.264 AVC pool has more than 30 licensors) because this



multilateral approach can mitigate transaction costs that arise with multiple bilateral arrangements in licensing. Pools can be convenient and efficient for those who would like to generate some patent income, but do not wish or cannot justify investing in establishing their own licensing programmes.

Patent pools tend to be unattractive to patent holders who have relatively strong patents, and who seek to maximise royalty income as opposed to protect downstream manufacturing business.

Patent pools tend to undervalue strong patents. Patent pools which most commonly use proportionality measures to allocate licensing fees among licensors regard all SEPs as having equal value. Instead of taking on the difficult task of valuing each individual patent, patent pools assume parity in patent value, but instead take on the major task of attempting to assess essentiality on an exhaustive basis.

There is no reason to presume that the crude approximations usually taken to establish relative SEP values in patent pool administration are any more accurate in determining overall portfolio value for patentees than the common approach taken in bilateral licensing. On the contrary, the latter tends to focus more on “proud lists” of relatively strong and most applicable patents, rather than on the much larger total numbers of patents for which validity, essentiality and value are less certain or lower. This latter approach is chosen by the parties to patent licensing agreements because it is a practical, efficient and effective.

Q 5.2.2 Incentives for pool participation: *How can this balance be influenced positively? What incentives can be provided by public authorities and/or standard setting organizations to increase patent pool participation?*

Pools can be useful, but they are not a panacea. It is a questionable notion that national or European authorities should seek to shift the balance by favouring them over other licensing mechanisms.

Would-be licensors and prospective licensees should retain free choice with opportunities to license in different ways in an open and competitive market.

Q 5.3.1 Right moment for pool creation: *What is the right moment in the standard setting process to start the process of creating a patent pool? What part of work on setting up a patent pool start could/should be done in parallel to the standard setting discussions?*



Pass.

Q 5.3.2 Role of SSOs: *What contribution can standard setting organizations make with regard to patent pools? Should they provide guidance patent pools? Should they provide and/or select patent pool administration services?*

Patent pools should remain independent of SSOs and vice versa. Rival pools may form (e.g. there are two patent pools for LTE). Many parties may prefer to establish licensing bilaterally.

Bilateral licensing can be more efficient. Whereas each patent pool is limited to one standard, it is possible to license SEPs for multiple standards and non-SEPs on a one-stop-shop basis in bilateral licensing directly with patent owners.

Q 5.3.3 Role of public authorities: *What contribution can public authorities make to facilitate patent pool creation? What role could publicly owned patents play? Are there specific features of non-EU legal systems that could be useful also in the EU? Under what conditions and to what purpose would public financial support be beneficial?*

Public patents can be included in pools if public authorities wish.

4.6 FRAND

Q 6.1.1 Notions "fair" and "reasonable": *How, in your view, should the terms "fair" and "reasonable" be understood? Which of the above methodologies do you consider particularly appropriate, which other methodologies do you find important and what could be an appropriate mix of references?*

Fair and reasonable rates should enable the 'gains from trade' or economic rents generated by a new technology to be shared equitably across the value chain, including SEP-based technology developers, implementers (designing, manufacturing and distributing products) and their customers. The latter will include distributors, network service providers and end users.

The popular notion that a technology developer should be entitled to no more than what the technology is worth before being included in the standard (the so called "ex-ante value" or "inherent value") is unfair,



unreasonable and dysfunctional. Technology developers join and participate in SSOs with no less right to be rewarded for their risks, efforts and costs than others. A share of the potential financial return (in increased revenues or lower costs) from any and all success of new technologies in standards is precisely the incentive and justification required to make and maximise costly and risky investments.

Q 6.1.2 Examples of non-FRAND licences: *Are you aware of cases of licenses of standard essential patents that, according to you, do not fulfil the FRAND terms and conditions? Please be as specific as possible.*

Pass.

Q 6.1.3 Time required for negotiations: *In your experience, how long does it take, on average, to negotiate FRAND terms? What does the length of negotiations depend on? Is it more or less difficult/fast to reach an agreement on FRAND terms and conditions for standard essential patents licenses compared to other similar patent licensing deals?*

Pass.

Q 6.1.4 Initial offer or outcome: *Do the terms "fair" and "reasonable" relate to the initial offer of the patent holder or to the actual outcome of negotiations? Are you aware of FRAND adjudication cases where there was a large difference of terms and conditions between the last offers of the licensor on the one hand and the last offer of the licensee on the other?*

Large differences between terms and conditions of two different offers does not necessarily mean one offer is necessarily not FRAND or significantly lower than the other. Negotiations include multiple factors. Whether or not offers are equivalent or different can only be determined by considering all terms and conditions in the context of the two parties negotiating the license. Final agreements may reflect significant changes among these without it being an overall reduction in what is being agreed to. For example, running royalty rates might be negotiated down with payment of a larger up-front payment, or up with a cap on annual or total royalty payments. Agreement term, patent capture periods, grant-backs and so on are also significant. The position of the counterparty is therefore also significant in determining what is and what is not an equivalent offer.



The initial offer should be FRAND. If it is not and the overall terms are significantly reduced, then the licensor should possibly be obliged to make lower offers to subsequent would-be licensees.

Q 6.1.5 Other methods of ensuring reasonableness of licensing terms and conditions: *Can patent pool prices for a given standard be a proxy for FRAND terms and conditions? What are the limits of the use of patent pools as a proxy? How can bias coming from such a method be avoided?*

It should also be noted that IPR policies call for FRAND terms rather than FRAND prices or FRAND rates. The entirety of the offer, including other terms and conditions, must be considered in determining whether or not an offer is FRAND. So prices alone cannot be a proxy for terms and conditions.

Patent pool prices for a given standard are not a reliable proxy for FRAND terms and conditions. The dynamics of patent pools are complex with downstream interests predominating to depress prices which will therefore tend to be below FRAND prices/rates in bilateral agreements. Pool terms can only be seen as FRAND when all the interconnected terms as licensors and licensees are considered and in the context of who the parties are.

Patent pool rates and terms are typically set below FRAND because major licensors tend to be major implementers who wish to minimise their licensing costs on large sales volumes. In other words, they have more to gain from minimising in-licensing costs on their own relatively large sales volumes than in maximising royalty receipts on the sales of others. Pricing might be fair and market-driven, but it reflects the netting off of different considerations, rather like a cross-license with a low net royalty payment in adjustment for two nominally much larger charges.

Comparisons to determine what is and what is not fair and reasonable must consider all terms and conditions and the entire basis (i.e. including different business models market participants) of licensing. Patent pool participation typically requires many commitments, such as grant-backs and non-assert commitments which might be quite different in other types of licensing. Patent pool rates are typically lower than bilaterally-agreed rates because patent pools are dominated by downstream players who are more interested in minimizing royalty out payments than maximizing royalty payments received.

For example, most Bluetooth SEPs can be licensed royalty free under arrangements similar to patent pooling. It is quite possible, and certainly not inconsistent that those licensing terms are FRAND, while those of other



Bluetooth patents licensed bilaterally for cash payments along with various other different terms might also be FRAND.

Q 6.2.1 Existing guidance: *To your knowledge, what guidance on FRAND definition already exists (regulators, standard setting organizations, courts)? Which of this guidance do you consider as particularly useful? Would you welcome additional guidance? If so, on what specific aspects of FRAND?*

Pass.

Q 6.2.2 Unilateral ex-ante disclosure: *Would you welcome a larger role for unilateral ex-ante disclosure of licensing terms in order to facilitate the licensing of SEPs? What form could it take? How should SSO mechanisms be shaped to facilitate this instrument? Should they be mandatory or voluntary? Should the disclosure only concern the most restrictive terms?*

Pass

Q 6.2.3 Ex-ante setting of parameters: *Alternatively, would it be efficient to set FRAND parameters - within the limits of competition law - at the beginning of discussions of a technical committee within or outside an SSO in order to facilitate the future FRAND licensing? Such parameters could be: the royalty base (at end product or component level, if component what component (s)), royalty type (lump sum, per unit price, percent value of a product/component). What other parameters could be discussed upfront to make licensing more practical, without violation of competition rules?*

It should be bilaterally negotiated decisions by parties to SEP licensing agreements that determine the basis of setting royalties (base, rate, cap, up-front amount etc) as well as the actual rate and monetary figures. There is no reason why free market principles should be restricted by interventions which cap charges or fix the way licenses must be structured or how fees should be charged.

There is no economic or practical reason why aggregate royalty charges for smartphone patent licensing should be limited to a proportion of certain hardware costs or total costs, or that royalties must be based on the "smallest saleable patent-practicing unit."

Copyright royalty charges on electronic or physical books, downloaded music or CDs, downloaded movies or DVDs, downloaded software or that distributed on CDRoms typically greatly exceed the cost of the physical



medium of delivery, yet these royalties are never limited on such a basis. The manufacturing costs, profitability and players in chipset fabrication (i.e. the foundry business) are almost invariably completely different from and irrelevant to IP development cost and investment monetization factors (e.g. for 3G, 4G, Wi-Fi and video compression technologies). Similarly, ink and printing costs and competition are very different to other cost and competitive factors in authoring and book publishing. CDROM or flash memory, CD and DVD manufacturing economics and competition have little to do with any of the other costs or monetization factors in software, music or video content. Most of the many examples of royalty charges paid, including those related to cellular SEPs in particular, are based on finished product device prices because that is the industry norm, including royalty rates demanded and those agreed in patent licensing agreements. Component price-based royalty benchmarks are few and far between because they are generally not used in patent-licensing agreements.

In general, parties are free to engage in bilateral negotiations to determine royalties for portfolios of patents covered by a license agreement. That is how free markets work. In the case of the mobile communications industry, licensors and licensees often choose to value intellectual property in license agreements – corresponding to the royalty fees the licensee must pay for access to the IP – using a formula that multiplies a “royalty rate” expressed as a percentage with a “royalty base” agreed upon by the parties. The parties can negotiate the appropriate royalty rate and base they believe is appropriate for their business circumstances. In many industries it is commonplace for licensors and licensees to choose the selling price of the licensed product as the royalty base, and indeed this is the most common practice in the cellular industry where royalties are almost invariably calculated as a percentage of handset sales prices. The parties use this approach for a number of reasons as noted below, and negotiate the appropriate royalty rate based on the IP to be licensed.

A chip-based royalty scheme incorrectly and unfairly associates royalties to costs, process economics and competitive outcomes in the silicon chip foundry manufacturing business that have nothing to do with mobile technology development costs and the market value generated from these investments in the broader ecosystem. Similarly, the applicable royalties for software licensors are not and should never be limited to the relatively small cost of burning programs onto CD ROM media. As U.S. District Judge Leonard Davis recently put it, “[b]asing a royalty solely on chip price is like valuing a copyrighted book based only on the costs of the binding, paper, and ink needed to actually produce the physical product. While such a calculation captures the cost of the physical product, it provides no indication



of its actual value.”³⁷ Accordingly, I was most critical of U.S. District Judge James Holderman’s chip-based damages assessments in the Innovatio case.³⁸

The SSPPU is a term of art developed through patent litigation case law in the United States as one of the many ways in which U.S. district courts may value a patent or a few patents that have been found to be infringed. As the name states, the concept can only be applied where the “patent practicing unit” can be defined. In patent litigation, where one or a few patents are at issue and the scope of the claims of each patent are defined by the court, it may be possible to establish a smallest saleable patent practicing unit. But this is not a substitute for how a patent owner and a potential licensee might value a portfolio of patents as part of a license agreement. ‘Cherry-picking’ the SSPPU concept and applying it out of context in portfolio licensing ignores the realities of licensing and how parties have valued patents and portfolios for decades.

Virtually every mobile phone manufacturer with a licensing program or that reveals its rates at all, including EU companies (Alcatel-Lucent, Ericsson, Nokia, Siemens), North American companies (InterDigital, Motorola, Nortel, Qualcomm), and Chinese companies (Huawei, ZTE), has publicly stated in recent years that its mobile SEP licensing rates are based on a percentage of the entire handset price, as illustrated with LTE.³⁹ Licensing on this basis is a long-standing practice and was widely recognised since the introduction of 2G GSM, as noted by the International Telecommunications Standards User Group in 1998 and in 2G and 3G standards by several other observers including PA consulting Group (2005), Credit Suisse First Boston (2005) and ABI Research (2007). Most mobile phone patent licensing agreements use this basis and Article 325 of China’s contract law specifically anticipates it. European antitrust authorities and the U.S. patent courts also endorse this approach.⁴⁰ Chinese courts used this commonly-accepted royalty base in Huawei-InterDigital litigation.⁴¹ However, in this case with application of antitrust law, royalty costs were crammed down by multiplying this base with a very low royalty rate.

³⁷ <http://www.essentialpatentblog.com/wp-content/uploads/sites/234/2014/07/CSIRO-v.-Cisco.pdf>

³⁸ <http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html>

³⁹ <http://www.investorvillage.com/uploads/82827/files/LESI-Royalty-Rates.pdf>

⁴⁰ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2004.101.01.0002.01.ENG

⁴¹ http://www.americanbar.org/content/dam/aba/publications/antitrust_law/at315000_tidbits_201304_05.authcheckdam.pdf



Even assuming it is appropriate to apply the SSPPU concept to patent portfolio licensing, the SSPPU for many portfolios is likely to be the entire device. Narrowing the royalty base to a mobile phone's baseband processor does not reflect numerous SEP patent claims which extend beyond this chip, including many other components throughout the device and beyond. Mobile communication is a system in which mobile devices operate in conjunction with cellular networks. For example, some patented techniques in interference mitigation are implemented in the ether in conjunction with the antenna arrays (e.g. with MIMO technologies) of both phones and radio base stations.

Costs in patent licensing, as in hardware components, are only detrimental or harmful if they are unnecessary or do not represent value for money. However, the Report makes no attempt to assess whether aggregate licensing costs—including information and transaction costs—provide net negative value for the technology provided, as opposed to positive value, downstream to manufacturers, mobile operators and consumers. Evidence indicates that innovative cellular technologies have been enormously valuable, and worth the associated costs, as indicated in Section 3.

Q 6.3.1 Advantages of portfolio licensing: *What are the advantages of portfolio licences respectively for the patent holder and for the implementer? How important is the so-called "freedom to operate" or "patent peace" between companies? Please cover in your answer also issues of scope (e.g. geographic scope, product scope, inclusion of future patents).*

Devices such as mobile phones, in particular, and many other ICT products can be subject to thousands of SEP and non-SEP technologies. Portfolio-based licensing is the only realistic way of licensing and providing assured freedom to operate with so many patents owned by many patent owners and prospective licensors.

Q 6.3.2 Determination of portfolio license value: *How can the value of licences over large portfolios be determined if there is disagreement over the validity, essentiality/infringement or enforceability of (some) patents included in the portfolio? Is sampling (i.e. the review of a representative set of patents) a good approach for the evaluation of a patent portfolio? If so, how should sampling be done?*

This is a matter for the parties in bilateral licensing negotiations. Sampling, as described using "proud lists" in Q 3.1.4 might be the best or only practical means for establishing value in such circumstances.



Q 6.3.3 Cross-licenses: *What are the advantages of cross-licensing? What problems arise? How do the concepts "fair" and "reasonable" apply to cross-licensing?*

Cross-licensing is an efficient way of minimising out-licensing costs while obtaining freedom to operate. FRAND principles apply with the negotiated agreement being FRAND overall, including all terms and conditions. However, net royalty prices/payments might be very low or even zero.

Q 6.4.1 Pertinence and impacts: *In your experience how common is royalty stacking and in which areas of past, ongoing, or planned standardization does it exist or will it likely occur? What problems arise in such situations? How do individual companies deal with such situations and what are the (financial) costs?*

Royalty stacking is not the problem described theoretically. In practice, royalties do not stack as predicted by some academics and others, and as some of these cite to the classical economic theory of Cournot complements (explaining pricing in brass production with monopolistic supply of copper and zinc).

I have countered assertions of alleged royalty stacking in three of my IP Finance publications.⁴²

Q 6.4.2 Co-ordination mechanisms: *What forms of voluntary co-ordination mechanisms are, or could be, efficient for situations of royalty stacking? Should they be limited to a single standard, or cover families of standards, or cover all standards related to a type of product? How can the abuse of such mechanisms, for example by a group of dominant license-takers, be avoided?*

Patent pools are acceptable and can be a useful option for various market participants, so long as participation is not mandatory and it remains possible to license bilaterally outside the pool(s). There is a growing concern,

⁴² Reported by Keith Mallinson: <http://ipfinance.blogspot.co.uk/2014/09/stacking-deck-in-analysis-of-smartphone.html> , <http://ipfinance.blogspot.co.il/2013/05/theories-of-harm-with-sep-licensing-do.html> and <http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html>



due to the large size and commercial strength of implementers (and because they are likely to far outnumber patent holders) that we see the emergence of monopsony power and buyer cartels, whether they impose terms or seek to establish metrics that have the effect of reducing financial returns for technology holders.

Q 6.4.3 Method for allocating value: *In order to improve methods to deal with royalty stacking and for adjudicators to find proportionate FRAND value, what are best ways to allocate value between patent holders of a given standard? How can the proliferation of patent applications in case of simple patent counting be avoided?*

Before suggesting methods to deal with alleged royalty stacking, it is important to assess the extent – if at all – royalty stacking actually occurs. As I have noted above, aggregate royalties paid in mobile phones are a small proportion of the theoretical and alleged figures. It is best to use bilateral negotiations on the basis of FRAND commitments (with recourse to the courts or arbitration, if voluntarily agreed in advance by both parties, where negotiations fail). Otherwise there is a risk that DG GROWTH will be dragged into business model battles about rent-shifting from one part of the ecosystem to another and relative patent values. All patents are not created equal, and pretending that they are with proportionality-based fee apportionments will encourage ‘gaming the system’ with excessive and low-quality patenting.

Q 6.5.1 Current business practices: *On what level of the value chain (e.g. component, bundle of components, final product) does SEP licensing currently take place in the fields of standardization in which you are active/interested? Is this business practice applied by all patent holders/implementers or are there different business practices?*

The final product is invariably used as the base with mobile phones for mobile SEP licensing. In the case of tablets, PCs, consumer electronic products and cars, mobile SEP licensing is more likely to be at the communications module level.

Q 6.5.2 Royalty base: *How should the royalty base be selected to allow licensing for different types of products (products that rely entirely on a given standard or set of standards, or rely mostly on a set of standards or on multiple technologies)? For a given implementation of a standards in a product, to what extent would it be desirable or feasible that the royalty type*



be streamlined, e.g. in a percentage of the product value, royalty per unit sold, or lump sum?

It should be whatever the parties decide in bilateral negotiation. Considerations are widespread including practical matters of what can most reliably be counted or otherwise measured. Parties should also have the discretion to decide between themselves what the applicable rate might be given the chosen base. The base is a benchmark to allocate reasonable cost and reasonable return; merely seeking to reduce the base will not change the need for inventors to get a reasonable return.

Q 6.5.3 Need for clarity: *Is this issue, in your opinion, currently addressed in the patent policies of the standard setting organizations in your area of activity/interest? Is there a need for more explicit rules or should this be left open?*

Pass.

Q 6.5.4 Impacts of changes: *What are the advantages of giving or denying the patent holder the right to licence only on one level in the value chain and thus of allowing or prohibiting that he refuses licences to implementers on other levels? Please distinguish between impacts on patent holders, on component makers, on end product makers and on the standardization system itself.*

Denying rights impedes free market competition; and rules can soon become out of date. Dictating how to or how not to do things also has the problem that what might seem like a good idea proves not to be so in practice -- either immediately or over time. Licensors tend to like a large base so demanded royalty rates seem (e.g. in the eyes of trial jurors) small and very reasonable. Conversely, licensees tend to like a small base because it may help keep royalty charges down. For example, some people are persuaded that royalty charges should be less than the cost of the hardware upon which they are levied, even though there is no reason why they should be so limited.

Q 6.6.1 Definition in practice: *In your opinion, what is the best definition of the non-discrimination principle? What aspects of non-discrimination do you find important? Is there sufficient clarity on what non-discrimination means and how it is to be applied in practice? Does the non-discrimination principle relate to the initial offer of the patent holder or the actual outcome*



of negotiations? Does it relate to an offer isolated to a single standard or to multiple standards? Do you consider that the non-discrimination principle creates obligations on the (potential) licensee?

Non-discrimination requires some kind of equivalence between the arrangements offered and agreed between a licensor and one licensing counter-party versus that same licensor and another licensing counter-party. Terms can and should reflect particular circumstances, in the broadest sense, and may change over time. For example, if patents are challenged for validity, essentiality and infringement; terms including rates may change depending on litigation outcome without being deemed to discriminate between old and new licensees. The different rates would not be discriminatory because the circumstances have changed (e.g. an invalidity decision) with the litigation outcome.

A licensee might be able to obtain a rather lower rate within a patent pool than in bilateral licensing outside. The difference might reflect transaction costs and also the fact that becoming a pool licensee requires certain obligations to the pool (e.g. reciprocal licensing commitments to the pool and non-assert provisions).

Q 6.6.2 Pertinence: *In your experience, is the non-discrimination commitment sometimes/often broken? In what ways is it broken? Please provide examples. Is there sufficient transparency about licensing terms to allow participants to assess whether they are discriminated against?*

Pass.

Q 6.6.3 Justification for discriminations: *Are there any reasons why individual implementers could be excluded from the obligation to license to (reciprocity)? What would justify different terms and conditions for FRAND licenses?*

Pass.

Q 6.6.4 Cash-only/cash-equivalent: *One idea discussed in the standardization community in order to make licensing terms comparable in cases, where non-cash elements such as cross-licenses are used with some implementers, is to foresee that a cash-only offer is made. What is your opinion on this? Should this idea apply only in some instances and, if so, in*



which? Should this be a genuine self-binding offer or would a cash equivalent estimation of non-cash components be preferable?

Many licensees already make cash-only offers. For example, at least nine companies have published their maximum royalty rates for LTE.⁴³ The Report (page 137) suggests a “cash-only option”. It states that “[t]his suggested solution entails rules that require licensors to provide royalty rates or a royalty schedule (‘cash-only option’) for licensing their SEPs, should licensees request this. It particularly addresses the situation in which the prospective licensee owns valuable non-SEPs to which the licensor would like to obtain access.” These cash-only offers already enable prospective SEP licensees who are non-SEP owners to retain their exclusive rights to exclude, or negotiate reductions in these headline SEP rates through cross-licensing with their own patents.

If a licensor makes its SEPs available on a royalty-free basis, should it be able to insist on royalty-free conditions from the licensee in return? Certainly not: the licensor’s royalty-free SEPs might be worthless. Just because the licensor is pursuing a royalty-free business model while generating income from other means does not mean that its licensees should have no alternative but to do the same.

Q 6.6.5 Other mechanisms/differences in national jurisdictions: *What other mechanisms for ensuring non-discrimination are you aware of? What are their respective costs and benefits? Where and how should they be implemented (at standard setting organisations or in regulations)? Are there differences across national jurisdictions in the EU/EFTA or worldwide that negatively impact on these solutions?*

The biggest problem with regard to disparate terms and payments among licensees is with infringement by those who are unlicensed. They are free-riding on the technology of others, while compliant licensees are suffering a cost disadvantage in competition against the infringers. There is a need to level the playing field so that all implementers pay their way on a FRAND basis.

Authorities need to help with enforcement by not increasing uncertainties.

⁴³ <http://www.investorvillage.com/uploads/82827/files/LESI-Royalty-Rates.pdf>



4.7 Dispute resolution

Q 7.1.1 Pertinence of the issue: *In your experience how often do disputes over SEPs arise, notably in comparison to patents that are not standard essential but comparable? Are there typical circumstances that make disputes particularly likely to arise? What role do business models or product life-time cycles have in this regard?*

Pass.

Q 7.1.2 Main areas of disputes: *What are the main areas of disputes over SEPs (infringement/ essentiality, validity, value, etc.)? How are these areas related in the practice of negotiations and litigation?*

Pass.

Q 7.1.3 Cost of disputes: *What are the typical costs of settling SEP disputes? What factors drive these costs in practice and to what extent? How do firms try to minimize costs?*

Pass.

Q 7.1.4 Impact of disputes on standardization: *Do you perceive an impact of disputes on the standardization work itself? Do standardization participants foresee future disputes and adapt their behaviour during the standardization process accordingly?*

Pass.

Q 7.2.1 Usefulness of alternative dispute resolution: *In your experience, does ADR currently play an important role in resolving SEP disputes? Is it regularly considered/discussed when SEP disputes arise? Do you see any trend in its prevalence?*

Pass.

Q 7.2.2 Target areas: *Which situations/external factors render an alternative dispute resolution mechanism particularly useful? In what areas of patent based standardisation would ADR be particularly useful?*



Pass.

Q 7.2.3 Suitable forms of ADR: *What form of ADR (mediation, arbitration, other) do you consider suitable for what type of conflict?*

Pass.

Q 7.2.4 Benefits of ADR: *What are the benefits of alternative dispute mechanisms applied to SEP disputes respectively for patent holders and/or patent users? What are the most important conditions to ensure that these benefits materialize?*

Pass.

Q 7.2.5 Difficulties and costs: *What are the main difficulties and costs for parties in agreeing to and setting up a given dispute resolution mechanism? What do the costs depend on? Do rules on ADR differ between jurisdictions and does this create problems?*

Pass.

Q 7.3.1 Your experience: *Are you participating in SSOs that have ADR mechanisms? To your knowledge are they being used? If so, what are the experiences? If they are not used, why not?*

Pass.

Q 7.3.2 Role of SSOs: *To what extent and how should SSOs be involved in the creation and provision of alternative dispute resolution mechanism? Should procedural aspects be further defined in SSOs in order to facilitate the use of ADR?*

Pass.

Q 7.3.3 Incentives to use ADR: *What incentives are necessary for parties to use ADR? Please explain those incentives depending on the type of ADR mechanism and/or type of dispute concerned.*

Pass.



Q 7.3.4 Voluntary/mandatory: *What are the benefits and risks of making ADR mandatory for the resolution of SEP disputes? What consequences would this have for participation in standardisation, for licensing negotiations and for the implementation of a standard? If ADR would be made mandatory: Should it be linked to membership in SSOs, or to the fact of contributing a patented technology to a standardisation process, or other? Should there be an opt-in/opt-out possibility at the declaration stage? Should ADR replace litigation completely or should it be a mandatory step (e.g. mediation) before litigation?*

Pass.

Q 7.4.1 Specificities of ADR for SEP disputes: *Which particular features should ADR mechanisms have in order to be (more) suitable for SEP disputes? What would constitute a ADR mechanism "tailor-made for SEP disputes"?*

Pass.

Q 7.4.2 Scope of ADR: *Which issues such as rate, validity, essentiality and infringement should be addressed by ADR in SEP disputes? Which territory should be covered? When is the adjudication of a global license suitable and when not? Should ancillary claims also be addressed and if so, how?*

Pass.

Q 7.4.3 Procedure: *What procedural issues have you experienced in relation to ADR for SEP disputes? What procedural features are particularly important for resolving SEP disputes? What degree of procedural discretion should be left to the arbitrator? Should there be an appeals procedure and if so, in what form?*

Pass.

Q 7.4.4 Timeframe: *What would be a reasonable timeframe for dispute resolution mechanisms? In which cases is an accelerated procedure suitable? In what procedural and/or substantive ways should this accelerated procedure differ from the regular one?*



Q 7.4.5 Transparency: *Should the outcomes of ADR be made public in order to achieve transparency? If only partially, which part? And in what form?*

Pass.

Q 7.4.6 Forms of ADR: *Are there forms of decision making by the arbitrator that you consider particularly suitable for SEP disputes? If so, in what situations and why? Is the concept of baseball arbitration, where the arbitrator resolves the dispute by choosing either the offer of the patent holder or the offer of the implementer, a practical form to settle SEP disputes?*

Pass.

4.8 Unwilling implementers and injunctions

Q 8.1 Defences for patent holder: *What needs to be done to ensure that holders of standard essential patents have effective means of obtaining appropriate remuneration for their patents and to defend themselves against implementers who are unwilling to pay royalties or who delay payment of such royalties? What can standard setting organizations do in this regard?*

The possibility of seeking injunctions is indispensable. Patent owners need some leverage over prospective licensees in order to ensure that manufacturers do not simply implement with infringements and wait to be sued. If a prospective licensee's worst outcome is payment of FRAND royalties it will have no incentive to agree to these terms straight away and it will have every incentive to drag out negotiations, including through litigation with challenges to patents and licensing terms.

Prohibiting injunctions for SEP infringements will cause rent shifting from patent holders to manufacturers. This will stifle investment because the inevitable effect of prohibiting injunctions will be to reduce or delay royalty payments to licensor patent owners.

The effects might have been less damaging a decade or more ago when most SEP owners were vertically integrated including product businesses. In those days, major SEP owners were more interested in protecting their product businesses than generating cash royalties. SEP owners are increasingly dependent upon cash royalties to fund ongoing R&D and innovation. The possibility of obtaining injunctions is an important means of



ensuring that manufacturers agree to be licensed, and do so in a timely manner on a FRAND basis.

As indicated above and in my recent published articles in FierceWireless Europe and IP Finance, the aggregate royalty burden on mobile phone manufacturers for all mobile-SEPs, and including non-mobile SEPs and some non-SEPS is probably less than \$19 billion last year, representing only 5% of \$377 billion in 2013 handset sales revenues.⁴⁴

Q 8.2 Protection against abuses: *How can it be ensured (at the same time) that injunctions based on standard essential patents are not abused to either exclude companies from implementing a standard or to extract unfair, unreasonable or discriminatory royalties from them?*

Pass.

Q 8.3 Prevalence of injunctions: *According to your experience, in which fields of standardization and in which situations are/were injunctions based on standard essential patents threatened and/or actually sought? What are/were the consequences? Please be as specific as possible.*

Pass.

Q 8.4 Consequences of banning injunctions: *Are you aware of national jurisdictions that have banned injunctions based on standard essential patents or that have restricted injunctions even against unwilling implementers (court cases or legislative changes)? Did this impact on the licensing negotiations, on the royalty rates and/or on the risk of getting no remuneration at all? How did patent holders reacted in these jurisdictions?*

Pass.

Q 8.5 Awareness among stakeholders: *In your experience, is there sufficient awareness among standardization participants of the recent EC antitrust decisions cited above? What role can standard setting organizations play in ensuring awareness of these antitrust decisions? On what aspects of the issue as such would you welcome additional guidance, if any?*

Pass.

⁴⁴ As published by Keith Mallinson, see <http://ipfinance.blogspot.co.uk/2014/11/licensing-mobile-technologies-becomes.html> and <http://www.fiercewireless.com/europe/story/mallinson-licensing-mobile-technology-will-become-even-more-essential/2014-11-26>



5 Appendix A: Selected publications by Respondent

Footnotes citing some of my own publications are reproduced in this appendix as part of my Response.

<http://ipfinance.blogspot.co.uk/2014/11/licensing-mobile-technologies-becomes.html>

Licensing mobile technologies becomes even more essential

By Keith Mallinson and published in IP Finance, 26th November 2014

Dramatic structural changes in mobile communications technology supply, with the demise of vertical integration, is forcing those who are developing standard-essential technologies for 4G and "5G" networks to monetise these efforts through patent licensing, as well as their own product sales. Exiting the handset business, as have most of the original major technology suppliers, including former market leader Nokia earlier this year, eliminates participation in the largest product market, and the need for cross-licensed patent protection there.



Under New Management

The market size for mobile standard-essential patent (SEP) royalties paid remains below 5 per cent (\$19 billion [€15.2 billion]) of the \$377 billion in annual smartphones sales.



Netting-off

Once upon a time, new mobile communications technologies such as 2G GSM were developed by small clutches of vertically integrated players. Mobile technology pioneers including Alcatel, Ericsson, Nokia, Nortel Networks, Motorola, Qualcomm and Siemens all manufactured handsets, as well as network equipment. Some of these companies also produced communications chips.

Business models were predominantly oriented towards generating income from product sales. Technology development costs and risks of failure (e.g. with demise of the rival U.S. 2G TDMA standard) were compensated for through product sales and in cross-licensing, for little or no cash royalty payments among these major players, to obtain access to all the SEP technologies required to make and sell products.

Vertical disintegration

Over the last decade or so, virtually all the diversified mobile technology manufacturers have exited the handset market. From among the above, brand names Alcatel, Motorola and Nokia live on in handsets, but ownership is now completely removed from the original parent companies. I tracked the demise of some of these in the face of new market entrant challengers in [another of my recent postings](#). Some of them have also ceased sales of other mobile products, including network equipment and chips.

Consequently, all the above parents have lost their ability to obtain a financial return on their mobile technology R&D investments directly through sales of handsets, which is by far the largest product market in the mobile sector. Global market revenues in 2013 were \$377 billion for handsets, according to Morgan Stanley; \$61 billion for network equipment, including radio, IP & transport and core equipment, according to Ericsson; and around \$20 billion in baseband modems (which are mostly embodied in handset products). Nevertheless, the pace of technology development is continuing relentlessly in standard-essential technologies and in mobile technologies in general.

R&D spending continues to increase

Despite so many mobile technology vendors no longer selling handsets, mobile R&D spending, of approximately \$42 billion in 2013, has grown 50 per cent since 2008, as indicated in table below. The figures include 12 large technology companies with a predominant or exclusive focus on mobile communications, including several named above. Some of these are quite



diversified and do not break out their wireless R&D expenditures in public disclosures, so these figures include some R&D related to other technologies and product markets. However, my total excludes many companies that also invest significantly in cellular R&D; so I believe the table provides a fair, yet approximate, and consistent representation of total R&D investments and their growth by the mobile technology industry as a whole.

Total Sales and R&D for Leading Cellular Technology Companies

	2008	2009	2010	2011	2012	2013
Total Sales (millions)	\$399,917	\$353,836	\$401,722	\$510,840	\$559,173	\$582,011
Total R&D (millions)	\$27,990	\$27,854	\$30,829	\$37,922	\$39,970	\$41,927
R&D/Sales	7.0%	7.9%	7.7%	7.4%	7.1%	7.2%

Sources: Includes public disclosures for Alcatel-Lucent, Apple, BlackBerry, Ericsson, Huawei, LG Electronics, MediaTek, Nokia, Qualcomm, Samsung, Electronics and ZTE.

New business model

Value is derived from standard-essential and other patented technologies through the manufacture and sale of one's own products, through cross-licensing to protect one's own product sales from infringement claims and through licensing for receipt of cash royalty payments.

Licensing value, in kind through cross-licensing or in cash, tends to correlate positively or proportionally with product sales revenues. Significantly for Alcatel-Lucent, Ericsson and Nokia, as indicated above, the network equipment business has only around one-sixth the market value of that for handsets. This means the value potential for royalty-generating licenses or royalty-mitigating cross-licenses is also likely to be correspondingly lower there for the mobile SEPs, which tend to apply to both networks and devices.

Therefore, in order to maintain R&D investment levels or increase them, technology developers are increasingly dependent on licensing others' handsets for cash royalties to recoup returns on their costly and risky R&D.

Qualcomm has been able to focus on developing its patent licensing while substantially growing its R&D. It needs to do so because R&D spending (e.g. \$5 billion in 2013) exceeds the profit it makes on its chip sales. Qualcomm led the way in licensing with the company being the majority developer of CDMA technologies in the 1990s. Qualcomm's exit from network equipment and handset businesses around the turn of the millennium eliminated its need to patent-protect those operations through cross-licensing. Qualcomm's licensing revenues of \$7.9 billion in 2013 are equivalent to a royalty rate yield of 1.77 per



cent of total global handset revenues indicated above.

The opportunity to grow licensing income with SEPs and non-SEPs (also referred to as implementation patents) was presented as a significant strategic objective by Ericsson and Nokia at their recent Capital Markets Days in Stockholm and London. Ericsson's 2013 licensing income was around \$1.6 billion, which corresponds to a royalty rate of 0.42 per cent on the same basis as for Qualcomm above. Corresponding figures for Nokia were \$650 million and 0.17 per cent, respectively.

Nokia, in particular, has a history of handset patent licensing agreements which sought to minimize or eliminate royalty out-payments through cross-licensing, rather than to maximise royalty income. The company needs to unravel previous arrangements and substitute sales volume-dependent agreements for legacy sales volume-independent agreements. The latter were highly beneficial while handset market shares were up to around 40 per cent last decade. These two companies and Qualcomm are also including non-mobile SEPs and non-SEPs in some of their licensing. Ericsson, Nokia and others still need cross-licensing to provide "freedom to operate" in design, manufacture, sale and use of network equipment.

Low barriers with modest royalties paid

The mobile device business--including smartphones, feature phones, tablets and Internet of Things connectivity--has relatively low barriers to market entry through the freely available 3GPP standards. That is why there are so many new handset OEM names in recent years--with the most notable successes including Apple since 2007 and Xiaomi since 2011--seizing substantial market shares.

Ericsson, Nokia and Qualcomm are widely regarded as holding, in total, a substantial proportion, and quite likely the majority, of SEPs reading on 3GPP standards. On this basis, and the fact that Qualcomm has a far more well-developed patent licensing programme than any other company, a total aggregate SEP royalty across all handsets worldwide is most likely to be no more than a mid-single-digit percentage. Five per cent is conservatively more than double the total of 2.36 per cent in royalty rates I have calculated for Ericsson, Nokia and Qualcomm. Other significant SEP holders account for only relatively small licensing revenues. For example, InterDigital Communications, with a business model entirely focused on patent licensing, reported \$264 million in patent licensing revenues in 2013. That corresponds to a comparable royalty rate of 0.07 per cent.

Smartphones designers also seek to include features which are subject to non-mobile SEPs and which might be subject to non-SEPs. But the latter are more



easily ignored or worked around with alternative technologies, and some features might be omitted if this is not possible. In the case of SEPs, it is at least in theory not possible to implement the standard or part thereof without infringing.

On the basis of financially audited royalty incomes from leading licensors, my estimate that total mobile SEP royalties amount to less than a mid-single-digit percentage of handset revenues is in marked contrast to the erroneous aggregate royalty rate estimates of Intel and others. Elsewhere, I have published a detailed [**rebuttal of Intel's defective assessment that the smartphone "royalty stack" could amount to \\$120**](#) on an average \$400 smartphone, including SEPs and non-SEPs. That would correspond to a 30 per cent royalty rate, or around \$100 billion per year in total royalties. This is more than five times my estimate of less than \$19 billion, which includes all mobile SEPs, many non-cellular SEPs and many non-SEPs also thrown in to the licensing bundles. This figure is less than half the mobile industry's R&D spending.

Royalties paid on non-cellular SEPs (e.g. H.264 video and 802.11 Wi-Fi) and non-SEPs amount to no more than additional single-digit billions of dollars. It has been disclosed that Samsung, with 2013 smartphone revenue share of 34 per cent, paid Microsoft an [**annual \\$1 billion in licensing fees**](#) to implement Android. This is exceptional and accounts for a significant proportion of all non-SEP royalties paid.

*I [**originally published this article**](#) in the mobile communications industry trade press with FierceWireless.*



<http://ipfinance.blogspot.co.uk/2014/09/stacking-deck-in-analysis-of-smartphone.html>

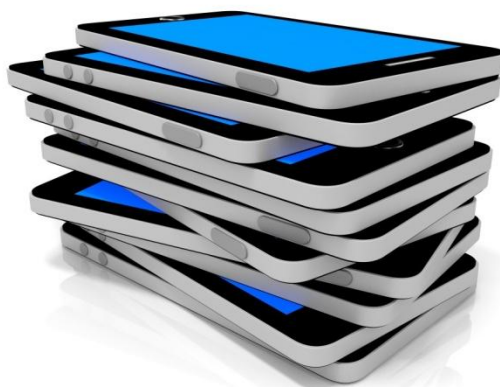
Stacking the Deck in Analysis of Smartphone Patent Licensing Costs

By Keith Mallinson, IP Finance, 19th September 2014

Estimates of patent licensing costs for smartphone manufacturers are greatly exaggerated. Allegations of excessive fees paid and resulting harm to manufacturer profits, incentives to invest and compete are faulty and unsupported by the facts -- which show much to the contrary.

A [working paper](#) entitled *The Smartphone Royalty Stack: Surveying Royalty Demands for the Components Within Modern Smartphones* (the "Paper") has been published by one in-house lawyer at Intel and two outside counsel from [WilmerHale](#). [Intel Vice President and Associate General Counsel Ann Armstrong](#) and WilmerHale's [Joseph Mueller](#) and [Timothy Syrett](#) argue that aggregate patent licensing fees including SEPs and non-SEPs are excessive at around \$120 per \$400 smartphone. They conclude that "few suppliers are meeting the basic goal of selling devices for more than the costs incurred in supplying them," imply that this is due to the alleged royalty stack, and state that "those costs may be undermining industry profitability—and, in turn, diminishing incentives to invest and compete."

Allegations of excessive royalties and harm pile high in smartphones



The Paper's economic and empirical analyses are deficient and defective. In contradiction to its findings, evidence shows that licensing fees:



1. Are not undermining profits and are not preventing manufacturers from covering more than their costs. [According to Credit Suisse](#), handset manufacturer operating profits since 2007 have tripled to \$51 billion on \$326 billion revenues in 2013.
2. Are not excessive. There is no basis for arbitrary price caps on smartphone patent fees, or limits based on chip manufacturing costs. The latter are unrelated to patented technologies and the value they generate more broadly in the entire device, its use in mobile networks, or across the broader ecosystem including services and applications. Methods of determining charges follow well established principles and benchmarks in bilateral negotiation. Patent licensing fees are analogous to licensing fees for book, music, movie or software publishers, which typically exceed greatly the cost of the physical mediums on which they are published and distributed.
3. Are nowhere near \$120 in aggregate; and there is copious evidence actual payments are much lower than purported. The Paper inexplicably and erroneously disregards fundamental offsets in cross-licensing which greatly reduce or eliminate fees paid to many patent owners. This figure is also systematically biased and inflated by including rates demanded by licensors, even where there is no evidence anybody—including those who have little or nothing to cross license —actually pays such rates. And, where there is, instead, copious evidence that rates actually paid, if at all, are substantially less—orders of magnitude less in some instances. For example, court-adjudicated rates were much lower than “demanded” rates in various cases, and yet the higher figures were used in calculating the above total.
4. Are helpful, not detrimental, to the [highly competitive and flourishing smartphone ecosystem](#). By every measure the patent system and the risk-reward balance it strikes—spurring innovation, market entry and competition while not overburdening licensees—is unmistakably working very well.

Theories and practice, in litigation and commercially

This reply to the Paper follows my previous IP Finance posting on alleged royalty stacking entitled [Theories of harm with SEP licensing do not stack up](#) in which I responded to papers co-authored by Mark A. Lemley and Carl Shapiro in 2006 and 2013, and my posting entitled [Absurd \(F\)RAND licensing-rate determinations for SEPs](#) that analyses some U.S. court judgments which have relied on these economists in their royalty rate determinations. I concluded that



economic theories employed (such as that developed by Cournot in the 19th Century to explain pricing effects in the manufacture of brass) are inapplicable to 21st Century ICT patent licensing including smartphones. Theories applied by these economists were not supported by any empirical evidence related to mobile phones. In contrast, evidence I presented indicates the alleged stacking problem does not occur in practice.

The Paper includes pages of purported analysis on smartphone licensing costs, but much of this is defective or misleading: conclusions are largely drawn on the basis of biases and conjecture instead of facts and rigorous analysis. It provides an unbalanced and distorted perspective on litigation versus licensing in general. The Paper's authors boast "years of experience studying such costs, as an in-house attorney at a supplier of components for mobile devices, and as litigators who have worked on many patent cases involving smartphones." The Paper includes discussion of patent litigation, including by non-practicing entities, but without assessing how (in)significant this is in comparison to negotiated licensing without resorting to legal action in this major industry sector. This is a fundamental flaw. The authors make no mention of any experience in forging bilateral agreements without litigation—where terms and conditions for the vast majority of smartphone patent licenses are peacefully determined outside public view.

Economic and econometric analyses are also absent. The Paper does not assess the value derived by licensees in exchange for the R&D costs incurred and risks taken by technology developers. The authors make no claim of having the expertise required to assess or measure the extent to which costs are, or are not, passed through from suppliers to manufacturers and then on to their customers, in the context of the "fierce" competition they observe. They present no econometric analysis to test their assertion that manufacturer profits are undermined or eliminated due to licensing costs being absorbed rather than passed through to their customers, including mobile operators and consumers. The extent to which costs are passed through in the value chain is an empirical question that has not been identified, let alone properly analysed.

One cannot have it both ways

Moreover, there is a major and fundamental contradiction between the Paper and popular positions on alleged [patent hold-up](#) with regard to assumptions on the "pass through" of costs from manufacturers to consumers. As indicated above, the Paper asserts that licensing costs undermine or eliminate profits because they are absorbed by manufacturers rather than passed on in their prices to customers. This necessarily implies that reductions or elimination of such costs, or increases in margin through higher prices at constant costs, would also stay with and be to the benefit of manufacturers. In contrast, patent



hold-up theory proponents seek to deprive patent licensors any share of the economic surplus generated by their technologies in standardisation—which can arise from lower manufacturing costs, higher prices at constant sales volumes or larger sales volumes at constant price—on the basis that these benefits would not simply be pocketed by manufacturers, but would, instead, be passed through to consumers. Significantly, it is quite common for proponents of royalty stacking theories in general, also to be proponents of hold-up theories, as is the case with [Carl Shapiro](#).

My response to the Paper's main conclusions

The Paper's main conclusions answer, incorrectly, four commercial questions:

1. What impact do royalty costs have on manufacturer profits and ability to invest in R&D?

Royalty costs do not undermine profits or diminish incentives for licensees to invest and compete. The Paper states that "the smartphone royalty stack across standardized and non-standardized technology is significant, and those costs may be undermining industry profitability—and, in turn, diminishing incentives to invest and compete." Instead, royalty costs which are widely paid by licensees tend to be passed through to customers (including mobile operators and consumers), as are, and along with, hardware component costs and taxes. And the Paper ignores how patent royalties fund the large and growing R&D investments which enable ongoing innovations, including those by manufacturers who both pay and earn royalties, for today's and tomorrow's cellular standards.

Profits in this industry sector are large and growing rapidly. [According to Credit Suisse](#), handset operating profits since 2007 have tripled to \$51 billion on \$326 billion revenues in 2013. Various mobile network equipment manufacturers also derive significant profits on the basis of SEP-based and other technologies. For example, [Huawei](#) and [ZTE](#) have been doing very well for themselves with record profits recently.

The Paper even states that royalties are "like a tax that a smartphone supplier should expect to pay." Putting aside the obvious negative connotation, this comparison is incorrect and misleading. License fees are consideration for the benefit of incorporating necessary patented technologies in the licensee's products. Fees are paid for only by those who choose to employ the particular technologies. In contrast, taxes are imposed broadly with no choice or direct benefit in return for those who are levied.

And, in contrast to the Paper's assumption that royalty costs go directly to the bottom line in profit reductions and profit elimination for handset manufacturers, taxes are largely or entirely passed through to consumers. For



example, European value-added-tax is levied in the range of 15% to 27% (depending on nation) at every successive stage in the value chain, including to consumers, while suppliers recover their VAT costs. Taxes can exceed the 30% aggregate royalty rate inferred in this Paper (i.e. "estimated potential patent royalties in excess of \$120 on a hypothetical \$400 smartphone") with no evidence tax charges reduce profitability. For example, imported [iPhones in Brazil are subject to 45% tax](#); but consumer prices are marked up accordingly.

Overall market demand is determined by income levels (i.e. consumer spending power) and finished goods pricing; but is only modestly affected by patent fees because these, in aggregate, represent a relatively small proportion of the finished goods prices. The common practice of subsidising handset prices, with handsets sold to consumers in a bundle including an airtime service contract, further diminishes any effects on demand from royalties; because royalties represent an even smaller proportion of total consumer costs. Consumers typically pay several times more for services over the usage life of the phone and service contract period than the unsubsidised handset price. The effective royalty rate as a proportion of total costs is therefore correspondingly much lower.

Variations in profits among manufacturers are determined by competition with differences in pricing power and disparities in costs; not by common input costs. It is the disparities with economies of scale, scope, vertical integration, purchasing power and proprietary differences in design, technology and brand value that put the likes of Apple and Samsung at an advantage with regard to their costs, pricing and product demand. Apple and Samsung generate substantial smartphone profits (up to [nearly 60% gross margins for Apple's iPhones](#)) while patent fees are paid to various licensors on these products. There is no reason to believe, and none was provided in the Paper, why cutting aggregate royalties would reduce the 100% share of mobile profits that the Paper identifies Apple (57%) and Samsung (43%) collectively command in favour of other OEMs.⁴⁵

In contrast to creating cost differences among manufacturers, patent fees paid to licensing-oriented technology companies such as Qualcomm and InterDigital are common costs that make for a level playing field which enables all manufacturers to pass on these costs in their customer prices with minimal effect on their respective competitive positions or profits. The "non-discriminatory" rates paid are reportedly similar among different licensees.

⁴⁵ The Paper fn 3.



Annual R&D spending in cellular, of approximately \$40 billion in 2012, has grown 43 percent since 2008, as indicated in Figure 1. Figures include eleven large technology companies with a predominant or exclusive focus on mobile communications. Some of these are quite diversified and do not break out wireless R&D expenditures in public disclosures, so these figures include some R&D related to other technologies and product markets. However, my total excludes many companies who also invest significantly in cellular R&D; so I believe it provides a fair, yet approximate, representation of R&D investments by the mobile technology industry as a whole.

Figure 1: Total Sales Revenues and R&D Investments for Leading Cellular Technology Companies, in U.S. Dollars and as a Percentage of Sales Revenues

	2008	2009	2010	2011	2012
Total Sales (millions)	\$399,917	\$353,836	\$401,722	\$510,840	\$555,555
Total R&D (millions)	\$27,990	\$27,854	\$30,829	\$37,922	\$39,878
R&D/Sales	7.0%	7.9%	7.7%	7.4%	7.2%

Sources: Includes public disclosures for Alcatel-Lucent, Apple, BlackBerry, Ericsson, Huawei, LG Electronics, MediaTek, Nokia, Qualcomm, Samsung, Electronics and ZTE.

Highly successful new market entry including [Apple \(2007\)](#) and [Xiaomi \(2011\)](#), and large market share gains by [Huawei and Lenovo](#) with smartphones show there are very strong incentives to compete in this market.

2. Are licensing fees fair and reasonable, or excessive and should be capped or rebased?

Licensing costs are not excessive given the value derived by licensees. There is no economic or practical reason why aggregate royalty charges for smartphone patent licensing should be limited to a proportion of hardware costs or total costs, or that royalties must be based on the "smallest salable patent-practicing unit," as demanded by the Paper's authors.

Copyright royalty charges on electronic or physical books, downloaded music or CDs, downloaded movies or DVDs, downloaded software or that distributed on CDROMs typically greatly exceed the cost of the physical medium of delivery, yet these royalties are never limited on such a basis. The manufacturing costs, profitability and players in chipset fabrication (i.e., the foundry business) are



almost invariably completely different from and irrelevant to IP development cost and investment monetization factors (e.g. for 3G, 4G, Wi-Fi and video compression technologies). Similarly, ink and printing costs and competition are very different to other cost and competitive factors in authoring and book publishing. CDRom or flash memory, CD and DVD manufacturing economics and competition have little to do with any of the other costs or monetization factors in software, music or video content. Most of the many examples of royalty charges with rates cited in the Paper, including those related to cellular SEPs in particular, are based on finished product device prices because that is the industry norm, including royalty rates demanded and those agreed in patent licensing agreements. Component price-based royalty benchmarks are few and far between because they are generally not used in patent-licensing agreements.

In general, parties are free to engage in bilateral negotiations to determine royalties for portfolios of patents covered by a license agreement. That is how free markets work. In the case of the mobile communications industry, licensors and licensees often choose to value intellectual property in license agreements – corresponding to the royalty fees the licensee must pay for access to the IP – using a formula that multiplies a “royalty rate” expressed as a percentage with a “royalty base” agreed upon by the parties. The parties can negotiate the appropriate royalty rate and base they believe is appropriate for their business circumstances. In many industries it is commonplace for licensors and licensees to choose the selling price of the licensed product as the royalty base, and indeed this is the most common practice in the cellular industry where royalties are almost invariably calculated as a percentage of handset sales prices. The parties use this approach for a number of reasons as noted below, and negotiate the appropriate royalty rate based on the IP to be licensed.

A chip-based royalty scheme incorrectly and unfairly associates royalties to costs, process economics and competitive outcomes in the silicon chip foundry manufacturing business that have nothing to do with mobile technology development costs and the market value generated from these investments in the broader ecosystem. Similarly, the applicable royalties for software licensors are not and should never be limited to the relatively small cost of burning programs onto CD ROM media. [As U.S. District Judge Leonard Davis recently put it](#), “[b]asing a royalty solely on chip price is like valuing a copyrighted book based only on the costs of the binding, paper, and ink needed to actually produce the physical product. While such a calculation captures the cost of the physical product, it provides no indication of its actual value.” Accordingly, I was [most critical of U.S. District Judge James Holderman’s chip-based damages assessments](#) in the Innovatio case.

The SSPPU is a term of art developed through patent litigation case law in the United States as one of the many ways in which U.S. district courts may value a



patent or a few patents that have been found to be infringed. As the name states, the concept can only be applied where the “patent practicing unit” can be defined. In patent litigation, where one or a few patents are at issue and the scope of the claims of each patent are defined by the court, it may be possible to establish a smallest saleable patent practicing unit. But this is not a substitute for how a patent owner and a potential licensee might value a portfolio of patents as part of a license agreement. Cherry-picking the SSPPU concept and applying it out of context in portfolio licensing ignores the realities of licensing and how parties have valued patents and portfolios for decades.

Virtually every mobile phone manufacturer with a licensing program or that reveals its rates at all, including EU companies (Alcatel-Lucent, Ericsson, Nokia, Siemens), North American companies (InterDigital, Motorola, Nortel, Qualcomm), and Chinese companies (Huawei, ZTE), [has publicly stated in recent years that its mobile standard-essential patent licensing rates are based on a percentage of the entire handset price](#), as illustrated with LTE. Licensing on this basis is a long-standing practice and was widely recognized since the introduction of 2G GSM, as noted by the International Telecommunications Standards User Group in 1998 and in 2G and 3G standards by several other observers including PA consulting Group (2005), Credit Suisse First Boston (2005) and ABI Research (2007). Most mobile phone patent licensing agreements use this basis and Article 325 of China’s contract law specifically anticipates it. [European antitrust authorities](#) and the U.S. patent courts also endorse this approach. Chinese courts used this commonly-accepted royalty base in [Huawei-InterDigital litigation](#). However, in this case with application of antitrust law, royalty costs were crammed down by multiplying this base with a very low royalty rate.

Even assuming it is appropriate to apply the SSPPU concept to patent portfolio licensing, the SSPPU for many portfolios is likely to be the entire device. Narrowing the royalty base to a mobile phone’s baseband processor does not reflect numerous SEP patent claims which extend beyond this chip, including many other components throughout the device and beyond. Mobile communication is a system in which mobile devices operate in conjunction with cellular networks. For example, some patented techniques in interference mitigation are implemented in the ether in conjunction with the antenna arrays (e.g. with MIMO technologies) of both phones and radio base stations.

Costs in patent licensing, as in hardware components, are only detrimental or harmful if they are unnecessary or do not represent value for money. However, the Paper makes no attempt to assess whether aggregate royalties—even at the exaggerated levels they allege—provide net negative value, as opposed to positive value, downstream to manufacturers, mobile operators and consumers. Evidence indicates that innovative cellular technologies have been enormously valuable, and worth the associated costs, as summarised in Bullet 4., below.



3. How should aggregate royalties be counted and how much is actually paid?

It is not costing and nobody is paying anywhere near the \$120 indicated in the Paper. The authors note their estimate both understates and overstates the true royalties, but provide no indication of the magnitude of either effect, or whether the net effects are significant. The Paper states that “cross-licenses and pass-through rights could be expected to significantly decrease the monetary payments made by companies with large patent portfolios.” Nevertheless, the inaccurate \$120 figure remains prominent in absence of anything realistic, and it has therefore been picked up in [headlines by commentators who sympathise with the authors’ cause](#).

The authors inflate aggregate royalties with double-counting. The Paper states they “have not attempted to account for a smartphone supplier’s potential to reduce its cash payments for royalties through cross-licenses and pass-through or exhaustion of patent rights.” It ambiguously and confusingly seeks to justify this by stating they “express royalty costs purely in monetary terms.” It admits that “[f]or companies with a strong patent portfolio, [e.g. cross-licensing] could eliminate cash payments altogether for certain licenses,” but hedge: “granting non-monetary patent rights is still a form of compensation and, presumably, a licensor would demand equal compensation no matter the form in which it is received.” Elimination of cash costs in this way is indeed the elimination of economic and financial accounting costs. Therefore, any cross-licensing value or cost should also be eliminated from any notional stack of aggregated licensing fees.

The associated costs including cross licensing should show up only once in economic and accounting analysis—as R&D expensed by the developer—not twice; as expensed R&D plus a notional outgoing licensing fee that is not actually paid in cash, but only paid in kind. A company’s R&D expenses can generate patented technology value for it in three ways: for its own products, for cross licensing to access rights to others’ patented technologies and to generate cash royalties. In the case of cross licensing, the total cost for the company is no more than its own R&D expense. That pays for it to be able to use its own technology plus the rights to use the technology owned by the counter-party. A manufacturer’s R&D expenses fully account for its internal rights to use the technologies developed plus the rights to use the external technologies made accessible as a result of the cross license.

Cross licensing can reduce royalties actually paid to a small proportion of the theoretical maximum aggregate royalty rate for many implementers. Nokia provides an example of how a strong patent position arising from extensive R&D can keep licensing fees low. Long after the introduction of WCDMA in 2001, [Nokia stated](#) that until 2007 it “paid less than 3 per cent aggregate license fees



on WCDMA handset sales under all its patent license agreements.” Limiting aggregate royalty payments through cross licensing is a major incentive for implementers to contribute to upstream developments or acquire patents. For example, Chinese company Huawei entered the smartphone market in recent years as a manufacturer, and has then diversified vertically by developing and extensively patenting new technologies. Its R&D investments and patenting have increased enormously. This illustrates the incentives to invest and compete are enhanced not diminished, in contradiction to the Paper’s finding (Bullet 1., above).

Moreover, the figure of \$120 greatly overstates aggregate royalties even despite the disregard for cross-licensing offsets. Many of the licensing rates cited in the Paper are unrealistically high because nobody would pay anywhere near as much as demanded in various cases, even if they had nothing to cross license. For example, Motorola is shown to ask for a 2.25% royalty for each of its LTE, 802.11 and H.264 SEP portfolios. In total, this accounts for \$27 (i.e. 22.5%) of the \$120 figure. The Paper does not show that anybody is actually paying anywhere near such “headline rates.” It presents no anecdotal evidence, let alone representative or exhaustive analysis across all the listed royalty demands or for smartphone manufacturers overall. In the *Microsoft* case⁴⁶, Motorola did not produce a single agreement showing the demanded 2.5% royalty rates. Indeed, Judge Robart observed that “the challenge in apportionment is made more difficult by Motorola’s practice of providing licensees with a license to its 802.11 and H.264 portfolios *at no additional charge* if a licensee takes a license to its cellular portfolio.” Since Judge Robart has now set the reasonable royalty rate for Motorola’s H.264 portfolio at \$0.555 per unit, for example, it is clear that the real world H.264 royalty burden would be a tiny fraction of what the Paper’s authors assert. Similarly, Judge Robart determined the reasonable royalty rate for Motorola’s 802.11 patent portfolio to range between \$0.008 and 0.195 per unit.

The Paper also inaccurately attributes \$7.20 to Innovatio IP Ventures’ WiFi patent portfolio. In that case, Innovatio did not submit a single license with a smartphone company to justify this royalty demand.⁴⁷ Once again, this suggests no such license exists. And as is the case with Motorola’s WiFi portfolio, now that a District Court has set a royalty rate for Innovatio’s portfolio at \$0.0956 for each Wi-Fi chip used, no smartphone manufacturer would pay anywhere close to the \$7.20 per \$400 smartphone that the Paper asserts, given that there is typically only one WiFi chip per smartphone.

⁴⁶ *Microsoft Corp. v. Motorola, Inc.* No. C10-1823JLR WL 2111217 (W.D.Wash. Apr. 25, 2013).

⁴⁷ *In re Innovatio IP Ventures, LLC Patent Litig.*, No. 11-C-9308 2013 WL 5593609 at — (N.D.Ill. Oct. 3, 2013, MDL No. 2303).



Similarly, the reasonable royalty rate for the Agere WiFi portfolio has been set at 0.19% of the chip price through District Court litigation, and not the \$20.00 per \$400 smartphone royalty that the Paper's authors assert comprises the royalty stack.⁴⁸ It cannot be determined whether Agere has entered into any licenses with any smartphone manufacturers for the royalty rates that the Paper includes. Agere's Wi-Fi portfolio litigation⁴⁹ involved a jury trial and no written opinion has yet issued on the post-trial motions.

The authors also assert that there is a \$20.00 contribution attributable to Lucent Technologies. For this component, the authors cite an April 29, 1998 letter from Lucent to IEEE.⁵⁰ But there is substantial reason to believe that no company is paying anything close to such a royalty to Lucent. Indeed, there have been four cases involving 802.11 technologies – *Microsoft*, *RealTek*, *Innovatio*, and *Ericsson*. But in none of these cases did any party submit evidence that Lucent was getting such a royalty for its 802.11 patents. In the *Ericsson* case, Judge Davis described the purported 802.11 royalty stacking problem as "theoretical"⁵¹, indicating that no such patent holder was receiving royalties of such magnitude. Moreover, the Lucent letter is very old, and was authored long before any smartphone entered the market. It is not credible to assert, based on this, single, 16 year-old letter, that Lucent is currently making \$20 per smartphone.

The Paper's authors admit that licensing demands are negotiating positions from which they move significantly before licensing fees are agreed. They imply they "have knowledge of confidential licensing information," but state they "do not report on it in this article, in any way." They "report only publicly-available information," and use it exclusively in their "bottom up" analysis; but this heavily biases results toward asking prices and away from agreed rates in executed agreements which are usually private. Negotiations can bring agreed rates right down, for example, where prospective licensees identify weak patents, when licensors are eager to complete an agreement quickly. In some cases, patented technologies are used on an unlicensed basis where no agreement is reached or sought. And yet, the Paper's aggregation of fees is based on the headline rates demanded, for example, by Motorola, Innovatio, Ericsson and others, while there is significant evidence that such rates were not agreed and not paid. Rates paid are commonly much lower: mostly as a result

⁴⁸ Assuming that a Wi-Fi chip costs \$2.00-\$3.00, the royalty rate for these patents would be \$0.0038-\$0.0057.

⁴⁹ The Paper's table at p. 25 fails to reflect the jury verdict in the *Realtek Semiconductor Corp. v. LSI Corp.*, No. C-12-13451-RMW (N.D.Cal.) case, which found that the RAND royalty for the LSI patents-in-suit was 0.19% of LSI's chip product (not the smartphone royalty base used in the table).

⁵⁰ The Paper, p. 24, fn. 110.

⁵¹ *Ericsson Inc. v. D-Link Systems, Inc.*, Case No. 6:10-CV-473 (E.D.Tx Aug. 6, 2013).



of bilateral negotiations without litigation; or alternatively through litigation with royalty determinations by the courts.

The authors presumably feel justified in using headline rates because, as they put it, “they have nonetheless been sought (and received) from some licensees.” But the authors offer no evidence to support this statement even for “some licensees,” and it is far from being representative of agreed licensing terms in all technologies discussed. To the contrary, for example, Judge Robart informed me in a coffee break discussion at a conference in London this year that analysis conducted in the Motorola versus Microsoft case, of Motorola’s pre-existing patent licensing agreements with various parties, showed that agreed rates were far below 2.25%. He made it clear to me his decision in this case, including “reasonable royalties” determined to be two orders of magnitude below that rate, was significantly affected by that discovery.

4. Have licensing fees helped or harmed innovation and competition?

Licensing fees are helpful to the [highly competitive and flourishing smartphone ecosystem](#), not detrimental as the Paper asserts. This is a topic I have [examined extensively before](#), and so I limit myself, here, to making only a few summary remarks. By every measure the patent system and the risk-reward balance it strikes—spurring innovation, market entry and competition while not overburdening licensees—is evidently working very well with respect to:

- Subscriber and network traffic growth: This is outstanding with 7 billion mobile connections worldwide, billions of people now using smartphones with mobile broadband and data usage doubling every year.
- Increasing product and service performance: Innovations include faster baseband modems, applications and multimedia processors, higher screen pixel densities, additional sensors, improved operating system software and a flourishing apps ecosystem.
- Market entry and competition: Successful new entrants in recent years include Apple and Xiaomi, market shares have shifted enormously with supplier concentration decreasing significantly to low levels.
- Price reductions: If royalty stacking was a problem, average smartphone prices would not be falling; but the authors admit prices are falling significantly by stating [that by mid 2013] “the average price of a smartphone fell to \$375 from \$450 at the beginning of 2012.” This is despite the fact that functionality and performance for the “average”



handset increases substantially every year, as indicated above. Quality-adjusted prices are therefore declining even more dramatically.

Licensing fees fund technology developments and innovations that enable large and growing revenues and profits in handsets, network equipment and mobile operator services. Licensing fees contributed to the \$40 billion cellular sector R&D spending in 2012 by various companies. This investment is risky: fees help compensate for their extensive work in standard-setting organizations where most new technology submissions are rejected and some standards (e.g. WiMAX) subsequently fail in the marketplace.



<http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html>

Absurd (F)RAND licensing-rate determinations for SEPs

By Keith Mallinson and published by [IP Finance](#) on 14th November 2013.

[Judge James L. Robart's findings](#) in the case between Microsoft and Motorola, which issued in April 2013, represent the first U.S. judicial attempt to determine reasonable and non-discriminatory licensing fees. Most recently, [Judge James F. Holderman has also had a go](#) in his royalty rate opinion in the Innovatio case. The judges' rate setting applies only to standard-essential patent technologies in H.264 video and 802.11 WiFi. In my opinion, the rates set in both cases are defectively based and unreasonably low.

Rate-setting in SEP licensing



The judges' decisions are both based on the faulty [dictum](#) that patentees are entitled only to a small proportion of standard-essential patent value. Valuation methods selected unsurprisingly reflect that predisposition. The judgements significantly rely on the defective notion that SEP-owners' rewards should only reflect "intrinsic value" of technologies, and that they should be deprived a share of the value that comes through standardisation including "[network effects](#)."



The judges' decisions employ defective methods in determining "reasonable royalties". Parties in litigation proposed few reasonable royalty valuation options that were acceptable to the judges, so the latter worked with what was left after they had rejected everything else. The judges rightly reject various theories that are nonsensical or unsupported by fact, which are promoted by various firms implementing standards-based technologies and their cheerleaders. The judges identify some major limitations in using patent pools as royalty rate benchmarks while seeming oblivious to other pitfalls. Nevertheless, Judge Robert ill-advisedly uses pools as benchmarks. Judge Holderman, however, latches onto an alternative approach, based on component manufacturer profits, that is also deeply flawed. Unfortunately, the judicial systems tends to oblige, or at least strongly encourages, the judges to go along with the best (or least unacceptable) royalty rate assessment methods presented by the opposing parties in litigation, even if none of them are very good.

While picking out some points with which I agree, I'll leave it to readers to plough through the bulk of the judges' own analysis explaining how they rejected and selected from among various methodologies presented by the testifying experts. This includes economic and legal principles and precedents in reasonable-royalty determination for patents in general and SEPs in particular.

In this article, I first consider some fundamentals including dubious concepts and assertions around intrinsic value, "hold-up" and "royalty stacking". I then focus critically on the basis – and deficiencies therein – upon which (fair) "reasonable and non-discriminatory" royalty rates were determined in each judge's decision. I have without prejudice adopted the assumptions and conclusions on validity, infringement, essentiality and relative patent strength in the above judgements. I have not evaluated the patents in suit with respect to these issues and I have not had access to various confidential patent licensing agreements in evidence in these cases. Instead, I have focused my analysis on the ways and means reasonable royalties and damages can and cannot be, accurately and reliably, derived upon the basis of the above.

My assessments are as a business analyst with 25 years experience in the ICT sector. I have written numerous industry research publications on technical and commercial developments throughout this period. My work includes many engagements as a testifying expert witness in patent licensing agreement disputes, asset valuations, damages assessments and antitrust cases in the mobile communications industry.



Unreasonable definitions and pie-sharing

There is little or no contention that developing core technologies involves costs and risks for which SEP owners are entitled to recompense under (F)RAND licensing agreements. The risks of developing SEPs include not only the usual R&D risks but also the risk of not obtaining adoption of a successful R&D technology into the standard. Some, however, including these two judges, believe SEP owners do not deserve and should not receive any additional financial reward for technologies being incorporated in standards including enhanced demand resulting from network effects for these.

Total value exceeds even golden inherent value



"With the doubloon, you've got the intrinsic value of the metal plus the numismatic considerations."

These and other recent judgments are awash with dicta on types of SEP value and who is not entitled to benefit from some of them. The notion that the "intrinsic value" should be the maximum reward for SEP technology developers is central to the judgements of Robart and Holderman, and yet there is inadequate basis for such a limitation. Instead, sharing proceeds from the value of standardisation is equated with "hold-up" – a term with intrinsically negative connotations. According to Judge Robart "[t]he ability of a holder of an SEP to demand more than the value of its patented technology and to attempt to capture the value of the standard itself is referred to as patent "hold-up." According to Judge Holderman, standards-setting allows a company "to charge inflated prices that reflect not only the intrinsic value of its technology, but also the inflated value attributable to its technology's designation as the industry standard." Citing Judge Robart, he asserts that "a RAND rate [should] reflect



only the value of the underlying technology and not the hold-up value of standardization.” These comments echo those of [Judge Posner in his 2012 Apple versus Motorola ruling](#) who also conflates sharing value with patent hold-up: “[t]he purpose of the FRAND requirements ... is to confine the patentee’s royalty demand to the value conferred by the patent itself as distinct from the additional value—the hold-up value—conferred by the patent’s being designated as standard-essential.” The judges also cite back to various academic papers with theories going back many years. But this is all a whim: there is nothing in patent law, antitrust law or any law other than the dodgy case precedents being set here, or in the voluntary intellectual property policy agreements made by consensus or majority voting among the members of standard setting organisations including ETSI, IEEE and ITU that requires such a restriction.

Judge Holderman recognises that value in standardization cannot easily be separated, but this held little sway, given the unreasonably low rate he selected. He cited one expert by stating that “the court finds Dr. Teece's testimony regarding the difficulty of distinguishing between the intrinsic value of the technology and the value of standardization to be persuasive.” It makes no economic or commercial sense to truncate financial incentives and rewards for core technology developers. On the contrary, [there is extensive evidence](#) that the IP compensation system with (Fair)RAND licensing works well with SEP technology implementers negotiating market-based rates that share rewards with patentees for the success of standards-based products and services, including network effects.

What Judges Robart, Holderman and Posner and their academic precursors seem to be concerned about is the theoretical possibility that SEP owners will abuse their position once standards are adopted to extract more than their appropriate share of rents from the implementers. But this is only theory and conjecture. In pursuing this they go well beyond reasonableness and deny the technology developers any royalty benefit due to standardisation. This is plainly goes against common sense, industry practice and appropriate returns, and incentives, for development.



Is this really hold-up?



There is an implied but highly questionable assumption; which is rarely stated and never in conjunction with any supporting empirical evidence, that economic benefits from patented technologies in standards, including product improvements and cost savings, will be passed through to end users in lower quality-adjusted prices – not hoarded by implementers and distributors in fatter profits. End-users are worthy of some such gains, and they probably receive some eventually; but there is no good reason that all the standardization value which has not passed through should only be accrued by implementers and distributors, including service providers such as mobile operators. For example, market-leading OEMs including Nokia until around 2008 and Apple ever since have retained stellar smartphone profit margins by selling at premium-prices. Elsewhere in price-fixing damages litigation, for example, empirically-based “pass-through” analysis measures how changes in costs are borne or passed on at the various steps in the value chain. This analysis is the norm and is typically required in evidence in those cases; but this kind of assessment is totally absent in these SEP reasonable royalty determinations. There is no proof or even supporting evidence presented that reasonable royalty determinations bifurcate pie shares more widely than among those who develop the standard-essential technologies and those who make beneficial use of them in the design, manufacture and distribution of finished goods and services.



Technologies do not sell themselves to SSOs

Core technology developers do deserve to share in the economic benefits of standardisation and network effects because of the significant costs and risks in developing, proposing and integrating their technologies. That has been the basis for investment and market success so far. Technologies that might find little or no market demand, unless included in standards, are developed at great expense with significant risks in anticipation of adequate rewards if developments yield good technical results, quickly enough, **and**, most significantly, if their sponsors can persuade SSOs to adopt them. Overall, rewards for successes must cover the costs of failures for investments to be sustained. There is no suggestion failure should be directly rewarded; but this is a common misrepresentation by detractors.

Technology does not automatically find itself adopted by SSOs. It takes a lot of time, money and effort even to get a very good core technology into a standard. This is a highly competitive environment with alternative technologies and rival companies often furthering their own interests primarily. Standardization of UMTS and LTE provide enlightening examples.

Even great produce needs sales and marketing or it will go to costly waste



Financial returns for core technology developers must cover the possibility that the entire standard might fail in the market. This can be illustrated with the intense competition that was evident among wireless technologies for inclusion



in 3G and 4G mobile standards. There were four air-interface technologies proposed for 3GPP's UMTS standard including WCDMA, OFDMA, WTDMA and TD-CDMA, with member voting penultimately split right down the middle between WCDMA and TD-CDMA in 1997. WCDMA ultimately prevailed, depriving all the other technologies an adequate commercial return from the standard. Several years later, OFDM/OFDMA technologies were made fundamental to several new and competing standards including IEEE's 802.20 (based on Flarion's proprietary Flash-OFDM), IEEE's 802.16 WiMAX, 3GPP's LTE and 3GPP2's UMB. Only LTE and WiMAX have gained sufficient commercial traction for long enough to generate significant revenues for anybody. WiMAX foundered, has failed commercially and is [dying young](#). The other standards were aborted in infancy. Nevertheless, significant R&D expenditures were incurred and work was required and expended in workgroups by a wide variety of would-be and actual contributors to each and every one of these standards.

There is also a lot of attrition at the more granular level of individual and incremental contributions to specific standards and parts thereof. According to Signals Research, in [a consulting study for Ericsson](#), ETSI data reveals 42,318 submissions to 3GPP standards working groups, including 55% of them for LTE, between 2007 and 2008. Most technological suggestions, including those subject to SEPs did not make it into the standards. According to Signals Research's interpretation of the data, "[o]f the LTE-specific submissions, only 3,683 documents, or 15.9% of all LTE submissions, were approved by the pertinent 3GPP working group, meaning that the contents or suggestions contained in the document were incorporated into the LTE standard. The remaining LTE submissions were withdrawn, noted (but not approved), revised, or not acted upon by the working group. Most of the unapproved submissions fell into the latter classification." That is equivalent to fewer than one in six submissions being successfully approved. Therefore, return on investment for adopted submissions in successful standards must also cover costs for all the core technology development and standards-setting work for the other five. Obtaining approvals for submissions is much more than simply a paperwork exercise. For example, there is also the need for significant backup with simulation, lab and field testing results. Obtaining SSO approvals also requires something akin to sales and marketing activities in the quest to educate and persuade peers in the relevant working groups.

It is economically efficient and necessary that core technology developers should and do invest most significantly in promoting and integrating their



technologies in standards, as indicated above. They also require and deserve adequate returns on these costs for technologies that are adopted with commercial success in downstream markets. Simple economic theory shows it is worthwhile incurring significant additional indirect costs, for example, in sales and marketing when the costs of producing are mostly fixed, sunk and with low marginal costs, as is the case with licensing-out SEP technologies. The aim is to offset one's additional fixed costs with additional demand volume at high gross margins through growing the market, competing for share or reducing costs for downstream customers. For example, elsewhere, in pharmaceuticals where patented drugs tend to have very high sunk costs in R&D and low marginal costs in production, it is economically most efficient to spend nearly twice as much on sales and marketing versus R&D to maximise volume demand for products. [The U.S. pharmaceutical industry spent](#) 24.4% of sales on promotion, versus 13.4% for research and development, as a percentage of US domestic sales of US\$235.4 billion in 2004. The S&M expenditure is to inform, educate and promote in a highly-competitive marketplace to maximise these high gross profit margin sales. This system and the profits it generates also spurs ongoing drug R&D. Similarly, where core ICT technologies are developed, R&D costs are sunk and can be substantial; but marginal costs in licensing them by SEP owners are low. It is therefore worthwhile for technology developers to invest significantly in a wide range of SSO activities, as they do, in pursuit of getting their technologies adopted. This can only be justified if SEP owners get to share in the rewards from the increased utility, lower costs or increasing demand that may ensue. When they do, they are [incentivised to continue investing in innovation as they clearly have in SEP-based standards](#) in recent years.

SEPs are neither equal in value nor worthless

The value of individual SEPs reading on a standard can vary significantly; but standard-essential patent pool administrators for H.264 video coding/decoding and 802.11 WiFi technologies generally deem total value proportional to the number of patents owned among SEP owners. Judge Holderman rightly rejected bogus expert witness testimony explaining that low participation in VIA Licensing's 802.11 patent pool was due to licensing charges being too high. He also applies real-world common sense in his reasoning that "it is unlikely that the market would drive the price of all patented technology to zero" by rejecting an expert's notion that "economic models suggest that if two patented and equally effective alternatives both cost the same amount (i.e., charge the same



royalty), the two patent holders would negotiate the price down to effectively zero (ignoring the cost of implementing the alternatives), because both desire to have their technology incorporated into the standard, and both know that their technology will be worth practically nothing if it is not adopted into the standard." This ill-conceived theory ignores the obvious conclusion that at zero price the patent holder would have no remaining incentive to have its technology incorporated into the standard. It would, instead, seek other avenues for implementation of its patented technology.

Nevertheless, rate determinations are unsoundly based and derisory for patentees. As Judge Holderman rightly states, "calculating a reasonable royalty 'necessarily involves an element of approximation and uncertainty.'" But bias is neither fair nor just. Their determinations include significant biases that are either unidentified or subject to adjustments lacking adequate and reliable basis, in a similar manner and extent to those of some expert witness estimations the judges rejected under the very same reasoning. For example, Judge Robart multiplies patent pool rates by a factor of three: "the only relevant evidence before the court is that Microsoft pays into the MPEG LA H.264 patent pool about twice as much as it receives back for rights to its H.264 SEPs." As analysed in greater depth below, patent pools have predominantly downstream interests and participation: disaggregating net payments in this way does not accurately reflect reasonable royalties between downstream and upstream interests. There is also scant justification that the figure would likewise also be applicable to Motorola. Instead, he dubiously states that "[t]his conclusion follows logically from the simple fact that Motorola and Google are similarly situated, substantial technology firms with vast arrays of technologically complex products."

By contrast Judge Holderman rejected, for good reason, the explicit use of a pool benchmark in the Innovatio case. Pools tend to skew towards lesser patents and are not representative of rates for moderate to high value patents, such as Innovatio's, whose owners are relatively more inclined to self select out of pools.

Squashing the stack

Analysis is also based on [strongly contested theories](#) of problems and associated harm with respect to what Judge Holderman calls "stacking concerns." The supposition is that unless individual royalties are moderated, aggregate rates



will be excessive. There is no empirical evidence that the alleged stacking problem actually has occurred.

It never really piles so high



The debate about what constitutes reasonable royalties is usually framed rather simplistically—in particular by those who assert that royalties are too high. Patent fees are usually referred to as running royalty percentage rates or monetary amounts (e.g., in dollars or Euros) demanded per unit sold. However, these metrics are probably not the most prevalent, let alone universal, determinants of actual payments made on a trade-weighted basis. Instead, standard-essential patent licensing agreements commonly include royalty caps and cross-licensing. Under these circumstances, the effective royalty rate or royalty payment per unit may be reduced substantially or eliminated entirely for incremental sales on relatively large total sales volumes –particularly for the most commercially successful licensees who command largest market shares. With cross-licensing, net charges can be as low as zero or even negative in many cases. In other words, the headline maximum royalty rates, in many or most cases, shrink substantially in the effective rates and per-unit fees that are actually paid, if any at all. Net royalty charges, therefore, can vary enormously from licensee to licensee. They depend crucially on the specific circumstances in licensing, parties' business profiles with respect to technology development and manufacturing, business models, license-negotiating acumen and commercial



performance in their relevant markets. Multiple bilateral cross-licenses can net-off incoming and outgoing royalty claims and payments to relatively low figures, with somewhat similar overall results to patent pooling in some, but by no means all cases.

Spurious precision where demands exceed awards 100-1,000-fold

Judge Robart agreed with Microsoft that Motorola's SEP royalty demands were unreasonable. Microsoft claims that Motorola breached its RAND obligations by making an unreasonable offer in a negotiation to license Motorola's H.264 and 802.11 SEPs. Motorola sought a "reasonable royalty" of "2.25% per unit for each H.264 compliant product, subject to a grant back license under the H.264 patents of Microsoft" and "2.25% per unit for each 802.11 compliant product, subject to a grant back license under the 802.11 essential patents of Microsoft". The royalties are "calculated based on the price of the end product (e.g., each Xbox 360 product) and not on component software (e.g., Windows Mobile Software)". These figures correspond to single or double-digit dollars-per-unit in royalties, with end-product prices varying considerably with specifications. Judge Robart's decision sets the royalty rate and range around two or three orders of magnitude lower, and as a monetary amount per unit rather than as a percentage of end-product prices, as follows:

- H.264 SEPs: "The RAND royalty rate for Motorola's H.264 SEP portfolio is 0.555 cents per unit; the upper bound of a RAND royalty range for Motorola's H.264 SEP portfolio is 16.389 cents per unit; and the lower bound is 0.555 cents per unit. This rate and this range are applicable to both Microsoft Windows and Xbox products. For all other Microsoft products using the H.264 Standard, the royalty rate will be the lower bound of 0.555 cents".
- 802.11 SEPs: "The RAND royalty rate for Motorola's 802.11 SEP portfolio is 3.471 cents per unit; the upper bound of a RAND royalty range for Motorola's 802.11 SEP portfolio is 19.5 cents per unit; and the lower bound is 0.8 cents per unit. This rate and this range is applicable to Microsoft Xbox products. For all other Microsoft products using the 802.11 Standard, the royalty rate will be the lower bound of 0.8 cents per unit".



Judge Holderman only needed to consider 802.11 SEPs in the Innovatio case: in this he nominally settled on a rather different rate-setting methodology to Judge Robart; but cross-checked with his findings. It seems Judge Holderman was mostly likely significantly swayed by these in setting his own rate. His satisfaction with the closeness of the rates is very clear: “the court’s RAND rate of 9.56 cents per Wi-Fi chip is comfortably within Judge Robart’s reasonable range for a RAND rate for Motorola’s eleven standard-essential patents.”

In the context of the parties’ claims and counterclaims for reasonable royalty rates in these cases differing by several orders of magnitude, it is quite remarkable and extremely pertinent that Judge Holderman has selected a rate that is within Judge Robart’s relatively narrow range. There is no reason why one should assume, without adequate justification that the relative values of Motorola’s 802.11 SEPs, which are deemed to be “only of minimal value to the standard”, versus those for Innovatio, which are deemed to be of “moderate to moderate-high importance to the standard,” should necessarily be within only around one order of magnitude. Even that range might seem quite wide in comparison to other estimates one can readily make with far greater precision – such as the cost of ingredients to make a standard-sized plain white loaf of bread, the volume of water in a reservoir, or the temperature on the surface of the sun. However, there was no judicially endorsed RAND benchmark for these kinds of SEPs before Judge Robart’s ruling, so there is no ex-ante reason to assume anything about ranges and relative valuations.

Consequently, it is most significant that Judge Robart has anchored his rate assessments on the plentiful and seemingly precise facts and figures about patent pools. However such precision is only legitimate if the patent pools themselves; including adjustments applied to their rates by the courts, are quantitatively representative of licensing outside the pools. I will show in the following sections that there are major biases that make even adjusted patent pool rates inaccurate and unreliable.

Inapplicable benchmarks

Judge Robart finds all kinds of reasons why settlement agreements and licenses executed in the normal course of business are not indicative of reasonable royalties for SEPs relating to these standards including: duress of litigation, inclusion of patents that are not RAND encumbered, expired patents, and cross-licensing. Having exhausted these possibilities, he strays into making unreliable



comparisons himself by basing his determinations on patent pools. These are multi-lateral voluntary arrangements which Motorola considered and then chose not to join late in the game. I have also heard stories of other companies who ever-so-nearly joined the 3G WCDMA patent pool. Similarly, hours before the establishment of the MPEG-2 pool, [Lucent elected not to participate](#), having concluded it would do better licensing its patents individually. There are various [reasons why supposedly "interested parties" might not eventually join patent pools](#) including intelligence gathering, tactical bluffing, hedging bets, favourable progress with bilateral negotiations outside the pool and changes in circumstances. But that is their prerogative. No deal is done until it is done. If the understanding is that parties are not bound by patent pool terms and conditions until they sign on the dotted line, then that means they are not at all bound until they do, if ever. Basing rate determinations on pools are a significant distortion from what arms-length negotiations would yield in bilateral negotiations between willing parties, even if a party expressed interest in joining the applicable pool and then changed its mind.

Judge Robart defectively uses patent pool licensing rates as a basis, albeit with some adjustments, for his reasonable royalty rate determinations. The following sections analyse patent pools and explain why they are biased and inapplicable in determining (F)RAND royalties for those outside the pooling agreements.

Raison d'être for patent pools and those who promote them

The primary business objective for most patent pools and industry organisations that promote them is to eliminate, minimise or significantly limit royalty payments inside and outside patent pools. They seek to establish themselves as general benchmarks for SEP value in relevant standards so as to forge and maintain their apparent share of the total patent value created by the standardised technology. For example, [patent pooling is promoted for 3G WCDMA mobile technologies](#), by patent pool member NTT DoCoMo, on the self-serving basis as a major purchaser of mobile phones, in its technical journal:

"Because standardized technologies incorporate many patents, high cumulative patent royalties are a major concern. To address this concern for the W-CDMA technology, Platform W-CDMA, an organization that enables patent holders to jointly license their essential patents, has been established and has conducted its licensing business since 2004."



Similarly, a primary mission for setting up the [NGMN Alliance](#) (a creation of the major wireless operators) was to minimise royalty rates, even though this is not stated explicitly. It issued a Request for Information and conducted a [beauty parade among patent pool administrators](#) to spur interest in the formulation of patent pools for LTE SEPs.

Constituency-effect biases in patent pools

Patent pools have become popular in certain technology fields; but there are several reasons why they are inapplicable benchmarks, with inaccuracies and severe biases arising from [strong constituency effects](#) and other shortcomings:

- Patent pools are downstream-oriented despite including large proportions of vertically-integrated members. According to Judge Robart, “[t]he uncontroverted evidence before the court demonstrates that an SEP licensor in a patent pool receives both royalty rates from the pool and value to the SEP holder in terms of unfettered access to the intellectual property of the pool”. This neglects the fact that some licensors, such as upstream core technology developers including universities who do not manufacture, might not need access to access to others’ IP for that purpose. This is a major reason why such companies are disinclined to join. In contrast, minimising royalty out-payments is more important than generating cash royalties for most implementers, including those with upstream core-technology development activities. Where these kinds of vertically-integrated companies predominate in the formation and ongoing control of patent pools, as they invariably do, they conspire to keep rates relatively low. Judge Holderman concludes, in the case of the Via Licensing patent pool for 802.11, that it was not that licensing prices were set too high, as suggested by one testifying expert: on the contrary; “[t]he court finds it more plausible, however, that the prices are too low to give patent holders a reasonable return on their technology.”
- Patent pools have only succeeded or significantly exist for a relatively small number of particular technologies and standards. Some patent pools for audio and video streaming technologies have been successful in pooling most of the SEP technologies for the relevant standards; but pools have generally fared poorly elsewhere. Various attempts in 3GPP cellular and IEEE wireless



technologies over many years have drawn at best pitifully low and unrepresentative contributions to prospective pools. The 3G WCDMA patent pool was generally rejected by significant patent owners. Only mobile operators including NTT DoCoMo along with its highly-dependent, obedient and [isolated Japanese equipment vendors](#) and Siemens joined. While Siemens' position in 3G IP assets was marginalized with adoption of WCDMA, as opposed to its preferred TD-CDMA technology, in the initial standardization of UMTS in Release 99, it retained a significant market position in handsets and infrastructure manufacture. According to Judges Robart and Holderman, "the Via Licensing 802.11 patent pool has not been successful in encouraging widespread adoption of the 802.11 Standard through buy-in to the pool of licensors and licensees. As stated, the purpose of the RAND commitment is to achieve widespread adoption of the standard. It stands to reason then that the less a patent pool achieves widespread adoption of the standard, the less relevant the pool becomes as an indicator of a RAND royalty rate." Also according to Judge Holderman "[t]here are several problems with the use of the Via Licensing pool as an indicator of a RAND rate in this case. The first is that the pool has attracted only five licensors, thirty-five patents, and eleven licensees. The Via Licensing pool has therefore been relatively unsuccessful in attracting licensors." Over 1,000 companies have participated in 802.11 standard-setting. VIA Licensing's coverage is therefore very low. Given all the biases, as described above and below, it seems most likely to be woefully unrepresentative of WiFi patents in general. There appears to be no evidence to the contrary.



Pool flop sets poor example



- Most significantly, in the context of reasonable royalty assessments in these cases, patent pool [representation is also significantly skewed](#) towards companies holding relatively weak patent portfolios. Judge Robart recognises that “[t]he trial record supporting the court’s policy concern is clear: Other things remaining the same, the higher the value of an owner’s SEPs and the stronger its licensing program, the lower is its incentive to join a patent pool and the less likely it is to join a pool.” For example, none of the clear leaders in 3G WCDMA technology—neither Ericsson, nor Nokia nor Qualcomm—joined the 3G WCDMA patent pool. Owners of strong, valuable patent portfolios are put off joining because patent pools tend to under-value such patents, with most pools assigning value on the quantity of essential patents while making no allowances for differences in patent quality or value. Judge Holderman nominally rejects the use of pool rates in the Innovatio case specifically for the reason that rates may be biased towards lower value patents and cannot be seen as benchmarks for moderate to high value patents. However; he is clearly comforted by the fact that the rate he sets falls within Robart’s pool-based rate range.
- Patent pools, therefore, tend to significantly encourage and reward quantity over quality or value by applying uniform rates to all included SEPs in most cases. Patent pool administration tends to favour assessing patent essentiality and then allocating royalty revenues and costs with simple mechanisms such as proportionally



on the basis of total patents owned and number of units manufactured or sold. This clearly short-changes those with strong or valuable patents. It also creates the detrimental incentive for members to make as many new filings as possible for prospective SEPs, rather than to focus on a smaller number of stronger and more valuable patents. Consequently, over the years, average patent quality will fall as the total number of patents in the pool increases. Relatively low rates per patent will also result.

- A further fundamental problem with most patent pools and other shared licensing methods is in simplistically allocating royalties to individual patents or patent portfolios. For administrative ease, patent pools tend to allocate value in proportion to the count of SEPs. This proportionality, as employed by MPEG LA's H.264 pool and Via Licensing's 802.11 pools, does not and cannot reflect that individual SEPs differ in value. Some SEPs can be worth up to several orders of magnitude more than others. For example, seminal patents with many forward citations, court-proven validity, widespread licensing or successful patent infringement history might be worth thousands of times more than those of dubious validity or usefulness. Patent pool participant licensors and licensees also voluntarily agree to, simple, sum-of-the parts portfolio valuations, with addition and subtraction of incoming and outgoing royalties, in determining net royalty charges.
- Most pools arbitrarily decide on some aggregate maximum royalty to be charged by the pool. There is no reason why this calculus should be imposed on others outside the strictures of patent pool membership and administration. Valuations in bilateral licensing agreements do not have the simplistic caps and linearity employed by patent pool administrators. There is no justification to subjugate a company with a superior patent portfolio to the arbitrary aggregate royalty and allocation methodology adopted by pool members with inferior (e.g., weaker, less valuable) patent portfolios.
- In contrast to fairly simple pricing metrics for patent pools—predominantly with running royalty rates or per-unit fees—while also including some per unit caps, bilateral licenses may have



broader scope and a much wider range of terms and conditions. Licences typically include portfolios that might include multiple standards and non-SEPs. Payments can be percentage-based or per unit, they might include running royalties or up-front lump sum payments, could be fully paid-up, or include annual or lifetime caps, for example. Public discussion of royalties including academic literature and reasonable royalty rate judgements such as these tend mostly to be described in terms of running royalties in money payments (e.g., a dollars or cents figure) or royalty rates as a percentage of the price of a component or finished product. This view of the world is somewhat consistent with the way patent pools work, but there are many and major examples of licensing that bear little resemblance to this. For example, with royalty caps on individual products or on high total sales volumes, effective royalty rates frequently shrink to small proportions of headline royalty rate percentages or per unit fees. Similarly, with lump sum paid-up licences, licensees also have the opportunity and incentive to effectively diminish their royalty rate percentages by successfully selling higher volumes than parties expected.

- Non-monetary terms and other factors can also be very significant. For example, grant-backs, non-assertion and defensive suspension provisions make patent pools more attractive to downstream players including vertically-integrated players. These provisions provide little incentive to disinterested upstream technology developers. Inclusion of non-SEPs and the bundling of SEP licensing across standards, which are forbidden with patent pooling, and time left until patents expire may also be very important factors in choosing whether or not to join a pool versus seeking to complete multiple bilateral negotiations outside of it.

Extrapolations and analogies

The only attempt to quantify the disparity in SEP values in these two cases accepted was with the testimony of one expert who came up with a rule of thumb akin to [Pareto's 80:20 rule](#). This was applied not to a pool rate; but to apportioning "the 12.1% profit margin on a WiFi chip" defectively considered to be the applicable amount available for payment of royalties. Judge Holderman latched onto this expert witness testimony "relying on a 1998 article finding that



the top 10% of all electronics patents account for 84% of the value in all electronics patents.”

The boom in SEPs and patent pooling in ICT are predominantly post-1998 phenomena. Empirically-based recalibration with something more up-to-date valuing SEPs, in particular, is required, given prolific tactical patenting to increase patent count under proportionality rules, for example. Furthermore, how one could, for example, reliably extrapolate upon a finding, such as that above, to value “top 5%” patents is unclear. This should only be attempted with analytical rigour and sufficient empirical support.

Patent pool rates are readily and clearly available publicly, but that does not make them generally representative of bilateral agreements. If you lose your car keys at night you may be inclined to start looking for them under the light of a street lamp. However, the keys are quite likely to be found where visibility is not so good. Taking such analogies further; patent pool rates are used to benchmark reasonable royalties in a similar manner that drunks use street lamps – more for support than illumination.

Street lamp assistance



Litigation parties and the courts need to seek out a wider and more representative selection of valuation benchmarks. Companies that have well established licensing programs with broad market acceptance of their SEP portfolios and licensing terms often provide better, more accurate, reliable and generally-applicable benchmarks for royalty rates consistent with (F)RAND undertakings. For example, [Ericsson](#), [InterDigital](#), [Nokia](#) and [Qualcomm](#) own, in total, the majority of SEPs reading on 3GPP standards. They have well-



developed patent licensing programs for these and many other standards, including 802.11, for example.

The absurdity of a free lunch

The notion that patent pool licensing rates are representative of bilateral (F)RAND licensing is shown to be false by the existence of the royalty-free patent pool for the [Bluetooth](#) personal area network wireless technology standard. Some claim this is not a true patent pool; but that is because it does not have the usual administrative trappings to exhaustively evaluate essentiality, collect and disburse royalties. Those would be superfluous with [royalty-free licensing](#). Whereas it would be bizarre to assert that zero royalties are *reasonable* compensation for an SEP technology developer with no means to derive income in the downstream market, many an implementer, distributor, service provider or end user would be quite happy with that arrangement. Royalty-free pools sacrifice all potential licensing fees in order to maximise standards' adoption and demand for products in downstream markets including components, finished goods, and services. Vertically-integrated licensors are more concerned to minimise royalty out-payments and stimulate demand for downstream products than maximise their royalty receipts. In this case, patentees' rewards must be entirely through alternative benefits to royalty income. [Open source software ecosystems have similar characteristics](#) with OSS software developers voluntarily contributing shared code for free and seeking no royalties while making their money in downstream markets such as hardware, customization, integration and support (e.g., [Redhat –“The World's Open Source Leader”](#)).



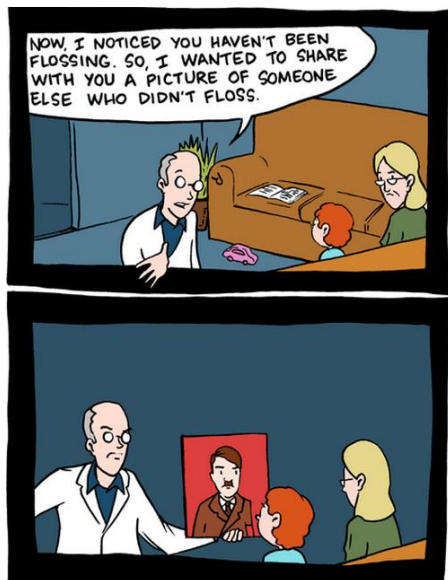
Beware of getting hooked on costly freebies



Reductio ad absurdum, as argued above, can be applied further to the bogus notion that grossing-up royalty costs plus royalty revenues (as opposed to considering only royalty revenues, or, even worse, net royalty revenues after subtracting royalty costs) captures all value accrued from the pool. As already discussed, Judge Robart multiplies pool rates by a factor of three in his shaky assessments on the basis that "Microsoft pays into the MPEG LA H.264 patent pool about twice as much as it receives back for rights to its H.264 SEPs." If this logic was applied to a royalty-free pool benchmark the adjusted value would be three times nothing, which still equals nothing. Pool rates, therefore, cannot be used as reasonable royalty benchmarks unless the corresponding adjustments can be proven more reliable. For example, multipliers would tend towards infinity with near-royalty-free pool rates. If pool rates are to be used at all, adjustment factors need to be much larger than Judge Robart estimates, and other kinds of adjustment (e.g., additive, rather than multiplicative) are required in at least some cases.



Reductio ad absurdum



Just because a theory is popular or convenient and seems to fit does not make it right. If pooling can skew rates to zero, how high might they reasonably be without pooling? Any accurate and reliable use of pools as benchmarks must have a sound basis for establishing their rates and scaling them versus non-pooled rates in negotiated bilateral agreements. This was absent in Judge Robart's analysis.

He has provided insufficient justification for pool-based rates despite his findings that:

- Motorola's patents were below average quality and utility, based in part on testimony from Motorola's own expert with regard to a patented H.264 feature that was rarely, if ever, used (e.g., not even by Google's YouTube).
- Motorola was close to joining the Via Licensing patent pool, even though it did not ultimately join.
- Motorola's negotiating history and executed licensing agreements with other parties are consistent with his pool-based rate findings.

The confidentiality of the latter, in particular, makes it impossible for me to critically assess the conclusion. Nevertheless, this does not make patent pool benchmarking generally applicable, for example, to the Innovatio case, in particular, where the patents were deemed to be above average with respect to



quality and utility. Using patent pools as a benchmark for what is generally fair and reasonable to both upstream and downstream interests in bilateral negotiations outside of pooling is misplaced and will yield unfair, unreliable and in some instances absurd results.

Judge Holderman shuns pools, but limits royalty base

Judge Holderman takes an approach to (F)RAND royalty determination which is substantially based on Robart's ruling but differs on several points. In particular, he ultimately bases reasonable royalties not on pool rates, as Robart did, but on allocation of "the 12.1% profit margin on a WiFi chip" among the total population of relevant SEPs. Judge Holderman believes the "Top Down approach [proposed by an infringers' expert] best approximates the RAND rate that the parties to a hypothetical ex ante negotiation most likely would have agreed upon in 1997, before Innovatio's patents were adopted into the standard."

Shortcomings with top down



Although I agree with some of Judge Holderman's analysis, his damages assessment is deeply flawed. Judge Holderman rightly recognizes patents vary in value and he recognizes that patent owners would have no incentive to invest in new technologies or would leave SSOs if their patents only received incremental value versus closest alternative. However, while rejecting damages assessment methods with patent pool benchmarks, he leaps onto this alternative "top-down" method that is inconsistent with how royalties achieve value and are derived in the real world. He erroneously bases his assessments



on the notion that royalty costs must come out of and be a modest proportion of chip component profit margins. This is nonsense.

Royalty base

Royalty costs do not generally come out of contract manufacturer or component manufacturer profit margins. Royalties are in some cases paid at the component or contract manufacturer level, and in some cases at the product or original OEM level. Implementers treat licensing fees like any other input cost such as labour or materials in manufacturing. In some cases, manufacturers may even mark up royalty charges along with other costs in setting their prices. This can result in additional, not reduced, profits to the implementer (i.e., the licensee).

Royalties are paid for manufacture, sale and use of technologies. There is generally no double-dipping by patentees. Once royalties have been levied and paid for a particular purpose, they are usually not paid again, further along in the value chain. Contract-manufacturer pricing is generally cost-based in ICT nowadays. If a contract manufacturer (e.g., Foxconn) pays royalty fees, they are an allowable "bill of materials" cost upon or before which its profit margin is applied in setting the agreed price with the OEM purchaser. Alternatively, and most commonly in manufacture of leading products such as mobile phones and DVD players, royalties are paid downstream by the OEM on production.

Judge Holderman correctly states it is difficult to estimate share of finished goods value in WiFi functionality: but this does not, however, negate the principle that patent value (as well as legal liability) extends beyond the smallest component incorporating SEP functionality. A WiFi chip in isolation to the end product in which it is incorporated cannot provide the SEP functionality. A WiFi chip will not work at all without other components such as an antenna. The functionality and benefits of wireless connectivity are exploited throughout the device with a variety of applications including email programs, web browsers and video streaming applications. A good example of the value proposition for the addition of 3G and 4G wireless technology to a product is the comparison between Apple's market demand-driven price for iPhone models ([from around \\$450](#) unsubsidised or without service contract) versus a WiFi-only iPod Touch ([from \\$299](#)). Forcing IP licenses to be paid out of chip-maker profits is like forcing a book author's publishing copyright royalties to be paid out of the profits of the ink or paper suppliers.



In Judge Holderman's defective reasoning, adopted from a misguided expert witness, "the method of basing the total potential royalty for all 802.11 standard-essential patents on the chipmaker's profit insures that the total royalty stack will not exceed an amount that would force chipmakers out of the business." This is a completely artificial and misplaced constraint. It is the finished goods manufacturers who are liable and are being sued here; including Cisco Systems, Inc., Motorola Solutions, Inc., SonicWALL, Inc., Netgear, Inc., and Hewlett-Packard Co. Their profits are entirely different to, and more significant than, those of their chip suppliers. The hardware footprint and manufacturing costs of wireless chips are shrinking, while development costs and value in firmware and software algorithms increase. Where chips are custom designs, the latter costs are borne by OEM customers, not by chip manufacturers. It should be at the manufacturers own peril if they do not make sufficient cost provisions to include unpaid royalties, if applicable, in their pricing. Competing with pricing as if a technology is royalty free – a popular myth in WiFi that was promulgated by ideologists for many years – is, nevertheless, an error of the infringer. It is neither the duty nor the privilege of the court to protect them from the repercussions of their naivety.

Judge Holderman credits Innovatio for having above-average value 802.11 SEPs, but his proportionality-based assessments do not quantify or adjust for the proportion of the total 3,000 patents that are "claimed" to be essential to the 802.11 standard that are actually essential. He notes that the "number of approximately 3000 is a credible account of the number of potentially-essential patents. Nonetheless, there is no guarantee that all of those approximately 3000 potentially essential patents actually are essential."

However, he instead concludes "that Innovatio's patents are in the top 10% of all 802.11 standard essential Patents" while using $10\% \times 3,000 = 300$ as the denominator in his proportionality-based calculations. This discrepancy could make a significant difference. It is unclear what proportions of declared essential patents are actually essential to various standards. For example, a 2010 report by Fairfield Resources, sponsored by Nokia, assessed that only 50% of patents declared as possibly essential to 3G standards by patentees were actually or probably essential. Whereas the report has been widely criticised for findings such as who owns most of the essential patents, the above conclusion is far less controversial. With tactical patenting to puff-up licensor positions for patent pooling or bilateral negotiations, it is quite possible this "denominator" would be much smaller (e.g., $50\% \times 300 = 150$). Innovatio's



value share would consequently double. Judge Holderman made no such adjustment.

Essentiality is not assessed by SSOs and can only be definitively determined by a court. This exclusively occurs only when litigation demands it. Judge Holderman notes that “for purposes of this proceeding all of Innovatio's asserted patent claims are essential to the 802.11 standard.” No determination has been made for the 3,000 total patents claimed as essential.

Conclusion and suggestions

Judges Robart and Holderman have highlighted many pertinent issues in establishing (F)RAND rates and limitations with assessment methods and benchmarks, but their decisions are still significantly based on falsehoods. Patent pools and chipset profits provide inadequate and misleading benchmarks. Parties in litigation through their experts need to find more representative benchmarks that are applicable to the realities that bilateral licensing establishes distinctly different rates than patent pools. Companies that have well established licensing programs with broad market acceptance of their SEP portfolios and licensing terms often provide better, more accurate and reliable benchmarks for royalty rates consistent with (F)RAND undertakings. Licensing rates on ICT products commonly apply across the entire product because value is delivered and enjoyed on that basis.



<http://ipfinance.blogspot.co.il/2013/05/theories-of-harm-with-sep-licensing-do.html>

Theories of harm with SEP licensing do not stack up

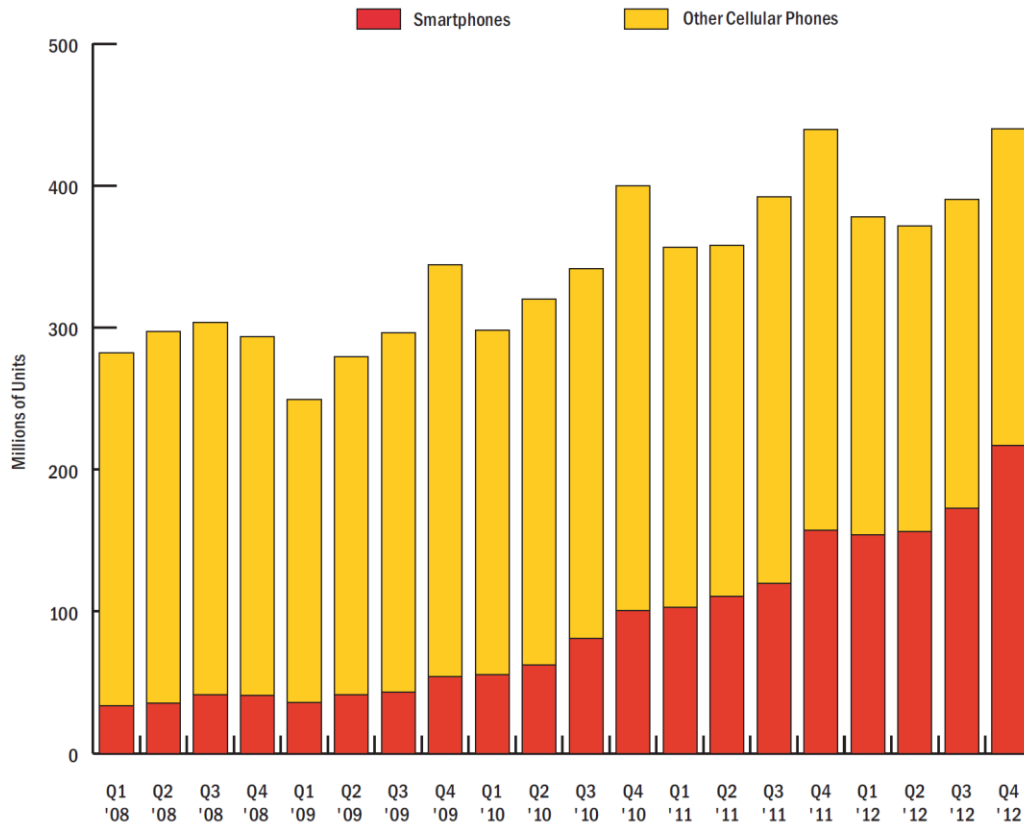
By Keith Mallinson, IP Finance, 24th May 2013

I have already written several [articles for IP Finance](#) citing many references with facts and figures which show how exceedingly well the cellular industry and its customers have done in recent years. The outstanding innovation, product and service adoption is based on various and numerous interdependent technologies; and these are also subject to thousands of patents with extensive licensing among technology developers and manufacturers.

Along with further supporting evidence of this success, including updated market information and analysis, this article also shows that detractors' dire predictions over the last six years or more on patent royalty effects are incorrect, unfounded and based on inapplicable theories. There is no evidence that aggregate patent royalties paid have had any detrimental impact on this highly competitive and flourishing ecosystem. To the contrary, by every measure the patent system and the risk-reward balance it strikes—to spur innovation while not overburdening licensees—is undoubtedly working; without the need for implicit or explicit caps on aggregate royalties and with no more than a trivial amount of patent pooling for cellular patents. The revolution in cellular since around 2007, with high growth in smartphones and data services including mobile broadband, as illustrated in Exhibit 1 and Exhibit 2 respectively, is widely beneficial. Smartphones are cellular with high-level operating systems including Apple's iOS, Google's Android, Microsoft's Windows Phone and BlackBerry. Trends in technology development, breadth of competition, prices and consumer choice are all positive. Instead of causing harm, intensive standard-essential patenting with (Fair) Reasonable and Non-Discriminatory Licensing, including extensive cross licensing, has encouraged innovation and participation in standards development while efficiently and fairly redistributing some of the costs and financial returns from major investments across the broad ecosystem.



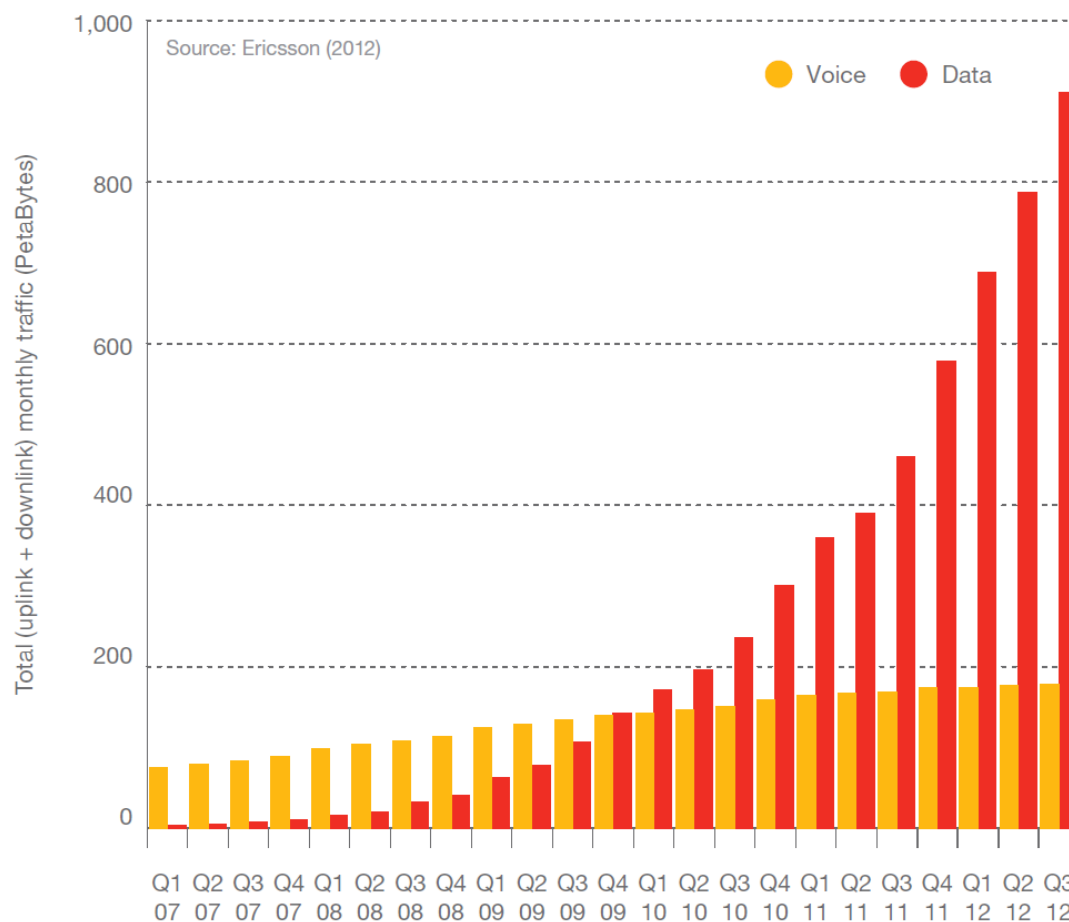
Exhibit 1: Massive global adoption of smartphones in recent years has driven....



Sources: Industry analysts including Gartner, Strategy Analytics and WiseHarbor using company disclosures



Exhibit 2: Exponential global growth in cellular data with mobile broadband



Source: [Ericsson Mobility Report, November 2012](#)

Extensive patent licensing, and in only a very small proportion of instances litigation—including out-of-court settlements and exceptionally FRAND rate determinations or injunctions by the courts—illustrates that things are working rather well—not broken. There is abundant publicly-available evidence of [widespread patent licensing](#) in cellular technologies. In addition, many other such agreements are not disclosed. Where and when there are disputes, litigation costs are small in the context of the \$2 trillion or so per annum in cellular products and services. Tensions and spats are inevitable as players jostle to reposition themselves in a sector that has been literally turned upside down over the last six years. For example, Nokia has plunged from 50% global market share leader down to 5% in smartphone units sold, while Apple's share has risen from 0% to 22% (and rather higher in terms of value share).



Much ado about nothing

Disaffection with the prevailing system for licensing and litigating standard-essential patents is nothing new. A 2006 paper entitled [Patent Holdup and Royalty Stacking](#) by Mark A. Lemley and Carl Shapiro alleged “interacting areas in which problems arise: *injunction threats* and

royalty stacking.” The authors noted they were “especially interested in how these problems affect

the royalties that will be negotiated between patent holders and downstream firms that produce products that may infringe those patents.” Their stated concern was that “[a]fter all, since far more patents are licensed or settled than litigated to judgment, the primary economic effect of rules governing patent litigation arises through the effect of those rules on the licensing terms that are negotiated in the shadow of litigation.” Their beef was that resulting royalty rates exceed their “inherent value”, and that “royalty stacking causes harm based on reduced output, higher prices, and thus deadweight loss.” (Emphasis added).

The analysis, however, was largely theoretical: with limited, inaccurate and unreliable quantification of royalties paid; no indication of whether or not these rates—stacked, cross-licensed or otherwise—represent value for money; and no reasoned assessment of whether or not elevated prices or harm have ensued for implementers or end-users. Case studies on “3G Cellular Technology” and WiFi were singled-out as “Empirical Evidence of Royalty Stacking”. However, in the case of 3G, the only royalty figures presented were an unreferenced estimate of 30% before cross-licensing and “Thelander suggest[ing] that actual royalties may run to 22.5% for the WCDMA technology, in addition to 15-20% for GSM technology if the phone is dual band.” Unmentioned by the authors, the cited June 2005 report entitled [The IPR Shell Game](#), lists numerous standard-essential patent holders and states that “those companies that have essential patents are not subject to these rates due to cross-licensing arrangements.” That exclusion applied to around 90% of handset manufactures on the basis of the report’s GSM patent ownership analysis and concurrent detailed market share tracking from industry analyst firms including [Gartner](#) and [Strategy Analytics](#) (their press releases do not provide all the market share details analysed). In the case of WiFi, one jury verdict for a single patent is cited as evidence of the royalty stacking problem.

Undeterred by the paucity of evidence for the alleged costly stacking or actual harm, six years on the authors present their remedies to the aforementioned “problems” in a sequel paper entitled [A Simple Approach to Setting Reasonable Royalties for Standard-Essential Patents](#). As in 2006, Lemley and Shapiro rely on the same inapplicable theory in their 2013 paper to assert overcharging and resulting competitive harm, while



neglecting to consider marketplace evidence. In their recent paper, binding arbitration is advocated to set portfolio royalty rates and thus eliminate the alleged overcharges that result from licensing with the status quo. I will defer my analysis and opinions on the proposed fix, to others or until a later date, with my focus here on debunking the alleged problems.

Misplaced compliments to Cournot

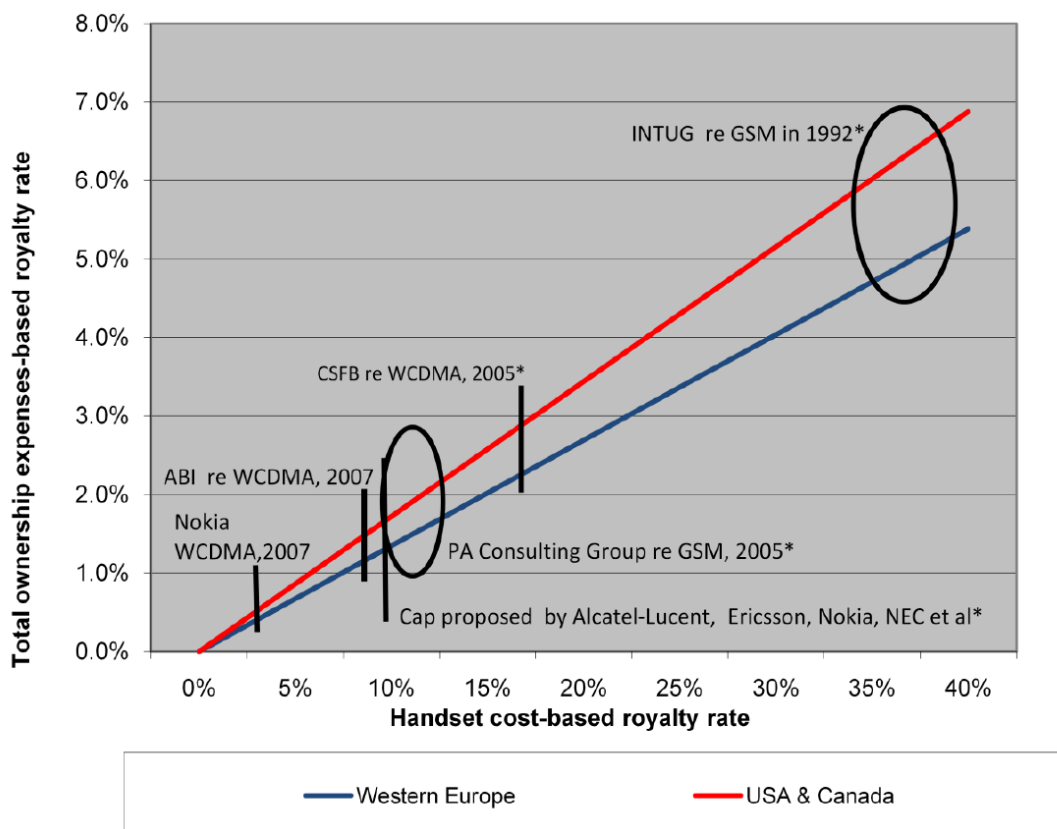
Lemley and Shapiro rely on 19th Century economic theory—developed long before the existence of ICT, SEPs and (F)RAND licensing. According to these authors, the supposed Cournot-complements problems occur when multiple “input” owners each charge more than marginal cost for their input, thereby raising the price of the downstream product and reducing sales of that product. Cournot used the example of two separate monopolist copper and zinc suppliers selling to manufacturers of brass. Each input supplier imposes a negative “externality” on other suppliers when it raises its price, because this reduces the number of units of the downstream product that are sold. As a result, if multiple input owners each control an essential input and separately set their input prices, output is depressed even below the level that would be set by a vertically-integrated monopolist. Also according to Lemley and Shapiro, the theory of Cournot complements concludes that royalty stacking will be worse the greater the number of independent owners of patents that read on a product.

The negative effects Cournot predicts are demonstrably not occurring with SEPs in cellular despite the numerous complementary patented “inputs” to the licensed standards. The Cournot complements problem is supposed to raise downstream product prices, while squeezing manufacturer margins, impeding manufacturer market entry and forcing market exits. Instead, evidence shows the opposite effects in ICT including standards-based technologies. Increasing numbers of patented complements—in the thousands in many cases—refutes applicability of Cournot’s theory here. And this is in spite of fragmentation of ownership and uncertainties about rights in many cases. There are 125,000 patents which have been declared by hundreds of companies, on an ETSI database with public access, as possibly essential to 3GPP’s cellular standards. This reflects substantial growth in patenting and declarations since 2006.

Upstream royalty costs

In a [June 2011 article for IP Finance](#), I showed that aggregate royalty rates had reduced to much lower levels than the above figures, and that as a proportion of the entire cost of cellular phone ownership, including service fees, were in the low single digits, as reproduced in Exhibit 3.



Exhibit 3: Aggregate royalty rates based on total ownership expenses

Sources: WiseHarbor analysis on figures from sources cited above

In that article, my analysis on aggregate royalty rates was as follows:

Estimates for "cumulative royalties" vary widely. In 1998, International Telecommunications Standards User Group (representing some operators and manufacturers) complained to the European Commission that "when GSM handsets first appeared on the marketplace cumulative royalties amounted to as much as 35 percent to 40 percent of the ex-works selling price". Much lower estimates for the cumulative GSM royalty rate paid, by companies that do not have any patents to trade, include 10-13 percent (IP Law and Business reporting PA Consulting Group estimate, July, 2005). In September 2005, CSFB's "3G Economics" report estimated cumulative royalties had fallen to single digits and predicted 17.3% cumulative royalties in WCDMA "for those vendors without an IPR position to trade off". Whereas ABI Research described average WCDMA cumulative royalties of 9.4% in 2007 "a most challenging barrier... ..to the development of more affordable devices", the market-leading handset



manufacturer with 37% share was paying much less: Nokia **stated** that "until 2007 it has paid less than 3 percent aggregate license fees on WCDMA handset sales under all its patent license agreements".

In addition, there have been various attempts to determine aggregate fees sought by licensors for new technologies. In 2007, the Next Generation Mobile Network (**NGMN**) Alliance, an industry group led by mobile operators and including major 4G equipment vendors, established a confidential process for the ex ante disclosure and aggregation of expected licensing fees for a number of upcoming 4G standards including LTE. The process concluded in 2009 and the results are confidential. However, commentators have suggested the individual disclosures of expected licensing fees—which were in several cases accompanied by public disclosures on company websites—produced misleading and unrealistic figures.

Aggregate figures derived are not actual prices paid including cross-licensing and do not reflect other realities in negotiations such as identification of patents that are weak or inapplicable. Patent strengths and "essentiality" were not validated. In 2003, the 3G Patent Platform Partnership (including 19 telecommunications operators and equipment makers) **estimated** "that several hundred different patents, among several thousand publicly claimed as essential, will actually be determined to be 'essential patents' in implementing 3G standards". Some candidate licensees would rather risk being sued than pay "rack rates" in these circumstances. Licensors prefer to negotiate settlements than litigate and subject their patents to invalidity and non-infringement claims. Vertically-integrated licensors are particularly concerned about their product revenues with the risk of being counter-sued for infringement.

There is no evidence that aggregate royalty payments have increased, despite ongoing technological developments with additional standardisation, new market entry, product introductions and successes including Apple with the iPhone since 2007, Android smartphones since 2008 and LTE since 2010. For example, many patent portfolio licensing agreements demand no additional royalties despite the inclusion of additional SEPs as existing standards are further developed or new standards are introduced.

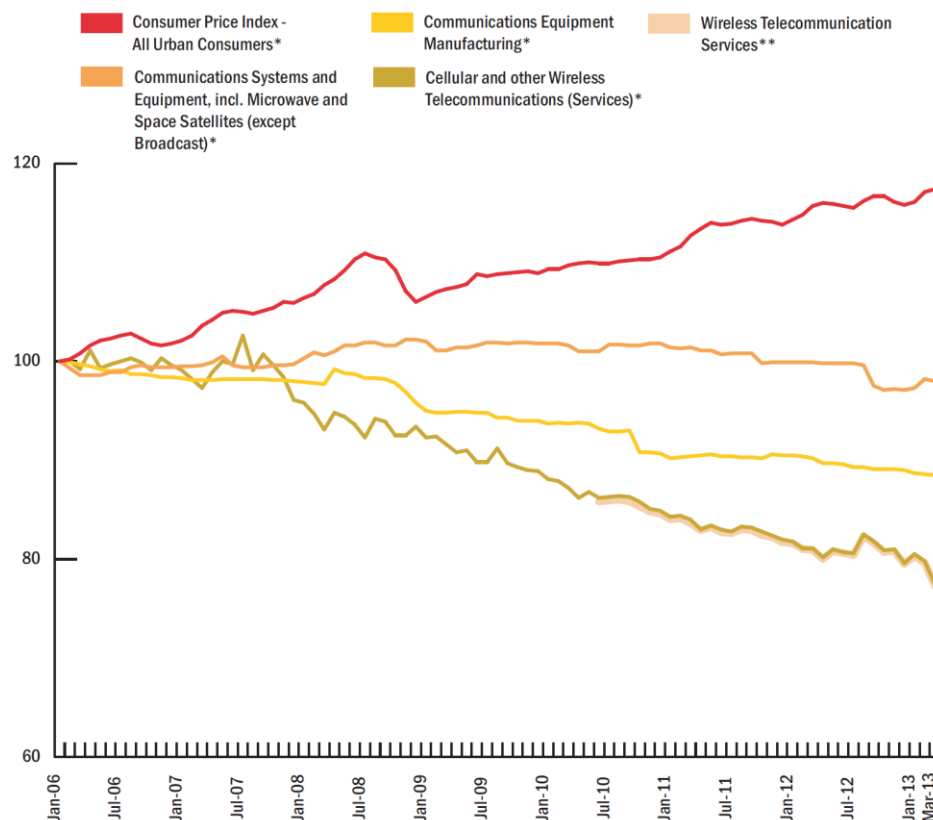
Downstream product and service prices

Whereas Lemley and Shapiro provide no empirical analysis on downstream pass-through for the alleged stacked and rising aggregate patent costs, evidence shows prices for cellular products and services have generally declined since 2006. For example, comparison of various indices from the [U.S. Bureau of Labor statistics](#) in Exhibit 4 shows that quality-adjusted prices for applicable



product categories have fallen or remained flat in comparison to the rising [Consumer Price Index](#). Exhibit 5 provides more detail on the indices used. These include some non-cellular along with cellular products and services. However, cellular spending has led or dominated telecommunications products and services in recent years.

Exhibit 4: Cellular prices flat or falling versus the rising CPI



*Rebased to January 2006 **Rebased to coincide with cellular index in June 2010

Source: U.S. BLS indices



Exhibit 5: U.S. BLS indices including CPI and those including cellular products and services

Type	Category	Name	BLS Series ID
Consumer Price Index	Consumer Price Index	Consumer Price Index - All Urban Consumers	CUUR0000SA0
Producer Price Index Industry Data	Broadcast and wireless communications equipment mfg	Communications systems and equipment, incl. microwave and space satellites (except broadcast)	PCU3342203342201
Import/Export Price Indexes	NAICS import Indexes	Communications equipment manufacturing	EIUIZ3342
Producer Price Index Industry Data	Wireless telecommunications carriers	Cellular and other wireless telecommunications (services)	PCU51721051721012
Producer Price Index-Commodities	Telecommunication, cable, and internet user services	Wireless telecommunication services	WPU372

Pricing trends must be analysed with more sophistication than comparing average prices. It is important to compensate for changing quality—including increased functionality and performance—because some averages in cellular phone pricing have increased as the product mix has changed to include increasing proportions of smartphones. Unlike lower-end phones, smartphones have adopted relatively large multi-touch screens, increasingly powerful applications processors, high-level operating systems and mobile broadband among other capabilities in recent years.

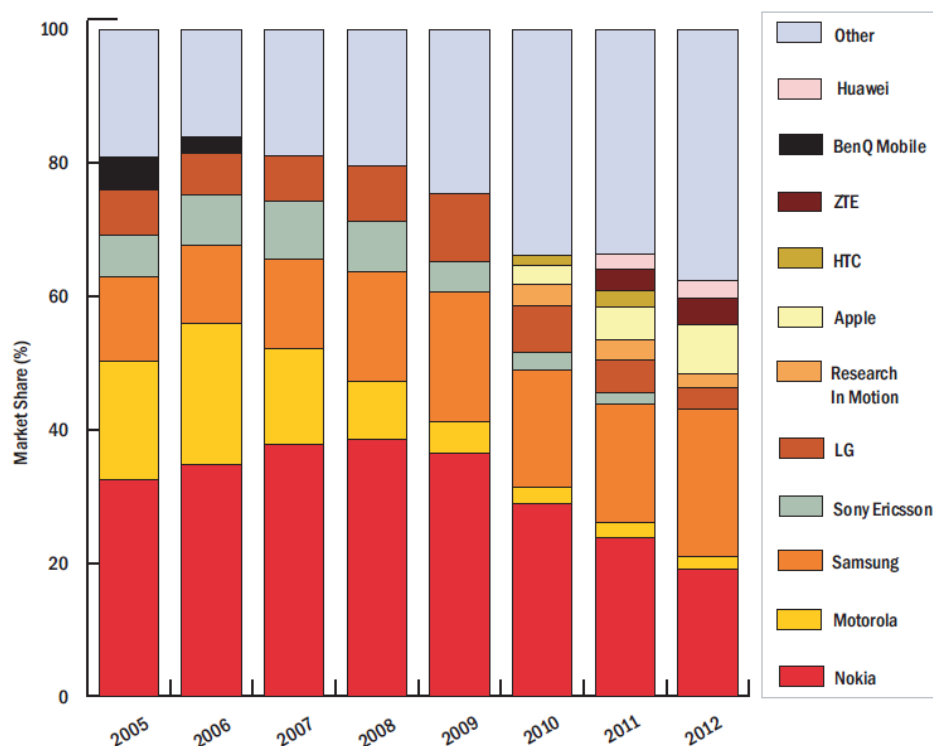
Cellular phones are available at low and declining prices despite increasing functionality and performance with 3G communications and powerful software applications in many cases. Smartphone sales are being propelled in developing markets with [unsubsidized handset prices as low as \\$100](#) for entry-level LTE Android handsets in 2013. Ultra-low cost mobile phones are sold without operator subsidies for as little as [\\$25 or less](#).



Less-concentrated market shares and new market entry

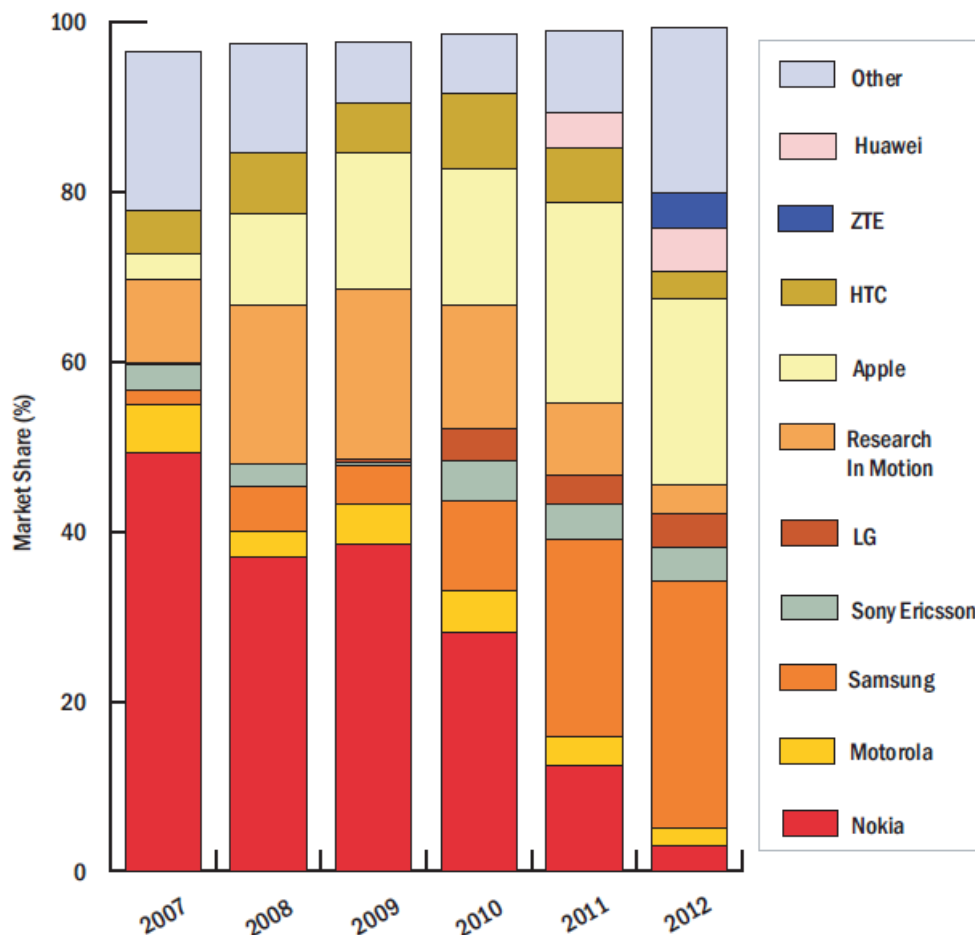
Manufacturer market shares have become less concentrated in cellular phones including smartphones with significant market entry and major shifts in market share. Exhibit 6 and Exhibit 7 show how dramatically incumbent market shares have changed with major share losses for Nokia, Motorola, Sony Ericsson (now Sony), RIM (now BlackBerry) and others. Apple entered the market in 2007 with no prior history in the sector and little or nothing in the way of cellular SEPs. It has subsequently risen to smartphone market leadership in the U.S. and second only to Samsung globally.

Exhibit 6: Cellular phone market shares



Sources: Industry analysts including Gartner, Strategy Analytics and WiseHarbor using company disclosures



Exhibit 7: Smartphone market shares

Sources: Industry analysts including Gartner, Strategy Analytics and WiseHarbor using company disclosures

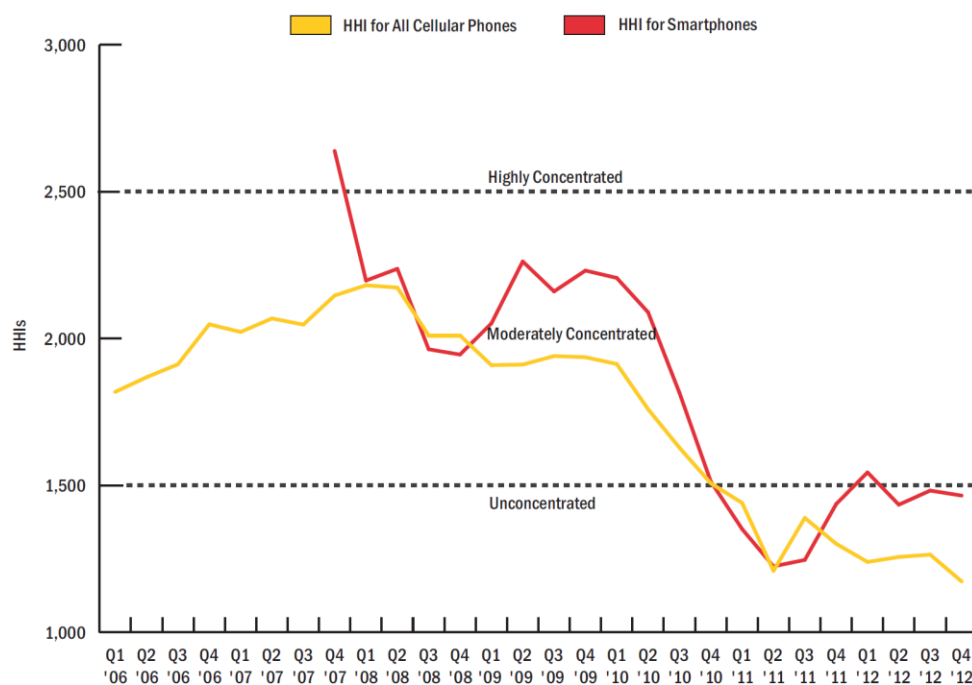
Numerous Asian and other manufacturers have also entered the cellular phone markets in recent years including HTC, Huawei, ZTE, Lenovo, Coolpad, Ginoee, Micromax and Karbonn Mobiles (these are just some of the larger ones) with smartphones including 3G technologies. Huawei revealed it sold more than 20 million 3G handsets to China Telecom alone in 2010. Its 2011 average handset selling price was \$125, despite the majority of sales being smartphones. China Telecom employs CDMA2000 EV-DO technology for 3G services. China added 113 million new 3G subscribers in 2012, in comparison to only 23 million new 2G subscribers. Handset market entry also includes manufacturers in western nations, such as UK-based [MOJO Maker](#) selling its own-designed phones across Europe.

The decreasing and relatively low market share concentration in downstream cellular handset manufacturing is also evident from and can be quantified by



trends in the [Herfindahl-Hirschman Index](#). This is the most widely-accepted measure of concentration in competition analysis. For example, it is used by various government agencies including the [Department of Justice and the Federal Trade Commission](#) in evaluating prospective mergers. The HHI is calculated by summing the squared market shares of all firms in any given market. Antitrust authorities in the United States generally classify markets into three types: Unconcentrated (HHI < 1500), Moderately Concentrated (1500 < HHI < 2500), and Highly Concentrated (HHI > 2500). Market concentration has reduced from moderately concentrated to unconcentrated for smartphones and for cellular phones in general since 2007, as shown in Exhibit 8.

Exhibit 8: HHI tracking declining manufacturer market share concentration



Sources: WiseHarbor analysis on figures from Gartner, Strategy Analytics and WiseHarbor using company disclosures

Apple was a new cellular market entrant in 2007 with little or nothing in the way of cellular SEPs, and yet it has achieved and maintained strong profit margins. This is due to its innovative handsets including its own-patented technologies, others' SEP technology, complementary offerings such as software applications through its App Store, bricks and mortar retail outlets and strong brand differentiation. Apple's smartphone gross profit margins have remained very high, in comparison to other manufactured ICT consumer products, at around



48%, as estimated by Jefferies & Co in an April 2, 2013 research note. This margin, as computed in Exhibit 9, substantially exceeds those for its other product lines including Mac, iPods and (predominantly non-cellular) iPads and is much higher than the industry average for smartphone manufacturers. Samsung had only a few percent smartphone share until 2008 with the launch of the Android handset operating system that year. It is also commanding strong profit margins with [Samsung's overall financial health being significantly attributed to its market leadership in smartphone sales](#).

Exhibit 9: Strong iPhone profit margins for Apple

	CY2012
Units (millions)	135.8
Average selling price	\$639
Revenues (millions)	\$86,776
Gross Profit (millions)*	\$41,653
Gross Margin	48.0%

Source: Jefferies, company data

*[Jefferies] estimates as Apple does not report GM by product line

Virtuous circle in cellular developments

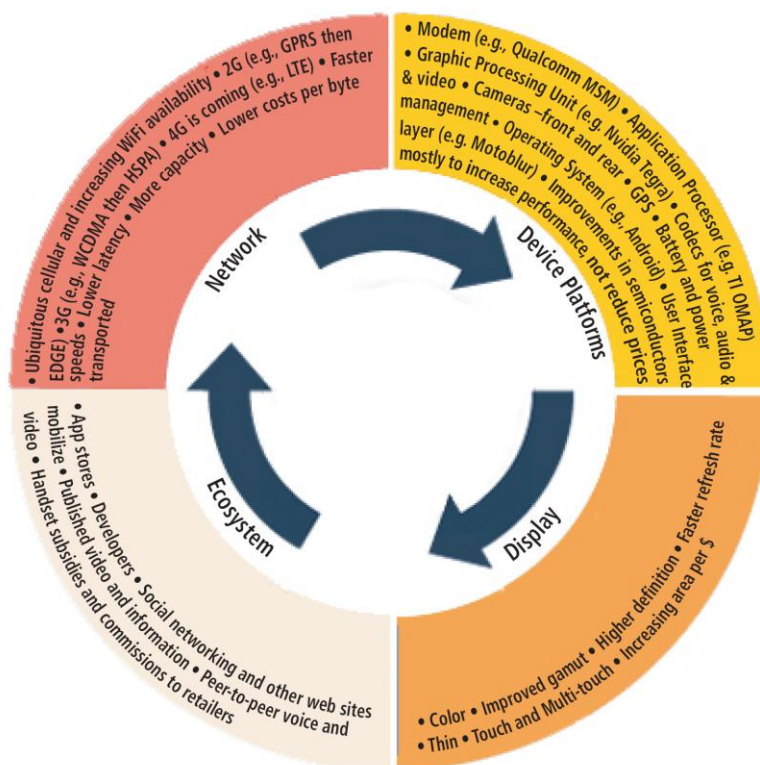
There are many other indicators of cellular's success that also defy the alleged harms caused by the need to license multiple patent rights to commercialize new technologies. [Shapiro](#), [Hargreaves](#) and others have also argued that "patent thickets" will "hold-up" market development, impede entry and stifle innovation; but there is overwhelming evidence to the contrary in my previous IP Finance postings entitled [SMEs, SSOs and Patent Thickets](#) and [There aren't too many Patents](#).

The following update also shows how cellular communications has progressed in leaps and bounds with smartphones and mobile broadband in particular over the last six years. Exhibit 10 illustrates that cellular has developed with a virtuous circle of various significant and complementary factors. The cellular and other standards-based technologies, including 802.11 (WiFi), H.264 (video codec), Bluetooth and GPS, as standardized by [3GPP](#) and other standard-setting organisations, and as incorporated in the networks and devices are most significant. The vast majority of the world's cellular operators adhering to 3GPP standards could provide data speeds of no more than the few hundred kilobits per second maximum provided by [WCDMA](#), or considerably less with 2G GPRS



or EDGE technologies, until the introduction of multi-megabit per second 3G [HSDPA](#). This technology was first launched by AT&T in December 2005, with national network rollout in 2006. This was mostly used by a market niche of PC data card users until the revolution in smartphones, the introduction of the 3G iPhone and Android devices in 2008 and with surging smartphone sales with significant market impact thereafter.

Exhibit 10: Virtuous circle in cellular developments



Source: WiseHarbor

Cellular has advanced in a succession of large and small upgrades and the pace of change has accelerated. Significantly, this has provided the much faster connection speeds and low latency (time delay for data packets to transit the network) required for the satisfying end-user experiences that are provided in today's smartphones that were not possible in 2006.



The cellular networks have also increased capacity to support active mobile data users, who have grown from a small minority to a mass market majority in the last six years. Enhancements have included [HSPA+](#) and the introduction of 4G [LTE](#) services, with 163 commercial networks in 67 countries and more than 69



million subscribers, according to a [2013 publication by the GSA](#). The time-to-market from standardization to implementation in networks and devices was quicker with LTE than with previous technology generations. It took less than two years from [3GPP Release 8](#) standardization to the first major commercial launch by [frontrunner Verizon](#) in 2010. [Innovation is continuing apace](#) to 2020 and beyond.

By comparing the features and performance specifications of market leading smartphones in 2006 with those in 2012/2013, Exhibit 11 and Exhibit 12 show how very dramatic advancements have been. For example, device data speeds have increased 100-fold or more. Apple and former U.S. smartphone market leader BlackBerry have only offered 3GPP-compliant 3G devices, as required on the vast majority of 3G cellular networks worldwide, since [2008](#) and [2009](#) respectively. The smartphone revolution has started in earnest since then.

Exhibit 11: Smartphone market leaders' model specifications in 2006

Introduced	April 2006	June 2006
<i>Images not to scale</i>		
Model	Nokia N93	BlackBerry 7130c
2G Network	GSM 900/1800/1900	GSM 850/900/1800/1900
3G Network	UMTS (WCDMA) 2100	No
Data Speed	384 kbps (3G)	<300kbps (2G)
Chipset		
Central processor	332 MHz Dual ARM 11	312 MHz Intel XScale



Graphics processor	3D Graphics hardware accelerator	No
Operating System	Symbian OS 9.1, Series 60 3 rd edition UI	BlackBerry OS
Display	TFT, 256K colours, 240 x 320 pixels, 2.4 inches, 36 x 48mm, 167 pixels per inch	65K colours, 240x 260 pixels, 2.4 inches, 147 pixels per inch
Touchscreen	No	No
Memory	50MB storage +64 MB RAM +128 MB miniSD Card	64 MB storage +16 MB RAM
Cameras	3.15 megapixels, VGA @30 fps: secondary CIF videocall camera	No
Leading Features	SMS, MMS, WAP/xHTML, HTML, Email, IM, polyphonic ringtones, MP3/MP4 and video calling	SMS, MMS, HTML, Email, IM, polyphonic ringtones
Full specification	http://www.gsmarena.com/nokia_n90-1155.php	http://www.gsmarena.com/blackberry_7130c-1623.php

UI= user interface, TFT= thin film transistor, WAP= wireless Application Protocol, MMS= multimedia messaging



Exhibit 12: Smartphone market leaders' model specifications in 2012 and 2013

Introduced	September 2012	June/September* 2012
<i>Images not to scale</i>		
Model	Apple iPhone 5	Samsung Galaxy S III: I747 and I9500*
2G Network	GSM and CDMA (multiple bands)	GSM 850/900/1800/1900
3G Network	HSDPA and EV-DO (multiple bands)	HSDPA 850/900/2100
4G Network	LTE (multiple bands)	LTE 700/2100 or LTE 800/1800/2600*
Data Speed	100 Mbps (LTE)	50 Mbps (LTE)
Chipset	Apple A6	Qualcomm MSM 8960 or Exynos 4412 Quad*
Central processor	Dual core 1.6 GHz	Dual core 1.5 GHz or Quad core 1.4 GHz Cortex-A9*
Graphics processor	PowerVR SGX 543MP3 triple core	Adreno 225 or Mali-400MP*
Operating System	iOS 6, upgradeable to iOS 6.1.3	Android OS v4.0 (Ice Cream Sandwich) or Android OS v4.1.1 (Jelly Bean)*
Display	LED backlit IPS LCD, 16M	Super AMOLED, 16M colours, 720 x



	colours, 640x 1,136 pixels, 4 inches, 326 pixels per inch	1,280 pixels, 4.8 inches, 306 pixels per inch
Touchscreen	Capacitive multitouch	Capacitive multitouch
Memory	16/32/64GB storage, 1 GB RAM	16GB storage, 2GB RAM, up to 64 GB microSD
Camera	8MP, autofocus, LED flash: secondary 1.2MP, 720p @30 fps	8MP, autofocus, LED flash: secondary 1.9MP, 720p @30 fps
Leading Features	Simultaneous HD video and image recording, touch focus, geo-tagging, face detection, 1080p @30 fps video, image stabilization. GPS with A-GPS support and GLONASS, accelerometer, gyro, proximity, compass	Simultaneous HD video and image recording, touch focus, geo-tagging, face and smile detection, 1080p @30 fps video, image stabilization. GPS with A-GPS support and GLONASS, accelerometer, gyro, proximity, compass, barometer
Full specification	http://www.gsmarena.com/apple_iphone_5-4910.php	http://www.gsmarena.com/samsung_galaxy_s_iii_i747-4803.php and http://www.gsmarena.com/samsung_i9305_galaxy_s_iii-5001.php *

IPS=In-Plane Switching, fps= frames per second, GPS=Global Positioning System

* September introduction for I9500 version. Superseded by the Galaxy S IV as flagship model in March 2013

These improvements in cellular technologies and non-voice capabilities, together with plunging mobile broadband data communications prices, have increased consumer utility and stoked demand enormously. According to the U.S. Federal Communications Commission's [16th Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services](#), published March 2013, the effective price per megabyte of data declined from \$0.47 per megabyte in the third quarter of 2008 to about \$0.05 per megabyte in the fourth quarter of 2010, which is roughly an 89 percent decrease. As indicated in Exhibit 2, data has grown at an exponential rate to exceed voice on mobile networks since 2010. Also on the basis of [Ericsson's figures](#) (updated in February 2013), data was exceeding voice by a factor of seven by yearend 2012. Since around 2009, non-voice usage has also dominated time spent using phones and is now several times greater. On the phone for around 25 minutes per day, U.S. subscribers are the heaviest cellular voice users in the world. However, [according to eMarketer](#),



their non-voice minutes of use per day almost quadrupled from 22 in 2009, 34 in 2010 and 54 in 2011 to 82 in 2012.

This is no mean feat: in contrast to the very high data growth on fixed networks which could readily be accommodated with existing or new fibre deployments; the severe shortage of radio spectrum, high costs and planning constraints in adding cell sites (including masts, towers and rooftops), which are needed to increase spectrum reuse, mean that technological innovations to massively increase radio network capacity, as well as end-user speeds, are particularly important. [These ongoing technological developments](#) include the introduction of [MIMO](#) with HSPA, OFDMA modulation with LTE, carrier aggregation, interference cancellation, self-organising networks and many other techniques.

Standards competition, choice and secondary markets

Vibrant competition among standards has also helped accelerate the pace of technological innovation and service deployment. Competition in 3G technologies and standards initially included WCDMA and CDMA2000 from rival standards groups 3GPP and 3GPP2 respectively. IEEE challenged these incumbents with 802.16 WiMAX which was soon claimed to be a 4G standard. This in turn resulted in acceleration of 4G technology developments elsewhere including LTE standardisation by 3GPP. For example, with less than 10% of Vodafone's revenues from 3G services in 2006, there was a [call to arms with LTE](#) for cellular operators against WiMAX by Vodafone's former CEO, Arun Sarin at the GSM Association's Mobile World Congress in February 2007. Later that year, Vodafone and its 45%-owned CDMA technology-based partner Verizon Wireless [announced](#) they would both pursue LTE as their common next generation technology. A keynote [presentation](#) by Verizon Wireless CTO, Dick Lynch, at the 2009 Barcelona show announced the LTE vendor line up and most ambitious launch dates.

Consumers also have enormous choice in handset suppliers and device models. For example, while virtually non-existent until a few HSDPA PC data cards appeared on the market for AT&T's December 2005 service launch; by August 2012 there were 3,847 HSPA and 444 HSPA+ device models available worldwide, [according to the GSA](#). Similarly, by March 2013, 97 manufacturers had announced 821 different LTE-enabled user devices. Also according to [Gfk market research](#) sales tracking, there were thousands of different phone models available in 2012. Significantly, this includes many that have been discontinued by manufacturers for years. Rather like with cars, there is a vibrant secondary market for cellular phones and smartphones in particular that extends their operational life well beyond the conventional 2-year service-



contract cycle. For example, in May 2013, [Mazuma Mobile.com](http://Mazuma-Mobile.com) and others will pay up to £270 (\$415) in cash for used high-end devices such as the iPhone 5 64GB. These devices are refurbished and resold globally.

Inherently inapplicable

Another flaw in the Lemley and Shapiro theories and analysis is the assertion of how the value in standards-based technologies should be accrued among different parties through licensing. The authors' assertion of what is deemed to be fair and appropriate in licensing hangs on a rather tenuous term and an erroneous principle. Their implication that "inherent value" means value absent the inclusion of patented technologies in standards is flawed and contrary to the way markets function efficiently. [According to Dictionary.com](http://According-to-Dictionary.com), "inherent" means "existing in someone or something as a permanent and inseparable element, quality, or attribute." But prices can, do and must change significantly in the real world for economic reasons such as sunk, fixed and variable costs, the utility of what is created, changing market demand, existence of substitutes and competition. Technology developers and their financial backers will only invest if expected returns compensate for costs and risks including the cost of capital and of unsuccessful projects. Some developments are commercially successful and others are not, but it is impossible to know in advance what the outcomes will be.

Lemley and Shapiro load their arguments with misapplied theory on auction value. According to these authors, "the key idea here is that a reasonable royalty should reflect what would happen as a result of well-informed *ex ante* technology competition. The incremental value of the patented technology over and above the next-best alternative serves as an upper bound to the reasonable royalties". This is also clearly nonsense. Two different patented technologies that are each potentially very beneficial and yet costly-to-develop might vie for selection against each other in a standard as alternatives to provide certain essential functionality. If the utility or value to the standard of each was very similar, the above incremental value limitation would shrink the royalty price to virtually nothing by forcing the contenders to disregard their sunk costs. Monopsony-style purchasers (seeking to determine prices multilaterally) might be able to get away with rigging such an auction on a one-off basis, but if the "winner" only gets an inadequate payoff it will have insufficient incentive to keep investing in future innovative candidate technologies for the standards. In the dynamic, real world, developers of technologies that compete to be included in standards must factor in all costs and risks (including that of not being selected for standards) versus returns if they are selected.

Fees in lump sums or running royalties are among several considerations for patent owners in licensing. These also include netting-off charges in cross licences, defensive value in case of litigation threats, and the ability to use the



technology in downstream activities such as manufacturing, including first-mover advantages. Different companies put different store in each of these, which is why overwhelming emphasis on cash royalty rates is both misleading and distorting. For example, a downstream manufacturer with a large market share might not care much about receiving cash royalties if it can reduce its royalty out-payments by having its technologies included in standards. That financial saving might be passed on to consumers in lower prices to improve the company's competitive position and market share, or it may be retained to boost profits. Only empirical analysis can reveal what actually occurs.

If technologists compete to have their technologies included in standards, value can and does legitimately accrue from it being included in the standard because a technology might have little or no market value if it is not adopted. And yet, candidate technologies that are not selected might nevertheless be very costly to develop. This is not to suggest that also-rans are compensated where there is only one winner, as is sometimes misconstrued. Instead, it is that winners may legitimately be compensated handsomely enough to cover their losses from the failures, as well as the costs from developing technologies, if and when the standard achieves commercial success. This matter was also the subject of [my first article for IP Finance](#) in May 2011:

Many technologies developed are never adopted. Even those technologies that are contributed to a standard and selected for inclusion, on the basis of merit, might never generate return on investment because of the standard failing or being overtaken by a competing standard. Further, minimizing the cost of licensed technologies may not result in a minimum cost solution. In addition to providing higher performance and improved features, incorporating patented IP into a standard may actually reduce the cost of implementing the standard. For example, patented IP might reduce the total cost of ownership to the end consumer of a product such as a mobile phone – including phone acquisition costs (with costs of design, development, bill of materials and assembly) and network service charges (reflecting costs of bandwidth acquisition, network equipment, operations, and maintenance).

The impact of such cost reductions may far exceed any additional costs in licensing fees. Market forces are best at determining the value to be attributed to any input component in such a system, including technology licences. Regulators should be careful to avoid favouring particular business models or making decisions on which part of the value chain deserves to make the greater profit, especially where dynamic innovation is concerned.

Commercial negotiations between companies are the most effective way



to balance the interests of the parties and to establish an agreement that takes into account their particular incentives and business relationships. Arbitrary pricing limits or ex-ante terms cannot take such factors into account and fail to recognize the inherent difficulty in determining a "value" for a certain technology early in a standards process or in the case where no competing technology exists. If regulated pricing principles were enforced, it could make patent owners leery of licensing technologies until incorporated in a major standard or of participating in the standards process at all, resulting in inferior and ultimately more costly standards.

Unhealthy regurgitations

That the authors' theoretical and false assertions are propagating by being repeated, quoted and cited absent supporting evidence and in the face of much of it to the contrary does not make them any less wrong. Regrettably, Judge James L. Robart of the United States District Court for the Western District of Washington published his [\[F\]RAND rate-setting decision in the Microsoft v. Motorola contract case](#) also adopting their position: "From an economic perspective, a [F]RAND commitment should be interpreted to limit a patent holder to a reasonable royalty on the economic value of its patented technology itself, apart from the value associated with incorporation of the patented technology into the standard." Judge Posner has also erred in his *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 913 (N.D. Ill. 2012) decision. As regurgitated by the FTC in its [Analysis of Proposed Consent Order to Aid Public Comment: In the Matter of Motorola Mobility LLC and Google Inc., File No. 121-0120](#): "After manufacturers implement a standard, they can become 'locked-in' to the standard and face substantial switching costs if they must abandon initial designs and substitute different technologies. This allows SEP holders to demand terms that reflect not only 'the value conferred by the patent itself,' but also 'the additional value—the hold-up value—conferred by the patent's being designated as standard-essential.'"

Market facts and figures fly in the face of the theories and assertions in Lemley and Shapiro's 2006 and 2013 papers on alleged hold-up and royalty stacking. It is troubling that major legal and government agency decisions in the so-called [smartphone patent wars](#) should be so tenuously based.



<http://ipfinance.blogspot.co.uk/2012/09/are-there-too-many-patents.html>

Are there too many patents?

By Keith Mallinson, IP Finance, 3rd September 2012

Innovation is the lifeblood of various technology markets including pharmaceuticals, software, telecommunications, consumer and automotive electronics. It is facilitated by R&D investments and secured from misappropriation by patenting. Meddling with patent law to discriminate among different types of inventions, industries or business models is unwarranted and would be harmful.

It is generally agreed that patents encourage innovation in “static” or “non-sequential” developments where a patent corresponds to a single product, and upfront costs are high, such as in drug development. However, the enormous success of standards-based technologies such as those implemented in video codecs (e.g., H.264) and in mobile communications (e.g., GSM, UMTS and LTE)—each including hundreds or thousands of standards-essential patents (SEPs)—show that the patent system also works well when innovation is both “sequential” (each successive innovation builds on its predecessors) and “complementary” (various different innovations are combined).

Specious theories

With the rise in patent litigation among some well-known smartphone technology companies, various theories of harm are being promoted seeking to radically undermine the patent system. Most recently, following US Judge Richard Posner’s June 2012 Opinion and Order including his decision to dismiss a case in which Apple and Motorola had sued each other for alleged smartphone patent infringement, the judge published an article in the *Atlantic* entitled “Why there are too many patents in America”. He is persuaded that the pharmaceutical industry “really does need” patent protection, but he would have patent law discriminate among different types of inventions or particular industries. However, his theory of differences fails when tested with examples in software and telecommunications.

Similarly, a report commissioned by the UK Prime Minister and written by Professor Ian Hargreaves entitled *Digital Opportunity: A Review of Intellectual Property and Growth, May 2011*, states that patent “thickets”



with “strategic” patenting in software and telecoms is a problem, as illustrated in Figure 1. His report cites academic research erroneously asserting that, in contrast to industries with non-sequential developments which underlie the traditional justification for patents, in industries with many sequential and complementary technologies—the software industry is given as an example—consumers and even technology innovators could be better off if there were no patents.

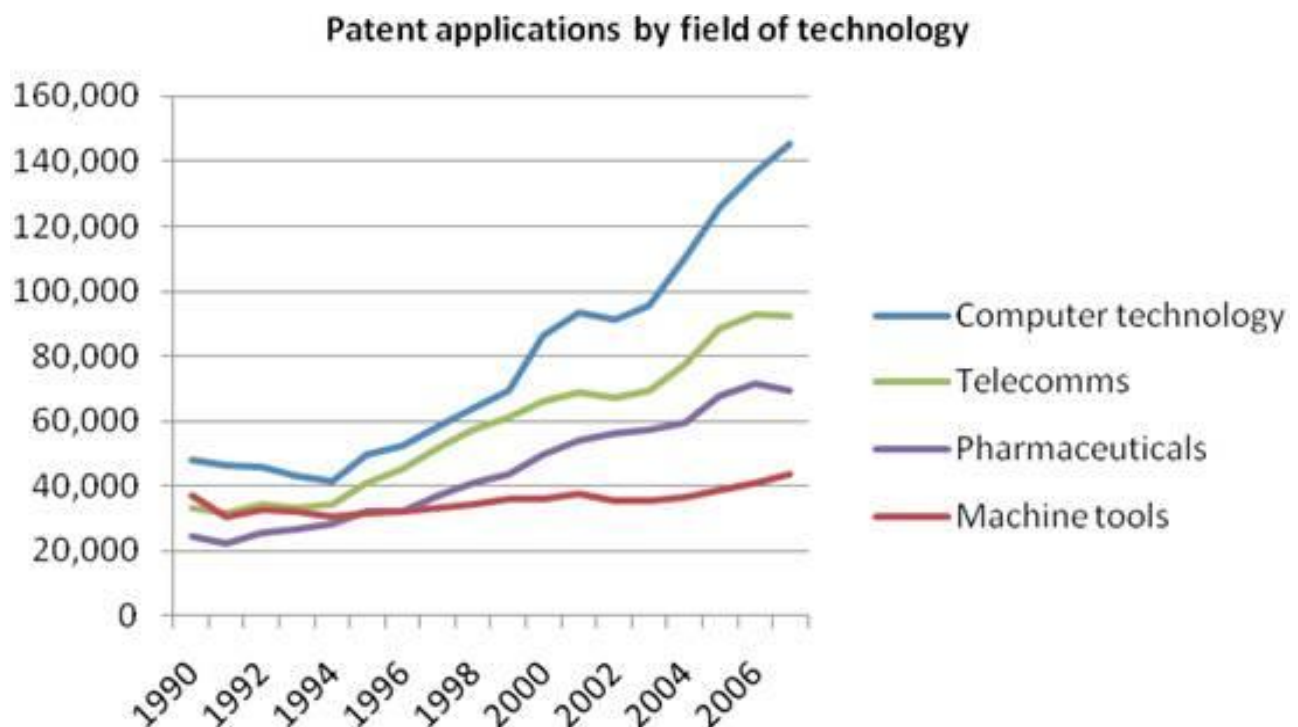


Figure 1: “Which Technologies are Causing the Problem?”

Source: Digital Opportunity: A Review of Intellectual Property and Growth, May 2011, by Professor Ian Hargreaves, based on WIPO Statistics Database, September 2010

Pharma is not unique

The context of Judge Posner’s article is a comparison of pharmaceuticals versus software and communications technologies. Patented software in mobile phone user interfaces, operating systems and for communications functions have figured prominently along with industrial design rights in recent litigation among smartphone technology companies. Judge Posner



incorrectly asserts, or overstates, three reasons why pharmaceuticals is different to other industries, in justification for weaker or no patent protection elsewhere: high R&D costs; long delays after patenting before revenues are generated; and low production costs.

Cost of inventing – R&D comparisons

Whereas pharmaceuticals companies typically have R&D spending levels, as a percentage of sales, five times higher than an average of only 3.3% among 1,400 leading companies according to *The 2011 EU Industrial R&D Investment Scoreboard*, the corresponding percentages for software product companies are very similar to pharmaceutical companies, as shown in Figure 2. Microsoft's total R&D expenditure (\$9.8 billion over the last year) exceeds that of any pharmaceutical company.

R&D Investment Intensity and Gross Profit Margins are Similar for Major Pharmaceutical and Software Product Companies

	R&D/Sales	Annual R&D (millions)	Gross Profit Margin
Roche	18.1%	CHF 8,266 (\$8,640)	73.0%
Pfizer	11.0%	\$7,766	82.3%
Novartis	16.0%	\$9,518	67.8%
Merck	16.2%	\$7,834	77.2%
Pharmaceutical Average	15.3%		75.1%
Microsoft	14.4%	\$9,811	76.9%
SAP	15.2%	\$2,064	67.6%
Oracle	11.2%	\$4,523	81.6%
Red Hat	19.0%	\$220	85.4%
Software average	15.0%		77.9%

Source: Google Finance



Increases in R&D investment since the 2009 downturn have been most significant in both pharmaceuticals and ICT and have fuelled economic growth. The top 50 *Scoreboard* companies invested €194 billion (\$243 billion) in 2010, accounting for 42.5 % of the total R&D investment by the companies. Thirty-eight companies in the top 50 showed positive R&D investment growth over the preceding year including: Merck US (47 %), Abbot (35.7 %), Pfizer (21.4 %), LG (39.5 %), Oracle (38.9 %), Google (32.3 %), and Samsung (24.9 %).

Time on market for patented technologies

Whereas half of a 20-year patent term can elapse before a drug is clinically tested and approved for sale, there can also be similar length delays before patented ICT technologies are fully commercialised for adoption globally. For example, it took many years before new cellular technologies were adopted around the world with generational advances from 1G analogue to 2G (with mostly TDMA-based technology systems), then to 3G CDMA-based systems and most recently to 4G OFDMA-based systems. These new technologies have been brought to market commercially in nine year intervals, with peak sales reached after around 16 years, as indicated in Figure 3. Patented pharmaceuticals tend to reach peak sales sooner. However, European legislature has allowed extensions for pharmaceutical patentees through Supplementary Protection Certificates.



Mobile Technology Adoption Lifecycles – From Launch to Peak Demand

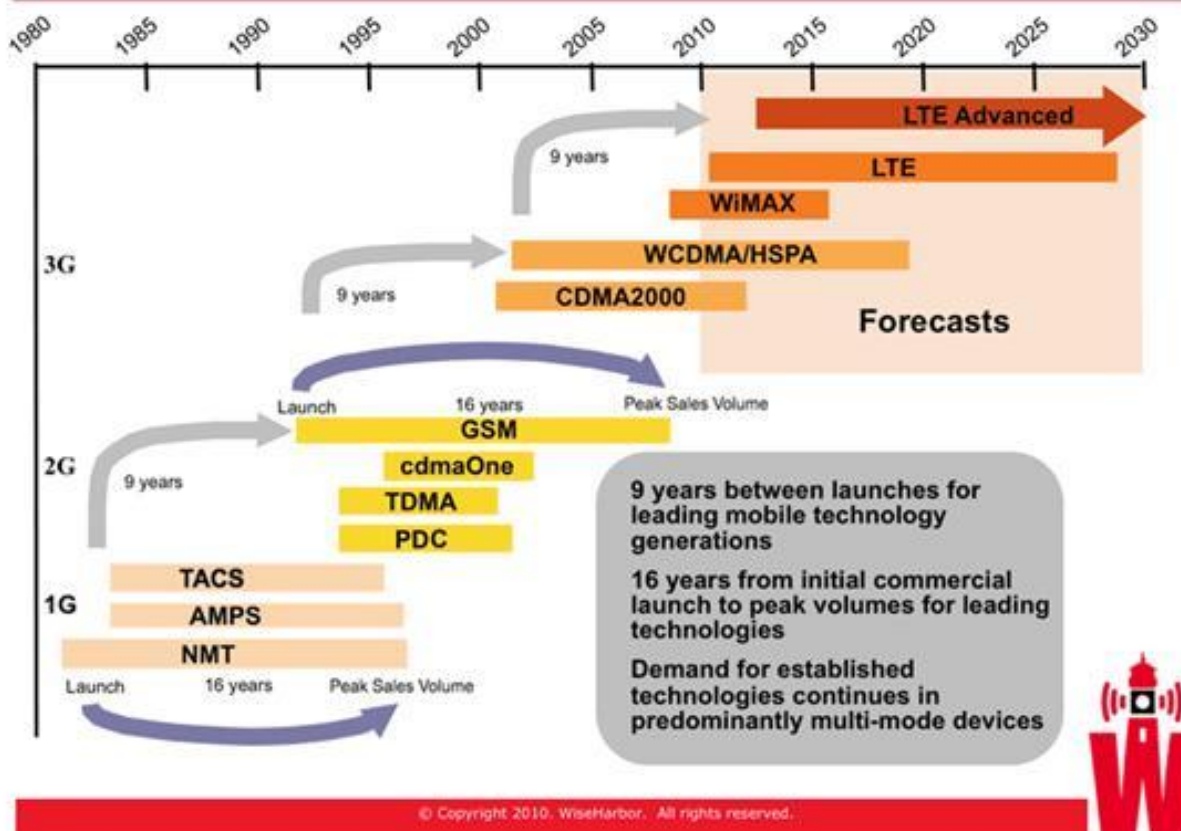


Figure 3

Pioneering cellular technology innovation was undertaken around one generation ahead of widespread implementation. CDMA technologies were developed for cellular by Qualcomm, Motorola and others by the early 1990s, but it was 1999 before these were adopted by ETSI and 3GPP in the UMTS 3G standard with WCDMA. These organisations have defined the cellular technologies for 80% of mobile users worldwide since the mid 1990s. UMTS was gradually introduced by mobile operators over several years. Japan's NTT DoCoMo was a solitary frontrunner with UMTS from 2001. UMTS was not commercially deployed until 2003 in Europe, until 2005 in the US by AT&T and until 2008 by T-Mobile USA. Prior to the UMTS standard, CDMA technologies in the cdmaOne standard were generally excluded by regulation except in the Americas, Korea and Japan. The oldest CDMA patents expired from around 2010.



Similarly, OFDMA-based technologies for cellular communications were implemented by Flarion in Flash-OFDM and by many others in WiMAX from the mid 2000s, but market demand was niche and commercial performance for suppliers was poor until OFDMA cellular technologies were standardised for LTE by 3GPP with its Release 8 in 2008. The first LTE network was launched at the end of 2009.

Widespread availability and adoption follows as network technologies are rolled out over several years. This is subject to national spectrum licensing and construction cycles that are capital intensive and time consuming. For example, LTE is still not available in the UK. In contrast, blockbuster drugs can be distributed most extensively through well-established product distribution channels once national regulatory approvals are given.

Cost of producing – Gross Profit Margin comparisons

Judge Posner correctly states that “the cost of producing, as distinct from inventing and obtaining approval for selling, a drug tends to be very low, which means that if copying were permitted, drug companies that had not incurred the cost of invention and testing could undercut the price charged by the inventing company yet make a tidy profit, and so the inventing company would never recover its cost.” However, as also illustrated in Figure 2, the gross profit margins of pharmaceutical and software companies are around the same high levels. This is unsurprising given the ease with which software functions or entire programs can be copied. It makes software companies just as vulnerable to undercutting. Low cost copying and counterfeiting—notably in China—is a major problem with various ICT products.

Best of both worlds with SEP licensing

Academic research cited by Professor Hargreaves, and its 2009 re-publication entitled “Sequential innovation, and imitation” by James Bessen and Eric Maskin makes some sweeping statements, including asserting patentees’ unwillingness to collaborate with other innovators, that do not apply in the extensive context of ICT standards that include SEPs. The authors appear oblivious and make no mention of these in their articles. The authors claim that “patents may actually reduce welfare: by blocking innovation”. They assert that “licensing may fail” and so complementary technologies will not be shared among innovators. They lend feeble support to their notion that companies will not collaborate or share by citing a distant example in the oil industry where only 12 out of 3,000 oil fields were completely covered by joint production agreements despite economic and regulatory incentives.



Yet it is precisely those industry sectors and R&D activities under criticism by Professor Hargreaves where ICT SEP patentees provide open and non-discriminatory access to their technologies for other innovators and product manufacturers. Standards setting organisations (SSOs), patent disclosures and conformance testing arrangements enable all-comers to implement technologies most easily. Agreements to license to all on (Fair) Reasonable and Non-Discriminatory terms invariably prevail, despite some well-publicised disputes. In some cases, licensing (e.g., Bluetooth) is overwhelmingly royalty-free through a patent pool. In mobile communications technologies licensing costs are predominantly eliminated through cross-licensing. For example, while 40% market share leader, Nokia stated that “until 2007 it has paid less than 3 percent aggregate license fees on WCDMA handset sales under all its patent license agreements”. While concluding that patent holders cannot make enough in licensing fees to make up for a loss of market share in downstream markets, Bessen and Maskin concede in a footnote that their findings “might change if the firms developed complementary innovations that could be advantageously be cross-licensed.” This is exactly what occurs with SEPs, but they make no further comments.

Licensing SEPs fosters downstream market development and competition, and upstream collaboration by sharing and building upon the fruits of innovation. Video and cellular standards, for example, have been phenomenally successful with billions of users and flourishing supply sectors. Thousands of patents have been declared to ETSI as likely to be essential to 3GPP standards including GSM, UMTS and LTE. Hundreds of companies collaborate in development of these standards. Most develop or manufacture products that implement the standards in downstream markets. Some of these specialise in upstream technology development but do not themselves implement their new technologies in products. They also deserve compensation for their innovation efforts. The thriving mobile phone sector with reducing prices, increasing choice and blossoming smartphone functionality has been described in several of my previous IP Finance postings, including this one from July 2011.

This article also rebuts the discredited Swanson and Baumol *ex-ante* IP auctioning proposal that Judge Posner cites in his Opinion and Order. By timing SEP auctions after upstream innovators have sunk their enabling technology development costs, but before downstream companies have sunk their product development costs, it would in theory be possible to drive IP prices below upstream innovation costs on a one-off basis. However, in a



dynamic marketplace, such loss-making R&D would soon dry up to the detriment of everybody.

In addition (to numerous problems with that particular method of fixing prices) evidence presented in my article shows that consumers are doing rather well amid the efficient status quo in licensing SEPs. With standards of great complexity and involving hundreds or thousands of patents in mobile communications each covering different portions of each standard, it would be very cumbersome to administer IP auctions and there would be all manner of undesirable consequences. Whereas standards-based technologies are selected in a collective process on the basis of technical merit by a wide assortment of companies who generally negotiate licensing terms on a separate bilateral basis, auctions create a high risk of collusion among purchasers and would likely unduly emphasise price over other important factors (such as functionality, features, performance, and even total system cost and price to consumers).

A new world in ICT

The means of innovation has changed significantly over the last 30 years with a revolution in ICT industries. The rise of personal computing, the Internet, mobile communications, globalisation and the demise of national monopolies in telecommunications has increased upstream specialisation in R&D, increased collective efforts in standards-based innovation and increased competition among technologies, standards and companies. Some ICT developments tasks are so extensive and economies of scale in production and distribution are so great that collaboration with voluntary sharing of intellectual property on a widespread basis through licensing has proven indispensable. The patent system has underpinned change and growth as ICT's global economic share has increased with the advance of personal computing, media and communications including extensive software functionality and technical standardisation.

The patent system is not perfect, but it is not broken and certainly does not require the radical change proposed by Posner and Hargreaves. There are some bad actors by both infringers as well as patentees, as I have also discussed in another of my IP Finance articles, but courts can and do redress imbalances under the existing law. There is no justification to exclude or discriminate against software and other industry sectors, methods of patent licensing or business models. The consequences of any such exclusions or discriminatory changes to the patent system run the high risk of stifling the very innovation that these sectors generate.



<http://ipfinance.blogspot.co.uk/2011/07/fixing-ip-prices-with-royalty-rate-caps.html>

Fixing IP Prices with Royalty Rate Caps and Patent Pools

By Keith Mallinson, Tuesday, 5 July 2011

This is the fourth in a series of features written by [Keith Mallinson](#) (WiseHarbor) for IP Finance. In this piece, Keith contrasts different structures for establishing the price paid for use of IP in the context of essential standards and concludes that, while voluntary patent pools have sometimes had beneficial results, pools should never be imposed because their imposition would eliminate significant competition from originates from outside pools; mandatory pools with royalty caps would both be anticompetitive and impede competition.

"Fixing IP Prices with Royalty Rate Caps and Patent Pools

Whereas voluntary patent pooling is common in licensing standards-essential IP for digital audio and video, attempts to *impose* pooling on licensing complex products, which include multiple standards and many more patents, are ill-suited and potentially anticompetitive. Some companies may voluntarily form patent pools for any particular standard, but mandatory patent pools seeking to limit licensing fees would distort competition by favouring downstream licensees at the expense of upstream licensors who depend on licensing fees to fund their R&D. IP owners, including vertically-integrated companies which combine downstream product businesses with upstream technology licensing, generally prefer bilateral agreements for IP-rich products such as mobile phones. Unlike patent pools, bilateral licenses most frequently include technologies for several standards and other IP, whereas each pool may only include essential patents for just one standard. Technology and market developments are best when competition facilitates various business models and licensing practices. And that also benefits consumers.



Licensing Cartels: From Monopoly to Monopsony

There is a long history of patent pools being [used to monopolise markets](#)⁵², excluding competitors and controlling prices in several cases.

Adam Smith and others typically depict price fixing as conspiracy against the public to raise prices. However, there is another way to fix prices: collusion to reduce prices paid to suppliers. Forcing technology input prices lower would starve upstream technology developers of the profit margins required to sustain employment, reinvestment and their output in technology development. Ultimately this would be to the detriment of consumers who benefit from rapid and dynamic innovation in ICT and elsewhere. Reduced licensing fees do not guarantee lower consumer prices. With concentration in supply downstream, manufacturers may take the savings in profits.

Nevertheless, calls for mandatory or strongly encouraged participation in ICT patent pools are an increasing trend—typically from downstream licensees and their customers—with the self-serving objectives of limiting their input costs. Some well-intentioned policy makers also mistakenly regard patent pools as a panacea for supposed problems with complex patent landscapes and patent quality.

In-licensing requirements highest among those with most IP

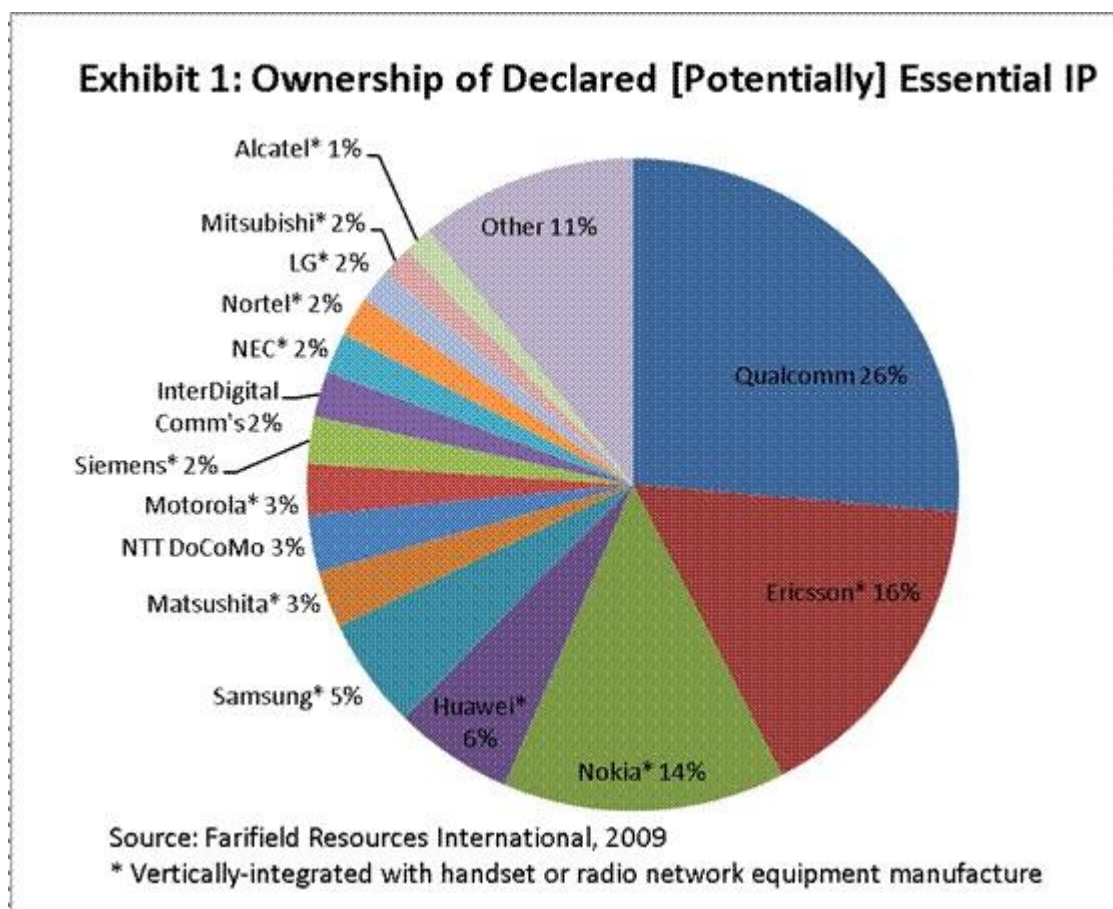
Manufacturers with little or no IP and vertically-integrated companies with extensive IP are all dependent on in-licensing for most IP required in today's ICT products, such as mobile phones. Technology ecosystems are complex webs including those who create new technologies and those who implement them in products. No handset manufacturer has declared more than a small minority of the IP required to implement 3G cellular. Technologies developed by scores of different companies are shared in implementation by hundreds of downstream manufacturers.

Exhibit 1, based on data from a 2009 study funded by Nokia, shows that leading implementers Ericsson, in radio network equipment, and Nokia, in handsets, declared IP ownership amounting to 16% and 14% respectively of the total for 3GPP mobile communications standards with WCDMA. Leading technology and chipset provider Qualcomm declared 26% ownership. (Many have claimed the study methodology is flawed. The input data is used here to demonstrate the well accepted fact that many companies have patents

⁵² Survey of Patent Pools Demonstrates Variety of Purposes and Management Structures, David Serafino, June 2007: <https://www.law.berkeley.edu/files/ds-patentpools.pdf>



related to these standards).



With the need to in-license most essential IP, it is no surprise—with self-interest rather than altruism—manufacturers and their downstream customers (mobile operators who in many cases subsidise handset prices to consumers) have striven to limit aggregate licensing fees. A common proposal from several mobile LTE operators is to limit aggregate essential-IP charges by establishing an LTE patent pool with that specific objective. For example, would-be pool administrators Via Licensing and SISVEL have **promoted themselves and pooling**⁵³ over the last two years by scaremongering about the threat of so-called royalty stacking. In one

⁵³ SISVEL presentation, April 2011: http://ec.europa.eu/dgs/jrc/downloads/events/20110428-tto-circle/jrc_20110428_ttocirle_brufani.pdf



presentation, Sisvel nonsensically **projected WCDMA royalties**⁵⁴ at twice average wholesale prices. I analysed aggregate royalty levels in my last posting **here**⁵⁵ and concluded that aggregate fees are modest and merited by those that invest significantly in risky R&D.

The European Commission **DG Comp's Draft Horizontal guidelines**⁵⁶ recognise that vertically integrated companies that both develop technology and sell products "have mixed incentives". Companies with a significant share of a downstream manufacturing business generally face higher costs in licensing fees for the IP they do not own than they can generate in licensing fees from the IP they do own. This explains the 2008 attempt by Alcatel-Lucent, Ericsson, NEC, NextWave Wireless, Nokia, Nokia Siemens Networks and Sony Ericsson to cap below 10% aggregate royalties for handsets implementing the 3G/4G LTE standard, as **described** in my previous IP Finance posting.

Proposed caps are for aggregate maximum rates to be paid for all standards-essential patents owned by all patent holders. However, in practice, net royalty payments are zero or are minimized among vertically-integrated companies who cross-licence, with or without a cap – so a proposed cap would have little or no impact on licensing costs among such companies. The latter would greatly benefit from any reduction in upstream licensors' fees—payable by all licensees—whereas, any squeeze on their own charges would only be significant in the minority of the market where they are not cross-licensing to minimise or eliminate net payments. A manufacturer's IP fee income is generally small compared to its product revenues.

IP licensing, before and after imposition of an aggregate royalty cap, is depicted in Exhibits 2a and 2b respectively. In this simplified yet representative model, 75% product market share (applicable for handsets sold in 2010) is supplied by vertically-integrated manufacturers who

⁵⁴ Article I wrote on patent pools in August 2010 as one of my monthly columns for trade publication FierceWireless: <http://www.fiercewireless.com/europe/story/mallinson-uncertain-outlook-patent-pool-licensing/2010-08-25>

⁵⁵ All my IP Finance postings are available at <http://ipfinance.blogspot.com/>. My June 15, 2011 compendium of articles, including my first three IP Finance postings, was submitted to the FTC for its 2011 consultation on patents and standards and is on the WiseHarbor web site: <http://www.wiseharbor.com/pdfs/Mallinson-WiseHarbor-FTC-IP-in-standards-submission-12June2011.pdf>

⁵⁶ Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements: http://www.profbrugger.at/kartell/Texte/horizontal_guidelines_en_2010.pdf



minimise royalty charges among themselves. Product markets are predominantly supplied by those who hold significant essential IP—even excluding Apple, RIM and HTC who had no essential IP until after 2006, according to the source used in Exhibit 1. Manufacturers with the largest patent holdings also tend to have the largest shares of the downstream markets for which they need to license-in most IP. Smaller manufacturers with significant IP have negotiating leverage over larger players because the latter need licensing for relatively large shares and revenues in product markets. The remaining manufacturers, without IP, who account for the other 25% of market share, instead pay fees for all IP licensing required. Upstream licensors charge fees to all manufacturers downstream to fund R&D investments. Also consistently with declared IP ownership in Exhibit 1's source, it is assumed that manufacturers without IP to trade make one third of their out-payments to upstream licensors and the remainder to vertically-integrated players. As an example, the royalty cap modelled is an arbitrary reduction of one third to the aggregate royalty rate (as a percentage of handset prices). Total licensing fees paid, received, and reduced are proportional to the areas of the various coloured blocks on the two diagrams.



Exhibit 2a: Licensing Fees, without Cap, Paid by Handset Manufacturers

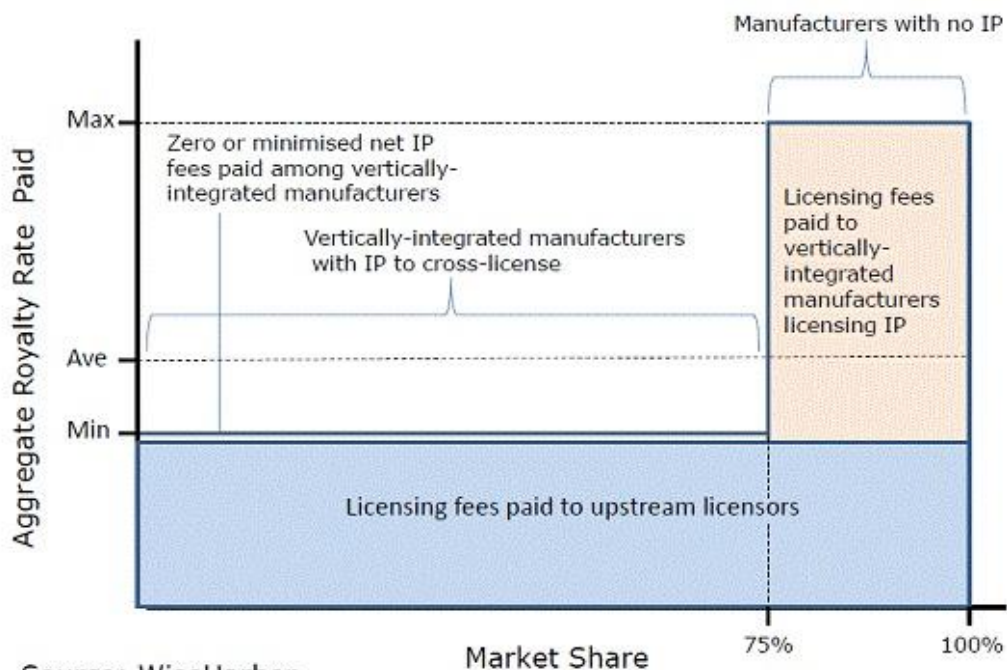
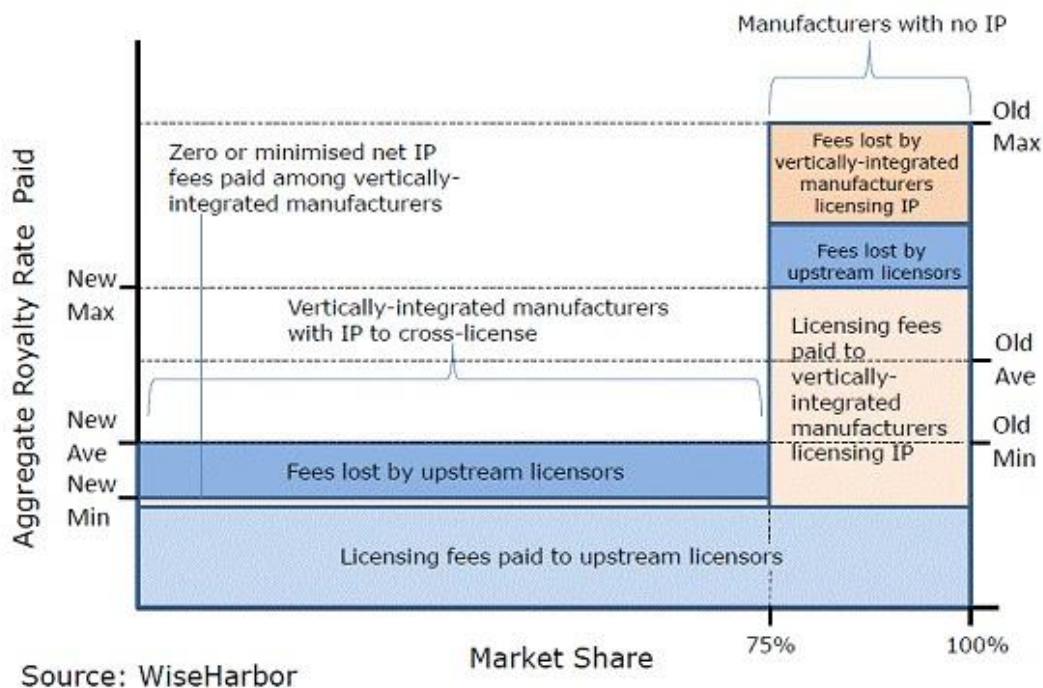


Exhibit 2b: Licensing Fees, with Cap, Paid by Handset Manufacturers



The result is that aggregate royalty rate caps save money for all downstream manufacturers at the expense of upstream licensors. Downstream manufacturers with no IP to trade save most significantly. In this model, vertically-integrated companies lose some revenue, but save significantly more in reduced expenses. For every dollar of licensing revenues they lose through any capping, they save \$1.50 in licensing out-payments to upstream licensors. Licensing fees to upstream licensors from all manufacturers fall in the same proportion.

Fish too big for the pool

Several voluntary patent pools established in the last decade or so have been quite successful. They have attracted many firms to join as licensees. This collective out-licensing is efficient because the pool administrator can serve as a distribution channel for many licensors and as a one-stop-shop, subject to the pool standard's limited scope and IP contributed, for licensees. [Research reveals](#)⁵⁷ that recent pools for audio and video codec standards-essential patents have attracted, in most cases, the majority of the standards-essential patents for those standards, including MPEG-4 with 34% of firms that have applicable patents contributing 89% of the required patents. This research also concludes that while a number of vertically-integrated companies who manufacture products implementing the standards are most inclined to join, many vertically-integrated and upstream essential-IP owners decide to stay out. Some IP owners find they can derive more value from bilateral licensing and cross licensing, or that pools do not provide sufficient freedom to pursue and defend their downstream businesses. Specific concerns include:

- The difficulty of determining how to share pool profits with thousands of patents, uncertainties around essentiality and the relative values among patents;
- Differing business models with upstream licensors and vertically-integrated manufacturers holding major proportions of essential IP;
- Asymmetries in patent ownership among these manufacturers and versus upstream licensors;

⁵⁷ To Join or Not to Join: Examining Patent Pool Participation and Rent Sharing Rules, [Anne Layne-Farrar](#) and [Josh Lerner](#), January 2008
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=945189



- The need to license devices for multiple standards with 2G, 3G, 4G, video, audio and for other technologies outside of the standards; meaning that bilateral deals, which can encompass all of a company's IP, are always going to be necessary, and are more flexible;
- The need to resolve significant patent litigation with fierce competition between vertically-integrated manufacturers and other end-user product manufacturers without standards-essential IP.

This is mostly achieved through bilateral settlements which likely would be extremely difficult if the companies had agreed to, or been forced into, patent pools. Pooling IP would surrender control of this most strategic asset for several major players; and mandatory pooling would expropriate this valuable private property. For example, it could have limited Nokia's ability to sue Apple for significant licensing fees in 2009, based upon Nokia's standards-essential WCDMA patents, and then expediently agree to settle for cash in face of counter-suits and deteriorating Nokia finances with a profit warning most recently. In contrast, the 3G Licensing pool has never sued for patent infringement. While announcing settlement of patent infringement litigation with Apple, **Nokia's CEO, Stephen Elop, stated**⁵⁸ that Nokia's cumulative R&D investment during the past two decades was Euro 43 billion (\$60 billion). This is largely justified by sales of its own products and by minimising aggregate royalty out-payments, stated to be **less than 3% gross to 2007**⁵⁹, through bilateral licensing. Fees to be received in the cross-licensing settlement with Apple—now with revenue share close to market leading levels of Nokia and Samsung—were not disclosed. Whereas Google does not manufacture anything, HTC and Samsung are being sued by Apple for infringement, of patents that are not essential to the mobile standards, by their smartphone devices employing Google's Android operating system. Google made a stalking-horse bid of \$900 million for a portfolio of 6,000 patents, including essential IP, from bankrupt Nortel. The patents would have had great defensive value to Google, who makes its money from advertising in search on PCs and phones using its software and services, but has a limited patent portfolio. However, a consortium of Apple, Microsoft, Sony, Research In Motion, Ericsson, and EMC obtained Nortel's

⁵⁸ Nokia June 2011 press release: <http://press.nokia.com/2011/06/14/nokia-enters-into-patent-license-agreement-with-apple/>

⁵⁹ Nokia April 2007 press release: <http://press.nokia.com/2007/04/12/nokia-has-paid-less-than-3-per-cent-gross-royalty-rate-for-wcdma-handsets/>



patents for \$4.5 billion. The consortium rules are unknown publicly, but presumably the members will be able to use the portfolio defensively in bilateral license negotiations and litigation settlement discussions.

Absent (misguided) regulatory fiat, there is no reason why an LTE pool would become any more significant than the unsubstantial and struggling WCDMA pool. Attempts in the early 2000s by the 3G Patent Platform Partnership (set up by some telecom companies as a voluntary pooling arrangement) to regulate 3G IP fees with collective licensing and a **"Maximum Cumulative Royalty Rate"**⁶⁰ of 5% were unsuccessful. The WCDMA patent pool includes mainly mobile operators and Japanese manufacturers. It covers only around 10% of patents declared by the patent holders to be WCDMA standards-essential. Multimode, multi-media devices (e.g., smartphones, 3G tablets) are incorporating increasing numbers of cellular and other standards. Proposed LTE patent pools have also made little progress over the last couple of years for all of the same difficulties faced by the 3G patent pools.

No panacea

Manufacturers, including the vertically integrated with significant IP, have self-serving incentives to cap aggregate royalties. Caps would reduce downstream product licensing costs significantly more than they would reduce licensing revenues for the latter. However, these companies tend not to favour patent pools for other reasons. Unfortunately, the significant shortcomings are not recognised by many policy makers who mistakenly see patent pools as a panacea to solve supposed problems with complex patent landscapes. Voluntary patent pools have been beneficial in some cases, but patent pools should never be imposed because this would eliminate significant competition that comes from outside of pools. Mandatory pools with royalty rate caps would be anti-competitive and impede innovation".

⁶⁰ Remarks by US Counsel for 3G Patent Platform Partnership on EC and DoJ Approval of the 3G Patent Platform in March 2003: <http://www.mondaq.com/unitedstates/article.asp?articleid=20207>



<http://ipfinance.blogspot.co.uk/2011/11/valuing-ip-in-smartphones-and-lte.html>

Valuing IP in Smartphones and LTE

By Keith Mallinson, IP Finance, 8th November 2011

Extensive IP litigation among various smartphone ecosystem participants — most notably between Apple and Android licensees Samsung and HTC— connotes the rising importance of developing or acquiring IP, then licensing and defending it. Smartphones and tablets represent a diverse, IP-rich and rapidly changing product sector. Disputes include standards-essential patents, software and hardware designs. Purported IP valuations including those derived from essential patent ownership “determinations” are subject to great uncertainties, inaccuracies and biases. Negotiated licensing agreements can overcome these shortcomings while reflecting significantly different positions among licensors and licensees.

Licensing in and out, layer-by-layer

Valuing various contributions to the IP employed in smartphones and tablets is a multifaceted and subjective task. These are multifunctional devices that include several layers of technology and IP in radios, voice encoder-decoders (vocoders), multimedia coder-decoders (codecs), operating systems and applications software—all wrapped up in physical and systems designs, as illustrated in Exhibit 1. The former two categories tend to be standards-based and subject to open licensing on the basis of [\(Fair\) Reasonable and Non-Discriminatory terms](#). While other categories are in some cases proprietary and in other cases open sourced, [these technologies will also infringe the IP rights of third parties](#) in many cases. The coexistence of proprietary IP for which a FRAND commitment may or may not have been provided, and IP provided under open source principles in these complex products is testament to the ability of companies with different contributions and business models to collaborate to bring innovative products to market. Unsurprisingly, everybody talks up the relative value of their own IP versus others’. In fact, a fair bit of spin, bluffing and in some case outright deceit is inevitable among the more concrete claims with such high stakes in this very innovative and competitive market.



Exhibit 1 Smartphone IP Lies (and Truth) Everywhere

Layer	Functions	Implementation	Notable IP owners
Radio	Modem protocols including GSM, CDMA, HSPA, LTE	Dedicated silicon baseband processors running microcode or software defined radios on more general purpose processors	Ericsson, Nokia, Qualcomm, InterDigital, Motorola/Google, Samsung, LG (the list of claimants is growing)
Multimedia	Speech vocoders, video recording/playing codecs, graphics engines	Dedicated silicon Graphics Processing Units with hardware acceleration or software acceleration	Various ICT companies. Patent pool administrator MPEG LA lists 29 licensors for the AVC/H.264 video standard
Operating System Platform and User Interface	The device's management system and human interface	Software on general purpose applications processors with voice recognition, text-to-speech and innovative hardware such as touch-screen controllers	Google (Android*), Apple iOS, Windows Phone (Microsoft), Nokia (Symbian), RIM, WebOS
Applications	Various	Software that is typically obtained in the aftermarket	Numerous. Rovio's Angry Birds is a popular game
Physical design	Aesthetic style, ergonomics	Hardware form factor and layout	Handset manufacturers. Apple is asserting its design IP
System design	Apps stores, content delivery, service management, billing	External to device including network, service provisioning and third party content providers	Various, including Apple, Google and mobile operators

**Open source software has nominally somewhat common ownership. However, it can be under significant control of its leading sponsor(s) while being fragmented with vendor-specific implementations (e.g., with Motorola's proprietary Motoblur UI replacement, HTC's Sense and Kindle Fire)*

Implementers employ others' IP though licensing-in with payment of fees, cross-licensing with their own IP or unlicensed infringement with the risks and costs of litigation. Some implementers buy IP outright; such as with acquisition of patent portfolios, and many continue to develop their own IP in R&D labs and with extensive field testing in many cases. In all cases, a



crucial commercial question is the value of the various IP portfolios required to build a product.

There are seldom definitive prices for licensing IP. Reasons for this include bilaterally negotiated license agreements that consider the multiple objectives and requirements of each unique licensee/licensor combination. These depend upon individual business plans and the unique nature of IP licensing. Voluntary licensing under bilateral agreements is the best means to establish fair market values for licensing IP between a licensor and licensee. There is no reason why any particular valuation method or approach taken in negotiations with other licensees should necessarily yield a similar "price" when the business models, commercial positions, intended use of IP and non-price terms sought (including cross-licenses and other business value to be provided by a licensee) are typically different from licensee to licensee.

Standard deviations in valuations and licensing charges

Prescribed valuation methods are all well and good for those who agree to opt-in to the use them, but save for exceptional circumstances (e.g., court judgment following litigation and failed settlement negotiations), there is no more reason to impose any particular pricing or valuation method for intangible components of complex technology products such as IP than there is for tangible components such as silicon chips or batteries. In fact, the most economically efficient markets tend to be those that are free to price with maximum flexibility because that incentivises best allocation of resources.

Nevertheless, there have been various attempts to standardise or even regulate the way IP is valued and associated licensing rates are derived. DIN, the German Institute for Standardisation has published a standard entitled [DIN 77100 - Patent Valuation - General Principles for Monetary Patent Valuation](#). Some patent pools, such as that for [H.264](#), use "proportionality" with the counting of patents determined essential by the pool's examiners, and charging of patent licensing fees pro-rata. [Implying value on the basis of numeric proportionality has been significantly criticised in recent years because it fails to reflect different value for each essential patents](#). A better approach is to determine the relative value of patents by looking at their relative frequency of citation in subsequent patents. However, this is also far from perfect, providing only "relative values," and is subject to a significant error. Some patents may cover seminal technology, but are overlooked as prior art citations when later patents are examined,



while other patents may become favourite repeated citations of patent examiners without necessarily covering significantly valuable technology. Other valuation methods are much less formulaic; they recognise the merits of valuing IP in different ways and that terms may also vary significantly depending upon circumstances (e.g., FRAND versus other IP licensing). Furthermore, IP is commonly cross-licensed (or kept for defensive purposes) with very significant netting-off (or disregard) for monetary requirements in many cases.

The world is awash with ideology, theories and biases when it comes to conditioning industry opinion on valuations for licensing negotiations, litigation or [proposed regulation](#). Different studies produce results with proportions of patents judged essential and rankings varying by more than a factor of ten. [Nokia sponsored a 2010 study](#) ranking patentee companies on the basis of families of patents declared and judged essential, by the Nokia sponsored analysts, to the latest generation of mobile technology standards. This study and its methodology are introduced as follows (citations omitted):

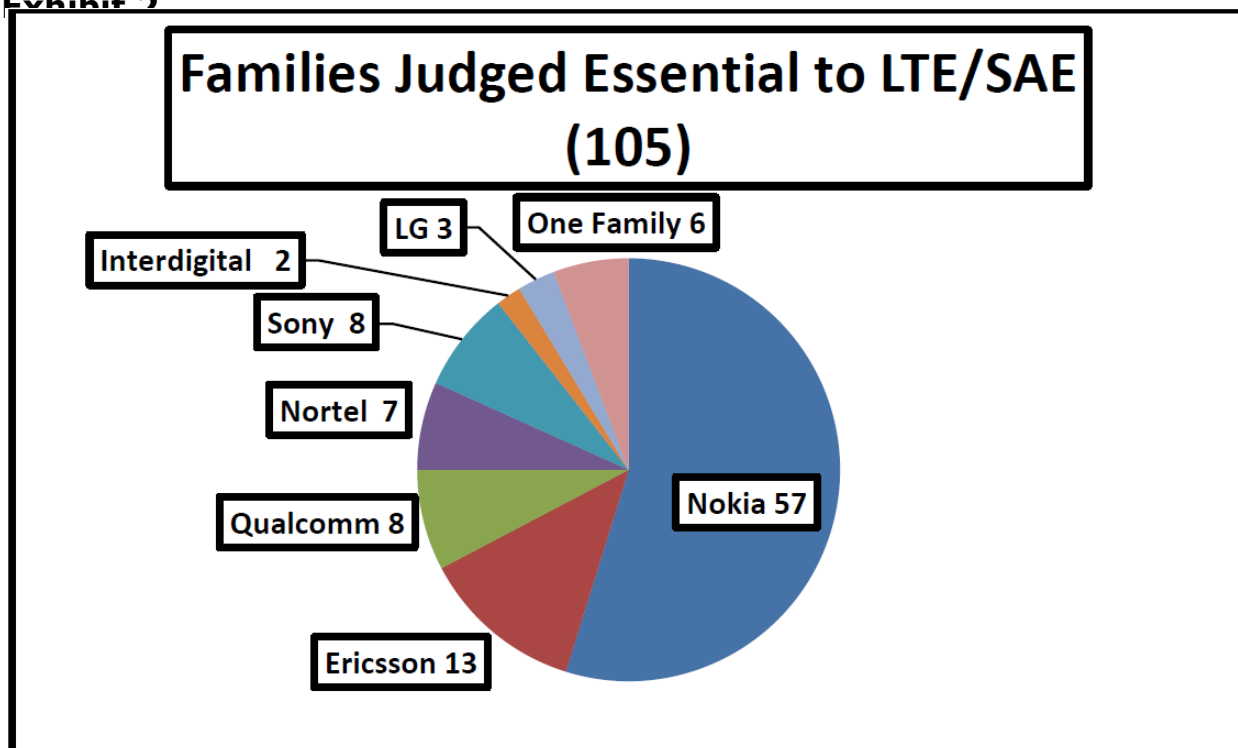
Fairfield Resources has for more than six years, with support from Nokia and other wireless industry leaders, been studying the extent to which patents declared as essential to wireless standards actually are essential, as determined by a team of experienced wireless engineers.

The present report, using substantially the same team of experts as in our previous studies, extends our reviews to patents declared as essential to two fourth generation cellular technologies, LTE (the radio access interface) and SAE (the core network).

Nokia came out top, followed by Ericsson and Qualcomm, and with LG, for example, trailing in 6th position, as shown in Exhibit 2.



Exhibit 2



Source: Fairfield Resources International, 2010 ("study was funded by Nokia")

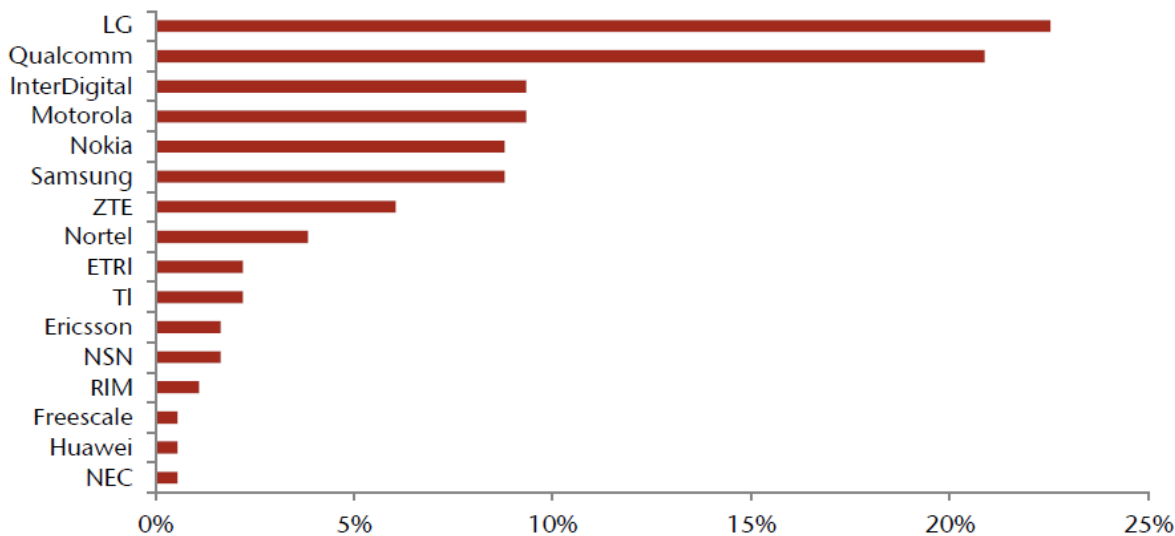
In marked contrast, a recently published [financial research report by Jefferies & Co](#) ranks Ericsson 11th in essential LTE patents with one twelfth the number of patents judged essential as for LG, as shown in Exhibit 3. The report describes its methodology as follows:

In valuing the essential LTE patent portfolios of major players in the wireless space, we utilized outside industry experts that included physics PhDs, wireless engineers, patent legal specialists, and former patent office employees.

Our work began by first screening tens of thousands of patents and then determined a level of essentiality based on individually examining over 1,400 patents related to LTE.



Exhibit 3 (Judged) Essential LTE Patents



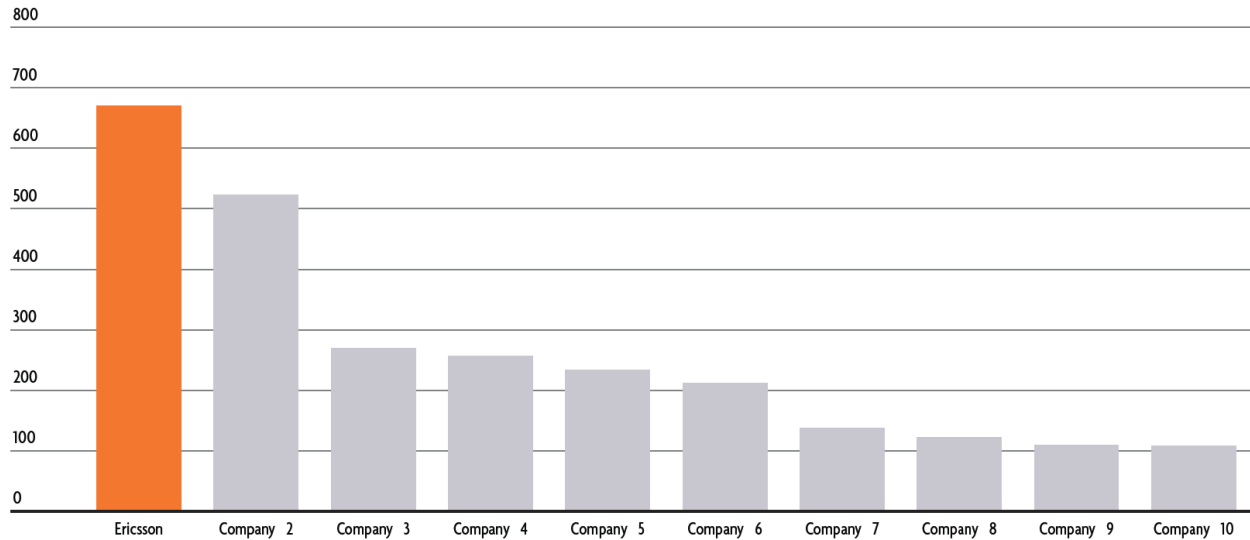
Source: Jefferies & Co, September 2011

For more than one year, [Ericsson has promoted its concept of patent strength](#) being proportional to the number of approved submissions to the Third Generation Partnership Project ([3GPP](#)) standards. Ericsson commissioned Signals Research to undertake research that shows Ericsson in the top position, as reproduced in Exhibit 4.



Exhibit 4 3GPP Approved Submission for the LTE Release Standard – by Company

LTE Approved Submissions








Source: Signals Research ("on behalf of Ericsson")

The combined rankings in Exhibit 5 are a simple combination of the Fairfield Resources International and Jefferies & Co study rankings. I was unable to include the Signals Research data because the study only identifies Ericsson.



Exhibit 5 Combined Rankings for Ownership of LTE Patents or Patent Families Judged Essential

Rank	
1	
2	
3	
4	
5	
5 [^]	

Source: WiseHarbor aggregating Fairfield Resources International and Jefferies & Co rankings

[^][Nortel's patents were sold for US \\$4.5 billion in auction](#) to a consortium including Apple, Ericsson, Sony, Microsoft, RIM and EMC

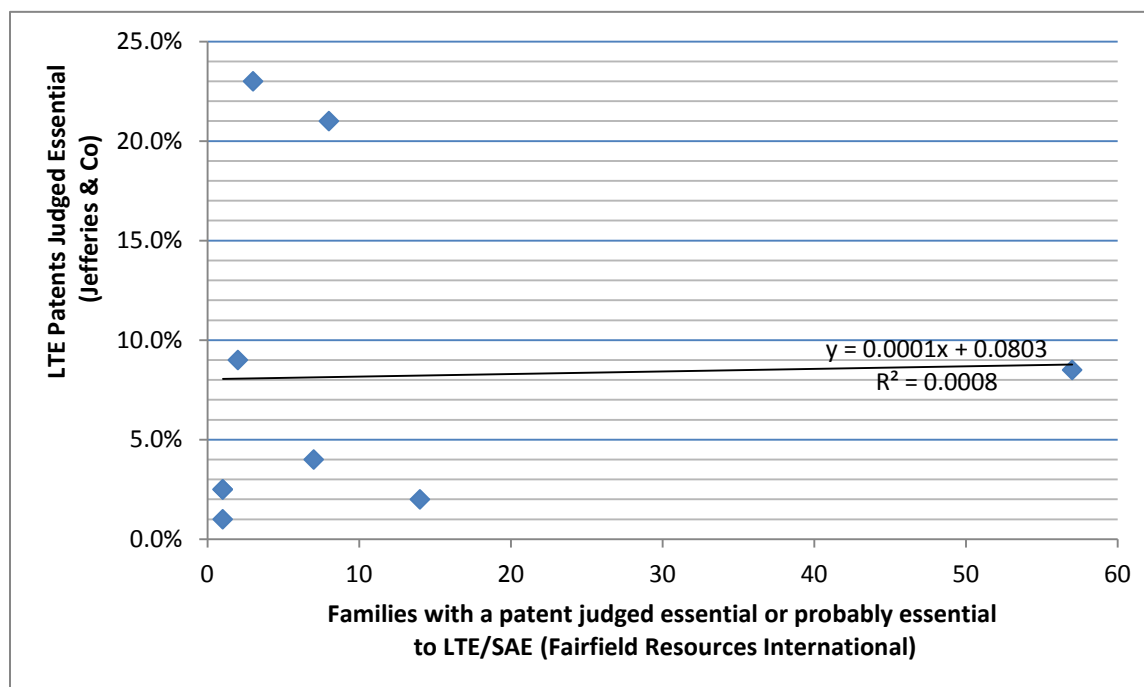
Out for the count

Even assuming for simplicity that portfolio value can be assessed on the basis of numeric patent proportionality, assessments of essential IP ownership vary enormously between studies that use very similar methodologies. The Fairfield Resources International and Jefferies & Co studies are in considerable disagreement, despite both purporting to “determine” essentiality and then count patents or patent families. The results of these two studies bear virtually no relationship whatsoever. There is probably a stronger correlation between levels of sunspot activity and Wimbledon Championship results for British tennis players. In other words, it is as if something completely unrelated was being measured by each of these studies.



I established this disparity by comparison with regression of the data sets from the two studies. I included nine companies while having to drop nine others including Motorola, Samsung, RIM and ZTE because they were only judged to be essential LTE patent owners in one of the two studies. Exhibit 5 plots the figures and a regression curve. [The R squared correlation coefficient](#) is the very low figure of 0.0008. This represents extremely weak correlation between the two sets of results. For example, whereas the Jefferies & Co research report estimated Samsung had 9% of essential LTE patents, the Fairfield Resources International study credited it with none of the 105 Families with a patent judged essential or probably essential. Such widely different results do not inspire confidence in the competence or objectivity of the examiners or those managing these studies. At least one of these studies must be way off the mark.

Exhibit 5 Extremely Weak Correlation between two Studies' Results



Source: WiseHarbor using data sets identified. Graph includes 9 plots (ETRI and TI coincide)

Valuation the old fashioned way

As illustrated above, we are nowhere near consensus, even with valuation of essential-IP for just one standard (i.e., LTE). As illustrated in Exhibit 1, there are many layers and elements of IP that might need to be licensed or cross-licensed including multiple radio protocols (e.g., GSM, CDMA, HSPA, LTE), various codecs and many other capabilities. Furthermore, implicit or explicit



licensing and cross-licensing valuation is a rather different matter to valuation for outright sale of IP ownership.

With multiple standards and the various IP in smartphones, valuation for licensing and cross-licensing is something that reflects many variables including the unique circumstances of the licensing counter-parties. This requires negotiating monetary and non-monetary terms the old-fashioned way – by bilateral negotiation.

Beauty is in the eye of the beholder

There are [three textbook ways to value intellectual property](#), just as one would with real estate – the income approach, the cost approach, and the market approach. For example, rates agreed in previous licensing agreements can in many cases form a good basis for determining reasonable royalties for the same IP in other agreements. In reality, these methods are skewed by business considerations.

Sellers have the lowest price they will accept and buyers have highest price they will pay. So long as the former is lower than the latter, there is the possibility of a deal. Price is usually down to negotiation and in some cases regulation or court judgement. In many markets there are clear benchmarks (e.g., the spot market price for crude oil or real estate comparisons) that significantly guide both sellers and buyers. In contrast, the marketplace for licensing or outright purchase of patents is not so clear cut for many reasons:

- Whereas one consignment of oil can be a perfect substitute for another, and similar-sized houses in the same area may be very close substitutes, by definition, no two patents are alike. Most traded goods and services, including manual and professional labour, can be valued on the basis of prices in markets for comparables or substitutes. This is in many cases not possible with patented IP.
- Patent market trading volumes are rather thin. The unique positions of relatively small numbers of potential outright buyers means that even the expected outcomes of auctions such as that for Nortel's patents, that raised \$4.5 billion, were very uncertain. Consensus press speculation had been for a price of around \$1 billion in the months running up to the auction. [InterDigital](#) suffered a large decline of approximately 20% in its stock price on 15th August 2011, when



Google announced its intent to acquire Motorola Mobility. This was presumed to substantially reduce the likelihood of aggressive bidding for InterDigital that had been expected of Google.

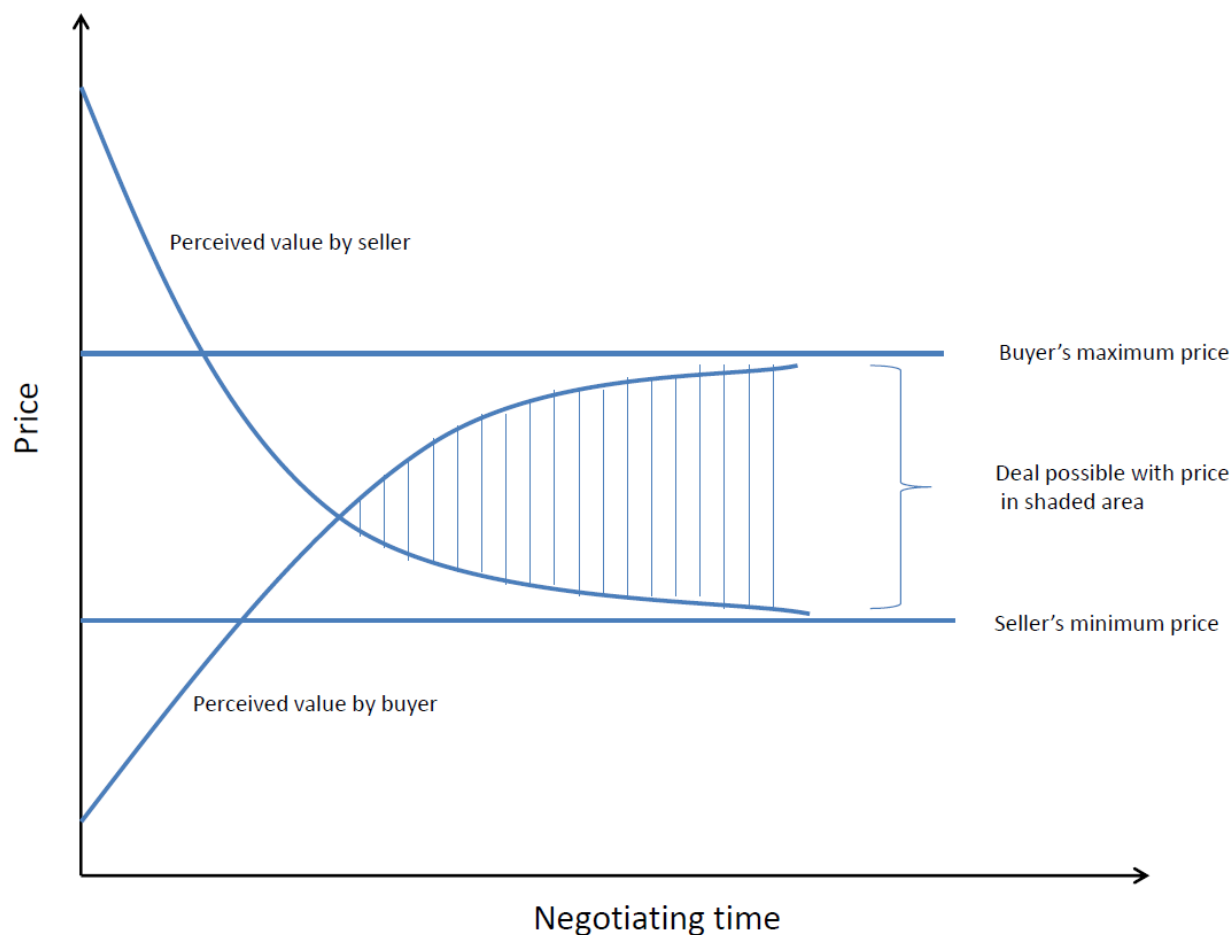
- Cross licensing can accommodate significant asymmetries in the value of IP owned and scale of downstream implementation. For example, a vertically-integrated technology company with high value IP and large product sales might strike an equitable deal, for no royalty payments either way, with a vertically-integrated player who has relatively low value IP and small product sales.
- Value to a patent owner can be as much or more in defensive terms to mitigate royalty out-payments or deter patent infringement litigation as it is in the ability of patents to generate royalty income. In fact, whereas many major owners do not even have licensing programmes; instead, their patents provide the possibility of counter-suing should their owners be threatened with litigation.
- In the mobile sector, licenses are typically offered on a portfolio basis including standards-essential patents, for not just one but several standards (e.g., GSM, WCDMA and LTE). Sometimes non-essential patents, that are useful in implementing technically and commercially competitive products, are desired by the licensee and are also included in license agreements.
- Prices paid in cash include up-front payments and running royalties. The latter are rarely fixed monetary prices. Instead they are typically a percentage of the sale price of the licensed products or sometimes a fixed fee per unit of product sold. This represents the sharing of reward, if not risk, between the two parties on the basis of how much the IP is actually used.
- The scope of licenses is often limited by “field of use” – by geography, type of product – and for limited periods of time.



- IP trades are private affairs, the terms for which are typically not disclosed, whereas the transaction prices for many other assets (e.g., domestic real estate in the US) soon become public information.

Exhibit 6 illustrates how pricing expectations for the two parties to a negotiated sale might typically progress.

Exhibit 6 Value Perceptions through negotiations and agreement



In litigation, courts have in many cases also relied on multiple factors, such as those set out in the [Georgia Pacific case](#), to determine reasonable royalties for use of intellectual property.

Cheque-writers are not necessarily the losers in patent settlements

It is unclear how numerous IP litigation suits involving many smartphone ecosystem players including Apple, Microsoft, RIM, HTC, Samsung, Motorola



and plenty of others will all end. However, settlements are occurring and some recent disclosures provide figures that can help us discern how significant patent licensing fees can be.

Apple's June 2011 settlement with Nokia was widely reported as victory for Nokia (and therefore defeat for Apple) following [strong opinions from a prolific and influential blogger](#). I disagree. Apple probably paid around 0.8% of its total previous cumulative sales revenues on iPhones and 3G tablets. The agreement included ongoing licensing fees, as well as a one-time payment made from Apple to Nokia. The details of the deal were not disclosed, but Nokia's second quarter financials revealed a rare glimpse with [EURO 430 million in royalties](#) reported, suggesting Apple's one-off payment was no more than that. With my assumption that running royalties for future sales are likely to be at similar rates, these charges put a pretty small dint in Apple's exceptionally strong finances. Gross profit margins on iPhones have approached 60% in recent quarters versus, for example, around 25% at Motorola Mobility.

With Nokia's historic emphasis on standards-essential IP development in 2G, 3G, and with Apple a new market entrant in 2007, it was inconceivable Apple was going to get away without paying anything. Ongoing litigation with Apple was the last thing Nokia needed with its strategic and financial problems. The question was simply how much and when? According to a Nokia press release announcing the settlement, [d]uring the last two decades, Nokia has invested approximately EUR 43 billion in research and development and built one of the wireless industry's strongest and broadest IPR portfolios, with over 10,000 patent families." Nokia is in a desperate financial position with its smartphone market share plummeting. The one-off payment came in very handy at a particularly difficult time for Nokia and in reducing losses to EURO 368 million for the second quarter and running royalties will buoy future profitability. In contrast, [Apple's R&D spending is very modest](#) for such a large technology-based company. It spent \$645 million on R&D last quarter, versus \$1.69 billion for Nokia.

By coincidence, the settlement is equivalent to approximately the same amount per handset HTC has reportedly agreed to pay Microsoft in patent licensing fees for manufacture and sale of HTC's Android phones. In May, industry blog [Asymco calculated](#) Microsoft had made \$150m from sales of HTC Android handsets in a licensing agreement that yielded \$5 per handset. Most recently, Samsung has also taken a license with Microsoft to enable the former to sell Android-based devices. As reported by the UK's [Guardian newspaper](#) "Samsung will have to pay Microsoft a small fee – likely between



\$10 and \$15 – for each Android smartphone or tablet computer it sells.” If that is the yardstick, Apple struck a bargain with Nokia!

Innovation, market entry, competition and choice

“If I have seen further [than certain other men] it is by standing upon the shoulders of giants.” Sir Isaac Newton.

It is a popular and yet unproven and erroneous refrain that smartphone IP litigation and licensing costs are stifling innovation and foreclosing market entry. Evidence does not support such theories. On the contrary, licensing costs are modest; smartphone innovation is extensive and shows no signs of slowing with faster connections, more powerful processing and richer applications. (F)RAND-based licensing has fostered investment in the mobile technologies that underpin the smartphone revolution. HTC is an example of a relatively new market entrant with little in the way of patents when it started and yet its smartphone market share rose to a very significant 8% last year. Apple had no history in the essential-IP that is required to implement 2G and 3G radio standards, and yet it has been able to license the IP it needs for a very small proportion of its revenues and build market share of approaching 20% in four years. It took 20 years of cumulative industry development to make a mobile phone cheap enough to be adopted by half the world’s population and another five years before technology was up to the task of creating a smartphone. Maximum mobile data rates have increased 1,000-fold since the introduction of GPRS around 2000 until the launch of LTE with 50 Mbps speeds in some cases. Concurrent improvements in silicon processing, display technologies and software capabilities are also vital.



<http://www.fiercewireless.com/europe/story/mallinson-uncertain-outlook-patent-pool-licensing/2010-08-25>

Mallinson: Uncertain future in LTE patent pool licensing

August 25, 2010 | By [Keith Mallinson](#)

Patent pools can benefit both licensors and licensees but are no panacea for mobile technology licensing. Innovation and competition are as much about alternative business models as new technology. Patent pooling is just one of various ways of licensing. In fact, antitrust authorities recognise that such collective licensing arrangements can be abused to fix prices and harm competition. Consumers and the market in general are best served by maximizing competition with a variety of Intellectual Property Rights licensing arrangements including pools, bilaterally negotiated royalty payments and cross-licensing.



Mallinson

Pooling patents has been popular in recent years with significant success in standardized audio and video encoding technologies including AAC, MPEG-2 and MPEG-4. Consensus is that these pools have captured the vast majority of IPR owners and their "essential" patents that are needed to implement the respective standards. Licensors have profited by pool administrators maximizing the number of licensees and licensees have benefited from pricing visibility and the efficiencies of buying from a one-stop-shop. Patent pool administrator Via Licensing estimates licensing revenues of around \$2bn per year from technology pools--a small figure in comparison to bilateral arrangements.

GSM oligopoly loosened with more varied WCDMA licensing

Many would-be and actual technology vendors were unhappy with GSM licensing arrangements. They sought something different for WCDMA. In GSM, most of the essential IPR was owned by small group of companies who also manufactured handsets and network equipment. Whereas cross-licensing

Rules for pools and licensing deal policies

- *Standards setting organizations such as ETSI, ATIS and 3GPP and trade groups such as NGMN are prohibited by competition (antitrust) law from being the forums for*



among these resulted in low or nonexistent IPR charges for the likes of Nokia, Ericsson and Motorola, outside companies suffered from high licensing charges. As a result, handset manufacturers NEC and Panasonic who had enjoyed significant European market shares in analogue technologies in the 1980s were marginalized with the switch to GSM the 1990s.

Two significant differences in essential IPR licensing occurred with the introduction of WCDMA. After selling its infrastructure and handset businesses in 1999 and 2000 respectively, Qualcomm maintained and grew its R&D programs by retaining its chip business and licensing its IPR in CDMA technologies on a widespread basis. In addition, a WCDMA patent pool was launched in 2004.

WCDMA has flourished in terms of market growth and increasing competition. WCDMA technology's global share of handset sales is rising from around 21 per cent in 2009 to around 28 per cent in 2010, according to WiseHarbor estimates. Handset vendor market shares have always been significantly less concentrated in WCDMA than in GSM, with the top five vendors collectively commanding 70 per cent and 80 per cent for each technology respectively in 2009.

commercial negotiations or setting royalty rates.

- *Neither patent essentiality nor what are deemed to be (Fair) Reasonable And Nondiscriminatory licensing terms are determined by ETSI, 3GPP, NGMN or any other industry association. Patent owners may voluntarily subject themselves to essentiality assessments through patent pooling agreements, but there is no obligation for patent owners in general to do so. Otherwise, determinations only occur in rare instances, such as by a court of law in patent infringement litigation or antitrust cases. ETSI maintains a database of patents that have been declared essential or possibly essential by their owners.*
- *NGMN conducted some LTE royalty rate evaluations using a "Trusted Third Party" that totted up maximum royalty rates declared by various companies that claim to own essential IPR for the standard. Aggregate figures were only ever disclosed among members, but are widely regarded as meaninglessly high because they disregard the reality of extensive netting-off of royalty charges that occurs through cross-licensing in bilateral negotiations.*
- *It is not NGMN policy to*



Struggling WCDMA pool

The WCDMA Patent Licensing Program patent pool, administered by UK-based 3G Licensing Ltd, has made lacklustre progress since its 2004 inception. It has only incorporated a small proportion of WCDMA IPR. One independently published assessment is that only 10% is included. This figure is very plausible given that the licensors are predominantly only Japanese companies including NTT, NTT DoCoMo, Fujitsu, Sharp, Mitsubishi, NEC, Panasonic and Toshiba. The rest, apart from Siemens, are operators including France Telecom, KPN and SK Telecom. The notable absence of Qualcomm, Nokia, Ericsson and many other big names makes it seem unlikely anybody else's credible patent count or other evaluation would come up with a much larger percentage. Mobile is much more complex than audio and video standards with several times more patents and patent owners. It is no surprise that building the pool has been a slog, but problems are fundamental.

Were pool licensors duped by other patent owners who stated intentions also to join, but did not follow through? Whereas Qualcomm has clearly expressed its unwillingness, there were widespread unmet expectations that other major names would join eventually.

determine patent value on a proportionate basis by counting patents or capping the aggregate LTE royalty at 10% or any other figure. It was a splinter group of five companies, plus their joint ventures, including Ericsson, Nokia Alcatel-Lucent and NEC who first promoted these concepts in their 2008 framework agreement. This approach, which is most appealing to companies who are significantly licensees, has far from universal appeal. For example, RIM rejects the notion of proportionality on the basis that some patents are much more valuable than others.

- *NGMN issued a Request for Information from would-be LTE patent pool administrators. Whereas antitrust approval is essential, neither NGMN nor any other industry body has the authority to determine who can and cannot form a patent pool. One year later, it seems like NGMN is never going to decide who has won its beauty contest. Such a decision would necessarily be highly commercial and involve the conflicting interests of licensors and licensees on matters such as individual and aggregate royalty rates.*



What about 4G?

Why should results be any different with LTE? Whereas there is a lot of interest and jostling for position to be the patent pool facilitator and administrator for LTE, there is no reason yet to believe an LTE pool will do any better than the WCDMA pool. The Open Patent Alliance's WiMAX patent pool initiative, administered by Via Licensing, has similar shortcomings with none of the leading mobile technology patent owners in 2G and 3G--who also lead in IPR ownership for the OFDMA technologies upon which both LTE and WiMAX are based --onboard yet. According to industry analyst and WiMAX proponent MARAVEDIS, there is 60-80 per cent overlap of LTE and WiMAX patents.

Major players in particular continue to believe they can derive more monetary, cross-licensing and litigation defence value by not pooling their patents. Recent patent disputes, such as RIM with Motorola and Nokia with Apple discourage collective agreements in favour of bilateral defence, despite mechanisms in pooling agreements that enable patents to be asserted in the face of litigation. Significant concessions by existing WCDMA pool licensors would be required to secure a star IPR owner or two.

While it is unsurprising the three contenders to facilitate and administer one or more LTE patent pools are companies that have already succeeded with other patent pools, it is significant that the current WCDMA pool administrator is not a contender. MPEG LA, Via Licensing and Sisvel responded to a 2009 Request for Information on forming an LTE patent pool by the Next Generation Mobile Network Alliance. See sidebar for some basic facts and rules for trade organizations in licensing negotiations.

Sisvel's pitch has popular appeal with regulators, licensees, carriers and consumers who end up paying royalties when they subsidize or purchase handsets. Sisvel founder Roberto Dini made a public conference presentation in London on patents and standards in February 2010 that seeks to show pools can prevent excessive costs from royalty stacking. He suggested that licensed individually, 85 patents for MPEG video at 50 cents apiece would cost \$42.50, as opposed to the \$2.50 charged by the patent pool. He used several other examples, including the clearly fallacious hypothetical of 954 WCDMA patents at 50 cents each costing \$477 in aggregate. Even though around 90% of WCDMA patents are licensed for payment or are cross-licensed bilaterally without pooling, average wholesale selling prices for entire WCDMA phones are only around half that figure.



There is also supposedly a lot of popular support for a WiMAX patent pool. In fact, the pooling of patents in WiMAX is purported to be one of the reasons why royalty costs are touted to be lower with WiMAX than with WCDMA or LTE. A low royalty rate regime could be attractive for Intel with its economies of scale in selling chips, but this makes for poor business by licensors and the administrator. With a weak outlook in WiMAX versus LTE, it is unsurprising that the OPA is now seeking in recent public comments to reposition its initiatives to 4G patent pooling in general, including both LTE and WiMAX.

The OPA has also resorted to scaremongering with demands that Qualcomm should pool its patents to prevent costly legal actions. OPA's President Yung Hahn says that otherwise litigation costs might ultimately be passed along to the end user, thus relegating 4G to the elite, often business users, [not the mass market as intended](#). This is patent nonsense and a repeat of how Nokia, Ericsson, Broadcom, TI, NEC and Panasonic criticised Qualcomm's WCDMA licensing in 2005. It was these companies, not Qualcomm that initiated the associated legal action with the European Commission's competition directorate. As indicated above, WCDMA has since flourished on a widespread basis in a mass market. The complaint failed following years of thorough investigations.

Conflicting interests

Pools for 3G and 4G also face external challenges. Competition authorities are concerned that the pools may be driven by cartel-like activity. Pool rules prohibit the inclusion of non-essential IPR on antitrust grounds, but fathoming out which patents are and are not essential is not straightforward. Most significantly, a pool that is hijacked by licensee and device customer interests might fix low prices to the detriment of licensors and their ability to fund ongoing developments. Some of the minor patent owners in pools and others with strong voices and representation in organizations such as NGMN are more interested in aggregate royalty rate minimization as licensees or device customers than as revenue-earning licensors for the few patents they own, if any. This kind of pricing pressure is also unappealing for patent pool administrators who typically take a percentage of licensing revenues.

No wonder 3G Licensing Ltd is unwilling to provide the tea and sandwiches as hosts for yet another talking shop on mobile licensing with LTE.



6 Appendix B: Some market updates on previous publications

Smartphone Market Leaders' Model Specifications and Prices in 2006 and 2012

Introduced	April 2006	June/September* 2012	August 2014
Images not to scale			
Model	Nokia N93	Samsung Galaxy S III: I747 and I9500*	Xiaomi Mi 4 (4G model)^
2G Network	GSM 900/1800/1900	GSM 850/900/1800/1900	GSM 850/900/1800/1900
3G Network	UMTS (WCDMA) 2100	HSDPA 850/900/2100	TD-SCDMA 2010-2025/1880-1920 CDMA 800/1900 and CDMA2000 1x EV-DO (Telecom) HSDPA 850/900/1900/2100 (Unicom)
4G Network	No	LTE 700/2100 or LTE 800/1800/2600*	TD-LTE 2570-2620/1880-1920/2300-2400^
Data Speed	384 kbps (3G)	50 Mbps (LTE)	HSDPA, 42 Mbps; HSUPA; LTE; EVDO Rev A, up to 3.1 Mbps^
Chipset	Nokia/TI baseband processor and Texas Instruments OMAP 2420 Applications Processor	Qualcomm MSM 8960 or Exynos 4412 Quad*	Qualcomm MSM8974AC Snapdragon 801
Central processor	332 MHz Dual ARM 11	Dual core 1.5 GHz or Quad core 1.4 GHz Cortex-A9*	Quad-core 2.5GHz Krait 400
Graphics processor	3D Graphics hardware accelerator	Adreno 225 or Mali-400MP*	Adreno 330
Operating System	Symbian OS 9.1, Series 60 3 rd edition UI	Android OS v4.0 (Ice Cream Sandwich) or Android OS v4.1.1 (Jelly Bean)*	Android OS, v4.43 (KitKat)
Display	TFT, 256K colours, 240 x 320 pixels, 2.4 inches, 36 x 48mm, 167 pixels per inch	Super AMOLED, 16M colours, 720 x 1,280 pixels, 4.8 inches, 306 pixels per inch	IPS LCD, 16 M colors, 1080x1920 pixels, 5.0 inches, 441 pixels per inch
Touchscreen	No	Capacitive multitouch	Capacitive multitouch
Memory	50MB storage +64 MB RAM +128 MB miniSD Card	16GB storage, 2GB RAM, up to 64 GB microSD	16 GB (64GB at higher price), 3GB RAM



Cameras	3.15 megapixels, VGA @30 fps: secondary CIF videocall camera	8MP, autofocus, LED flash: secondary 1.9MP, 720p @30 fps	13 MP, autofocus, dual-LED flash. Video includes 2140p@30fps. Secondary 8MP, 1080p@30fps
Leading Features	SMS, MMS, WAP/xHTML, HTML, Email, IM, polyphonic ringtones, MP3/MP4 and video calling	Simultaneous HD video and image recording, touch focus, geo-tagging, face and smile detection, 1080p @30 fps video, image stabilization. GPS with A-GPS support and GLONASS, accelerometer, gyro, proximity, compass, barometer	Face/smile detection, geotagging, panorama, accelerometer, gyro, proximity, compass, barometer. A-GPS, GLONASS, Beidou. Active noise cancellation with dedicated mic.
Full specification ⁶¹	http://www.gsmarena.com/nokia_n93-1551.php	http://www.gsmarena.com/samsung_galaxy_s_iii_i747-4803.php and http://www.gsmarena.com/samsung_g_i9305_galaxy_s_iii-5001.php *	http://www.gsmarena.com/xiaomi_mi_4-6518.php
Price without subsidy	Euro 550 x \$1.26 (rate 7/14/2006) = \$693 http://press.nokia.com/2006/04/25/adobe-and-nokia-join-forces-to-bring-consumers-a-complete-video-editing-solution/	\$599-\$649 http://www.phonearena.com/news/Samsung-Galaxy-S-III-to-cost-600-on-Verizon-at-full-retail-price_id30944	\$400-\$460 http://www.xiaomiworld.com/xiaomi-mi4.html

* September introduction for I9500 version. Superseded by the Galaxy S IV as flagship model in March 2013
 ^Also 3G models with CDMA 800/1900 and CDMA2000 1x EV-DO (Telecom); HSDPA 850/900/1900/2100 (Unicom)

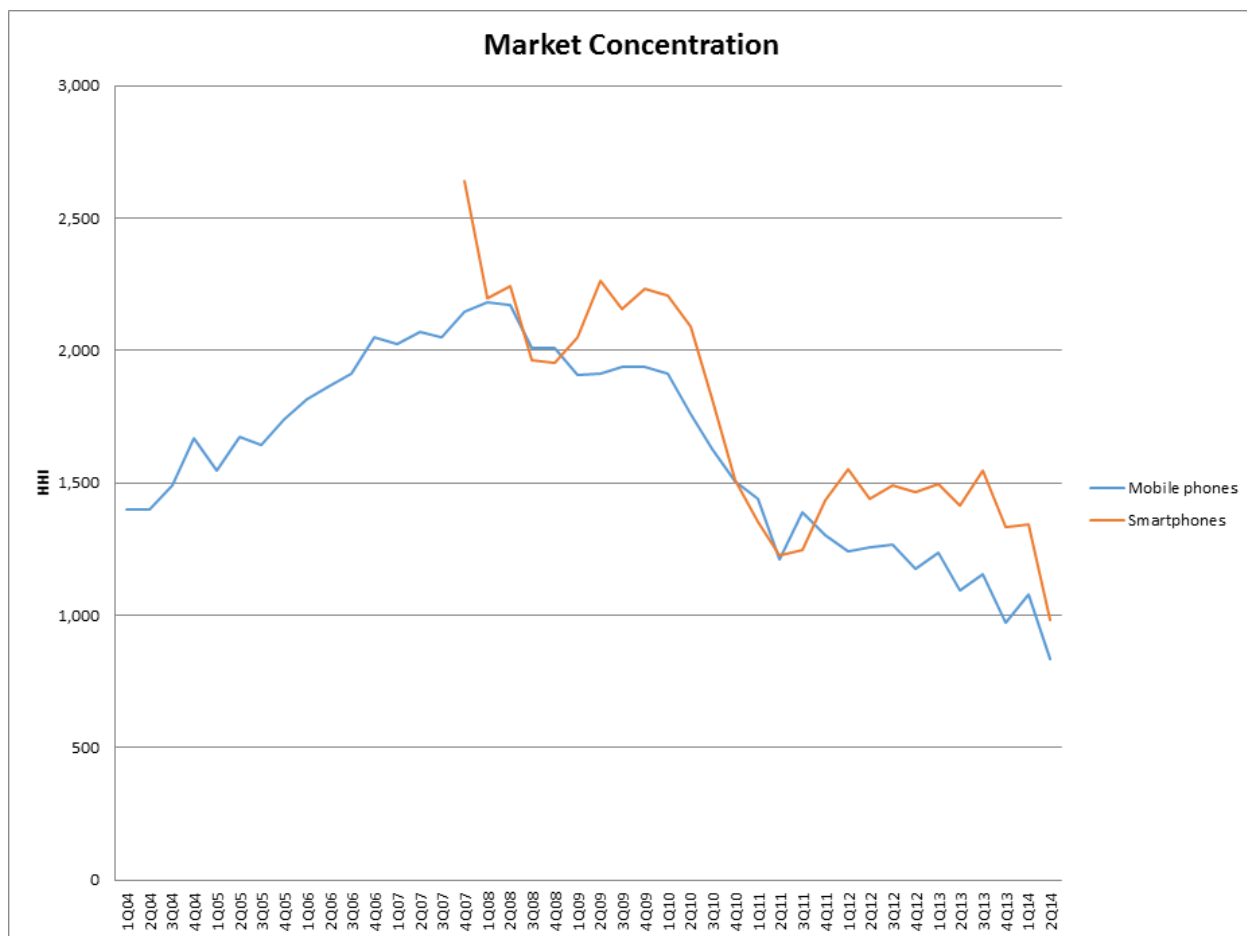
While performance specifications have vastly increased, unsubsidized prices (without adjusting for inflation) have actually reduced somewhat, as also illustrated in this comparison. The price before any carrier subsidy was the equivalent of \$693 for the Nokia smartphone in April 2006 and 10 percent lower at around \$624 for the Samsung smartphone in June 2012. After adjusting for a 14% increase in the U.S. consumer price index over that six-year period, the Samsung is 24% cheaper on an inflation-adjusted basis.

Two years later, Xiaomi launched a new flagship phone, the Mi4, with similar or better specifications to the Samsung device in several respects at prices around 30% lower.

⁶¹ All specifications in this chart may be found at these sources except the chipset used in the Nokia N93. The source for that specification is Portelligent/Techinsights 2006.



Market concentration in supply of Smartphones and mobile phones in general



At the global level, sales of both smartphones and cell phones more generally have become increasingly unconcentrated, a trend that began with the decline of Nokia's share since 2007. This important fact can be quantified by reference to the Herfindahl-Hirschman Index, a widely-accepted measure of market concentration in competition analysis. The HHI is calculated by summing the squared market shares of all firms in any given market. U.S. antitrust authorities generally classify markets into three types: Unconcentrated ($HHI < 1500$), Moderately Concentrated ($1500 < HHI < 2500$), and Highly Concentrated ($HHI > 2500$).

Since 2007, market concentration for cellular phone suppliers has reduced from moderately concentrated to unconcentrated. Smartphones were first marketed as such by Nokia from around 2002.⁶² With Nokia and RIM

⁶² All About Symbian, http://www.allaboutsymbian.com/devices/item/Nokia_3650.php



predominating until the market entry of Apple and others in 2007 and 2008, sales of smartphones were “Highly Concentrated”, but quickly dropped into the “Moderately Concentrated” and then “Unconcentrated” range, where they have remained, or very nearly so, as other manufacturers entered. Market concentration has reduced markedly with the index falling significantly to below 1,000 for phones and smartphones in 2014 with many new market entrants making significant market share gains, in developing countries, for example.



7 Appendix C: Respondent's biography

Keith Mallinson is founder of [WiseHarbor](http://www.wiseharbor.com)⁶³, providing expert commercial advisory to technology and services businesses in wired and wireless telecommunications, media and entertainment serving consumer and professional markets. He is a regular columnist with [FierceWireless Europe](http://www.fiercewireless.com)⁶⁴ and [IP Finance -- "where money issues meet intellectual property rights"](http://ipfinance.blogspot.com)⁶⁵.

Mallinson's recent clients at WiseHarbor include several mobile phone technology IP owners. His work includes various other commercial issues. He provides advisory services including market analysis and forecasts on operator services, network equipment and devices. He also has significant testifying expert witness experience in the cellular sector.

Mallinson led Yankee Group's global Wireless/Mobile research and consulting team as Executive Vice President, based in Boston, from 2000 to 2006. His responsibilities also included consumer media and enterprise communications. Until then, he had overall responsibility for the firm's European division, based in London, as Managing Director from 1995 until 2000. He was the European Research Director prior to 1995.

Mallinson has 25 years experience in the telecommunications industry, as research analyst, commercial consultant and as a testifying expert witness. Complementing his industry focus, he has a broad skill set including technologies, market analysis, regulation, economics and finance. He has published numerous reports and speaks publicly at industry events such as the Mobile World Congress and CTIA trade shows on a wide variety of topics including next generation broadband network technology adoption, fixed mobile convergence, semiconductor technologies, intellectual property patents and licensing, emerging markets in developing nations, mobile operating systems, search and advertising.

Mallinson started his career in military communications design and project management with the UK Ministry of Defence. Prior to studying for his MBA he worked as a minicomputer systems engineer for electronic security company Cardkey Systems. For several years he served as a Director at a

⁶³ Company web site: www.wiseharbor.com

⁶⁴ Publication web site: www.fiercewireless.com

⁶⁵ Publication web site: <http://ipfinance.blogspot.com>



seed capital investment firm specialising in information and communications technologies as well as biotechnology.

Mallinson has an undergraduate electronic engineering degree from London University's Imperial College and an MBA from the London Business School, including an academic exchange with Northwestern University's Kellogg Graduate School of Management in Illinois.

