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**Formulating or evaluating a FRAND offer for LTE**

Berkeley Research Group LLC  
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# *Yearbook* 2020

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# Formulating or evaluating a FRAND offer for LTE

By David Kennedy and Larry Tedesco, Berkeley Research Group LLC

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The subject of fair, reasonable and non-discriminatory (FRAND) licensing has brought about a significant amount of debate in recent years. Much of it has focused on what constitutes FRAND licensing offers provided by standard-essential patent (SEP) holders to potential licensees. This chapter introduces the basics of FRAND and outlines considerations that should be accounted for during FRAND licence negotiations.

## FRAND overview

The primary activities of standard-setting organisations (SSOs) are developing, implementing and maintaining technical standards intended to address the needs of a wide base of users. Technical standards are important across many different technologies to enable the interoperability of systems and devices (eg, mobile phones).

One of the most well-known SSOs is the European Telecommunications Standards Institute (ETSI), which develops worldwide standards for information and mobile communication technologies. As a general rule, when patented technology is adopted into telecommunication standards set by ETSI, the use of the patent (referred to as an SEP) becomes essential to implementing the standard. Since manufacturing a product that complies with that standard without practising the patent becomes impossible, ETSI requires that the patent holder agree to license its SEPs on FRAND terms. Although ETSI has never dictated a way to calculate FRAND, and there is no universally accepted definition of the term, it is well accepted that the FRAND commitment does not require

a licensor to offer the exact same terms and conditions to every licensee.

Many issues that arise during the formulation and consideration of a FRAND licensing offer or proposal are legal issues. However, the terms ‘fair’, ‘reasonable’ and ‘non-discriminatory’ all have economic underpinnings that influence a legal determination of whether an offer may be FRAND. The perspective of this chapter is purely from an economic standpoint – economic issues should drive the legal issues, not the other way around.

A number of important questions must be answered before determining whether an offer to license long-term evolution (LTE) patents is FRAND.

## Is FRAND a range or a specific number?

There is no universally accepted definition of the term ‘fair, reasonable and non-discriminatory’. In general, when the royalties reflect the value of the patents or portfolio to be licensed, they could not be considered to be unfair or unreasonable and still comply with a party’s FRAND obligations. There are many methodologies for determining the value of patents and patent portfolios, but the terms and conditions that other licensees have agreed to – properly adjusted for relevant differences – can be one important indicator of the value of those patents and patent portfolios (the ‘market approach’). However, sufficient information is not always available. Licensors should not be economically punished for that. If an owner of an SEP is truly prepared to grant a licence under terms and conditions that are within a reasonable range of those previously agreed to by other similarly situated licensees, courts should recognise

that the patent owner has legally satisfied its FRAND commitment.

The FRAND commitment does not require a licensor to offer the exact same terms and conditions to every licensee, but rather allows for a range of terms and conditions reasonably tailored to individual circumstances. A FRAND range should allow for discounts to early adopters for the risk that they take in licensing patents of uncertain validity, enforceability and infringement. In addition, discounts related to capital requirements, other financial structural complexities and common licensing practices should be allowed consideration.

**Can the FRAND royalty stack change over time?**

The ‘royalty stack’ concept refers to situations in which a single product potentially infringes on many SEPs and may thus bear multiple individual royalty liabilities or burdens, ultimately resulting in an unusually high overall total product royalty. The term ‘royalty stacking’ reflects the fact that all the different claims for royalties must be added or stacked together to determine the total royalty burden for a specific manufactured product in order for the manufacturer to sell that product free of patent litigation.

FRAND royalties for SEPs should be based on a more fluid royalty stack that changes over time as the true value of technology within standards evolves. For example, in 2009, when a number of LTE SEP holders (innovators) announced the predicted (or *ex ante*) total value of LTE and the corresponding estimated total

LTE royalty stack, the industry had no way of knowing or valuing the real future technological enhancements to the LTE standard (eg, carrier aggregation). As a result, estimates of what total royalties a technology implementer should have expected to pay for the right to implement the LTE standard in 2009, before the first generation of LTE technology was released, could logically be less than what they would be many years later when the standard was widely accepted and materially enhanced and the overall true value provided by the innovators to the standard was realised. Economic and legal fairness should not prevent the inventors of the standard from participating in the future realised benefits of their inventions alongside the manufacturers (or implementers) as they realise – and charge for – those realised benefits.

**Should predictive statements set a single digit and permanent ceiling on the royalty stack for individual SEP owners?**

Predictive royalty statements made by large SEP holders around 2009 have often been used by experts and industry analysts to set a ceiling on cumulative LTE royalties of less than 10%. We disagree with this line of thinking for a number of reasons.

First, some companies that made these statements, like Ericsson and Nokia, were not only the largest LTE SEP holders in the world at the time, but were also the largest sellers of LTE handsets. These companies had a strong incentive to balance royalties that they received with royalties they had to pay. In this sense, the royalty

**TABLE 1.** Royalty rates

Summary of announced royalty rates for LTE in 2008-2009	
	Published handset royalty rate
Alcatel-Lucent	2%
Huawei	1.5%
Nokia Corporation	1.5%
Nortel Networks	1%
ZTE	1%
Ericsson	1.5%
Motorola	2.25%
Nokia Siemens Networks	0.8%
Qualcomm	3.25%
Total	14.8%

rates that they predicted were constrained by their business models at the time.

Second, cumulative LTE royalties based on the only nine (of 38) significant SEP holders that announced their individual expected LTE royalty rates – many of which advocated for a single-digit royalty stack – added up to nearly 15% (see Table 1).

As Eric Stasik (a renowned telecoms industry economist) pointed out in the 2011 study “Royalty Rates and Licensing Strategies for Essential Patents On LTE (4G) Telecommunication Standards”, based on this information alone (a partial royalty stack of 14.8%), it is hard to imagine a royalty stack of less than 25% to 30%.

A number of independent third-party studies support this total LTE royalty stack range. For example, ABI Research, a market intelligence company specialising in global connectivity and emerging technology, releases a bi-annual research report, *Mobile Device Royalties*, which “provides subscribers with updates on the mobile technology royalty rates and revenues for mobile devices”. ABI’s analysis is based on data from focused interviews with executives, engineers and marketing professionals, industry periodicals, trade group reports, government and private databases, corporate financial reports, industry directories, and other resources. In its 2008 release, ABI estimated that the royalty for a single-mode LTE device would be 23.6%. In the 2011 release, ABI estimated that the royalty for a multi-mode LTE device would be over 30%.

In the same timeframe that the ABI studies were released, a number of studies were undertaken to estimate the royalty stack for 3G. In 2009 Rudi Bekkers, René Bongard and Alessandro Nuvolari presented the paper “Essential Patents in Industry Standards: The Case of UMTS”, which assessed whether the technological significance of the patent and the applicant’s involvement in the standardisation process play a role in whether a patent will be claimed as essential. In this paper, Bekkers, Bongard and Nuvolari cite that estimates for the cumulative royalties for wide band code division multiple access (WCDMA) (3G) are between 25% and 30%.

In the 2008 paper, “The Limits to IPR Standardisation Policies as Evidenced by Strategic Patenting in UMTS”, Bekkers and Joel West summarise their analysis of 1,227 unique patents claimed to be essential by 72 firms involved in the Universal Mobile Telecommunications Service (UMTS). Bekkers and West used the number of times that each essential patent is cited by other patents as an indication of the individual patent’s value, adjusting for potential biases such as right truncation, changing citation requirements, the devaluation of citations, and the effect of computer-aided searches for related patents or patent timing. Bekkers and West then compare UMTS patenting to the patenting activities in the earlier global system for mobile communication (GSM) era. Their comparison finds that the estimated total royalty for UMTS was 20%.

While the two 3G studies obviously predate 4G, it is reasonable to assume that the 4G LTE royalty

**TABLE 2.** Royalty stack analysis

LTE royalty stack analysis				
Author/paper	Date	Standard	Expected stack	Midpoint
Bekkers and West, “The Limits to IPR Standardisation Policies as Evidenced by Strategic Patenting in UMTS”	2008	3G	20%	20%
Bekkers <i>et al.</i> , “Essential Patents in Industry Standards: The Case of UMTS”	2008	3G	25% - 30%	27.5%
Carlaw and Wheelock, “Mobile Device Royalties: Intellectual Property Rates for GSM, WCDMA and LTE”, ABI Research	2008	4G	23.6%	23.6%
Solis and Carlaw, “Mobile Device Royalties: Intellectual Property Rates for GSM, WCDMA and LTE”, ABI Research	2011	4G	30%+	30%
3G and 4G royalty stack midpoint:	25%			
4G royalty stack midpoint:	27%			



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David Kennedy is a certified public accountant and an expert in IP licensing, valuation, analysing claims of economic damages related to IP infringement damages and negotiating the economics of patent sales and licensing agreements. Over 30 years, he has served as the lead negotiator in more than 200 IP-related transactions and performed patent portfolio valuations in a variety of industry segments for investor groups, large public companies and patent holding companies. He has served in International Chamber of Commerce international arbitration and litigation matters as an expert in determining FRAND royalty rates. Mr Kennedy has testified in the Court of Federal Claims and in state, federal and bankruptcy courts regarding patent values, royalty rates, lost profits, trade secrets and other forms of economic damages.



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Larry Tedesco provides financial damages, valuation, licensing and expert witness services in litigation matters. Over 18 years, Mr Tedesco has monetised intellectual property as an owner and on behalf of clients in a wide range of industries. He has also negotiated more than 100 patent and software licence agreements. Mr Tedesco's experience includes strategic advisory services to IP owners and companies of all sizes, providing multiple levels of IP damages assessments for plaintiffs and defendants in significant IP disputes, and evaluating licensing terms and the intent of parties in patent licensing litigation and calculating reasonable royalty rates for standard-essential patents subject to FRAND commitments. Mr Tedesco is a certified licensing professional, a certified valuation analyst and a master analyst in financial forensics.

stack would be at least as high as the 3G stack due to vast improvements in wireless communications technology. As can be seen in Table 2, the combined 3G and 4G average royalty stack based on these studies is 25%, while the LTE royalty stack is 27%.

**How many truly essential patents cover the LTE standard?**

The determination of the amount due from implementers for each SEP essential to the standard is necessarily limited to some portion of the total royalty stack. As a result, the number of truly essential patents must be identified – versus just those LTE patents that have been declared by their owners to be essential.

Based on experience and review of third-party studies and FRAND court cases related to damages, there is no consensus on the exact number of truly essential LTE SEPs. One of the most recent – and perhaps thoroughly litigated – numbers of truly essential LTE SEPs can be found in Judge Birss' opinion in *Unwired Planet v Huawei*, which found that there are 800 truly essential LTE SEPs. This number appears to be 'battle tested', meaning both UP and Huawei put forward their independent evaluation of how many LTE patents were truly essential with both sides to benefit from either end of the spectrum. Birss then took both analyses into equal consideration to form his opinion of the number of truly essential patents for LTE. While other numbers are

available, we are not aware of any that have been subjected to the level of analysis by both parties in litigation and further scrutiny by Birss – and his opinion has been upheld on appeal.

### How valuable is any particular patent or subset of SEPs to the overall standard?

Patents, by definition, are unique and are widely accepted to have differing values. It is generally accepted that within a large group, some patents are worthless and some are highly valuable. However, once the ‘truly’ essential determination is made (ie, to weed out the patents that are worthless or not essential to the standard), differences in value and quality of the truly essential patents can remain.

This subsequent segregation of patent value between more or less valuable patents is most likely more technically oriented than economically driven once a particular patent has been determined to be truly essential. A number of options are available to help evaluate what portion of the overall royalty stack should be allocated to the truly essential patents. A relative evaluation of every patent within the standard is certainly one way; however, this may be cost prohibitive for most parties. Studies by independent parties may be used, or other higher-level metrics may be available, to at least distinguish between jurisdictional differences (better patent enforcement regimes around the world) and ratios found by more general studies of value distribution within a group of patents (see *UP v Huawei*). Many economic experts

generally recognise the concept of ‘patent value skew’ and specifically that 20% of a group of patents represent or contain 80% of a group of patents’ value.

### Comment

A number of court decisions have recently addressed various aspects of FRAND licensing, including *HTC v Ericsson*, *Unwired Planet v Huawei* and *TCL v Ericsson*. Judge Birss’ opinion in *UP v Huawei* was recently upheld by the Court of Appeals in London, while Judge Selna’s opinion in *TCL v Ericsson* has been challenged by Ericsson in an appeal to the Federal Circuit. As courts continue to analyse the principals of FRAND licensing, the fundamental questions of what legally constitutes FRAND licensing offers will undoubtedly evolve – but should never ignore reasonable economic factors. *iam*



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