

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Junqing Sun & Haoli Qian Attorney Docket No. 59230-0005IP1
U.S. Patent No.: 11,012,252
Issue Date: May 18, 2021
Appl. Serial No.: 16/539,910
Filing Date: August 13, 2019
Title: ACTIVE ETHERNET CABLE

DECLARATION OF EXPERT

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable under Section 1001 of Title 18 of the United States Code.

Date: 12 Aug 2025

By: *Tim Arthur Williams*
Tim A. Williams

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I. ASSIGNMENT

1. I have been retained on behalf of Credo Technology Group., Ltd. (“Credo”) to offer technical opinions related to 11,012,252 (“the ’252 patent”) (EX-1001). I understand that CREDO is requesting that the Patent Trial and Appeal Board (“PTAB” or “Board”) to deny institution of an *inter partes* review (“IPR”) proceeding of the ’252 patent.

2. I have been asked to provide my independent analysis of the Petition regarding the ’252 patent.

3. I am not and never have been, an employee of Credo. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’252 patent, the Petition, the cited references in the Petition, and issues related thereto, and I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the ’252 patent.

II. QUALIFICATIONS AND BACKGROUND INFORMATION

4. I am an independent consultant. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art.

5. I am over 18 years of age, and, if I am called upon to do so, I would

be competent to testify as to the matters set forth herein. Although my qualifications are stated more fully in my curriculum vitae, attached hereto as Appendix A, I provide below a brief summary of my qualifications.

6. I earned a Bachelor of Science degree in Electrical Engineering (BSEE) from Michigan Technological University in 1976. In 1982, I earned a Master's degree, also in Electrical Engineering (MSEE), from the University of Texas at Austin. I earned a Doctor of Philosophy (Ph.D.), also from the University of Texas at Austin, in 1985. My doctorate dissertation was "Digital Signal Processing Techniques for Acoustic Log Data." In 1991, I earned a Master of Business Administration degree from the University of Texas at Austin as well.

7. I have over 40 years of professional experience in wireless communications and telecom technology, including roles in large corporations as well as start-ups and consulting work.

8. For example, from 1979 through 1991, I held the positions of Senior Engineer, Senior Member of the Technical Staff, and Member of the Technical Staff at Motorola, Inc. My work at Motorola included serving as business manager, project leader, and senior technical member for projects relating to the development of various cellular modems, transceivers, and transcoders.

9. As another example, in 1991, I co-founded Wireless Access, Inc., a start-up company focused on the Narrow Band PCS equipment market and which

developed the over-the-air protocols, subscriber equipment, and integrated circuits to deploy 2-way paging services. I held the positions of Co-Founder, Chief Technical Officer, Vice President of Engineering, and Vice President of Business Strategy at Wireless Access until it was sold to Glenarye Electronics in 1998.

10. As another example, between 1998 and 2000, I was the Chief Technology Officer and Advisory Board Member of Picazo Communications, which built and sold software PBXs Telephony equipment using VoIP and Circuit Switched Technologies.

11. As another example, in 2004, I founded DoceoTech Inc., which provides training for engineers in Wireless, Networking, and Telephony technologies. Since 2004, I have served as DoceoTech's Chairman.

12. I hold over 25 United States patents in wireless and signal processing technology, as well as numerous patent applications in the same field. Additionally, I am a Patent Agent registered with the U.S. Patent and Trademark Office since January 2002. Further, I have served as a technical expert in multiple patent proceedings.

13. My curriculum vitae, included as an appendix to this declaration, includes a list of publications on which I am a named author. It contains further details regarding my experience, education, publications, and other qualifications to render an expert opinion in connection with this proceeding.

14. I have reviewed the '252 patent, the Petition, and the cited references in the Petition.

15. I have also reviewed the following references:

- EX-2013 U.S. Pat. No. 10,148,414 (“Lugthart414”)
- EX-2014 U.S. Pat. Pub. No. 2007/0237464 (“Aronson464”)
- EX-2020 U.S. Pat. No. 7,401,985 (“Aronson985”)

16. I have no financial interest in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

17. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '252 Patent. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art as of the priority date. Any figures that appear within this document have been prepared with the assistance of Counsel and reflect my understanding of the cited references in the Petition.

III. LEVEL OF ORDINARY SKILL IN THE ART

18. A person having ordinary skill in the art (“POSITA”) as of August 28, 2018 would have had an undergraduate degree in electrical engineering or electrical and computer engineering, or equivalent knowledge, training, or

experience, with at least three years of experience working in high speed data communication. A higher level of education may substitute for less experience, and *vice versa*.

19. Based on my experiences, I have a good understanding of the capabilities of a POSITA. Based on my knowledge, skill, and experience, I have an understanding of the capabilities of a POSITA. For example, from my industry experience, I am familiar with what a POSITA would have known and found predictable in the art.

IV. LEGAL STANDARDS

A. Terminology

20. I have been informed by Counsel and understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by one of ordinary skill. I further understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent's history of examination before the Patent Office. Counsel has also informed me, and I understand that, the words of the claims should be interpreted as they would have been interpreted by one of ordinary skill at the time of the invention was made (not today). The '252 patent was filed August 13, 2019 and claims priority to a foreign application filed on March 1, 2019, which I refer to as the "Critical Date" in this proceeding.

B. Legal Standards

21. I have been informed by Counsel and understand that documents and materials that qualify as prior art can render a patent claim unpatentable as being anticipated or obvious.

22. I am informed by Counsel and understand that all prior art references are to be looked at from the viewpoint of a person of ordinary skill in the art at the time of the invention, and that this viewpoint prevents one from using his or her own insight or hindsight in deciding whether a claim is anticipated or rendered obvious.

C. Anticipation

23. I understand that patents or printed publications that qualify as prior art can be used to invalidate a patent claim as anticipated or as obvious.

24. I understand that, once the claims of a patent have been properly construed, the second step in determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

25. I understand that a prior art reference “anticipates” an asserted claim, and thus renders the claim invalid, if all limitations of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present).

D. Obviousness

26. I understand that even if a patent is not anticipated, it is still invalid if

the differences between the claimed subject matter 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 POSITA.

27. I have been informed by Counsel and understand that a claim is unpatentable for obviousness and that obviousness may be based upon a combination of references. I am informed by Counsel and understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. However, I am informed by Counsel and understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.

28. I am informed by Counsel and understand that when a patented invention is a combination of known elements, a court determines whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue by considering the teachings of prior art references, the effects of demands known to people working in the field or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art.

29. I am informed by Counsel and understand that a patent claim composed of several limitations is not proved obvious merely by demonstrating

that each of its limitations was independently known in the prior art. I am informed by Counsel and understand that identifying a reason those elements would be combined can be important because inventions in many instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. I am informed by Counsel and understand that it is improper to use hindsight in an obviousness analysis, and that a patent's claims should not be used as a "roadmap."

30. I am informed by Counsel and understand that an obviousness inquiry requires consideration of the following factors: (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called "secondary considerations" of non-obviousness, which include: (i) "long felt need" for the claimed invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) "copying" of the claimed invention by others.

31. I have been informed by Counsel and understand that an obviousness evaluation can be based on a single reference or a combination of multiple prior art references. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but that the nexus linking two or more prior art references is sometimes simple common sense. I have been informed by Counsel and understand that obviousness analysis recognizes that

market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

32. I have been informed by Counsel and understand that if a technique has been used to improve one device, and a person of ordinary skill at the time of invention would have recognized that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

33. I have been informed by Counsel and understand that practical and common sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I have been informed by Counsel and understand that a person of ordinary skill looking to overcome a problem will often be able to fit together the teachings of multiple prior art references. I have been informed by Counsel and understand that obviousness analysis therefore takes into account the inferences and creative steps that a person of ordinary skill would have employed at the time of invention.

34. I have been informed by Counsel and understand that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill at the time of invention. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention can provide a

reason for combining the elements in the manner claimed.

35. I have been informed by Counsel and understand that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.

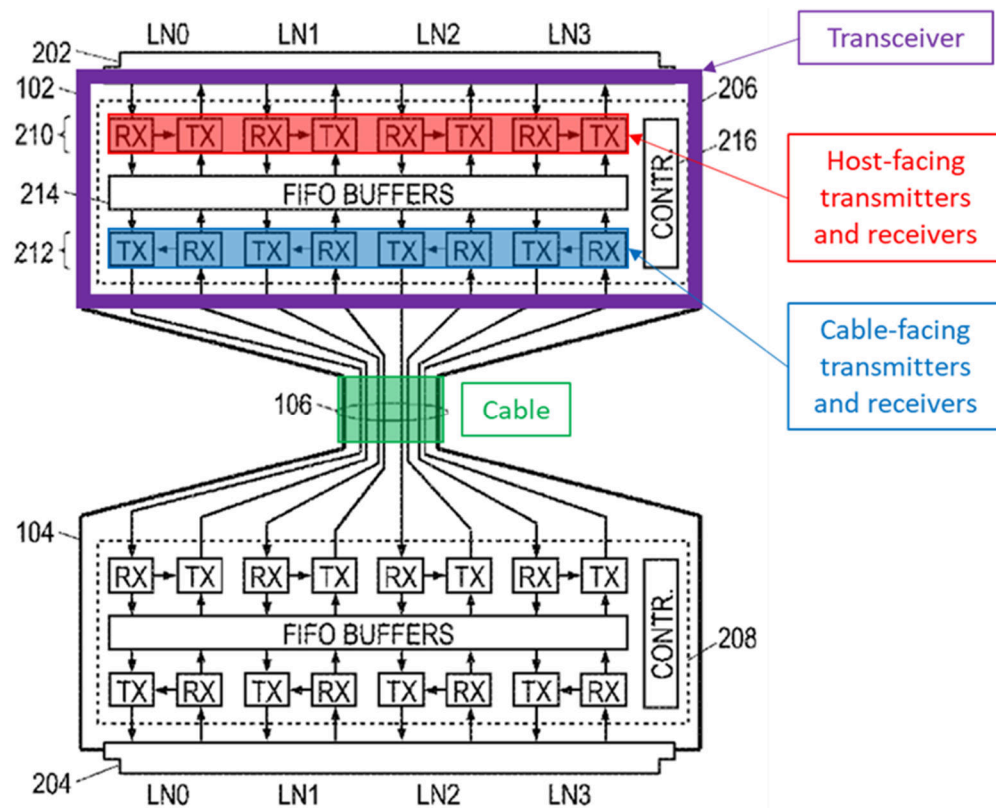
36. In sum, my understanding is that prior art teachings are properly combined where one of ordinary skill having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

37. I have been informed by Counsel and understand that in an *inter partes* review, “the petitioner shall have the burden of proving a proposition of unpatentability,” including a proposition of obviousness, “by a preponderance of the evidence.” 35 U.S.C. §316(e).

V. SUMMARY OF THE '252 PATENT

38. The '252 Patent is directed to an active ethernet cable (AEC) that provides “a high-bandwidth communications link between devices in a routing network.” EX-1001, Abstract, 3:44-46. The AEC of the '252 Patent includes

connectors 102, 104 that each “include a powered transceiver that performs clock and data recovery (CDR) and re-modulation of data streams in each direction” thus providing “consistently robust data transfer over extended cable lengths ... without consideration of the electronics manufacturers of the network interfaces.” *Id.*, 3:61-4:26, FIG. 2 (reproduced below). A “host-facing transmitter and receiver set 210 employ fixed equalization parameters that are cable-independent, i.e., they are not customized on a cable-by-cable basis.” *Id.*, 4:60-5:5. These equalization parameters can include “filter coefficient values for pre-equalizer filters in the transmitters, and gain and filter coefficient values for the receivers.” *Id.*



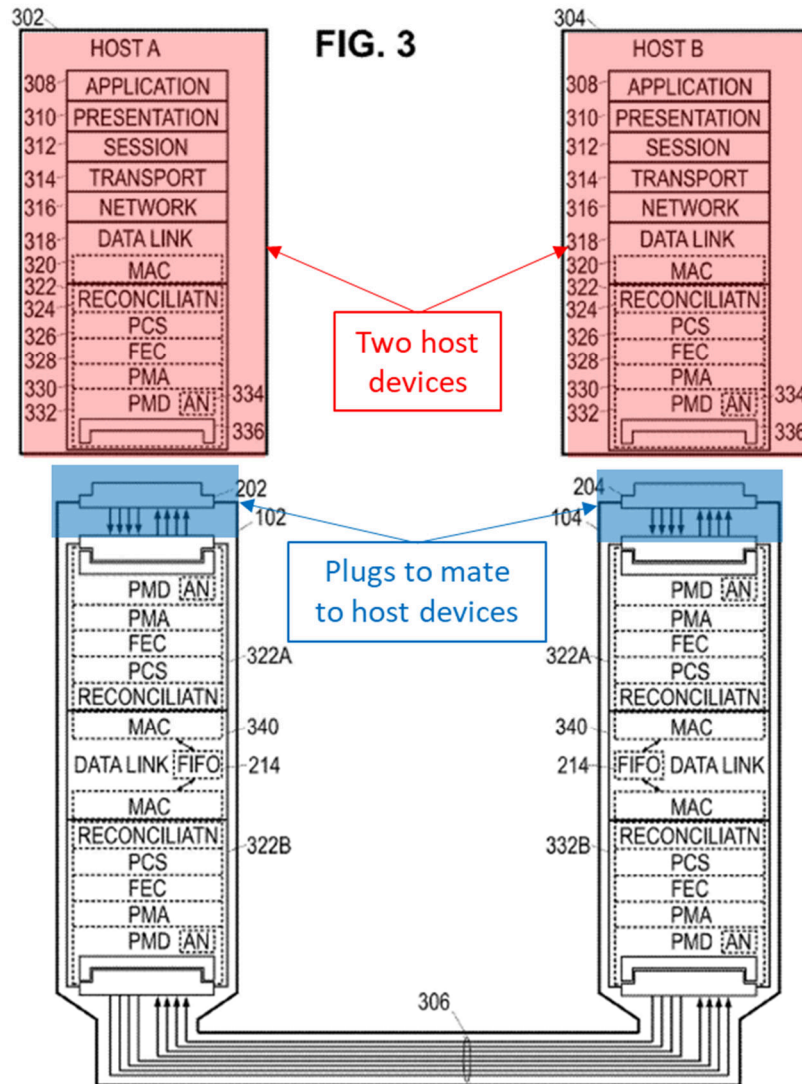
EX-1001 ('252 patent), FIG. 2.

39. The transceiver sets 210 and 212 are described as follows:

In at least some contemplated embodiments, the host-facing transmitter and receiver set 210 employ fixed equalization parameters that are cable-independent, i.e., they are not customized on a cable-by-cable basis. The center-facing transmitter and receiver set 212 preferably employ cable-dependent equalization parameters that are customized on a cable-by-cable basis. The cable-dependent equalization parameters may be adaptive or fixed, and initial values for these parameters may be determined during manufacturer tests of the cable. The equalization parameters may include filter coefficient values for pre-equalizer filters in the transmitters, and gain and filter coefficient values for the receivers.

EX-1001 ('252 patent), 4:60-5:5.

40. The '252 Patent discloses that the cable illustrated in FIG. 2 forms “a point-to-point communications link between two host devices 302, 304,” shown in FIG. 3. EX-1001, 5:6-6:54, FIG. 3. The cable connectors have “plugs 202, 204” that allow the cable to “mate with receptacles 336” of the two host devices. *Id.*



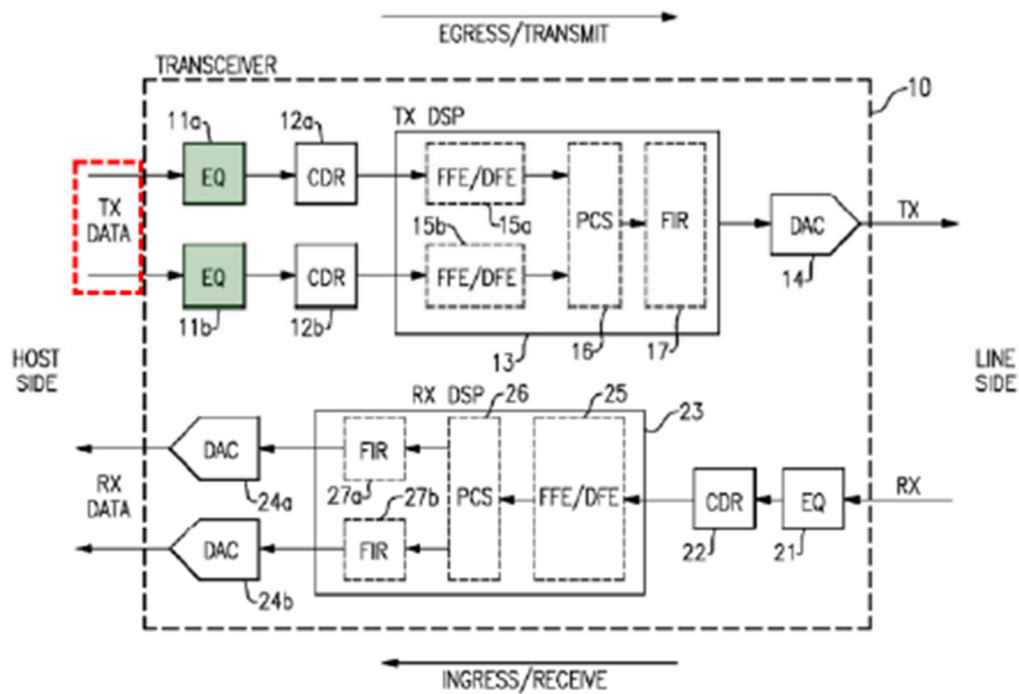
EX-1001 ('252 patent), FIG. 3.

VI. OVERVIEW OF THE CITED REFERENCES

A. Lugthart

41. Lugthart is directed to “[s]ystems and methods for high speed communications,” to include “transceiver architectures and techniques for re-timing, multiplexing, de-multiplexing and transmitting data.” EX-1005, Abstract. The Petition relies on a particular embodiment of Lugthart, FIG. 1A, which depicts

a “schematic diagram of ... a transceiver” (the Petition’s annotated figures reproduced below). *Id.*, 4:64-65; Pet., 8-12, 14-21. Specifically, Petitioner identifies Lugthart’s equalizers 11a/11b and finite impulse response (FIR) filters 27a/27b within Lugthart’s FIG. 1A transceiver. EX-1005, 7:63-67, 8:58-10:8; Pet., 8-12, 14-21.

**FIG. 1A**

EX-1005, FIG. 1A (annotated at Pet., 15).

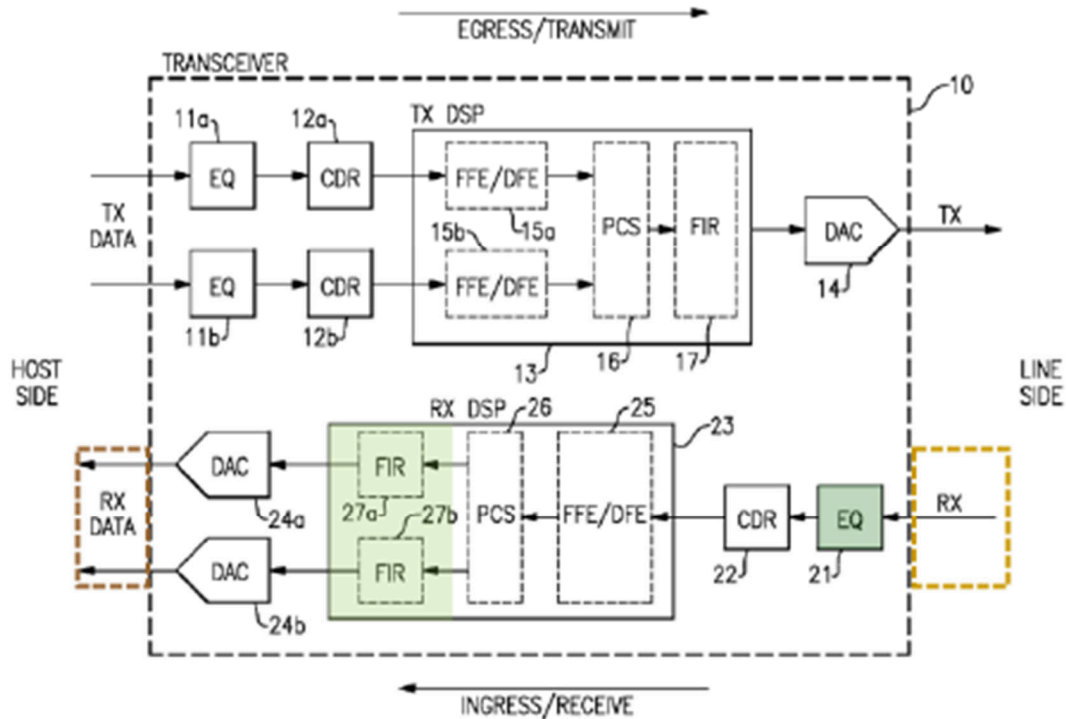


FIG. 1A

EX-1005, FIG. 1A (annotated at Pet., 16).

42. Lugthart describes that equalizers 11a/11b “provide signal equalization to compensate for transmission line losses on the host side” by “boosting high frequency components of a signal relative to low frequency components of the signal.” EX-1005, 8:58-66. I note that Lugthart does not provide any further detail of how this boosting is performed by equalizers 11a/11b, and nowhere does Lugthart state that this boosting is performed independently of cable characteristics. *Id.*

43. Lugthart is similarly terse with respect to FIRs 27a/27b, only describing that a digital signal processor (DSP) 23, including FIRs 27a/27b, can be

used to “process (for example, filter or otherwise recover and condition) data recovered by the receive path CDR circuit 22, and to deserialize the data to generate output signals having a desired modulation format for host side transmission.” EX-1005, 9:19-51. Lugthart does not describe with any specificity what functions FIRs 27a/27b perform within DSP 23 in FIG. 1A. *Id.* I note that nowhere does Lugthart describe that FIRs 27a/27b perform their functions with any specific parameters or coefficients, or that their functionality is performed independently of any cable characteristics. *Id.*

B. Aronson

44. Aronson alleges that its techniques provide cable designs that are “mechanically and electrically interoperate with ... optical cables.” EX-1006, 5:7-25. Specifically, Aronson describes an “active cable that is configured to communicate over much of its length using one or more optical fibers” that includes equalization to provide “compensation for high frequency loss in the host-board traces.” EX-1006, 2:29-3:3, 14:16-15:24.

45. The Petition relies on Aronson’s FIGS. 12A and 1B (reproduced below) which are directed to an “active copper cable transmitter integrated circuit” and an “active copper cable receiver integrated circuit,” respectively. EX-1006, 3:62-65, 14:16-15:24, FIGS. 12A-12B; Pet., 12-14, 17-27. Below, I discuss the specific areas of Aronson that the Petition relies upon.

46. The Petition relies on Aronson's "adjustable equalization" component in the FIG. 12A transmitter when mapping to cable-independent equalization parameters, which compensates for "host board traces." Pet., 17; EX-1006, 14:16-23. Other than this general description of correcting host board traces, there is no explicit disclosure of cable-independent equalization parameters in the FIG. 12A transmitter of Aronson. *Id.*

47. The Petition cites to 15:1-8 of Aronson when discussing host board traces that are corrected by the FIG. 12B receiver, but this section of Aronson is concerned with "cable high frequency rolloff, rather than the host PCB traces." Pet., 17; EX-1006, 15:1-8. In contrast with the cited disclosure of Aronson, the Petition's annotated figure highlights Aronson's preemphasis/output driver component which "help[s] overcome high frequency losses on long PCB traces." Pet., 17; EX-1006, 15:17-24. Aronson's description of the preemphasis/output driver is also terse, and limited to explaining that the output driver provides "optional preemphasis." Aronson does not describe implementation details such as the parameters or coefficients it uses for the "optional preemphasis." EX-1006, 15:17-24. I note that the Petition does not identify any disclosure that is relevant to cable-independent equalization parameters in Aronson's transmitter. Pet., 17.

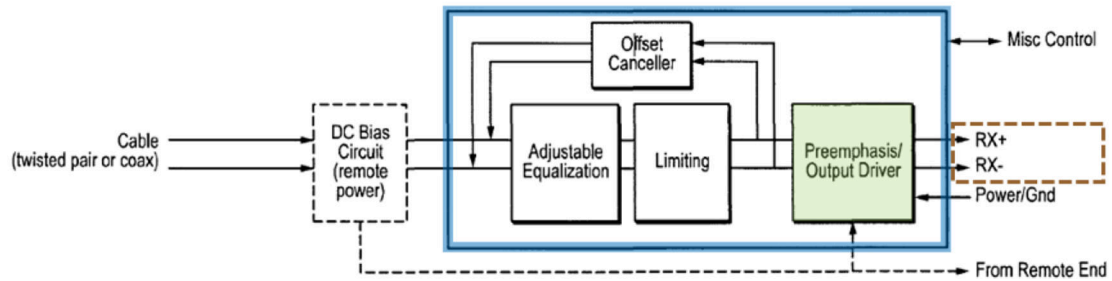


FIG. 12B

EX-1006, FIG. 12B (annotated at Pet., 17).

48. The Petition appears to concede that Aronson does not depict fixed equalization in its FIG. 12A transmitter and FIG. 12B receiver. Pet., 18. Instead, the Petition notes that Aronson describes that equalization “could” be fixed. *Id.* I note that there is no explicit disclosure of fixed equalization parameters in Aronson. Pet., 18-20.

49. The Petition also identifies the preemphasis/output driver of Aronson’s FIG. 12A transmitter and adjustable equalization component in Aronson’s FIG. 12B receiver when mapping to the claims’ cable-dependent parameters. Pet., 20-28.

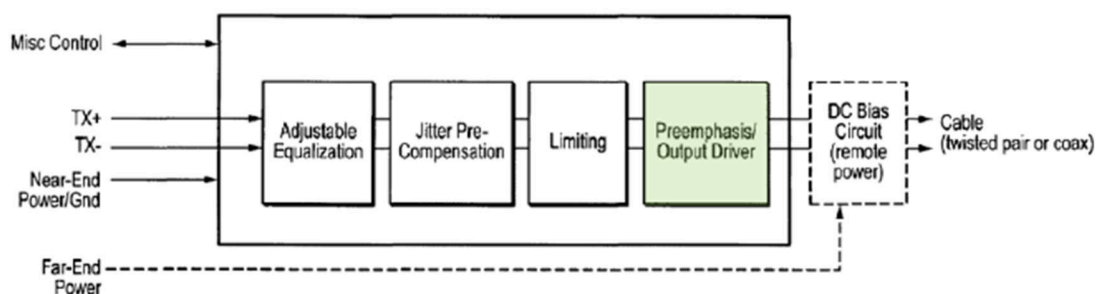


FIG. 12A

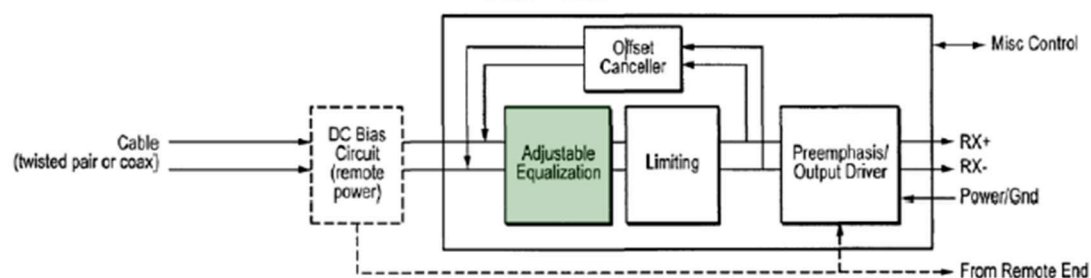


FIG. 12B

EX-1006, FIGS. 12A, 12B (annotated at Pet., 27).

50. Again, Aronson’s description of both components in FIG. 12A/12B is terse. EX-1006, 14:33-39, 15:1-8. With respect to the preemphasis/output driver of FIG. 12A, Aronson describes that this component “provides preemphasis to the high frequency content of the transmitted signal to overcome the larger loss on the cable of these high frequencies.” EX-1006, 14:33-39. Aronson suggests that “gains of 12 dB or larger may be used” in performing this function, but notes that gain “can be adjusted at factory setup individually to match the particular length of the characteristics of the copper cabling.” *Id.*

51. With respect to the adjustable equalization component of FIG. 12B, Aronson describes that this component is provided to “compensate for the cable

high frequency rolloff, rather than the host PCB traces in the case of the driver.” I note that Aronson does not explicitly disclose any parameters or coefficients for its adjustable equalization component. *Id.*

C. Tang

52. Tang is directed to networking data cables supporting Ethernet communications between transceivers in host devices (*e.g.*, servers, routers, switches). EX-1007, [0001]-[0002], [0014]-[0017]. From my review, the Petition does not allege that Tang discloses or suggests the fixed, cable-independent, equalization parameters, and instead relies on the disclosure of Aronson in combination. Pet., 71-74, 85.

D. TI-Retimer

53. TI-Retimer is a Texas Instruments DS125DF1610 retimer chip datasheet that Petitioner alleges was published March, 2017. EX-1008, 1. From my review, the Petition does not allege that TI-Retimer discloses or suggests the fixed, cable-independent, equalization parameters, and instead relies on the disclosure of Aronson in combination. Pet., 85.

VII. THE ALLEGED PRIOR ART DOES NOT DISCLOSE THE CLAIMED FIXED, CABLE-INDEPENDENT, EQUALIZATION PARAMETERS

A. Lugthart does not disclose the claimed fixed, cable-independent, equalization parameters

54. I note that the cited passages of Lugthart in the Petition fail to provide

any evidence that Lugthart teaches the claimed fixed, cable-independent equalization parameters. Although these passages of Lugthart generally describe CDR and remodulation, they fail to disclose or suggest any specific requirement for the parameters used for each. Pet., 16-17; EX-1005, 7:58-10:8. The Petition and Dr. Min simply allege that a POSITA would have understood these parameters to exist because Lugthart's equalizers and FIRs allegedly "compensate for host-side distortion/losses." Pet., 14-16; EX-1003, ¶134. I disagree with this assumption, noting that nothing in Lugthart explains how equalization is performed independently of the cable. EX-1005, 7:58-10:8. Petitioner and Dr. Min appear to imply that host-side distortion is inherently solved with fixed, cable-independent, equalization parameters—a flawed theory that I explain below with respect to Aronson. See below, §VII.

55. The '252 Patent clearly provides examples of fixed, cable-independent, equalization parameters, to include "filter coefficient values for pre-equalizer filters in the transmitters, and gain and filter coefficient values for the receivers." EX-1001, 5:2-5. I do not see any attempt by the Petitioner or Dr. Min to produce evidence of similar equalization parameters within Lugthart. Pet., 14-16. This is because Lugthart does not provide any detail on the parameters used by equalizers 11a/11b and finite impulse response (FIR) filters 27a/27b (what the Petition alleges as disclosing fixed, cable-independent, equalization parameters).

Id.; *see also* EX-1005, 7:49-9:5.

56. The Petition appears to tacitly admit Lugthart’s deficiencies by relying on the disclosure of Aronson. Pet., 17-20. In this way, both grounds of the Petition depend on Aronson—which itself fails to disclose the necessary parameters for the reasons I discuss below. *See below*, §VII.B.

B. Aronson does not disclose the claimed fixed, cable-independent, equalization parameters

57. Like Lugthart, the Petition fails to provide evidence that Aronson teaches the claimed fixed, cable-independent equalization parameters—the Petition instead simply alleges that parameters exist in Aronson because of the presence of “[h]ost board traces.” Pet., 17-18. Again, despite examples of what suitable equalization parameters would have been according to the ’252 Patent, the Petition makes no attempt to show intrinsic evidence of their existence within Aronson.

Id.; *see above* §VII.A. Even looking beyond what was cited from Aronson in the Petition, there is no disclosure in FIG. 12A/12B that discloses or suggests such parameters. EX-1006, 14:14-15:24. Aronson’s very limited discussion of preemphasis gain is with respect to FIG. 12A’s preemphasis/output driver. EX-1006, 14:33-36, FIG. 12A; Pet., 17-18. This disclosure still fails to satisfy the claim language as it suggests only the features of Aronson’s transmitter (not the receiver; the claims require “the respective transceivers each employing ...” the claimed parameters, e.g., both the transmitter and the receiver). *Id.*, *see also* EX-

1001, Claim 1.

58. The Petition’s inference of cable-independent parameters in Aronson based on the simple presence of host-board traces appears to rely on inherency—something that counsel informs me must be “carefully circumscribed in the context of obviousness.” Pet., 17. I understand that one can only properly infer that cable-independent equalization parameters are inherently present as a solution to host-board traces in Aronson when they are the natural result of these traces. *Id.* Aside from a mere seven lines from Aronson’s disclosure, and Dr. Min simply saying so, the Petitioner does not produce any evidence as to why a POSITA would have understood that host-board traces illicit any naturally following solution—let alone cable-independent equalization parameters. Pet., 17 (citing EX-1006, 14:16-23). Dr. Min’s testimony simply repeats the Petition’s alleged obviousness analysis and says that “[h]ost board traces are independent of the cable, so parameters compensating for them are cable-independent.” *Compare* EX-1003, ¶137 with Pet., 17. No support is provided that explains why fixed, cable-independent, equalization parameters are a “natural” solution to this problem, and indeed they are not an inherent solution. Engineering problems often have many such solutions and POSITAs would have appreciated that many factors drive design decisions such as the decision to use a particular form of equalization parameters.

59. Mindful of this design decision, Aronson frequently describes cable-

dependent equalization. EX-1006, 14:33-39 (“The amount of gain can be adjusted at factory setup individually to match the particular length of the characteristics of the copper cabling”), 15:1-8 (“Adjustable but factory set equalization is of particular interest because the cable length and characteristics will be established at the time of the cable manufacture”). Petitioner’s theory (whether inherency or obviousness) overlooks that Aronson’s equalization disclosure is focused on cable transmission-side communication which is dependent on cable characteristics. *Id.* No explanation is provided in the Petition as to why a POSITA would discard Aronson’s explicit teachings, absent a single conclusory statement with respect to host board traces. Pet., 17.

60. Aronson frequently discloses that equalization can be “adjustable” or “adaptable,” and explains that “[a]djustable but factory set equalization is of particular interest because the cable length and characteristics will be established at the time of the cable manufacture”—not only suggesting that any parameters associated with this equalization would have been adjustable, but also that they would have depended on cable length and characteristics (such that they are not cable-independent. EX-1006, 15:1-8, 15:17-24 (emphasis added). Adjustable parameters that depend on cable characteristics are neither “fixed” nor “cable-independent,” as claimed.

61. Further, Aronson discloses that the amount of “gain” used in

preemphasis “can be adjusted at factory setup individually to match the particular length of the characteristics of the copper cabling,” further indicating that any parameters in Aronson would have been adjustable and cable-dependent. EX-1006, 14:33-39 (emphasis added). Finally, Aronson even suggests that CDR may be eliminated entirely “if the active cable sufficiently limits jitter because of the choice of fiber ... [or] length,” implying that CDR isn’t even performed in some embodiments of Aronson for certain cables (such that the existence of CDR itself is cable-dependent in Aronson). EX-1006, 20:13-20. Accordingly, contrary to Petitioner’s inferences, if Aronson suggests any equalization parameters (it does not), it clearly suggests adjustable, cable-dependent equalization parameters—not fixed cable-independent, equalization parameters.

62. Although Dr. Min claims that the decision to used fixed or adjustable equalization is a tradeoff, this analysis is discussed in a vacuum and is not related to the combination of Lugthart and Aronson, and no analysis is provided that explains why a POSITA would implement fixed equalization in Lugthart in light of Aronson’s explicit preference for adjustable equalization. EX-1003, ¶¶139-140. For example, the Petition’s design choice remarks are not described in the context of the Lugthart-Aronson combination system, or any features thereof, and thus simply provide an abstract tradeoff discussion disconnected from the references and claimed features. *See* Pet., 18-19.

63. Most engineering problems involve tradeoffs and design decisions, and the simple existence of multiple design choices does not automatically imply a particular design choice is preferable in any given scenario, absent a clear articulated reason. Here, a POSITA would have known the benefits of adaptive equalization in a high data rate system, and thus, their desirability in Lugthart and Aronson. The references cited by Dr. Min confirm the same. Pet., 18-19; EX-1003, ¶¶139-140; EX-1011, ¶¶[0011] (“Adaptive equalization is attractive as it will automatically compensate for the different changes that can be introduced by different links. This enables interoperability of different subsystems in the system.”); EX-1017, 1:39-42 (“Due to the often complex mix of factors causing distortion on real-world links, adaptive equalization has generally been favored over static equalization to compensate for such distortion.”); EX-1014, ¶¶[0036], (“Accordingly, there is a need for an adaptive equalization scheme that provides optimum level of equalization. There is a need for an adaptive equalization scheme that detects when the equalizer is trapped in a failure state. There is also a need for an adaptive equalization scheme that allows the equalizer to recover from the failure state.”) (emphasis added).

VIII. A POSITA WOULD NOT HAVE COMBINED THE ALLEGED PRIOR ART REFERENCES

A. A POSITA would not have combined Lugthart and Aronson

64. The Petition simply alleges that “[t]o the extent Lugthart-993 is

considered to not expressly teach or suggest using cable-independent parameters for pre-equalizing and equalizing signals to and from the host, Aronson does” and that “Aronson also teaches that these cable-independent parameters are fixed.” Pet., 17-18 (emphasis removed). This statement does not explain how or why a POSITA would incorporate Aronson’s teachings into Lugthart, and from my review, there are numerous unanswered questions with respect to the scope, motivation, and expectation of success of this combination.

65. First, what exactly is being combined into Lugthart from Aronson is unexplained; the Petition simply alleges that a POSITA would implement Lugthart “in the same manner” as Aronson. Pet., 17-29. The Petition and Dr. Min frequently reference Aronson’s FIGs 12A and 12B, with the Petitioner identifying particular components within these figures as allegedly being relevant to the ’252 Patent’s claims (for example, the “Preemphasis/Output Driver” of FIG. 12A and the “Adjustable Equalization” component of FIG. 12B). *Id.* Yet, no explanation is provided as to where these components would be incorporated into Lugthart’s transceivers. *Id.* If the Petitioner or Dr. Min were to argue Lugthart’s alleged parameters are being modified “in the same manner” as Aronson, without the need of any particular component in Aronson’s transmitters and receivers, (1) this theory is not clearly established, and (2) Lugthart does not disclose any parameters to modify, as explained above, rendering the combination inoperable for this

reason. *Id.*; *see above*, §VII.A. The Petitioner and Dr. Min allege that a POSITA would implement Lugthart “in the same manner” as Aronson, yet I do not see what that “manner” would have been. *Id.*

66. Second, the Petition and Dr. Min’s arguments for a POSITA’s expectation of success in implementing the combination are circular. Pet., 29; EX-1003, ¶59. In a single paragraph, repeated by Dr. Min, the Petitioner alleges that a POSITA would have expected success in combining Aronson into Lugthart because “Lugthart-993 already discloses cable-dependent and cable-independent parameters” and “every above-discussed design choice was well-known as demonstrated by Aronson and numerous other references.” *Id.* These statements assume (1) that both Lugthart and Aronson disclose the claimed fixed, cable-independent, equalization parameters, despite the fact that both references lack any explicit disclosure, as explained above, and (2) simply because concepts are allegedly well-known, combining such known concepts would automatically have had a reasonable expectation of success. *Id.* As said above, most engineering problems involve tradeoffs and design decisions, and the simple existence of multiple design choices does not automatically imply an expectation of success in implementing a particular choice in any given application. Even if one were to accept the alleged motivation to combine the references or the alleged inherent features in the asserted references, the the Petition’s one paragraph explanation of

an expectation of success is woefully insufficient. The lack of a reasonable expectation of success is compounded by the lack of a clear explanation of which features from Aronson are being combined into the Lugthart system (the Petition presenting FIGS. 12A-B of Aronson, but describing only that Lugthart would have been implemented “in the same manner” as Aronson). Pet., 17-29.

67. Finally, the Petitioner’s combination motivation is further strained by the fact that fixing Lugthart’s equalization, as allegedly taught by Aronson, would have changed of Lugthart’s principle of operation, which is firmly rooted in higher accuracy equalization obtained through adaptive and configurable equalization. EX-1005, 4:25-29, 28:40-47, 28:57-63, 46:30-39. Indeed, Lugthart explains that adaptive equalization is preferred for “relatively high data rates,” despite the higher sophistication. *Id.*, 31:27-45, 46:30-39. Petitioner and Dr. Min’s own evidence confirms that the benefits of adaptive equalization were well known in the art. Pet., 18-19; EX-1003, ¶139-140; EX-1011, ¶[0011] (“Adaptive equalization is attractive as it will automatically compensate for the different changes that can be introduced by different links. This enables interoperability of different subsystems in the system.”); EX-1017, 1:39-42 (“Due to the often complex mix of factors causing distortion on real-world links, adaptive equalization has generally been favored over static equalization to compensate for such distortion.”); EX-1014, ¶[0036], (“Accordingly, there is a need for an adaptive equalization scheme that

provides optimum level of equalization. There is a need for an adaptive equalization scheme that detects when the equalizer is trapped in a failure state. There is also a need for an adaptive equalization scheme that allows the equalizer to recover from the failure state.”) (emphasis added).

68. Petitioner and Dr. Min’s allegation of a “tradeoff” between adaptive and fixed equalization overlooks that Lugthart clearly indicates what side of the tradeoff it prefers. Lugthart does not prefer the lower cost and simplicity of fixed equalization. EX-1005, 4:25-29, 28:40-47, 28:57-63, 31:27-45, 35:60-67, 46:30-39. Lugthart clearly prefers the accuracy of adaptive equalization at higher data rates. *Id.* The proposal to fix Lugthart’s equalization (as allegedly disclosed in Aronson) would have destroyed the accuracy of Lugthart’s equalization at these high data rates—a principle central to Lugthart’s operation and purpose. *Id.* Thus, the combination of Aronson into Lugthart in the manner Petition and Dr. Min proposes significantly changes Lugthart’s operation and purpose—shifting the goal of the reference from accuracy to cost.

B. A POSITA would not have combined Tang, TI-Retimer, and Aronson

69. The Petition and Dr. Min rely solely on Aronson’s disclosure with respect to claim limitation [1.E]. Pet., 71-74 (discussion of “cable-independent,” “fixed,” and “cable-dependent” equalization parameters that all cite to Ground 1 analysis of Aronson), 87 (referring the reader to the combination analysis for

Ground 2, which refers the reader to Ground 1). Accordingly, the Petition and Dr. Min's mappings to the features of limitation [1.E] are entirely contained within the Petition's combination analysis for Tang, TI-Retimer, and Aronson (which are themselves dependent entirely on the combination analysis for Lugthart and Aronson, as evidenced by frequent *supra* cites). *Id.*; Pet., 71-74; *see above*, §VIII.A. For this reason, my analysis above is applicable to Petitioner's combination of Tang, TI-Retimer, and Aronson for the same reasons. *Id.*

IX. MATERIALS CONSIDERED

70. My analysis and conclusions set forth in this declaration are based on my educational background and experiences in the field (*see* Section II). Based on my knowledge and experience, I believe that I am considered to be an expert in the field. Also, based on my knowledge and experience, I understand and know of the capabilities of persons of ordinary skill in the field around the Critical Date.

71. My analysis and conclusions set forth in this declaration are based on the perspective of a POSITA.

X. CONCLUSION

72. For all the reasons I have noted in the foregoing paragraphs, the Board should deny institution of Ground 1 of the Petition, and thus decline to institute *inter partes* review of any claim of the '252 Patent.

73. I currently hold the opinions set expressed in this declaration. But my

analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

APPENDIX A

Tim Arthur Williams, Ph.D.
Curriculum Vitae

Dr. Williams has 45 years of professional experience in wireless communications, networking and telecom technology. He is an entrepreneur who has participated in the organization and operation of start up companies that brought wireless LAN, software VoIP PBX, and 2-way paging technology to the marketplace. Dr. Williams holds numerous patents in wireless and signal processing technology. He is an experienced litigation support consultant with experience in patent infringement matters. Dr. Williams is also a registered Patent Agent.

- Wireless LAN
- Cellular and PCS Standards
- Cellular Telephone Architecture
- Digital Signal Processing

- Telecommunications Technology
- VoIP Technology
- Computer Networking
- Wireless Networks & Protocols

Year	University	Degree
1991	University of Texas at Austin	MBA
1985	University of Texas at Austin	Ph.D., Dissertation: “Digital Signal Processing Techniques for Acoustic Log Data”
1982	University of Texas at Austin	MSEE, Thesis: “Cepstral Processing of Speech Signals”
1976	Michigan Technological University	BSEE

Professional Experience

From: 2008
To: 2010
Organization: Expressume, Inc / Montage Inc. – Milwaukee, WI
Title: Board Member
Summary: This company sells software for human resource recruiting. This company was sold in June 2019.

From: 2008
To: 2014
Organization: Faculte, Inc. – San Jose, CA
Title: Board Member
Summary: This company provided SaaS (Software as a Service) web video based communication products.

From: 2008
To: 2010
Organization: BitRail Networks Inc. – Miami, FL
Title: Founder, Board Member
Summary: This company sold computer networking solutions.

From: 2008
To: Present
Organization: Calumet Venture Management – Madison, WI
Title: Member
Summary: This company provides seed capital and management expertise to small companies.

From: 2006
To: 2015
Organization: BEEcube Inc. – Fremont, CA
Title: Founder, Board Member, Board Advisor
Summary: This company built high speed processing solutions. This company was sold to National Instruments, Inc. in Feb 2015.

Tim Arthur Williams, Ph.D.
Curriculum Vitae

From: 2006
To: 2015
Organization: Topaz Equity, LLC – Danville, CA
Title: Founder, Board Member
Summary: This is a private equity investment company. It owned AtomAMPD which develops, markets and sells software based network solutions.

From: 2004
To: Present
Organization: DoceoTech Inc. – Danville, CA
Title: Founder, Chairman
Summary: This was a training company that provides training for engineers in Wireless, Networking, and Telephony technologies. It is currently owned by Beach Technologies, LLC.

From: 2004
To: 2006
Organization: SiBEAM, Inc. – Sunnyvale, CA
Title: Founder, Chief Executive Officer
Summary: This is a fabless semiconductor company that develops high-speed wireless networking ICs. This company was sold to Silicon Image, Inc. in Apr 2011.

From: 2001
To: 2004
Organization: JetQue, Inc. – Danville, CA
Title: Founder, Chief Executive Officer
Summary: This company created messaging solutions for the mobile professional.

From: 1999
To: 2000
Organization: Atheros Communications, Palo Alto, CA
Title: Interim CEO, Advisory Board Member
Summary: This company builds wireless LAN ICs. Atheros became a public company in May 2004. (ATHR) This company was sold to QCOM in Jan 2011.

Tim Arthur Williams, Ph.D.
Curriculum Vitae

From: 1998
To: 2000
Organization: Picazo Communications, Inc. – San Jose, CA
Title: Chief Technology Officer, Advisory Board Member
Summary: This company built and sold software PBXs Telephony equipment using VoIP and Circuit Switched Technologies. The company was purchased by Intel.

From: 1996
To: Present
Organization: Beach Technologies, LLC – Danville, CA
Title: Chief Executive Officer
Summary: This is a consulting company that provides IP services. It owns DoceoTech LLC and Streaming Knowledge LLC, which perform the same services.

From: 1991
To: 1998
Organization: Wireless Access, Inc. – Santa Clara, CA
Title: Co-Founder, Chief Technical Officer, Vice President of Engineering, Vice President of Business Strategy
Summary: This was a startup company focusing on the Narrow Band PCS equipment market. The company developed the over the air protocols, the subscriber equipment and the ICs to deploy 2-way paging services. The company was sold to Glenarye Electronics.

From: 2014
To: 2021
Organization: Through Technology, LLC. – Chicago, IL
Title: Partner
Summary: This is a private equity investment company. It owns Through Technology Group, PTE LTD, which is registered in Singapore.

From: 1979
To: 1991
Organization: Motorola, Inc. – Austin, TX – Semiconductor Sector

Tim Arthur Williams, Ph.D.
Curriculum Vitae

Title: Sr. Engineer, Member Technical Staff, Sr. MTS
Summary: Business manager, project leader, and senior technical member of the teams which were responsible for product development of the following systems:

- ADPCM transcoder,
- ISDN U-reference point transceiver,
- CT-2 voice codec and channel modem,
- GSM voice codec and channel modem,
- TDMA voice codec and channel modem
- CDMA voice codec and channel modem, and
- Japanese Digital Cellular voice codec and channel modem.

From: 1976

To: 1979

Organization: Motorola Inc. - Chicago, IL - Communications Sector - Digital Voice Privacy Group

Title: Engineer

Summary: This group built the first commercial digitally encrypted two-way FM land mobile radio system.

Professional Certifications

- Patent Agent – U.S. Patent and Trademark Office #50,790 (Jan 2002)

Issued Patents

Patent	Date	Description
10,917,232	2021	Data Enciphering or Deciphering using a Hierarchical Assignment System
9,787,471	2017	Data Enciphering or Deciphering using a Hierarchical Assignment System
7,904,117	2011	Wireless Communication Device using Adaptive Beamforming
6,781,962	2004	Apparatus and Method for Stored Voice Message Control
6,600,481	2003	Data entry apparatus and method
6,088,457	2000	Method and apparatus for over the air programming a communication device
5,854,595	1998	Communications apparatus and method with a computer interchangeable integrated circuit card
5,557,642	1996	Direct conversion receiver for multiple protocols

Tim Arthur Williams, Ph.D. Curriculum Vitae
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5,428,638	1995	Method and apparatus for reducing power consumption in digital communications devices
5,345,406	1994	Bandpass sigma delta converter suitable for multiple protocols
5,101,344	1992	Data processor having split level control store
5,001,661	1991	Data processor with combined adaptive LMS and general multiplication functions
4,989,169	1991	Digital tone detector using a ratio of two demodulators of differing frequency
4,972,356	1990	Systolic IIR decimation filter
4,965,762	1990	Mixed size radix recoded multiplier
4,947,363	1990	Pipelined processor for implementing the least-mean-squares algorithm
4,876,542	1989	Multiple output oversampling A/D converter with each output containing data and noise
4,862,169	1989	Oversampled A/D converter using filtered, cascaded noise shaping modulators
4,843,585	1989	Pipelineable structure for efficient multiplication and accumulation operations
4,843,390	1989	Oversampled A/D converter having digital error correction
4,796,219	1989	Serial two's complement multiplier
4,737,925	1988	Method and apparatus for minimizing a memory table for use with nonlinear monotonic arithmetic functions
4,734,876	1988	Circuit for selecting one of a plurality of exponential values to a predetermined base to provide a maximum value
4,727,508	1988	Circuit for adding and/or subtracting numbers in logarithmic representation
4,722,067	1988	Method and apparatus for implementing modulo arithmetic calculations
4,682,302	1987	Logarithmic arithmetic logic unit
4,618,946	1986	Dual page memory system having storage elements which are selectively swapped between the pages
4,406,010	1983	Receiver for CVSD modulation with integral filtering
4,398,262	1983	Time multiplexed n-ordered digital filter

Patent Applications and Continuation Applications
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Appl. Num.	Pub. Date	Description
20070037528	2007	Wireless Communication Device using Adaptive Beamforming
20040252679	2004	Stored Voice message Control Extensions

Tim Arthur Williams, Ph.D.
Curriculum Vitae

Published Papers

- 6 Sept 2016 Putnam, Jonathan D. and Williams, Tim A., The Smallest Salable Patent-Practicing Unit (SSPPU): Theory and Evidence.
Available at SSRN: <https://ssrn.com/abstract=2835617>
- 19 Sept 2022 Williams, Tim A, A Study of IPlytics Standard Essential Patent Tool.
Available at SSRN: <https://ssrn.com/abstract=4223782>

Litigation Experience

See attached.