

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

WSOU INVESTMENTS, LLC d/b/a/ BRAZOS  
LICENSING AND DEVELOPMENT,

Plaintiff,

v.

XILINX, INC.,

Defendant.

C.A. No. 20-1228-CFC-JLH  
(Consolidated)

**REPORT AND RECOMMENDATION**

Pending before the Court are the parties’ claim construction disputes in four consolidated cases. (C.A. Nos. 20-1228; 20-1229; 20-1231; 20-1232.) These cases involve four patents directed to aspects of communications systems. The parties originally requested that the Court construe thirteen disputed terms in five patents, but they subsequently settled their claims regarding one of those patents. (D.I. 142.<sup>1</sup>) The parties were unable to agree on the construction of any terms in the four remaining patents, and they are asking for construction of nine terms.

The four patents are U.S. Patent Nos. 6,784,653 (the “’653 patent”), 7,068,950 (the “’950 patent”), 7,613,938 (the “’938 patent”), and 7,903,971 (the “’971 patent”). I held a *Markman* hearing on May 25, 2022. (“Tr \_\_.”) I recommend that the Court adopt the constructions set forth below:

	<b>Term</b>	<b>Recommended Construction</b>
1.	“directly connected” (’653 patent, claims 1 & 7)	“connected only by conductors like wires or metal traces”

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<sup>1</sup> Docket citations refer to C.A. No. 20-1228, unless otherwise noted.

2.	“decision circuit” (’653 patent, claims 1 & 7)	“circuit that decides whether an input signal is a binary ‘1’ or ‘0’ by comparing the input signal to a threshold.”
3.	“an analyzer configured (i) to analyze spectral power of an input signal corresponding to the carrier and data signals, the spectral power being in a spectral band corresponding to a spectral null of the input signal, and (ii) to generate a control signal based on the analysis” (’950 patent, claim 1)	Governed by pre-AIA 35 U.S.C. § 112, ¶ 6.  Function: “(i) to analyze spectral power of an input signal corresponding to the carrier and data signals, the spectral power being in a spectral band corresponding to a spectral null of the input signal, and (ii) to generate a control signal based on the analysis.”  Structure: A spectrum analyzer and [an algorithm disclosed in the specification that can perform the claimed second function <sup>2</sup> ].  Not shown indefinite at this stage.
4.	“[input]/[data-modulated] signal corresponding to the carrier and data signals” (’950 patent, claims 1 & 17)	The [input]/[data-modulated] signals are not limited to optical signals.
5. & 6.	“a spectral band corresponding to a spectral null” (’950 patent, claims 1 & 17)	Not shown indefinite. Parties shall meet and confer about construction consistent with discussion below.
7.	“operable independent of the controller” (’938 patent, claim 13)	“able to operate while the controller is powered down”
8.	“wherein the plurality of signal states and the number of bits in each sequence are increased” (’971 patent, claims 1 & 15)	“wherein an increase in the plurality of signal states and the number of bits in each sequence is performed automatically”
9.	“based on a transmission quality of the optical signal” (’971 patent, claims 1 & 15)	“based on analysis and evaluation of a characteristic of the optical signal”

## I. LEGAL STANDARDS

### A. Claim Construction

The purpose of the claim construction process is to “determin[e] the meaning and scope of the patent claims asserted to be infringed.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). When the parties have an actual dispute

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<sup>2</sup> See *infra* Discussion.

regarding the proper scope of claim terms, their dispute must be resolved by the judge, not the jury. *Id.* at 979. The Court only needs to construe a claim term if there is a dispute over its meaning, and it only needs to be construed to the extent necessary to resolve the dispute. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

“[T]here is no magic formula or catechism for conducting claim construction.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed. Cir. 2005). But there are guiding principles. *Id.* “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” *Id.* at 1313. In some cases, the ordinary meaning of a claim term, as understood by a person of ordinary skill in the art, is readily apparent even to a lay person and requires “little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314. Where the meaning is not readily apparent, however, the court may look to “those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.” *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). Those sources include “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.” *Id.*

“The claims themselves provide substantial guidance as to the meaning of particular claim terms.” *Phillips*, 415 F.3d at 1314. For example, “the context in which a term is used in the asserted claim can be highly instructive.” *Id.* Considering other, unasserted, claims can also be helpful. *Id.* “For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314–15.

In addition, the “claims must be read in view of the specification, of which they are a part.” *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The specification “is always highly relevant to the claim construction analysis.” *Id.* (quoting *Vitronics*, 90 F.3d at 1582). The specification may contain a special definition given to a claim term by the patentee, in which case, the patentee’s lexicography governs. *Id.* at 1316. The specification may also reveal an intentional disclaimer or disavowal of claim scope. *Id.* However, “even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (internal marks omitted).

Courts should also consider the patent’s prosecution history. *Phillips*, 415 F.3d at 1317. It may inform “the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.” *Id.* Statements made by a patentee or patent owner during inter partes review may also be considered. *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1362 (Fed. Cir. 2017).

In appropriate cases, courts may also consider extrinsic evidence, which “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Markman*, 52 F.3d at 980. For example, dictionaries, especially technical dictionaries, can be helpful resources during claim construction by providing insight into commonly accepted meanings of a term to those of skill in the art. *Phillips*, 415 F.3d at 1318. Expert testimony can also be useful “to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish

that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Id.*; see also *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331–32 (2015).

## **B. Indefiniteness**

Section 112 of Title 35 imposes a definiteness requirement on patent claims. 35 U.S.C. § 112(b) (requiring that the claims “particularly point[] out and distinctly claim[] the subject matter which the inventor . . . regards as the invention”). “The primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, e.g., competitors of the patent owner, can determine whether or not they infringe.” *All Dental Prodx, LLC v. Advantage Dental Prod., Inc.*, 309 F.3d 774, 779–80 (Fed. Cir. 2002).

“A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Definiteness, like claim construction, should be assessed from the viewpoint of a person of ordinary skill in the art at the time the patent was filed, and it should be considered in view of the patent’s specification and prosecution history. *Id.* at 908.

The party asserting indefiniteness has the burden to prove it by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017).

## **II. DISCUSSION**

My Report and Recommendation was announced from the bench on May 31, 2022, as follows:

I am prepared to issue a ruling on the disputes argued on Wednesday, May 25, 2022. I will not be issuing a separate written Report and Recommendation, but we will file on the docket a transcript of my oral ruling today. . . . I want to emphasize before I

announce my recommendations that while I am not issuing a separate written opinion, we have followed a full and thorough process before making the recommendations I am about to state.

We have reviewed the patents in suit. Each side submitted lengthy technology tutorials. There was also full briefing on each of the disputed terms. The parties submitted their briefing in accordance with my procedures, so each side had the opportunity to submit two briefs, and they were combined into one joint claim construction brief incorporating all arguments. The parties' joint claim construction chart and brief also included numerous exhibits. Those exhibits included portions of the prosecution histories relied on by the parties as well as voluminous expert declarations from Drs. Daniel Foty, Duncan MacFarlane, and Nathaniel Polish. Neither party elected to put on live expert testimony.

Everything submitted has been carefully considered. To be clear, while my oral ruling will cite to the evidence that I conclude best supports my recommended constructions, my failure to cite to other evidence provided by the parties does not mean that I ignored or failed to consider it. As I stated, I have considered all of the arguments and evidence cited by the parties.

I am not going to read into the record my understanding of the general legal principles of claim construction. I set forth the legal standard in my opinion in *3Shape A/S v. Align Tech., Inc.*,<sup>3</sup> and I incorporate that articulation by reference. Defendant has also argued that a number of the disputed terms are indefinite. My understanding of the law of indefiniteness was also set forth in *3Shape v. Align*.<sup>4</sup>

**["directly connected"]**

The first term to be construed is "directly connected." That term is found in claims 1 and 7 of the '653 patent.<sup>5</sup>

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<sup>3</sup> C.A. No. 18-886, 2020 WL 2188857, at \*1–2 (D. Del. May 6, 2020).

<sup>4</sup> *Id.* at \*2.

<sup>5</sup> Claim 1 recites:

1. Eye monitor for evaluating a binary input signal of a transmission link and for recognizing the edges of an eye diagram of the input signal, comprising a decision circuit which is directly connected to an integrator, wherein the input signal and a variable

WSOU says that the phrase doesn't need construction or, alternatively, that it should be construed to mean "connected [without an EXOR circuit] such that the output of the decision circuit corresponds to the input of the integrator." Xilinx proposes "connected [by a wire or metal trace] with nothing in between."

Notwithstanding Xilinx's use of the phrase "nothing in between," the parties agree that there can be something between the decision circuit and the integrator. But they disagree about what connectors can be present and still result in the two components being "directly connected." Xilinx takes the narrow view—only wires and metal traces connecting the decision circuit to the integrator fall within the phrase. WSOU argues that the decision circuit and the integrator can be directly connected even though there are other active components between them. According to WSOU, what makes a connection "direct" is that it does not materially change the encoded data.

The dispute is essentially whether the phrase can include simple active components used to transmit the signals from the decision circuit to the integrator without changing the data, such as buffers, inverters, and amplifiers. I agree with Xilinx that the term "directly connected" does not allow such active components.

Starting with the language of the claim, the use of the word "direct" suggests that there is nothing else besides the wire or other component that makes the connection. That interpretation is consistent with the specification, including Figure 3, which shows the preferred embodiment with nothing besides an arrow connecting the decision circuit and the integrator. The specification describes that figure as "directly connected." ('653 patent 2:57–64.) WSOU

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threshold are provided to the decision circuit and wherein an output signal of the integrator is used to recognize the edges of the eye diagram.

Claim 7 recites:

7. Method of evaluating a binary input signal of a transmission link and of recognizing the edges of an eye diagram of the input signal, wherein a decision circuit is directly connected to an integrator, and comprising the steps of providing the input signal and a variable threshold to the decision circuit and using an output signal of the integrator to recognize the edges of the eye diagram.

offered no evidence that a person of skill in the art would understand the figures or language differently.

Instead, WSOU points out that the specification described “[t]he difference between the” preferred embodiment and the prior art as the removal of an “EXOR circuit.” (*Id.*) According to WSOU, then, “directly connected” could be read to mean any circuit without an EXOR.

The problem for WSOU is that, ultimately, the scope of the invention is described by the claims; the patentee is not entitled to everything not in the prior art. The patent could have claimed any circuit without an EXOR. The patent could have said in the specification that certain other components could be part of a “direct connection.” It did neither.

Although WSOU suggests that its proposal better captures the purpose of the invention, it fails to do so. The specification teaches that the “direct connection” is advantageous because EXOR circuits operate too slowly for modern high bit-rate channels, but a “direct connection” can operate above 10 gigabits per second. (*Id.* 2:14–37.) A person of skill in the art would recognize many other components that had the same problem as the prior art’s EXOR.<sup>6</sup> For example, WSOU suggested at oral argument that a “direct connection” could include any number of NAND and NOR circuits. (Tr. 21:16–22:5.) It would defeat the purpose of this invention to include [all combinations of] such components in this phrase.

Accordingly, I recommend that the term “directly connected” be construed to mean “connected only by conductors like wires or metal traces.”

#### **[“decision circuit”]**

The second term to be construed is “decision circuit.” That term is also found in claims 1 and 7 of the ’653 patent.

WSOU says the term needs no construction and should be given its plain and ordinary meaning. To resolve the parties’ dispute, WSOU has clarified that it thinks the plain and ordinary meaning is “a circuit capable of generating an output signal based on a comparison of an input signal against another criterion.” Xilinx argues the term should be construed to mean a “circuit that decides whether an input signal is a binary ‘1’ or ‘0’ by comparing the input

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<sup>6</sup> See, e.g., D.I. 135, Ex. 1 (Foty Decl.) ¶¶ 53–61.



signal to the variable threshold.” The crux of their dispute is whether the claimed “decision circuit” is limited to circuits whose input signal can only be one of two states (not including noise).

The Plaintiff’s expert, Dr. Polish, notes that in the art a decision circuit can refer to circuits that decide between inputs with more than two states.<sup>7</sup> That may be true, but it is not how the term is used in the ’653 patent.

First, the claims say that “a *binary* input signal of a transmission link . . . and a variable threshold are provided to the decision circuit.” Second, the claims are consistent with the description in the specification, which discloses that “a *binary* input signal of a transmission link . . . and a variable threshold are provided to the decision circuit.” (’653 patent 2:23–29.) Third, the specification teaches that a central improvement of the invention is a novel integrator, which identifies the edges of the input signal by the ratios of ones and zeros output by the “decision circuit” at different thresholds. (*Id.* 2:25–4:2.) Therefore, the claimed decision circuit must have both a binary input and a binary output. Indeed, the very concept of any “eye diagram” and an “eye monitor” requires an input signal with two levels: the edges of the signal that form the top and bottoms of the eye and, if the signal is clear, nothing in between.<sup>8</sup>

Accordingly, I recommend that the Court construe a “decision circuit” as a “circuit that decides whether an input signal is a binary ‘1’ or ‘0’ by comparing the input signal to a threshold.”

**[“an analyzer configured to . . .”]**

The third term to be construed is “an analyzer configured (i) to analyze spectral power of an input signal corresponding to the carrier and data signals, the spectral power being in a spectral band corresponding to a spectral null of the input signal, and (ii) to generate a control signal based on the analysis.” This term is found in claim 1 of the ’950 patent.<sup>9</sup>

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<sup>7</sup> (D.I. 135, Ex. 13 (Polish Decl.) ¶¶ 69, 72–73.)

<sup>8</sup> (*Id.*, Fig. 2, ¶ 40.)

<sup>9</sup> Claim 1 recites:

1. An apparatus for reducing misalignment between a carrier signal and a data signal, the apparatus comprising:

There are essentially three disputes about this phase. First, the parties disagree whether this term is a means-plus-function term governed by [pre-AIA] 35 U.S.C. § 112, ¶ 6. Xilinx says it is, but WSOU counters that the word “analyzer” connotes sufficiently definite structure to inform a person of skill in the art about its scope without invoking means-plus-function rules.

Claims without the word “means” are presumed not to be means-plus-function. But that presumption is rebutted if a claim does not recite “sufficient structure for performing [a claimed] function.”<sup>10</sup>

There is no real dispute that there are several kinds of “analyzers” a person of skill in this art would recognize. The claim language expressly refers to an “analyzer configured [] to analyze spectral power of an input signal.” That suggests the claimed analyzer is a *spectrum* analyzer. Consistent with that, WSOU argues that, in the context of the claim, a person of skill in the art would recognize the claimed analyzer to refer to a spectrum analyzer. The parties agree that spectrum analyzers that measure the power in a spectral band are well-known in the art.<sup>11</sup> For example, a person of skill in the art would recognize that Figures 3A, 3B, and 8A were made by a spectrum analyzer.<sup>12</sup>

The problem with WSOU’s argument is that the “analyzer” required by claim 1 does more than just measure the input’s power spectrum—the claim also requires the analyzer to analyze the power

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- (a) an analyzer configured (i) to analyze spectral power of an input signal corresponding to the carrier and data signals, the spectral power being in a spectral band corresponding to a spectral null of the input signal, and (ii) to generate a control signal based on the analysis; and
  - (b) a phase shifter configured to introduce a phase shift between the data signal and a clock signal using the control signal, wherein the carrier signal is based on the clock signal.

<sup>10</sup> *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015) (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)).

<sup>11</sup> (E.g., D.I. 135, Ex. 14 (Polish Reply Decl.) ¶ 42, Ex. 5; Tr. 61:1–22.)

<sup>12</sup> (See D.I. 135, Ex. 13 (Polish Decl.) ¶ 104.)

spectrum in a spectral band around a spectral null and generate a control signal based on the analysis. The claim recites no structure to perform that function besides the generic term “analyzer.” And none of the references WSOU cites about generic spectrum analyzers disclose the ability to perform that function.

Plaintiff’s expert, Dr. Polish, says in his opening [declaration] that a person of skill in the art would understand that the claimed “analyzer” is a structure that can analyze spectral power and generate a control signal based on the analysis.<sup>13</sup> But that’s not saying anything. Those are the claimed functions, and the law requires that the claimed analyzer be a structure that can perform them. The law *also* requires the claims to include objective guidelines about what structures are claimed beyond merely the ability to perform the claimed functions.<sup>14</sup> Dr. Polish’s statement doesn’t shed any light on whether the word “analyzer” connotes sufficient guidelines to one of skill in the art. And neither party has presented other evidence that a person of skill in the art would know a definite category of “analyzers” that could perform the claimed second function.

WSOU suggests a person of skill in the art could program a spectrum analyzer to perform the claimed second function. “But the fact that one of skill in the art could program a computer to perform the recited function[] cannot create structure where none otherwise is disclosed.”<sup>15</sup> I therefore find, based on the record before me, that the claim does not recite to one of skill in the art sufficient structure to perform the claimed second function. Accordingly, the term “analyzer” should be construed as a means-plus-function limitation.

This brings me to the second and third disputes. The second dispute is about what structures correspond to the claimed functions and whether the corresponding structure has to include an algorithm.

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<sup>13</sup> (D.I. 135, Ex. 13 (Polish Decl.) ¶ 96.)

<sup>14</sup> *Williamson*, 792 F.3d at 1349 (citing *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996)); *see also Nevro v. Bos. Sci. Corp.*, 955 F.3d 35, 39 (Fed. Cir. 2020) (“[T]he ambiguity inherent in functional terms may be resolved where the patent ‘provides a general guideline and examples sufficient to enable a person of ordinary skill in the art to determine the scope of the claims.’” (quoting *Enzo Biochem. Inc. v. Applera Corp.*, 599 F.3d 1325, 1335 (Fed. Cir. 2010))).

<sup>15</sup> *Williamson*, 792 F.3d at 1351 (citing *Function Media, LLC v. Google, Inc.*, 708 F.3d 1310, 1319 (Fed. Cir. 2013)).

As I understand it, there is no real dispute that there are two functions recited in the claim, that the corresponding structure has to include at least a spectrum analyzer like the example in Figure 5, and that a spectrum analyzer has to include at least a processor. Where the parties disagree is that Xilinx argues that the corresponding structure must also include a specific algorithm, and WSOU says, essentially, that the spectrum analyzer—with a processor—is sufficient corresponding structure.

I agree with Xilinx that the corresponding structure must include an algorithm. Whether it's the processor in the spectrum analyzer that generates the control signal or it's a specialized processor, the case law has consistently held that when a mean-plus-function claim requires a computer to perform a specific function, the claim is limited to algorithms disclosed to accomplish that [and their equivalents].<sup>16</sup> Generating a control signal from the power in a spectral null is a specific function, so the corresponding structure must include an algorithm.

Turning to the final dispute, Xilinx says that the claim is indefinite because the specification fails to disclose an algorithm that can perform the claimed function. This is a close question because, on the one hand, WSOU's proposed corresponding structure does not identify where an algorithm is disclosed in the specification, instead taking the position that the term was not a [§] 112 [¶] 6 limitation and the alternative position that, even if it were, the proper construction did not need to include an algorithm. On the other hand, it is Xilinx's burden to demonstrate by clear and convincing evidence that no algorithm is disclosed in the specification for performing the claimed function. Having carefully reviewed the patent and Xilinx's expert declaration, I cannot find on this record that Xilinx has met that burden.

In coming to that conclusion, I note that the specification isn't completely silent about how the second function is performed. The disclosure may not fill in every detail, but "a means-plus-function clause is indefinite" only "if a person of ordinary skill in the art would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim."<sup>17</sup>

Accordingly, I recommend that the Court deny Xilinx's indefiniteness argument with leave to renew it at the summary

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<sup>16</sup> See, e.g., *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1312 (Fed. Cir. 2012).

<sup>17</sup> *AllVoice Computing PLC v. Nuance Comms., Inc.*, 504 F.3d 1236, 1241 (Fed. Cir. 2007).

judgment stage of the case. The parties can address the question of whether the specification discloses an algorithm at that time. The most I can say now is that the analyzer should be construed as a means-plus-function term and that the corresponding structure must include at least a spectrum analyzer and an algorithm disclosed in the specification that can perform the claimed second function.

**["[input]/[data-modulated] signal corresponding to the carrier and data signals"]**

The fourth term to be construed is an “[input]/[data-modulated] signal corresponding to the carrier and data signals.” These terms are found in claims 1 and 17 of the ’950 patent.<sup>18</sup>

The parties agree both terms should be given the same construction, but dispute whether it should be limited to optical applications.<sup>19</sup> WSOU argues the terms should be given their plain and ordinary meaning. WSOU doesn’t say what that plain and ordinary meaning is, but it says it can include signals from non-optical systems. Xilinx argues that the disputed phrases should each be construed as “an input signal corresponding to a modulated optical signal.”

Starting with the independent claims in which the disputed terms appear, they are not limited to optical signals. Nor do they recite any devices the parties argue are specific to optics, whereas dependent claims 9–14 and 26 do. That suggests that the independent claims should not be limited to optical signals.

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<sup>18</sup> Claim 17 recites:

17. A method of reducing misalignment between a carrier signal and a data signal, comprising the steps of:
- (i) analyzing spectral power of a data-modulated signal corresponding to the carrier and data signals, the spectral power being in a spectral band corresponding to a spectral null of the data-modulated signal; and
  - (ii) introducing a phase shift between the data signal and a clock signal based on the analysis, wherein the carrier signal is based on the clock signal.

<sup>19</sup> I am not convinced that either party’s construction accurately captures this claim term. However, my recommendation is limited to the dispute presented to the Court and the evidence of record.

Turning to the specification, it is true that the patent's preferred embodiments are all optical systems. ('950 patent 3:49–4:41.) But the patent refers to those embodiments as “one embodiment of the present invention.” (*Id.* 3:42–43, 4:1.) And the specification expressly says that the invention is not limited to optics. (*Id.* 3:1–14, 6:32–39.) That suggests that the inventor did not understand the disputed phrases to be restricted to optical signals.

Xilinx argues that, all that notwithstanding, the '950 patent solves a problem that is unique to optics, but it cites no evidence to support that argument.

Accordingly, I reject Xilinx's argument that those terms should be limited to signals in optical systems.

**["spectral null" & "a spectral band corresponding to a spectral null"]**

The fifth and sixth terms to be construed are “spectral null” and “a spectral band corresponding to a spectral null.” Both phrases are found in claims 1 and 17 of the '950 patent.

WSOU says that “spectral null” does not need to be construed or, in the alternative, that it be construed to mean “loss or reduction of power indicative of misalignment.” Xilinx proposes a construction of “a frequency at which the amount of energy transmitted is at a minimum.” The parties agree that a spectral null broadly refers to a negative peak in spectral power. The parties nitpick each other's proposed constructions, but it became clear at oral argument that the real dispute here is whether the term “spectral null,” as used in the claim, refers to a single frequency or a range of frequencies.

WSOU clarified during argument that it believes “a spectral null,” as used in the claims, means the entire frequency range of the curve that forms a negative peak, including both the tip of a peak and the curves on either side. In other words, WSOU argues that every frequency where power decreases because of misalignment is part of a spectral null, not just the frequency where it decreases most (or, at least, more than all the nearby frequencies). Xilinx says that only the local minimum itself, *i.e.*, the point of a negative peak, is a claimed “spectral null.”

Both sides make reasonable arguments grounded in the specification to support their respective positions on the meaning of

“spectral null.” But at this point in time, I don’t understand the parties’ dispute about the meaning of “spectral null” to have any implications to the case aside from defining the “spectral band.” The Court only needs to construe the claims to the extent needed to resolve a dispute. Accordingly, I recommend that the Court decline at this point to construe “spectral null” separately from “a spectral band corresponding to a spectral null.”

As for the “spectral band corresponding to a spectral null,” WSOU says that it’s not indefinite and that it should be given its plain and ordinary meaning, which is “a frequency band that includes at least a frequency” where power is reduced if misaligned. Xilinx says that the spectral band must include at least the frequency of the negative peak of the spectral null but that the phrase spectral band is indefinite because it has no outer limits on how wide the band can be. On this record, I find that Xilinx has failed to meet its burden to establish indefiniteness by clear and convincing evidence.

According to the specification, a “spectral band” could be narrow or broad. In one example, the ’950 patent suggests choosing a 6 GHz wide band centered on a spectral null. (’950 patent 4:64–5:2, 5:13–18.) In other examples, the band is only 2 GHz wide. (*Id.* 4:4–7.) . . . [T]he record does not reflect any reason to think that the band must include the tip of the peak to see an increase or decrease in total power. It seems possible that including the minimum as Xilinx suggests might improve contrast, which might be why the preferred embodiments are designed that way, but embodiments are not limiting. Indeed, the specification mentions that the “spectral band” may be “*near* a [spectral] null,” which suggests that the claimed “spectral band” does not need to include the tip of the negative peak to work. (*Id.* 2:7–11, 4:1–4 (emphasis added).)

The ’950 patent teaches that an “analyzer” can detect misalignment by measuring the decrease in power around a spectral null. (*Id.* 4:1–12, 5:50–6:19.) That suggests that a person of skill in the art would recognize that the “spectral band” must be limited only to parts of the spectrum with this behavior—frequencies where power decreases if the signals are misaligned. The record does not contain clear and convincing evidence that a person of skill in the art would not understand how to determine which parts of the spectrum will behave this way mathematically or experimentally. Thus, Xilinx has not shown by clear and convincing evidence that this term is indefinite.

In light of my recommendation on the issue of indefiniteness, and my conclusion that the claimed spectral band

does not need to include the tip of the negative peak, it's unclear to me whether there are any additional disputes that would benefit from further construction of the phrase. So, I will direct the parties to meet and confer within seven days of the Court posting this Report and Recommendation in written version on the docket [to] see if they can agree about whether the Court needs to engage in additional construction of the claim term in light of what I said and [] if they can agree about what the construction should be in light of what I said. The parties shall file a joint status report within fourteen days [after the written version is put on the docket], setting forth their agreement or their respective positions. The joint status report shall be no more than six pages, single spaced [in no smaller than 12-point font].

**[“operable independent of the controller”]**

The next term is “operable independent of the controller.” This phrase is found in claim 13 of the '938 patent.<sup>20</sup>

The parties agree that the claimed “electrical power device, operable independent of the controller,” must be, at a minimum, capable of operating while the controller is powered down. Xilinx argues that this term requires the electrical power device to only “[o]perat[e] separately from signals or commands of the controller.”

Xilinx relies on the prosecution history of the '938 patent where the applicant distinguished the '938 patent from prior art by arguing, among other differences, that the prior art did not disclose any independent operation. According to the applicant, the “IA” in the prior art was barely more than a middleman—it passed shutdown

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<sup>20</sup> Claim 13 recites:

13. A circuit card comprising:
  - one or more devices,
  - a controller for controlling operation of the circuit card,
  - a switch responsive to a command received from the controller, for causing electrical power to at least one device to be decoupled therefrom for a predetermined period of time, and
  - an electrical power device, operable independent of the controller, that causes electrical power to the at least one device and the controller to be restored after the predetermined time period if the electrical power was also decoupled from the controller.



signals between three devices and never restarted the power while the controller was powered down.<sup>21</sup>

Essentially what Xilinx is saying is that because the prior art device distinguished in the prosecution history did not shut down or restart without a signal from a controller that both types of independent operation should be required by the claim term. I'm not sure the applicant needed to distinguish the prior art by its inability to shut down independently when the prior art did not disclose restarting independently either, but the cited portions of the prosecution history do not amount to a clear disclaimer of scope. The only thing that's clear from the cited portions is that the applicant thought the examiner misunderstood the prior art.

Claim 13 does not expressly require the "electrical power device" to independently power down any device—in claim 13 the "controller" and the "switch" power devices down then the "electrical power device" may re-power them after a predetermined period. Xilinx's position misconstrues the prosecution history and adds a limitation to claim 13 not rooted in either the claim language or the specification.

Accordingly, I reject Xilinx's proposal. I am not sure that the plain language of this claim fully captures the meaning of the term. Based on the discussion at oral argument, I recommend that "operable independent of the controller" be construed as "able to operate while the controller is powered down."

**["wherein the plurality of signal states and the number of bits in each sequence are increased"]**

The next phrase to be construed is "wherein the plurality of signal states and the number of bits in each sequence are increased." This phrase is found in claims 1 and 15 of the '971 patent.<sup>22</sup>

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<sup>21</sup> D.I. 135, Ex. 4; *see also* U.S. Pat. App. 2002/0023233 (prior art distinguished by applicant).

<sup>22</sup> Claim 1 recites:

1. A method of operating a passive optical network comprising an optical line termination being connected via a plurality of optical fibers to a plurality of network terminations and comprising the step of generating an optical signal for transmission over one of the plurality of optical fibers, the optical signal including

WSOU says this term should be given its plain and ordinary meaning, but it did not offer any proposal about what that plain and ordinary meaning is. Xilinx says the claims should be construed as “wherein an increase in the plurality of signal states and the number of bits in each sequence is performed automatically by the optical line termination.” It appeared from the briefing that the parties actually had two disputes: whether the change must be automatic and whether the change must be performed by the optical line termination (OLT). But at oral argument, Xilinx clarified that the real dispute it wants to resolve is whether the increase is performed “automatically” and that it would be amenable to a construction that does not require that the change must be performed by the OLT.

Although the claim itself does not use the word “automatically,” I agree with Xilinx that the disputed phrase does not allow the type of manual change WSOU appears to want to cover. As an initial matter, the claims recite that the change is made based on transmission quality. If the configuration of the system and claimed method of operating it permits the transmission quality to materially change without the signal state changing, as WSOU appears to contend, I don’t understand how the signal state changes are based on the transmission quality.

That is consistent with the specification, where all the embodiments feature network devices that make the change

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a plurality of signal states, each signal state corresponding to a different sequence of bits, wherein the plurality of signal states and the number of bits in each sequence are increased based on a transmission quality of the optical signal on the one of the plurality of optical fibers.

Claim 15 recites:

15. A method of operating a passive optical network comprising an optical line termination being connected via a plurality of optical fibers to a plurality of network terminations and comprising the step of generating an optical signal for transmission over one of the plurality of optical fibers, the optical signal including a plurality of signal states, each signal state corresponding to a different sequence of bits, wherein the plurality of signal states and the number of bits in each sequence are increased based on a transmission quality of the optical signal on the one of the plurality of optical fibers.

automatically.<sup>23</sup> The specification contrasts the invention with “pre-defined” signaling modes where a user controls the signaling mode. (’971 patent 1:16–24, 5:31–44.) Finally, while I believe that this dispute might be resolved on the intrinsic evidence, I note that Xilinx submitted an expert declaration in support of its position and WSOU offered no evidence to suggest a person of skill in the art would understand the claims to cover manually setting the signaling mode.<sup>24</sup>

I thus reject WSOU’s position that the change can be manual. Accordingly, I recommend that “wherein the plurality of signal states and the number of bits in each sequence are increased” be construed as “wherein an increase in the plurality of signal states and the number of bits in each sequence is performed automatically.”

**[“based on a transmission quality of the optical signal”]**

I now turn to the final term, “based on a transmission quality of the optical signal.” This phrase is also found in claims 1 and 15 of the ’971 patent.

Xilinx argues that this term should be construed as “based on analysis and evaluation of a characteristic of the optical signal.” WSOU says it wants the plain and ordinary meaning but argues for something totally different—WSOU wants this term to mean any change related to the quality of the signal, even if no characteristic of the signal is ever measured, analyzed, or evaluated.

I reject WSOU’s argument. The claim language clearly requires the change to be based on the quality of the optical signal. No reasonable interpretation of the words “based on” would include a change that was not somehow inspired by a quantitative measurement of the quality.

I’m not sure the Court needs to adopt a construction to reject WSOU’s position, but I agree that Xilinx’s proposed construction captures the plain meaning of the term. Accordingly, I recommend

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<sup>23</sup> See *GPNE Corp. v. Apple Inc.*, 830 F.3d 1365, 1370 (Fed. Cir. 2016) (“[W]hen a patent ‘repeatedly and consistently’ characterizes a claim term in a particular way, it is proper to construe the claim term in accordance with that characterization.” (quoting *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1318 (Fed. Cir. 2014))).

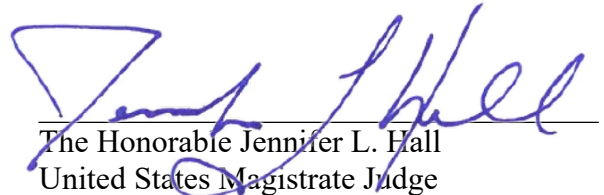
<sup>24</sup> See *Phillips*, 415 F.3d at 1312–13 (the words of a claim are understood as a person of skill in the art would interpret them).

that “based on a transmission quality of the optical signal” should be construed as “based on analysis and evaluation of a characteristic of the optical signal.”

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B), (C), Federal Rule of Civil Procedure 72(b)(1), and District of Delaware Local Rule 72.1. Any objections to the Report and Recommendation shall be filed within fourteen days and limited to ten pages. Any response shall be filed within fourteen days thereafter and limited to ten pages. The failure of a party to object to legal conclusions may result in the loss of the right to *de novo* review in the district court.

The parties are directed to the Court’s “Standing Order for Objections Filed Under Fed. R. Civ. P. 72,” dated March 7, 2022, a copy of which can be found on the Court’s website.

Dated: June 10, 2022

  
The Honorable Jennifer L. Hall  
United States Magistrate Judge