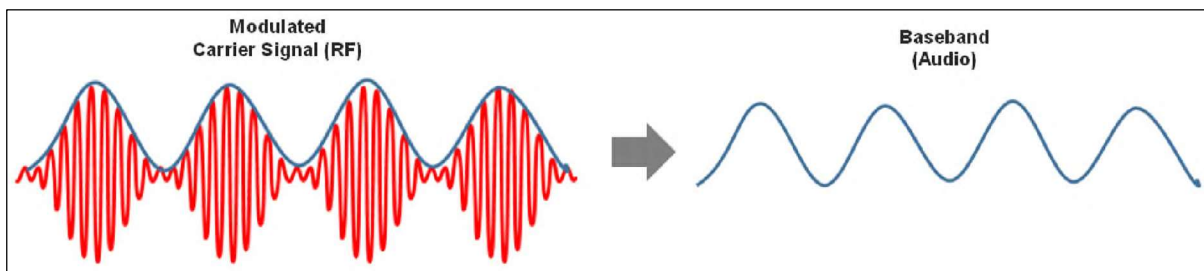




55 (W.D. Tex. June 21, 2022). The Court incorporates the Description of the Asserted Patents from that order, which is reproduced below.

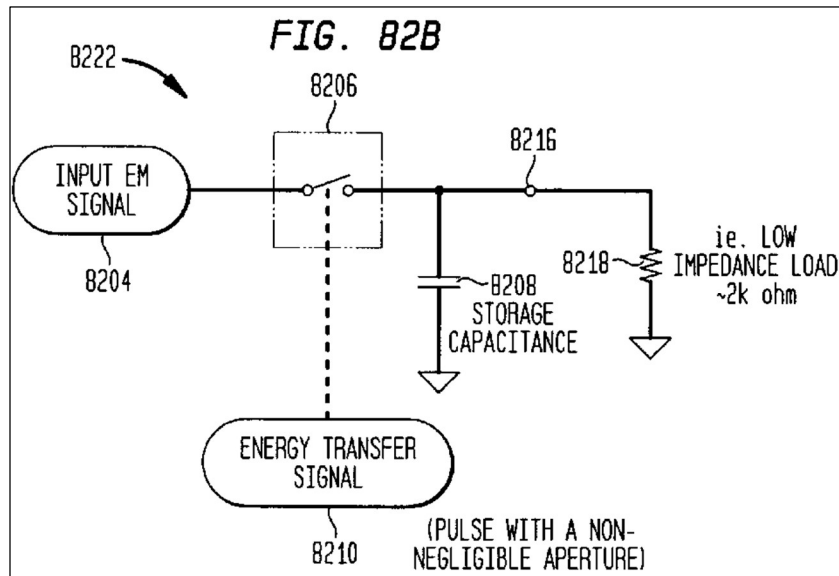
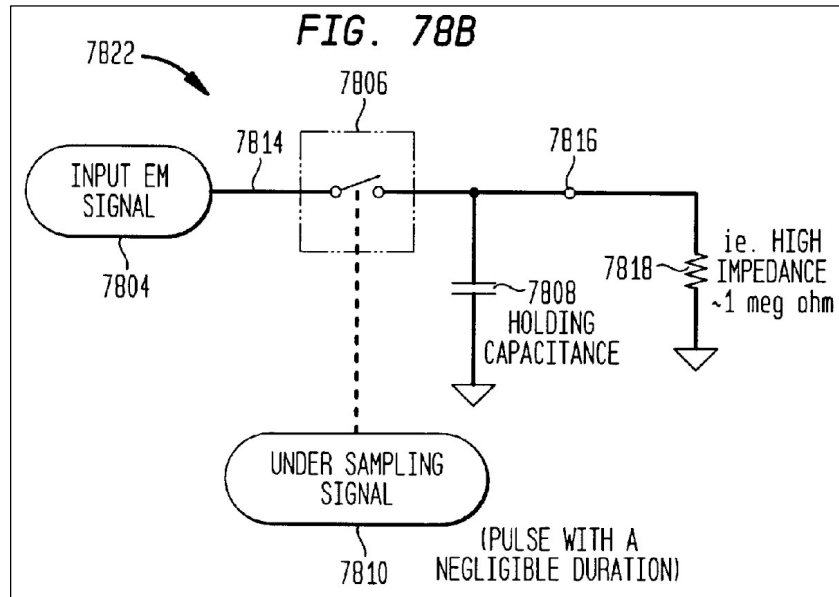
The Asserted Patents describe and claim systems for down-conversion of a modulated carrier signal. '835 Patent at Abstract. Down conversion is the process of recovering the baseband (audio) signal from the carrier signal after it has been transmitted to and received by the receiver. This process is referred to as “down-conversion” because a high frequency signal is being down-converted to a low frequency signal.



The Asserted Patents disclose at least two types of systems for down-conversion: (1) sample-and-hold (*i.e.*, voltage sampling) and (2) “energy transfer” (also known as “energy sampling”). The key difference between the two is that the former takes a small “sample” of the input signal while the latter takes a very large sample, *i.e.*, a large enough sample that a non-negligible amount of energy is transferred from the input signal. The following sub-sections describes each type of system, their respective operation, and compares them.

#### **A. Circuit configuration of down-sampling systems: sample-and-hold and energy transfer.**

Figure 78B depicts an exemplary sample-and-hold system while Figure 82B depicts an exemplary energy transfer system. '518 Patent at 63:19–26 (sample-and-hold) and 7:63–64 (energy transfer).



While Figs. 78B and 82B depict that the respective circuits have similar structure, their respective parameter values (*e.g.*, capacitor and load impedance values)—and concomitantly their respective operation—are very different. It is important to note that the input signal, input EM signal, is the same in both figures.

The circuits in both figures include a switching module (7806 in Fig. 78B and 8206 in Fig. 82B). *Id.* at 62:65–66 (switching module 7806), 66:13–14 (switching module 8206). The switching module opens and closes (*i.e.*, turns off and on, respectively) based on under sampling

signal 7810 in Fig. 78B and energy transfer signal 8210 in Fig. 82B. *Id.* at 62:67–63:1 (under sampling signal 7810), 66:24–26 (energy transfer signal 8210). When the switching module is “closed,” input EM signal 7804 and input EM signal 8204 can propagate across the switching module to holding capacitance 7808 and storage capacitance 8208, respectively, but when the switching module is “open,” input EM signals 7804/8204 cannot propagate across the switching module. While both switching module 7806 and switching module 8206 open and close, the duration that each module is closed differs significantly. The specifications of the Asserted Patents describe that under sampling signal 7810 “includes a train of pulses having negligible apertures that tend towards zero time in duration.” *Id.* at 63:1–3. The specification discloses an embodiment of the “negligible pulse width” as being “in the range of 1–10 p[ico]sec[onds] for under-sampling signal a 900 MHz signal.” *Id.* at 63:3–5. By contrast, the specifications describe that energy transfer signal 8210 “includes a train of energy transfer pulses having non-negligible pulse widths that tend away from zero time in duration.” *Id.* at 66:26–28 (emphasis added). The specification discloses an embodiment where the “non-negligible pulse” is approximately 550 picoseconds for a 900 MHz signal.

The specifications describe that holding capacitance 7808 and storage capacitance 8208 are capacitors that charge when switching module 7804 and switching module 8204, respectively, are closed. *Id.* at 63:10–13 (holding capacitance 7808), 66:38–42 (storage capacitance 8208). The specifications disclose that holding capacitance 7808 “preferably has a small capacitance value” and disclose an embodiment wherein holding capacitance 7808 has a value of 1 picoFarad (“pF”). *Id.* at 63:9–15. By contrast, the specifications disclose that storage capacitance 8208 “preferably has the capacity to handle the power being transferred” and disclose an embodiment wherein storage capacitance 8208 has a value “in the range of 18 pF.” *Id.* at 66:38–49.

The specifications describe that holding capacitance 7808 and storage capacitance 8208 discharge through load 7812 and load 8212 when switching module 7804 and switching module 8204, respectively, are open. *See id.* at 63:19–26 (load 7812), 66:61–65 (load 8212). Fig. 78B depicts that “high impedance” load 7812 has an impedance of approximately 1 M $\Omega$  while Fig. 82B depicts that “low impedance” load 8212 has an impedance of approximately 2 K $\Omega$ . The specifications describe that “[a] high impedance load is one that is relatively insignificant to an output drive impedance of the system for a given output frequency. A low impedance load is one that is relatively significant.” *Id.* at 66:58–61.

## **B. Operation of down-converting systems**

At a very high level, both systems operate similarly. In particular, when the switching module (switching modules 7806 / 8206) is closed, the input signal (input EM signal 7804 / 8204) propagates to the capacitor (holding capacitance 7808 and storage capacitance 8208) and charge the voltage across the capacitor to the voltage of input signal. But when the switching module is open, the input signal cannot propagate to the capacitor, *i.e.*, cannot charge the voltage across the capacitor to the voltage of input signal. Rather, the charge on the capacitor discharges through the load impedance (load 7812 / 8212).

While both systems operate similarly at a high level, differences in (1) the width of the sampling aperture, (2) value of the capacitor, and (3) value of the load are what dictates whether the system operates as a sample-and-hold system or an energy transfer system.

### **1. Operation of sample-and-hold system**

In a sample-and-hold system, the sampling aperture in under sampling signal 7810 is negligible which means only a small amount of charge from input EM signal 7804 propagates to the holding capacitance 7808 before switching module 7806 opens. *Id.* at 62:63–63:8. Because the sampling aperture has a negligible (*i.e.*, very small) width, there is only enough time take a

“sample” of input EM signal 7804, *i.e.*, only a small amount of charge is transferred to holding capacitor 7808. Given that only a small amount of charge is transferred to the capacitor, the value of holding capacitor 7808 needs to be relatively low in order for the voltage across holding capacitance 7808 change to the voltage of input EM signal 7804. More specifically, the relationship between charge ( $Q$ ) and voltage ( $V$ ) across a capacitor (with a capacitance of  $C$ ) is  $Q = C * V$ , or  $Q / C = V$ . As such, if the capacitance  $C$  is large, more charge  $Q$  is needed to order to increase the voltage to  $V$ . For example, for the same amount of charge, if the capacitance is  $2C$  in one case and  $C$  in other case, the voltage in the former case will be half the voltage of the voltage in the latter case. *Id.* at 65:29–35. Therefore, to ensure that the value of holding capacitance 7808 does not limit the voltage across the capacitor, the value of holding capacitance 7808 needs to be, as described above, low. *Id.* at 63:9–15.

When sampling module 7806 is open, the charge on holding capacitance 7808 discharges through load impedance 7812. *See id.* at 63:19–26. When value of load impedance 7812 is high, the charge on holding capacitance 7808 discharges very slowly as compared to when the load impedance is low. More specifically, the time to discharge a capacitor is related to  $R * C$  (also known as the time constant  $\tau$ ) where  $R$  is the value of the load impedance. Using the exemplary values depicted in Figs. 78B (1 M $\Omega$ ) and 82B (2 K $\Omega$ ), assuming that the capacitance is the same, it will take 500 times longer to discharge the capacitor with the 1 M $\Omega$  load impedance as compared to the circuit with the 2 K $\Omega$  load impedance. Because it takes significantly longer to discharge the capacitor using with a 1 M $\Omega$  load impedance (as compared to the 2 K $\Omega$  load impedance), the 1 M $\Omega$  load impedance in “holds” the charge.

To summarize, in a sample-and-hold down-sampling system, a negligible sampling aperture for switching module 7806 and a small value for holding capacitance 7808 only allows

for a “sample” of the voltage of the input EM signal 7804 when switching module 7806 is closed. And because of the high value of load impedance 7812, the capacitor “holds” that value when switching module 7806 is open.

## **2. Operation of energy transfer system**

As described above, in an energy transfer system, the sampling aperture is non-negligible (*e.g.*, 550 picoseconds versus 1 picosecond for the sample-and-hold system for a 900 MHz input signal). Therefore, there is significantly more time to transfer charge from the input signal to storage capacitance. *Id.* at 66:42–44. Because significantly more charge is transferred to the capacitor, the value of storage capacitance 8208 can be larger, in spite of the fact that charge and voltage are inversely related (*i.e.*,  $V = Q / C$ ). The fact that this system transfers a large amount of charge—or energy—to the capacitor gives rise to the name “energy transfer” system.

When sampling module 8206 is open, the charge on holding capacitance 8208 discharges through load impedance 8212. *See id.* at 66:61–65. Because the load impedance in an energy transfer system is “low,” *e.g.*, 2 K $\Omega$ , the charge on storage capacitance 8208 discharges much faster than the charge on a capacitor in a sample-and-hold system, *e.g.*, 500 times faster as compared to using a 1 M $\Omega$  load impedance.

To summarize, in an energy transfer down-sampling system, a non-negligible sampling aperture for switching module 8206 and a high value for holding capacitance 8208 allows for a large amount of charge—or energy—to be transferred from the input signal.

### C. Comparison of sample-and-hold and energy transfer systems

The following summarizes the key difference between sample-and-hold and energy transfer systems.

| Parameter                | Sample-and-hold                        | Energy transfer                           |
|--------------------------|----------------------------------------|-------------------------------------------|
| <b>Sampling aperture</b> | Negligible<br>(e.g., 1–10 picoseconds) | Non-negligible<br>(e.g., 550 picoseconds) |
| <b>Capacitor</b>         | Holding capacitance<br>(e.g., 1 pF)    | Storage capacitance<br>(e.g., 18 pF)      |
| <b>Load impedance</b>    | High<br>(e.g., ~1 M $\Omega$ )         | Low<br>(e.g., ~2 K $\Omega$ )             |

It is important to emphasize that differences in the set of parameter values is what determines whether a system functions as a sample-and-hold system or an energy transfer system. For example, there is nothing special in the structure of a holding capacitance as compared to the structure of a storage capacitance. A circuit designer could, in theory, swap the holding capacitance in a sample-and-hold system with the storage capacitance in an energy transfer system and still have a sample-and-hold system by appropriately adjusting the sampling aperture and load impedance to “match” the larger capacitor value of the holding capacitance.

It is important that changing one parameter without adjusting the other parameters will prevent each system from operating as intended or have other problems. For example, using a non-negligible sampling aperture in a sample-and-hold system is unnecessary as the holding capacitance can be fully charged (to the voltage of the input signal) with a negligible aperture, but using a non-negligible sampling aperture may distort or destroy the input EM signal by transferring too much of its energy to the holding capacitance. *Id.* at 62:30–39.

Even worse, using a high load impedance in an energy transfer system or a low load impedance in a sample-and-hold system could result in a system with poor performance. *See, e.g., id.* at 65:52–55. More specifically, in the latter situation, the low value of the holding capacitance

combined with a low load impedance means that its corresponding time constant  $\tau$  is very low, which means that the holding capacitance may discharge significantly when the switching module is open. As a result, the down-converted signal “cannot provide optimal voltage reproduction, and has relatively negligible power available at the output.” *Id.* at 64:49–51.

In the former situation, the high value of the storage capacitance combined with a high load impedance means that its corresponding time constant  $\tau$  is very high, which means it will take considerably more time (as compared to a low load impedance) to discharge the storage capacitance. This may result in less than optimal voltage reproduction, *e.g.*, when the voltage of the input EM signal is lower than the voltage across the capacitor. Furthermore, the down-converted signal could have substantially less power (*e.g.*:  $V^2/R$ ;  $\sim 2$  mV and  $1\text{ M}\Omega$ ) than the energy transfer system with a low impedance load (*e.g.*:  $V^2/R$ ;  $\sim 2$  mV and  $2\text{ k}\Omega$ ) or even the sample-and-hold system with a high impedance load (*e.g.*:  $V^2/R$ ;  $\sim 5$  mV and  $1\text{ M}\Omega$ ). *See id.* at 67:28–33.

## II. LEGAL STANDARD

### A. General principles

The general rule is that claim terms are generally given their plain-and-ordinary meaning. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*); *Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347 (Fed. Cir. 2014), *vacated on other grounds*, 575 U.S. 959, 959 (2015) (“There is a heavy presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.”) (internal quotation omitted). The plain-and-ordinary meaning of a term is the “meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Phillips*, 415 F.3d at 1313.

The “only two exceptions to [the] general rule” that claim terms are construed according to their plain-and-ordinary meaning are when the patentee (1) acts as his/her own lexicographer or (2) disavows the full scope of the claim term either in the specification or during prosecution. *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). The Federal Circuit has counseled that “[t]he standards for finding lexicography and disavowal are exacting.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014). To act as his/her own lexicographer, the patentee must “clearly set forth a definition of the disputed claim term” and “‘clearly express an intent’ to [define] the term.” *Thorner*, 669 F.3d at 1365.

“Like the specification, the prosecution history provides evidence of how the PTO and the inventor understood the patent.” *Phillips*, 415 F.3d at 1317. “[D]istinguishing the claimed invention over the prior art, an applicant is indicating what a claim does not cover.” *Spectrum Int’l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1379 (Fed. Cir. 1998). The doctrine of prosecution disclaimer precludes a patentee from recapturing a specific meaning that was previously disclaimed during prosecution. *Omega Eng’g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). “[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable.” *Id.* at 1325–26. Accordingly, when “an applicant’s statements are amenable to multiple reasonable interpretations, they cannot be deemed clear and unmistakable.” *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

A construction of “plain and ordinary meaning” may be inadequate when a term has more than one “ordinary” meaning or when reliance on a term’s “ordinary” meaning does not resolve the parties’ dispute. *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361

(Fed. Cir. 2008). In that case, the Court must describe what the plain-and-ordinary meaning is. *Id.*

“Although the specification may aid the court in interpreting the meaning of disputed claim language . . . , particular embodiments and examples appearing in the specification will not generally be read into the claims.” *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988). “[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

Although extrinsic evidence can be useful, it is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). Technical dictionaries may be helpful, but they may also provide definitions that are too broad or not indicative of how the term is used in the patent. *Id.* at 1318. Expert testimony may also be helpful, but an expert’s conclusory or unsupported assertions as to the meaning of a term are not. *Id.*

## **B. Claim differentiation**

Under the doctrine of claim differentiation, a court presumes that each claim in a patent has a different scope. *Phillips*, 415 F.3d at 1314–15. The presumption is rebutted when, for example, the “construction of an independent claim leads to a clear conclusion inconsistent with a dependent claim.” *Id.* The presumption is also rebutted when there is a “contrary construction dictated by the written description or prosecution history.” *Seachange Int’l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1369 (Fed. Cir. 2005). The presumption does not apply if it serves to broaden the

claims beyond their meaning in light of the specification. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1326 (Fed. Cir. 2017).

### C. Indefiniteness

“[I]ndefiniteness is a question of law and in effect part of claim construction.” *ePlus, Inc. v. Lawson Software, Inc.*, 700 F.3d 509, 517 (Fed. Cir. 2012). Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112, ¶ 2. A claim, when viewed in light of the intrinsic evidence, must “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). If it does not, the claim fails § 112, ¶ 2 and is therefore invalid as indefinite. *Id.* at 901. Whether a claim is indefinite is determined from the perspective of one of ordinary skill in the art as of the time the application was filed. *Id.* at 911.

## III. LEGAL ANALYSIS

### A. Term #1: “quadrature-phase oscillating signal”

| Term                                                                                                                     | Plaintiff’s Proposed Construction                                                                                              | Defendant’s Proposed Construction                                                            |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| #1: “quadrature-phase oscillating signal”<br><br>U.S. Patent No. 7,292,835, Claims 1, 2, 18<br><br>Proposed by Defendant | Plain-and-ordinary meaning<br><br>Alternatively: “oscillating signal that is out of phase with an in-phase oscillating signal” | “oscillating signal that is out of phase with the in-phase oscillating signal by 90 degrees” |

### The Parties’ Positions:

Defendant contends that Plaintiff is attempting to broaden the meaning of this term by construing it to encompass signals that are more or less than 90 degrees out of phase, *i.e.*,

“substantially 90 degrees,” which is required by dependent Claim 2, in order for Claim 2 to “survive.” Opening at 6.

Defendant contends that the “specification states repeatedly and consistently that the quadrature-phase oscillating signal is precisely 90 degrees out of phase from the in-phase oscillating signal.” *Id.* (citing ’835 Patent at 46:1–4 (describing that the Q-oscillating signal is preferably shifted “by 90 degrees”), 47:27–30 (same)). Defendant contends that specification never describes that a quadrature-phase oscillating signal was shifted by “more or less than 90 degrees, or around 90 degrees.” *Id.* Defendant contends that “when a term can encompass ‘around’ or ‘substantially’ a value, the patent specification states so.” *Id.* at 6–7 (citing ’835 Patent at 14:48–49, 48:22–26).

Defendant contends that extrinsic evidence (dictionaries) describe that “quadrature” describes that there is a 90 degree separation between items. *Id.* at 8 (citing dictionaries).

In its response, Plaintiff contends that the intrinsic evidence does not support Defendant’s proposed construction. Response at 3–5. Plaintiff contends that ’835 Patent repeatedly incorporates U.S. Patent No. 6,091,940. *Id.* at 3 (citing ’835 Patent at 1:24–26, 12:63–67, 45:34–38, 46:47–52). Plaintiff contends that the ’940 Patent recites “***Quadrature-phase (‘Q’) signal: A signal that is out of phase with an in-phase (‘I’) signal.*** The amount of phase shift is predetermined for a particular application, but in a typical implementation, the ‘Q’ signal is 90° out of phase with the ‘I’ signal.” *Id.* at 3–4 (citing ’940 Patent at 9:4–8 (emphasis in Plaintiff’s brief)). Plaintiff contends that, contrary to Defendant’s proposed construction, the quadrature-phase oscillating signal is “typically” only 90 degrees out of phase with the in-phase signal. *Id.* at 4. Plaintiff contends that when the specification generally describes the quadrature-phase

oscillating signal, it does not mention a specific phase offset, let alone that the offset is 90 degrees. *Id.* (citing '835 Patent at 40:40–45).

Plaintiff contends that while the specification describes that the offset can be 90 degrees in one embodiment, limiting the offset to 90 degrees would read out embodiments where the offset is not 90 degrees. *Id.* (citing *Liebel-Flarsheim*, 358 F.3d at 913).

Plaintiff contends that Defendant's proposed construction violates the principle of claim differentiation. *Id.* at 5 (citing *Ecolab Inc. v. Paraclipse, Inc.*, 285 F.3d 1362, 1375 (Fed. Cir. 2002)). More specifically, Plaintiff contends that Defendant's proposed construction would import "90 degrees" from dependent Claim 2 into Claim 1, which erases any difference between Claims 1 and 2, thus violating the principle of claim differentiation. *Id.* (citing *Intamin Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, 1335 (Fed. Cir. 2007)). Plaintiff further contends that interpreting Claim 1 to require that the quadrature-phase oscillating signal is exactly 90 degrees out of phase would make it narrower than Claim 2, which only requires that the quadrature-phase oscillating signal is substantially 90 degrees. *Id.* at 6.

Plaintiff contends that Defendant's reliance on dictionary definitions is misplaced as it cannot override intrinsic evidence. *Id.* at 5 (citing cases).

Plaintiff finally contends that a POSITA would understand that wireless signals are not perfectly out of phase by 90 degrees, but would "still consider these signals to be 90 degrees out of phase." *Id.* at 6.

In its reply, with respect to Plaintiff's proposed alternative construction, Defendant contends that it confirms that Plaintiff construes the claim term to cover an oscillating signal that is out of phase by any amount. Reply at 2.

With respect to the phrase “typical implementation” in the ’940 Patent, Defendant contends that it “confirms that a Q signal is ordinarily 90 degrees out of phase” and that the ’940 Patent is “clear that ‘quadrature-phase’ means out of phase ‘by 90 degrees’[.]” *Id.* at 2–3 (citing ’940 Patent at 9:4–10, 28:63–64, 29:13–15, Figure 17, 23:54–56). Defendant contends that when the ’940 Patent does not describe signals that are out of phase by phases other than 90 degrees, *e.g.*, 180 degrees, as being quadrature-phase. *Id.* at 3 (citing ’940 Patent at 13:33–36, 11:34–39, 25:56–61). Defendant contends that, by contrast, the ’940 differentiates 90 degree phase shifts from “more exotic embodiments wherein the intermediate signals are shifted by some amount other than 90°.” *Id.* (citing ’940 Patent at 29:17–25).

Defendant contends that there is no support in any embodiment of the ’835 Patent for Plaintiff’s proposed alternative construction. *Id.* Defendant contends that, by contrast, each embodiment involves exactly a 90 degree shift. *Id.* (citing ’835 Patent at 43:21–24, 46:1–4, 47:27–30). As such, Defendant contends that Plaintiff is incorrect that its proposed construction is based on a single embodiment. *Id.* at 4. Defendant contends that “claim terms must be read in light of the specification ‘to tether the claims to what the specifications indicate the inventor actually invented.’” *Id.* (quoting *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011)).

Defendant contends that “quadrature-phase oscillating signal” “cannot encompass any and all out of phase oscillating signals because the specification simply does not describe a quadrature signal as being anything other than 90 degrees out of phase, nor does the specification teach a skilled artisan how to implement such a device.” *Id.* at 4–5.

With respect to Plaintiff's claim differentiation argument, Defendant contends that "claim differentiation cannot be used to 'broaden claims beyond their correct scope.'" *Id.* at 5 (quoting *Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1381 (Fed. Cir. 2006)).

Defendant contends that Plaintiff's proposed alternative construction is inconsistent with contemporaneous extrinsic evidence. *Id.* Defendant contends that Plaintiff is incorrect that the extrinsic evidence conflicts with the intrinsic evidence as both describe that "quadrature" is out of phase by 90 degrees. *Id.* at 5–6.

Defendant contends that Plaintiff's proposed alternative construction reads "quadrature" out of the claim term to broaden the claim to include any signal that is out of phase with an in-phase oscillating signal. *Id.* at 6.

In its sur-reply, Plaintiff contends that the incorporation of the '940 Patent into the '835 Patent indicates that the patentee did not intend to limit "quadrature-phase oscillating signal" to signals that are exactly 90 degrees out of phase with the in-phase signal. Sur-Reply at 1. Plaintiff contends that Defendant fails to identify any lexicography or disavowal that justifies its proposed construction. *Id.* Plaintiff further contends that Defendant agrees that a 90 degree phase offset is ordinary, which means that the signal is not always 90 degrees out of phase. *Id.*

Plaintiff contends that Defendant's proposed construction improperly attempts to limit the claim term to the disclosed embodiments. *Id.* Plaintiff contends that Defendant ignores passages in the '940 Patent that describe that 90 degree phase offset is exemplary. *Id.* (citing '940 Patent at 28:53–57, 29:17–25).

With respect to Defendant's argument that Plaintiff's alternative proposed construction reads out "quadrature," Plaintiff contends that Defendant's argument is based on its overly narrow interpretation of "quadrature." *Id.* at 3.

Finally, with respect to Defendant’s extrinsic evidence, Plaintiff contends that “extrinsic evidence cannot be used to justify Realtek’s construction *which is at odds with the intrinsic evidence.*” *Id.* (citing cases) (emphasis in Plaintiff’s brief).

### **The Court’s Analysis:**

After reviewing the parties’ arguments and considering the applicable law, the Court agrees with Plaintiff that this term should be construed according to its plain-and-ordinary meaning for the reasons that follow. **First**, the “heavy presumption” is that terms should be construed according to their plain-and-ordinary meaning. *Azure Networks*, 771 F.3d at 1347. **Second**, Defendant does not expressly allege lexicography or disclaimer, which are the only two exceptions to the general rule that a term should be construed as having its plain-and-ordinary meaning. *Thorner*, 669 F.3d at 1365.

**Third**, the intrinsic evidence, *i.e.*, the ’940 Patent, which is incorporated into the ’835 Patent, describes that a 90 degree offset is only “typical,” but is not required or mandatory. ’940 Patent at 9:4–8 (“Quadrature-phase (‘Q’) signal: A signal that is out of phase with an in-phase (‘I’) signal. The amount of phase shift is predetermined for a particular application, but in a typical implementation, the ‘Q’ signal is 90° out of phase with the ‘I’ signal.”). More generally, the intrinsic evidence describes that a quadrature-phase signal is a “signal that is out of phase with an in-phase (‘I’) signal.” *Id.* Notably, this passage does not specify a particular amount of phase offset; only that quadrature-phase signal is out of phase with an in-phase signal. *Id.*

**Fourth**, Defendant’s proposed construction improperly attempts to limit the claim scope to the disclosed embodiments. *Liebel-Flarsheim*, 358 F.3d at 913 (“[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only

embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.”). But Defendant does not appear to identify any disclosure—let alone a clear indication in the intrinsic record—that the patentee intended the claim scope to the disclosed embodiments. By contrast, the incorporated ’940 Patent describes that a 90 degree phase offset is merely “typical,” which indicates that the patentee did not intend to limit the claim term to the disclosed embodiments.

*Fifth*, because the intrinsic evidence does not require that the claim term have a 90 degree offset with the in-phase signal, Defendant’s proposed construction violates the principle of claim differentiation. More specifically, adopting Defendant’s proposed construction would improperly exclude dependent Claim 2 from being within the scope of independent Claim 1 because the latter would be limited to phase offsets of exactly 90 degrees while the former would allow for phase offsets that are not exactly 90 degrees (“substantially 90 degrees”). Put simply, under Defendant’s proposed construction, the scope of the independent claim is narrower than the scope of its dependent claim. As such, Defendant’s proposed construction violates the principle of claim differentiation. *Eli Lilly & Co. v. Teva Parenteral Medicines, Inc.*, 845 F.3d 1357, 1371 (Fed. Cir. 2017) (“The doctrine of claim differentiation, however, presumes that dependent claims are ‘of narrower scope than the independent claims from which they depend.’” (quoting *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1242 (Fed. Cir. 2003))).

Therefore, for the reasons described above, the Court finds that the term should be construed according to its plain-and-ordinary meaning.

But given that a jury is unlikely to be familiar with the meaning of this claim term, the Court appends a sentence from the ’940 Patent (“A signal that is out of phase with an in-phase (‘I’) signal.”) to explain the plain-and-ordinary meaning of this term, *i.e.*, plain-and-ordinary meaning,

wherein the plain-and-ordinary meaning is “A signal that is out of phase with an in-phase (‘I’) signal.”

**B. Term #2: “quadrature-phase oscillating signal is out of phase with said in-phase oscillating signal by substantially 90 degrees”**

| Term                                                                                                                                                                                               | Plaintiff’s Proposed Construction | Defendant’s Proposed Construction |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|
| #2: “quadrature-phase oscillating signal is out of phase with said in-phase oscillating signal by substantially 90 degrees”<br><br>U.S. Patent No. 7,292,835, Claim 2<br><br>Proposed by Defendant | Plain-and-ordinary meaning        | Indefinite                        |

**The Parties’ Positions:**

Defendant contends that there are two independent reasons why this term is indefinite: “(1) it involves a term of degree without an objective standard to determine its scope, and (2) it is internally inconsistent and contradicts the scope of claim 1 and the specification.” Opening at 9.

With respect to the former, Defendant contends that “substantially” is a term of degree and that the intrinsic evidence does not provide an objective standard for measuring that degree. *Id.* (citing cases). More specifically, Defendant contends that the specification only describes that the quadrature-phase signal is out of phase by 90 degrees as compared to the in-phase signal. *Id.* at 10 (citing ’835 Patent at 47:27–30, 46:1–4). Defendant contends that this disclosure does not provide any guidance as to the meaning of “substantially 90 degrees.” *Id.*

With respect to the latter, Defendant contends that “substantially 90 degrees” is inconsistent with the specification’s requirement that the quadrature-phase signal is exactly 90

degrees out of phase with the in-phase signal, which renders this term indefinite. *Id.* at 11. Defendant further contends that dependent Claim 2, which recites that the quadrature-phase signal is “substantially 90 degrees” out of phase, is improperly broader than independent Claim 1, which requires that, at least according to Defendant, that the quadrature-phase signal is exactly 90 degrees out of phase. *Id.* Defendant contends that this also renders this term indefinite. *Id.*

In its response, Plaintiff contends that “[i]n cellular/wireless systems, signals are not perfect. And two signals may not be out of phase by exactly 90 degrees. The claim accounts for this reality.” Response at 6 (citing Response, Ex. 7 at ¶¶ 5–6). Plaintiff contends that the Federal Circuit “has held that the term ‘substantially’ does not require strict numerical boundary[.]” *Id.* at 7 (citing cases). Plaintiff contends that “the term ‘substantially,’ as used in this context, denotes approximation.” *Id.*

In its reply, Defendant contends that Plaintiff’s expert declaration is “entitled no weight, as it provides only a vague, unsupported assertion of ‘imperfections in realwor[l]d signal processing.’” Reply at 7. Defendant contends that “the declaration is devoid of any guidance to determine whether a signal falls within the scope of ‘substantially 90 degrees’ (because no such guidance exists in the context of the ’835 patent).” *Id.*

Defendant contends that “any concern that ‘a would-be infringer . . . would assert that it does not infringe, because their offset does not hit exactly 90 degrees’ is properly dealt with under the doctrine of equivalents, not sloppy claim writing.” *Id.* at 8 (internal citations omitted).

To the extent that Plaintiff argues that “substantial” means “approximate,” Defendant contends that “a term is not definite merely because court can ascribe some meaning to a patent’s claims.” *Id.* (citing *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014)) (internal quotations omitted). Rather, Defendant contends that the claim is indefinite because

Plaintiff has not identified the boundaries of the claim, as there “are none in the ’835 patent or elsewhere.” *Id.* at 9. Defendant further contends that “approximate” is another term of degree, which courts have also found to be indefinite. *Id.* (citing cases).

Defendant finally contends that “[a]lthough a strict numerical boundary is not required (nor does [Defendant] suggest it), the definiteness requirement ‘while recognizing that absolute precision is unattainable,’ still “mandates clarity.” *Id.* at 10 (citing *Nautilus*, 572 U.S. at 910).

In its sur-reply, Plaintiff contends that:

the use of the term “substantially” does not automatically render a term indefinite. One must look at the context of the term. Here, given the nature of the invention of the ’835 patent, specifically related to cellular/wireless systems, the term “substantially” is a meaningful modifier that accounts for the reality that two signals may not be out of phase by *exactly* 90 degrees. Accordingly, a POSITA would understand the term “substantially” used in claim 2 denotes approximation.

Sur-Reply at 4–5 (emphasis in Plaintiff’s brief, citations omitted).

With respect to Defendant’s argument that it is more proper for Plaintiff to assert “doctrine of equivalents” in order to overcome “sloppy claim writing,” Plaintiff contends that “the doctrine of equivalents is irrelevant to an analysis of indefiniteness.” *Id.* at 5.

With respect to Defendant’s argument that this claim term is indefinite due to contradictions, Plaintiff contends that Claim 2 is only broader under Defendant’s flawed proposed construction for Term #1. *Id.* By contrast, Plaintiff contends that under its proposed construction for Term #1, independent Claim 1 is broader than dependent Claim 2, which indicates that its proposed construction is correct. *Id.*

### **The Court’s Analysis:**

After reviewing the parties’ arguments and considering the applicable law, the Court agrees with Plaintiff that the term is not indefinite. With respect to Defendant’s former argument (term

of degree), the Court agrees with Plaintiff that the outputs of cellular/wireless systems are not necessarily precise enough to achieve a phase offset of exactly 90 degrees, even if designed to do so. Response, Ex. 7 at ¶¶ 5–6. One reason is that the underlying electrical components, *e.g.*, resistors and capacitors, have tolerances, *e.g.*,  $\pm 10\%$ . *See, e.g., Practical Resistors: Manufacturing Tolerances, Common Values, and Color Codes*, ULTIMATE ELECTRONICS, <https://ultimateelectronicsbook.com/resistor-tolerances-values-color-codes/>, *Capacitor Codes: Capacitor Markings and Tolerance Code Chart*, ARROW, <https://www.arrow.com/en/research-and-events/articles/guide-to-capacitor-codes-and-tolerance-code-chart>; *see also* Response, Ex. 7 at ¶ 6. While components with tighter tolerances may be available, they also may have a higher cost. *Practical Resistors: Manufacturing Tolerances, Common Values, and Color Codes*, ULTIMATE ELECTRONICS, <https://ultimateelectronicsbook.com/resistor-tolerances-values-color-codes/>. Therefore, even when designers attempt to design for a specific goal, *e.g.*, a phase offset of 90 degrees, due to differences in the values of electronic components, a POSITA would understand that the claim language “substantially 90 degrees” accounts for differences in the values of electronic components. Response, Ex. 7 at ¶ 6.

With respect to Defendant’s second argument (it is internally inconsistent and contradicts the scope of claim 1 and the specification), the Court agrees with Plaintiff that the alleged inconsistency and contradiction for Term #2 is based upon adopting Defendant’s proposed construction for Term #1. Because the Court has rejected Defendant’s proposed construction for Term #1, there is no inconsistency and contradiction for Term #2.

Therefore, for at these reasons, the Court concludes that this term is not indefinite.

**Construction:** Because the “heavy presumption” is that terms should be construed according to their plain-and-ordinary meaning and because Defendants does not allege lexicography or disclaimer, which are the only two exceptions to the general rule that a term should be construed as having its plain-and-ordinary meaning, the Court concludes that the term should be construed as having its plain-and-ordinary meaning. *Azure Networks*, 771 F.3d at 1347; *Thorner*, 669 F.3d at 1365.

Therefore, for the reasons described above, the Court finds that the term is not indefinite and should be construed according to its plain-and-ordinary meaning.

**C. Term #3: “coupled”**

| Term                                                                                          | Plaintiff’s Proposed Construction | Defendant’s Proposed Construction                                          |
|-----------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------|
| #3: “coupled”<br><br>U.S. Patent No. 7,292,835,<br>Claims 18, 20<br><br>Proposed by Defendant | Plain-and-ordinary meaning        | “directly connected or connected through a conductor (or a closed switch)” |

**The Parties’ Positions:**

In its response,<sup>2</sup> Plaintiff contends that this term is “straightforward and readily understood by a jury.” Response at 7. Plaintiff contends that Defendant’s proposed construction is “based on the *mistaken* belief that the Court found the plain and ordinary meaning of ‘coupled’ to be ‘directly connected or connected through a conductor (or a closed switch).’” *Id.* at 8 (emphasis in Plaintiff’s brief). Plaintiff contends that the Court’s previous construction of “coupled” in 6-20-cv-00108 was “based on *specific* claim language (and corresponding disclosure) in the ’474 patent that is *not*

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<sup>2</sup> Defendant does not appear to provide any argument for this term in its Opening brief. *See, e.g.*, Opening at 12.

found in the '835 patent.” *Id.* (emphasis in Plaintiff’s brief). Plaintiff further contends that “[t]he Court’s construction of ‘coupled’ was based on the specification’s disclosure related to the *specific* claimed embodiments, not just the term ‘coupled’ in general.” *Id.* (emphasis in Plaintiff’s brief).

In its reply, Defendant contends that the Court previously construed this term and Plaintiff “provides no legitimate basis to vary this Court’s prior construction—indeed, [Plaintiff] undercuts its own position, by incorporating its arguments from the previous case that this Court has already rejected.” Reply at 10.

Defendant contends that the “supposed differences [between the '835 Patent and '474 Patent] do not result in a construction different from the one already reached by the Court.” *Id.* at 11. Defendant first contends that the relevant claim language in both patents recites “switch ... coupled to [a] storage element.” *Id.* (comparing '474 Patent at 85:56–64 *with* '835 Patent at 52:20–24). Defendant next contends that the figures and embodiments in the '474 Patent that Plaintiff points to also appear in the '835 Patent. *Id.*

In its sur-reply, Plaintiff contends that the Court’s prior construction was used in a different context. Sur-Reply at 6. More specifically, Plaintiff contends that “

the Court’s prior construction of ‘coupled’ (which was part of a larger phrase) is based on *specific* claim language (and corresponding disclosure) in the '474 patent. But the '835 patent has no relationship to the '474 patent. And the “coupled” term from the '474 patent is *not* the language of the '835 patent. In particular, the claim language in the '474 patent covered *specific* embodiments where a switch was “coupled” to a storage element and reference potential. The Court provided a very specific construction of “coupled” *for this particular configuration*. The claims at issue here, however, do not have the same configuration.

*Id.* (emphasis in Plaintiff’s brief).

**The Court's Analysis:**

The dispute between the parties essentially boils down to whether the plain-and-ordinary meaning of “coupled” includes indirect connections. The Court concludes that it does not.

Every electrical component in a circuit is necessarily indirectly connected to all other components that it is not directly coupled to. As such, construing “coupled” to include indirect connections would render “coupled” to be meaningless as all components are already indirectly connected to the components that they are not directly connected to. *Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1557 (Fed. Cir. 1995) (“We must give meaning to all the words in [the] claims.”). By contrast, construing “coupled” to only include direct connections gives meaning to the claim language that specifies what two components are coupled together. *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.”).

Therefore, for the reasons described above, the Court concludes that the term should be construed according to its plain-and-ordinary meaning, wherein the plain-and-ordinary meaning of “coupled” is directly connected or connected through a wire (or a closed switch).

**D. Terms with Briefing in Prior Litigations Incorporated by Reference**

| <b>Term</b>                                                                                                      | <b>Plaintiff's Proposed Construction</b>                                                                               | <b>Defendant's Proposed Construction</b>                     |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| “under-sampling”<br><br>U.S. Patent No. 6,049,706,<br>Claims 8, 19<br><br>Proposed by Plaintiff and<br>Defendant | “sampling at an aliasing rate”<br>or “sampling at less than or<br>equal to twice the frequency<br>of the input signal” | “sampling at an aliasing rate<br>using negligible apertures” |
| “harmonic”                                                                                                       | “A sinusoidal component of a<br>periodic wave that has a                                                               | Plain-and-ordinary meaning:                                  |

|                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                            |                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| U.S. Patent No. 6,049,706, Claims 8, 19; U.S. Patent No. 6,266,518, Claims 1, 2<br><br>Proposed by Plaintiff and Defendant                                                                                                                                                                                                                                                            | frequency that is an integer multiple of the fundamental frequency of the periodic waveform and including the fundamental frequency as the first harmonic” | <b>Harmonic:</b> “A sinusoidal component of a periodic wave that has a frequency that is an integer multiple of the fundamental frequency of the periodic waveform” |
| “said control signal comprises a train of pulses having pulse widths that are established to improve energy transfer from said input signal to said down-converted image”<br><br>U.S. Patent No. 6,049,706, Claim 18<br><br>Proposed by Defendant                                                                                                                                     | Plain-and-ordinary meaning                                                                                                                                 | Indefinite                                                                                                                                                          |
| “establishing apertures of said pulses to increase the time that said switch is closed for a purpose of reducing an impedance of said switch”<br><br>U.S. Patent No. 6,049,706, Claims 87, 97<br><br>Proposed by Defendant                                                                                                                                                            | Plain-and-ordinary meaning                                                                                                                                 | Indefinite                                                                                                                                                          |
| “widening apertures of said pulses... by a non-negligible amount that tends away from zero time in duration to extend the time that said switch is closed for a purpose of increasing energy transferred from said input signal” / “widening of said apertures... prevents substantial voltage reproduction of said input signal”<br><br>U.S. Patent No. 6,049,706, Claims 88, 91, 97 | Plain-and-ordinary meaning                                                                                                                                 | Indefinite                                                                                                                                                          |

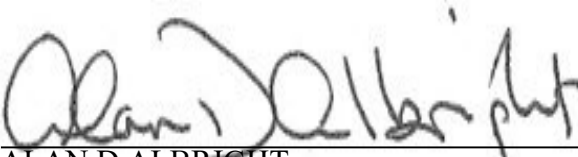
|                                                                                                                                                            |                                                                              |                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proposed by Defendant                                                                                                                                      |                                                                              |                                                                                                                                                                    |
| “low impedance load” / “low impedance loads”<br><br>U.S. Patent No. 6,049,706, Claims 97; U.S. Patent No. 6,266,518, Claim 13<br><br>Proposed by Defendant | Plain-and-ordinary meaning                                                   | Indefinite                                                                                                                                                         |
| “sampling aperture”<br><br>U.S. Patent No. 6,266,518, Claim 19<br><br>Proposed by Plaintiff and Defendant                                                  | “a period of time during which the switch is in its closed (i.e., on) state” | “a period of time during which the switch is in its closed (i.e., on) state as part of the process of reducing a continuous-time signal to a discrete-time signal” |

The parties dispute the constructions for terms that were at-issue in prior litigations. Because the parties do not provide any new reasons for the Court to change its final constructions, the Court adopts the final constructions from the prior litigations to be the final constructions in this case.

#### IV. CONCLUSION

In conclusion, for the reasons described herein, the Court adopts the below constructions as its final constructions.

**SIGNED** this 2nd day of April, 2024.



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ALAN D ALBRIGHT  
UNITED STATES DISTRICT JUDGE

| <b>Term</b>                                                                                                                                                                                               | <b>Plaintiff's Proposed Construction</b>                                                                                              | <b>Defendant's Proposed Construction</b>                                                            | <b>Court's Final Construction</b>                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>#1: "quadrature-phase oscillating signal"</p> <p>U.S. Patent No. 7,292,835, Claims 1, 2, 18</p> <p>Proposed by Defendant</p>                                                                           | <p>Plain-and-ordinary meaning</p> <p>Alternatively: "oscillating signal that is out of phase with an in-phase oscillating signal"</p> | <p>"oscillating signal that is out of phase with the in-phase oscillating signal by 90 degrees"</p> | <p>Plain-and-ordinary meaning, wherein the plain-and-ordinary meaning is "A signal that is out of phase with an in-phase ('I') signal."</p>                   |
| <p>#2: "quadrature-phase oscillating signal is out of phase with said in-phase oscillating signal by substantially 90 degrees"</p> <p>U.S. Patent No. 7,292,835, Claim 2</p> <p>Proposed by Defendant</p> | <p>Plain-and-ordinary meaning</p>                                                                                                     | <p>Indefinite</p>                                                                                   | <p>Not indefinite. Plain-and-ordinary meaning.</p>                                                                                                            |
| <p>#3: "coupled"</p> <p>U.S. Patent No. 7,292,835, Claims 18, 20</p> <p>Proposed by Defendant</p>                                                                                                         | <p>Plain-and-ordinary meaning</p>                                                                                                     | <p>"directly connected or connected through a conductor (or a closed switch)"</p>                   | <p>Plain-and-ordinary meaning wherein the plain-and-ordinary meaning of "coupled" is directly connected or connected through a wire (or a closed switch).</p> |

**Terms with Briefing in Prior Litigations Incorporated by Reference**

| <b>Term</b>                                                                                                                                         | <b>Plaintiff's Proposed Construction</b>                                                                                                                                                                                | <b>Defendant's Proposed Construction</b>                                                                                                                                                               | <b>Court's Final Construction</b>                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>"under-sampling"</p> <p>U.S. Patent No. 6,049,706, Claims 8, 19</p> <p>Proposed by Plaintiff and Defendant</p>                                   | <p>"sampling at an aliasing rate" or "sampling at less than or equal to twice the frequency of the input signal"</p>                                                                                                    | <p>"sampling at an aliasing rate using negligible apertures"</p>                                                                                                                                       | <p>"sampling at an aliasing rate" or "sampling at less than or equal to twice the frequency of the input signal"</p>                                                                                                                                                                          |
| <p>"harmonic"</p> <p>U.S. Patent No. 6,049,706, Claims 8, 19; U.S. Patent No. 6,266,518, Claims 1, 2</p> <p>Proposed by Plaintiff and Defendant</p> | <p>"A sinusoidal component of a periodic wave that has a frequency that is an integer multiple of the fundamental frequency of the periodic waveform and including the fundamental frequency as the first harmonic"</p> | <p>Plain-and-ordinary meaning: <b>Harmonic:</b> "A sinusoidal component of a periodic wave that has a frequency that is an integer multiple of the fundamental frequency of the periodic waveform"</p> | <p>Plain-and-ordinary meaning wherein the plain-and-ordinary meaning is: "A sinusoidal component of a periodic wave that has a frequency that is an integer multiple of the fundamental frequency of the periodic waveform and including the fundamental frequency as the first harmonic"</p> |

| Term                                                                                                                                                                                                                                                     | Plaintiff's Proposed Construction | Defendant's Proposed Construction | Court's Final Construction                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|---------------------------------------------|
| <p>“said control signal comprises a train of pulses having pulse widths that are established to improve energy transfer from said input signal to said down-converted image”</p> <p>U.S. Patent No. 6,049,706, Claim 18</p> <p>Proposed by Defendant</p> | Plain-and-ordinary meaning        | Indefinite                        | Not indefinite. Plain-and-ordinary meaning. |
| <p>“establishing apertures of said pulses to increase the time that said switch is closed for a purpose of reducing an impedance of said switch”</p> <p>U.S. Patent No. 6,049,706, Claims 87, 97</p> <p>Proposed by Defendant</p>                        | Plain-and-ordinary meaning        | Indefinite                        | Not indefinite. Plain-and-ordinary meaning. |

| Term                                                                                                                                                                                                                                                                                                                                                                                                                      | Plaintiff's Proposed Construction | Defendant's Proposed Construction | Court's Final Construction                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|---------------------------------------------|
| <p>“widening apertures of said pulses... by a non-negligible amount that tends away from zero time in duration to extend the time that said switch is closed for a purpose of increasing energy transferred from said input signal” / “widening of said apertures... prevents substantial voltage reproduction of said input signal”</p> <p>U.S. Patent No. 6,049,706, Claims 88, 91, 97</p> <p>Proposed by Defendant</p> | Plain-and-ordinary meaning        | Indefinite                        | Not indefinite. Plain-and-ordinary meaning. |
| <p>“low impedance load” / “low impedance loads”</p> <p>U.S. Patent No. 6,049,706, Claims 97; U.S. Patent No. 6,266,518, Claim 13</p> <p>Proposed by Defendant</p>                                                                                                                                                                                                                                                         | Plain-and-ordinary meaning        | Indefinite                        | Not indefinite. Plain and ordinary meaning. |

| Term                                                                                                                 | Plaintiff's Proposed Construction                                                   | Defendant's Proposed Construction                                                                                                                                         | Court's Final Construction                                                                 |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <p>“sampling aperture”</p> <p>U.S. Patent No. 6,266,518,<br/>Claim 19</p> <p>Proposed by Plaintiff and Defendant</p> | <p>“a period of time during which the switch is in its closed (i.e., on) state”</p> | <p>“a period of time during which the switch is in its closed (i.e., on) state as part of the process of reducing a continuous-time signal to a discrete-time signal”</p> | <p>“a period of time during which the switch is in its closed (<i>i.e.</i>, on) state”</p> |