# The Art of Quantification:

## Insuring Success in the Damages Phase of Patent Litigation

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## Introduction

Until 2009, patent litigation and valuations were focused primarily on liability: infringement and validity. But over the last few years, the world has changed and damages for infringement have become an equally important component of patent litigation. A patent holder can win on infringement, win on validity, and still recover nothing if it fails to prove its damages case. Accused infringers therefore have incentive to resist early settlement because they can walk away with an outright win on damages even after losing the liability case.

The courts (in particular the Federal Circuit) have tightened the standards required to establish proof of reasonable royalty damages in patent litigation. The specific rules set out in the case law address a variety of issues but share a common theme: the economic benefits enjoyed by the infringer from using the patented invention must be precisely quantified. At its highest level, this means the additional revenue or decreased costs the infringer has realized by using a claimed invention.

Like all aspects of the law, quantification is an art, not a pure science. Of course it includes technical aspects and precise calculations. But the strategy for establishing a framework for quantification is unique not only for every patent, but for every patent claim. Creativity and collaboration are necessary and discipline is required. These statements are true whether the quantification is performed in patent infringement litigation or in negotiations over the purchase or licensing of patents. The framework for quantifying the benefits achieved from infringement of a particular patent claim cannot be laid down all at once; instead, it must be built up layer-by-layer based on the foundational rules set forth by the courts. This chapter teaches a series of these steps which, when applied together, can build a model for quantification of patent damages.

## I. Evaluate your high-level damages strategy—are you the plaintiff, the defendant, or both?

In patent litigation, the high-level damages strategy is heavily influenced by which side of the "v" your client finds itself on. The overarching goal, of course, is to obtain full value for the claimed invention(s) if your client is the plaintiff and to prevent verdicts or settlements that are not proportionate with the claimed invention(s) if your client is the defendant. The strategy should then focus on maximizing or minimizing the royalty base and royalty rate that will be used in calculating the statutorily required "reasonable royalty," and supporting the calculation with sufficient technical and economic evidence.

Recent patent-damages decisions have highlighted several variables concerning the royalty base and the royalty rate, which are important to crafting a high-level damages strategy. These decisions, along with subsequent sections of this chapter, offer important guidance on the factors to consider and pitfalls to avoid.

With respect to the royalty base, case law instructs that the analysis should begin with an identification of the smallest saleable patent-practicing component. The cumulative value of these components constitutes the base. Obviously, people can have differing interpretations of what constitutes the saleable component based on your perspective as a plaintiff or defendant. Beyond that, however, there are additional opportunities to expand or contract the base.

For instance, as a plaintiff you may want to argue that the base should include the entire value of the accused products. But bear in mind that to do so you must prove that the patented invention is the primary driver of demand for the product. Alternatively, as a defendant you may want to argue that some of the components even should be excluded from the base. For a method-claim patent, you can point out

a plaintiff's failure to demonstrate that all purchasers use the accused products to practice the claimed methods. If, for example, only half of the purchasers practice the claimed method, then only half of the products should be included in the base.

With respect to the royalty rate, important considerations include comparable licenses, apportionment, consumer surveys, and regression analyses. A truly comparable prior license can be powerful evidence of what the royalty rate should be in a given case. Thus, it is important to obtain and analyze potentially comparable licenses early on. But be cautious—it is unlikely that a prior license will be exactly like the hypothetical license in the instant case, and settlement licenses are generally looked upon with disfavor. Consequently, it will be important to provide sufficient information about any distinguishing characteristics of a prior license—such as additional patents, slightly different technology, etc.—that will allow the fact-finder to appreciate the economic importance of the licensed invention(s).

Apportionment presents an additional challenge in that the certain analytical techniques are unavailable or unproven. For example, the 25% rule has been banished, and the Nash bargaining solution—simplistically stated as a 50-50 split—has not survived as a stand-alone damages analysis. So it is important to craft a sound strategy for isolating the profit attributable to the claimed invention and a basis for apportioning that profit to the patentee and the accused infringer. Finally, you may want to consider supporting a proposed royalty rate with surveys or regression analyses. These are still emerging areas in patent damages law so, as discussed later on in this chapter, it will be critical to craft these analyses such that they truly isolate the claimed invention and do not improperly claim additional, unpatented features of the accused product(s). Otherwise, a lot of work will have been for naught.

By focusing on these factors, you can formulate a successful damages

strategy whether you represent a plaintiff or a defendant. Of course, if you represent both via counter-claims, just remember the Golden Rule and do unto others.

## II. Before and during litigation, for each asserted claim, ask: what difference does the invention make?

There is one single most important question on the mind of any jury, court, potential licensee, or potential purchaser of patent rights: what difference does the invention make? This fundamental question underlies all aspects of the damages quantification analysis. A patent holder is entitled to only as much value as is actually contributed to an infringer's bottom line by the invention recited in a patent claim.

The "difference" referred to in the question should include both technical and economic aspects. Patents are technical creatures, and each claimed invention therefore should make a technical difference over the prior art. The answer to what difference it makes should articulate the technical benefits of the invention over what came before. An invention may make a process more efficient. It may enable a useful new feature in a device. It may reduce the amount of raw material required to manufacture a product. These are only examples; the technical difference can take a wide variety of forms.

The difference also includes an economic aspect and this is what creates value in a patent claim. After determining what difference an invention makes technically, the next part of the inquiry is to determine what impact the technical improvement makes in the market. The answer to this part can be more uncertain, especially at the invention stage or inception of a patented technology when there is no certain data about how the technology will be accepted. Once a patent has been practiced enough to justify an infringement lawsuit, however, the economic difference must be determined to prove damages.

Inventors or companies that are patenting their inventions should consider the difference question long before a lawsuit is filed. The question should be asked before a patent application is filed with the U.S. Patent and Trademark Office in order to ensure that the proposed claims are capturing as much value as possible for the inventing organization. Always asking the question in advance of filing patent applications also may help an organization make decisions about which technologies justify investment in patent protection: if the inventors cannot articulate the difference made by the invention, at least technically, it might not be worth investing time and money in patent protection. It is also worthwhile to project the economic difference that the invention might make in the market in order to prioritize investment in the commercialization or enforcement of potentially high-value patents.

The high-level question of what difference the invention makes sits atop many levels of detail, as discussed further in this chapter. But keeping the question in mind throughout the process of obtaining, monetizing, and enforcing patents will help facilitate focus and communication among executives, inventors, attorneys, judges, and juries.

**III. Establish a framework for economic quantification: are the technical benefits of the invention internal (cost-focused) or external (customer-focused)?**

The baseline for quantification of economic benefits arises from one of the most basic business formulas: profit equals revenue minus costs. A patented invention therefore can improve an infringer's bottom line by either increasing revenues or decreasing costs. To quantify the economic benefit provided by a particular claimed invention, both revenues and costs should be considered.

For a convenient way to categorize and track economic benefits of a claimed invention, we label these two categories "internal" and

"external." Inventions which reduce an infringer's costs confer internal benefits (the economic impact is on the infringer's internal processes). Inventions which increase an infringer's revenues confer external benefits (the economic impact arises from the external market's reaction to the patented technology). Thus, internal benefits are cost-focused, and external benefits are revenue-focused (or customer-focused).

Whether a claimed invention confers internal or external benefits often can be determined from a review of the patent itself. Very often the description of an invention in the patent specification articulates at least some benefits of the invention, including whether the invention reduces costs (internal) or improves a product (external). Also, a person with experience in the technology often can review a patent claim and determine whether it will decrease costs or increase revenue by improving a product.

Quantification methods differ between internal and external benefits. Internal benefits often must be quantified based on data held by the accused infringer. That is, the entity practicing the patent holds the information on how much cost it incurs by using the invention. To quantify the economic impact of the invention, that cost must be compared to a hypothetical cost which the infringer would have incurred if it did not have the benefit of the claimed invention. This hypothetical cost often can be quantified based on the accused infringer's own internal data.

External benefits, in contrast, depend on the impact of the claimed feature in the market. The accused infringer typically will have data on the revenue generated by the product incorporating the claimed invention, but how that revenue compares to a hypothetical world where the patented feature was not incorporated depends on market information which is not held by the accused infringer. As discussed below, this market information can be established by various methods including consumer surveys.

Therefore, it can be useful to articulate whether a claimed invention provides internal or external benefits before launching a patent monetization campaign or infringement lawsuit. It also can help an accused infringer assess and attack the type of proof the patent holder will need to establish to make its damages case. The distinction between internal and external benefits is a useful initial step toward establishing a framework for proving the economic benefits or non-benefits of a claimed invention.

**IV. Identify non-infringing alternatives in the prior art and the present market.**

The overwhelming majority of patents are for iterative improvements to a field of art. Indeed, even the Wright Brothers' 1903 patent for the Wright Flyer was for "improvements in flying machines."[1] Patentees should always take it upon themselves, as early as possible, to be able to understand and quantify (1) what came before the invention, and (2) how the invention has improved upon the most recent iterative step. From the perspective of the defendant, the question can be asked, "what version of a device or method can I practice without touching upon the patentee's improvement," or in other words, "what is the closest non-infringing alternative"?

In 1978, the Court of Appeals for the Sixth Circuit in *Panduit Corp. v. Stalin Bros. Fibre Works, Inc.*[2] developed a four-factor test for determining when a patent plaintiff would be entitled to lost-profit damages. Under *Panduit*, a plaintiff must show demand for the patented product, manufacturing and marketing capacity to exploit additional demand, and the amount of profit he or she would have made.[3] Additionally, *Panduit* required plaintiffs to show an "absence of acceptable non-infringing substitutes."[4] Why? Because if in the hypothetical, "but-for" world, a defendant could reach the same customers and make the same amount of money by selling a product

that did not infringe, then the plaintiff would not have captured those sales.

In the context of a reasonable royalty, understanding what non-infringing substitutes would have been available to the defendant is still key. The Federal Circuit Court has demanded that plaintiffs quantify the invention's "footprint on the marketplace."[5] Many times this footprint can be measured precisely as the difference between (1) how much profit a defendant made by infringing, and (2) how much profit a defendant would have made by achieving a non-infringing mode.

For example, consider an invention for tire treads that allows a car tire to achieve 10% better traction on wet roads. The defendant is able to sell tires that practice this invention at a markup of 5% compared to the next best tire. At the hypothetical negotiation, this defendant has three choices: (1) take a license to the tread invention; (2) pay costs to design new, non-infringing treads that, if possible, achieve the same 10% improvement in traction; or (3) forego the feature altogether and sell tires that have 10% less traction. Since we assume for the purpose of calculating a reasonable royalty that a license agreement was reached at this negotiation, we must accept that the defendant, being of rational business mind, would never have paid more for that license than for either options (2) or (3).

In the scenario above, it was paramount to understand precisely what the tire tread invention had contributed to the art. The patentee could easily overreach by ignoring the fact that its tread invention was an improvement upon already existing modes of achieving traction on wet roads. But the more measurable and significant the gap between the benefits of the infringing mode and the closest non-infringing mode, the bigger difference the invention has made and the stronger the damages case has become.

## V. Account for non-infringing components in the quantification analysis.

Just as patentees can overreach by ignoring the modes in which benefits can be achieved by not infringing at all, they can also overreach by claiming profit rightfully belonging to the infringing defendant and not attributable to the invention. In other words, though a defendant's profitable machine or method might incorporate a patentee's contributions to the art, it typically also uses know-how and components that the patentee had nothing to do with. Any damages analysis must account for this reality, and patentees should take care to identify precisely what is in the realm of the invention, even when incorporated into a larger scheme or machine. This concept has been long recognized in the world of patent damages. As stated by Justice Stephen Johnson Field in the 1884 Supreme Court decision *Garretson v. Clark*:[6]

> When a patent is for an improvement, and not for an entirely new machine or contrivance, the patentee must show in what particulars his improvement has added to the usefulness of the machine or contrivance. He must separate its results distinctly from those of the other parts, so that the benefits derived from it may be distinctly seen and appreciated.[7]

Though the ruling above was made to apply to a patent for "improvement in construction of mop heads," the fundamental concepts still apply to today's technology and with equal or greater weight given the increased complexity of modern electronics. Consider, for example, a smart phone that is accused of infringement by a patentee with an invention on digital signal processing. In that scenario, there are innumerable other components in the device that add value but are unrelated to the invention, including, for example, DRAM and flash memory, the central processing unit, video and graphics processors, a LED screen, the operating system, the battery, an antenna, Bluetooth,

a high-definition camera, and so on. Can you quantify the contribution in value made by the digital signal processor alone?

Sometimes this type of quantification manifests in a rule of law called the "entire market value rule." Under that rule, a patentee can only claim the "entire value" of an infringing apparatus in its royalty base if the patentee's invention was a substantial basis of consumer demand for that product (courts differ on whether the invention must be the only basis of consumer demand). Other times, harkening all the way from *Garretson* and its progeny, the analysis instead is referred to as "apportionment," and requires the patentee to apportion the value of its contribution away from non-patented parts of the infringing article. These labels should not be given undue weight, however, because they both espouse a general and well-founded principle that a patentee cannot claim damages for infringement on what he or she has not invented.

In the case of the digital signal processor above, care must be taken to ensure that the damages analysis accounts for the value that the component adds to the smartphone. Is it possible to measure the price premium enjoyed by a cell phone that includes the infringing digital signal processor against one that includes a non-infringing digital signal processor? This is a simple version of what is known as a *conjoint pricing analysis*. Is it possible to obtain component pricing paid as cost-of-goods by the smartphone manufacturer for the infringing DSP? Could you survey consumers of the smartphone at issue and ask how much less they would pay for a phone that did not include the features added by the infringing DSP? These are just some of the ways in which a damages analysis can and should account for non-infringing components.

**VI. Develop the technical benefits or non-benefits of the invention through inventors, in-house engineers, and technical experts.**

As discussed briefly above, determining the economic benefits of a claimed invention depends on the technical benefits of the invention. Thus, the technical benefits of an invention must be articulated before the economic impact of those technical benefits can be quantified.

Attorneys alone cannot identify and quantify the technical benefits of the invention—they do not have the expertise and cannot testify at trial. Economic "damages" experts also do not have the foundational expertise necessary to testify about technical benefits. The key people for identifying, quantifying, and proving the technical benefits of a claimed invention are (1) the inventors, (2) in house engineers, and (3) expert witnesses with experience in the relevant technical field.

The inventors of a claimed invention typically understand what they had in mind for the technical benefits—what problem they solved with the invention. Inventors are a good place to start in identifying the benefits. Keep in mind, however, that the actual impact of a claimed invention in a commercial product can differ significantly from the impact envisioned by the inventors. Also, inventors may not be available to consult or testify, and therefore other sources may be needed to establish the technical benefits.

In-house engineers with a deep understanding of the patented technology can also be a good resource for developing technical benefits of the invention. Often the engineers have worked to commercialize the technology and their insights may be more practical than an inventor's theoretical perspective. Also, non-inventor engineers may have a useful objective viewpoint on the technical benefits achieved by the invention.

Both inventors and engineers can establish the facts underlying the theory of technical benefits of the invention. To tie these facts to the actual claims of the patent typically requires testimony from an expert witness with experience in the relevant field. Selection of this expert is critical: she must be able to describe exactly which part of a product or process uses a claimed invention, understand the state of the technology using the invention, and compare that to a hypothetical world where the invention is not used in order to quantify the technical benefits of the invention over alternatives. Most often, the expert witness will perform this quantification of technical benefits.

The process of identifying inventors, engineers, and experts to determine technical benefits should begin at the outset of any litigation or patent monetization campaign. These technical benefits must be established before their economic impact can be quantified.

**VII. Determine the discovery you need, including licenses, to prove your damages analysis.**

Almost every damages analysis will rely, to a certain degree, on discovery obtained from your opponent or a third-party. It is essential to obtain this discovery early, instead of at the last minute. This will give you and your experts sufficient time to analyze the materials, synthesize the information with your damages theory and to obtain additional information where it is still needed.

One particularly influential area of damages discovery concerns licenses. Many parties use prior licenses involving the asserted patent(s) or similar technologies to establish a starting royalty rate for their damages model. This is because, if the circumstances match up closely enough, the license rate can be compelling evidence of the appropriate rate in the instant case. Accordingly, if you represent a plaintiff you should seek all licenses where the defendant has licensed-in similar technologies and if you represent a defendant you should seek all

licenses where the plaintiff has licensed out the asserted patent(s) or similar technologies.

Another crucial area of damages discovery concerns profit and loss information. A sophisticated company will have detailed information concerning the forecasted and actual cost, pricing and profitability of its products, down to the component level. This information is crucial to identifying the profitability of a given product or component for the purposes of apportioning that profit between the patentee and the accused infringer. In addition, similar information concerning competing but non-infringing alternatives is essential to understanding what benefit the infringing product or component offers over and above an available non-infringing alternative. As a result, you should seek this information for any product that allegedly practices the claimed invention, whether you are a plaintiff or a defendant. Bear in mind that information concerning an allegedly non-infringing alternative may reside with a third party, requiring a Rule 45 subpoena.

An additional area to explore is the real-world licensing practices of the opposing party. The reasonable royalty analysis seeks to create a "hypothetical negotiation" in which the opposing parties would have negotiated a license on the day infringement began. Thus, you will want to notice a Rule 30(b)(6) deposition that seeks to explore the opposing party's preferences in licensing-in technology: does the opposing party seek lump sum licenses, running royalties, hybrids, payment caps, etc.? To the extent that the opposing party has a defined strategy when entering licenses, this information can heavily influence your damages model and the type of "hypothetical license" the parties would have arguably reached.

Finally, if your damages strategy involves a regression analysis, you will want to consider potential sources of information regarding pricing and features of the accused products as well as non-infringing alternatives. You will want to create a relevant result and that may require serving

Rule subpoenas on various third parties. Don't forget that in some industries, third parties have made a business out of collecting and analyzing this same information, the procurement of which could save a lot of time and money.

Remember, all of this information is of little use if you don't have sufficient time to analyze it and respond accordingly. So think about and obtain damages discovery early. This will allow your damages model to evolve with the case as a whole and will lessen the probability of defeat due to an eleventh hour surprise.

**VIII. Avoid pitfalls in apportioning the infringer's profit between the patent holder and the infringer.**

Even if you have succeeded in quantifying the claimed invention's technical and economic benefits, you must still apportion the profit between the patentee and the accused infringer. This is because while—arguably—the profit would not exist but for the patentee's invention, the accused infringer nonetheless deserves some benefit for investing capital, expending resources on development, delivery and promotion, and assuming the risk necessary to make the invention commercially successful.

When apportioning profits, there are several key pitfalls to avoid. The first concerns identifying the correct profit to apportion. If the smallest saleable patent-practicing thing is a component within the accused product and there is no evidence that the claimed invention is the primary driver of consumer demand for that product, then the profit to be apportioned is that of the component, not the product. Apportioning profits attributable to distinct and unpatented components compensates the patentee beyond the reach of the patent-damages statute. Thus, failure to appreciate this basic principle could be fatal to any apportionment analysis.

Another potentially fatal apportionment error concerns the "25% Rule" or the "Rule of Thumb." Once upon a time, the apportionment analysis consisted of identifying the profit of the accused product and apportioning 25% of it to the patentee. Patentees have utilized this approach in countless cases over the past several decades but following the Federal Circuit's *Uniloc* decision, it is now verboten. That does not mean you cannot present evidence that 25% of the profits should be apportioned to the patentee, it just means that if you care going to make such an argument, it must be based on some evidence that the negotiating parties would have actually agreed to that form of apportionment.

Finally, if you are seeking to avoid the "25% Rule," don't seek refuge in the Nash bargaining solution. The Nash bargaining solution is based on the work of the Nobel-prize winning mathematician John Nash. In simple terms, it uses economic and mathematical theory to show that when negotiating parties are presented with the potential gains to be had from licensing a technology and the potential losses to be realized from not licensing a technology, the parties will split the gains fifty-fifty. The advancement to a fifty-fifty split in the wake of the more conservative 25% Rule's demise has struck at least one court as imprudent, leading to the rejection of an expert damages analysis that relied on the Nash bargaining solution alone. Other courts, however, have allowed a Nash bargaining analysis to remain where it was but as one part of a multi-faceted damages analysis. Thus, while the Nash bargaining solution may have some value, given its reception to date any apportionment analysis that features it should have a robust backup plan.

## IX. If using a survey, tailor it to the claimed invention and do not wrap in non infringing alternatives.

Consumer surveys have recently become a popular means to quantify patent damages. Long used by the trademark infringement bar as

key proof for issues such as consumer confusion and dilution, surveys can be used by a patentee to measure the beliefs held by a particular population about the value added by a particular invention. In fact, the Federal Circuit has encouraged patentees to use surveys in such a way. As with anything else, however, it is easy to overreach when constructing and conducting a survey, and to measure values that do not correspond with what the patentee has contributed to the field of art.

Judge Richard Posner of the U.S. Court of Appeals for the Seventh Circuit recently sat by designation in the Northern District of Illinois and presided over a patent infringement case between Apple and Motorola. There Judge Posner was presented with survey evidence and his criticism of the manner in which the survey was carried out was specific and unforgiving. The biggest shortcoming he identified was that the survey did not compare devices that included the patented feature with devices that did not include it. As stated in the opinion excluding the survey from evidence, if such a survey were presented to someone with P&L responsibility in a business setting, the response from the business head would be "Dummy! You haven't estimated the value of the [patented] feature."

The same problem was recently encountered by a patentee with an invention on a particular type of internal cell phone antenna that provided "advantages such as multiband functionality and reduced size." The consumer survey conducted in that case, however, was directed not only to the particular type of cell phone antenna invented by the patentee, but instead all internal cell phone antennas as compared to external antennas. Unsurprisingly, the survey found that consumers placed a great value on internal (as compared to external) antennas, and thus the survey was used as the basis for a substantial amount of damages. This was overreaching, because the patentee did not invent the internal cell phone antenna, but merely improved upon the design

thereof. The survey therefore measured a population's characteristics that had little to do with the claimed invention.

The lessons from these cases are rather straightforward. When conducting a consumer survey in an effort to quantify the value of a patentee's invention, be sure to tie the survey design and its questions to the particular thing that was invented. Otherwise the survey evidence is nothing more than conjecture.

One might ask whether it is even possible to design a survey to measure characteristics about a particular invention. In the example above, perhaps it would have been impossible to accurately measure everyday opinions about internal cell phone antenna features that are largely unappreciated by the consuming public. Under circumstances such as those, where the invention provides benefits that manifest themselves only much later and in tangential ways, to consumers, perhaps a survey should not be conducted at all. The consumer survey should never be viewed as the one-size-fits-all approach to quantifying patent damages. Considering all that has been presented in this chapter, there are a multitude of options available to a creative and endeavoring patentee. Examine the nature of your invention, the evidence and data available to you, and the expertise of scientists and economists, to find the approach that makes the most sense to your technology and field of art.

## Footnotes

1. http://www.theatlantic.com/technology/archive/2012/11/the-wright-brothers-famous-1903-flying-machine-patent-is-missing/265041/
2. 575 F.2d 1152 (6th Cir. 1978).
3. *Id. at 1156.*
4. *Id.*
5. Lucent Technologies Inc. v. Gateway Inc., 580 F.3d. 1301 (Fed. Cir. 2009)
6. 111 U.S. 120 (1884).
7. *Id. at 121.*

## *About The Authors*

**William H. Manning** is a partner in the Minneapolis office of Robins, Kaplan, Miller & Ciresi L.L.P. He has moved a billion dollars in patent litigation from one side of the table to the other giving a ten to one return without trial or appeal. He has proven ability solving complex legal problems through strategic planning and meticulous preparation. Bill represents clients in the intellectual property area with emphasis on patent litigation. He also represents clients in class action litigation with particular emphasis on class action defense in the areas of common law fraud, false advertising, and securities. Bill has also obtained numerous multi-million dollar verdicts and settlements on behalf of injured individuals. He has also represented numerous corporate clients in national product liability programs in over thirty different state and federal jurisdictions. He is a member of The American Board of Trial Advocates (ABOTA), and was named to "The BTI Client Service All-Star Team" in 2010.

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