On 4 Dec. 2014, the Federal Circuit issued an important decision on determining royalties on patents embodied in a standard and subject to a reasonable and nondiscriminatory (RAND) obligation, in Ericsson, Inc. v. D-Link Systems, Inc. This is the first decision of its kind in the Federal Circuit, the federal appeals court to which all patent infringement disputes go. This case will be an important precedent for future RAND disputes.

Standard-essential patents

As usually occurs in the case of other IEEE standards, when the group formulating the IEEE 802.11(n) Wi-Fi standard pondered what technology to include in the standard, it considered whether patents covered the technology and thus could hinder widespread adoption of the standard. The IEEE group required those participants suggesting particular technologies to identify whether they knew of patents their company owned and, if so, to advise the IEEE whether their company would grant either royalty-free or RAND licenses to manufacturers of products using the standard. Generally, a standard-setting body such as the IEEE will not write a standard that requires devices to use specific patented technology, so that standard-compliant devices necessarily infringe given patents, without a RAND or royalty-free licensing commitment from the patent owners. These patents are called standard-essential patents (SEPs).

For a company with patented technology that might be useful to an IEEE standard, there are business advantages in having the IEEE standardize on the company’s technology. The company is already familiar with its own technology, and has probably already incorporated it into the products it sells to which the standard will apply, and therefore gains a head-start advantage from the standard’s being based on the technology. On the other hand, the company’s management will have some reluctance to lose the exclusivity or rent its patents can earn for it. A tradeoff is thus involved. Most of the time, the benefits are judged to outweigh the possible losses, and companies agree to grant RAND or even royalty-free licenses on products embodying the standard and thus infringing the SEPs.

Ericsson was one of the companies whose employees participated in the formulation of the IEEE 802.11(n) Wi-Fi standard (see the “IEEE 802.11” sidebar). It agreed with the IEEE that it would “grant a license under [its SEPs at] reasonable rates to an unrestricted number of applicants on a worldwide basis with reasonable terms and conditions that are demonstrably free of unfair discrimination.”

A recurrent legal problem in this area has been how to determine what is a fair and reasonable royalty rate on an SEP. The problem is not only one for the manufacturers of standard-compliant products but for the IEEE as well. Excessive royalties on SEPs will hinder the widespread adoption of a standard and thus defeat the IEEE’s purpose in establishing the standard. Two important aspects of this legal problem are so-called patent hold-up and royalty stacking.

- Patent hold-up exists when the holder of a SEP demands excessive royalties after companies are locked into using a standard. (The patent owner “holds up” the manufacturer for a ransom; see the “Patent Hold-up” sidebar for more information.)
- Royalty stacking can arise when a standard embodies technology covered by numerous patents. If companies are forced to pay royalties to all SEP holders, the royalties will “stack” on top of each other and may become excessive in the aggregate. What “the traffic will bear” in the way of patent royalties is limited. A 2-percent royalty rate might well be reasonable for one SEP, but if there are 40 SEPs, 40 \times 2\% = 80\% might well be unreasonable.

The accused infringers in this case were D-Link Systems, Netgear, Acer, Gateway, Dell, and Toshiba; Intel intervened as a defendant because its Wi-Fi chips were implicated in devices that other defendants sold. The defendant companies produce a variety of electronic devices, including laptop...
The IEEE, acting as an amicus curiae (friend of the court), told the Federal Circuit the following things about the IEEE 802.11 standard.

The IEEE publishes the 802.11 standards, more commonly known as Wi-Fi. The 802.11 standard is the prevailing wireless Internet standard and has reached widespread adoption. A device is considered 802.11-compliant if it adheres to the IEEE’s technological requirements stated in the 802.11 standard. Requiring all 802.11-compliant devices to operate in a certain way ensures that every compliant device can communicate and is interoperable with all other 802.11-compliant devices.

For example, an 802.11-compliant laptop will be able to establish a connection with an 802.11-compliant router. The 802.11 standards also govern how data is passed between the laptop and the router once that connection is established. This includes data formatting, prioritization, error handling, and flow control.

Data files are not sent between a router and a laptop in a single transmission. For example, if a laptop user wants to download a video, the router does not send the entire file in a single huge transmission. Instead, each data file is broken into packets, and each packet is sent in a different transmission. Small files might require only a single packet, whereas large files (such as video and sound) might require thousands of packets. The receiving device then reassembles the file out of the packets. The data from the file in the packet is called the "payload." Because packets may be lost or arrive out of order, the 802.11 standard provides ways to handle these errors. For example, each packet has a "header" that is sent to the receiving device with the packet. The header includes a sequence number so the receiving device can reestablish the proper order in which to reassemble the payload of the packets.

The IEEE also explained its policy on patents covering SEPs. "IEEE-SA seeks to produce standards that any willing implementer can use and that will become widely adopted. IEEE-SA’s patent policy permits the inclusion of patented technology, because the best technological approach that the standards-development participants select is or may be covered by a patent. Inclusion of patented technology without the patent holder’s commitment that it will grant licenses to implementers on reasonable and nondiscriminatory terms, however, jeopardizes the goal of widespread adoption.”

For more information, read the IEEE brief at //URL for web extra/.

**Patent Hold-up**

The Department of Justice and Federal Trade Commission have defined hold-up as follows1:

“Patent hold up can be defined to involve a situation where all the following conditions exist: [1] after the standard is set, the holder of a patent essential to that standard identifies a patent, or attempts to impose licensing terms, that SDO [standard development organization] members could not reasonably have anticipated; [2] it is not a commercially reasonable option to abandon the standard and attempt to create an alternative, due to the cost of the standard setting process itself or the cost of developing products incorporating the alternative standard; [3] and—most importantly—if the other SDO members had anticipated the patent holder’s demands, those SDO members could have chosen a different technology that avoided this patent.”

**Reference**

how to calculate a RAND royalty by taking into account patent hold-up and royalty stacking. Apparently, defendants took the position that Ericsson engaged in patent hold-up by demanding excessive royalties after the defendant companies were locked into using the patents to comply with the 802.11(n) standard. The claim of royalty stacking appears to be based on a contention that many SEPs are built into the 802.11 technology, so that the cumulative royalty is quite high relative to the margin on the products.

The trial court declined to instruct the jury on how to determine royalties except by reading to it some very general instructions on calculating damages, known as the Georgia-Pacific factors. These come from a 1970 decision widely followed in patent infringement cases—Georgia-Pacific Corp. v. United States Plywood. The problem with the Georgia-Pacific factors is that they say nothing about a RAND commitment, the effect of incorporation of patented technology into a standard, or other factors specific to SEPs. After listing these factors, the court added that the jury “may consider Ericsson’s obligation to license its technology on RAND terms.” Ultimately, the Federal Circuit reversed the judgment on damages and remanded the case to the trial court for a revised determination of damages, because the trial court had instructed the jury inadequately on how to determine a RAND royalty for a SEP.

**The Georgia-Pacific factors**

Probably the most important issue was the use of the Georgia-Pacific factors in RAND disputes. There are about 15 oranges-and-apples factors that the courts balance against one another in a Georgia-Pacific factors analysis. The Federal Circuit held in the Ericsson case that it was error for the trial court just to set out these traditional factors to calculate a RAND royalty, without regard to the fact that most of them were not relevant to RAND disputes or even were counterindicated. “In a case involving RAND-encumbered patents, many of the Georgia-Pacific factors simply are not relevant; many are even contrary to RAND principles.”

For example, the Federal Circuit explained, at least the following Georgia-Pacific factors are irrelevant or misleading in the context of a RAND dispute:

- **Factor 4:** Licensor’s established policy and marketing program to maintain its patent monopoly.
- **Factor 5:** Commercial relationship between the licensor and licensee.
- **Factor 8:** Established profitability of the product made under the patent, its commercial success, and its current popularity.
- **Factor 9:** Utility and advantages of the patented invention over the old modes or devices.
- **Factor 10:** Commercial embodiment of the licensor.

For example, factor 4 is out of place in a RAND case. The Federal Circuit pointed out, “Because of Ericsson’s RAND commitment, however, it cannot have that kind of [anti-licensing] policy for maintaining a patent monopoly.” Similarly, factor 5 has no proper place because part of a RAND commitment is offering licenses at a nondiscriminatory rate. Factor 8 refers to an invention’s “current popularity,” which is likely inflated in a SEP case, because the standard requires the use of the technology. Factor 9 speaks of the “utility and advantages of the patented invention over the old modes or devices.” But that “is also skewed for SEPs,” the court insisted, “because the technology is used because it is essential, not necessarily because it is an improvement over the prior art.” Factor 10, moreover, “considers the commercial embodiment of the licensor,” here Ericsson, but that is irrelevant because “the standard requires the use of the technology” by Ericsson and everybody else who makes 802.11(n)-compliant devices.

**The actual RAND promise**

The trial court also should have instructed the jury on the actual RAND promise. The Federal Circuit said. RAND commitments vary from case to case. The trial court should have turned to the actual language instead of speaking in generalities. It is not the case that the jury “may consider” Ericsson’s RAND commitment, as the trial court told the jury. That commitment was a legally binding obligation to grant a license on “reasonable terms and conditions that are demonstrably free of unfair discrimination.” That is something the jury “must consider.”

The Federal Circuit summed up its instructions to trial courts for royalty determinations in RAND cases in these terms:

*“There is no Georgia-Pacific-like list of factors that district courts can parrot for every case involving RAND-encumbered patents. The court should instruct the jury on the actual RAND commitment at issue and must be cautious not to instruct the jury on any factors that are not relevant to the record developed at trial.”*

**Apportionment**

When dealing with SEPs, there are two special apportionment issues. First, the patented feature(s) must be dissected out from all of the unpatented features (and other patented features that other patents cover) that are embodied in the standard. “Second, the patentee’s royalty must be premised on the value of the patented feature, not any value added by the standard’s adoption of the patented technology.” This is necessary to make sure that “the royalty award is based on the incremental value that the patented invention adds to the product,” rather than the value that results from the adoption of an industr-wide standard for the product, embodying the patented technology. A reasonable royalty award in a SEP case must be apportioned to the value of the patented invention, not based on the value of the standard as a whole. Also, it must not be based on the fact that the standard made the patent essential and removed competition from alternative technologies.

For example, the 802.11 standard encompasses numerous technologies to
enable devices to communicate with each other via wireless network connection. This includes, among many other things, technologies on link establishment, security protocols, error control, and flow control. Each SEP involved in this case, the court pointed out, covers “only a small aspect of the 802.11(n) standard.” In fact, it is undisputed that some products do not even use some aspects of the 802.11(n) standard’s capability. Therefore, the Federal Circuit emphasized, the jury must be instructed to differentiate the value attributable to the infringed patent(s) from any value that the infringing device has otherwise acquired, as well as the value it acquired because it complies with the IEEE standard.

**Patent hold-up and royalty stacking**

Finally, the Federal Circuit agreed that instructing the jury on patent hold-up and royalty stacking can be important, but only on the basis of record evidence that it is relevant in the particular case at issue. The court held that the trial court must instruct on patent hold-up or royalty stacking only if “the accused infringer presents actual evidence of hold-up or stacking,” rather than “a general argument that these phenomena are possibilities.”

Absent evidence that a patentee used its SEPs to hold up standard users for high royalties, the trial court need not instruct on patent hold-up. Also, the fact that potentially thousands of patents are essential to some standards does not necessarily mean, without evidence, that stacking occurs for the 802.11(n) standard. Such actual evidence was lacking in this case.

Here, the defendants failed to present adequate evidence of patent hold-up and royalty stacking. The court illustrated what kind of evidence could prove patent hold-up—for example, evidence that after the adoption of the 802.11(n) standard Ericsson started requesting higher royalty rates than it did previously—or, in the alternative, evidence that Ericsson charged a higher royalty rate to users of the 802.11 standard than to other licensees.

**How should stacking be addressed?**

The Federal Circuit did not describe what kind of evidence would be sufficient to show stacking. But that may be a difficult issue. What should happen, for example, if 802.11(n) has 50 SEPs in addition to Ericsson’s two valid SEPs? Suppose, hypothetically, that the demand and competitive factors do not permit a price increase for 802.11-compliant products above the current levels. Suppose also that the cumulative royalty for the other 50 SEPs is already 50 cents per unit and the profit margin on the product is now 60 cents before royalties. If you add the jury’s 15 cents for Ericsson, the royalties come to 65 cents, which makes the product sell at a loss of 5 cents per unit. Is that stacking? But how do you conclude that Ericsson has to bear all the financial impact of the stacking rather than those SEP patentees who came earlier to collect royalties? What is a RAND royalty for Ericsson in such a hypothetical case?

This may suggest that the patent-pooling approach of groups such as the Moving Picture Experts Group (MPEG)—where there is one RAND for all SEPs together, which the pool then divides up among the owners of the pooled SEPs—in some cases has advantages over the IEEE’s approach. That approach is refusing to become involved in royalty-level issues, which can lead to royalty stacking (see the “IEEE Hands-off Policy on RAND” sidebar). A number of RAND pools now exist for standards, in addition to the MPEG pool. They seem to work satisfactorily, so maybe the IEEE should take a lesson from them and from the Ericsson case.

Also, the Federal Circuit insisted in the Ericsson decision that it is improper to assume that royalty stacking occurs just because the standard requires a great many SEPs. “The mere fact that thousands of patents are declared to be essential to a standard does not mean that a standard-compliant company will necessarily have to pay a royalty to each SEP holder.”

The Federal Circuit did not say how many SEPs 802.11(n) actually requires. (Perhaps, some IEEE Micro readers will know this and tell the rest of us.) But if 802.11(n) requires use of thousands of SEPs, how likely is it that royalty stacking would not occur? Should there at least be a rebuttable presumption that royalty stacking occurs at some SEP level, say 50 or 100 SEPs (or pick another number if it is more reasonable)? That would shift the burden to the patent holder to produce evidence of no stacking, absent which evidence the court would presume stacking.

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IEEE Hands-off Policy on RAND

In the Ericsson case, the IEEE told the Federal Circuit, “To maintain its position as an impartial forum where both patent holders and implementers will seek to develop standards…IEEE-SA does not involve itself in license negotiations between implementers and patent-holders and does not make determinations of whether a particular royalty rate (or other license terms and conditions) is or is not reasonable.” IEEE-SA Standards Board Bylaws § 6.2 says, “the IEEE is not responsible for…determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or nondiscriminatory.” At present, no one but the federal courts takes any responsibility for making such determinations, and they do so only in the context of lawsuits that result from impasses over what is RAND.
Consider the context of the Ericsson case and 802.11. Laptops, PCs, and other electronic commodity products have notoriously thin profit margins, and they operate in a price-sensitive market environment. How can you expect to pile on separate royalties for 50 SEPs, much less the thousands of which the Federal Circuit speaks? The Federal Circuit says you shouldn’t assume that the separate SEP owners will demand separate royalties. But why wouldn’t they? Does the Federal Circuit imagine that they are charitable institutions? The royalty of 15 cents per unit of this case, if multiplied by 1,000 patent holders, would be $150. How could a PC or laptop absorb that kind of royalty burden, or even a fraction of it? Is that what the IEEE would have considered a reasonable royalty when it adopted 802.11(n)? I doubt it.

Thought should be given to a new approach to SEPs and standard setting. A substantial risk exists that royalty stacking and other unreasonable royalties could defeat the goals of the IEEE’s standardization efforts. The IEEE explained the goals of its standardization program as follows: “Standards simplify product development and reduce costs that do not add value, thereby increasing a user’s ability to compare competing products. Standards also are fundamental building blocks for international trade. Only through the use of standards can the requirements of interconnectivity and interoperability be assured and the credibility of new products and new markets verified, thereby enabling the rapid implementation of new technologies.”

Certainly one approach to explore tentatively would be that of the MPEG. Perhaps there should be one or more nonprofit corporations (maybe, controlled by the IEEE) to act as equivalents of the MPEG pool organization, to determine and allocate RAND royalties collected on pooled SEPs. Another approach might be to establish a cumulative RAND royalty ceiling for each standard, to be prorated among SEPs, agreement to which arrangement should become part of the assurance letter required when patented technology is a candidate for incorporation into an IEEE standard. Doubtless, readers of IEEE Micro will think up better solutions and share them with the rest of us. Comment is invited.

References

Richard H. Stern is an attorney at Kellogg Huber Hansen Todd Evans & Figel and a law professor at George Washington University Law School. He has been writing Micro Law columns for IEEE Micro for the past three decades. Contact him at rstern@khhte.com or rstern@law.gwu.edu.