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**PATENTS**

The authors assess the use of the Nash bargaining solution and conjoint surveys in presenting arguments for patent infringement damages calculations.

## Recent Trends and Approaches in Calculating Patent Damages: Nash Bargaining Solution and Conjoint Surveys



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Over the past several years, an increasing number of patentees have attempted to support their reasonable royalty calculations through an economic modeling theory known as the Nash bargaining solution and a method of surveying consumer preferences known as conjoint surveys. The use of these methods has met with modest acceptance in district courts, but in practice, courts have heavily scrutinized the underlying mechanics of how these methods work and their applicability to the particular facts of an individual case. The cases discussed below demonstrate that damages experts must tie damages calculations to the specific facts of each case.

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### I. Background on Patent Damages

#### a. Lost Profits and Reasonable Royalties

In patent infringement cases, plaintiffs may be awarded damages in the form of lost profits, reasonable royalties, or some combination of the two. To recover lost profits, the patent owner must demonstrate with reasonable probability that “but for” the act of infringement, it would have made the infringer’s sale. The classic test for determining “but-for” causation was established by the Sixth Circuit in *Panduit v. Stahl Bros. Fibre Works*.<sup>1</sup> Under *Panduit*, lost profits may be awarded where the patentee establishes:

- (1) demand for the patented product;
- (2) the absence of acceptable non-infringing substitutes;
- (3) that the patentee had manufacturing and marketing capability to exploit demand; and
- (4) the amount of profit the patentee would have made absent the infringement.

In a case where a plaintiff cannot show lost profits (or chooses not to pursue lost profit damages), the plaintiff should not recover “less than a reasonable royalty for the use made of the invention by the infringer.”<sup>2</sup> A reasonable royalty may be paid in a lump sum, a running royalty, or some combination of the two.

<sup>1</sup> *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1156, 197 U.S.P.Q. 726 (6th Cir. 1978).

<sup>2</sup> 35 U.S.C. § 284.

A reasonable royalty is determined based on the legal fiction of recreating a “hypothetical negotiation” between a willing patent owner and potential licensee conducted prior to the first act of infringement, with the presumption that the patents are both valid and infringed. The hypothetical royalty the parties would have reached under this framework is used in determining such a reasonable royalty.

To determine a reasonable royalty, experts typically present evidence and analysis in accordance with the 15-factor test outlined in *Georgia-Pacific v. U.S. Plywood*.<sup>3</sup> In general, those factors take into account, among other things, the prior and current licensing rates for the asserted patents (or comparable ones); the duration of the patents and terms of a license; the commercial success and profitability of the patented invention; and the extent to which the infringer has made use of the patented invention.

## b. Apportioning Damages and the Entire Market Value Rule

The royalty calculation is complicated where an accused infringer sells a product that incorporates the alleged invention as only one part of a more complex device or process. Under such circumstances, a patent holder should use a royalty base comprising the value of the component rather than the final product. A notable and very limited exception to this rule exists in cases where the “entire market value” (EMV) rule applies. Under the rule, a patentee may be allowed to recover damages based on the value of the final product only where the patented component constitutes the basis for consumer demand for that product.

## c. Recent Federal Circuit Decisions: Eliminating the 25 Percent Rule of Thumb and Raising the Level of Evidence Needed for the Entire Market Value Rule

A series of recent decisions by the U.S. Court of Appeals for the Federal Circuit demonstrates that the court is more rigidly enforcing the standards for proving reasonable royalties in patent cases.

In *Uniloc v. Microsoft*, the Federal Circuit eliminated the so-called 25 percent rule of thumb.<sup>4</sup> That rule had been used to allocate 25 percent of an infringer’s profit for use of a patented article to the patentee as a baseline royalty rate, which was then adjusted up or down as necessary after considering the relevant *Georgia-Pacific* factors. In *Uniloc*, the Federal Circuit squarely rejected the rule, holding that it was a “fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation.”

The Federal Circuit has also recently emphasized the importance of being able to properly apportion damages or provide evidence supporting the use of the EMV rule in at least two decisions. In *Lucent v. Gateway*, the Federal Circuit vacated a \$358 million damages award and remanded the case for a new trial on damages, finding there was no evidence that any consumer had

bought the accused product (Microsoft Outlook) because of a patented “date picker” software feature.<sup>5</sup>

Similarly in *LaserDynamics v. Quanta*, the court overturned an \$8.5 million jury award, discussing in detail the level of evidence needed to support the use of the EMV rule where an individual component of a computer was accused of infringement. The Federal Circuit held that application of the EMV rule could not be justified simply by asserting a low enough royalty rate.<sup>6</sup> It was also not enough to show that the patented component was valuable, important, or even essential to the entire system, or that given a choice, customers would choose the system with the patented feature. Instead, the patent holder had to demonstrate that customers bought the entire system because of the patented component alone.<sup>7</sup>

Two recent trends have arisen in the district courts following these decisions. The first is the use of the Nash bargaining solution,<sup>8</sup> which has been used as an alternative to the 25 percent rule of thumb. The second is the use of conjoint surveys to provide evidence supporting the use of the EMV rule or to apportion a monetary value to a specific component in a multi-component device.

## II. Recent Trends in Calculating Damages: Nash Bargaining and Conjoint Surveys

### a. The Nash Bargaining Solution

The Nash bargaining solution is a mathematical model that aims to define the most mutually beneficial outcome of a two-party bargaining scenario. In order to solve for the Nash bargaining solution in the reasonable royalty context, a party must be able to identify or reasonably estimate: (1) the disagreement profits  $d_1$  and  $d_2$  for the patent holder and infringer respectively (representing the profit each party expects to receive if the negotiation for a license fails); and (2)  $\pi$ , the total profits from licensing.

The solution is based on dividing the economic surplus from transactions in a way that satisfies five conditions:

- (1) neither party must be able to improve their situation by entering into an alternative arrangement;
- (2) neither party must receive less by entering into the transaction than it could by not doing so;
- (3) the solution must be independent of how payoffs are numerically measured;
- (4) the solution is not affected by eliminating alternatives that were not chosen; and
- (5) if the parties have equal bargaining positions, the solution treats them equally.

<sup>5</sup> *Lucent Techs. Inc. v. Gateway Inc.*, 580 F.3d 1301, 92 U.S.P.Q.2d 1555 (Fed. Cir. 2009) (78 PTCJ 583, 9/18/09).

<sup>6</sup> *LaserDynamics v. Quanta Computer, Inc.*, 694 F.3d 51, 67, 104 U.S.P.Q.2d 1573 (Fed. Cir. 2012) (84 PTCJ 809, 9/14/12).

<sup>7</sup> *Id.* at 68.

<sup>8</sup> The Nash bargaining solution was developed by John Nash, a professor at the Massachusetts Institute of Technology and Princeton University, whose battle with schizophrenia was made famous in the movie *A Beautiful Mind* starring Russell Crowe.

<sup>3</sup> *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 166 U.S.P.Q. 235 (S.D.N.Y. 1970).

<sup>4</sup> *Uniloc USA Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1315, 98 U.S.P.Q.2d 1203 (Fed. Cir. 2011) (81 PTCJ 275, 1/7/11).

Mathematically, Nash demonstrated that the only point that satisfies the above five conditions was one obtained by solving for the following constrained maximization problem (where  $\pi_1$  and  $\pi_2$  are the licensing profits for the patent holder and infringer, respectively):

$$\max (\pi_1 - d_1) (\pi_2 - d_2)$$

Where the equilibrium payoffs are:

$$\pi_1^* - d_1 = \pi_2^* - d_2$$

$$\pi_1^* + \pi_2^* = \Pi$$

Solving the equations yields the Nash bargaining solution:

$$\pi_1^* = d_1 + \frac{1}{2} (\Pi - d_1 - d_2)$$

$$\pi_2^* = d_2 + \frac{1}{2} (\Pi - d_1 - d_2)$$

$$\pi_1^* + \pi_2^* = \Pi$$

Under the Nash bargaining solution, if neither the licensor nor the licensee are able to monetize the patented technology without entering into a license (where  $d_1$  and  $d_2$  are 0 and they have equal bargaining power), the parties split the incremental profits created by licensing evenly, 50/50.

$$\pi_1^* = \frac{1}{2} \Pi$$

$$\pi_2^* = \frac{1}{2} \Pi$$

However, where the patent owner is capable of producing the patented technology or the infringer can turn to noninfringing alternatives, the results of the solution are not necessarily a 50/50 split.

## b. Applying the Nash Bargaining Solution

The Nash bargaining solution has been used by patent holders to establish a baseline royalty rate as an alternative to the now rejected 25 percent rule of thumb or as a “check” on a reasonable royalty calculation done separately through an independent analysis of the *Georgia-Pacific* factors.

This use of the Nash bargaining solution has been accepted in limited circumstances in some district courts and heavily criticized in others.

In *Oracle v. Google*, the U.S. District Court for the Northern District of California criticized the plaintiff’s expert’s use of the Nash bargaining solution, explaining that the solution’s complex mathematical formulas would be incomprehensible to the average juror, especially where the plaintiff’s expert had glossed over the axioms of the solution without relying on any evidence to show how the assumptions were warranted.<sup>9</sup> By not tying any of the facts of the case to the solution, the solution became nothing more than a 50/50 split assumption—and was rejected by the court.

Similarly, in *Suffolk Technologies v. AOL*, the Eastern District of Virginia excluded the testimony of a damages expert for failing to tie the use of the Nash bargaining solution to the facts, which resulted in an arbitrary 50/50 split.<sup>10</sup>

In contrast, in *Mformation Technologies v. Research in Motion*, the Northern District of California denied the

alleged infringer’s motion to exclude the testimony from the patentee’s expert.<sup>11</sup> The alleged infringer argued that the expert’s testimony was unreliable for use of the Nash bargaining solution for determining a royalty rate, which was an inadmissible rule of thumb. In denying the motion, the court noted that because the plaintiff’s expert used the solution as a “check” on the reasonableness of the rate reached through an extensive analysis based on the *Georgia-Pacific* factors, this use did not constitute grounds for exclusion based on the facts of that case.

In *Gen-Probe v. Becton Dickinson*, the Southern District of California went further. There, the court declined a motion to preclude expert testimony from the patentee’s expert based on his use of the Nash bargaining solution.<sup>12</sup> The court noted that the solution has been allowed when used with other considerations in *Mformation*, and that the expert’s testimony was properly tied to the facts of the case.

More recently, in *VirnetX v. Cisco Systems*, the Eastern District of Texas declined to exclude expert testimony on the Nash bargaining solution, finding that the expert had proffered an explanation as to how the solution applied, and why profit splits in that case deviated from a 50/50 split.<sup>13</sup>

As seen in these cases, expert testimony based on the Nash bargaining solution may be accepted by district courts where plaintiffs are able to justify its use by tying the analysis to the specific facts of the case—such as reasonably estimating disagreement profits and determining the relative bargaining power of the parties. Otherwise, a patentee’s assumption that the parties are equal merely turns the Nash bargaining solution into a 50 percent royalty rate assumption (similar to the now rejected 25 percent rule of thumb baseline).

Finally, although the Nash bargaining solution may be more readily accepted when it is used in addition to (rather than in place of) the *Georgia-Pacific* factors, whether it can be justified as simply a “check” on a reasonable royalty calculation is still an open question.

## c. Conjoint Surveys

Conjoint surveys are a method developed in the 1970s of measuring consumer preferences for specific product features. Conjoint surveys are designed to conceptually break a product down into bundles of attributes, and then test various combinations of those attributes to determine customer preferences.

Rather than specifically ask a consumer how “important” they believe a specific feature is, respondents to the survey are asked to evaluate several potential product profiles that comprise different bundles of attributes. By comparing respondents’ choices on certain profiles, a statistical analysis can be done (such as variable regression or a hierarchical Bayes estimation) to interpret the respondents’ choices into quantitative values regarding the value of individual product features and their impact on consumer choice.

<sup>11</sup> *Mformation Techs., Inc. v. Research in Motion Ltd.*, No. 3:08-cv-04990, slip op. at \*15-16, n. 19 (N.D. Cal. Mar. 29, 2012).

<sup>12</sup> *Gen-Probe Inc. v. Becton Dickinson & Co.*, No. 09-CV-2319, 10-CV-0602, slip op. at 506 (S.D. Cal. Nov. 26, 2012).

<sup>13</sup> *VirnetX, Inc. v. Cisco Sys., Inc.*, No. 6:10-cv-00417, slip op. at 5-6 (E.D. Tex. March 1, 2013).

<sup>9</sup> *Oracle Am., Inc. v. Google Inc.*, No. C-10-03561-WHA, slip op. at 11-12 (N.D. Cal. July 22, 2011).

<sup>10</sup> *Suffolk Techs., LLC v. AOL, Inc.*, No. 1:12-cv-625, slip op. at 4-5 (E.D. Va. April 12, 2013).

#### d. Using Conjoint Surveys in Determining Patent Damages

Conjoint surveys have been used recently by patent owners as a method for demonstrating the value of specific patented features in a multi-component device or process. The use of conjoint surveys has conceptually been accepted by some district courts, but *how* those studies have been conducted has been subject to criticism.

For example, in *Oracle v. Google*, the court rejected the use of a conjoint survey measuring the relative importance of features in a smartphone. Although the court noted that consumer surveys are not “inherently unreliable” for damages calculation purposes, it nevertheless found that the specific analysis done by the patentee’s expert was unreliable. Specifically, the plaintiff’s expert excluded certain product features in the survey without explanation.<sup>14</sup>

In contrast, in *TV Interactive Data v. Sony*, the court declined to exclude conjoint survey evidence presented by the patentee’s expert in support of the market’s willingness to pay for the patentee’s patented invention as an incremental benefit to the alleged infringer’s products. The court distinguished the *Oracle* case, noting that the patentee’s expert had provided a principled ba-

sis for selecting the features that were tested based on their similar values relative to the patented features.<sup>15</sup>

Patentees, however, must be careful of at least two considerations. First, patentees must be able to provide a principled basis to justify those attributes that are presented to survey respondents and those attributes that are left out. Second, as noted above, a hypothetical negotiation between two parties is assumed to take place *prior* to the first act of infringement.

This leaves it open as to how a survey completed after the fact can act as an accurate measure of the values consumers would have placed on specific features in the past, prior to the first act of infringement.

### III. Conclusion

The recent trend of using the Nash bargaining solution and conjoint surveys as methods of calculating and apportioning damages in patent cases emphasizes the renewed importance in economic modeling and consumer surveys in patent damage cases. Although the Federal Circuit has not spoken on the use of these methods, district court decisions demonstrate that patentees must support such claims based on the specific facts of each case.

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<sup>14</sup> *Oracle v. Google*, No. C-10-03561-WHA, slip op. at 13-16.

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<sup>15</sup> *TV Interactive Data Corp. v. Sony Corp.*, No. 3:10-cv-00475-JCS, slip op. at 16-17 (N.D. Cal. March 1, 2013).