Adjusting the Balance in SEP Evaluations and Licensing

A European Commission DG Growth initiative described in its Roadmap on Standard Essential Patents for a European digitalised economy aims to increase information on SEPs so implementers can get a better idea about which of these they might be infringing. Additional disclosures on how patent claims might read on the standards could be beneficial. Requirements should reflect the dynamics and uncertainties in standards development and patent prosecution and must not be onerous to patent owners. These are issues for standards development organisations to consider.

A report DG Growth commissioned in support of its initiative entitled Transparency, Predictability, and Efficiency of SSO-based Standardization and SEP Licensing (the CRA report) proposes that SDOs or the European Patent Office could also help meet this objective by being appointed the central assessor that would screen patent disclosures to determine and count which patents are *truly* essential. This would be undesirable intervention with various adverse consequences. As I wrote here for IP Finance in detail very recently, third-party determinations on large portfolios are inherently subjective, inconsistent and unreliable.

The creation of this EC-ordained "patent counting" database would also lend it to being used as an interventionist means of valuing SEP portfolios. In conjunction with the unwarranted imposition of maximum cumulative rates (i.e. royalty caps), this could facilitate the ill-conceived price regulation alluded to by the Competition Commissioner.

The CRA report also embraces defective patent hold-up and royalty stacking theories. General theories on hold-up and "Cournot complements" are misrepresented and do not apply to patents. There is a lack of supporting evidence on alleged patent hold-up, royalty stacking and much of it to the contrary including that for opposing effects from patent hold-out (i.e. patent trespass).

SDO IPR policies are commonly misrepresented with the bogus notion that patent owners should be deprived a share of value from use of patents in standards. Neither the economics nor the law is settled here. Sharing in the "gains from trade" incentivises risky investments.

Private ordering has worked very well in 2G, 3G, 4G and it will continue to work well in IoT including 5G. Prospects are no more uncertain now than they were when these previous-generation standards were introduced and helped transform the communications markets. Decades of fruitful progress indicates it is not "too soon to tell" how things are playing out. By all measures these markets are

extraordinarily competitive and successful, with large research and development investments, extensive resulting innovation, massive growth in subscribers and data consumption, reducing quality-adjusted prices, and dramatic shifts in market shares with new market entry, market exits, low and decreasing concentration in supply. I have been showing this with facts and figures here, here and here for many years, and as others have confirmed.

The CRA report is right to reject a mandatory switch to chip-based royalty rates and licensing, and to recognise the legitimacy of charging different royalties depending on "field-of-use" (e.g. an IoT lightbulb versus an augmented reality headset or a self-driving car). This well-established principle aligns costs with functionality used and value generated.

IoT is expected to be worth up to the teens of trillions of dollars to the global economy by 2025. That is 500 times more than the cost of licensing the communications technologies that are already providing the growth fulcrum for IoT developments. Undercutting royalties will diminish gains that could otherwise be obtained widely by leveraging reinvestments in intellectual property.

With it being much more difficult to obtain injunctions than it used to be, as the CRA report and Justice Birss in Unwired Planet v. Huawei also observes, the scales have already been tipped significantly in favour of implementers versus technology developers in terms of bargaining power. The balance here needs to be redressed here not swayed further. Royalties are flat or declining while opportunities and demands to invest in R&D for the good of all in IoT and 5G are increasing.

DG Growth should not interfere with SDO governance or try to pick winners among these or their IPR policies. Rather than speculating about how much aggregate licensing costs could be, costs should be measured by asking licensees what they are actually paying in cash royalties. Compare that with the value the resulting technologies deliver in the market.

Private ordering is preferable to public ordering and intervention is unnecessary. SDOs, patent pools, other licensing platforms and bilateral licensing under FRAND conditions can continue to serve the industry well and to the benefit of consumers.

However, if EC decides to intervene there should be impact assessments before intervening and empirical analysis of effects thereafter. DG Growth should also measure the results previous rulings— including those affecting the availability of injunctions— have already had on royalty rates and how long it takes to complete licensing agreements.

DG Growth's analysis should be as open and transparent as possible, for scrutiny by all.

This article supplements my response to the DG Growth consultation on this topic in 2015.

1. Many paths are well-worn for good reasons

DG Growth's desire for increased disclosure and clarity seems fine, but it must also be rigorous in its interpretation of facts and figures and allow full independent review of its analysis and recommendations against explicit policy objectives for any interventions.

The EC needs to develop a considered and coherent basis for change before regulating the ways in which technology developers and implementers engage in their dealings with SEPs. DG Growth is rightly seeking input from industry stakeholders. However, it needs to dig deep with analytical rigour

and not be swayed by populist calls that might harm rather than help the relatively mature smartphone market and developing market for IoT.

DG Growth has been trying to figure out what it wants to do about SEPs since it initiated a consultation on the matter in 2014. It evidently still feels it needs to do something. I submitted my written response to that in February 2015. Prior to that and since then it has commissioned various studies and a couple of workshops on issues related to standards, patents and their licensing. The EC recognises numerous SEPs are at the heart of high-end and innovative products that need to communicate with one another. It observes, with the development of 5G and IoT, a variety of EU industries are engaging in further digital integration of a constellation of objects, devices, sensors and everyday items.

DG Growth's new Roadmap highlights its ongoing initiative in which it seeks:

"(i) best practice recommendations to increase transparency on SEP exposure, including to SSOs to improve value and accessibility of SEPs databases and to bring more precision and rigour into the essentiality declaration system in particular for critical standards;

(ii) guidance on the boundaries of FRAND and core valuation principles;

(iii) guidance complementing existing jurisprudence on enforcement in areas such as mutual obligations in licensing negotiations before recourse to injunctive relief, portfolio licensing and the role of alternative dispute resolution mechanisms."

However, more information is not helpful if it is used to provide a distorted picture of reality or is burdensome to collect.

DG Growth is somewhat reassuring in its statement that an upcoming policy Communication on these issues "will mainly provide best practice guidance to industry, SSOs and Member States without changing legal positons or rights and obligations." And as also stated, nothing more targeted or stringent should be required before impact assessments have been made, based on developments. I agree that policy and intervention should not be based on conjecture or anecdotes. I request that this analysis should be open and transparent for scrutiny by all.

2. Growth threats

Under the pretext of an existential threat to development of the Internet of Things – notwithstanding the enormous success of the smartphone industry by every conceivable measure, and with billions of other connected items already – the European's Commission's DG Growth seeks to improve matters by intervention.

DG Growth asserts that IoT "may be delayed" due to regulatory uncertainty which is "undermining the roll out of business plans for both patent holders and implementers of these connectivity technologies". This is a red herring. Other uncertainties and concerns are much greater challenges to the development of IoT. For example, a 144-page report from the McKinsey Global Institute entitled "Unlocking the potential of [IoT]" does not even mention patent licensing among many potential barriers it discusses in detail including technology hardware costs, interoperability, privacy, confidentiality and security issues. Under the heading of "intellectual property", its discussion is entirely about ownership rights for data generated by connected devices. I attend conferences on

various technical, commercial and regulatory aspects of IoT. Discussions there also indicate that participants have plenty on their minds other than SEP licensing.

There has been a lot of scaremongering about allegedly excessive patent-licensing costs in communications devices. Nobody ever paid anywhere near the alleged "royalty stack" figures of 30 percent or more of a smartphone price that have been projected by the trade group NGMN, Intel and others. Evidence shows that actual figures paid average around five percent, equivalent to $20 on a $400 device. In comparison, VAT increases phone prices by around 20 percent, but nobody ever suggests VAT undermines the market for mobile phones. More information on what is actually being paid to license IoT devices in established applications over the last decade would be a most helpful guide for the future. I have had a cellular modem in my home alarm system since 2009. My connected car has two separate modems including one with LTE. I see no market failure here.

3. Evolution not revolution with IoT and 5G

IoT is significantly a rebranding in the long-developing and successful evolution of machine-to-machine communications and associated applications.

Risks and uncertainties more broadly in technical challenges (e.g. security end-to-end), legal issues (e.g. product liability in self-driving cars and data protection) and business cases for IoT applications among market participants are of much greater significance and concern than SEP licensing. Patent licensing costs will pale in comparison to total investments and expected returns, as they do today in mobile phones where they account for less than two percent of a billion or so dollars in ecosystem revenues including operator services, network equipment and devices.

In contrast to the uncertain future portrayed by DG Growth, I see great enthusiasm and optimism for and commitments to IoT including from developers, implementers and enterprise users. I saw this at the Mobile World Congress in Barcelona at the end of February. The following week SDO 3GPP agreed to accelerate development of 5G which will be largely used for IoT. Ericsson's 2016 Q4 Mobility Report expects the number of cellular IoT connections to increase from 400 million in 2016 to 1.5 billion in 2022. Ericsson also forecasts a total of 29 billion connected devices by 2022, of which around 18 billion will be related to IoT. Using traditional nomenclature, Cisco estimates that M2M will grow nearly three-fold from 4.9 billion in 2015 to 12.2 billion by 2020, representing nearly half of total connected devices. According to McKinsey, IoT has a total potential economic impact of $3.9 trillion to $11.1 trillion a year by 2025.

4. Private over public ordering

The industry developed a fair, predictable and effective patent licensing system in 2G, 3G and 4G. It can and will continue to do this by adapting to the opportunities and challenges in IoT with 5G.

Any uncertainties surrounding SEPs, licensing and enforcement that do exist are significantly a result of prospective policy-driven interventions such as antitrust actions that tilt the balance between licensors and licensees in this this domain. "Balance" is probably the most overused word in EC vocabulary: it appears eight times in the Roadmap. If this initiative is to be helpful, DG Growth should take stock of what is working so very well in technology and standards development including SEP licensing before making significant adjustments to favour one industry constituency over another. In light of historically positive outcomes, evidently-effective practices and enforcement measures should be defended not undermined. Technology licensing initiatives including Avanci for

IoT applications with cellular patents from Ericsson, Qualcomm, InterDigitial, ZTE and KPN illustrate that the market is developing ways in which open standard IoT technologies can be readily and affordably accessed by all, as desired by SDOs, their members, DG Growth and others. Similarly, for example, an MPEG LA patent pool has already licensed AVC/H.264 technologies, including several thousand patents from 38 licensors, with transparency, predictability and modest costs to 1,342 licensees across the consumer electronics industry where the standard is most popular for streaming video in a wide variety of products.

Additional disclosures on how patent claims might read on the standards could be beneficial if requirements are not onerous to patent owners and reflect the dynamics and uncertainties in standards development and patent prosecution. This should be a matter for the standards development organisations to consider, act upon as they see fit and according to their governance policies.

Centralised determinations of patent essentiality and patent counting should not be mandated because these would be inherently imprecise assessments and are no panacea in determining portfolio values. Parties in licensing negotiations are free to agree use of a variety of different assessments and assessors. Patent owners are encouraged to disclose patents they believe might be or might become essential to the standards. There is over-disclosure due to conservatism of patent owners and because high SEP counts are used justify larger shares of royalties. Different assessors and different assessment techniques come up with significantly different results. There is no justification for playing favourites with one particular assessor. Any prescribed authority and assessment technique would be vulnerable to being gamed and manipulated for political or commercial gain.

Licensing practices together with the legal and institutional mechanisms that support them must reflect the realities in licensing portfolios of thousands of patents in hundreds of standards and among hundreds of companies, many of whom are in no hurry to pay up while many billions of dollars have already been sunk by others in developing the valuable technologies they use. Litigation on a patent-by-patent, nation-by-nation basis is unworkable. Insisting on this as a litigation tactic should be resisted where infringers are benefitting from large patent portfolios, even where a significant proportion of patents might be invalid or not infringed.

5. A shift in relative bargaining power

The bargaining power of licensors has been significantly undermined as that of licensees has increased.

The Commission should be wary of further diminishing the bargaining positions of licensors. This would jeopardise their already-weakening motivations and abilities to invest. The CRA report notes that "the recent EU investigations into SEP licensing and the General Court's decision in Huawei have shifted the balance of power between licensors and licensees within the judicial process by restricting the licensors' ability to obtain preliminary injunctions".

With a diluted interpretation of the pejorative "hold-up"—I will discuss the term's origins, meanings and to whom in a subsequent section—Justice Birss in Unwired Planet v. Huawei also recognises that the relative bargaining power has shifted in favour of implementers and against developers with declining royalty rates:

> *"[96]..in economic literature hold up has been discussed more than hold out. In my judgment what counts is that both hold up and hold out are possible and both concepts are relevant in analysing a given set of facts. Unscrupulous behaviour by either the patentee or the licensee can lead to unfairness. In order to arrive at fair, reasonable and non-discriminatory licence terms the patentee must not engage in hold up nor must the licensee engage in hold out."*
> and
> *"[431] ..there is some evidence of a decline in some rates over time and I am sure that at least part of the explanation is the emergence by 2013 of decisions in which courts were prepared to set FRAND rates, which in turn strengthened the bargaining position of licensees by reducing the power of the threat of an injunction."*

Rebalancing should redress not reinforce this trend in the relative bargaining positions for technology developers versus implementers. With significant limitations on obtaining injunctions against unlicensed infringers, and with benefits to the latter in delay if payment of reasonable royalties, eventually, is their most costly possible outcome, patent hold-out (i.e. patent trespass) is the harmful inevitability. It deprives technology developers of income required to re-invest and gives unfair cost advantages to infringers versus those who pay their dues.

Mandating change on the basis of licensing from established practices such as device-based and module-based licensing to mandatory chip-based licensing would be a major shot in the dark that would result in unintended adverse consequences. It would further erode the bargaining position of licensors and unjustifiably undermine royalties. It is counter to industry licensing practices, to where patent claims read throughout devices and to where value is generated there. Charging different royalty rates depending on "field-of-use" (e.g. an IoT lightbulb versus an augmented reality headset or a self-driving car) is a well-established principle that aligns costs with value generated. It can also reflect level of functionality used, such as the limited amount in the narrowband IoT required to connect a domestic gas meter versus much more with multiple antennas and most-advanced modulation in a mobile broadband device. This differentiation would all be undermined with chip-based licensing because it is impossible to track where chips end up and price them accordingly.

There is no good reason to make such a change for IoT. M2M is well established and growing substantially based on existing licensing and other practices. It is rapidly evolving with 2G, 3G, 4G, 5G and other complementary technologies.

6. Spurious precision and over-dependency on one unreliable measure of patent strength

Patent disclosures and third-party checks of essentiality are inherently inaccurate measures of patent portfolio strength. Do not rely on patent counts too heavily versus other methods and metrics.

DG Growth is concerned "there are no effective, efficient and reliable tools for potential licensees to identify and verify the relevant and pertinent patents from which they need to take licenses for implementing the relevant standardised technologies in a concrete product." However, it is impractical to regard the large portfolios of patents declared-essential or judged-essential to a standard or standards as smörgåsbords from which to license on a patent-by-patent basis. Negotiation and litigation tactics that seek to do that are inconsistent with SDO patent policies and FRAND commitments. Whether or not specific patents are actually essential to a standard, let alone to a particular limited implementation of only part of a standard, is probabilistic and cannot be

known across the board with certainty or anything close to that. Licensees only want to pay for what is valid and actually infringed, but in practice, however, they need and typically demand a portfolio license to everything on a worldwide basis, even though a significant proportion of patents may be non-essential, not infringed or invalid. Bilateral and joint licensing arrangements find ways of providing licensing terms that reflect the extent to which patented technologies are used and value is derived from them. Agreements and licensing charges reflect realities including the fact that some patents are likely to be invalid or are of lower value than others. There is a limit to how exhaustive or detailed information provided can be in light of the limited precision and high costs in patent-by-patent analysis.

Increased disclosure on SEPs seems appealing, but whether or not a patent is standard essential or might become essential as a standard evolves or as a patent application is prosecuted is far from clear cut. The CRA report recognises "this is a world where there is little objective verification of essentiality." This is because it is impossible to determine standard-essentiality accurately or reliably for every patent family and patent in large portfolios and across many owners. SEP disclosures and third-party determinations are highly subjective and manipulable. Having the EC appoint an assessor does not eliminate these shortcomings. In fact, it will make the adverse effects of unreliable assessments even greater.

Patent owners are incentivised to over-declare patents that might be or might become essential and must do so to minimise commercial risk because there are significant penalties for patent owners who under-declare. For example, patent owners might lose their rights to enforce their patent rights if they fail to declare patents that are or become essential to a standard. Declarations are inevitably likely to be biased to over-disclosure. That bias can be mitigated with the second step of independent assessment, but major problems remain even with third-party evaluations.

Some essentiality checks are rudimentary and others are far more extensive. Attempting to undertake thorough essentiality checks can be prohibitively expensive. Either way, determining essentiality is highly subjective, inaccurate and cannot be reliably reproduced among different assessors (a key requirement for a good measurement system). I show this in another IP Finance posting recently on the topic of "patent counting", where I compare widely different methodologies and results among studies counting judged-essential patents.

A covert objective here is to count SEPs so that licensing charges can be set as a proportion of a stipulated aggregate royalty maximum (i.e. a cap), but this is also inapplicable for other reasons. Essentiality checking says nothing about patent validity or patent value, which varies enormously among SEPs in the same standard and across different owners' portfolios. Patent counts can only be helpful to the limited extent that obtaining them is cost effective and can be relied upon in evaluating portfolios' patent strengths. Proportional allocations do not reflect value varying significantly from patent to patent. Furthermore, there is no objective and reasoned basis to determine how much a royalty cap should be or to have a cap at all.

Counting approved contributions to the standards is another means of measuring SEP portfolio strength. This indirect measure also has significant limitations, but at least it can be applied exhaustively at modest cost and results can be consistently reproduced. Several such studies have been carried out by Signals Research and ABI Research since 2010.

However, with respect to patent portfolio valuation in licensing negotiations, patent counts and approved contribution counts are simply complements to other established methods. These include comparisons with numerous executed licensing agreements underpinned by billions of dollars over many years of royalty payments, and in-depth discussions on the mapping of patent claims to the standards. This is widely recognised in the industry and by the courts.

7. Murky analysis on Transparency, Predictability and Efficiency

Unsubstantiated theories on patent hold-up and royalty stacking are widely refuted by others including another EC-sponsored report.

Despite the CRA report's name –Transparency, Predictability, and Efficiency of SSO-based Standardization and SEP Licensing – it rather obfuscates instead of clarifies on some issues. Uncovering findings is rather like an archaeological dig: despite running to a lengthy 100 pages it includes no summary. Its conclusions and recommendations weave throughout. Evidentiary support is generally absent, devoid of any empirical analysis (apart from citing a study of mine on aggregate royalty payments which is dismissed out of hand) and is at best anecdotal. Nevertheless, I agree with the authors on some major points, as discussed elsewhere in the paper.

They state that "this report is concerned with practical solutions to practical problems, we need to assess the empirical relevance of each issue. In doing so, we rely mainly on the available academic literature, as it has the advantage of relying on systematic evidence rather than just hearsay or anecdotes." And yet, when it comes to patent hold-up the report states there is "no reliable empirical analysis of hold-up within SSO based standardisation processes".

The CRA report regurgitates disputed claims about hold-up while offering only speculation in support of these claims. The authors ignore that transaction cost economics (TCE) scholars regard opportunistic surprise as a necessary condition of hold-up, along with incomplete contacts and specific investments. No facts, figures nor other evidence of actual patent hold-up, nor of costs including delays in mitigating the threat of it are presented. In fact, no examples are mentioned of any kind of verified hold-up except for passing references with citations to examples in coal, electricity, gas supply and in transportation.

A recent working paper by Haber and Galetovic shows how economic theory is being widely misapplied with respect to patents. They argue patent hold-up theory is based on several fallacies: that firms cannot adapt to mitigate potential hold-up; that they can be held-up multiple times via royalty stacking; and that the essential technologies have no value other than that conferred by standardisation. Patent hold-up is a theory whose claims are "assumed to be true a priori" and have not been tested against empirical evidence. In consequence, the authors believe patent hold-up provides no basis for government intervention in the market. Instead they suggest that a constructive theory about the mechanics and dynamics of SEP-intensive ITC industries should start further back in the development and standardisation process. It should consider the implications of sunk costs of R&D and associated risks in creation of patented technologies as well as of the implementation of it in the standards and the repeated interactions over long periods between technology developers, implementers, and other stakeholders aimed to produce valuable products in competition with alternative technologies and products. Indeed: it is very one-sided to limit consideration to what happens after technology has been developed.

Another recent working paper by Heiden and Petit methodically assesses how application of TCE theory has been distorted with mischaracterization and terminology has been manipulated over the last decade or so by those alleging patent hold-up. It finds that the theoretical analysis of patent hold-up proposed in the early patent economics literature is incompatible with the conventional understanding of hold-up theory in TCE. It also discusses the adverse effects and extent of what is commonly called [patent] hold-out, which the authors believe should more correctly be referred to as "patent trespass".

8. No windfall gains from Apple

Strong arguments against adopting patent hold-up theory to justify intervention by antitrust and other authorities are facts and figures showing mobile phone OEMs are not being "held up" in practice. The example of Apple illustrates this clearly.

There is no full-blown patent hold-up. This would be quite malignant, according to TCE and as articulated in a speech by the US Department of Justice's Chief Economist, Nancy Rose, at a George Washington University conference on "Patents in Telecoms" in November 2015. But there is no evidence for it and much of it to the contrary.

A key condition for hold-up is that the party being held up is "locked-in" with relationship-specific sunk investments. However, Apple has always been a late entrant with respect to new cellular standards and so has not sunk any such costs until long after standardisation has been established. Apple could find out royalty costs and negotiate agreements in advance of committing to the standards. Licensing rates are generally per cellular standard and include improvements following a standard's initial release. Some licenses include multiple standards. The first iPhone was a 2G-only device that was introduced in 2007 – twenty years after the standard was established in 1987 and fifteen years after the first GSM phones were sold. The first 3G WCDMA iPhone was introduced in 2008 – nine years after the standard was established in 1999 and seven years after the first 3G phones were sold. Apple did not introduce its first LTE device until the iPhone 5 in September 2012 – four years after the standard was established and three years after the first LTE devices were sold following the initial service launches at the end of 2009. Results of NGMN's royalty-rate evaluations on LTE rates were released in 2008 and widespread public notification of maximum royalty rates from prospective licensors was published in 2010. It typically takes up to approximately eighteen months to design and produce a new phone. Most of the specific investments for this are in the latter stages. Furthermore, there was no surprise (opportunistic or otherwise) in the maximum it could theoretically have to pay by the time it was making its iPhone investments. As I show below, the actual amounts it pays for all standards are a small fraction of those theoretical maximum rates it was well aware of at least two years ahead of launching the first LTE iPhone.

If the alleged patent hold-up was occurring in smartphones – the nub of SDO-based standardisation and SEP licensing – "quasi rents", created by relationship-specific investments and equal to the difference between revenues and short-run costs (in the form of and potentially even exceeding profits generated there), would be opportunistically pocketed by patent licensors instead of OEMs. The vast majority of smartphone industry profits are not expropriated or otherwise taken as hold-up theory dictates, they are retained by Apple and to a lesser extent by Samsung and other manufacturers. Whereas it is possible for companies in other industries to be held up on specific projects (e.g. an oil refiner held up by a pipeline operator at a certain location) with only modest

impact on substantial overall company profits, Apple's iPhone sales generating 66% of its total revenues of $234 billion (2015 figures) and an even higher percentage of its profits are all directly exposed to the alleged hold-up in patent licensing.

According to TCE theory, victims of hold-up do not remunerate their capital investments and will therefore cease to reinvest. In contrast, with very strong profits Apple has repeatedly reinvested. Victims of hold-up should be worth less than investments made. Apple is by far the most valuable company in the world with this overwhelmingly derived from iPhones. If anything, in litigation against Qualcomm and others, Apple is manoeuvring to hold up patent holders by undermining SEP licensing fees so that it can appropriate the quasi rents of these innovators.

In a market where Apple has retained $55 billion in smartphone profits (i.e. 2.75 times more than total industry licensing income) there is evidently no hold-up of Apple. Total smartphone operating profits totalled $66 billion in 2015, according to Strategy Analytics, in comparison to significantly less than $20 billion in total patent licensing fees (my upper-bound figure validated by Sidak of Criterion Economics and in another paper by Haber and Galetovic) and with rather less in licensing profits after associated operational costs. Apple sold 231 million iPhones in 2015 and so its operating profit per phone was $239 on average that year. That represents 36% of its $669 average selling price. The alleged "lock-in" with specific investments to the mobile standards should, according to hold-up theory, enable licensors to extract these stellar profits instead of Apple retaining them. Patent fees and costs in litigation and other activities to minimise those fees are deducted before that $239 of profit is derived. The patent licensors' rewards are evidently quite modest in comparison to Apple's. This is unsurprising in the *absence* of hold-up because Apple also generates value in various ways other than in exploiting the patented technologies of third parties. Apple also wields significant purchasing power versus its various suppliers, including patent licensors, which enables it to minimise its costs. Patent licensors are unable to appropriate the economic rents Apple generates in various ways.

It is inconceivable Apple, including its contract manufacturers, is paying any more than a third and most likely no more than around only one sixth of Apple's net profit figure in total royalty fees to license SEPs and other patents. The higher bound can be tested by making the absurd hypothetical assumption that Apple paid all patent fees for all licensees in the mobile phone industry. If it did pay that much, the aggregate royalty yield to all licensors from all of Apple's licensing payments would be no more than 12.5% of total iPhone sales revenues (i.e. a conservatively very high $20 billion divided by Apple's total 2015 iPhone sales of $155 billion). The lower figure of one sixth of its profits (equivalent to the more plausible but nevertheless conservatively high aggregate rate of 6.3% of iPhone sales revenues, equivalent to $42 per iPhone at a wholesale average selling price of $669) is estimated on the basis that royalty charges tend to be proportional to sales revenues, or, to a rather lesser extent, to unit sales with caps and floors on percentage rates or dollar-per-unit charges in some licensing agreements. Apple's share of the smartphone market was 54% by revenue and 16% by units shipped in 2015 and so the proportion of total industry royalties it pays is likely to sit in that wide range, notwithstanding complicating factors such as cross licensing.

Nor is there patent hold-up of other licensees who demand and use discovery in litigation to review the licensing agreements of others to ensure they are not paying discriminatory rates versus Apple or other licensees. Given that Apple is not being held up, other OEMs cannot be either unless they are paying discriminatorily higher rates than Apple. The profitability of OEMs is determined by their

efficiency. That most handset OEMs make little or no profit, or make losses, is due to the highly-competitive nature of this market with low barriers to entry arising from standardised inputs including merchant components and various technical standards. It is not a consequence of paying a common cost to license SEPs in the same way it would not be for paying the market price for commoditised memory chips or batteries.

"Hold-up" is a misnomer for what is occurring here between licensors and licensees. The licensees' complaint here is nothing to do with hold-up, but instead about the relative bargaining power of licensors versus licensees, as indicated previously.

The CRA report's fall-back position on the meaning of patent hold-up is that it could merely be about having some bargaining power versus implementers, as also indicated by Justice Birss above. This diminishes the phenomenon to something that is quite benign, particularly in the face of paten hold-out.

9. Stacking the deck

Rigged and economically-flawed evaluations have created very exaggerated perceptions of how much aggregate royalty rates really are.

Prior to the initial release of the LTE standard being frozen in 2008, mobile operator-dominated industry association NGMN sought to estimate aggregate royalty costs with assistance from a "trusted third party" by simply adding up the maximum royalty rates of dozens of prospective patent owners. This was disingenuous and inevitably highly misleading. By purposely ignoring realities such as netting-off charges in cross licensing, other price reductions that occur in negotiations and that many patent owners do not pursue licensing to generate royalty income it derived the absurdly large aggregate royalty rate figures of 33 to 37 percent of handset prices for single-mode LTE. It is high time these figures are revealed so we can all see how far adrift they are.

As the IPR session "Speaker" for the NGMN Alliance's Industry Conference & Exhibition on 5G in March 2015, Luke Ibbetson, Head of R&D Technology at Vodafone, claimed there was a "perception" that mobile patent royalties are too high. That misconception was unsurprising given the widespread circulation of those biased figures within the industry while cloaked under secrecy and away from external critical analysis and reporting by economists, analysts and journalists.

Professionals in law and industry have also disingenuously connived to portray "*potential* patent royalties" at aggregate levels of 30 percent, as opposed to the much lower levels they know are actually being paid. And, EC's Competition Commissioner has unquestioningly picked up this falsehood from a paper by Intel to attract support for her hinted prospective new policy to regulate royalty rates. Nobody has ever paid anywhere near such high figures.

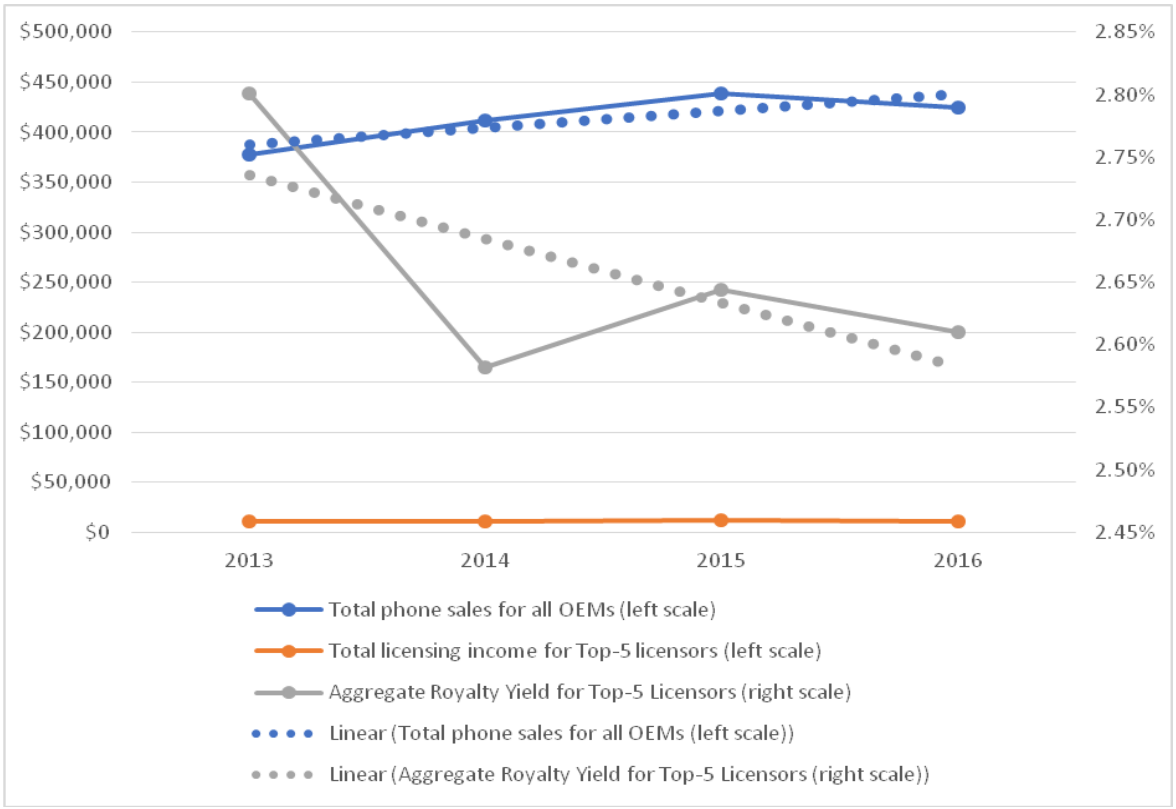
The CRA report is also evasive about alleged royalty stacking concerns by stating that "[u]nfortunately, the relevant empirical literature is rather thin due to the general methodological difficulties of identifying royalty stacking based on market data." This is not true: there is systematic and extensive empirical evidence that cumulative royalties, the so-called stack, are in fact rather modest at around five percent. However, one piece of empirical research the CRA report does cite on this topic is my 2015 analysis showing cumulative royalty payments averaging around five percent of handset prices. But it disregards this on the basis that it is "still too early to get reliable

estimates on the extent of likely royalty stacking: there is still so much on-going litigation and – possibly – sufficient licensee 'hold-out' that current actual payments are likely underestimate what the total stack will effectively be once litigation is concluded." This is a cop out. The industry is mature: SEPs have been licensed in mobile phones for twenty-five years and SEP litigation has being going on concurrently over the last decade or so.

I have not received any rebuttals challenging the integrity of my methodology or results in the above or on my analysis rejecting alleged patent hold-up. Instead, my methodology and findings on aggregate royalties have been replicated, validated and endorsed by eminent economists here and here and others state that patent hold-up and stacking assertions are without empirical foundation. Refined estimates for aggregate royalties by others are even lower than my five percent figure. A 2017 report from the EC's Science hub also finds "there is a lack of solid empirical evidence on the prevalence of royalty stacking, hold-up and/or hold-out problems".

The CRA report vacuously suggests that the alleged stack might be increasing. The reverse is true: the tide has been ebbing against licensors in favour of licensees in negotiations and disputes. Aggregate royalty payment trends are flat or declining from only modest levels in the first place. This is illustrated in total royalties reported by the top five companies who account for most patent licensing income from mobile phones. Whereas estimates of total licensing income for others can be estimated, it is not possible to do this with precision to show annual trends for these or for licensees a whole.

Total Royalty Yield for Top-5 Licensors Mobile SEP Licensors* Trending Downwards while Mobile Phone Sales Revenues Trending Upwards



*Qualcomm, Ericsson, Nokia (including Alcatel-Lucent) and InterDigital

Source: WiseHarbor analysis based on companies' SEC 10K filings and IDC's estimates for mobile phone sales revenues

10. FRAND valuation

Valuation principles being promoted seek to undermine the position of technology developers and licensors. There is no reasoned basis for this in economics or with regard to what is best for industry development. The courts have produced inconsistent and some unjustified rulings.

Opinions differ enormously on how to value SEPs and ascribe value for these. Many of these are significantly based on dogma and dictum rather than solid economic principles allowing a fair return on risky investments. Professor David Teece, Peter Grindley, Ed Sherry and I have recently published a working paper that shows how allowing SEP owners a share of the total gains from trade provided by standard essential technologies is sound economics and in everybody's best interests. The following two paragraphs are largely the abstract for this paper verbatim.

Proposals for setting FRAND licensing rates include the *ex ante* and inherent value methods. These set rates that might be agreed before standards adoption based only on the "inherent" contribution of the technology, typically compared to alternatives. Proponents argue that after standardisation, rates may reflect unearned bargaining power due to "hold-up". Although these methods have been accepted in several quarters, this is unwarranted as they fail two basic requirements for reasonable royalties: (a) they do not reflect the full contribution of the IP to the value of the relevant products including standardisation, belittling the value of the technology, and (b) they have little resemblance to how technology is developed and standardised in the real world. In attempting to avoid alleged patent hold-up, these methods exclude technology developers from sharing adequately in the benefits of standardisation, a primary objective for developing technology. This under-compensates developers and distorts incentives for innovation. In fact, core technology is developed and standardized collaboratively; benefits are expected to be shared and the technology would not be developed otherwise. In addition, the methods provide little practical guidance for market-relevant rates, which even proponents admit. And advocates have never explained convincingly why the current system for development, standardisation and licensing needs to be changed, given these industries' outstanding economic performance.

Despite these weaknesses, the methods may increasingly be adopted as benchmarks for FRAND royalties in courts and standards setting organizations (SSOs). *Ex ante*/inherent value proponents need to explain why the full benefits from standardisation should not be shared equitably between all participants in the industry rather than captured primarily by implementers. They also need to provide evidence that there is a need for change. In our paper, we also propose modifications to the *ex ante*/inherent value framework for a more economically effective approach.

As for the practicalities with assessments and figures used in doing valuations, as well as checking the suitability and accuracy of measurements such as SEP counts, and implied aggregate rates, determining fair value or reasonable royalties requires consideration of technology development and implementation costs, risks, rewards and incentives. Valuation theories and practices for SEPs and patents in general are all over the place including significant misapplications. On occasion, court-based determinations can resemble what occurs in bilateral or joint licensing agreements. In other cases, they differ entirely with no pretence otherwise.

In Unwired Planet v. Huawei, Justice Birss accepted expert opinion that "did not regard FRAND as a scheme which meant the patentee could not appropriate some of the value that is associated with the inclusion of his technology into the standard and the value of the products that are using those

standards". He also stated that "economists' opinions show that it is not necessary to deprive the patentee of its fair share of those two sources of value in order to eliminate hold up and fulfil the purpose of FRAND. To that extent I may be differing from certain parts of the decisions in *Innovatio IP Ventures* and *Ericsson v D-Link* in the US".

Thorough research on legal and economic history on (Un)Reasonable Royalties and damages by Michael Risch reveals decades of poorly justified and inconsistent valuation methods being peddled by experts and adopted in the courts. While taking a fairly neutral position through all the twists and turns, Risch argues that artificial explicit court rules for setting royalties contrary to economic rationality are taking us in the wrong direction, towards lower royalties and away from value – to which we should return.

11. Licensing negotiations, disputes and enforcement

Don't it always seem to go, That you don't know what you've got 'till it's gone (Joni Mitchell).
Don't kill the goose that lays the golden egg.

No system is perfect: however, the one we have with private ordering solutions for licensing SEPs has served the ICT industry and consumers very well. Mobile communications is the most SEP-rich and licensing-intensive part of the ICT industry, as it has advanced from 2G and 3G to 4G, from voice to data, from featurephones to smartphones with many applications and services, from tens of millions to tens of billions of connections in 25 years and from connections with hundreds of kilobits per second to those with hundreds of megabits per second in 15 years. It is not "too soon to tell" with emerging IoT and 5G, which are simply the next phase in an evolution following the great advances described above.

SDO patent policies and industry consensus are commonly misrepresented. The CRA report states, without citation, that "[t]he purpose of the "F" and "R" in (F)RAND is simply to avoid hold-up". This statement and others like it are often parroted and so appear *truth-like*; but it and its origins are nugatory. For example, in Microsoft v. Motorola it is stated that "[t]he very purpose of the RAND agreement is to promote adoption of a standard by decreasing the risk of hold-up. *See generally* Mark A. Lemley, *Ten Things to Do About Patent Holdup of Standards (And One* Not *To)*, 48 B.C. L. Rev. 149 (2001)" (emphasis added). But there is nothing in Lemley's paper or in SDO IPR policies describing the intentions or purposes of SDOs or their members to prevent hold-up. Instead, for example, memorializing the consensus of SDO members in ETSI's IPR policy since 1994:

> *"[T]he ETSI IPR POLICY seeks a balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.*
>
> *IPR holders whether members of ETSI and their AFFILIATES or third parties, should be adequately and fairly rewarded for the use of their IPRs in the implementation of STANDARDS and TECHNICAL SPECIFICATIONS".*

This also requires that ETSI's members identify to ETSI those of their IPRs they believe may be or may become standard essential, and state whether they are committed "*to be prepared to grant irrevocable licenses on fair, reasonable, and non-discriminatory terms and conditions under such licenses to such IPRs*". This voluntary commitment, which ETSI members make using forms called "IPR Licensing Declarations," is commonly known as the "FRAND Commitment".

The IPR policies of other SDOs are quite similar with the purpose of striking a balance of interests between those who implement the standard with the interests and voluntary cooperation of those who own intellectual property rights that are essential to the standard. It is only IEEE, with its new patent policy since March 2015 that has departed from these norms.

The IEEE's new patent policy is also an illegitimate template for change in other SDOs by introducing restrictions on the royalty base, (in)applicable license benchmarks and availability of injunctions. The patent policy was changed despite broad resistance from SDO membership. Such changes are also strongly resisted at other SDOs including ETSI. SDO participation is voluntary and decision-making is by consensus or majority voting. I agree with the CRA report that "[in] particular, imposing a 'smallest tradeable component' rule would be hard to justify".

Licensors would like to sustain or grow licensing income and licensees would like to pay less in patent fees. Striking the "right" balance should be that which fosters competition across the entire ecosystem to maximise innovation, market development and customer welfare. Proven market failures should be addressed and if possible rectified. But allegations and "concerns" without concrete indication of harm are not sufficient to justify intervention. Various unjustified demands that have come into fashion, and in some cases out again, over the last decade or so among various implementers, and yet fly in the face of established practices. These demands include mandatory licensing at the chip level, SSPPU-based royalty determinations and apportionment of arbitrarily capped royalties based on proportionality with SEP counts.

Policy makers have therefore good reason to be very wary of misinformation. Post-truth politicking came early to this sector. For example, no licensor ever asked for royalties to be based on the entire value of a car. However, a decade ago, I heard a senior executive speaking at a public conference deceitfully state that one company was making demands based on the price of high-end vehicles. The scaremongering continues: I have heard the above repeated several times by others since then. The implicit supposition that aggregate SEP royalties are a large and rising proportion of device costs is false. To the contrary, the licensing costs are, in fact, only a small and declining percentage.

Before further enforcement changes are made, there should be full analysis of causes and effects including costs and benefits with proper evidence that proposed measures will be helpful rather than harmful overall to investment, innovation, competition and consumers. For example, following DG Comp's interventions with Motorola and Samsung in 2014 and notwithstanding "clarification" from the CJEU in its 2015 Huawei versus ZTE decision, injunctions are much harder to obtain around the world now than several years ago. This has protracted disputes, which increases uncertainties and deadweight costs in litigation.

There has been no turn for the worse by patent owners and there is no basis for predicting there will be with IoT. Innovation, market development, and market entry by implementers have only accelerated in SEP-based industries in recent years. For example, in Ericsson versus D-Link, the trial court found that Ericsson did not violate its RAND obligations with its license offer to Intel. In fact, the court concluded that it was Intel that violated its obligation to negotiate a royalty rate in good faith. Courts and arbitrators are competent to make FRAND determinations where there are disputes and in the small proportion of cases where FRAND agreements cannot be reached bilaterally.

DG Grow is right to state that its upcoming policy Communication on these issues "will mainly provide best practice guidance to industry, SSOs and Member States without changing legal positions or rights and obligations." As also stated, nothing more targeted or stringent should be required before impact assessments have been made. There should be no intervention based on inadequately supported theories, conjecture or anecdotes. Impact assessments and empirical analysis of previous changes (e.g. with respect to obtaining injunctions following various rulings and the effects this has on royalty rates and on how long it takes to complete licensing) would be helpful. Analysis should also be open, transparent and available for scrutiny by all. DG Growth needs much better substantiation than that provided in any of the studies it has commissioned so far before formulating new policy or contemplating any interventions.

12. Market concentration at full tilt

There are clearly heavyweights and lightweights on either side of debates about SEP licensing. The EC should be very careful about any adjustments it imposes among them.

A recent leader in the Financial Times on how modern monopolists are defining competition states that "while the dominance of the 'four horsemen' of Internet technology – Amazon, Facebook, Apple and Google – can feel unsettling, it is not easy to pin down why". Facebook and Google have acquired companies in adjacent markets that might otherwise have challenged their cash cows. Amazon has expanded laterally with new market entries. Apple exerts pressure on its suppliers with the threat of further vertical integration to its already strong position in hardware, software and services, as recently illustrated with its plans to insource the technologies it currently licenses from Imagination Technologies. The FT also notes that "a dominant social network like Facebook, or dominant mobile device/software maker such as Apple, could extract painful rents not just in journalism but in music, film and elsewhere". Economic rents in mobile communications are indeed mostly being captured and retained by a small number of ecosystem leaders, as I have shown in my other articles. Profits generated in licensing SEPs to OEMs pale in comparison.

This article was originally published in the IP Finance blog on 19th May 2017.

Keith Mallinson is 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. He is an industry expert and consultant with 25 years of experience and extensive knowledge of the ICT industries and markets, including the IP-rich 2G/3G/4G mobile communications sector. His clients include several major companies in ICT. He is often engaged as a testifying expert witness in patent licensing agreement disputes and in other litigation including asset valuations, damages assessments and in antitrust cases. He is also a regular columnist with RCR Wireless and IP Finance – "where money issues meet intellectual property rights."

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