IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

PARKERVISION, INC., *Plaintiff* **-v-** **HISENSE CO., LTD., HISENSE VISUAL TECHNOLOGY CO., LTD.** *Defendants*	§ § § § § § § § §	**6-20-CV-00870-ADA**
PARKERVISION, INC., *Plaintiff* **-v-** **TCL INDUSTRIES HOLDINGS CO., LTD., TCL ELECTRONICS HOLDINGS LTD., SHENZHEN TCL NEW TECHNOLOGY CO., LTD., TCL KING ELECTRICAL APPLIANCES (HUIZHOU) CO., LTD., TCL MOKA INT'L LTD., TCL MOKA MANUFACTURING S.A. DE C.V.** *Defendants*	§ § § § § § § § § § § § § § § §	**6-20-CV-00945-ADA**

SPECIAL MASTER'S REPORT AND RECOMMENDATION REGARDING CLAIM CONSTRUCTION

Before the Court are the Parties' claim construction briefs: Defendants HiSense Co., Ltd. and HiSense Visual Technology Co., Ltd. (collectively "HiSense") and TCL Industries Holdings Co., Ltd., TCL Electronics Holdings Ltd., Shenzhen TCL New Technology Co., Ltd., TCL King Electrical Appliances (Huizhou) Co., Ltd., TCL Moka Int'l Ltd., TCL Moka Manufacturing S.A. De C.V.'s (collectively "TCL") Opening and Reply briefs (No. 6-20-cv-00870, ECF Nos. 33 and 42, respectively, and No. 6-20-cv-00945, ECF Nos. 33 and 40, respectively) ("Opening" and "Reply," respectively) and Plaintiff ParkerVision, Inc. Response and Sur-Reply briefs (No. 6-20-cv-00870, ECF Nos. 40 and 44, respectively, and No. 6-20-cv-00945, ECF Nos. 38 and 42,

respectively) ("Response" and "Sur-Reply," respectively). United States District Judge Alan D Albright referred these cases to the undersigned on October 25, 2021. No. 6-20-cv-00870, ECF No. 47 and No. 6-20-cv-00945, ECF No. 45. The undersigned provided preliminary constructions for the disputed terms the day before the hearing. No. 6-20-cv-00870, ECF No. 46 and No. 6-20-cv-00945, ECF No. 44. The undersigned held the *Markman* hearing on October 27, 2021. No. 6-20-cv-00870, ECF No. 48 and No. 6-20-cv-00945, ECF No. 46. During that hearing, the undersigned informed the Parties of the final recommended constructions for the disputed terms. *Id.* This Report does not alter any of those constructions.

I. BACKGROUND

Plaintiff asserts U.S. Patent Nos. 6,049,706, 6,266,518, 6,580,902, 7,110,444, 7,292,835, 8,588,725, 8,660,513, 9,118,528, 9,246,736, and 9,444,673. Plaintiff previously asserted these patents in the Western District of Texas against Intel in two cases (6-20-cv-00108, 6-20-cv-00562) and later against LG (6-21-cv-00520). Judge Albright held *Markman* hearings in the Intel cases on January 26, 2021 (-00108) and July 22, 2021 (-00562). Judge Albright previously construed Terms 3, 5–10, and 14-23 below in the prior Intel cases. 6-20-cv-00870,[1] ECF No. 51 at 3–9, 11-16.

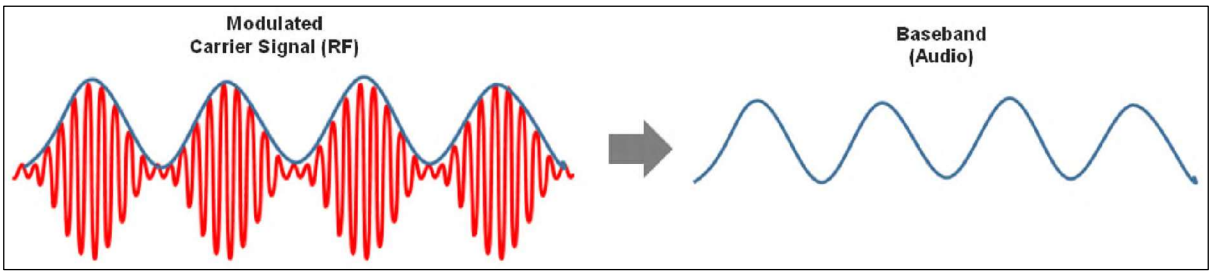
Judge Gilliland held a *Markman* hearing in *LG* case on May 10, 2022. No. 6-20-cv-00520, ECF No. 51. Judge Gilliland entered a *Markman* order and memorandum in support of his claim constructions on June 21, 2022. No. 6:21-cv-00520-ADA, 2022 WL 2240465 (W.D. Tex. June 21, 2022). In that order, Judge Gilliland provided his reasoning for his constructions for two terms (Term #1: "energy storage element" / "energy storage device"/ "energy storage module"/ "storage

[1] For simplicity, all references to the docket entries will be from the -00870 case.

element"/ "storage module" and Term #2: whether "cable modem" in U.S. Patent No. 7,292,835 Patent, Cl. 1 was limiting) and adopted Judge Albright's constructions for 28 other terms (Terms #3 to #30). *Id.* Term #3 in this case corresponds to Term #1 in Judge Gilliland's *Markman* order and memorandum in support thereof.

II. DESCRIPTION OF THE ASSERTED PATENTS

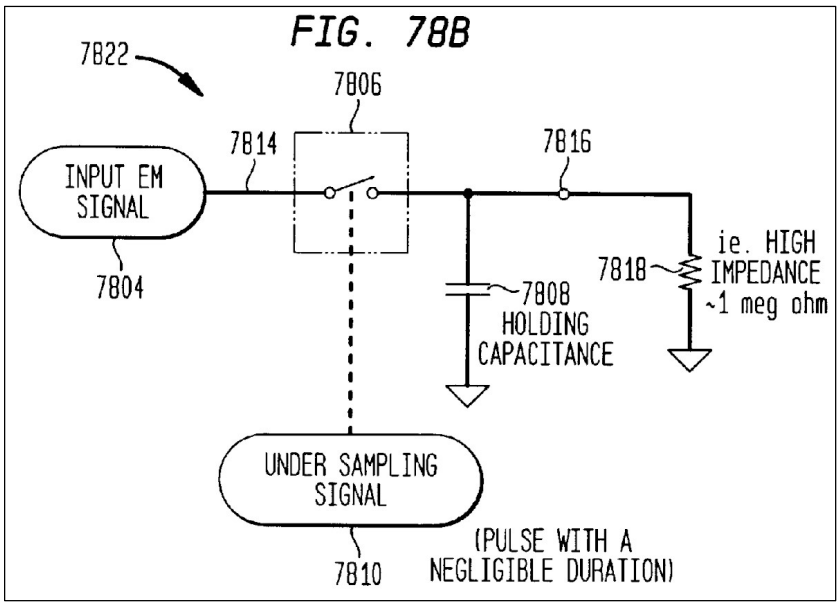
The Asserted Patents describe and claim systems for down-conversion of a modulated carrier signal. '518 Patent at Abstract. Down-conversion is the process of recovering the baseband (audio) signal from the carrier signal after it has been transmitted to and received by the receiver. This process is referred to as "down-conversion" because a high frequency signal is being down-converted to a low frequency signal.

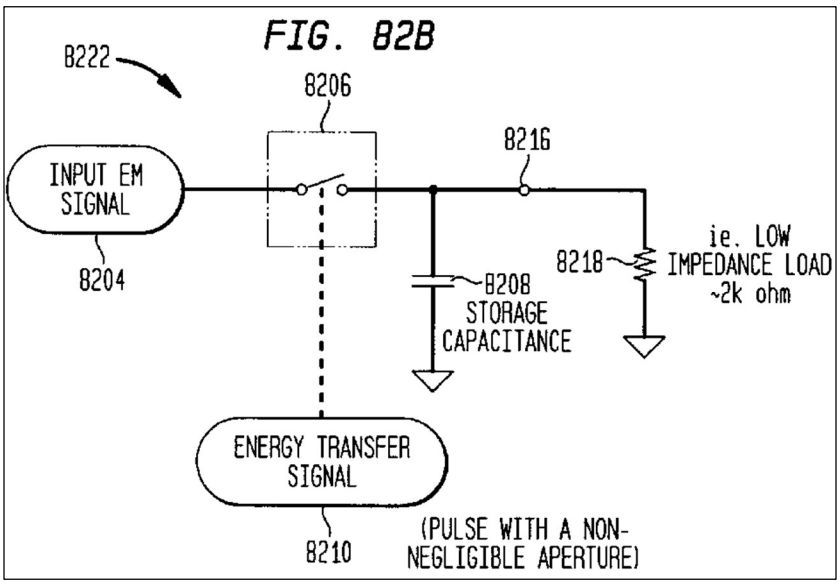


The Asserted Patents disclose at least two types of systems for down-conversion: (1) sample-and-hold (*i.e.*, voltage sampling) and (2) "energy transfer" (also known as "energy sampling"). The key difference between the two is that the former takes a small "sample" of the input signal while the latter 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 Figures 78B and 82B depict that the respective circuits have a 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 Figure 78B and 8206 in Figure 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 Figure 78B and energy transfer signal 8210 in Figure 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] ("ps") for under-sampling 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 ps 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 also 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

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