

Negotiating a Reasonable Royalty in a Patent Licensing Setting

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A Practice Note discussing royalty determinations in a patent licensing negotiation. Topics addressed include the basic principles underlying reasonable royalty determinations in a patent infringement damages context, determining the royalty base and rate, and identifying and applying negotiation-specific risk and business considerations to negotiate a reasonable royalty for a patent license.

It is important for a licensor to use a credible patent valuation methodology during patent license negotiations to obtain optimum returns. This is especially important for licensors of large patent portfolios where valuation may be based on a small set of important patents rather than a statistical value given to the overall portfolio. Such a valuation methodology can be based on a typical reasonable royalty analysis conducted during the damages phase of patent infringement litigation.

This Note discusses:

- The basics of determining a reasonable royalty in a patent infringement damages context, including determining:
 - an appropriate royalty base; and
 - the reasonable royalty rate.
- Addressing negotiation-specific risks, such as non-infringement and invalidity.
- An example demonstrating the concepts of determining a reasonable royalty in a patent licensing negotiation setting set out in the Note.

The reasonable royalty determination methodologies discussed in the Note focus on patent licensing situations. They may be used for licenses of large patent portfolios where the practicality of evaluating each patent in the portfolio is not possible.

THE BASICS OF A REASONABLE ROYALTY DAMAGES DETERMINATION

The Patent Act authorizes a court to award a patentee with compensation for infringement that is no less than "a reasonable royalty for the use made of the invention by the infringer" (35 U.S.C. § 284). This measure of damages:

- Provides a just recovery to a patentee who cannot prove lost profits.
- Is based on compensation to the patentee for the economic harm caused by infringement.

The reasonable royalty determination must be tied to the claimed invention's footprint in the marketplace (see *ResQNet.com v. Lansa, Inc.*, 594 F.3d 860, 869 (Fed. Cir. 2010)). Courts typically determine a reasonable royalty based on a hypothetical negotiation between a willing licensor and a willing licensee:

- Determined at the time just before infringement began.
- Based on the assumption that the patent is valid and infringed.

(See *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324-25 (Fed. Cir. 2009).)

The reasonable royalty typically is determined by applying a specified royalty rate to a royalty base. Since the royalty base and rate determinations may rely on each other, counsel must ensure that the determined royalty rate is properly applied to the corresponding royalty base.

In addition, counsel should determine the reasonable royalty base and rate for each patent and product or service pair when licensing a patent portfolio since:

- Each patent in the portfolio may have a different value for different products and services.
- The law requires evidence tending to separate or apportion between patented and unpatented features.

(See *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 67 (Fed. Cir. 2012).)



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THE GEORGIA-PACIFIC HYPOTHETICAL NEGOTIATION

Though determination of a reasonable royalty in a patent infringement litigation setting is based on a large set of case law, courts typically rely on the *Georgia-Pacific* case as the basic reasonable royalty damages framework (see *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F.Supp. 1116, 1120 (S.D.N.Y. 1970), judgment modified, 446 F.2d 295 (2d Cir. 1971)).

This framework requires the court to determine the reasonable royalty based on a hypothetical negotiation between a willing licensor and a willing licensee. The *Georgia-Pacific* court set out 15 factors to consider as an aid in the determination. These factors are set forth in the table below, organized by the general factor type:

Licensing (Royalty Rate)	Business / Financial	Apportionment (Royalty Base)	Overall
1. Royalties received by the patentee for the licensing of the patent in suit tending to show an established royalty rate.	3. Nature and scope of the license.	13. Portion of realizable profit that should be credited to the patented invention as distinguished from the business risks or features added by the infringer.	14. Opinion testimony of qualified experts.
2. Rates paid by the licensee for the use of other comparable patents.	4. Licensor's established policy and marketing program to maintain patent monopoly.		15. Hypothetical negotiation between licensor and licensee.
9. Utility and advantages of the patent over old modes or devices.	5. Commercial relationship between the licensor and licensee, such as whether they are business competitors.		
10. Nature, character, and benefits of the patented invention to users.	6. Effect or value as a generator of sales of non-patented items.		
11. Extent of use by infringer and evidence probative of the value of that use.	7. Duration of the patent and term of the license.		
12. Portion of profit customary to allow for use of the patented invention.	8. Profitability, commercial success, and popularity of products made under patent.		

However, counsel should note that for standard-essential patents, where standard-setting organizations seek pledges from patent owners to grant licenses on reasonable and nondiscriminatory (RAND) terms, many of these *Georgia-Pacific* factors are not relevant (see *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1230 (Fed. Cir. 2014)).

In the context of the patent infringement damages hypothetical negotiation, the reasonable royalty may be estimated by identifying a bargaining range and the appropriate profit split between the licensor and licensee. The bargaining range includes:

- A maximum value equal to the expected incremental benefits, the profits, the licensor receives from selling a product incorporating the patented feature. This incremental benefit estimates the claimed invention's footprint in the marketplace by comparing the economic situation where the licensor sells:
 - a product incorporating the patented feature; and
 - an otherwise-identical product that uses the next-best available alternative or omits the patented feature completely.
- A minimum value equal to the licensor's incremental cost from licensing the patented feature.

DETERMINING THE ROYALTY BASE

The royalty base should focus on the product portion attributable to the patented feature, not the unpatented features. This determination requires either:

- A showing that the entire product's value is attributable to the patented feature, otherwise known as the entire market value rule (EMVR) (The Entire Market Value Rule).
- Apportioning the product profits between the patented feature and the unpatented features, which typically is an analysis concerning the smallest saleable patent-practicing unit (SSU) (The Smallest Saleable Patent-Practicing Unit).

Each of these analyses requires counsel to determine the overall product value, and implicitly the portion of the product's economic benefit, attributable to the patented feature. Some factors counsel should consider in determining the appropriate royalty base include:

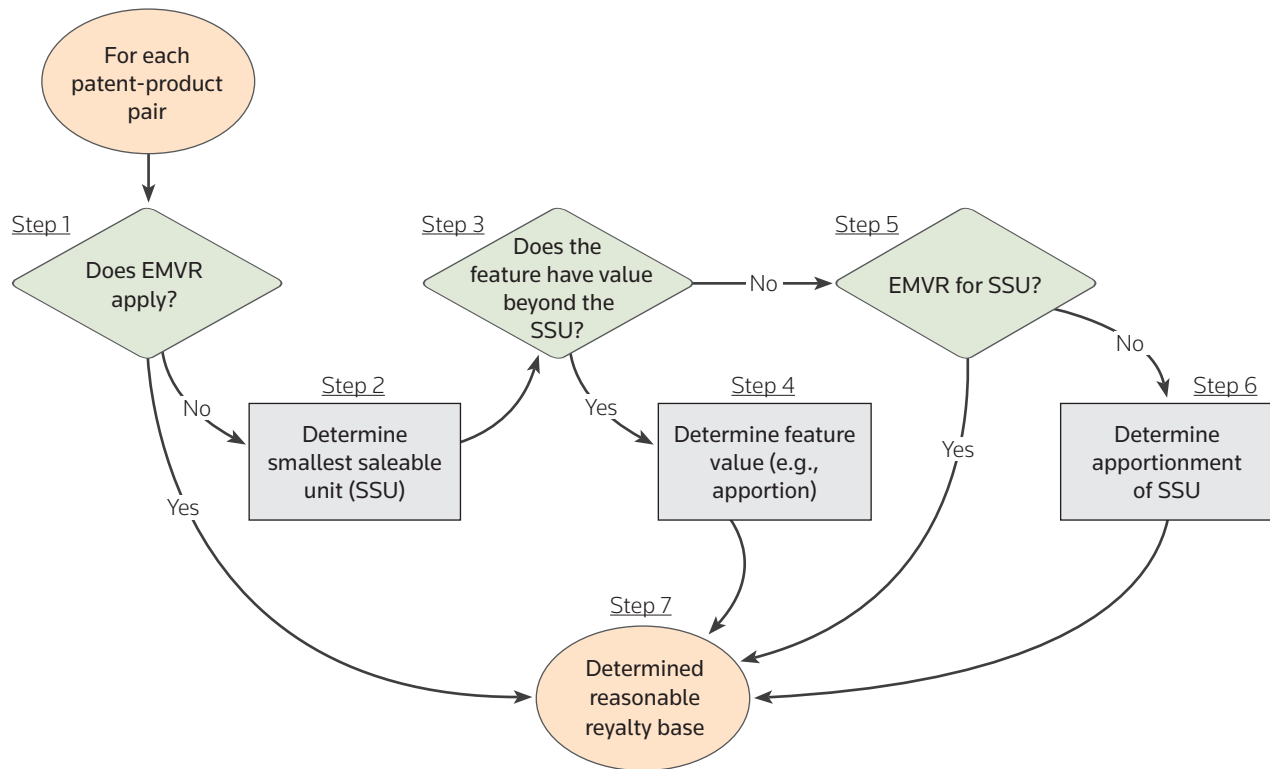
- The product's purpose.
- The patented feature.
- The importance of the patented feature to the product's purpose.
- The patented feature's advantages over alternatives to the product's purpose.

The parties should use reliable and tangible evidence to support their respective valuation positions. However, even in a litigation setting, absolute precision is not required and some degree of approximation and uncertainty should be acceptable (see *VirnetX, Inc. v. Cisco Sys.*, 767 F.3d 1308, 1328 (Fed. Cir. 2014)).

A method for determining an appropriate royalty base could be to:

- Determine whether EMVR applies (The Entire Market Value Rule).
- Identify the SSU if EMVR does not apply (The Smallest Saleable Patent-Practicing Unit).
- Determine whether the patented feature has value beyond the SSU (Determine Whether the Patented Feature has Value Beyond the SSU).
- If the patented feature does not have value beyond the SSU, determine whether the SSU should serve as the royalty base or if the patented feature should be apportioned in the SSU, such as where it has multiple components containing non-infringing features unrelated to the patented feature (Multi-Component SSU).

The following flow chart may help counsel conceptualize this analysis.



Although the flow chart implies that only one royalty base is determined, counsel should analyze each path to determine the potential range of royalty bases for purposes of any patent license negotiation. In the litigation context, the US Court of Appeals for the Federal Circuit recognizes that there can be multiple methods for determining a reasonable royalty (see *Commonwealth Scientific v. Cisco Sys., Inc.*, 809 F.3d 1295, 1301 (Fed. Cir. 2015)).

THE ENTIRE MARKET VALUE RULE

As a preliminary matter, counsel should determine whether the EMVR applies. In making this determination, counsel should note that the EMVR:

- Is a narrow exception to the general rule that royalties should be based on the SSU.
- Requires proof that the patented technology is what motivates consumers to buy the overall product. Merely being a required or important feature is insufficient for the EMVR to apply.

(See *LaserDynamics*, 694 F.3d at 67.)

In addition, for the EMVR to apply:

- The components of the multi-component product should preferably work as a single functioning unit.
- The patented feature should be integral to the single functioning unit's overall performance.

(See *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1361 (Fed. Cir. 2001).)

THE SMALLEST SALEABLE PATENT-PRACTICING UNIT

The general rule is that royalties are based on the SSU. This limits the risk that a patentee will be improperly compensated for the product's non-infringing components (see *VirnetX, Inc.*, 767 F.3d at 1327 and *LaserDynamics*, 694 F.3d at 67). Counsel therefore must take care to understand the claimed invention because often it may broadly relate to different potential SSUs.

In a patent licensing negotiation, using a larger base that includes multiple components or is even based on the EMVR is not as critical as in litigation because of the different settings. In addition, in a negotiation counsel will not be skewing any potential damages by biasing a jury into believing that the proffered damages appear modest as compared to the product's full value, which counsel should consider in litigation (see *LaserDynamics*, 694 F.3d at 68). Therefore, counsel should focus on proper apportionment concerning the patented feature, which can be used to:

- Determine the patented feature's value beyond the SSU (Determine Whether the Patented Feature has Value Beyond the SSU).
- Further apportion the SSU to a smaller base when the SSU is a multi-component product containing non-infringing features unrelated to the patented feature (Multi-Component SSU).

Determine Whether the Patented Feature has Value Beyond the SSU

For multi-component products, apportionment is the governing rule in the patent litigation context (see *Commonwealth Scientific*, 809 F.3d at 1301).

However, in a negotiation, the licensor should set aside the SSU as the royalty base and use a larger royalty base if counsel can show that the patented feature has value beyond the SSU (see *Fractus, S.A. v. Samsung Elecs. Co.*, 876 F.Supp.2d 802, 835-36 (E.D. Tex. 2012)). This situation may apply in cases where the licensor can establish that multiple product components rely on the patented feature. In that situation, the licensor may be able to increase the royalty base to the portion of the product's value that can be attributed to the specific advantages the patented feature provides to the overall product.

Of course, since a determination that the patented feature's value is greater than the SSU significantly impacts the reasonable royalty base, it is important for counsel to have factual support on which to base its client's apportionment theory. Such factual support may include:

- Industry papers.
- Expert testimony.
- Marketing documents.
- Comparisons with similar products without the patented feature.

Multi-Component SSU

If the SSU is a multi-component product containing non-infringing features unrelated to the patented feature, the patented feature must be apportioned within the SSU (see *VinnetX*, 767 F.3d at 1327 and *Mirror Worlds, LLC v. Apple, Inc.*, 784 F. Supp. 2d 703, 727 (E.D. Tex. 2011)).

DETERMINING THE ROYALTY RATE

A reasonable royalty rate is typically capped by the parties' respective incremental benefits, which depend on their relative bargaining power in a hypothetical negotiation (see *TWM Mfg. Co., Inc. v. Dura Corp.*, 789 F.2d 895, 899 (Fed. Cir. 1986)). The parties' relative bargaining power is determined based on the facts of the case by considering:

- The appropriate *Georgia Pacific* factors.
- Other economic considerations, such as the specific industry and technology involved.

The courts have consistently required credible and reliable evidence that supports the appropriate starting point for the reasonable royalty rate determination (see *Uniloc USA, Inc.*, 632 F.3d at 1317-18). The difficulty in determining the appropriate royalty rate starting point in a negotiation setting is that tools typically used in the damages phase of patent litigation, such as surveys and expert witnesses, are not readily available and may be too time consuming or costly to obtain. Thus, in a negotiation setting, the parties must rely on their own internal expertise and industry documents and could rely on:

- Industry accepted comparable rates, when adequate comparable rates are available (Comparable Rates for Royalty Rate Determinations).
- A technology-defined profit split (Technology-Defined Royalty Rate).
- Other methods (Other Royalty Rate Determination Methods).

COMPARABLE RATES FOR ROYALTY RATE DETERMINATIONS

An influential factor in determining the royalty rate is the existence of comparable license agreements (see *Commonwealth Scientific*, 809 F.3d at 1303). Where there are comparable licenses, especially those

concerning the patent currently being licensed or similar patents negotiated under similar conditions for similar products, the royalty rate established in those licenses can be the basis for the current royalty rate (see *Monsanto Co. v. McFarling*, 488 F.3d 973, 978-979 (Fed. Cir. 2007) and *Uniloc USA, Inc.*, 632 F.3d at 1316-18).

However, counsel should consider that prior license agreements often have materially different terms from the current situation. If that is the case, the parties should adjust the royalty rate to account for technology differences and the other parties' economic circumstances. If the royalty rates in those license agreements cannot be adjusted to account for the different circumstances, the parties should not consider those license agreements (see *ResQNet.com, Inc.*, 594 F.3d at 870-71 and *Lucent Techs., Inc.*, 580 F.3d at 1330-31).

Examples of license agreement terms that may impact the royalty rate include:

- The value of any grant back of patent rights.
- Any lump sum payments, which provide:
 - certainty on the royalties received;
 - a time value of money benefit.
- Rates which may apply a lower royalty rate over a larger royalty base, such as where the parties either applied the royalty rate to:
 - the entire product instead of an apportioned royalty base; or
 - all revenues instead of revenues from specific products.
- Business considerations, such as purchase credits or joint ventures.
- Patent license scope, for example whether the license includes inducement, combinations or have made rights.
- Other consideration, such as technology transfer.

Counsel should also note that for standard-essential patents, a reasonable royalty damages award must be apportioned to the patented invention's value to ensure that the royalty award is based on the incremental value the patented invention adds to the product, not any value added by the technology's standardization (see *Ericsson, Inc.*, 773 F.3d at 1232).

If comparable royalty rates exist, they may be applied against the same product or apportioned base. However, rather than mechanically applying the comparable rate to the apportioned base, licensor's counsel should consider determining the royalty rate by taking the ratio of the royalty base from the comparable license agreement rate to the apportioned royalty base and multiplying that ratio by the comparable royalty rate. This should yield a larger royalty rate for the licensor.

TECHNOLOGY-DEFINED ROYALTY RATE

Alternatively, the parties could use a technology-defined royalty rate, which would be based on:

- Proper apportionment of the patented feature to the entire product to identify the royalty base.
- An industry royalty rate uniformly applied across the apportioned royalty base.

The technology-defined royalty rate is based on determinable quantities, such as:

- The details of the technology employed in the product.

- The value of the patent to the technology.
- The value placed on the technology by the industry.

Since the technology-defined royalty rate does not rely on the unknown quantity or quality of other patents relevant to the product, this method:

- Eliminates concerns over royalty stacking.
- Does not rely on the costly and problematic polling of the prospective licensee's customers for their view on the patented feature's importance.
- Lends itself to use in a negotiation setting.

By having a detailed understanding of the technology's value to the product and industry, the parties may be able to agree on a technology-defined royalty rate that is tied to the specific industry and product. In addition, for a patent portfolio, the parties may be able to consistently use a technology-defined royalty rate for each patent applied to the same product type since the parties have already determined the patent's actual value contribution to the overall product. This is appropriate because the reasonable royalty base reflects the proper patented feature's value apportionment to the product type.

The parties may determine the technology's value to the industry by many different data points such as either:

- Industry documents detailing the typical cost of patents to the product or comparable product.
- The use of comparable licenses as a guide to the typical cost of patents to the product or comparable product.

OTHER ROYALTY RATE DETERMINATION METHODS

The courts have used a number of other methods to determine a reasonable royalty rate in the litigation setting. Counsel should consider these to verify the royalty rate determined using either the technology-defined royalty rate or comparable methods. These other techniques include:

- Alternative technology (Next-Best Available Alternative).
- Cost saving (Cost Savings).
- Incremental profits (Incremental Profits).

Next-Best Available Alternative

By comparing the patented feature to its next-best available alternative, licensee's counsel may be able to cap the reasonable royalty rate to the cost difference between infringing and non-infringing alternatives. The cost difference between a next-best available alternative and the patented feature must:

- Include all costs associated with the alternative, such as the cost of licensing the alternative if it is protected by intellectual property.
- Supported by reliable evidence

In addition, the next-best available alternative must be:

- Available at the time of the hypothetical negotiation.
- Acceptable to consumers.

(See *Grain Processing Corp. v. American Maize-Products Co.*, 185 F.3d 1341, 1351 (Fed. Cir. 1999) and *Advanced Fiber Technologies (AFT) Trust v. J&L Fiber Services Inc.*, 2015 WL 1472015, at *22-23 (N.D.N.Y. March 31, 2015).)

The courts have not widely used the next-best available alternatives technique to cap the reasonable royalty and seem to suggest it is only appropriate where there is no willful infringement in a litigation setting since the infringer should not be allowed to willfully infringe and should switch to the alternative if there is no agreement on a royalty rate (see *Grain Processing Corp.*, 185 F.3d at 1353).

Counsel must take care in a negotiation setting where the patent is a SEP as the argument that the alleged infringer should switch to an alternative may not be possible. In that case, courts may indeed look to the cost difference of implementing an alternative to cap the reasonable royalty rate.

Cost Savings

Cost savings associated with using a patented feature may be a basis for the reasonable royalty rate provided the cost savings are based on reliable evidence that assigns a dollar value to each of the savings obtained by using the patented feature (see *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1240 (Fed. Cir. 2011) and *Monsanto*, 488 F.3d at 980).

Incremental Profits

Incremental profits should be defined as any pecuniary product benefit achieved by the patented feature that the parties can reliably determine. Examples of pecuniary product benefits include increased:

- Product sales.
- Price point, which indicates a customer's willingness to pay extra for the patented feature.

Typically, in a litigation setting, the incremental profits from the patented feature are determined by expert reports including customer surveys. For example, a survey establishing the incremental price increase a customer would be willing to pay to include the patented feature.

In a negotiation setting, obtaining expensive expert reports may not be feasible so counsel may need to determine the incremental profit's valuation using public data such as:

- Increased market share after a manufacturer incorporates a feature into its product. In that situation, those additional revenues may be due to the feature's inclusion in the newer product. However, typically there are other factors for increased market share such as the value from other added features, marketing, and other market dynamics such as a competitor losing market share due to their actions. Moreover, other manufacturers may add the new feature simultaneously, which would lessen the impact.
- The price differential between two competing products that are exactly the same except for the patented feature. The price differential between the products may be used as a floor to the value of the added feature's functionality. However, this may be too low a value since some customers might not buy a product without the included feature and the price differential may not reflect the product's value to that particular customer. For example, a consumer buying an iPad™ mobile digital device with mobile connectivity would probably shift to a different product rather than an iPad™ mobile digital device without mobile connectivity despite the lower price since the mobile connectivity feature's value is greater than the mere difference in price between an iPad™ mobile digital device with and without mobile connectivity.

APPLYING NEGOTIATION SPECIFIC RISKS SUCH AS NON-INFRINGEMENT AND INVALIDITY

Counsel should note that a reasonable royalty damages calculation in the litigation context is not necessarily the same as a reasonable royalty in the normal course of business because in:

- The litigation context, the court must also compensate the patent owner for infringement (see *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078 (Fed. Cir. 1983) and *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1158 (6th Cir. 1978)).
- The negotiation context, the parties must address risks, such as non-infringement and invalidity, and potentially other business considerations.

For a prospective licensee, since the patents are assumed to be valid and infringed in the hypothetical negotiation for litigation purposes, the reasonable royalty concept in a negotiation setting should discount the royalty by the risk that the patents are invalid or not infringed. This risk may be characterized by a value between:

- 0%, which indicates that the patent is clearly invalid and no arguments may be made for the patent's validity, or that at least one claim element is clearly missing from the product.
- 100%, which indicates that there is no possibility of the patent being found invalid and all of the claim elements are unequivocally being practiced by the product.

To assign such risks, counsel must understand each of the potential arguments that would be raised in litigation to challenge the patent's validity or infringement, as well as the file history and applicable case law. Assigning risk is not an exact science and likely will yield an appropriate "risk range" that addresses the uncertainties.

In litigation, certain events are likely to decrease the uncertainty, such as:

- Claim construction in a *Markman* order.
- A patentee-favorable decision in an *inter partes* review proceeding or other US Patent and Trademark Office proceeding. For more information, see Practice Note, USPTO Post-Prosecution Patent-ability Proceedings (<http://us.practicallaw.com/9-553-6247>).
- The pendency of other patent family members, such as continuation applications, which would allow the patentee potentially to obtain claims addressing any invalidity or non-infringement argument.

In a patent license negotiation, the royalty may also be discounted by business considerations such as:

- Litigation cost avoidance.
- The delay to payment in litigation.
- Other various factors such as customer relationships and quarterly revenue expectations.

The risk discount may be conceptualized by the following formula:

$$\text{Reasonable Royalty(Negotiated)} = ((\text{Royalty Base}) \times (\text{Reasonable Royalty Rate})) \times \text{Risk of Invalidity} \times \text{Risk of Non-infringement} \times \text{Business Considerations Factor}.$$

EXAMPLE: REASONABLE ROYALTY DETERMINATION

Determining a reasonable royalty in a negotiation setting can be illustrated by a patent license negotiation in the smartphone industry involving:

- A patent concerning long term evolution (LTE) technology directed to an orthogonal frequency-division multiple access (OFDMA) smartphone.
- A smartphone having eight equally valuable functions, such as:
 - a camera;
 - a display;
 - audio and visual codes;
 - an LTE interface with eight features, such as error correction, an antenna, OFDMA, handover, mobility management, beam forming, scheduling, and power control;
 - contacts and calendar;
 - GPS navigation;
 - email and messaging; and
 - internet and social media capabilities.

ROYALTY BASE DETERMINATION

In this situation, the licensor may attempt to convince the prospective licensee that the smartphone's entire value is based on the patented technology. However, as noted above, to be successful in applying the EMVR, the licensor must convince the prospective licensee that:

- The components work as a single functioning unit.
- The patented feature is integral to the single functioning unit's overall performance.

The licensor could argue that the smartphone's multiple components all rely on the LTE interface because:

- All functionality requiring data such as email, messaging, maps for the navigation feature, and the internet all rely on the LTE data interface.
- Components such as the camera and display interact with the LTE data interface as the data being displayed is predominately delivered via a mobile connection and pictures taken with the camera are shared via social media, emailed, and uploaded through the LTE data interface.

However, since the general rule is that the royalty base should be based on the SSU, the licensor must make a strong showing for it to use the EMVR. In most cases, though, it must identify the SSU as the royalty base.

In this example, the SSU may be either the smartphone's:

- Processor if the claimed invention relates to functionality based completely on a processing unit.
- Mobile baseband processor if the claimed invention relates to the functionality based completely on the mobile baseband processing unit.

On the other hand, the licensor could attempt to increase the royalty base by establishing that the patented feature has value that extends to non-patented features, such as by arguing that:

- The LTE interface value to the smartphone is increased beyond the SSU, the baseband processor, as the data provided by LTE impacts most of the smartphone features.
- Since OFDMA is a critical feature required to achieve the data rates necessary for LTE, the OFDMA value should be a larger portion of the smartphone's value.
- The impact of the particular patent to the OFDMA interface, which is determined by understanding:
 - the OFDMA standard and the portion of the standard that applies to the patented feature;
 - the number of patents impacting the standard, although, if many patents have only marginal value, a patentee should not engage in a mere numbers game of comparing patent totals; and
 - any value for the patented feature must be apportioned from the value of the invention, not any value added by the standard-ization of that invention (see *Ericsson, Inc.*, 773 F.3d at 1235).

If the SSU is the baseband processor and the licensor can demonstrate that multiple smartphone components rely on LTE, then the parties can calculate the patented feature's apportionment beyond the SSU to determine the reasonable royalty base as follows:

Smartphone value (assume \$640) × the contribution of LTE to the smartphone (50%) × the contribution of OFDMA to LTE (25%) × the contribution of the patented feature to OFDMA (2.5%) = \$2 (see Step 4 of the flowchart).

If the SSU is a multi-component element containing features unrelated to the patented feature, the prospective licensee should attempt to apportion the patented feature within the SSU.

However, the licensor should note that the prospective licensee's starting point for the reasonable royalty base likely will be the cost of the SSU, the baseband processor. Since the SSU is incorporated in the smartphone, the licensor's negotiating position may be that the royalty base should not be just the SSU cost but rather the SSU cost plus the product gross margin. This is because the SSU is incorporated into the smartphone and the licensor can argue that the gross margin should be applied against each of the smartphone's individual components. Therefore:

- The OFDMA's contribution to LTE should be appropriately apportioned.
- The patented feature's value to the OFDMA interface should be appropriately apportioned to the non-patented features' value.

Specifically, if the mobile baseband processor is \$150 and the gross margin on the smartphone is 40% the SSU apportionment may be determined as follows:

SSU cost (\$150) × the gross margin (40%) × the contribution of OFDMA to the mobile baseband processor (25%) × the contribution of the patented feature to OFDMA (2.5%) = \$1.31 = \$1.31 (see Step 6 of the flowchart).

These different results therefore establish a potential bargaining range for the licensing negotiations.

ROYALTY RATE DETERMINATION

Comparable License Royalty Rates

If a comparable license applied a 0.05% royalty rate against the \$640 smartphone, it could be inappropriate for the licensor to merely take the 0.05% rate and apply it against the apportioned \$2 royalty base, which is 0.1 cent royalty per phone.

Instead, where the parties conducted an apportionment analysis to determine the reasonable royalty base, counsel may consider taking the ratio of the royalty base from the comparable license agreement rate to the apportioned royalty base and multiplying that ratio by the comparable royalty rate. Using that analysis, the ratio of the royalty base from the comparable license agreement to the apportioned royalty base (\$640/\$2) may be multiplied by the comparable royalty rate, 0.05%, to yield an equivalent reasonable royalty rate of 16%, which is a royalty of 32 cents per phone.

Technology-Defined Royalty Rate

Counsel may identify a technology-defined royalty rate for smartphones using industry documents and comparable rates. For example, such a technology-defined royalty rate for the smartphone industry could be in the 20% to 40% range based on:

- Industry information on product cost, such as information contained in industry magazine articles that:
 - suggest that there are \$120 in patent license costs on a typical \$400 smartphone resulting in a technology-defined royalty rate of 30% (\$120 divided by \$400)(see Amrstrong, et al., "The Smartphone Royalty Stack: Surveying Royalty Demands for the Components Within Modern Smartphones", Working Paper); and
 - propose that limiting the patent license cost to 20% of the smartphone cost is sustainable (see Schofield, "Patent insanity: Royalty fees could reach \$120 on a \$400 Smartphone", ZDNet – Jack's Blog, May 31, 2014).
- Estimates from specific company activities, such as:
 - Qualcomm, which receives a 3% to 5% royalty of the wholesale price of every smartphone shipped worldwide. Using conservative assumptions that Qualcomm's CDMA

technology is about 25% of the smartphone's value and Qualcomm's contribution to the technology is greater than 50%, the estimated Qualcomm apportioned CDMA impact of the smartphone is 12.5%. Therefore, the technology-defined royalty rate would be in the range of 24% (3% royalty divided by 12.5% apportioned impact) to 40% (5% royalty divided by 12.5% apportioned impact) (see Sun, "3 Reasons I'm Thinking About Investing in Qualcomm Inc.", Motley Fool August 31, 2015).

- Microsoft, which receives a \$5 or about a 1% royalty on each Android smartphone sold. Using conservative assumptions that the Android operating system is about 10% of the smartphone's value and Microsoft's contribution to the technology is about 25%, the estimated Microsoft apportioned impact of the phone is 2.5%. Therefore, the technology-defined royalty rate is 40% (1% royalty divided by 2.5% apportioned impact) (see Tung, "Microsoft is making \$2bn a year on Android licensing – five times more than Windows Phone", ZDNet, November 7, 2013).
- MPEG-2 decoders and encoders, which are licensed at \$2.00, about a 0.5% royalty rate, per consumer product. Using conservative assumptions that MPEG-2 is about 5% of the smartphone's value and the MPEGLA contribution to the technology is greater than 50%, the estimated MPEG apportioned MPEG-2 impact of the smartphone is 2.5%. The technology-defined royalty rate is 20% (0.5% royalty divided by 2.5% apportioned impact) (see MPEGLA website - MPEG-2 License Agreement Summary). The MPEG-2 licensing rates have been decreasing as the patents covering the technology approach expiration which may account for the lower royalty rate compared to the other examples in the MPEGLA website,

Using the apportioned royalty base range of \$1.31 - \$2.00 as described above multiplied by the technology-defined royalty rate range (20-40%) yields a royalty in the range of 26 to 80 cents per smartphone.

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