IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

OMNI MEDSCI, INC., *Plaintiff*,	§	
v.	§	Case No. 2:24-cv-01070-JRG-RSP
SAMSUNG ELECTRONICS, CO. LTD., et al., *Defendants*.	§	

CLAIM CONSTRUCTION ORDER

In this patent case, Omni Medsci, Inc., alleges infringement by Samsung Electronics Co., Ltd., Fossil Group, Inc., OnePlus Technology (Shenzhen) Co., Ltd., Ōura Health Oy, and various affiliates (together, "Defendants"). Omni asserts claims from three patents relating to wearable systems for measuring a user's physiological parameters. *See* U.S. Patent 9,651,533 at [57] ("A measurement system includes a wearable measurement device for measuring one or more physiological parameters"); U.S. Patent 10,874,304 at [57] ("A measurement system is provided with a light source that is configured to increase signal-to-noise ratio by increasing a light intensity from at least one of a plurality of semiconductor sources."); U.S. Patent 12,268,475 at [57] ("A wearable device to measure a user's physiological parameters comprising one or more biosensors . . . .").

The parties present three disputes about claim scope. Having considered the parties' briefing, along with arguments of counsel at a February 18, 2026 hearing, the Court resolves those disputes as follows.

I. BACKGROUND

A. The Patents

1. U.S. Patent 9,651,533

The ’533 Patent explains the need for “[a] rapid, non-destructive, non-contact optical method for screening or identification of counterfeit pharmaceuticals[.]” ’533 Patent at 1:63–65. The patent addresses this need with “Spectroscopy using near-infrared or short-wave infrared (SWIR) light . . . because most pharmaceuticals comprise organic compounds that have overtone or combination absorption bands in this wavelength range[.]” *Id.* at 1:65–2:3. “[M]ost drug packaging materials are at least partially transparent in the near-infrared or SWIR, so that drug compositions may be detected and identified through the packaging non-destructively.” *Id.* at 2:3–6. “Also, using a near-infrared or SWIR light source with a spatially coherent beam permits screening at stand-off or remote distances.” *Id.* at 2:6–8. “Beyond identifying counterfeit drugs, the near-infrared or SWIR spectroscopy may have many other beneficial applications.” *Id.* at 2:8–10. “For example, spectroscopy may be used for rapid screening of illicit drugs or to implement process analytical technology in pharmaceutical manufacturing,” as well as “a wide array of applications in assessment of quality in the food industry, including screening of fruit, vegetables, grains and meats.” *Id.* at 2:11–16.

The patent teaches a wearable measurement device that includes a light source with a plurality of light emitting diodes (LEDs) configured to generate an output optical beam with a near-infrared wavelength between 700 nanometers and 2500 nanometers. ’533 Patent at [57]. The light source is configured to increase signal-to-noise ratio by increasing a light intensity and pulse rate of the LEDs. *Id.* The system includes a plurality of lenses that receive the output optical beam and deliver an analysis output beam to a sample. *Id.* The measurement device also has a receiver that

processes the beam reflected from the sample and generates an output signal then sent to a remote device to generate and store processed data. *Id.*

The parties have one dispute from this patent, which concerns dependent Claim 11. Claim 5 recites:

> 5. A measurement system comprising:
>
> a light source comprising a plurality of semiconductor sources that are light emitting diodes, the light emitting diodes configured to generate an output optical beam with one or more optical wavelengths, wherein at least a portion of the one or more optical wavelengths is a near-infrared wavelength between 700 nanometers and 2500 nanometers,
>
> [and]
>
> a receiver configured to receive and process at least a portion of the analysis output beam reflected or transmitted from the sample and to generate an output signal, wherein the receiver is configured to be synchronized to the light source[.]

'533 Patent at 29:43–30:10. Claim 11 then recites:

> 11. The system of claim 5, wherein the receiver further comprises **one or more filters** in front of one [or] more detectors to select a fraction of the one or more optical wavelengths.

Id. at 30:38–41 (emphasis added). At least in their briefing, the parties dispute whether the "one or more filters" can be implemented using software or electronic signal processing alone.

2. U.S. Patent 10,874,304

The '304 Patent, which is related to the '533 Patent,[1] strives to "increase [the] signal-to-noise ratio by increasing a light intensity from the semiconductor sources" providing the optical

[1] *See* '304 Patent at [60], 2:1–14 (setting forth related application data and identifying the '533 Patent as a distant ancestor).

signal for the measurement. *See* '304 Patent at [57]. The patent explains one way to improve the signal-to-noise ratio is using modulation and lock-in techniques. The light source is modulated and the detection system synchronized with the light source. The detection system captures the signal with the light source both on and off and differences the captured signals, which allows the system to compensate for light attributable to other sources, like the sun. *Id.* at 30:10–26.

The dispute relates to Claim 19, which recites:

> 19. A wearable device for use with a smart phone or tablet, the wearable device comprising:
>
> a measurement device including a light source comprising a plurality of semiconductor sources for measuring one or more physiological parameters, the measurement device configured to:
>
> generate, by **modulating** at least one of the semiconductor sources having an initial light intensity, an input optical beam having one or more optical wavelengths, and
>
> receive and to deliver a portion of the input optical beam to tissue, wherein the tissue reflects at least a portion of the input optical beam delivered to the tissue;
>
> the measurement device further comprising a receiver configured to:
>
> capture light while the semiconductor sources are off and convert the captured light into a first signal, and
>
> capture light while at least one of the semiconductor sources is on and convert the captured light into a second signal, the captured light including at least a portion of the input optical beam reflected from the tissue;
>
> synchronize to the modulation of the at least one of the semiconductor sources;
>
> the measurement device further configured to improve a signal-to-noise ratio of the input optical beam reflected from the tissue by:

> differencing the first signal and the second signal, and
>
> increasing the light intensity relative to the initial light intensity from at least one of the semiconductor sources;
>
> the measurement device further configured to generate an output signal representing at least in part a non-invasive measurement on blood contained within the tissue . . . .

'304 Patent at 38:62–39:29 (emphasis added). Specifically, the parties dispute whether "modulating" requires the purpose of "to include information" and whether Omni should be judicially estopped from arguing otherwise.

3. U.S. Patent 12,268,475

The '475 Patent, which is also related to the '533 Patent,[2] teaches a method of determining whether the wearable device is being worn by a user. The dispute relates specifically to dependent Claim 13. Claim 8 recites:

> 8. A wearable device configured to be worn by a user, the wearable device comprising:
>
> a light source configured to be on or off, responsive to the light source being on, the light source generates an output light;
>
> a lens positioned to direct at least a portion of the output light towards a bodily tissue of the user;
>
> a detector; and
>
> a processor configured to:
>
> (i) responsive to the light source being on and the detector receiving at least a portion of the output light that is reflected from the bodily tissue of the user, generate a first output signal having a first signal-to-noise ratio; and
>
> (ii) responsive to the light source being off and the detector receiving ambient light, generate a second output

[2] *See* '475 Patent at [60], 2:1–13 (setting forth related application data and identifying the '533 Patent as a distant ancestor).

signal having a second signal-to-noise ratio;

(iii) generate a third output signal using at least a portion of the first output signal and at least a portion of the second output signal, the third output signal having a third signal-to-noise ratio that is greater than the first signal-to-noise ratio and greater than the second signal-to-noise ratio, the third output signal being associated with a physiological parameter of the user; and

(iv) determine, based at least in part on the third output signal, that the wearable device is being worn by the user.

'475 Patent at 86:17–46. Claim 13 then recites "[t]he wearable device of claim 8, wherein the processor is further configured to *modulate the light source with a modulation frequency*." *Id.* at 86:60–62 (emphasis added). The parties dispute whether "modulate" requires the purpose of "to include information," and whether "modulation frequency" requires modulating a frequency—i.e., frequency modulation.

B. Previous Litigation

This case indirectly implicates two other cases previously before this Court. In *Omni Medsci, Inc. v. Apple Inc.*, No. 2:18-CV-00134-RWS (*Apple I*), Judge Schroeder construed the phrases "modulating at least one of the LEDs" and "modulating of at least one of the LEDs" from claims of two patents related to the patents now at issue. Dkt. No. 113-5 at 13–16. In *Omni Medsci, Inc. v. Apple Inc.*, No. 2:18-CV-00429-RWS (*Apple II*), Judge Schroeder construed five other similar phrases. Dkt. No. 113-6 at 15–20. In each of the seven constructions for these similar terms, Judge Schroeder concluded "modulating" light requires varying the amplitude, frequency, or phase of the light "to include information." Here, Defendants rely on these prior constructions for significant support of their proposed constructions and their argument that Omni should be judicially estopped from arguing otherwise.

II. LEGAL STANDARDS

"The claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). As such, if the parties dispute the scope of the claims, the court must determine their meaning. *See, e.g.*, *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1317 (Fed. Cir. 2007) (Gajarsa, J., concurring in part); *see also Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996), *aff'g*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*).

Claim construction, however, "is not an obligatory exercise in redundancy." *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997). Rather, "claim construction is a matter of [resolving] disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims . . . ." *Id.* A court need not "repeat or restate every claim term in order to comply with the ruling that claim construction is for the court." *Id.*

When construing claims, "there is a heavy presumption that claim terms are to be given their ordinary and customary meaning." *Aventis Pharm. Inc. v. Amino Chems. Ltd.*, 715 F.3d 1363, 1373 (Fed. Cir. 2013) (citing *Phillips*, 415 F.3d at 1312–13). Courts must therefore "look to the words of the claims themselves . . . to define the scope of the patented invention." *Id.* (citations omitted). The "ordinary and customary meaning of a claim 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, *i.e.,* as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1313. This "person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Intrinsic evidence is the primary resource for claim construction. *See Power-One, Inc. v.*

Artesyn Techs., Inc., 599 F.3d 1343, 1348 (Fed. Cir. 2010) (citing *Phillips*, 415 F.3d at 1312). For certain claim terms, "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; *see also Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history."). But for claim terms with less-apparent meanings, courts consider "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean . . . [including] the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips*, 415 F.3d at 1314.

III. THE LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is the skill level of a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In resolving the appropriate level of ordinary skill, courts consider the types of ,and solutions to, problems encountered in the art, the speed of innovation, the sophistication of the technology, and the education of workers active in the field. *Id.* Importantly, a "person of ordinary skill is also a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Here, Omni says a skilled artisan at the time of invention would have had

> a good working knowledge of optical sensing techniques and their applications, familiarity with optical design and signal processing techniques, and such a person would have obtained such knowledge through an undergraduate education in

> engineering (electrical, mechanical, biomedical, or optical) or a related field of study, along with relevant experience studying or developing physiological monitoring devices in industry or academia.

Dkt. No. 113 at 5 (citing Daft Decl., Dkt. No. 113-4 ¶ 24). Defendants don't dispute this level of ordinary skill in the art, which the Court therefore adopts for its analysis.

IV. THE DISPUTED TERMS

A. "one or more filters" ('533 Patent, Claim 11)

Plaintiff's Construction	Defendants' Construction
Plain and ordinary meaning	"one or more physical components or coatings configured to selectively pass light of a particular wavelength or range(s) of wavelengths"

Based on nothing more than Defendants' construction, the Court expected the underlying dispute to be whether the "one or more filters" could be implemented in software. Indeed, Defendants say that, without the clarifying language of their construction, "'filter' could be improperly read to encompass software algorithms or electronic signal processing, which the patent treats separately." Dkt. No. 116 at 17. But in its reply, Omni calls that a "false concern." *See* Dkt. No. 121 at 2 (referring to "Defendants' false concern that 'filter' could be improperly read to encompass software algorithms or electronic signal processing"); *id.* (noting "Omni has never asserted that the 'one or more filters' element reads on software algorithms or electronic signal processing, and the plain language of claim 11 would preclude such a theory"). Because Omni's reply resolves the dispute between the parties, which the parties confirmed at the hearing, *see* Hr'g Tr., Dkt. No. 135 at 6:13–7:15, the Court adopts a "plain and ordinary meaning" construction for this term with the understanding that this limitation is not met by software or electronic signal processing alone.

B. "modulating," "modulation" ('304 Patent, Claim 19); "modulate," "modulation" ('475 Patent, Claim 13)

Omni's Construction	Defendants' Construction
"[vary/varying/the varying of] the amplitude, frequency, or phase of the light produced"	"[vary/varying/the varying of] the amplitude, frequency, or phase of the light produced . . . to include information"

This parties dispute whether "modulation" within the scope of these claims requires modulating "to include information." Asserting it does, Defendants say (1) Omni should be judicially estopped from arguing otherwise, and (2) regardless, both the intrinsic and extrinsic evidence support a "to include information" requirement.

1. Defendants' judicial estoppel argument

Defendants' judicial estoppel position stems from what they call "Omni's argument that the construction [for 'modulating at least one of the LEDs' in *Apple II*] should include 'to include information.'" Dkt. No. 116 at 3. In *Apple I*, Omni proposed a construction of "pulsing the light, or varying the frequency of the light, produced by at least one of the LEDs." *Id.* (citing *Apple I* Cl. Constr. Order, Dkt. No. 113-5 at 13). Disagreeing that "pulsing the light" is a type of modulation, Apple proposed a narrower construction of only "varying the frequency of the light produced by at least one of the LEDs." *Apple I* Cl. Constr. Order, Dkt. No. 113-5 at 13. The Court, however, arrived at its own construction of "varying the amplitude, frequency or phase of the light produced by at least one of the LEDs to include information." *Id.* at 16. According to Defendants, in *Apple II*, Omni said Apple was barred from rearguing the scope of "modulating," calling the constructions "settled." Dkt. No. 116 at 5. In their view, "Omni cannot now repudiate that position and ask this Court to adopt a contrary construction." *Id.* at 6.

Omni replies that its positions in *Apple I* and *Apple II* are not inconsistent with its current

position, so judicial estoppel doesn't apply. Dkt. No. 121 at 5. Rather, Omni's position in *Apple II* was that the "modulating" terms in the patents then at issue should be construed the same way in both cases. *Id.* at 6. Omni emphasizes that it took that position only in its *Apple II* claim construction reply, shortly after the Court issued its Claim Construction Order in *Apple I*. *Id.*

The Court agrees with Omni that judicial estoppel does not apply here. Notably, in *Apple I*, neither party submitted a proposed construction that contemplated "to include information." The Court arrived at that language on its own. *See Apple I* Cl. Constr. Order, Dkt. No. 116-5 at 13–17. In *Apple II*, Judge Schroeder noted that Omni, in its opening brief, resisted the inclusion of "to include information" by arguing "'modulating' the light produced by a light-emitting diode (LED) does not necessarily involve including information in the signal 'beyond the fact of the modulation.'" *Apple II* Cl. Constr. Order, Dkt. No. 113-6 at 16. Omni never retreated from that position, but instead simply called the Court's constructions "now-settled." That does not give rise to judicial estoppel.

Defendants stress the importance of construing the same term the same way in related patents, but they focus on the same *language* rather than the same *scope*. The dispute here, which does not appear to have been a dispute in the *Apple* cases, is whether modulating requires encoding information in the "communications" sense. Judge Schroeder didn't address that issue, but only described "information" as a characteristic "that can be used to reject noise." Omni doesn't disagree with that, and that's the thrust of the invention. In other words, even to the extent the record could be construed in a way that suggests Omni agreed with the *language* of the construction, it never agreed that "modulating" requires encoding information. Accordingly, judicial estoppel does not apply. See *Karaha Bodas Co., L.L.C. v. Perusahaan Pertambangan Minyak Dan Gas Bumi Negara*, 364 F.3d 274, 294 (5th Cir. 2004) (noting that, for judicial estoppel to apply, "the position

of the party to be estopped must be clearly inconsistent with its prior position").

2. Whether the evidence requires modulating "to include information"

Defendants argue that, even if the Court declines to estop Omni from arguing against this phrase, the intrinsic record and extrinsic evidence support including the language in the construction for the "modulation" terms. As far as the intrinsic evidence, Defendants cite the specifications' explanation that the "'optical light' and or 'optical beam' and or 'light beam' may be modulated or unmodulated, which also means that they may or may not contain information." Dkt. No. 116 at 7 (quoting '304 Patent at 13:16–25, '475 Patent at 16:22–31). Regarding the extrinsic evidence, Defendants note this Court previously relied on multiple dictionary definitions for "modulate," each of which refers to the purpose of modulation as transmitting information. *Id.* at 10.

Omni replies that the recited "modulation" may be for any purpose, not just the purpose of including information. Dkt. No. 121 at 3. Omni stresses that the "'304 Patent describes a measurement system, not an information communications system." Dkt. No. 113 at 11 (citing '304 Patent at 5:4–40). Moreover, the statement on which Defendants rely, says Omni, "is the only statement in each specification that links modulation with information, and it explains that modulated light *may* (or *may not*) include information whereas unmodulated light *will not* contain information." *Id.* at 14. Omni says the Court's prior orders in the *Apple* cases ignore "the specification's unequivocal disclosure that modulation is not used to transmit information." *Id.* at 17.

The Court agrees with Omni for three reasons. First, the specifications' statement that the beam "may be modulated or unmodulated, which also means that they may or may not contain information," does not require that all modulated light necessarily includes information. While an unmodulated beam cannot include information in the communication-systems sense, transmitting such information requires modulation. But that doesn't mean modulation requires information.

Moreover, even if the Court were to read this passage as Defendants suggest, the better understanding is that the light *beam* is modulated when the light *source* is "on." In other words, the light source is modulated by pulsing it on and off, and then when the light *source* is on, the light *beam* could also be modulated to include information.

Second, Defendants don't dispute Omni's assertion that "neither specification discloses any embodiments where light is modulated to include information nor what type of information would be transmitted in the modulated light." Dkt. No. 113 at 14. To the contrary, the specifications disclose a modulated signal that does not include information, at least in the traditional sense that the word is used with communication systems. Specifically, they explain that, in some embodiments, change-detection schemes may be used, "where the detection system captures *the signal with the light source on and with the light source off*. . . . [F]or this system the light source may be *modulated*. Then, the signal with and without the light source is differenced. This may enable the sun light changes to be subtracted out." '304 Patent at 30:36–40 (emphasis added). In other words, the light source is pulsed on and off, which allows the noise from the sunlight to be subtracted from the signal when the light source is on. Elsewhere, the patent explains "the light source may be modulated, and then the detection system would be synchronized with the light source." *Id.* at 58:7–9. This shows "modulated" in this context simply means pulsed on and off; otherwise, there would be nothing with which the detection system can synchronize.

Third, Omni's position is not inconsistent with Judge Schroeder's construction in *Apple I*. Judge Schroeder explained that, "[i]n this application, modulation includes information in the light source that can be used to reject noise, and specifically, modulation injects information about the source of the light." *Apple I* Cl. Constr. Order, Dkt. No. 113-5 at 15. With this reasoning, Judge Schroeder uses "information" in a broad sense, suggesting that if the modulated light could be used

for *any* purpose, it inherently has information. Importantly, he did nothing but describe an embodiment that does not encode "information" using modulation, as communication systems do.

Critically, there has been no discussion about the scope of the word "information" in this context, either before Judge Schroeder (as reflected in the current record) or in this proceeding. Samsung has latched on to this statement by Judge Schroeder in an effort to interpret "information" as the word is used in the communication-systems sense, which was clearly not Judge Schroeder's intent. And because nothing in the record supports such a reading, the Court adopts Omni's construction of "[vary/varying/the varying of] the amplitude, frequency, or phase of the light produced."

C. "modulate the light source with a modulation frequency" ('475 Patent, Claim 13)

Omni's Construction	Defendants' Construction
No construction necessary apart from the construction of "modulating" / "modulation" ("modulating the light source by varying the amplitude, frequency, or phase of the light in a controlled manner," Dkt. No. 121 at 9)	"vary the frequency of the light produced by the light source to include information"

Claim 8 of the '475 Patent requires a processor configured to:

> (i) responsive to the light source being on and the detector receiving at least a portion of the output light that is reflected from the bodily tissue of the user, generate a first output signal having a first signal-to-noise ratio; and
>
> (ii) responsive to the light source being off and the detector receiving ambient light, generate a second output signal having a second signal-to-noise ratio;
>
> (iii) generate a third output signal using at least a portion of the first output signal and at least a portion of the second output signal, the third output signal having a

> third signal-to-noise ratio that is greater than the first signal-to-noise ratio and greater than the second signal-to-noise ratio, the third output signal being associated with a physiological parameter of the user; and
>
> (iv) determine, based at least in part on the third output signal, that the wearable device is being worn by the user.

'475 Patent at 86:26–46. Claim 13 then recites "[t]he wearable device of claim 8, wherein the processor is further configured to modulate the light source *with a modulation frequency*." *Id.* at 86:60–62 (emphasis added). The parties dispute whether "with a modulation frequency" in Claim 13 means the processor must be configured to modulate the frequency of the light source, as Defendants suggest, or whether it refers to how often the light source is pulsed on or off.

Defendants point to the claims and the specification. Regarding the claims, Defendants stress "claim 14, which depends from claim 13, recites that the detector applies 'narrow band filtering . . . around the modulation frequency." Dkt. No. 116 at 12. This, say Defendants, "is consistent with the specification's description of synchronization and lock-in detection techniques, which are compatible with modulation and rely on detecting signals at a particular modulation frequency." *Id.* (citing '475 Patent at 43:66–44:7, 58:9–13).

Omni, however, accuses Defendants of misconstruing "modulation frequency" as "frequency modulation." Dkt. No. 113 at 22 (citing Daft Decl., Dkt. No. 113-4 ¶ 58). Instead, says Omni, the specification uses the term in a way that doesn't limit its meaning to only varying the frequency of the light. *Id.* at 21 (citing '475 Patent at 43:66–44:7).

"Modulation frequency" only appears in two sentences, with each sentence explaining that, "[i]n a particular embodiment, the techniques from lock-in detection may be used, where narrow band filtering around the *modulation frequency* may be used to reject noise outside the *modulation*

frequency." '475 Patent at 58:9–13 (emphasis added); *id.* at 70:16–19 (same). Notably, this sentence aligns with Claim 14's language, which limits Claim 13 such that "the processor is further configured to cause the detector to apply narrow band filtering to the at least a portion of the output light that is reflected from the bodily tissue of the user *around the modulation frequency*." *Id.* at 86:63–67 (emphasis added).

The Court agrees with Omni. The parties agree "modulation" refers to varying the amplitude, frequency, or phase of a signal. That "varying" happens at a certain frequency. "[T]he amplitude of the light may be varied at a frequency, the frequency of the light may be varied at a frequency, and the phase of the light may be varied at a frequency." Daft Decl., Dkt. No. 113-4 ¶ 59.

Whereas nothing in the intrinsic record supports modulating the frequency of the light, the specification is replete with examples of changing the amplitude of the pulsed light by turning it off and on. For example, the patent explains:

> light may be first generated from a seed laser diode. For example, the seed LD may be a distributed feedback laser diode with a wavelength near 1542 or 1550 nm, with approximately 0.5–2.0 ns pulsed output, and with *a pulse repetition rate* between a kilohertz to about 100 MHz or more.

'475 Patent at 31:6–11 (emphasis added; reference numbers omitted). Elsewhere, the patent explains:

> it may be advantageous to pulse the light source with a particular pulse width and pulse repetition rate, and then the detection system can measure the pulsed light returned from or transmitted through the tooth. Using a lock-in type technique (e.g., detecting *at the same frequency as the pulsed light source* and also possibly phase locked to the same signal), the detection system may be able to reject background or spurious signals and increase the signal-to-noise ratio of the measurement.

Id. at 43:66–44:7 (emphasis added). This expressly ties the notion of a "frequency" to the pulse repetition rate. Thus, a skilled artisan would understand to "modulate the light source with a

modulation frequency" means to "modulate the light source at a specific pulse repetition rate."

This makes sense in light of Claim 8, which only requires "a light source configured to be on or off," '475 Patent at 88:20, not switching between those states. Claim 13 then adds the requirement of modulating the light source at a certain frequency.

This interpretation is also supported by Claim 14, which requires the processor of Claim 8 to also be "configured to cause the detector to apply narrow band filtering to the at least a portion of the output light that is reflected from the bodily tissue of the user around the modulation frequency." '475 Patent at 86:63–67. The specification only refers to "narrow band filtering around the modulation frequency" in connection with lock-in detection, *see id.* at 56:9–13 ("In a particular embodiment, the techniques from lock-in detection may be used, where narrow band filtering around the modulation frequency may be used to reject noise outside the modulation frequency"), 70:16–19 (same), and nothing about those descriptions of lock-in detection suggests changing the frequency of the light. In fact, *nothing* in the specification suggests changing the frequency of the light during the measurement process.

Defendants say this reading "collapses the phrase 'with a modulation frequency' into surplusage and ignores the narrowing effect of the claim language.'" Dkt. No. 116 at 12. But "with a modulation frequency" is not so much surplusage as the express recitation of an inherent requirement, as any modulation requires a frequency of that modulation. Alternatively, the drafter could have written "modulate the light source with a *first* frequency" or "modulate the light source with a frequency of modulation" with the same effect. Regardless, even if this did violate the cannon against surplus claim language, "'no canon of claim construction is absolute in its application, . . . [and] surplusage may exist in some claims." *Decisioning.com, Inc. v. Federated Dep't Stores, Inc.*, 527 F.3d 1300, 1312 n.6 (Fed. Cir. 2008). Accordingly, the Court rejects Defendants'

position and construes "modulation frequency" as "pulse repetition rate."

V. CONCLUSION

Disputed Term	The Court's Construction
"one or more filters" ('533 Patent, Claim 1)	Plain and ordinary meaning
"modulating," "modulation" ('304 Patent, Claim 19) "modulate," "modulation" ('475 Patent, Claim 13)	"[vary/varying/the varying of] the amplitude, frequency, or phase of the light produced"
"modulation frequency" ('475 Patent, Claim 13)	"pulse repetition rate"

The Court **ORDERS** each party not to refer, directly or indirectly, to its own or any other party's claim-construction positions in the presence of the jury. Likewise, the Court **ORDERS** the parties to refrain from mentioning any part of this opinion, other than the actual positions adopted by the Court, in the presence of the jury. Neither party may take a position before the jury that contradicts the Court's reasoning in this opinion. Any reference to claim construction proceedings is limited to informing the jury of the positions adopted by the Court.

SIGNED this 23rd day of March, 2026.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE