UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

IN RE: CHROMACODE LITIGATION

Case No. 5:23-cv-04823-EKL

CLAIM CONSTRUCTION ORDER

[Re: U.S. Patent No. 12,168,797]

The patents asserted in this case relate to biochemical tests for detecting the presence of specific polynucleotide sequences within samples using fluorescent signals. The parties propose competing constructions of three terms of U.S. Patent No. 12,168,797 ('797 Patent). The Court held a tutorial and a *Markman* hearing regarding the construction of the disputed terms. ECF No. 177; *see also* ECF No. 185 ("Tr."). After considering the parties' arguments, moving papers, and evidence, the Court construes the disputed terms as follows.

I. BACKGROUND

A. Procedural Background

On September 20, 2023, ChromaCode, Inc. ("ChromaCode") filed the present action against Bio-Rad Laboratories, Inc. ("BioRad"), seeking a declaratory judgment of non-infringement as to U.S. Patent Nos. 9,222,128 ('128 Patent) and 9,921,154 ('154 Patent). ECF No. 1. BioRad asserted counterclaims for infringement of the '128 and '154 Patents. ECF No. 27.

On October 5, 2023, ChromaCode filed a separate complaint for infringement against BioRad in the U.S. District Court for the Central District of California, asserting infringement of U.S. Patent Nos. 10,068,051 ('051 Patent) and 10,770,170 ('170 Patent). After the California Institute of Technology was added as a plaintiff, the case was transferred to the Northern District of California. *See ChromaCode Inc. v. Bio Rad Labs. Inc.*, No. 23-cv-06360-EKL, ECF No. 35

(N.D. Cal. Oct. 5, 2023). ChromaCode subsequently amended the complaint to add U.S. Patent No. 11,827,921 ('921 Patent). *See ChromaCode*, No. 23-cv-06360-EKL, ECF No. 54. The two cases were consolidated, with this case designated as the lead. ECF No. 71. The Court issued its claim construction order for the '128, '154, '051, '170, and '921 Patents on July 22, 2025. ECF No. 125.

On July 2, 2025, ChromaCode served its infringement contentions for the '797 Patent on BioRad. The parties subsequently filed claim construction statements for three terms of the '797 Patent. *See* ECF No. 160 ("ChromaCode Op. Br."); ECF No. 161 ("BioRad Op. Br."); ECF No. 171 ("BioRad Resp. Br."); ECF No. 172 ("ChromaCode Resp. Br"). The Court held a tutorial on December 5, 2025, *see* ECF No. 175, and a *Markman* hearing on December 18, 2025, *see* ECF No. 177.

B. '797 Patent

The '797 Patent is entitled "Signal Encoding and Decoding in Multiplexed Biochemical Assays" and is in the same family as the '051, '170, and '921 Patents, with which it also shares a specification. ChromaCode's patents are all directed to addressing problems that arise with multiplexing polymerase chain reaction ("PCR") assays, in which analytes are amplified and combined with probes designed to hybridize (*i.e.*, bind) to the analytes. These multiplexed assays use multiple colors of light, alone or in combination, to encode targets of interest.

ChromaCode's patents use a nondegenerate coding scheme, in which every unique potential combination of analytes corresponds unambiguously to a unique light signature. In a degenerate encoding scheme, the same cumulative light signal could potentially correspond to more than one possible combination of analytes present. In a nondegenerate encoding scheme, the cumulative light signal emitted from the sample volume uniquely corresponds to only one possible combination of analytes present.

ChromaCode asserts that BioRad's products, including the QX600 Droplet Digital PCR System, the QX ONE Droplet Digital PCR System, and the ddPCR Multiplex Supermix, infringe its patents—including the '797 Patent—by practicing one or more claims of the asserted patents.

II. LEGAL STANDARD

A. Claim Construction

Claim construction is a matter of law to be determined by the court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc). The "correct construction" is "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) (quoting *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)). Claim terms "are generally given their ordinary and customary meaning." *Id.* at 1312 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he 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." *Id.* at 1313.

The claims "must be read in view of the specification, of which they are a part." *Markman*, 52 F.3d at 979. "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics*, 90 F.3d at 1582); *see also Merck & Co. v. Teva Pharms. USA, Inc.*, 347 F.3d 1367, 1371 (Fed. Cir. 2003) ("A fundamental rule of claim construction is that terms in a patent document are construed with the meaning with which they are presented in the patent document."). Although "claims are interpreted in light of the specification," this "does not mean that everything expressed in the specification must be read into all the claims." *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 957 (Fed. Cir. 1983). "The claim, not the specification, measures the invention." *Env't Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 699 (Fed. Cir. 1983).

In addition to considering the specification, "the court should also consider the patent's prosecution history, if it is in evidence." *Markman*, 52 F.3d at 980 (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 33 (1966)). The prosecution history, which is part of the intrinsic evidence, consists of the complete record of the proceedings before the U.S. Patent and Trademark Office ("PTO") and "includes the prior art cited during the examination of the patent." *Phillips*,

415 F.3d at 1317. "Like the specification, the prosecution history provides evidence of how the PTO and the inventor understood the patent." *Id.*

Courts may consider extrinsic evidence, such as dictionary definitions, expert and inventor testimony, and treatises. *Markman*, 52 F.3d at 980. "This evidence may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history." *Id.*

B. Indefiniteness

Indefiniteness is an invalidity defense arising from section 112, which requires that a patent specification "conclude[s] with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor . . . regards as the invention." 35 U.S.C. § 112(b). A patent claim is indefinite if, "viewed in light of the specification and prosecution history, [it fails to] inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Determining whether a claim is indefinite requires "a delicate balance" between the uncertainty inherent in the "limitations of language," and enough precision "to afford clear notice of what is claimed" and "appris[e] the public of what is still open to them." *Id.* at 909.

The indefiniteness analysis focuses on entire claims rather than individual terms. *Cox Commc'ns, Inc. v. Sprint Commc'n Co.*, 838 F.3d 1224, 1231 (Fed. Cir. 2016). "Indefiniteness must be proven by clear and convincing evidence." *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017). A claim may be indefinite if the patent does not convey with reasonable certainty how to measure a claimed feature. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015).

III. DISCUSSION

The parties request construction of three terms. The Court addresses each below.

A. Term 1: "F" (claims 1, 5)

BioRad's Proposed Construction	ChromaCode's Proposed Construction	Adopted Construction
Indefinite.	Not indefinite. Plain and ordinary meaning.	Not indefinite. Plain and ordinary meaning.

	To the extent construction is required, "F, a value that scales with a constituent signal."	

BioRad argues that this claim is indefinite for two main reasons. First, BioRad argues that the claim language is "internally inconsistent" regarding "F" because "it can take on different integer values in different independent and dependent claims. BioRad Op. Br. at 7-9. More specifically, BioRad argues that the fact that F can take on the value of, say, 1 in one claim but cannot take that same value in another claim contravenes the general maxim that a "claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent." *Id.* at 7 (quoting *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001)). Second, BioRad argues that the requirement that F be an integer would leave a person of ordinary skill in the art uncertain as to how it should be computed because intensities are not normally represented as integer values. *Id.* at 9-16. The Court finds neither of these arguments persuasive and agrees with ChromaCode that the claim is not indefinite. The Court further agrees that the claim language, read in light of the specification, is sufficiently clear and that accordingly no further claim construction is required.

BioRad first argues that "the claim language itself clearly confirms indefiniteness" because F may have different values across different claims. BioRad Op. Br. at 7. In support of this proposition, BioRad makes the following observations about claims 1, 4, and 19. First, in claim 1, it appears that the minimum value of F is 3 because (1) C is equal to 4, (2) M must be greater than C, and (3) $M = C*\log_2(F+1)$ is not greater than 4 unless F is 3 or greater. By contrast, claim 4, which depends from claim 1, expressly contemplates situations where F is equal to 1. Further, in independent claim 19, which requires that M be equal to 6, if C is equal to 4 than F would be equal to roughly 1.8284 (*i.e.*, not an integer). According to BioRad, these different values of F constitute "contradictory requirements" that "deprive the public of notice of the scope of the invention." BioRad Op. Br. at 9 (quoting *In re Shofovaloff*, No. 24-1035, 2025 WL 1779173, at *2 (Fed. Cir. June 27, 2025) (nonprecedential)).

BioRad's inconsistent-value argument, while creative, does not supply a basis for finding

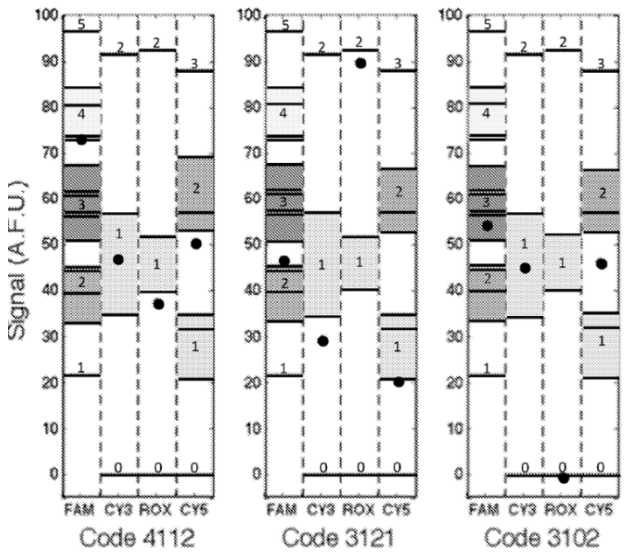
that the term "F," "read in light of the specification delineating the patent[] . . . fail[s] to inform, with reasonable certainty, those skilled in the art bout the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). As a preliminary matter, BioRad cites no authority for the proposition that a variable recited in a patent claim is necessarily indefinite simply because it can take on different values in different claims—this is hardly surprising given that "variables," by their very nature, are expected to "vary."

More fundamentally, however, this argument is inconsistent with governing Federal Circuit precedent. As to BioRad's argument that F can take on a value of 1 in claim 4 but not in claim 1, the Federal Circuit has been clear that "the language of a dependent claim cannot change the scope of an independent claim whose meaning is clear on its face." *Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1360-62 (Fed. Cir. 2018). Indeed, as ChromaCode points out in its response brief, the fact that BioRad is able to clearly decipher the ranges of acceptable values for F based on the claims in which they appear strongly cuts against its argument that a person of ordinary skill in the art would not be able to compute the value of F. *See* ChromaCode Resp. Br. at 3. BioRad's argument as to the supposed inconsistency between claims 1 and 19 is similarly unavailing. While the Court agrees that inserting M = 6 and C = 4 into the formula recited in claim 19 would improperly result in F taking on a non-integer value, nowhere in its briefing does BioRad establish that C *must* be equal to 4. Moreover, BioRad's reliance on *Rexnord* is misplaced. *Rexnord* did not involve a variable governed by a mathematical formula, but instead involved a situation where the specification described a *structural feature* of the invention as being both "integral" and "separate," which is a physical impossibility. 274 F.3d at 1341.

BioRad next argues that the requirement that F be both an integer and an intensity prevents a person of ordinary skill in the art from understanding the limits of F with reasonable certainty because "[i]ntensity is just the strength of a light signal and need not be an integer." BioRad Op. Br. at 9. BioRad further argues that, since F is a cumulative value that is calculated based on the sum of each intensity of the signal generated by the analytes, if one of those constituent intensities is not an integer than F cannot be an integer. *See id.* Stated differently, BioRad argues that neither

the claim language nor the specification sufficiently discloses to a person of ordinary skill in the art how to convert a raw fluorescence intensity detected by a color channel (which is indisputably not an integer) to an integer that satisfies the equation $M = C*\log_2(F+1)$. This argument, however, is belied by the face of the specification, which recites precisely how to convert an intensity measurement—measured in arbitrary fluorescence units—into a single integer value for F.

The specification explains that intensities are grouped into "bands" that correspond to integer values. *See* '797 Patent col. 48 ll. 62-67 ("Cumulative signals corresponding to all possible organizations of the same rank in the same color were organized into their own 'band.' Doing this for all four colors produced a level and band structure[] . . . ."). Specifically, figure 3 provides an example where six analytes are encoded and a chromatogram is "constructed using positive controls . . . to assemble every possible combination of present sequences in each color," *id.* col. 48 ll. 38-62:



Id. at fig. 3.

The specification explains that the bands constructed using the positive control samples represent a range of intensities rather than single intensity values, and it is these ranges that are ultimately encoded into integer values. *Id.* at col. 48 ll. 62-67. It is thus of little relevance that the underlying measurement (intensity) is itself not an integer value, since the specification clearly explains to a person of ordinary skill in the art how to convert that non-integer value into an

integer as provided by the coding scheme covered by the claims.

At oral argument, BioRad sought to analogize this case to *Dow Chemical Co. v. Nova Chemicals Corp. (Canada)*, 803 F.3d 620 (Fed. Cir. 2015). In *Dow*, the Federal Circuit explained that the claim term "slope of strain hardening coefficient" was indefinite where there existed multiple methods of calculating such a slope and the asserted patent's claims and specification did not provide any guidance to an ordinarily skilled artisan as to which method to choose. *Id.* at 634. But that is plainly not the case here, where the claim language itself explains that F "is a positive integer and is equal to the maximum cumulative intensity of the first component of the signal, for any second value, when all of the analytes are present" such that $M = C*\log_2(F+1)$. '797 Patent col. 28 ll. 39-44.

BioRad apparently argues that there is insufficient explanation in the '797 Patent's specification as to how raw intensity measurements are scaled to discrete integer values and that such insufficiency renders "F" indefinite. *See* BioRad Op. Br. at 9-11. Unlike the situation in *Dow*, where there were multiple ways to calculate a slope that would result in different values, there is only one way to calculate F once the intensity measurements have been scaled to integers. BioRad's citation to *Akamai Technologies, Inc. v. MediaPointe, Inc.*, 159 F.4th 1370 (Fed. Cir. 2025), is even further afield, since, unlike the patent at issue in that case, the claim terms do not require an "optimal" or "best" measurement without the specification "giv[ing] the required objective boundaries for determining" such metrics. *See id.* at 1378. Put simply, the claim's description of how to calculate F is sufficient to apprise a person of ordinary skill in the art of the relationship between the variables M, C, and F.

Finally, to the extent that BioRad invites the Court to inject ambiguity into the '797 Patent's teachings based on the patent's prosecution history or the Parties' infringement contentions, *see* BioRad Op. Br. at 14-16, the Court declines that invitation, since the claim itself teaches how to calculate F. The Court is similarly unpersuaded by BioRad's last-ditch effort—raised for the first time in supplemental briefing,[1] weeks after the *Markman* hearing—that Caltech

[1] ChromaCode and Caltech opposed BioRad's administrative motion for leave to file a supplemental claim construction brief. *See* ECF No. 188. The Court need not decide whether the

and its expert witness's representations before the Patent Trials and Appeals Board during inter partes review "confirms" the claim term's indefiniteness. *See* ECF No. 187-4. Although BioRad contends that labelling signal levels is shown to be an "arbitrary choice" rendering the claim language indefinite, *see id.* at 6-7, the Court does not find BioRad's characterization of the inter partes review proceedings to be accurate. Nothing in BioRad's supplemental briefs plausibly suggests that the claim fails to identify a single preferred method for calculating F.

Based on the claim language and specification, the Court concludes that no construction of the term "F" is required. A person of ordinary skill in the art would understand that F simply refers to the highest cumulative intensity value when all analytes are present.

B. Term 2: "analyte-specific hybridization probes" (claims 1, 10)

BioRad's Proposed Construction	ChromaCode's Proposed Construction	Adopted Construction
"a reagent capable of generating a signal in the presence of particular analyte and that hybridizes to the analyte"	Plain and ordinary meaning. To the extent construction is required, "a probe that binds to a portion of an analyte having a specific sequence, with the sequence generally also characterizing the analyte."	"a reagent capable of generating a signal in the presence of particular analyte and that hybridizes to the analyte"

BioRad argues that the term "probe" should be construed as it is defined in the specification, which states that the "term 'probe,' as used herein, generally refers to a reagent capable of generating a signal in the presence of a particular analyte." BioRad Op. Br. at 19 (quoting '797 Patent col. 11 ll. 19-21). BioRad's construction further specifies that the probe must "hybridize[] to the analyte," based on "the fact that the probes at issues are 'analyte specific hybridization' probes." *Id.* ChromaCode urges that this construction is inconsistent with how TAQMAN probes, which are disclosed in a preferred embodiment, function, charging that "a POSITA would understand that a TAQMAN probe is only capable of generating a signal after (1) the probe hybridizes to a sequence in the analyte, (2) a polymerase copies that sequence which

filing of this brief is unwarranted since the arguments raised therein overlap substantially with BioRad's infringement contention and other prosecution history arguments and are similarly unpersuasive.

degrades the probe and releases the probe's quencher from the probe's fluorophore, and (3) the fluorophore is excited." ChromaCode Op. Br. at 15.

The Court will not give a term its plain meaning when the patentee departs from the plain and ordinary meaning by acting as its own lexicographer. "To act as its own lexicographer, a patentee must 'clearly set forth a definition of the disputed claim term' other than its plain and ordinary meaning." *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (quoting *CCS Fitness, Inc. v. Brunswick Corp.,* 288 F.3d 1359, 1366 (Fed. Cir. 2002)). The specification is "relevant and controlling insofar as it provides clear lexicography." *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004). In other words, the patentee must "clearly express an intent" to redefine the term. *Helmsderfer v. Bobrick Washroom Equip., Inc.,* 527 F.3d 1379, 1381 (Fed. Cir. 2008).

Here, the '797 Patent's specification provides an express description of what is meant by the term probe as used throughout the patent in a section titled "Definitions." '797 Patent col. 9 l. 64. That is: "The term 'probe,' as used herein, generally refers to a reagent capable of generating a signal in the presence of a particular analyte. A probe generally has at least two portions: a portion capable of specifically recognizing an analyte, or a portion thereof, and a portion capable of generating a signal in the presence of an analyte[.]" *Id.* at col. 11 ll. 19-23. The patent clearly evinces an intent to define a set of terms, including the term "probe," in this section of the specification, and the Court accordingly effectuates that intent. The Court further finds that construing the claim term so as to require that the probe hybridize to the analyte, as BioRad suggests, follows straightforwardly from the claim language.

Frustratingly, the parties have committed themselves to already injecting ambiguity into the straightforward construction of the claim term as defined by the '797 Patent's specification. At oral argument, BioRad was evasive when directly asked by the Court whether it intended for its construction to exclude TAQMAN probes, baldly asserting that the issue was not pertinent to claim construction. *See* Tr. at 54:2–3 ("It might [read out TAQMAN probes.] But you know what? That's not our job here today."). On the contrary, whether a defendant's claim construction operates to exclude a preferred embodiment disclosed by the asserted patent is plainly an issue of

claim construction. The Court admonishes the parties that the adopted construction is not inconsistent with how the '797 Patent's specification describes TAQMAN probes. With this in mind, the Court adopts BioRad's construction of the claim term as "a reagent capable of generating a signal in the presence of particular analyte and that hybridizes to the analyte."

C. Term 3: "associating, for each analyte, a first value in a first component of the cumulative signal" (claim 1)

BioRad's Proposed Construction	ChromaCode's Proposed Construction	Adopted Construction
"associating each analyte with one value in a series of values for a first component of the cumulative signal that follow the progression 1, 2, 4, 8, 16, and so on"	Plain and ordinary meaning. To the extent construction is required, "assigning each analyte to an intensity value of the cumulative signal and a wavelength value of the cumulative signal, wherein each intensity value is an intensity or range of intensities and each wavelength value is a wavelength or range of wavelengths."	Plain and ordinary meaning.

BioRad argues that the "specification is unambiguous" that the invention contemplates the "situation where the signals for the individual analytes follow the progression 1, 2, 4, 8, 16, and so on." BioRad Op. Br. at 18. BioRad thus seeks a claim construction that would limit the claim term "a first value" to the range of values following the progression 2^n. ChromaCode responds that the term does not require construction and that a person of ordinary skill in the art "would readily understand that an intensity or range of intensities and a wavelength (color) or range of wavelengths are associated with each analyte." ChromaCode Op. Br. at 16.

The Court does not find any construction to be necessary, since the claim term is expressed in general descriptive words, and it is unclear why it should be so limited simply because of an embodiment recited in the specification. *See Renishaw*, 158 F.3d at 1249. Rather, the '797 Patent describes how to use several encoding schemes and decoding matrices, including embodiments that are non-degenerate by design and those that are non-degenerate based on other types of

coding schemes. Because the '797 Patent discloses associating the values of components of a cumulative signal more broadly than this specific embodiment, no such limitation is required.

Nothing in the '797 Patent's claims or specification requires limiting the claim language to the construction suggested by BioRad. The Court accordingly concludes that no construction beyond plain and ordinary meaning is necessary.

IV. ORDER

For the foregoing reasons, the Court construes the following terms:

	Claim Term	Court's Construction
1	"F" (claims 1, 5)	Not indefinite. Plain and ordinary meaning.
2	"analyte-specific hybridization probes" (claims 1, 10)	"a reagent capable of generating a signal in the presence of particular analyte and that hybridizes to the analyte"
3	"associating, for each analyte, a first value in a first component of the cumulative signal" (claim 1)	Plain and ordinary meaning.

IT IS SO ORDERED.

Dated: January 30, 2026

Eumi K. Lee
United States District Judge