

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NOKIA OF AMERICA CORPORATION,
Petitioner,

v.

ALEXANDER SOTO AND WALTER SOTO,
Patent Owner.

IPR2023-00682
Patent 10,771,181 B2

Before THU A. DANG, GARTH D. BAER, and
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review on Remand
35 U.S.C. § 314(a)

I. INTRODUCTION

A. Background

Nokia of America Corporation (“Petitioner”) filed a Petition pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–3, 5, 6, 8, 10–17, 22, and 23 (“the challenged claims”) of U.S. Patent No. 10,771,181 B2 (Ex. 1001, “the ’181 patent”). Paper 1 (“Pet.”). Alexander Soto and Walter Soto (collectively, “Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With our authorization, Petitioner filed a Reply and Patent Owner filed a Sur-reply. Paper 8 (“Reply”), Paper 9 (“Sur-reply”). In response to Petitioner’s Request for Director Review of the Original Decision (Paper 11 (“Req. Dir. Review”)), the Board’s discretionary denial of the Petition under 35 U.S.C. § 325(d) in our Original Decision (Paper 10) was vacated by the Director, who remanded it back to the Board. Paper 18 (“Director Review Decision”). With our authorization, Petitioner and Patent Owner respectively filed a Case Update and Arguments, and a Response to the other party’s Update. Paper 21 (“PO Update”), Paper 22 (“Pet. Update”), Paper 23 (“Pet. Update Resp.”), Paper 24 (“PO Update Resp.”).

We have jurisdiction under 35 U.S.C. § 314 and 37 C.F.R. § 42.4. For the reasons set forth below, we exercise our discretion under 35 U.S.C. § 325(d) and decline to institute an *inter partes* review.

B. The ’181 Patent (Ex. 1001)

The ’181 patent “relates to optical fiber communications,” and describes several embodiments of optical transceiver modules. Ex. 1001, 1:36–38; 9:7–11:20. One such embodiment is illustrated in Figure 3 of the ’181 patent, which is reproduced below.

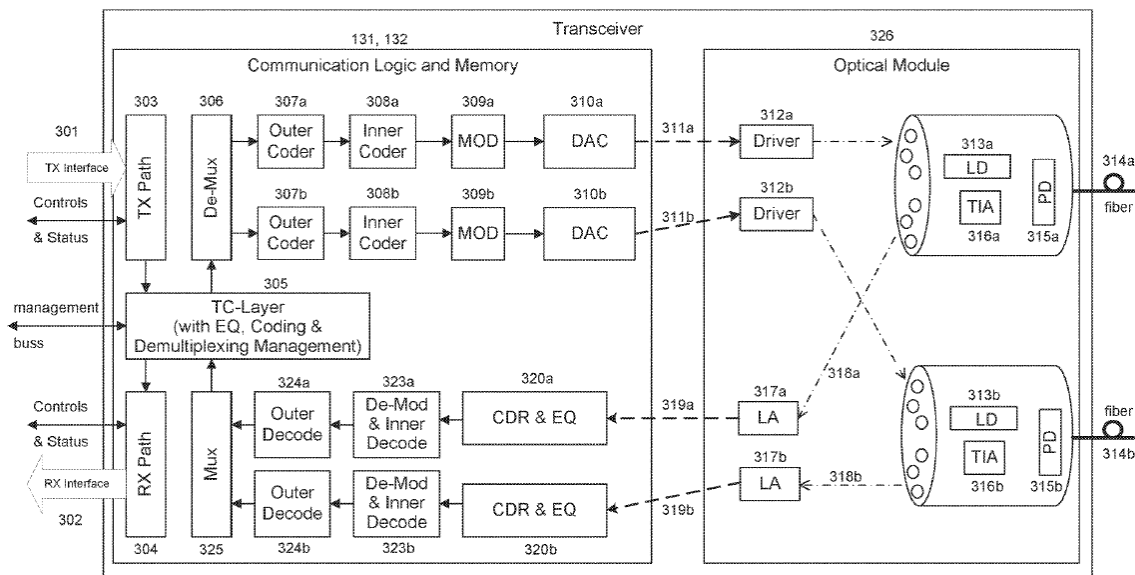


FIG. 3

Figure 3 shows a system block diagram for an implementation of a transceiver with components for transmit-side processing generally in the upper half of the diagram and components for receive-side processing generally in the lower half. *Id.* at 9:7–8, 9:18–22. On the transmit side, signals are received from transmit (“TX”) interface 301 and prepared for data transmission by TX path block 303 and transmission convergence layer or media access control (“TC-Layer/MAC”) block 305. *Id.* at 9:18–45. Optionally, DeMux block 306 may split the transmitting data into a plurality of paths (two of which are shown in Figure 3), for demultiplexing data across multiple fibers. *Id.* at 9:45–56.

In a transmit path, transmit data may be provided to outer and inner coder blocks 307, 308 to perform error-correction coding, Reed-Solomon coding, trellis coding, and the like, as appropriate to the application. *Id.* at 9:61–10:9. Modulation block 309 performs any of a variety of m-ary modulation methods to increase the number of bits per symbol transmitted. *Id.* at 10:20–31. Digital-to-analog converter (“DAC”) 310 converts the

m-ary modulated signal to an analog signal that is processed by laser driver 312, which drives an optical transmitter such as laser diode 313 to transmit an optical signal over fiber 314. *Id.* at 10:36–46.

The receive side of the transceiver includes components that generally implement inverse functions of the transmit side. *See id.* at 10:47–11:20.

Photodiode (“PD”) 315 detects a received optical signal and converts it to an electrical signal that is amplified by transimpedance amplifier (“TIA”) 316 and linear amplifier (“LA”) 317, which may also perform signal conditioning. *Id.* at 10:47–60. The electrical signal is processed by clock data recovery (“CDR”) and equalization (“EQ”) block 320 to recover clock and data signals. *Id.* at 10:60–65. De-Mod & inner decoder block 323 performs complementary demodulation to the m-ary modulation performed by modulation block 309, and, in combination with outer decoder block 324, decodes for error correction and other coding that may have been applied. *Id.* at 10:65–11:13. Optional multiplexer 325 may be applied to multiple signals on the receive side to provide a single signal that is output through RX path 304 and RX interface 302. *Id.* at 11:13–20.

As illustrated in Figure 3, certain components that include laser driver 312 and linear amplifier 317, as well as laser diode 313, photodiode 315, and transimpedance amplifier 316 on both the transmit and receive side may be embodied in optical module 326. *See id.* at 10:36–60. Optical module 326 “can conform to a form factor of standard optical modules such as the 300pin, XENPAK, X2, XPAK, XFP or SFP and SFP+.” *Id.* at 11:34–37.

1. Illustrative Claim

Of the challenged claims, claims 1, 22, and 23 are independent. Independent claim 1 is illustrative of the challenged claims and is reproduced below.

1. A pluggable optical transceiver module comprising of:
 - an electrical system interface for receiving a first electrical data signal and for transmitting a second electrical data signal;
 - an m-ary modulator for increasing the number of bits per symbol in the first electrical data signal to produce a first m-ary modulation signal;
 - a digital to analog converter for converting the first m-ary modulation signal to a first electrical m-ary analog modulation signal;
 - a driver for amplifying the first electrical m-ary analog modulation signal to an amplified first electrical m-ary analog modulation signal to drive an optical transmitter;
 - the optical transmitter for emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary analog modulation signal from the driver;
 - an optical detector for receiving a second optical signal on a second wavelength to produce an electrical analog signal;
 - an amplifier for amplifying the electrical analog signal to an amplified electrical analog signal;
 - a clock data recovery unit for recovering clock and data information to produce a second m-ary modulation signal from the amplified electrical analog signal;
 - an equalizer for performing equalization on the second m-ary modulation signal to remove noise; and
 - an m-ary demodulator for decreasing the number of bits per symbol in the equalized second m-ary modulation signal to produce the second electrical data signal.

Ex. 1001, 15:2–33.

2. *Prosecution History*

The '181 patent is a continuation of U.S. Patent No. 10,263,723 (“the '723 patent”), which is a continuation of U.S. Patent No. 9,887,795 B2 (“the '795 patent”).¹ Ex. 1001, code (63). It claims the benefit of the filing dates of the '723 and '795 patents, as well as the filing dates of other utility and provisional applications. *Id.*, codes (60), (63).

The application that matured into the '181 patent received only double-patenting rejections. After a first Office Action that rejected the originally filed claims under 35 U.S.C. § 101 for claiming the same invention as the '723 patent, the Applicant filed an amendment canceling those claims and presenting a new set of claims for examination. Ex. 1003, 112–118, 122–131. The Examiner then issued a rejection for nonstatutory obviousness-type double patenting over the '723 patent, a rejection that the Applicant overcame through filing a terminal disclaimer. *Id.* at 52–54 (Notice of Allowability), 63–64 (Response to Office Action discussing terminal disclaimer), 75–88 (Office Action).

The application that matured into the '723 patent was allowed in a first-action allowance, with the Examiner providing the following statement of reasons for allowance: “the prior art fails to teach each of the recited elements of claim 1 within a unitary pluggable optical transceiver with a priority date before 2003.” Ex. 1026, 51. In addition, the Examiner provided the following remarks regarding the prior art:

The closest prior art identified by Examiner is Applicant’s own work and the grandparent of the instant application, e.g.

¹ Petitioner challenges claims 1–3, 5–7, 9, and 11–20 of the '723 patent in concurrently filed IPR2023-00681, and challenges claims 1–3, 5, 10–14, and 16–21 of the '795 patent in concurrently filed IPR2023-00680.

15/095,137 now patent 9,887,795. However, the instant application is more specific than the parent application in that it recites the inclusion of error correcting code, an encoder unit tasked with coding the data signal error correction code, and digital to analog conversion of the modulation signal. Furthermore, the parent application is directed to the method of use of the pluggable optical transceiver whereas the instant application is directed to the pluggable optical transceiver apparatus.

Id.

Notably, the application that matured into the '795 patent was examined by the same Examiner who examined both the subject '181 patent and the '723 patent. *Compare* Ex. 1001 (identifying the Examiner of the '181 patent), *with* Ex. 1025 (identifying the same Examiner for the '723 patent), *and* Ex. 1023 (identifying the same Examiner for the '795 patent). Unlike the subject '181 patent and the '723 patent, the '795 patent was subject to multiple prior-art rejections during prosecution, summarized below. Independent claim 1 of the '795 patent was initially presented by the Applicant in the following form:

1. A method for m-ary modulation communication across an optical network by an optical transceiver module comprising of:
 - receiving a first electrical binary data signal through a system interface of the optical transceiver module;
 - converting the first electrical binary data signal in the optical transceiver module to a first electrical m-ary modulation signal;
 - amplifying the first electrical m-ary modulation signal to drive an optical transmitter of the optical transceiver module;
 - emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary modulation signal from the optical transmitter of the optical transceiver module;

receiving a second optical signal on a second wavelength and producing an electrical signal from an optical detector of the optical transceiver module;
amplifying the electrical signal to facilitate clock and data recovery in the optical transceiver module;
equalizing the amplified electrical signal and recovering clock data information to produce a second m-ary modulation signal in the optical transceiver module;
demodulating the second m-ary modulation signal according to a second electrical binary signal; and
transmitting the second electrical binary signal through the system interface of the optical transceiver module.

Ex. 1024, 240. This claim was rejected in a first Office Action as anticipated by U.S. Patent No. 6,603,822 B2 (“Brede”). *Id.* at 174–176. The first Office Action was made final because the application that matured into the ’795 patent was itself a continuation of an earlier application (which matured into U.S. Patent No. 9,337,948 B2 (“the ’948 patent”)), and “[a]ll claims [we]re drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office Action if they had been entered in the earlier application.” *Id.* at 178.

With a Request for Continued Examination, the Applicant amended the claims, particularly by amending independent claim 1 to recite a “pluggable” optical transceiver module. *Id.* at 148. Specifically, indicating added material with underline and deleted material with strikethrough, independent claim 1 of the ’795 patent was amended as follows:

1. A method for m-ary modulation communication ~~across an optical network~~ by an pluggable optical transceiver module comprising of:
receiving a first electrical binary data signal through a system interface of the pluggable optical transceiver module;

converting the first electrical binary data signal in the pluggable optical transceiver module to a first electrical m-ary modulation signal;
amplifying the first electrical m-ary modulation signal to drive an optical transmitter ~~of~~ in the pluggable optical transceiver module;
emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary modulation signal from the optical transmitter ~~of~~ in the pluggable optical transceiver module;
receiving a second optical signal on a second wavelength and producing an electrical signal from an optical detector ~~of~~ in the pluggable optical transceiver module;
amplifying the electrical signal to facilitate clock and data recovery in the pluggable optical transceiver module;
~~equalizing the amplified electrical signal and recovering a clock data information from the amplified electrical signal to~~ produce a second m-ary modulation signal in the pluggable optical transceiver module;
demodulating the second m-ary modulation signal ~~according to~~ a second electrical binary data signal in the pluggable optical transceiver module; and
transmitting the second electrical binary data signal through the system interface of the pluggable optical transceiver module.

Id. The Examiner also initially rejected this form of independent claim 1 in a nonfinal Office Action,

contend[ing] that the optical transceiver of Figure 3 [of Brede] is “pluggable” when that term is given its broadest reasonable interpretation being that the transceiver of Figure 3 will be plugged in to the network at a central office via the electrical interfaces shown in Figure 3. A similarly broad interpretation of the term “pluggable” is met by Brede’s disclosure in that at some point the optical transceiver of Figure 3 will be required to be plugged in to another element for power and data input/output.

Id. at 129. The Applicant then “argued that the ‘pluggable’ interpretation by the Examiner on the entirety of Brede’s Fig. 3 is flawed.” *Id.* at 69–72. In particular, the Applicant argued that the Examiner had applied the broadest *possible* interpretation rather than the broadest *reasonable* interpretation, which the Applicant contended “could be [Brede’s] optical transmitter 14 and optical receiver 16 elements combined somehow as an optical transceiver that is pluggable via pluggable coaxial lines 22, 28 to the host data terminal (HDT) 12.” *Id.* at 71–72.

Although the prosecution of independent claim 1, as well as other claims of the ’795 patent, addressed anticipation over Brede, further aspects of the prosecution considered obviousness over Brede in combination with other references. In particular, claim 2 depended from claim 1 and originally recited that “the form factor of the optical transceiver module is selected from the group consisting of: SFP; SFP+; XFP; X2; XENPAK; XPA; and 300 pin transceiver form factors.” *Id.* at 240. The Examiner rejected this claim for obviousness over Brede and U.S. Patent Publ. No. 2007/0031153 A1 (“Aronson”), asserting that Aronson evidenced that “these types of form factors are well known in the art” and that “[o]ne skilled in the art would have been motivated to utilize any of the claimed form factors in order to meet design requirements, budgetary requirements, or performance requirements such as achieving 10 Gb/s.” *Id.* at 177–178.

The Applicant amended claim 2 to recite the more generalized limitation that “the form factor of the pluggable optical transceiver module is a pluggable form factor standard ~~selected from the group consisting of: SFP; SFP+; XFP; X2; XENPAK; XPA; and 300 pin transceiver form factors.~~” *Id.* at 149. The Examiner also rejected this form of the claim, this time for

obviousness over Brede and U.S. Patent No. 7,729,617 B2 (“Sheth”), which the Examiner cited as evidence that “standardized pluggable form factors are well known in the art.” *Id.* at 126–127. The Applicant argued that the Examiner failed sufficiently to establish a motivation to combine the references. *Id.* at 72–73.

Following these arguments by the Applicant, the Examiner allowed the application. *Id.* at 60 (Notice of Allowability). The Examiner did not provide any express reasons for allowance in the Notice of Allowability. *Id.*

II. ANALYSIS

A. Evidence

Petitioner relies on the following references. Pet. 8–9.

Agazzi ’640	US 6,879,640 B1	Apr. 12, 2005	Ex. 1005
Wei	US 6,873,800 B1	Mar. 29, 2005	Ex. 1006
Agazzi ’341	US 7,933,341 B2	Apr. 26, 2011	Ex. 1009

In addition, Petitioner relies on a Declaration by Paul R. Prucnal, Ph.D. Ex. 1003.

B. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–3, 5, 6, 8, 10–17, 22, and 23 on the following grounds. Pet. 1–2.

Claim(s) Challenged	35 U.S.C. § ²	References
1–3, 5, 6, 8, 10–14, 17, 22	103(a)	Agazzi '640, Wei
5, 6, 15, 16, 23 ³	103(a)	Agazzi '640, Wei, Agazzi '341
1–3, 8, 10–17, 22, 23	103(a)	Agazzi '341, Wei

C. Real Parties in Interest

In addition to itself, Petitioner identifies Nokia Corporation and Nokia Solutions and Networks OY as real parties in interest. Pet. 76. Patent Owner identifies Alexander Soto and Walter Soto as real parties in interest, as well as NextGen Innovations, LLC, the exclusive licensee of the '181 patent. Paper 7, 1.

D. Related Matters

The parties indicate that the '181 patent is the subject of the following district court litigation: *NextGen Innovations, LLC v. Nokia of America Corporation*, No. 2:22-cv-00637 (E.D. Tex.) (“*Nokia II* district court

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended various provisions of 35 U.S.C. Petitioner applies the pre-AIA version of 35 U.S.C. § 103(a), and Patent Owner does not contest that this is the applicable version. Pet. 1–2. On the record before us, we agree that the pre-AIA version of 35 U.S.C. § 103(a) applies.

³ Petitioner characterizes the challenge to claims 5 and 6 as a separate ground from the challenge to claims 15, 16, and 23. *See* Pet. 1–2. But “where the relevant factual inquiries underlying an obviousness determination are otherwise clear, characterization . . . of prior art as ‘primary’ and ‘secondary’ is merely a matter of presentation with no legal significance.” *In re Mouttet*, 686 F.3d 1322, 1333 (Fed. Cir. 2012) (citing *In re Bush*, 296 F.2d 491, 496 (CCPA 1961); *In re Krammes*, 314 F.2d 813, 816–17 (CCPA 1963)).

litigation”).⁴ Pet. Update 2; PO Update 1. In addition, both parties identify the following as related district court matters in which the ’181 patent is asserted against different defendants: (1) *NextGen Innovations, LLC v. Infinera Corporation*, No. 2:22-cv-00306 (E.D. Tex.); (2) *NextGen Innovations, LLC v. Fujitsu Network Communications, Inc.*, No. 2:22-cv-00307 (E.D. Tex.); and (3) *NextGen Innovations, LLC v. AT&T Services, Inc.*, No. 2:22-cv-00308 (E.D. Tex.). Pet. Update 1; Pet. 76–77; Paper 7, 1. Petitioner additionally identifies the following matters as involving the ’181 patent: (1) *Nokia Innovations, LLC v. II-VI, Inc.*, No. 4:20-cv-00854 (E.D. Tex.); and (2) *NextGen Innovations, LLC v. II-VI, Inc.*, No. 4:21-cv-07477 (N.D. Cal.) (Pet. 76); and (3) *NextGen Innovations, LLC v. Cisco Systems, Inc.*, No. 2-24-cv-00092 (E.D. Tx.) (Pet. Update 1–2).

Both parties identify IPR2021-01361 (“the related IPR”) as involving the ’181 patent. Pet. 77; Paper 7, 1. Patent Owner identifies several other *inter partes* reviews as involving the ’181 patent or a related patent, namely IPR2021-01358, IPR2021-01359, IPR2023-00680, IPR2023-00681, IPR2023-00834, IPR2023-00835, IPR2023-00838, and IPR2023-00960. Paper 7, 1–2.

E. Overview of Asserted Prior Art

1. Agazzi ’640

Agazzi ’640 “relates to methods and apparatus for the transfer of high rates of data over a fiber optic channel[], and in particular embodiments to

⁴ The district court granted the parties’ joint motion and consolidated *NextGen Innovations, LLC v. Nokia of America Corporation*, No. 2:22-cv-00309 (E.D. Tex.) with *Nokia II* district court litigation.

methods and apparatus which utilize existing fiber optics systems to achieve high data transfer rates.” Ex. 1005, 1:16–20. Figure 10 of Agazzi ’640 is reproduced below.

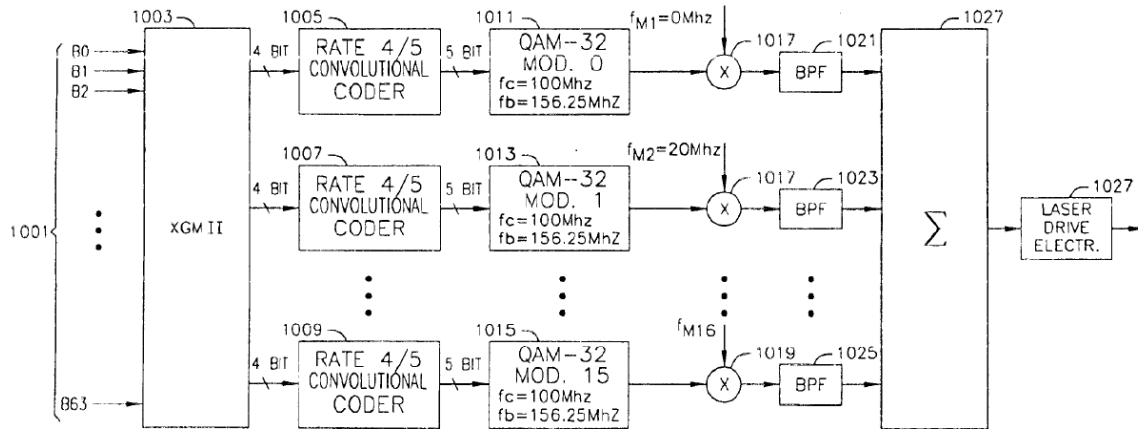


FIG. 10

Figure 10 illustrates a multi-carrier modulation transmitter with trellis encoding. *Id.* at 2:26–27, 2:54–55, 12:5–9, 15:27–28. XGMII (“Input Ten Gigabit Media Independent Interface”) block 1003 receives 64 input bit signals B0–B63, which are divided into sixteen 4-bit “nibbles” that are processed by sixteen parallel convolution coders 1005, 1007, 1009, each of which outputs a 5-bit signal. *Id.* at 8:36–44, 8:66–9:3, 12:5–9. Such 5-bit signals are modulated by respective QAM-32 (“Quadrature Amplitude Modulation 32”) modulators 1011, 1013, 1015 for mixing with mixers 1017, 1019, filtering by band-pass filters 1021, 1023, 1025, and summing by combiner circuit 1027, with the output sent to laser drive electronics 1027.⁵ *Id.* at 9:3–31, 12:7–11.

Figure 12 of Agazzi ’640 is reproduced below.

⁵ Agazzi ’640 uses reference number 1027 for both the combiner circuit and the laser drive electronics.

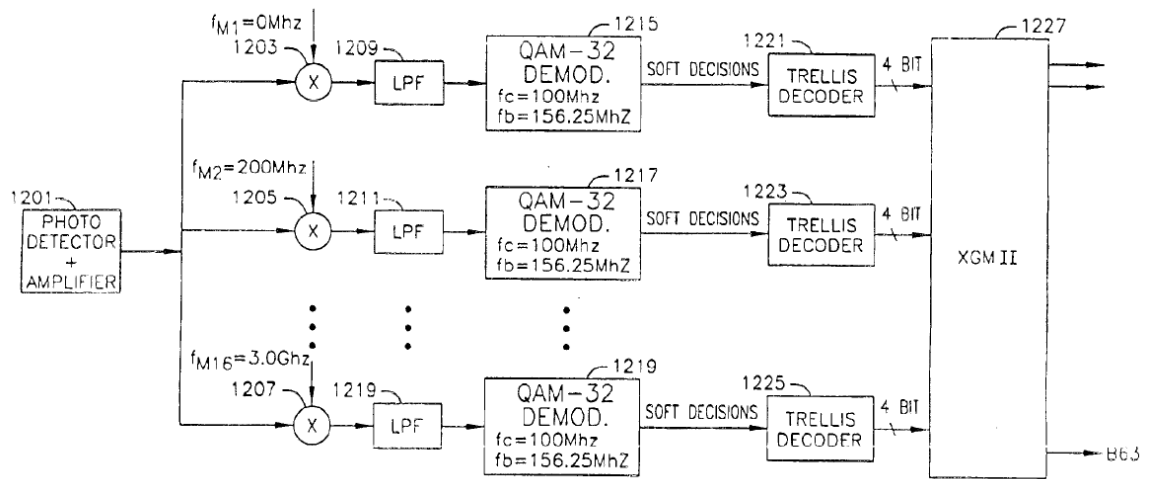


FIG. 12

Figure 12 illustrates a receiver that receives a trellis-coded signal. *Id.* at 2:59–60, 15:56–57. Photodetector/amplifier 1201 receives and amplifies the signal, which is processed with sixteen parallel pathways that include respective mixers 1203, 1205, 1207, low pass filters 1209, 1211, 1219, QAM-32 demodulators 1215, 1217, 1219, and trellis decoders 1221, 1223, 1225 to output 4-bit nibbles so that a 64-bit signal may be output through XGMII block 1227. *Id.* at 15:57–65.

2. Wei

Wei “relates to fiber optic modules.” Ex. 1006, 1:19–21. Wei asserts that “[i]t is desirable to package the functions of a [Gigabit Interface Converter (‘GBIC’)] into the compact size of a [small form pluggable (‘SFP’)], LC package.” *Id.* at 2:2–4. To achieve this, Wei describes implementation of a fiber-optic transceiver module using “vertically stacked receiver and transmitter printed circuit boards.” *Id.* at 2:28–29. Wei explains that

[t]he use of separate vertically stacked printed circuit boards allows packaging the functions of a GBIC within an LC or other small form factor package. One of the printed circuit boards protrudes from the fiber optic module's outer housing, while the other printed circuit board is wholly contained by the outer housing.

Id. at 2:29–35.

3. Agazzi '341

Agazzi '341 “relates generally to data communications and, more particularly, to systems and methods for performing digital signal processing in a communications system and communication devices.” Ex. 1009, 1:15:18. Figure 2 of Agazzi '341 is reproduced below.

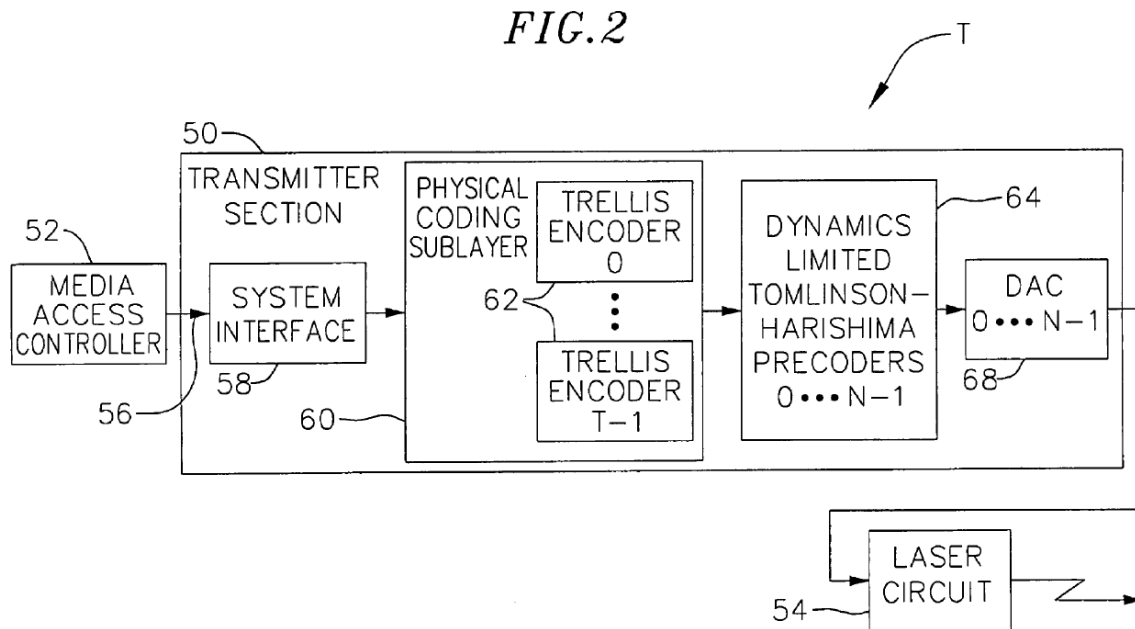


Figure 2 is a block diagram of a transmitter that incorporates parallel equalization. *Id.* at 2:46–48. Transmitter section 50 encodes signals received from media access controller 52 to provide an encoded data stream that drives laser circuit 54. *Id.* at 4:66–5:3. Transmitter section 50

sequentially includes system interface 58, physical coding sublayer 60 with trellis encoders 62, Tomlinson-Harashima precoders 64, and a set of parallel digital-to-analog converters 68. *Id.* at 5:9–18, 5:45–51, 6:33–39.

Figure 5 of Agazzi '341 is reproduced below.

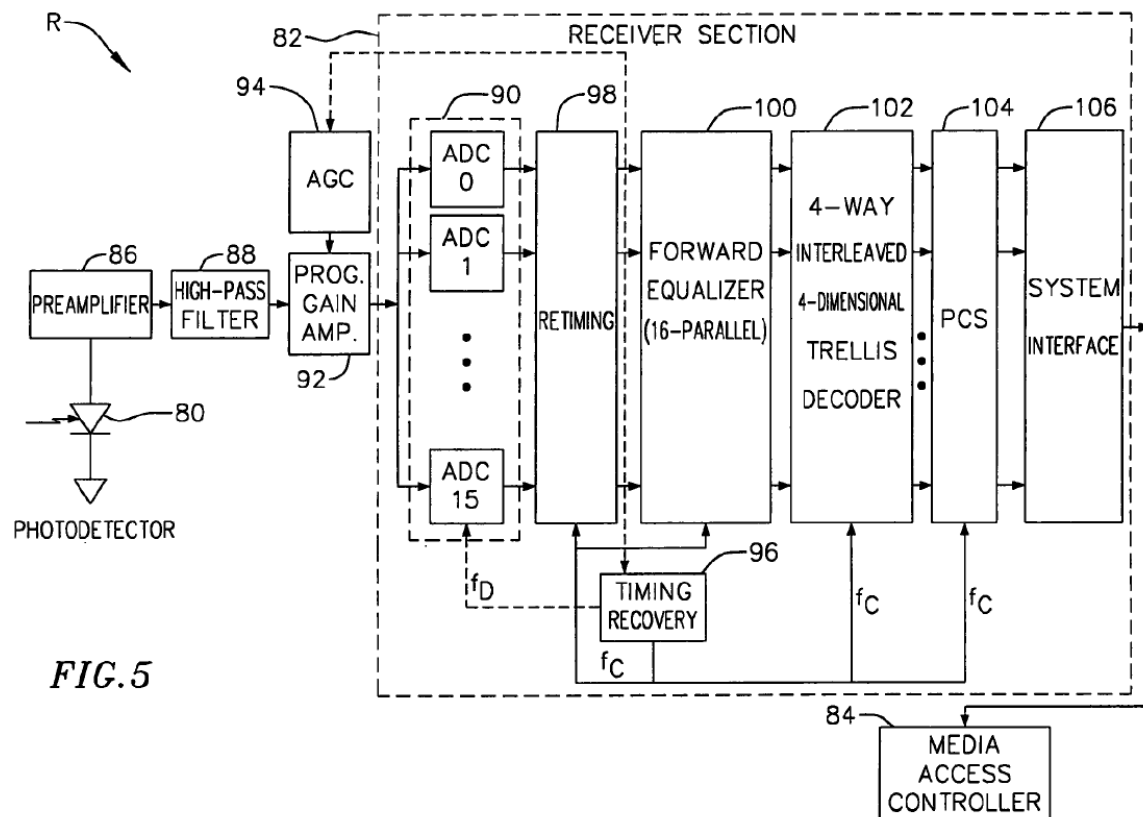


FIG.5

Figure 5 is a block diagram of a receiver that may be used with the transmitter of Figure 2. *Id.* at 2:53–56. Photodetector 80 receives optical signals from an optical channel to provide an encoded data stream to receiver section 82 after amplification by preamplifier 86 and filtration by high-pass filter 88. *Id.* at 6:40–49. The amplitude of the input signal provided to the set of parallel analog-to-digital converters 90 is controlled by programmable gain amplifier 92, whose gain is controlled by automatic gain control 94. *Id.* at 6:50–60. The set of parallel analog-to-digital converters 90 samples the received analog data stream to generate digital signals that

are processed by retiming circuit 98, parallel forward equalizers 100, and four-way interleaved four-dimensional trellis decoders 102. *Id.* at 7:4–46. Outputs of parallel trellis decoders 102 drive physical coding sublayer 104, which “performs several operations that are complementary to those performed by the physical coding sublayer 60” of Figure 2, and the signals are routed to system interface 106 and media access controller 84. *Id.* at 7:47–55.

F. Discretion Under 35 U.S.C. § 325(d)

“In determining whether to institute or order [an *inter partes* review], the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). Patent Owner asks that we exercise the Director’s discretion under this statutory section to deny the Petition. *See* Prelim. Resp. 39–53. The Director has delegated that discretion to the Board. 37 C.F.R. § 42.4(a).

1. Framework

In *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential) (“*Advanced Bionics*”), the Board applied a two-part framework in considering whether to exercise discretion to deny institution under § 325(d):

- (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office;
- and (2) if either condition of first part of the framework is

satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics at 8.

Within this two-part framework, the Board considers a number of non-exclusive factors in evaluating whether to exercise its discretion under § 325(d). *See Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, first para.) (“*Becton, Dickinson*”); *see also Advanced Bionics* at 9–11. The factors set forth in *Becton, Dickinson* are as follows:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art;
- (e) whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and
- (f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson at 17–18.

Factors (a), (b), and (d) of the *Becton, Dickinson* factors relate to whether the art or arguments presented in the Petition are the same or

substantially the same as those previously presented to the Office. *Advanced Bionics* at 10. The art or arguments presented in the Petition are not “substantially the same” as those previously presented to the Office when there are differences between them that are material to the Office’s prior consideration of the art and arguments. *Wolfspeed, Inc. v. Trs. of Purdue Univ.*, IPR2022-00761, Paper 13 at 7–8 (Vidal Mar. 30, 2023) (“*Wolfspeed*”).

Factors (c), (e), and (f) “relate to whether the petitioner has demonstrated a material error by the Office” in its prior consideration of that art or arguments. *Id.* Only if the same or substantially the same art or arguments were previously presented to the Office do we then consider whether petitioner has demonstrated a material error by the Office. *Id.* “At bottom, this framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown.” *Id.* at 9.

2. *Advanced Bionics Part I: Previous Presentation of Art to the Office*

We first determine whether the same or substantially the same art was previously presented to the Office. *Advanced Bionics* at 8. As an initial matter, we note that, although the prosecution history of the ’181 patent itself is limited because it involved only double-patenting rejections, the ’181 patent is part of a chain (notably including the ’795 patent) such that the prosecution history of other patents and applications within the chain bears on our assessment. *See Cultec, Inc. v. StormTech LLC*, IPR2017-00777, Paper 7 at 9, 11 (PTAB Aug. 22, 2017) (informative); *see also Elkay*

Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 980 (Fed. Cir. 1999) (“When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation.”); *II-VI, Inc. v. Alexander Soto*, IPR2021-01361, Paper 10 at 20–21 (PTAB Feb. 15, 2022) (evaluating Patent Owner’s comparison of claim 1 of the ’181 patent with claim 1 of the ’795 patent and finding that “it supports Patent Owner’s position that the prosecution history of the [’795] patent is appropriately considered in evaluating whether to exercise discretion to deny the Petition”).

Petitioner does not disagree that the prosecution history of other patents and applications within the chain bears on our assessment. *See* Pet. 67–70 (Petitioner addressing prosecution history of the ’795 patent). In fact, in addressing part I of the *Advanced Bionics* framework, Petitioner contends that the “Petition does not include any prior art references that were cited during the original prosecution of the ’181 Patent or the prosecution of the parent ’723 Patent or grandparent ’795 Patent; nor are the references cumulative of any of the art considered by the Examiner” or by the Board in the related IPR. *Id.* at 66–67. Petitioner specifically contends that, “[u]nlike the references in this Petition, the Examiner never had a primary reference with integrated optoelectronics.” *Id.* at 69.

Petitioner challenges claims 1–3, 5, 6, 8, 10–17, 22, and 23 based on a combination of Agazzi ’640 and Wei, and on a combination of Agazzi ’341 and Wei. *See* Pet. 1–2. With respect to Agazzi ’640, Petitioner relies on the reference for disclosing “a transceiver module that performs signal processing including m-ary modulation/demodulation, equalization, and

error corrections,” with “receivers and transmitters [that] are integrated on a single integrated circuit.” *Id.* at 10–11 (citing Ex. 1005, code (57), 2:66–3:55, 15:15–17; Ex. 1003 ¶ 92). Petitioner states that Agazzi ’640 “does not, however, expressly disclose a pluggable transceiver module.” *Id.* at 11.

Petitioner further relies on Wei for its disclosure of a “hot pluggable optical transceiver in a small form pluggable . . . type package.” *Id.* (citing Ex. 1006, 1:66–2:4). In particular, according to Petitioner, “Wei teaches how to package larger transceiver modules into a pluggable SFP package by vertically stacking the transmitter and receiver printed circuit boards.” *Id.* (citing Ex. 1006, 2:28–35).

Petitioner then contends that a person of ordinary skill in the art would have understood the transceiver as taught in Agazzi ’640 “would have been implemented in the pluggable form factor taught in Wei.”⁶ Pet. 11 (citing Ex. 1003 ¶ 93). In particular, Petitioner contends that a person of ordinary skill would have been motivated to combine the transceiver module of Agazzi ’640 with the pluggable form factor of Wei “to include creating a cost-effective pluggable transceiver with greater data throughput that was easily removable.” *Id.* at 11–12.

⁶ In addition to reciting the “pluggable” aspect of the optical transceiver module of claim 1 in the preamble, this “pluggable” aspect is reiterated in the body of the claim each time the optical transceiver module is recited. Petitioner does not explicitly take a position on whether the preamble is limiting, but expressly addresses the “pluggable” aspect of the optical transceiver in its analysis. *E.g.*, Pet. 14–15, 28. Patent Owner does not refer to the preamble, but contends that the primary references to Agazzi ’640 and Agazzi ’341 fail to disclose “pluggable” modules, wherein the prosecution history involves repeated consideration of “a second reference cited for a pluggable form factor.” *See* Prelim. Resp. 47–52.

Similarly, with respect to Agazzi '341, Petitioner relies on the reference for disclosing “a transceiver module that performs signal processing including m-ary modulation/demodulation, equalization, and error corrections,” with “transmitter and receiver sections [that] are implemented as a transceiver integrated circuit constructed as a single chip.” Pet. 41 (citing Ex. 1009, 1:55–2:20, 4:33–35, 4:62–65; Ex. 1003 ¶ 190). Petitioner states that, similar to Agazzi '640, Agazzi '341 “does not, however, expressly disclose a pluggable transceiver as taught in Wei.” *Id.* Thus, Petitioner similarly relies on Wei for its disclosure of a “hot pluggable optical transceiver in a small form pluggable . . . type package.” *Id.* (citing Ex. 1006, 1:66–2:4, 3:29–32). Petitioner similarly contends that a person of ordinary skill in the art would have understood the transceiver as taught in Agazzi '341 “would have been implemented in a pluggable form factor as taught in Wei.” *Id.* at 42 (citing Ex. 1003 ¶ 191).

Patent Owner counters that “[m]ultiple examiners and the Board” have “repeatedly” considered and rejected “the same basic argument” advanced in all grounds of the Petition. Prelim. Resp. 40.

We generally agree with Patent Owner’s characterization of Petitioner’s challenge. Prelim. Resp. 39. In particular, we agree with Patent Owner that the same or substantially the same art and arguments were previously presented, i.e., the Office has already considered whether the claims would have been obvious over “a first reference cited for electrical signal processing components combined with a second reference cited for pluggable form factors.” *Id.*

Here, for its challenge based on a combination of Agazzi '640 and Wei, and for its challenge based on a combination of Agazzi '341 and Wei,

Petitioner relies entirely on the respective Agazzi reference for all limitations except the “pluggable” aspect. Pet. 14–28, 45–57. Petitioner then contends that a person of ordinary skill in the art would have implemented the integrated optoelectronics of either Agazzi reference “in the pluggable form factor taught in Wei.” *Id.* at 11, 42. According to Petitioner, “the fiber-optic industry standardized the pluggable SFP form factor to ensure compatibility across fiber-optic systems,” wherein “a POSITA would have understood that higher throughput pluggable transceivers in an SFP form factor were needed.” *Id.* That is, similar to the Examiner’s determination during prosecution of the ’795 patent that it would have been obvious to implement Brede’s optical transceiver module in Sheth’s pluggable form factor to “efficiently support a variety of client interfaces, tributary optics interfaces, data standards” (*see* Ex. 1024, 126–127), in this IPR, Petitioner is relying on the same rationale to combine Wei’s pluggable form factor with the Agazzi references’ optical transceiver module. Pet. 10–11, 41–42. Further, Petitioner contends that the Agazzi references do not disclose a “pluggable transceiver module,” (Pet. 11, 42), which is precisely the argument Applicants made against Brede during prosecution of the ’795 patent -- that Brede’s Figure 3 was not “pluggable.” Ex. 1024, 69–72.

In response to Petitioner’s contentions, similar to the Applicant’s argument during prosecution of the ’795 patent regarding the combination of Brede and Sheth, Patent Owner argues that the Petition fails to make a *prima facie* obviousness argument. Prelim. Resp. 19–20; Ex. 1024, 73 (“Applicants respectfully traverse these rejections for at least the reason that they have not stated a proper *prima facie* case for obviousness”). Thus,

there is significant overlap between the arguments Applicant made during examination and the manner in which Petitioner relies on the prior art and/or Patent Owner distinguishes the prior art.

Although we agree with Petitioner’s contention that the “Petition does not include any prior art references that were cited during the original prosecution [of the ’181 patent],” we disagree that substantially the same art was not previously presented by the Office. Pet. 66. In particular, in this IPR, the Petition relies on the Agazzi references for teaching an optical transceiver module (*id.* at 10 (“Agazzi ’640 discloses a transceiver module” with “receivers and transmitters”), 41 (“Agazzi ’341 discloses a transceiver module” with “transmitter and receiver sections”)), similar to the Examiner’s finding during prosecution of the ’795 patent that Brede’s OLT with optical transmitter and receiver connected thereto is also an optical transceiver module, i.e., a module with an optical transmitter and an optical transceiver. Ex. 1024, 175.

We are unpersuaded by Petitioner’s contention that the references and arguments are not substantially the same because “the primary prior art references used in this Petition disclose an optical transceiver module with integrated optoelectronics, as claimed by the ’181 Patent, rather than an OLT device, as disclosed in the primary prior art reference used by the Examiner” (Pet. 67; *see also id.* at 69 (citing Ex. 1003 ¶¶ 81–82)).

We note that, although Petitioner cites to Agazzi ’640 at column 16, lines 9–14 and the Abstract for such difference in teachings (Pet. 68), the cited portion of Agazzi ’640 indicates that “transmitters and receivers can be integrated on a single integrated circuit,” wherein “it will be clear to anyone skilled in the art that *many alternative embodiments* are possible.” *See*

Ex. 1005, code (57), 16:9–14 (emphasis added), 4:61–65. In fact, Agazzi ’640 depicts a transmitter section in Figures 10–11 as a separate section from that of a receiver section depicted in Figures 12–13. *See id.* at 2:54–62, Figs. 10–13.

Similarly, although Petitioner cites to Agazzi ’341 at column 3, lines 34–36 and column 4, lines 61–65 for such difference in teachings (Pet. 68–69), the cited portion of Agazzi ’341 merely indicates that, “[i]n *one embodiment*, the transmitter and receiver sections . . . are implemented as a transceiver integrated circuit constructed as a single chip.” *See* Ex. 1009, 3:34–36 (emphasis added), 4:61–65. Like Agazzi ’640, Agazzi ’341 also depicts a transmitter section in Figures 2–4 as a separate section from that of a receiver section depicted in Figures 5–6. *See id.* at 4:58–61, Figs. 2–6.

Other than the cited portions of Agazzi ’640 and Agazzi ’341 indicating that, in some embodiments, transmitter and receiver sections are constructed as a single chip, Petitioner does not cite to any other teachings or figures in Agazzi ’640 or Agazzi ’341 to show an optical transceiver module with integrated optoelectronics or the advantages of such integration. *See* Pet. 68–69; Ex. 1003 ¶¶ 81–82. Thus, although these cited portions discuss embodiments in which the transmitter and receiver sections, although shown as separate sections, are constructed on a single chip, Petitioner does not cite to any teaching in the Agazzi references to support its contention that the Agazzi references teach “an optical transceiver module with integrated optoelectronics” different from Brede’s teaching of an OLT with transmitter and receiver sections connected thereto. *See* Pet. 68–69; Ex. 1003 ¶¶ 81–82.

That is, Petitioner does not show how such teaching of transmitter and receiver sections on a single chip distinguishes from Brede's optical transmitter/receiver combination as shown in Brede's Figure 3. *Id.*

Furthermore, the '181 patent is the continuation of the '723 patent is a continuation of the '795 patent, which is a continuation of the '948 patent, which in turn is a continuation-in-part of US Patent Appl. No. 11/772,187 ("the '187 application"). Ex. 1001, code (63); *see* Ex. 2001. As Patent Owner points out, Agazzi '341 is a continuation-in-part of U.S. Patent Appl. No. 09/795,014, whose publication as U.S. Patent Publ. No. 2001/0035997 ("Agazzi '997") was cited by the Examiner during prosecution of the '187 application from which the '181 patent ultimately continued from. Prelim. Resp. 30; *see* Ex. 2001, 33; Ex. 2005. In particular, Patent Owner points out that "[t]hese two Agazzi references share similarities in Figures 1-5," most notably in Figure 5, which Petitioner relies on extensively in its analysis. Prelim. Resp. 43; *see* Pet. 51–56. We find the specific citation of Agazzi '997 by the Examiner during prosecution of the '187 application for an optical transceiver module belies Petitioner's argument that the Examiner never had a reference "with integrated optoelectronics." *See* Pet. 69; *see* Ex. 2006; Ex. 2005 ¶ 39 (stating that "technology such as CMOS . . . may be used to implement the electronic circuitry").

Additionally, during prosecution of the '795 patent, the Examiner found that "Gilliland teaches that the concept of a pluggable optical transceiver module is well known in the art." *See* Ex. 1024, 120. We find the citation of Gilliland by the Examiner for a "pluggable optical transceiver module" also belies Petitioner's argument that the Examiner never had a

reference “with integrated optoelectronics.” *See* Pet. 69. Instead, in the discussion of Gilliland, the Examiner concluded that “[o]ne skilled in the art would have been motivated to utilize a pluggable optical transceiver module in order to allow quick install and removal of the optoelectronic transceiver module” (Ex. 1024, 120), which is similar to Petitioner’s argument for combining the transceiver module of the Agazzi references with a pluggable form factor “to create a cost-effective pluggable transceiver with greater data throughput that is easily removable.” Pet. 11, 42. Further, the Examiner issued rejections including Aronson (Ex. 1024, 177–178), which also describes teaching electrical signal processing components on a single integrated circuit. Ex. 2003 ¶ 45 (stating that transceiver module (e.g., XFP comprised of dual eye openers and receiver optical sub-assembly) “may be integrated within a single ASIC”).

Thus, although Petitioner argues that the Examiner never had a reference “with integrated optoelectronics” (Pet. 69), we agree with Patent Owner that the Office has previously considered similar art directed to integrated optoelectronics. Prelim. Resp. 43; Ex. 2001, 33; Ex. 1024, 120.

Nevertheless, as Petitioner acknowledged, the argument regarding the difference between Brede’s OLT with optical elements connected thereto and an optical transceiver module with integrated optical elements has already been considered and rejected by the Examiner during prosecution. Pet. 67–68 (citing Ex. 1002, 121–128, 153) (“To traverse the first rejection, Applicants distinguished Brede as an OLT with separate and distinct optical elements rather than an optical transceiver module with the optical elements . . . But, this argument was not successful, and the application was rejected a second time.”).

Thus, although Petitioner argues that Brede's OLT is different from the Agazzi references' photoelectronic device because Brede's transmitter and receiver optoelectronics are not integrated within the transceiver module, such difference was already presented to the Examiner and was immaterial to the Examiner's prior consideration of whether Brede's OLT functions as a pluggable optical transceiver module as claimed. *See* Ex. 1024, 121–128, 153. That is, during prosecution of the '795 patent, the Examiner considered whether Brede's optical transceiver module as a whole functions as a pluggable module as claimed, and thus, whether or not the transmitter and receiver optoelectronics are integrated was not material to the Examiner's consideration as to whether they function to plug into an aperture or gap. *See* Ex. 1024, 70–71 (Applicant arguing that Brede's "entirety is a collection of rack mounted units that collectively as a whole do not function to plug into an aperture or gap and therefore not pluggable as suggested by the Examiner."). Unlike the differences between the prior art references considered during prosecution and those presented by Petitioner in *Wolfspeed*, here, whether the transmitter and receiver optoelectronics are integrated was not the basis for the Office's consideration of the art and arguments. *See Wolfspeed*, Paper 13 at 8. Applicant's arguments that ultimately overcame the rejection were focused on whether Brede's Figure 13 was pluggable (Ex. 1024, 69–72), and we find that Petitioner's argument that "Applicants successfully traversed the rejections by arguing that the OLT of Brede was not akin to an optical transceiver module with integrated optoelectronics" overstates what is reflected in the record. *See* Pet. 67; Ex. 1024, 69–72.

Accordingly, we disagree with Petitioner's contention that the references cited and arguments provided in the Petition are materially different from those previously considered by the Examiner. Pet. 67. Instead, the Examiner had considered Applicant's argument that Brede's OLT with optical elements connected thereto is not an optical transceiver module with integrated optical elements (*see* Ex. 1024, 121–128, 153), and the Examiner had even cited references with integrated optoelectronics (*id.* at 120), but ultimately the Examiner found this distinction immaterial to the determination of whether the optical module functions to plug into an aperture or gap. *Id.* at 121–128, 153.

Furthermore, as Patent Owner points out, in the related IPR, the Board also has already considered references similarly applied for their teachings of a transceiver formed on a single semiconductor chip in combination of a disclosure of form factors for use in a pluggable environment. Prelim. Resp. 42–43. For example, Patent Owner points out that the petitioner in the related IPR relied on Agazzi '152 [i.e., U.S. Patent Publ. No. 2002/0012152 A1] with Richard [i.e., U.S. Patent Publ. No. 2003/0118273 A1] for its disclosure of a variety of form factors. *Id.* at 42 (citing IPR2021-01361, Paper 10 at 31–33). We agree with Patent Owner that Petitioner describes and uses Agazzi '640 and Agazzi '341 in the same way, “substituting Agazzi '640 or Agazzi '341 in place of Agazzi '152, combined with Wei (instead of Richard) for the form factors.” *Id.*; *see* also Pet. 11, 42.

We are also unpersuaded by Petitioner's argument that the differences between the references cited in the Petition and those considered by the Examiner and/or the Board would have altered the analysis of the proposed combination. Pet. 69. As Petitioner points out, the Examiner had already

considered Applicant's arguments that Brede's transmitter and receiver optoelectronics are not integrated (Ex. 1024, 70–71), and yet, the Examiner did not find the difference argued as material in combining with a secondary reference. *See* Pet. 67–68 (citing Ex. 1024, 121–128, 153) (“this argument was not successful, and the application was rejected a second time.”). Instead, the Examiner maintained that it would have been obvious to implement Brede's optical transceiver module in Sheth's pluggable form factor to “efficiently support a variety of client interfaces, tributary optics interfaces, data standards” (*see* Ex. 1024, 126–127), similar to Petitioner's rationale to combine Wei's pluggable form factor to the Agazzi references' optical transceiver module, i.e., “to ensure compatibility across fiber-optic systems.” *See* Pet. 11, 42.

With respect to Wei, we also agree with Patent Owner that Petitioner applies Wei in the same manner as Aronson, Gilliland and Sheth during prosecution of the '795 patent, and in the same manner as Richard and Halgren (U.S. Patent Publ. No. 2004/0052528 A1) in the related IPR. Prelim. Resp. 47–48. That is, similar to these other proceedings before the Office, Petitioner relies on Wei for its teaching of a pluggable form factor and proposes to combine that teaching with those of a reference cited for electrical signal processing components.

We are unpersuaded by Petitioner's contention that Wei differs from the art previously presented during the prosecution of the '795 patent because “Wei discloses ‘separate vertically stacked printed circuit boards allows packaging the functions of [larger modules] within an LC or other small form factor package’ like the SFP.” Pet. 69. As Applicant acknowledged during prosecution of the '795 patent, Brede's Figure 3 also

depicts a “collection of rack mounted units.” *See* Ex. 1024, 70–71. Further, Applicant also acknowledged that “Gilliland discloses optical transceiver modules that plug into and mate with host receptacles.” *Id.* at 71. As the Examiner concluded with respect to Gilliland, Gilliland teaches “small form factor pluggable (SFP) configuration” wherein “[o]ne skilled in the art would have been motivated to utilize a pluggable optical transceiver module [] to allow quick install and removal of the optoelectronic transceiver module” (*id.* at 120), which is similar to Petitioner’s argument that a POSITA would have found it obvious to combine the transceiver module of Agazzi ’640 or Agazzi ’341 with the pluggable form factor of Wei “to create a cost-effective pluggable transceiver with greater data throughput that was easily removable.” Pet. 11, 42.

In light of these similarities, we find that the Petition relies on art that is substantially the same as art previously evaluated by the Office.

3. *Advanced Bionics Part II: Office Error*

Because the first part of the *Advanced Bionics* framework is satisfied, we next determine whether Petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. *Advanced Bionics*, Paper 6 at 8.

The ’181 patent claims the benefit of the filing date of U.S. Prov. Appl. No. 60/477,845 (“the provisional application”), and incorporates the provisional application by reference. Ex. 1001 at code (60), 1:8–32. As Petitioner contends that the “Applicants disclosed well-known pluggable form factors in the Background section” of the provisional application, but “moved this information from the background prior art section into the main

portion of the specification” when filing the nonprovisional application that led to the ’181 patent. Pet. 70 (citing Ex. 1032 ¶ 3; Ex. 1001, 11:24–26). According to Petitioner, the “Applicants never informed the Examiner that this information was originally in the background prior art section in the provisional.” *Id.* at 71. Petitioner also contends that the “Applicants failed to disclose that the pluggable form factors were set out in industry recognized multisource agreements.” *Id.* at 70. Petitioner characterizes these as “error[s] material to the patentability of the Challenged Claims.” *Id.* at 71.

We disagree. There is no dispute between the parties that various references disclosing pluggable form factors are prior art to the ’181 patent. Nor was the Examiner unaware of such references. In fact, as Patent Owner points out, during prosecution of the ’795 patent, the Examiner stated in an Office Action that the form factors “SFP; SFP+; XFP; X2; XENPAK; XPA; and 300 pin transceiver form factors” were “well known in the art,” as evidenced by Aronson. Ex. 1024, 177–178. This statement repeated a statement made by the same Examiner during prosecution of the ’948 patent. Ex. 2002, 146–147. And Aronson itself, cited by the Examiner in those instances, explicitly mentions an industry multisource agreement. Ex. 2003 ¶ 5.

That the Applicant moved a description of pluggable form factors from the background of the provisional application to the main portion of the specification when filing a nonprovisional application is of no moment, particularly because the record clearly demonstrates the Examiner’s awareness that such pluggable form factors are taught by the prior art. Regardless, the issues raised in this proceeding do not turn on whether

pluggable form factors were, or were not, known in the prior art since Patent Owner concedes that they were. *See* Prelim. Resp. 49 (“The inventors did not ‘fail to disclose’ the standardized nature of pluggable form factors and there is no evidence the Examiner was ignorant of this fact.”).

We accordingly determine that Petitioner fails to identify a material error by the Office in its earlier consideration of the art we discuss above.

4.. *Conclusion*

We conclude that (1) substantially the same art was previously presented to the Office, and (2) Petitioner has not demonstrated that the Office erred. We therefore conclude that it is appropriate to exercise discretion under 35 U.S.C. § 325(d) to deny the Petition.

III. CONCLUSION

For the foregoing reasons, we exercise discretion under 35 U.S.C. § 325(d) to deny institution of an *inter partes* review.⁷

IV. ORDER

In consideration of the foregoing, it is
ORDERED that the Petition is *denied*, and no trial is instituted.

⁷ Because we deny the Petition under 35 U.S.C. § 325(d), we do not reach Patent Owner’s request that we deny the Petition under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 13–14 (PTAB Mar. 20, 2020) (precedential). *See* Prelim. Resp. 53–60. Nor do we reach the parties’ merits arguments.

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