EXHIBIT Q

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Converting Royalty Payment Structures for Patent Licenses

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The parties to a patent-licensing agreement may choose from a variety of royalty structures to determine the royalty payment that the licensee owes the patent holder for using its patents. Three common structures of a royalty payment are (1) an *ad valorem* royalty rate, (2) a per-unit royalty, and (3) a lump-sum royalty. A royalty payment for a license might use a single royalty structure or a combination of these three structures.

Converting a royalty payment with one structure into an equivalent payment with another structure enables one to compare royalty payments across different licensing agreements. For example, in patent-infringement litigation, an economic expert can estimate damages for the patent in suit by examining royalties of comparable licenses—that is, licenses that cover a similar technology and are executed under circumstances that are sufficiently comparable to those of the hypothetical license in question.[1] However, licenses for a single patented technology might specify the royalty payment using different structures. One license might specify a per-unit royalty, a second might specify a lump-sum royalty, and a third might combine a lump-sum payment with a royalty rate. To analyze and compare the different royalty payments of those licenses, an economic expert or court must convert the royalties to a common structure. For example, a question related to the conversion of the royalty structure arose in August 2016 in *Trustees of Boston University v. Everlight Electronics Co.*, where, in granting an interlocutory appeal, the court asked "whether a district court can correct a damages figure on a motion for remittitur by extrapolating a royalty rate and base

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[1] *See, e.g.*, LaserDynamics, Inc. v. Quanta Comput., Inc., 694 F.3d 51, 79 (Fed. Cir. 2012).

Thus, a lump-sum royalty might not reflect accurately the licensee's *ex post* use of the patented technology.[8]

II. Converting Royalty Payments
of a One-Way License

Using economic methodologies, one can convert a royalty with any given structure into an equivalent royalty that uses a different structure. For example, one can convert a royalty payment that is specified as a per-unit royalty into an equivalent royalty payment under a different structure, such as an *ad valorem* royalty rate. I will use the term *derived royalty* to indicate a royalty that one obtains from the deconstruction or transformation of a royalty payment. Because the derived royalty and the original royalty payment of a license imply the same expected payment at the time of a license's issuance, the parties to a patent-licensing agreement will be indifferent between the two royalty payments.

I begin my analysis by examining a one-way license—that is, a license in which the parties determine the royalty that the licensee will pay the patent holder to use its licensed patents. The parties might determine the royalty payment using a single royalty structure or by using a complex structure that combines multiple royalty structures.

A. Licenses That Use a Single Royalty Structure

Simple economic methodologies enable the conversion of royalties in one-way licenses that use a single royalty structure. Suppose that a license specifies a per-unit royalty and that one must convert that royalty into an equivalent *ad valorem* royalty rate. To do so, one should compare the expected royalty payments under the two royalty structures and find the royalty rate that makes the two payments equal under appropriate assumptions. For example, when the license specifies a per-unit royalty, the expected royalty payment that the patent holder will receive equals the per-unit royalty multiplied by the projected number of the patent-practicing product's sold units, which the parties estimate at the time of the license's issuance. Equation (1) states this relationship:

$$\textit{Per-Unit Royalty Fee} \times \textit{Projected Number of Units} \;=\; \textit{Expected Royalty Payment}. \qquad (1)$$

Conversely, when the license specifies an *ad valorem* royalty rate, the expected royalty payment equals the projected price of the licensed product multiplied

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[8] *See* J. Gregory Sidak, *How Relevant Is Justice Cardozo's "Book of Wisdom" to Patent Damages?*, 16 Columbia Sci. & Tech. L. Rev. 246 (2016).

by the projected number of sold units (for simplicity, I will call this algebraic product the licensee's projected sales revenue) and by the royalty rate, as Equation (2) shows:

$$\textit{Projected Revenue} \times \textit{Royalty Rate} = \textit{Expected Royalty Payment}. \qquad (2)$$

Setting Equations (1) and (2) equal, one can derive the following relationship:

$$\textit{Per-Unit Royalty Fee} \times \textit{Projected Number of Units} = \textit{Projected Revenue} \times \textit{Royalty Rate}. \qquad (3)$$

Therefore, one can derive an *ad valorem* royalty rate simply by dividing the total projected royalty payment by the projected revenue. Equation (4) expresses that relationship:

$$\frac{\textit{Per-Unit Royalty Fee} \times \textit{Projected Number of Units}}{\textit{Projected Revenue}} = \textit{Derived Royalty Rate}. \qquad (4)$$

Because the licensee's projected revenue equals the projected number of sold units of the patent-practicing product multiplied by the projected price per unit, one can state the relationship of Equation (4) more simply as:[9]

$$\frac{\textit{Per-Unit Royalty Fee}}{\textit{Projected Price Per Unit}} = \textit{Derived Royalty Rate}. \qquad (5)$$

Thus, simply using the projected unit price of the licensed product enables one to convert a per-unit royalty fee into a derived royalty rate.

Similarly, one can deconstruct a lump-sum royalty payment into a derived royalty rate. A licensee might make a lump-sum payment either collectively at the beginning of the license's term or progressively following a schedule over that term. In either case, one can calculate the present value of projected revenues over the license's term using the discounted cash flow (DCF) method by applying an appropriate discount rate,[10] as Equation (6) shows:

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[9] The following equation illustrates the substitution and reduction process:

$$\frac{(\textit{Per-Unit Royalty Fee}) \; \cancel{(\textit{Projected Number of Units})}}{(\textit{Projected Price Per Unit}) \; \cancel{(\textit{Projected Number of Units})}} = \frac{\textit{Per-Unit Royalty Fee}}{\textit{Projected Price Per Unit}}$$

[10] *See* William Choi & Roy Weinstein, *An Analytical Solution to Reasonable Royalty Rate Calculations*, 41 J.L. & Tech. 49, 56 (2001) (emphasizing that a DCF method is used to "discount, into present value, the expected cash flow from a licensing agreement"); *see also* Heberden, *supra* note 6, at 21 ("[The discount rate] is a function of three factors: the risk free rate (yield on government bonds), the market risk premium (extra risk applying to the share market), and specific risks attached to the company and [(intellectual property)] IP.").