

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NOKIA OF AMERICA CORPORATION et al.,
Petitioner,

v.

IARNACH TECHNOLOGIES LIMITED,
Patent Owner.

IPR2024-00900
Patent 8,934,359 B2

Before TERRENCE W. MCMILLIN, CHRISTOPHER L. OGDEN, and
JOHN R. KENNY, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Nokia of America Corporation and AT&T Services, Inc. (collectively “Petitioner”)¹ filed a Petition for *inter partes* review of claims 1–11 of U.S. Patent No. 8,934,359 B2 (Ex. 1001, “the ’359 patent”). Paper 3 (“Pet.”), 1. Iarnach Technologies Limited (“Patent Owner”)² filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). With our authorization, Petitioner’s Reply (Paper 11, “PET Reply”) was filed and Patent Owner’s Sur-reply (Paper 13, “PO Sur-reply”) was filed.

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2020) (“The Board institutes the trial on behalf of the Director.”). The standard for institution is set forth in 35 U.S.C. § 314(a), which provides that *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” After considering the arguments of the parties and the evidence of record, we deny institution of an *inter partes* review.

B. *Related Proceeding*

The parties identify the following district court matters related to the ’359 patent: *Iarnach Technologies Ltd. v. AT&T Inc. et al.*, No. 2:23-cv-00231, filed May 26, 2023 (E.D. Tex.) and *Iarnach Technologies Ltd. v.*

¹ Petitioner identifies Nokia of America Corporation; AT&T Ventures, LLC, AT&T Enterprises, LLC, AT&T Mobility II LLC, AT&T Mobility LLC, AT&T Services, Inc., AT&T Communications LLC (AT&T Ventures, LLC) and AT&T Corp (AT&T Enterprises, LLC) as the real parties-in-interest to this proceeding. Pet. 85.

² Patent Owner identifies itself, Iarnach Technologies Ltd., as the real party-in-interest to this proceeding. Paper 5, 2.

Verizon Communications, Inc., et al., No. 2:23-cv-00631, filed December 28, 2023 (E.D. Tex.). Pet. 86; Paper 5, 2. Petitioner indicates that Nokia is an intervenor in case No. 2:23-cv-00231. Pet. 86.

C. The '359 patent (Ex. 1001)

The '359 patent is titled “Method and Passive Optical Network System for Managing Uplink Burst Overhead Parameters.” Ex. 1001, code (54). The '359 patent “relates to the field of optical communication technology, and more particularly, to a method for assigning and managing upstream burst overhead parameters used between an optical line terminal (OLT) and an Optical Network Unit (ONU) in a passive optical network (PON) system.” *Id.* at 1:7–12.

According to the description of the invention’s background, PON technology needs consistent upstream burst overhead parameters in the OLT and the ONU because the ONU sends upstream frames according to the parameters and the OLT correctly receives the upstream frames also according to the parameters. *Id.* at 1:16–22. In the '359 patent, the described parameters include (1) state of Forward Error Correction (FEC), (2) delimiter, (3) preamble, and (4) guard band. *Id.* at 1:25–31.

In an embodiment, while the ONU is at an initial state, the OLT determines and identifies a parameter set according to different levels of the link quality. *Id.* at 7:40–43. The sets are: set 1 used in default and for typical link quality; set 2 for worse than the typical link quality; and set 3 for better than the typical link quality. *Id.* at 8:55–66. Each set includes parameters (1) to (4) discussed above. *Id.* at 7:44–49. While the ONU is in a waiting state, the OLT sends the parameter values to the ONU. 7:47–52. The ONU then uses the parameter values. *Id.* at 7:54–63.

D. Challenged Claims

Petitioner challenges claims 1–11 of the '359 patent. Pet. 1. Claim 1 is the sole independent claim that is challenged. Ex. 1001, 21:47–25:65.

Claim 1 recites:

A method for managing upstream burst overhead parameters, comprising:

an optical line terminal or an optical network unit detecting transmission quality of a downlink between the optical line terminal and the optical network unit;

the optical line terminal or the optical network unit determining the upstream burst overhead parameters suitable for the optical network unit according to the transmission quality; and

the optical network unit starting to use the upstream burst overhead parameters suitable for the optical network unit after switching time determined by the optical network unit itself or indicated by the optical line terminal;

wherein, before the step of the optical line terminal or the optical network unit detecting the transmission quality of the downlink between the optical line terminal and the optical network unit, the method further comprises:

the optical line terminal determining and identifying N kinds of upstream burst overhead parameter sets according to different levels of link quality, wherein N is an integer and is larger than zero; and

the optical line terminal sending a parameter value or an identification of one default upstream burst overhead parameter set to the optical network unit; and the optical network unit receiving the parameter value or the identification of the upstream burst overhead parameter set in a waiting state and using the upstream burst overhead parameter set; or,

the optical line terminal sending parameter values or identifications of more than one upstream burst overhead parameter set to the optical network unit; and the optical

network unit receiving the parameter values or the identifications of the upstream burst overhead parameter sets in a waiting state and using one of the received upstream burst overhead parameter sets.

Ex. 1001, 21:26–22:15 (emphasis added).

E. The Asserted Ground

Petitioner challenges claims 1–11 of the '359 patent based on the ground set forth in the table below.

Claims Challenged	35 U.S.C. §	Reference(s)/Basis ³
1–11	103(a) ⁴	G.984.3, ⁵ Khernmsh ⁶

Pet. 1.

Petitioner supports the Petition with the Declaration of Dr. Alexander V. Sergienko (Ex. 1003), and Patent Owner supports the Preliminary Response with the Declaration of Bruce Schofield (Ex. 2001).

³ Petitioner contends that the cited art qualifies as prior art under applicable law. *See* Pet. 8–9. Patent Owner does not dispute the prior art status of the cited art. *See* Prelim. Resp. We determine that the cited art qualifies as prior art.

⁴ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103, and was effective on March 16, 2013. The application for the '359 patent is a U.S. national stage application of PCT/CN2010/073773 filed June 10, 2010. Because the '359 patent claims a priority date before the effective date of the applicable AIA amendment, the pre-AIA version of § 103 applies for purposes of institution.

⁵ ITU-T Recommendation G.984.3, Gigabit-capable Passive Optical Networks (G-PON): Transmission convergence layer specification (Mar. 2008) (Ex. 1005).

⁶ US 2008/0260378 A1, published Oct. 23, 2008 (Ex. 1014).

II. OBVIOUSNESS ANALYSIS

A. Principles of Law

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

Under 35 U.S.C. § 103(a), “[a] patent claim is unpatentable if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *See also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (similar language). The question of obviousness involves resolving underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and when presented (4) objective evidence of non-obviousness (not presented here). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

Petitioner contends:

A person of ordinary skill in the art (“POSITA”) pertinent to the ’359 Patent would have had at least a bachelor’s degree in electrical engineering, computer engineering, or similar discipline and had at least two years of experience with optical communications and networks. Ex. 1003, ¶ 22. A person with a different degree but with additional relevant experience could still qualify if the additional experience compensates for the different educational background. *Id.*

Pet. 10. Patent Owner does not dispute Petitioner’s contention and presents a near-identical description of a POSITA. Prelim. Resp. 9.

Determining the level of ordinary skill in the art involves various factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The prior art of record may also reflect the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). For purposes of this Institution Decision, we adopt the description offered by Petitioner as it is not disputed by the Patent Owner and is consistent with the ’359 patent and the asserted prior art.

C. Claim Construction

In *inter partes* reviews, the Board construes claims using the same claim construction standard employed in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2023). The “words of a claim ‘are generally given their ordinary and customary meaning,’” as would have been understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en

banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

Petitioner contends that “[t]he [claim] terms should receive their respective plain and ordinary meaning as understood by a person of ordinary skill in the art under *Phillips*.” Pet. 8. Patent Owner agrees. Prelim. Resp. 9.

No need exists to expressly construe any claim terms to resolve the parties’ dispute. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

*D. Asserted Obviousness of Claims 1–11
Based on G.984.3 and Khermosh*

Petitioner challenges claims 1–11 as being obvious in view of G.984.3 and Khermosh. *See* Pet. 15–42. We start with a description of the disclosures of G.984.3 and Khermosh and then consider the unpatentability arguments and evidence to the extent necessary to determine if institution of an *inter partes* review is appropriate.

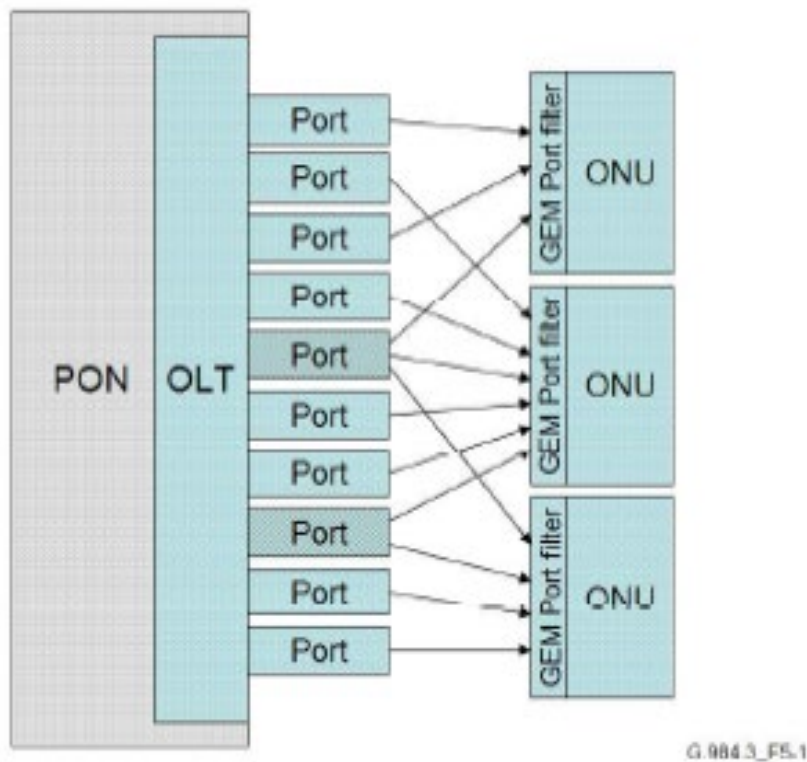
1. G.984.3 (Ex. 1005)

G.984.3⁷ is titled “Gigabit-capable Passive Optical Networks (G-PON): Transmission convergence layer specification” issued by the Telecommunication Standardization Sector of the International

⁷ There are two sets of page numbers in G.984.3 (Ex. 1005). We follow the practice in the Petition of using the original page numbers of this reference.

Telecommunications Union.⁸ A description of scope states the disclosure “is intended to . . . [d]escribe flexible access networks using optical fibre technology[, d]escribe characteristics of a passive optical network (PON)[,] . . . [and d]eal with specifications for . . . G-PON networks.” Ex. 1005, 1.

According to a “G-PON . . . architecture” overview, traffic multiplexing is centralized in a downstream direction and performed as shown in Figure 5-1 reproduced below. *Id.* at 9.



⁸ “The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.” Ex. 1005, ii.

The OLT multiplexes the G-PON encapsulation method (GEM) frames onto the transmission medium using GEM Port-ID as a key to identify the GEM frames that belong to different downstream logical connections. *Id.*; *see also Id.* at 7 (“G-PON encapsulation method (GEM) . . . provides a connection-oriented, variable-length framing mechanism for transport of data services over the [PON] and is independent of the type of the service node interface at the OLT as well as the types of UNI^[9] interfaces at the ONUs.”). Each ONU filters the downstream GEM frames based on their GEM Port-IDs and processes only the GEM frames that belong to that ONU. *Id.* at 9. In the upstream direction, the traffic multiplexing functionality is distributed by the OLT granting upstream transmission opportunities, or upstream bandwidth allocations, to the traffic-bearing entities within the subtending ONUs. *Id.* The ONU's traffic-bearing entities that are recipients of the upstream bandwidth allocations are identified by their allocation IDs (Alloc-IDs). *Id.*

The upstream frame contains multiple transmission bursts coming from one or more ONUs. *Id.* at 36. Each upstream transmission burst contains an upstream physical layer overhead (PLOu) section and one or more bandwidth allocation intervals associated with individual Alloc-IDs. *Id.* The PLOu data includes preamble, delimiter, and the burst header containing three fields of data that correspond to the ONU as a whole. *Id.* at 38. The PLOu section is sent at the beginning of any transmission burst of an ONU. *Id.*

According to the forward error correction (FEC) section of G.984.3, the correction is based on transmitting the data in an encoded format that

⁹ UNI is an acronym for User-Network Interface. Ex. 1005, 7.

introduces redundancy for the decoder to detect and correct the transmission errors. *Id.* at 92. The FEC encoding status (on/off) should be sent to the ONUs using an FEC bit. *Id.* at 93. An ONU that supports FEC decoding capability should apply FEC decoding and error-correction to the downstream data flow as long as the FEC bit is ON. *Id.* An ONU that does not support FEC decoding should be capable of detecting the fact that the downstream flow is FEC-encoded and skip the FEC decoding (not trying to correct any transmission errors). *Id.* The OLT sets the desired ONU FEC encoding status (on/off) using the FEC bit. *Id.* An ONU that supports FEC encoding should respond to FEC requests (with upstreaming of parity bytes) and provide FEC ON indication in the Ind field of an upstream burst header. *Id.* An ONU that does not support FEC encoding capability should ignore FEC requests (no upstreaming of parity bytes) and provide an FEC OFF indication in the upstream burst header. *Id.* The OLT should apply FEC decoding on a per-ONU-burst basis according to the FEC indication in each upstream burst. *Id.*

2. *Khermosh (Ex. 1014)*

Khermosh is titled “Method of Ethernet Frame Forward Error Correction Initialization and Auto-Negotiation.” Ex. 1014, code (54). Khermosh relates to “passive optical networks and, more particularly, to a method of performing forward error correction initialization and auto-negotiation in passive optical networks.” *Id.* ¶ 2.

Khermosh describes the invention as a means of Ethernet passive optical networks (EPONs) to integrate OLTs and ONUs supporting FEC (newer) with OLTs and ONUs not supporting FEC (older, legacy, etc.). *Id.* ¶¶ 7, 21. Khermosh explains that FEC has a bit-rate penalty and thus,

though it is desirable to employ FEC when available (because the improvement to network performance outweighs the bit rate penalty), it is not desirable to employ FEC when not required (because of the bit rate penalty). *Id.* ¶ 7. An “EPON automatically initializes each ONU and registers each ONU according to FEC coding capability of the ONU and the communications quality to and from the ONU[;] FEC coding is implemented when appropriate to improve the quality of the communications.” *Id.* ¶ 21.

3. Analysis

Challenged, independent claim 1 contains this limitation:

the optical line terminal determining and identifying N kinds of upstream burst overhead parameter sets according to different levels of link quality, wherein N is an integer and is larger than zero

Ex. 1001, 21:64–67. The remaining challenged claims (claims 2–11) directly or indirectly depend from claim 1. *Id.* at 22:16–25:64. The challenged, dependent claims contain this limitation by virtue of their dependency on a claim that includes this limitation. *See* 35 U.S.C. § 112(d) (“A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.”). Accordingly, all the challenged claims are construed to include this limitation.

Petitioner contends that the G.984.3/Khermosh combination discloses this limitation. Pet. 31–33 (citing Ex. 1003 (Sergienko Decl.) ¶¶ 114–119; Ex. 1005 (G.984.3), 38, 69, 93, 109–110; Ex. 1014 (Khermosh) ¶ 21). With regard to G.984.3, the Petition states:

G.984.3 discloses, during initialization, that the OLT determines and identifies upstream burst overhead parameter sets for the ONU and then sends the upstream burst overhead parameter sets to the ONU via the Upstream_Overhead

message. Ex. 1005, 38, 69, 109-110. Thereafter, “the ONU configures the overhead fields for the subsequent upstream transmissions using the Upstream_Overhead messages transmitted by the OLT. The following table shows the structure of the message, with ranges and typical values for the different fields.” Ex. 1005, 109-110.

Id. at 31. This passage references the table at pages 109–110 of G.984.3, reproduced below, and the Petition includes a copy of this table. *Id.* at 32.

Upstream_Overhead message			
Octet	Content	Description	Example value
1	11111111	Broadcast message to all ONUs.	
2	00000001	Message identification "Upstream_Overhead".	
3	gggggggg	Number of guard bits.	32 (G) (see Note 1)
4	xxxxxxxx	Length of type 1 preamble bits.	8 (P1) (see Note 1)
5	yyyyyyyy	Length of type 2 preamble bits.	8 (P2) (see Note 1)
6	cccccccc	Pattern of type 3 preamble pattern.	AA
7	bbbbbbbb	Pattern of byte 1 of delimiter.	0xAB 0x59 0x83
8	bbbbbbbb	Pattern of byte 2 of delimiter.	
9	bbbbbbbb	Pattern of byte 3 of delimiter.	
10	xxemsspp	xx – Reserved e – Status of pre-equalization mechanism m – Status of SN_Mask mechanism ss – Max number of extra SN-transmissions	0 (See Note 2)
11	dddddddd	MSB of pre-assigned delay.	0 (See Note 2)
12	dddddddd	LSB of pre-assigned delay.	0 (See Note 2)
General note – The values in this message, except for P1 and P2, are selected according to OLT parameters and preferences. NOTE 1 – Given that the total length of the burst overhead is L (L maximum value is 128 bytes), the values for G, P1, P2, P3 (number of type 3 preamble bytes) and D (delimiter length) must satisfy $G+P1+P2+P3+D=L$. The Extended_Burst_Length message may pre-empt the value of L by modifying the value of P3 (for both pre-ranged and ranged states). It is the responsibility of the OLT to ensure that the total length of the burst overhead is an integer number of bytes. NOTE 2 – It is assumed that the pre-assigned delay is not used and that the SN value is transmitted once by the ONUs. Note also that since the Serial_Number_Mask message has been deprecated, the m bit should always be set to 0.			

Ex. 1005, 109-110. Thus, in the Petition, it is this table that Petitioner states discloses the “*upstream burst overhead parameter sets*” of claim 1 that are

“*determin[ed] and identif[ied]*” by the OLT. *Id.* at 31–32; *see also id.* at 17–18, 34–35, 38–39, 48–49, 76.

Petitioner does not contend that G.984.3 teaches or suggests that the OLT “*determin[es] and identif[ies] . . . parameter sets according to different levels of link quality.*” *See* Pet. 31–33. Petitioner acknowledges that “G.984.3 does not, however, disclose the OLT or ONU determining the upstream burst overhead parameters based on the downlink quality” (*id.* at 11); “The parameter sets in the Upstream_Overhead message ‘are selected according to OLT parameters and preferences (*id.* at 32; *see also id.* at 35, 39); and “the Upstream_Overhead message is sent before the ONU sends any upstream communications, including upstream communications with information on the downlink quality” (*id.* at 32–33).¹⁰

The notes given at the bottom of the table, reproduced above, indicate that “[t]he values in this message, except for P1 and P2, are selected according to OLT parameters and preferences” and that P1 and P2 (length of preamble bits) are chosen by the OLT in order to ensure the total length of the burst overhead meets certain preset length restrictions. *Id.* at 32; *see also* Ex. 1005, 110. These notes confirm Petitioner’s acknowledgement that the parameters in this table are not determined based on link quality. *Id.*; *see also id.* at 35, 39. Thus, the upstream burst overhead parameters in the table in G.984.3, reproduced above, are not determined by the OLT “*according to different levels of link quality*” as this limitation requires.

¹⁰ Patent Owner’s Preliminary Response states that G.984.3 “does not address detecting transmission quality and switching those parameters as conditions change. . .” Prelim. Resp. 7. This statement appears to be accurate, and Petitioner does not appear to dispute it. *See generally* PET Reply.

Petitioner relies on Khhermosh as allegedly teaching “that the OLT determines and identifies N kinds of upstream burst overhead parameter sets *according to different levels of link quality.*” Pet. 33 (italics added). In support of this allegation, the Petition states, “Khhermosh discloses that the **OLT** ‘automatically initializes each ONU and registers each ONU according to FEC coding capability of the ONU and the communications quality to and from the ONU.’” *Id.* (citing Ex. 1014 ¶ 21) (emphasis added). However, the cited paragraph from Khhermosh actually states that “[t]he **EPON**^[11] automatically initializes each ONU and registers each ONU according to FEC coding capability of the ONU and the communications quality to and from the ONU.” Ex. 1014 ¶ 21 (emphasis added). Petitioner provides no reasoning or explanation for substituting “OLT” for “EPON” in this purported teaching in Khhermosh. *See* Pet. 33. We determine that there exists no justification for changing the statement in Khhermosh in this way. This misstatement in the Petition of what Khhermosh discloses creates an erroneous impression of what the reference actually says on a critical issue—whether the asserted art teaches a limitation recited in all of the challenged claims. Khhermosh does not disclose in this sentence or elsewhere that the OLT determines and identifies any kind of upstream burst overhead parameter set according to different levels of link quality. As this misstatement provides the only alleged teaching in the cited art of the OLT “*determining and identifying N kinds of upstream burst overhead parameter sets according to different levels of link quality*” as recited in claim 1, the Petitioner fails to show that the cited art teaches this limitation as alleged.

¹¹ EPON is an acronym for “**E**thernet **P**assive **O**ptical **N**etwork.” Ex. 1014 ¶ 5.

And, even if this misstatement were true and Khhermosh did disclose that the “OLT ‘automatically initializes each ONU and registers each ONU according to FEC coding capability of the ONU and the communications quality to and from the ONU’” as contended by Petitioner (Pet. 33), there is no reasoning or explanation in the Petition as to how or why this alleged disclosure supports Petitioner’s contention that “Khhermosh . . . teaches that the OLT determines and identifies N kinds of upstream burst overhead parameter sets” as concluded by Petitioner (*id.*). Petitioner’s argument is based upon an unwarranted and unsupported leap of logic that initializing and registering each ONU according to FEC coding capability and communication quality teaches “*determin[ing] and identif[ying] N kinds of upstream burst overhead parameter sets*” as recited.

There are other critical shortcomings to the Petition.

The Petition states that, in G.984.3, “[t]he upstream burst overhead parameter sets include the state of FEC (on or off).” Pet. 32 (citing Ex. 1005, 93); *see also id.* at 35, 39. The Petition does not identify with particularity where on page 93 of G.984.3 there is a teaching or suggestion that “[t]he upstream burst overhead parameter sets include the state of FEC (on or off).” *See id.* And, Petitioner fails to provide any explanation or reasoning to support this statement. *See id.* We do not find support for this statement on cited page 93 of G.984.3 (or elsewhere in G.984.3 or Khhermosh).

Page 93, first two lines, of G.984.3 states that “[t]he FEC encoding status (on/off) should be sent to the ONUs using the FEC bit of the Ident field.” G.984.3 provides that the “FEC bit of the Ident field” is sent by the

OLT to the ONUs as part of the GTC Header in GEM¹² frames. Ex. 1005, 12 (indicating that the “Downstream GTC frame . . . contain[s] the GTC header (PCBd field)”) ¹³ The GTC (Gigabit-capable passive optical network Transmission Convergence) header consists of the physical control block downstream (PCBd) (*id.* at 30) that in turn contains several fields including the Ident field (*id.* at 31–32); *see also* Pet. 28 (“The PCBd includes an ‘Ident’ field.”). “The most significant 1 bit of the Ident field is used to indicate whether FEC is being used in the downstream.” Ex. 1005, 32; *see also id.* at 33 (Fig. 8-5 depicting the Ident field with “FEC Ind[ication] 1 bit.”). Petitioner acknowledges that “G.984.3 discloses that the OLT sends a downstream frame to the ONU that includes a GTC Header (PCBd) . . . The PCBd includes an ‘Ident’ field.” Pet. 27–28; *see also id.* at 63–64 (“The downstream GTC frame includes a physical control block downstream (PCBd) in the GTC header”), 70–72. Thus, G.984.3 discloses sending the FEC encoding status (on or off) in the PCBd field of the GTC header and not as part of the table that Petition contends is the recited parameter set. G.984.3 on page 93 (or elsewhere) does not support Petitioner’s contention that “[t]he upstream burst overhead parameter sets include the state of FEC (on or off).”

¹² GEM is an acronym for Gigabit-capable passive optical network Encapsulation Method. Ex. 1005, 5. G.984.3 ‘identifies G-PON encapsulation method (GEM) as the sole data transport scheme in the specified G-PON transmission convergence layer.’ *Id.* at 7.

¹³ The downstream GTC frame including a physical control block downstream (PCBd) in the GTC header is depicted in Figure 8-1 on page 30 of G.984.3; the PCBd including the Ident field is depicted in Figure 8-3 on page 31 of G.984.3; and the Ident field including the FEC Ind[ication] bit is depicted in Figure 8-5 on page 33 of G.984.3.

We note particularly that the table from G.984.3, reproduced above, that is relied on in the Petition as the recited “*parameter sets*” does not make any reference to, or disclose, FEC coding status (on/off).¹⁴ And, we also note that Figure 8-8 from G.984.3 that is cited and reproduced in the Petition does not depict FEC coding as a burst overhead parameter. *See* Pet. 5 (citing Ex. 1005, 37–38); *see also id.* at 16–17, 60. The three parameters shown as included in the “Burst mode overhead” in Figure 8-8 are “Guard time,” “Preamble,” and “Delimiter.” *See* Pet. 5, 16, 60. G.984.3 states that “*Burst mode overhead . . . remain[s] invariant for all the ONUs on the PON for as long as the PON is operational. The burst mode overhead includes the guard time, preamble time and delimiter time*” (Ex. 1005, 12) and “*The burst mode overhead is composed of guard time, preamble time and delimiter time, all of which remain invariant for all the ONUs on the PON for as long as the PON is operational*” (*id.* at 37)¹⁵ As acknowledged in the Petition, the “Ind” field depicted in Figure 8-8 in the “Burst header,” rather than the “Burst mode overhead,” indicates the FEC coding status. *See* Pet. 6 (“In addition to guard time, preamble, and delimiter, another parameter described in the same figure is the status of FEC—either FEC on or FEC off. The ‘Ind’ field

¹⁴ The ’359 patent includes a discussion of G.984.3 and existing GPON standards in the “Background of the Related Art.” *See* Ex. 1001, 1:33–59. The ’359 patent indicates that, in the existing art, the upstream burst overhead parameters broadcast by the OLT do not include the state (on or off) of FEC and that FEC coding status is sent by a communication mechanism that is independent of the communication of the other upstream burst overhead parameters. *See id.* G.984.3 supports this description of the existing art.

¹⁵ These passages confirm that the overhead burst parameters disclosed in G.984.3 are “invariant” and not “*determin[ed] and identif[ied]* . . . according to different levels of link quality.”

. . . contains an indication of FEC status.”), 16 (“The burst mode overhead is composed of guard time, preamble time and delimiter time’ . . . The ‘burst header’ contains the ‘Ind’ field. The format of the ‘Ind’ field . . . includes the status of FEC.”), 60 (“[T]he upstream message [depicted in Figure 8-8] notifies the OLT of the guard time, preamble, and delimiter values via the burst mode overhead . . . And the Ind field in the burst header contains an indication of whether FEC is on or off.”); *see also* Ex. 1005, 38–39 (disclosing “FEC status” is part of the “Ind field” and stating “The indication field provides real time ONU status reports to the OLT.”). Petitioner does not show that G.984.3 teaches that “[t]he upstream burst overhead parameter sets include the state of FEC (on or off)” as contended.

The Petition further states that “Khernosh, like G.984.3, discloses that the upstream burst overhead parameter sets include the status of FEC (on or off).” Pet. 33 (citing Ex. 1014 ¶ 21).¹⁶ No reasoning or explanation supporting this contention is provided in the Petition. *See id.* The cited paragraph 21 of Khernosh does not support this contention. *See* Ex. 1014 ¶ 21. Paragraph 21 of Khernosh provides:

Specifically, the present invention can be used to automatically incorporate network equipment (e.g. OLT, ONUs) that supports FEC coding as well as network equipment that does not support FEC coding simultaneously in the same EPON. The EPON automatically initializes each ONU and registers each ONU according to FEC coding capability of the ONU and the communications quality to and from the ONU. FEC coding is implemented when appropriate to improve the quality of the communications.

¹⁶ Patent Owner’s Preliminary Response states that “Khernosh focuses on how to initialize a single parameter (FEC). EX2001 ¶¶41-42. It does not teach anything in relation to parameter sets.” Prelim. Resp. 8. We agree with Patent Owner.

Paragraph 21 of Khermosh does not disclose that upstream overhead parameter sets include the status of FEC coding.

Patent Owner argues that Khermosh does not teach or suggest the claimed parameter sets. The Preliminary Response states:

Petitioners never actually map anything [in Khermosh] to the claimed parameter sets. Instead, Petitioners focus solely on a single potential parameter (“FEC”), because Khermosh does not address any other parameters (or even the possibility of multiple parameters). Because Khermosh does not even address the possibility of other parameters, the disclosure cannot possibly teach or render obvious the claimed parameter sets. *See* EX2001 ¶¶50-53.

Prelim. Resp. 15. This argument has merit. As discussed above, the Petition includes a contention that “Khermosh . . . discloses where the OLT determines and identifies N (one or more) kinds of upstream parameter sets,” but provides no reasoning or explanation that supports this contention. *See* Pet. 33. And, in response to Patent Owner’s argument, Petitioner’s Reply states that “parameter sets can be simply a combination of parameters.” PET Reply 1. The only parameter in Khermosh that is referenced in the Petition is FEC coding. *See* Pet. 33. Petitioner does not show that Khermosh discloses any combination or set of parameters. *Id.* We determine that Petitioner has not shown that Khermosh discloses upstream burst overhead parameter sets including the status of FEC (on or off).

Petitioner has not shown that any upstream burst overhead parameter set taught or suggested in the cited art includes the status of FEC coding. And, as FEC coding is the only parameter that Petitioner even argues is “*determin[ed] and identif[ied] . . . according to different levels of link*

quality” (see Pet. 31–33), the failure by Petitioner to show that FEC coding is included in an upstream burst overhead parameter set is fatal to Petitioner’s argument that the cited art teaches or suggests that “the optical line terminal determining and identifying N kinds of upstream burst overhead parameter sets according to different levels of link quality, wherein N is an integer and is larger than zero” as recited in claim 1.

Summing up our analysis, G.984.3 discloses that the OLT determines and identifies one upstream burst overhead parameter set that includes guard time, preamble, and delimiter. G.984.3 does not teach or suggest determining and identifying this one upstream burst overhead parameter set “according to different levels of link quality.” G.984.3 does not teach or suggest including FEC coding (on or off) in this one upstream burst overhead parameter set.

Khermosh discloses determining and identifying one parameter, FEC coding (on or off). Khermosh does not teach or suggest the OLT (or any other component) determining or identifying an upstream burst overhead parameter set. Khermosh does not teach or suggest including FEC coding (on or off) in an upstream burst overhead parameter set.

Thus, the cited art lacks any teaching or suggestion of the OLT determining and identifying an upstream burst overhead parameter set “according to different levels of link quality.” For the reasons discussed above, we determine that the section of the Petition in which this limitation is discussed (Pet. 31–33) does not show that the combination of G.984.3 and Khermosh teaches or suggests this limitation. We have considered this showing in the context of all the arguments and evidence presented by the parties and determine that there are clear differences between the subject

matter of the challenged claims and the cited art. The Petition fails to establish that all the limitations of any claim are taught or suggested by the cited art. Accordingly, Petitioner has not established a reasonable likelihood of prevailing as to any challenged claim.

III. CONCLUSION

For the foregoing reasons, we determine that the Petition should be denied and no trial should be instituted on the presented challenge to claims 1–11 of the '359 patent.

IV. ORDER

Upon consideration of the record before us, it is:

ORDERED that the Petition is *denied* as to all challenged claims, and no trial is instituted.

IPR2024-00900
Patent 8,934,359 B2

FOR PETITIONER:

Christopher Douglas
Christopher.douglas@alston.com

Scott Stevens
Scott.stevens@alston.com

Karlee Wroblewski
Karlee.wroblewski@alston.com

Matthew Welch
Matthew.welch@alston.com

Bennett Hardymon
Bennett.hardymon@alston.com

FOR PATENT OWNER:

Michael Heim
mheim@hpcllp.com

Blaine Larson
blarson@hpcllp.com

Robert Bullwinkel
abullwinkel@hpcllp.com

Christopher Limbacher
climbacher@hpcllp.com