

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

PARKERVISION, INC.,
Plaintiff,

v.

TEXAS INSTRUMENTS INCORPORATED,
Defendant.

Case No. 6:23-cv-00384-ADA

**DEFENDANT TEXAS INSTRUMENTS
INCORPORATED'S CLAIM CONSTRUCTION BRIEF**

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Plaintiff ParkerVision, Inc. (“ParkerVision” or “Plaintiff”) asserts three patents in this action: U.S. Patent No. 7,496,342 (the “’342 Patent”), U.S. Patent No. 7,865,177 (the “’177 Patent”) and U.S. Patent No. 9,118,528 (the “’528 Patent”) (collectively the “Asserted Patents”). Defendant Texas Instruments Incorporated (“TI” or “Defendant”) hereby submits its opening claim construction brief for the Asserted Patents.

I. INTRODUCTION

TI presents arguments herein for seven claim terms recited in the Asserted Patents. With respect to the ’342 Patent, the parties dispute two claim terms. First, the phrase “controlling a charging and discharging cycle” in asserted method claim 18 means “controlling cycles of charging and then discharging,” as described in the ’342 Patent, where charging occurs only when the switch is closed, and discharging occurs only when the switch is open. Second, ParkerVision’s suggested meaning of “switch” and “switching device” for the claims of the ’342 and ’528 Patents asserted against TI is derived from unrelated ParkerVision patents. ParkerVision’s narrow interpretation requiring an “independent” control input is unsupported or contradicted by the ’342 and ’528 Patents’ own descriptions of the alleged inventions and should be rejected.

With respect to the ’177 Patent, two terms are in dispute. First, ParkerVision proposes construing the term “matched filtering/correlating module” by importing a grab-bag of limitations from various portions of the specification—as well as adding limitations not found in the intrinsic evidence—resulting in a lengthy paragraph of limitations divorced from the claim language and the disclosed embodiments. This term should be given its plain an ordinary meaning. Second, TI addresses the term “first channel down-converted signal.” This term appears in the asserted claim as well as a number of unasserted claims. The limitation is used consistently across those claims, as well as the specification, to describe an I-phase or Q-phase down-converted signal. The term

should be given this meaning.

With respect to the '528 Patent, TI addresses three claim terms. The construction TI proposes for the term “energy storage element” that appears in the '528 Patent has already been adopted by both the Patent Trial and Appeal Board (“PTAB”) and the Federal Circuit. The Federal Circuit mandate for its construction of this term issued on February 5, 2024, and collateral estoppel applies. ParkerVision’s proposed construction ignores this precedent along with a disclosure in the specification that the Federal Circuit held expressly defines the term. TI proposes that another one of the claim terms is indefinite, a position the Middle District of Florida has already adopted, and that ParkerVision has yet to appeal. TI’s proposed construction for “the energy discharged from any given discharge cycle is not completely discharged” should be adopted because it comports with the express disclosures in the specification and the plain and ordinary meaning of this term as it is understood by those of skill in the art.

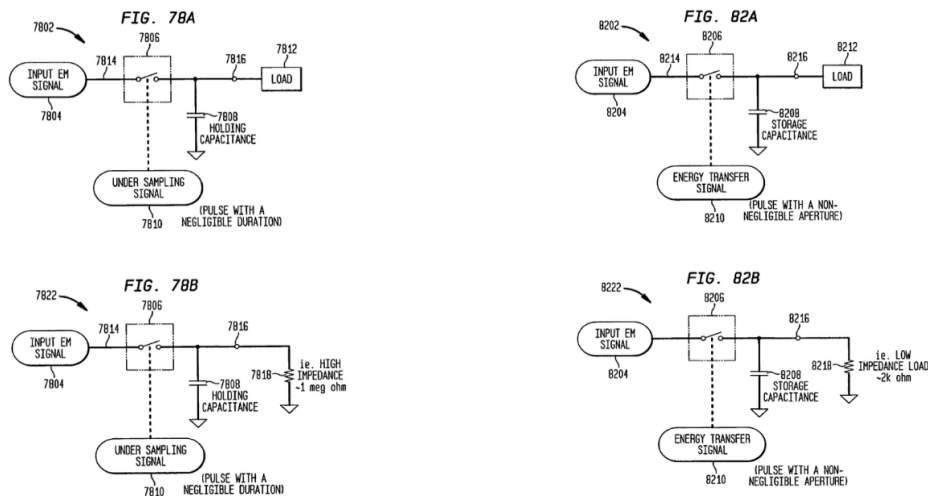
II. BACKGROUND

A. The Asserted Patents

Wireless devices, such as computers and cellular phones, exchange information by transmitting and receiving electromagnetic signals. These signals are communicated from one device’s transmitter to another device’s receiver. Before transmission, information (e.g., voice information of a telephone call) exists as a “baseband signal,” which has a relatively low frequency. However, due to their relatively low frequencies, baseband signals cannot, as a practical matter, be transmitted wirelessly from one device to another. Instead, a baseband must be “imprinted” or “modulated” onto a higher frequency radio-frequency (RF) signal – called a “carrier” signal – that can be transmitted more easily. The carrier signal “carries” the baseband signal through the air from one device to another device.

When that high-frequency carrier signal is received by an electronic device, the receiving device must then “down-convert” the signal back to the low-frequency baseband signal, so that the device can process the transmitted data. The claims of the Asserted Patents focus on devices for receiving carrier signals transmitted from another device. Specifically, the Asserted Patents are directed to systems and methods for performing down-conversion, a process for converting a high-frequency carrier signal to a low-frequency baseband signal that can be processed by a mobile device.

The claims of the Asserted Patents recite structures and methods for performing down-conversion. Figures 78A-B, and Figures 82A-B of the '528 Patent, for example, show schematic devices for receiving a high-frequency RF signal and down-converting it to baseband:



'528 Patent, Figs. 78A and 82A. The RF signal is first processed by a switch (7806 and 8206). The switch can be “open” or “closed.” When the switch is open, the RF signal does not flow through the switch. When it is closed, the RF signal flows unimpeded through the switch. After the RF signal flows through the switch, it reaches the capacitor or storage element (**7808 and 8208**), which stores energy in a circuit. The signal from the storage element is then amplified by a differential amplifier, which is an electronic component that receives two input signals, determines

the difference in magnitude between the signals, and amplifies – i.e., increases the magnitude of – that difference. The combination of these components operates to down-convert a modulated carrier signal.

B. Overview of the Disputed Terms

1. The '342 Patent

The parties dispute the construction of two terms in the '342 Patent: (1) “controlling a charging and discharging cycle” and (2) “switching device.”¹ Asserted independent claim 18 recites both terms:

18. A method for down-converting an electromagnetic signal, comprising the steps of:

- (1) receiving an information signal;
- (2) inverting the information signal to generate an inverted information signal;
- (3) electrically coupling the information signal to a first capacitor and the inverted information signal to a second capacitor;
- (4) **controlling a charging and discharging cycle** of the first and second capacitors with first and second **switching devices** electrically coupled to the first and second capacitors, respectively; and
- (5) performing a plurality of charging and discharging cycles of the first and second capacitors to generate first and second down-converted information signals across first and second impedance devices, respectively;

wherein the information signal is used to store a charge on the first capacitor when the first **switching device** is closed and the inverted information signal is used to store a charge on the second capacitor when the second **switching device** is closed. (emphasis added).

2. The '177 Patent

The parties dispute the construction of 2 terms in the '177 Patent: (1) “matched filtering/correlating module;” and (2) “first channel down-converted signal.” Asserted independent claim 14 recites both terms:

¹ A similar term, “switch,” also appears in the asserted claims of the '528 Patent. Although the '342 and '528 Patents do not share the same specification, both terms are briefed in connection with the '342 Patent in this case pursuant to the Court’s Standing Order.

14. A method for down-converting an electromagnetic signal, comprising:

receiving an input signal at a first **matched filtering/correlating module**;

down converting said input signal at said first **matched filtering/correlating module** according to a first control signal and outputting a first down-converted signal;

receiving said input signal at a second **matched filtering/correlating module**;

down-converting said input signal at said second **matched filtering/correlating module** according to a second control signal and outputting a second down-converted signal; and

combining said second down-converted signal and said first down-converted signal to output a **first channel down-converted signal**. (emphasis added).

3. The '528 Patent

The parties dispute the construction of three terms in the '528 Patent: (1) “energy storage element”; (2) “the energy discharged from any given discharge cycle is not completely discharged”; and (3) “a second differential amplifier circuit that combines said down-converted quadrature-phase baseband signal portion with said down-converted differential quadrature-phase baseband signal portion and outputs a second channel down-converted baseband signal.” As recited in claim 1,

1. A system for frequency down-converting a modulated carrier signal to a baseband signal, comprising:

a first **switch** coupled to a first control signal which comprises a sampling aperture with a specified frequency, wherein the first **switch** is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal as an output of said first **switch** during the sampling aperture of the first control signal;

a first **energy storage element** that stores the transferred energy from the modulated carrier signal and outputs a down-converted in-phase baseband signal portion of said modulated carrier signal;

a second **switch** coupled to a second control signal which comprises a sampling aperture with a specified frequency, wherein the second **switch** is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal as an output of said second **switch** during the sampling aperture of the second control signal;

a second **energy storage element** that stores the transferred energy from the modulated carrier signal and outputs a down-converted inverted in-phase baseband

signal portion of said modulated carrier signal;
wherein the portions of transferred energy from each of the first and second **switch** are integrated over time to accumulate said portions of transferred energy from which said down-converted in-phase baseband signal portion and said down-converted inverted in-phase baseband signal are derived; and
a first differential amplifier circuit that combines said down-converted in-phase baseband signal portion with said down-converted inverted in-phase baseband signal portion and outputs a first channel down-converted differential in-phase baseband signal. (emphasis added).

Claim 9 of the '528 Patent depends from Claims 8 and 1, and comprises the system of Claim 1 such that: "for each respective storage element, the energy discharged during any given discharge cycle is not completely discharged, with the remaining undischarged energy from the given discharge cycle becoming an initial condition for the next charging cycle."

Claim 19 of the '528 Patent depends from Claim 1, and further comprises third and fourth switches and storage elements:

19. The system of claim 1, further comprising:
a third **switch** coupled to a third control signal which comprises a sampling aperture with a specified frequency, wherein the third **switch** is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal as an output of said third **switch** during the sampling aperture of the third control signal;
a third **energy storage element** that stores the transferred energy from the modulated carrier signal and outputs a down-converted quadrature-phase baseband signal portion of said modulated carrier signal;
a fourth **switch** coupled to a fourth control signal which comprises a sampling aperture with a specified frequency, wherein the fourth **switch** is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal as an output of said fourth **switch** during the sampling aperture of the fourth control signal;
a fourth **energy storage element** that stores the transferred energy from the modulated carrier signal and outputs a down-converted differential quadrature-phase baseband signal portion of said modulated carrier signal;
wherein the portions of transferred energy from each of the third and fourth **switch** are integrated over time to accumulate said portions of transferred energy from which said down-converted quadrature-phase baseband signal portion and said down-converted differential quadrature-phase baseband signal portion are derived; and
a second differential amplifier circuit that combines said down-converted quadrature-phase baseband signal portion with said down-converted

differential quadrature-phase baseband signal portion and outputs a second channel down-converted differential quadrature-phase baseband signal.
(emphasis added).

III. DISPUTED CLAIM TERMS

A. The '342 Patent

1. “controlling a charging and discharging cycle”

Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“controlling a charging and discharging cycle” '342 Patent, claim 18	Plain-and-ordinary meaning	controlling a cycle of charging and then discharging

The phrase “controlling a charging and discharging cycle” in asserted method claim 18 means “controlling cycles of charging and then discharging.” As the '342 Patent makes clear, this interpretation “stays true to the claim language and most naturally aligns with the patent’s description of the invention”, and thus is, “in the end, the correct construction.” *Tr. of Columbia Univ. of N.Y. v. Symantec Corp.*, 811 F.3d 1359, 1366 (Fed. Cir. 2016) (quoting *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

The '342 Patent’s description of the invention repeatedly describes the “charging” and “discharging” portions of the cycle recited in method claim 18 as separate and distinct events, with “charging” occurring when a switch is closed and “discharging” occurring when the switch is opened. “[E]ven when guidance is not provided in explicit definitional format, the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents.” *Symantec*, 811 F.3d at 1364 (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1320-21 (Fed. Cir. 2005) (en banc)). “[T]he patentee’s choice of preferred embodiments can shed light on the intended scope of the claims.” *Id.* (collecting cases). In the '342 patent specification, the alleged invention is always either charging or discharging, and never simultaneously both charging and discharging. In the section entitled “EXAMPLE METHOD

EMBODIMENT OF THE INVENTION” (*see* ’342 Patent, col. 49:27–28), for example, the ’342 Patent specification distinguishes between (1) when the switching device is closed so that a “charging cycle” “causes a charge to be stored on capacitor 1604” (*see id.*, cols. 49:67-50:11), and (2) “[d]uring a period of time” that the switching device is open, “a percentage of the total charge stored on capacitor 1604 is discharged” (*see id.*, col. 50:12–15).

The remainder of the ’342 Patent’s written description is also consistent with TI’s proposed construction, with “charging” occurring during the aperture when a switch is closed and “discharging” occurring when the switch is open. “FIG. 60 illustrates an example charge/discharge timing diagram according to an embodiment of the present invention.” ’342 Patent, col. 5:25–27. “FIG. 60 illustrates an example charge/discharge timing diagram for the capacitor C_s , where the capacitor C_s **charges during** the apertures A, and **discharges between** the apertures A.” *Id.*, col. 42:58–61 (emphases added).

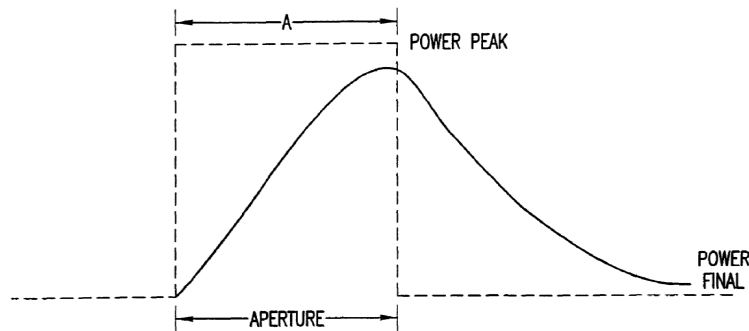


FIG. 60

“After the switch is opened, the final voltage that occurred at the sampling instance $t \cong T_A$ becomes an initial condition for a **discharge cycle** across R_L 5804. The **discharge cycle** possesses the following response: $V_D = \frac{V_A \cdot e^{-\frac{t}{R_L C}}}{R_L C} u(t - T_A)$ (single event discharge) ... Of course, if the capacitor 5806 does not completely discharge, there is an initial condition present for the next

acquisition cycle,” *id.*, col. 42:40–54 (emphases added), when the aperture opens again for the charging cycle. *See id.*, col. 42:27–39 (analyzing conditions that are “valid over the acquisition aperture”). Consequently, for example, “[w]hen switching device 1808 is opened, both capacitor 1804 and capacitor 1806 *begin to discharge*.” *Id.*, col. 23:39–40 (emphasis added).

As the foregoing makes clear, charging occurs only when the switch is closed, and discharging occurs only when the switch is open.

2. “switching device” (’342 Patent)/“switch” (’528 Patent)

Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“switching device” (’342 patent, claims 18, 19, 20, 21); “switch” (’528 patent, claims 1, 5, 8, 17, 18, 19, 23, 26, 35, 36)	Plain-and-ordinary meaning wherein the plain-and-ordinary meaning is “an electronic device for opening and closing a circuit as dictated by an independent control input”	No construction necessary/ Plain and ordinary meaning, or if construction is necessary, an electronic device which opens and closes to break or complete an electrical path in a circuit

ParkerVision’s suggested meaning of “switch” and “switching device” for the claims of the ’342 and ’528 Patents asserted against TI is legally incorrect. To the extent any interpretation of these terms is necessary, ParkerVision’s proposal—which is narrower than the definition of “switch” found in general purpose and technical dictionaries—is derived from unrelated ParkerVision patents that are not what patents need to be construed here. While it is possible that a narrow interpretation might have been appropriate for those other patents (which have different specifications and claims), it is inappropriate for the patents asserted against TI here. ParkerVision’s construction would exclude embodiments described in the ’342 Patent and appears to contradict the claims and specification of the ’528 Patent. There is no support for such a drastic interpretation in the claims, specification, or prosecution history.

ParkerVision is likely to argue that prior constructions are controlling. But those constructions arise from an order construing U.S. Patent No. 6,091,940. *See* Ex. A (ECF 381,

Order, *ParkerVision, Inc. v. Qualcomm, Inc.*, No. 6:14-cv-687-Orl-40LRH (M.D. Fla. Apr. 29, 2020)) at 24-32. The '940 patent specification (Ex. B) differs substantially from the '342 and '528 Patents in *this* case, and the '342 and '528 Patents are not related to the '940 Patent or each other: they are not continuations, divisionals, or continuations-in-part of the '940 Patent. It is error to look to the '940 Patent to construe “switch” and “switching device” in the unrelated '342 and '528 Patents. *See Tex. Digit. Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1211 (Fed. Cir. 2002) (holding that such an unrelated patent “sheds no light” on claim interpretation in a commonly owned patent despite common inventorship and similar subject matter); *Abbott Labs. v. Dey, L.P.*, 287 F.3d 1097, 1105 (Fed. Cir. 2002) (holding that estoppel did not apply despite common assignee and common inventor). This Court should return to first principles for the '342 and '528 Patents.

A lay jury can easily understand what a “switch” and “switching device” are. But if any construction is required, these terms provide good examples of the Federal Circuit’s *en banc* observation that “[i]n some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips*, 415 F.3d at 1314. As general purpose and technical dictionaries attest, a “switch” or a “switching device” in the '342 and '528 Patents is an “electronic device which opens and closes to break or complete an electrical path in a circuit.” *See, e.g.*, Exs. C at PA_004167 (“A mechanical, electrical or electronic device which opens or closes circuits, completes or breaks an electrical path, or selects paths or circuits.”), D at PA_004188 (“*n.* ... 5. *Elect.* A device for breaking or opening an electric circuit or for diverting current from one conductor to another.”); *see also* Exs. E at PA_004180 (defn. 1), F at PA_003855 (defn. 1), G at PA_004113 (defn. 1), H at PA_004194 (defn. 4), I at PA_004206 (defn. 5).

ParkerVision’s suggested reading proposes that a control input which is supposed to be “independent” dictates the operation of the switch, but nothing in ParkerVision’s definition explains what the control signal is independent of. Thus, ParkerVision’s definition *introduces* ambiguity when there is none. The claims do not require an “independent” control input. “To begin with, the context in which a term is used in the asserted claim can be highly instructive.” *Phillips*, 415 F.3d at 1314. “Other claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term.” *Id.* The asserted claims of the ’342 Patent do not recite *any* control input for the “switching device,” much less one that is independent (whatever that means); instead, the claims speak only of what the *switching device* controls when it is in an open or closed state. *See, e.g.*, ’342 Patent, Claims 18 (“first and second switching devices electrically coupled to the first and second capacitors, respectively”), 19 (“during a period of time that the first switching device is open”). The unasserted claims of the ’342 Patent mention only that each “switching device” has “a first, second, and third port” and can be a transistor, FET, JFET, or MOSFET. *See* ’342 Patent, Claims 1, 7-10. Similarly, the claims of the ’528 patent recite up to four distinct “control signal[s],” each corresponding to a switch, but these signals are not required to be independent of other claim features. *See* ’528 Patent, Claims 1, 7, 8, 10, 19, 25, 26, 28. In fact, to the extent the control signals for the switches recited in the ’528 Patent claims all have implied differential and/or in-phase/quadrature phase relationships, they can be viewed as *dependent* on each other. For example, the first and second control signals are used to obtain a “down-converted in-phase baseband signal” and “an inverted down-converted in-phase baseband signal,” respectively (*see* ’528 Patent, Claim 1), while the third and fourth control signals are used to obtain a “down-converted quadrature-phase baseband signal” and a “down-converted differential quadrature-phase baseband signal,” respectively (*see id.*, Claim 19).

The patent specifications of the two patents to be construed – the '342 and the '528 – also do not show an intention to adopt ParkerVision's narrow interpretation requiring an "independent control input." "The specification is 'the single best guide to the meaning of a disputed term,' and that the specification 'acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication.'" *Phillips*, 415 F.3d at 1321 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *see also Winans v. Denmead*, 56 U.S. 330, 338-39 (1853) (construing claims by considering the "structure or device, described by the patentee, as embodying his invention", the "mode of operation" of the structure or device, the "results ... attained by means of this mode of operation", and whether the "claim cover[s] the described mode of operation by which the result is attained"), *cited in Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 382 (1996). The '342 and '528 Patent specifications do not expressly define a "switch" or "switching device" to require an "independent" control input, and nothing in the specifications implies such a requirement. On the contrary, the '342 Patent specification includes embodiments where a switch's operation *depends* on an information signal being up-converted by that switch. *See* '342 Patent, col. 2:17-30. The '528 Patent specification's lengthy disclosure of a "switch module" does not mention an "independent" control input. *See* '528 Patent, cols. 62:59–63:26 & Figs. 28A–D. The '528 Patent specification also explains that the switches operate *dependently* on each other when they differentially sample in-phase/quadrature components of a complex received information signal. *See, e.g.*, '528 Patent, cols. 119:10-121:40 (describing differential embodiments), 120:65-121:5 ("In specific alternative embodiments, the present invention is implemented using a plurality of gated transfer modules controlled by *a common energy transfer signal* with a storage module coupled between the outputs of the plurality of gated transfer modules. For example, FIG. 99 illustrates a differential

system 9902 that includes first and second gated transfer modules 9904 and 9906, and a storage module 9908 coupled between.”) (emphasis added), 176:37–179:52 (describing “Example I/Q Modulation Receiver Embodiment”), 191:41–50 (“The present invention can serve as a quadrature down converter”).

Because ParkerVision’s proposed construction is unsupported or contradicted by the patents’ own descriptions of the alleged inventions, it should be rejected.

B. The ’177 Patent

1. “matched filtering/correlating module”

Claim Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“matched filtering/correlating module” (’177 Patent Claim 14)	“linear time-variant circuitry that samples a modulated RF (radio frequency) carrier signal at an aliasing rate using a switch with an independent control input driven by a control signal with a non-negligible, periodic aperture, such that the samples, having nonnegligible available energy, are accumulated and transferred to a load while the switch is closed and discharged through the load while the switch is open, thereby transferring available real power from the modulated RF carrier signal to the load and producing a downconverted signal with enhanced signal-to-noise power ratio”	No Construction Necessary/Plain-and-ordinary meaning

As observed above, the “construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Tr. of Columbia Univ. of N.Y.*, 811 F.3d at 1366. Here, the plain-and-ordinary

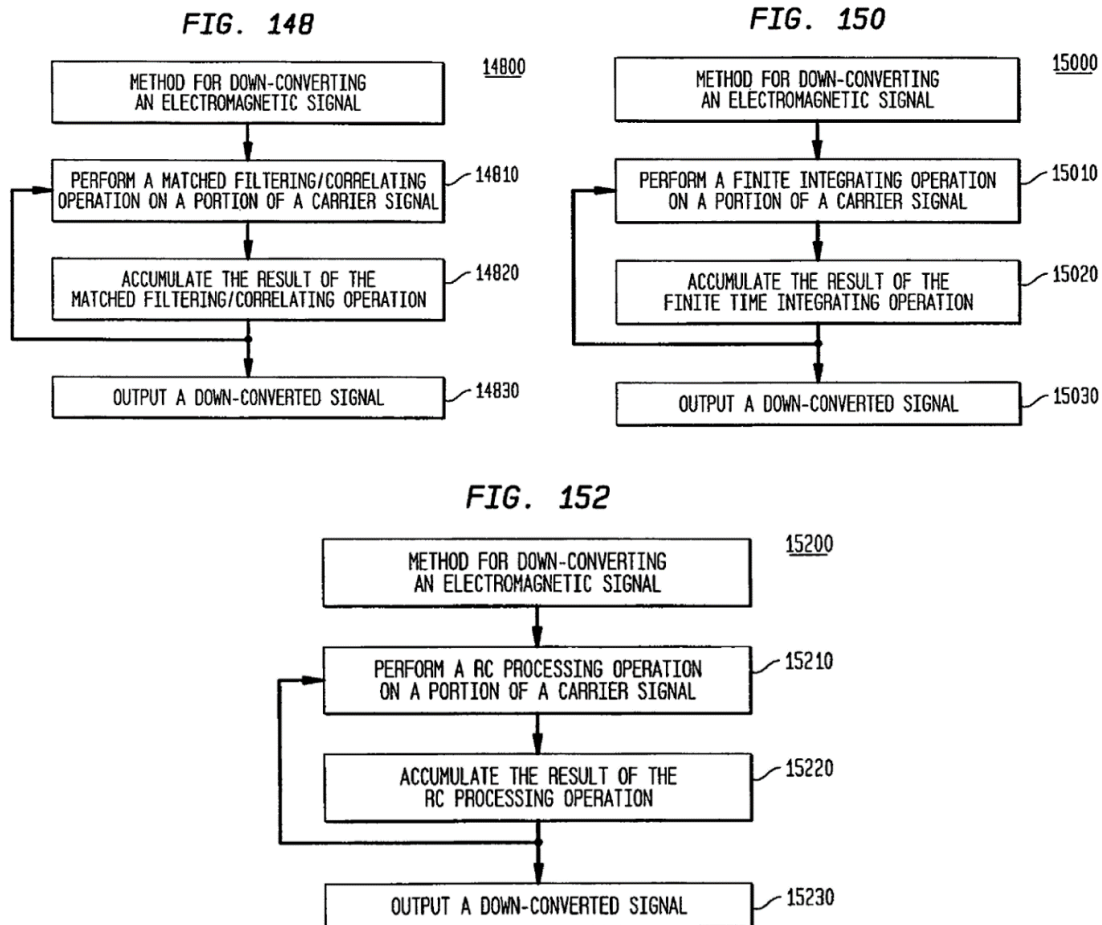
meaning of the terms matched filtering/correlating module—i.e., a module that performs matched filtering or correlating operations—stays true to the claim language and naturally aligns to the description in the specification. In contrast, ParkerVision’s proposal strays wildly from the language in claims and the specification, and fails to capture the meaning of the disputed term.

While the ’177 Patent does not use the phrase “matched filtering/correlating module” outside of the claims, it does often refer to a “matched filtering/correlating operation,” a “matched filtering/correlating processor,” “a matched filtering or correlating operation,” “the matched filtering/correlating process,” a “matched filtering/correlating system,” and “a Matched Filtering/Correlating Characterization/Embodiment of the Invention.” See ’177 Patent, col. 10:42-46, 18:65-67, 19:10-11, 130:23-142:42; Figs. 148, 149, 150, 151, 152, 153. Each of these are embodiments of a “matched filtering/correlating module.” Notably, across this substantial disclosure, describing multiple embodiments, the consistent characteristic of the described invention is that the system, or processor, or process, or embodiment “down-convert an electromagnetic signal by repeatedly performing a matched filtering or correlating operation on a received carrier signal.” *Id.*, col. 130:22-25.

The plain meaning of the term would further have been obvious to a person of ordinary skill in the art at the time of the invention. As acknowledged in the ’177 Patent specification, the invention was a “specific application of matched filter theory, sampling theory and frequency domain techniques.” *Id.*, col. 130:4-8. While the ’177 Patent claims that the specific application of the theory “is not taught or suggested in the present literature,” it does not dispute that matched filtering and correlating were well known in the art. *Id.*, col. 130:8-9.

In fact, the ’177 Patent provides for three specific embodiments of methods for “down-converting an electromagnetic signal using a matched/filtering correlating operation” in Figures

148, 150, and 152 (reproduced below):



'177, col. 131:14-16; 132:51-53; 133:59-61. Notably, each of these embodiments provides a different example system for implementing the matched filtering/correlating operation, with the common characteristic being that “a matched filtering/correlating operation is performed on a portion of a carrier signal,” “the result of the matched filtering/correlating operation ... is accumulated, preferably in an energy storage device[,]” and that these steps “are repeated for additional half cycles of the carrier signal.” *Id.*, col. 131:17-44; 132:54-133:14; 133:62-134:22. As illustrated in the '177 Patent, each of the systems for implementing these embodiments is different:

FIG. 149

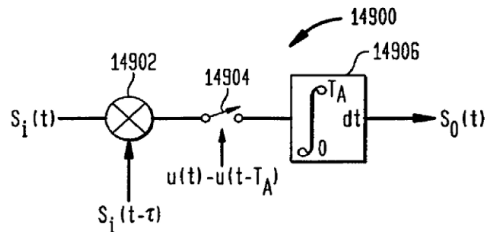


FIG. 151

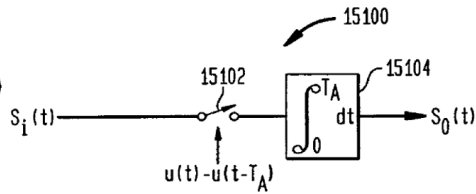
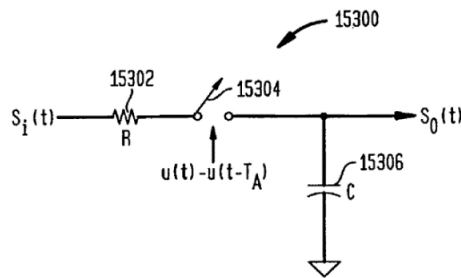


FIG. 153



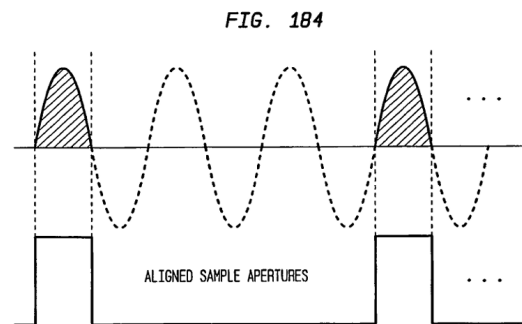
'177 Patent, Figs. 149, 151, 153. While each of these systems in these embodiments shares the common characteristics of performing matched filtering/correlating operations, they do not share the same structure. Thus, the plain and ordinary meaning of the term is closest to the language of the claims and the description in the specification.

In contrast, ParkerVision seeks to import limitations unrelated to matched filtering or correlating operations, and that are not necessarily shared across the disclosed embodiments.

First and foremost, ParkerVision's proposed construction is entirely divorced from the language of the claims—nothing in ParkerVision's construction recites the core characteristics of performing matched filtering or correlating operations. As described in the embodiments above, a matched filtering/correlating operation requires repeating the steps of 1) performing a matched filtering/correlating operation on a portion of a carrier signal, and 2) accumulating the results of the matched filtering correlating operation. *See also id.*, col. 131:14-16; 132:51-53; 133:59-61.

ParkerVision instead proposes a construction that simply requires sampling a signal and

then accumulating those samples. But merely sampling a signal is not performing a matched filtering/correlating operation. In contrast, the specification is clear in describing embodiments “of the present invention [that] down-convert an electromagnetic signal by repeatedly performing a matched filtering or correlating operation on a received carrier signal” as “operat[ing] on or near approximate half cycles (e.g., $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, etc.) of the received signal.” *Id.*, col. 130:23-27. This is illustrated in figure 184 of the '177 Patent:



This matching—or correlating—the sample apertures with the input signal is the point of the invention, because it allows the matched filtering/correlating operation to capture the energy of the signal as opposed to the energy of the noise. If the sampling aperture were not correlated with the input signal, the sampling windows would drift and the accumulated input signal would include both positive and negative portions of the waveform, canceling out the input signal and accumulating zero energy from the input, as illustrated below.

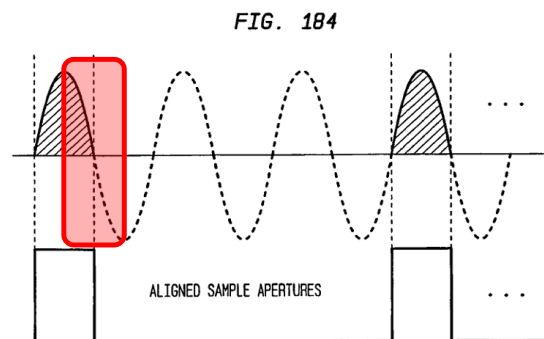


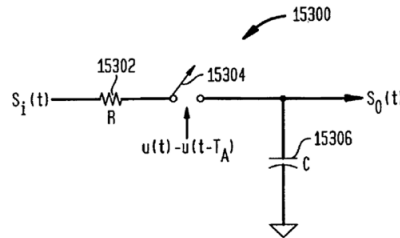
Fig. 184 (Annotated)

ParkerVision’s failure to capture the key language and concept of the very limitation they seek to construe is fatal to its construction.

While ParkerVision broadens the core concept of this term into something entirely divorced from matched filtering or correlating operations, it simultaneously adds narrowing limitations that read out embodiments from the specification. As an example, ParkerVision seeks to add a limitation that the “matched filtering/correlating module” samples a “modulated RF (radio frequency) carrier signal.” ParkerVision appears to be artificially narrowing the claim by importing the requirement that the “matched filtering/correlating module” samples a modulated RF carrier signal from two specific embodiments. First, the claim itself does not require a modulated RF carrier signal. Rather, the claim specifically recites “receiving an input signal at a first matched filtering/correlating module”. *Id.*, claim 14. Even if the Court were to consider the preamble of the claim limiting—which has not been proposed by either party—that merely recites “an electromagnetic signal.” *Id.* In fact, the only use of “modulated RF input signal” in the ’177 Patent comes from specific I/Q modulation receiver embodiments. *Id.*, col. 177:65-184:2. There is no reason to limit the claims to require a “modulated RF (radio frequency) carrier signal.”

ParkerVision further adds limitations that the switch of the matched filtering/correlating module be operated such that “samples, having nonnegligible available energy, are accumulated and transferred to a load while the switch is closed and discharged through the load while the switch is open.” Notably, ParkerVision’s proposed construction would require the load be part of a matched filtering/correlating module. Presumably, ParkerVision seeks to capture the capacitor in the embodiment illustrated in Figure 153 as the load to which the energy is transferred:

FIG. 153



Id., Fig 153. Notably, however, the other embodiments of systems that perform matched filtering/correlating operations do not expressly include a load to which the energy is transferred and accumulated:

FIG. 149

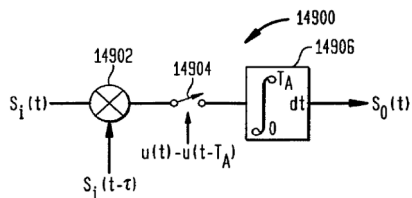
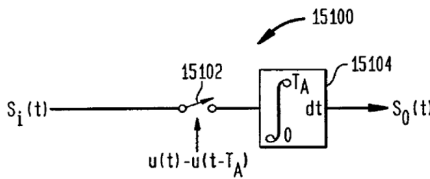


FIG. 151



The '177 Patent does not describe the integrators 14906 or 15a04 accumulating samples, but rather integrating the output of the accompanying switch. *Id.*, col. 132:10-12; 133:37-40. Again, this is a fatal flaw in ParkerVision's construction because it reads out multiple embodiments in the patent specification.

Next, ParkerVision adds the limitation that the "matched filtering/correlating module" transfers "available real power from the modulated RF carrier signal to the load." First, "available real power is not a term that appears anywhere in the '177 Patent, nor is TI aware of any general accepted meaning of the term. Moreover, as illustrated in annotated Figure 184 below, ParkerVision's construction would transfer zero power in circumstances in which the sampling aperture is not correlated with the input signal.

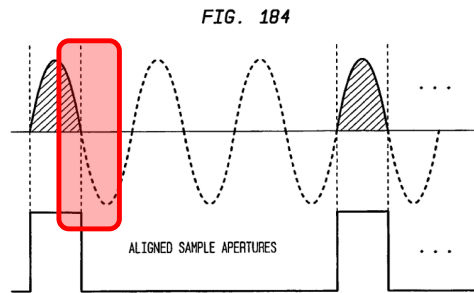


Fig. 184 (Annotated)

This further illustrates how ParkerVision’s proposed construction is divorced from the claims and the specification.

ParkerVision’s prolix and improper construction strays far from the claim language and the description in the specification. The terms are readily understandable without further construction.

2. “first channel down-converted signal”

Claim Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“first channel down-converted signal” (’177 Patent Claim 14)	Plain-and-ordinary meaning	“An I-phase down-converted signal or a Q-phase down-converted signal”

The parties’ dispute ultimately turns on one key question—should the term “channel” in the claim limitation “first channel down-converted signal” be given the construction provided in the specification of the ’177 Patent consistent with the terms used in the other claims of the patent, or should the jury be left without any guidance.

The ’177 Patent does not use the term channel—in reference to electromagnetic signals as in claim 14—in the ordinary sense of the term, but to describe different phases of an electromagnetic information signal. In describing the known prior art, the specification discusses the benefits of propagating “EM signals at higher frequencies,” including the ability for “multiple channels of baseband signals” to be communicated. ’177 Patent, col. 2: 7-12. The specification

further describes the two discrete channels—I-channel and Q-channel—in the portion of the specification titled “III. Energy Transfer/4.4 Optimized Switch Structures” and “4.5 Example I and Q Implementations.” *See id.*, col. 18:27-35; 113:18-114:21. As described by the ’177 Patent, and as understood by a person of ordinary skill in the art, the I-channel (or in-phase) oscillating signal and the Q-channel (or quadrature) oscillating signal “are approximately 90° out of phase.” *Id.*, col. 113:59-64.

The ’177 Patent goes on to describe a “Single Channel Receiver Embodiment,” in which the single channel “correspond[s] to either the I or Q channel of [an] I/Q modulation receiver”. *Id.*, col. 183:61-64. The more general I/Q modulation receiver is described just above this embodiment, and the I/Q modulation receiver uses a “First Processing module” to down convert “the I-phase signal portion of amplified input I/Q signal,” and a “Second Processing module” to down convert “the inverted I-phase signal portion of amplified input I/Q signal.” *Id.*, col. 177:65-178:63. It then uses a “first differential amplifier” to subtract “inverted I output signal” from “I output signal” to output the “I baseband output signal.” *Id.*, col. 179:33-36. Similarly, the receiver uses “Third” and “Fourth Processing module[s]” to down convert “Q-phase” and “inverted Q-phase signal portion[s]” of the input I/Q signal. *Id.*, col. 179:34-180:26. Finally, the receiver uses a “second differential amplifier” to subtract the “inverted Q output signal” from the “Q output signal” to output the “Q baseband output signal.” *Id.*, col. 180:62-181:1. This is entirely consistent with TI’s construction.

Finally, other unasserted claims of the ’177 Patent support TI’s construction. Independent claims 1 and 14 both use the term “first channel down-converted signal.” *See id.*, claims 1, 14. Claim 5, which depends on claim 1, further adds a “second channel down-converted signal.” *Id.*, claim 5. Finally, dependent claim 12, which depends on claims 1 and 5, recites the following

limitation: “wherein said first channel down-converted signal comprises an I-phase information signal portion of said RF I/Q modulated signal, and wherein said second channel down-converted signal comprises a Q-phase information signal portion of said RF I/Q modulate signal.” *Id.*, claim 12. Claim 12 once again confirms that a first (or second) channel down-converted signal can be either an I-phase down-converted signal or a Q-phase down-converted signal.

C. The ’528 Patent

1. “energy storage element”

Claim Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“energy storage element” (’528 Patent Claim 1)	“an element of an energy transfer system that stores non-negligible amounts of energy from an input EM signal”	“an element of a system that stores non-negligible amounts of energy from an input EM signal”

ParkerVision proposes a construction for “energy storage element” that the PTAB and the Federal Circuit considered and rejected for an almost identical term in another ParkerVision patent with a specification identical to the ’528 Patent which Intel petitioned for *Inter Partes* Review (the “Intel IPR”). That construction attempts to modify the definition of “storage element” provided in the ’528 Patent disclosure by requiring the “storage element” to be part of an “energy transfer system.” There is no support for this construction in the Patent. Further, the Federal Circuit has ruled that a disclosure that also appears in the identical ’528 Patent specification expressly defines “storage element” as “systems that store non-negligible amounts of energy from an input EM signal.” *ParkerVision, Inc. v. Vidal*, 88 F.4th 969, 976-77 (Fed. Cir. 2023). That holding applies with equal force here because the specifications of the two patents are identical, and there is no meaningful distinction between these two claim terms. “Energy storage element” should be construed in accordance with the express definition provided in the specification. *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009) (“When a patentee

explicitly defines a claim term in the patent specification, the patentee’s definition controls.”); *Honeywell Props. Int’l v. ITT Indus.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006) (“The public is entitled to take the patentee at his word”).).

The specification states that the “goal of the storage modules” is “to store non-negligible amounts of energy transferred from the EM signal.” 528 Patent, 106:8-10. It distinguishes storage elements from holding elements on that basis:

[1.] FIG. 82A illustrates an exemplary energy transfer system **8202** for down-converting an input EM signal **8204**. [2.] The energy transfer system **8202** includes a switching module **8206** and a storage module illustrated as a storage capacitance **8208**. [3.] The terms storage module and storage capacitance, as used herein, are distinguishable from the terms holding module and holding capacitance, respectively. [4.] **Holding modules** and holding capacitances, as used above, identify systems that *store negligible amounts of energy* from an under-sampled input EM signal with the intent of “holding” a voltage value. **Storage modules** and storage capacitances, on the other hand, refer to systems that *store non-negligible amounts of energy* from an input EM signal.

’528 Patent, 73:9-22 (emphases added). The Federal Circuit considered this disclosure and held that this “critical paragraph clearly expresses and intent to define the term ‘storage element.’” *ParkerVision*, 88 F.4th at 976. The same is true here. ParkerVision should not be permitted to force TI – and this Court – to relitigate issues that have already been decided. *See Nestle USA, Inc. v. Steuben Foods, Inc.*, 884 F.3d 1350, 1352 (Fed. Cir. 2018) (vacating PTAB claim construction that differed from prior construction and noting that “our precedent makes clear that collateral estoppel is not limited ‘to patent claims that are identical. Rather, it is the identity of the issues that were litigated that determines whether collateral estoppel should apply.’”) (citing *Ohio Willow Wood Co. v. Alps S., LLC*, 735 F.3d 1333, 1342 (Fed. Cir. 2013)).

ParkerVision cannot credibly dispute that this definition controls because it advocated for this construction in a proceeding before the PTAB regarding a third ParkerVision Patent with the same disclosure, arguing that this passage in the specification “explicitly defines a storage

module”. *RPX Corp. v. ParkerVision, Inc.*, IPR2014-00948, Paper 7 at 21-22 (PTAB Sep. 24, 2014).

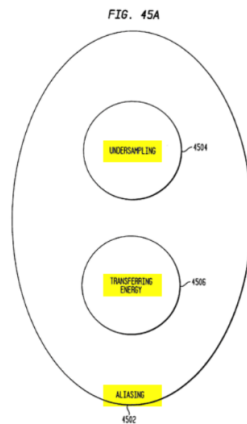
ParkerVision’s proposed construction here — “an element *of an energy transfer system* that stores non-negligible amounts of energy from an input electromagnetic signal” — attempts to re-characterize the patent’s purported invention by limiting it to “energy sampling” or “energy transfer” systems as opposed to “**voltage** sampling systems.”² Instead of distinguishing between “energy sampling” and “voltage sampling”, however, the ’528 Patent describes the alleged invention as down-converting an electromagnetic signal by sampling at an aliasing rate, and describes both energy transfer and under sampling systems as different embodiments covered by the same umbrella of aliasing rates. ’528 Patent, 2:2-4 (“The present invention also relates to under-sampling and to transferring energy at aliasing rates.”). The patent states that “the present invention is a method and system for down-converting an electromagnetic (EM) signal by aliasing the EM signal” at an “aliasing rate.” *Id.* at 26:24-29. The patent further discloses that “[t]he term aliasing, as used herein, [and as covered by the invention] refers to both down-converting an EM signal by under-sampling the EM signal at an aliasing rate and ... down-converting an EM signal by transferring energy from the EM signal at an aliasing rate.” *Id.* at 26:41-45.

The structure of the specification further demonstrates that the patent covers under-sampling and energy transfer systems. For example, the “Overview of the Invention” section is expressly organized around these two concepts:

² While the Patent does not anywhere describe a “voltage sampling system,” this term is generally understood to be interchangeable with sub-sampling systems. TI uses these terms interchangeably throughout the brief.

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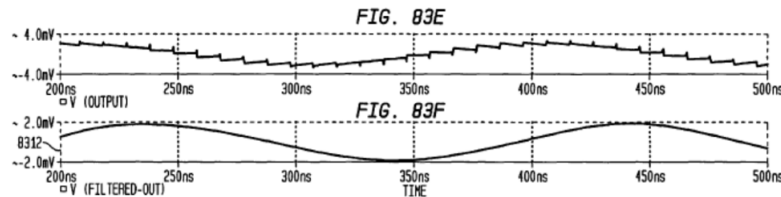
The specification provides a Venn diagram illustrating that “under sampling” and “transferring energy” are two types of “aliasing”:



'528 Patent, Figure 45A. In another proceeding before the PTAB, ParkerVision confirmed this understanding, stating that its patents describe “two sampling mechanisms: (1) under-sampling; and (2) energy transfer.” *RPX Corp. v. ParkerVision, Inc.*, IPR2014-00948, Paper 25 at 17 (PTAB Mar. 19, 2015).

In the Intel IPR, ParkerVision characterized its invention as “energy sampling,” which it argued was distinguishable from “voltage sampling.” *Intel Corp. v. ParkerVision, Inc.*, IPR2020-01265, Paper 18 at 1 (PTAB May 11, 2021). As Intel aptly noted, the terms “energy sampling” and “voltage sampling” appear nowhere in the specification. *Intel Corp. v. ParkerVision, Inc.*, IPR2020-01265, Paper 21 at 8 (PTAB Aug. 5, 2021). Nor does the patent refer to samples

measured in units of energy. To the contrary, the Figures in the Patent disclosure show that the down-converted waveforms for all embodiments show samples measured in units of voltage (“millivolts” or “mV”).



'528 Patent, Figs. 79A-F, 83A-F. TI respectfully submits that the Federal Circuit’s construction is correct and should control because it considered and rejected these very constructions. *ParkerVision*, 88 F. 4th at 977-78 (“We recognize that the magistrate judge’s claim construction order in *ParkerVision, Inc. v. LG* and the special master’s report and recommendation in *ParkerVision v. Hisense* and *ParkerVision v. TCL* adopted ParkerVision’s proposed construction...In our view, the magistrate judge and the special master’s analyses were unduly influenced by the energy transfer system embodiments in the '551 Patent...we consider these embodiments to be exemplary and do not find them to be a basis for defining the term “storage element” or limiting the term “storage element” to an element of an energy transfer system.”).

2. “the energy discharged from any given discharge cycle is not completely discharged”

Claim Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“the energy discharged from any given discharge cycle is not completely discharged” (’528 patent, claims 9, 27)	“Plain-and-ordinary meaning wherein the plain-and-ordinary meaning is “the energy that could potentially be discharged during any given discharge cycle is not completely discharged”	No construction necessary/Plain and ordinary meaning

The parties agree that this claim term should be given its plain and ordinary meaning. The

only dispute centers on whether the plain and ordinary meaning of the words requires the addition of a term—potentially—that has no relation to the language of the claim or the language in the specification. There is no basis in the intrinsic or extrinsic evidence for this addition, and it should be rejected.

This claim limitation is directed to the process by which the energy storage element—the capacitor—discharges energy when the switch attached to that capacitor is open. As ParkerVision has previously argued, the specification of the '528 Patent describes this discharge process in specific mathematical terms:

This result is valid only over the acquisition aperture. After the switch is opened, the final voltage that occurred at the sampling instance $t=T_A$ becomes an initial condition for a discharge cycle across R_L **17504**. The discharge cycle possesses the following response:

$$V_D = \frac{V_A \cdot e^{-\frac{t}{R_L C}}}{R_L C} u(t - T_A) \text{ (single event discharge)} \quad \text{EQ. (63)}$$

V_A is defined as $V_O(t=T_A)$. Of course, if the capacitor **17506** does not completely discharge, there is an initial condition present for the next acquisition cycle.

ParkerVision, Inc. v. Intel Corp., 6:20-cv-00108-ADA, Dkt. No. 57 at 33-34 (W.D. Tex. Nov. 20, 2020) (citing '528 patent, 147:25-39). Notably, this portion of the specification describes the amount of energy that will be discharged as modeled by the RC-response of the circuit. It is not some hypothetical amount that “could potentially be discharged.” Moreover, nothing in the claims or the specification of the '528 Patent refer to the amount of energy that could “potentially” be discharged—the term “potentially” appears twice in the specification, once referring to the conductance of FETs and once referring to a “potentially re-radiated signal.” '528 Patent, col. 109:12-16; 181:44-50. Moreover, no definition is provided to provide any boundaries around the

term “potentially” as it is used in ParkerVision’s construction.

ParkerVision might now wish it had written the claims differently, but that it would be incorrect to construe the claims as ParkerVision now proposes. *See Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004) (“[W]e construe the claim as written, not as the patentees wish they had written it.”); *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357 (Fed. Cir. 1999) (“[W]e do not permit courts to redraft claims....[W]e must construe the claims based on the patentee's version of the claim as he himself drafted it.”)

3. “a second differential amplifier circuit that combines said down-converted quadrature-phase baseband signal portion with said down-converted differential quadrature-phase baseband signal portion and outputs a second channel down-converted differential quadrature-phase baseband signal”

Claim Term	ParkerVision’s Proposed Construction	Texas Instruments’ Proposed Construction
“a second differential amplifier circuit that combines said down-converted quadrature-phase baseband signal portion with said down-converted differential quadrature-phase baseband signal portion and outputs a second channel down-converted baseband signal” (’528 patent, claim 19)	Plain-and-ordinary meaning	Indefinite

This term is indefinite because it uses the term “differential” in inconsistent and irreconcilable ways. As explained above, “differential” amplification refers to an electronic component that receives two input signals, determines the difference in magnitude between these signals, and amplifies that difference. In other words, the term “differential” implies two different input signals, not one. *See, e.g.*, ’528 Patent, 67:54-57 (“The outputs **4408** and **4410** are coupled to a differential circuit **4444** such as a filter, which preferably inverts one of the outputs **4408** or

4410 and adds it to the other output **4408** or **4410**. This substantially cancels common mode noise generated by the switch module **4416**.”). A comparison of claim 1 to claim 19 shows that ParkerVision uses the term “differential” inconsistently in the claims. The claims recite circuitry systems in which storage elements (e.g., capacitors) down-convert modulated RF carrier signals and output down-converted baseband signals. In claim 1, the first and second capacitors output down-converted in-phase and inverted in-phase baseband signals respectively. These down-converted signals are then sent to the differential amplifier circuit, where they are combined to output an amplified signal.

Claim 19, which depends from claim 1, recites third and fourth capacitors that output a “down-converted quadrature phase baseband signal” and a “down-converted *differential* quadrature-phase baseband signal,” respectively. The problem is that the term “differential” in this portion of the claim is illogical and cannot be reconciled with how it is used in claim 1. In the claimed systems, the capacitors operate to down-convert a modulated carrier signal to baseband, which is then amplified by a differential amplifier. That is consistent with claim 1, which requires two capacitors to output in-phase and inverted in-phase baseband signals, which are then amplified by a differential amplifier in the last step of the claim. In claim 19, by contrast, a third capacitor outputs a “down-converted quadrature-phase baseband signal” and a fourth capacitor outputs a “down-converted *differential* quadrature-phase baseband signal.” It is unclear what ParkerVision means when it refers to the fourth capacitor outputting a differential quadrature baseband signal, particularly because the last step of the claim requires a second differential amplifier to differentially amplify the down-converted signals. In other words, the reference to the differential quadrature-phase baseband signal output by the fourth capacitor, at best, presumes that the signal output by the fourth capacitor has been differentially amplified. This makes no sense – if that were

the case, there would be no need for a separate differential amplification step. It is unclear what ParkerVision intended by including “differential” with respect to the fourth capacitor; it either means what it means in claim 1, in which case it makes no sense, or it means something different, though there is nothing in the specification that explains what any such meaning could be. Either way, ParkerVision’s use of “differential” in claim 19 cannot be squared with how it is used in claim 1.

To attempt to resolve these internal inconsistencies, ParkerVision previously sought a construction that entirely rewrote “said down-converted **differential** quadrature-phase baseband signal portion” to mean “the said down-converted **inverted** quadrature phase baseband signal portion of the modulated carrier signal that is output by the fourth energy storage element”. *ParkerVision, Inc. v. Apple, Inc.*, 3:15-cv-1477, D.I. 151 at 27 (M.D. Fla. Jul. 15, 2019). According to ParkerVision, it was simply asking the court to correct “typographical errors.” *Id.* at 28. The court disagreed: “Replacing some, but not all, ‘differential’ terms with ‘inverted’ is not a minor correction that is obvious and free from reasonable debate or eviden[ce] from the prosecution history. Rather, the record supports that Plaintiff’s proposed construction would alter one type of signal for another type of signal.” *Id.* Additionally, as the court noted, “differential output signals consist of two signals, but an inverted signal is just one signal.” *Id.* ParkerVision’s previous construction and the court’s ruling demonstrate that the claim term suffers from fatal drafting flaws by using “differential” in inconsistent and nonsensical ways, rendering the claim, and those that depend from the claim, indefinite. *Tr. Knight v. Int’l Bus. Mach.*, 681 F. App’x 898, 903 (Fed. Cir. 2017) (affirming judgment of indefiniteness).

Dated: March 6, 2024

Respectfully submitted,

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INCORPORATED**

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was filed electronically via the court's CM/ECF system. Therefore, this document was served via email on all counsel of record who are deemed to have consented to electronic service on this the 6th day of March, 2024.

/s/ Andrea L. Fair
Andrea L. Fair