

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MARVELL SEMICONDUCTOR, INC.,
Petitioner,

v.

CREDO TECHNOLOGY GROUP LTD.,
Patent Owner.

Case IPR2025-01220
U.S. Patent No. 11,032,111

DECLARATION OF TIM A. WILLIAMS

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TABLE OF CONTENTS

I.	Assignment	1
II.	Qualifications and Background Information	1
III.	Level of Ordinary Skill in the Art.....	4
IV.	Legal Standards	5
	A. Terminology	5
	B. Legal Standards	6
	C. Anticipation	6
	D. Obviousness.....	7
V.	Summary of the '111 Patent	10
VI.	Overview of the Cited References.....	13
	A. Berke (EX-1004)	13
	B. Cornelius (EX-1005).....	16
	C. Ran (EX-1006)	17
	D. Stauffer (EX-1008).....	21
	E. Mejia (EX-1009)	22
VII.	Petitioner Fails to Establish that Any Challenged Claim is Unpatentable	24
	A. Ground 1	24
	1. Claim 1	25
	2. Claim 8	38
	3. Claim 11	43

4.	Claim 16.....	46
B.	Ground 2.....	46
1.	Claim 1.....	46
2.	Claim 8.....	47
3.	Claim 11.....	51
4.	Claim 16.....	54
C.	Grounds 3 and 4.....	54
1.	Claims 2 and 9.....	54
2.	Claims 5, 12 and 18.....	56
D.	Ground 5.....	60
1.	Claim 1.....	60
2.	Claim 8.....	66
3.	Claim 11.....	67
4.	Claim 16.....	69
VIII.	Materials Considered.....	70
IX.	Conclusion.....	70

I. ASSIGNMENT

1. I have been retained on behalf of Credo Technology Group., Ltd. (“Patent Owner” or “Credo”) to offer technical opinions related to U.S. Patent No. 11,032,111 (“the ’111 patent”) (EX-1001). I understand that Credo is requesting that the Patent Trial and Appeal Board (“PTAB” or “Board”) find that Petitioner Marvell Semiconductor, Inc. (“Petitioner” or “Marvell”) failed to prove that any claim of the ’111 Patent is unpatentable in this *inter partes* review (“IPR”) proceeding.

2. I have been asked to provide my independent analysis of the Petition regarding the ’111 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 ’111 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 ’111 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 '111 patent, the Petition, the references cited in the Petition, and the references cited herein.

15. 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.

16. My opinions, as explained below, are based on my education, experience, and expertise in the fields relating to the '111 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

17. 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*.

18. 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

19. 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 '111 patent was filed August 27, 2019, and claims priority to U.S. Provisional application No.

62/723,701 filed August 28, 2018, which I refer to as the “Critical Date” in this proceeding.

B. Legal Standards

20. 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.

21. 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

22. 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.

23. 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.

24. 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

25. 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.

26. 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.

27. 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.

28. 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."

29. 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.

30. 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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 ’111 PATENT

36. The ’111 Patent claims innovative, non-obvious improvements to serializer-deserializer (SerDes) communications, for example, using an “efficient adaptation interface for transmitter pre-equalizers” that enables “standards

suitable” data transmission over channels with varying “attenuation and dispersion.” EX-1001, 1:19-35; 1:39-2:16.

37. The ’111 Patent explains that “as demand continues for ever-higher data rates [for data communications], extensions to the standard must account for increased channel attenuation and dispersion even as the equalizers are forced to operate at faster symbol rates.” EX-1001, 1:19-35. Earlier techniques to address channel attenuation and dispersion “introduce[d] undesirable hardware complexity or cost.” EX-1001, 1:31-35. To provide a low cost and effective solution to, in part, address channel attenuation and dispersion, the ’111 Patent discloses “SerDes pre-equalizer having adaptable preset coefficient registers.” EX-1001, title. The systems and methods described in the ’111 Patent provide, among other benefits, improvement in signal quality while also reducing or eliminating the need for receiver-side equalization, thereby enabling digital filtering with reduced bit width, and reducing power consumption in high-speed communications links, including chip-to-module (C2M) channels. EX-1001, 6:40-54, 5:24-30.

38. For instance, the inventors discovered that desirable performance characteristics, such as improved efficiency and signal integrity, could be achieved by (i) providing multiple registers in a transceiver controller, each storing a set of preset initial pre-equalizer coefficient values corresponding to different channel models, (ii) allowing for selection of optimal starting point set of coefficients,

(iii) adaptive updating of such coefficients during a training phase, and
(iv) application of the updated coefficients to pre-equalize transmitted data streams, while minimizing power consumption, hardware complexity, and noise enhancement. *See, e.g.*, EX-1001, 11:53-14:11; 14:12-15:3; 6:40-54.

39. Further, the above-described adaptive pre-equalization process can be implemented in a pluggable module transceiver. *See, e.g.*, EX-1001, Abstract, 1:49-57, claims 8, 11, 16. Such pre-equalization can be applied to counteract expected loss and dispersion, which “generally requires knowledge of the channel.” EX-1001, 6:40-54. In an example, the above-noted selection of optimal starting point set of coefficients requires communication between a transmitter and a receiver, since testing each set of preset coefficients involves (i) the transmitter transmitting signals to the receiver and (ii) the receiver demodulating the received signals to “estimate or measure error signals.” EX-1001, 14:12-38, FIG. 8. Once the optimal starting point is determined, (i) the transmitter can “program[] the preequalizer with the preset coefficients from the selected register and transmit[] a training pattern and/or data [to a receiver],” (ii) the receiver can “demodulate[] the receive signals, again obtaining error signals,” and (iii) a transceiver controller can “derive adaptation information” from the error signals and communicate remote adaptation information to the transmitter, e.g., via backchannel information fields. EX-1001,

14:36-67, FIG. 8. Such remote adaptation information can be used to adjust the transmit pre-equalizer. EX-1001, 14:57-15:3, FIG. 8.

VI. OVERVIEW OF THE CITED REFERENCES

A. Berke (EX-1004)

40. Berke is directed to a system and method for optimizing equalization coefficients in high-speed serial interfaces such as PCIe, SATA, and SAS channels. EX-1004, ¶¶3, 12. Berke identifies the problem that “as the speed of serial interfaces increases, variations in circuit design, component manufacture, environmental conditions, and other factors make it increasingly difficult to ensure highly reliable data transmission.” EX-1004, ¶3.

41. As shown below in FIG. 1, Berke’s high speed serial channel 100 comprises a transmitter 110 and a receiver 130 connected by a transmission channel 120, representing one half of a bidirectional serial data link between components within an information handling system. EX-1004, ¶12. The serial channel “provides back channel adaptation where transmitter 110 and receiver 130 communicate with each other to optimize and adjust various compensation values within the transmitter and the receiver to compensate for the insertion loss and other signal degradations of transmission channel 120.” EX-1004, ¶13.

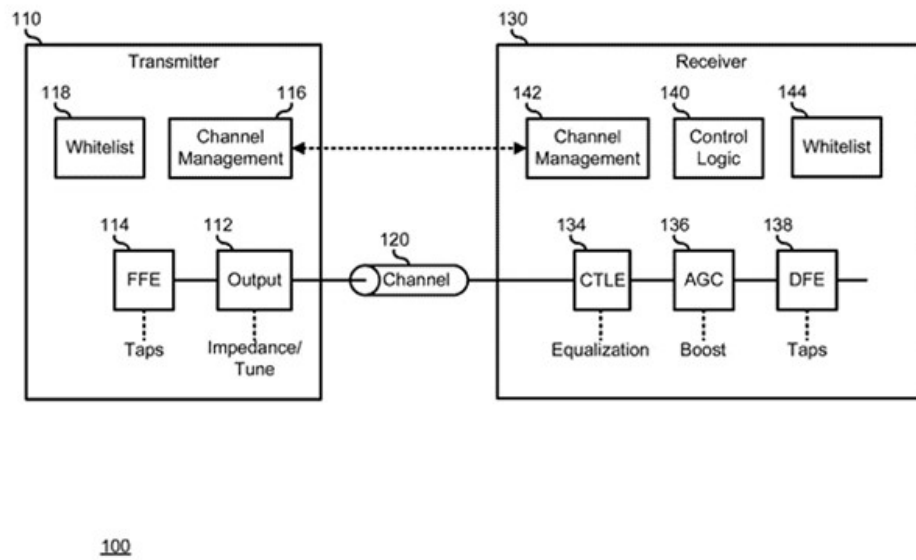


FIG. 1

42. The transmitter includes a channel output module 112 with impedance/tuning settings, a feed-forward equalization (FFE) module 114, a channel management module 116, and an equalization coefficient whitelist 118. EX-1004, ¶¶14-15. The receiver includes a CTLE module 134, an AGC module 136, a DFE module 138, a control logic module 140, a channel management module 142, and an equalization coefficient whitelist 144. EX-1004, ¶16.

43. Berke's system implements a training process to determine a "best set of tuning coefficients" for transmitter 110 and receiver 130 based on acceptable bit error rate (BER) or receiver eye height and width in serial channel 100. EX-1004, ¶¶13, 20-21. The training process is orchestrated by control logic module 140, which "trains transmitter 110 and receiver 130 by running through the various combinations of settings for the equalization setting, the gain settings, the DFE

taps settings, and the FFE tap settings, and recording for each combination, an associated eye height and eye width, or an associated BER.” EX-1004, ¶¶20-21.

The control logic module communicates with the transmitter via a backchannel established between channel management modules 116 and 142, which may be “a separate side-band communication channel for communicating adaptation instructions between transmitter 110 and receiver 130.” EX-1004, ¶19.

44. When training variability exceeds a threshold, the control logic module performs a sensitivity analysis to identify “a small number of variables in the equalization coefficients that, when altered from one setting to another, produce a wide variance in the measured performance of serial channel 100, in terms of eye height and width, or in terms of BER.” EX-1004, ¶24. Training ranges are narrowed for these sensitive coefficients, and the algorithm is re-run with the narrowed settings. EX-1004, ¶¶25-28; FIG. 3.

45. Berke’s equalization coefficient whitelists 116 and 144 store “certain equalization coefficient settings or combinations of equalization coefficient settings,” which are used “as a starting point for running the training algorithm” by the control logic module 140. EX-1004, ¶30. Whitelisted equalization coefficient settings are populated through two pathways: (1) “knowledge gained during the design, development, or manufacturing of serial channel 100”, where the coefficient settings are known to produce “one or more of a particularly robust eye

height or eye width” (EX-1004, ¶30), and (2) “knowledge gained during normal operation of serial channel 100,” where the coefficient settings exhibit “a particularly low BER” (EX-1004, ¶31). Berke does not disclose determining whitelisted coefficients based on any “channel models.”

46. Berke describes whitelist storage as “a register or group of registers of transmitter 110 and receiver 130, a memory element of the transmitter and the receiver, another data storage element of the transmitter and receiver, or a combination thereof.” EX-1004, ¶30.

47. When performance degrades, the control logic module “selects a second whitelist set of equalization coefficients from equalization coefficient whitelists 118 and 144 and utilizes the second whitelist set of equalization coefficients to retrain the serial channel.” EX-1004, ¶33. Berke never uses the term “channel model” and does not describe indexing its whitelist entries to predefined channel models.

B. Cornelius (EX-1005)

48. Cornelius is directed to “[c]ircuits, methods, and apparatus that allow signals that are compliant with multiple standards to share a common connector on an electronic device.” EX-1005, Abstract. The reference addresses the problem of accommodating a legacy standard (DisplayPort) and newer standards (such as “HSIO” or “T29”) on the same physical connector. EX-1005, 3:54-4:9, 5:33-39.

Cornelius discloses active cables in Figures 5 and 6 that include “two active plugs...one on each end of cable,” each with “dual clock and data recovery circuits for retiming data” and a cable microcontroller to configure those circuits. *Id.*, 6:6-24, Figs. 5-6.

49. The core teaching of Cornelius is a connector pinout arrangement and associated circuitry that enables signals from two different standards to share common connector pins without interfering with one another. EX-1005 at 2:20-26, 3:65-5:59, Figs. 3-4. Cornelius describes how pins for a newer high-speed standard may be arranged to reduce crosstalk and interference among themselves, and how additional circuitry—such as resistors, PiN diodes, multiplexers, coupling capacitors, and inductors—may be used to isolate the signal paths of the two standards from each other. *Id.*

C. Ran (EX-1006)

50. Ran is directed to a system and method for dynamically configuring and adjusting transmit equalization coefficients in high-speed communication links, such as the chip-to-module (C2M) link between a network interface controller (NIC) and a hot-pluggable optical module. EX-1006, 1:15-25, 3:33-40. According to Ran, “[a]t current rates of 50 Gb/s per lane, equalization is typically implemented in a receiver in the optical module and in a transmitter in the host.” EX-1006, 1:39-41. Ran recognizes the problem that “[f]ixed [transmit]

equalization as done in existing C2M AUIs may not work well in 100 Gb/s per lane, as the variations between modules will likely require different equalization settings, and variable operating conditions will have a higher effect on circuits and boards.” EX-1006, 2:26-39. Ran aims to address this problem by having a receiver adjust equalization settings for a transmitter using a request-response procedure performed by a management entity. EX-1006, 3:14-61.

51. Ran’s system includes a NIC 100 with a host transmitter 208 and host receiver 206, communicatively coupled via an XGAUI-1 electrical connection to an optical module 120 with a module transmitter 210 and module receiver 212. EX-1006, 5:3-30; FIG. 2A. The NIC and optical module each include management registers to enable control of equalization in the receiver in the optical module by the network interface controller: host request register 220 and host response register 222 on the NIC side, and module request register 224 and module response register 226 on the module side. EX-1006, 5:14-18; FIG. 2A. Ran also teaches that four additional registers may be used “to enable control of transmitter equalization in the optical module 120 by host or NIC 100,” enabling bidirectional equalization control. EX-1006, 6:52-62.

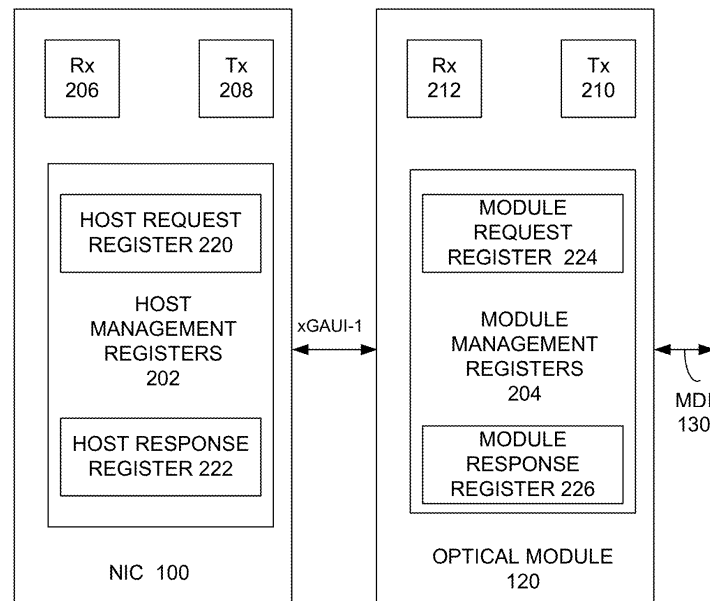


FIG. 2A

52. A management entity mediates equalization adaptation by copying register contents between the host and module sides. EX-1006, 5:36-60, 8:22-9:24, 11:65-13:30; FIG. 6A. The management entity reads the module request register and “writes the value read from module request register to host request register,” conveying the equalization change request from the module to the host. EX-1006, 5:46-50. The management entity then reads the host response register and copies its content to the module response register, completing the transaction. EX-1006, 6:1-18. The management entity “may be in a device driver in an operating system, logic in a network interface controller, or logic in a media access controller.” EX-1006, 5:39-42.

53. Each request register includes a “two-bit initial condition request field 304,” which is “used to select one of three predefined transmitter equalizer configurations (‘presets’). If one of the presets is not selected, that is, the binary value of the initial condition request field 304 is ‘00’, coefficient select field 312 and coefficient request field 314 are used to update the transmitter equalizer configuration.” EX-1006, 10:6-14, FIGS. 3A-3B.

Bit 13	Bit 12	Description
1	1	Preset3
1	0	Preset2
0	1	Preset1
0	0	Co-efficient Control

FIG. 3B

54. A coefficient change request uses the three-bit “coefficient select” field 312 to identify a specific target coefficient, e.g., $c(0)$, $c(-2)$, $c(-1)$, and $c(1)$, and the two-bit “coefficient request” field 314 to specify incrementing, decrementing or holding its value or setting it to “No equalization.” EX-1006, 10:25-48; FIGS. 3D-3E.

Bit 4	Bit 3	Bit 2	Description
1	1	0	c(-2)
1	1	1	c(-1)
0	0	0	c(0)
0	0	1	c(1)

FIG. 3D

Bit 1	Bit 0	Description
1	1	No Equalization
1	0	Decrement
0	1	Increment
0	0	Hold

FIG. 3E

55. Ran's three presets—Preset1, Preset2, and Preset3—are selectable by setting bits 12 and 13 of the request register. EX-1006, FIG. 3B. Ran does not disclose what these presets contain, how they differ, or what channel characteristics each is designed to address. Ran does not use the term “channel model.”

D. Stauffer (EX-1008)

56. Stauffer is a textbook that provides “a basic understanding of the rationale for using high-speed serializer/deserializer (Serdes) devices, and the inherent problems introduced by the high-speed operation of such devices.” EX-1008, at 000011. Stauffer covers SerDes features, functions, design, and protocol logic for standards including PCIe, SATA, and Ethernet. EX-1008, at 000058–000061.

E. Mejia (EX-1009)

57. Mejia is directed to techniques for using preset evaluation to improve I/O performance in high-speed serial interconnects, specifically PCIe. EX-1009, ¶¶1, 10. Mejia recognizes the problem that “some high-speed serial I/O implementations (such as PCIe) operate at frequency ranges at which the ISI becomes a major challenge for achieving a target high-speed data transfer.” EX-1009, ¶6.

58. Mejia addresses the problem by proposing a “preset search” technique: “a flow (that may be automated) is provided to evaluate the system performance at different recommended equalization preset values and select the best equalization preset for the given system.” EX-1009, ¶10. The preset search may be “implemented as a software-based characterization tool (e.g., implemented as part of BIOS (Basic IO System) reference code)” that “calculate[s]/determine[s] and compare[s] the margin(s) associated with different equalization presets for PCIe, e.g., at 8.0 GT/s or higher.” EX-1009, ¶10. The search may also “recommend the best equalization preset value(s) based on information such [as] gain, jitter and equalization controls, which can be obtained from the RX (Receiver) circuits.” EX-1009, ¶10.

59. Mejia’s presets are standardized configurations defined by the PCIe Base Specification. Mejia explains: “A vast number of settings within an

equalization map are valid for Gen3 (generation 3) transmitters, ranging from 0 db to -9.8 db of de-emphasis and 0 db to 8.0 db pre-shoot. Within this equalization map, the [PCIe] Base Specification defines a set of equalization ‘presets.’” EX-1009, ¶12. These presets are protocol-defined configurations communicated between link partners during the PCIe equalization training process: “At the beginning of the equalization training sequence, the link partners communicate starting point for the equalization via preset exchange.” EX-1009, ¶12.

60. Mejia’s preset search process (shown in Figure 3) evaluates different presets by restarting the link with each preset, measuring performance (including jitter margin), and repeating “until all presets are evaluated.” EX-1009, ¶31, FIG. 3. “Once done, ... the preset with the highest margins is selected and the link is retained using that preset.” EX-1009, ¶31. The selected preset may be “stored (e.g., in BIOS flash or other memory devices discussed herein) for future boots.” EX-1009, ¶31.

61. Mejia observes that “optimal preset that maximizes electrical margins may be a function of channel insertion loss” and identifies three channel-length categories: “(1) shortest channels (e.g., less than or equal to 3 inch or equivalent channel insertion loss), where best point is found at or near to P5 (or Preset 5); (2) medium channel (e.g., between 3-8 inch or equivalent channel insertion loss), where the best point is found at or near to P3 (or Preset 3); and (3) long channel

(e.g., more than 8 inch or equivalent channel insertion loss), where the best point is found at or near to P7 (or Preset 7).” EX-1009, ¶36.

62. Mejia acknowledges that static preset mapping may be unreliable: “some board manufactures may use different type materials that might not aligned directly with recommendation(s). On such systems, the channel loss will not be directly matching with the expected loss per inch average numbers. Preset search flow will guarantee target BER by selecting the best preset on those boards.” EX-1009, ¶32.

63. Mejia does not use the term “channel model” and does not describe storing presets in hardware registers indexed to channel models. Mejia does not disclose a controller that selects among registers based on channel model identification.

VII. PETITIONER FAILS TO ESTABLISH THAT ANY CHALLENGED CLAIM IS UNPATENTABLE

A. Ground 1

64. Ground 1 challenges Claims 1, 3, 4, 6-8, 10, 11, 13-17, and 19 of the ’111 patent under 35 U.S.C. § 103 based on the combination of Berke and Cornelius. Petitioner relies on Cornelius for an active cable with a SerDes architecture and on Berke to supply teachings for pre-equalization techniques for high-speed serial communications. EX-1003, ¶33.

1. Claim 1

**a) A POSITA Would Not Have Been Motivated to
Combine Berke and Cornelius**

65. Claim 1 is directed to a “SerDes communication method.” EX-1001, Claim 1. Dr. Chen argues that a POSITA would have been motivated “to combine Berke and Cornelius’ teachings by using Berke’s high-speed serial communications in a SerDes context, for example to connect two computers together” because “Cornelius provides express motivation by teaching[] this usage for its active cable.” EX-1003, ¶44.

66. As an initial matter, Dr. Chen’s SerDes-context rationale is circular because Berke purportedly already operates in a SerDes context (*e.g.*, PCIe/SATA). EX-1003, ¶42. In addition, Dr. Chen’s generic rationale is inadequate and does not explain why or how a POSITA would have combined these references to relocate, in a SerDes context, Berke’s transmitter-side whitelist/register/FFE/controller architecture into Cornelius’ cable plug and repurpose Cornelius’s management-oriented communication channels for iterative equalization training as taught by Berke.

67. The fact that both Berke and Cornelius relate to SerDes communications establishes field-of-end endeavor overlap, but says nothing about any reasonable expectation of success for the proposed combination in this case. By

2018, SerDes was a dominant paradigm for high-speed digital communication – PCIe, SATA, USB, Ethernet, Fibre Channel, InfiniBand, and dozens of other standards all used SerDes architectures despite significant differences and lack of interoperability among them. A POSITA would have understood that merely sharing a SerDes context is not sufficient motivation to combine any SerDes-related references without more.

68. The proposed combination effectively requires transplanting into Cornelius’s cable plug: (a) Berke’s FFE module 114; (b) Berke’s channel management module 116; (c) Berke’s equalization coefficient whitelist 118; and (d) the entire register-based selection and training architecture described in Berke’s paragraphs 19–33. None of these elements exists in Cornelius’s cable plug. The result is not a combination of two references – it is Berke’s system re-housed in Cornelius’s physical form factor, without any teaching from Cornelius suggesting such a configuration. This is the hallmark of impermissible hindsight reconstruction.

69. Furthermore, Berke’s equalization teachings are directed to a fundamentally different cable architecture than that of Cornelius. Berke’s training relies on a backchannel between the transmitter’s channel management module 116 and the receiver’s control logic module 140, through which “adaptation instructions” flow. EX-1004, ¶19. Berke teaches that “management module 116

and channel management module 142 represent a separate side-band communication channel for communicating adaptation instructions between transmitter 110 and receiver 130.” EX-1004, ¶19. This dedicated adaptation channel must carry real-time performance feedback and coefficient adjustment instructions in an iterative, convergence-driven process.

70. Cornelius discloses communication pathways between host devices and cable plugs—specifically, an LSx sideband bus for “configuration and identification information” and messaging between port microcontrollers and cable microcontrollers for sharing “cable feature information,” “diagnostics and fault isolation,” and “power management optimization.” EX-1005, 6:43–57, 7:7–17. None of these pathways is described as carrying iterative equalization coefficient training instructions.

71. The LSx bus is a low-speed management channel designed for reading and writing cable configuration and vendor identification data. The microcontroller messaging is for cable feature sharing, diagnostics, fault isolation, and power optimization. Berke’s adaptation channel is expressly for real-time performance feedback and coefficient adjustment – a fundamentally different function requiring different bandwidth, latency, and protocol characteristics. Petition and Dr. Chen provide no explanation of how Berke’s iterative coefficient training would be established over Cornelius’s management pathways.

72. In particular, Berke’s training involves “running through the various combinations of settings for the equalization setting, the gain settings, the DFE taps settings, and the FFE tap settings, and recording for each combination, an associated eye height and eye width, or an associated BER.” EX-1004, ¶20. This requires rapid, iterative exchange of coefficient settings and performance metrics. Cornelius’s low-speed management channels are not designed for, and are not disclosed as capable of supporting, this kind of high-bandwidth, low-latency adaptation protocol.

73. Finally, Cornelius describes calibration, but it is fundamentally different from Berke’s receiver-driven iterative training. Cornelius’s Figure 11 illustrates a loopback-based procedure in which a near end of the cable is placed in loopback mode, a signal is transmitted and received via the loopback path, and “transmit and receive parameters for the near-end circuits may be optimized,” followed by the same procedure for the far end. EX-1005, 11:45–62. This loopback calibration operates locally—the host transmits a signal, it loops back at the near-end cable plug, and the host receives its own signal back. There is no disclosed mechanism for the host receiver to send coefficient adjustment instructions to the cable plug’s transmitter. The calibration optimizes circuits in isolation as a batch process, not through Berke’s iterative convergence based on receiver-side performance monitoring across the full link.

b) Berke Does Not Disclose Multiple Registers For Pre-Equalizer Coefficients Each Corresponding To A Different Channel Model

74. Limitation [1a] requires “selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model.” Petitioner relies solely on Berke to supply the “each of the multiple registers corresponding to a different channel model” feature of limitation [1a]. EX-1003, ¶¶53-57.

75. Specifically, Dr. Chen asserts that Berke teaches the claimed “channel model” feature by reasoning that each whitelisted coefficient set of Berke is “based on knowledge about at least some of these channel characteristics” and thus, “corresponds to a channel model that represents or assumes the known and relied-upon channel characteristics.” EX-1003, ¶56. This reasoning represents a multi-step inference that impermissibly conflates general background awareness of channel conditions with the structured, model-based register organization the claims require.

76. Berke does not teach that whitelisted coefficients are determined based on knowledge of respective channel characteristics. Instead, Berke’s whitelisted coefficients are selected based on the measured performance of the transmission channel in terms of robust receiver eye height and width or BER. EX-1004, ¶¶30-31. While different channel characteristics may impact performance of

the transmission channel, Berke does not teach that any specific channel characteristics are known and relied upon to determine whitelisted coefficients. To the contrary, Berke teaches that its training algorithm may need to be repeated multiple times to derive a final converged set of tuning coefficients since “variables in the environment, such as the temperature of serial channel 100, the operating voltages of transmitter 110 and receiver 130, voltage transients, cross talk from other nearby serial channels, random noise, and other effects that are not deterministic and not reproducible.” EX-1004, ¶21.

77. Berke’s whitelist is organized around observed performance – coefficient settings that are “known to produce one or more of a particularly robust eye height or eye width.” EX-1004, ¶¶30-31. The organizing principle is output quality, not input characterization. There is no disclosure in Berke that each whitelisted set is tagged to, indexed by, or deliberately created to match a defined “model” of the channel’s physical or environmental characteristics.

78. As Dr. Chen points out, Berke discloses two pathways for populating the equalization coefficient whitelists: (1) knowledge gained during design, development, or manufacturing (EX-1004, ¶30); and (2) knowledge gained during normal operation (EX-1004, ¶31). However, neither pathway involves identifying discrete channel characteristics corresponding to a “channel model” and then deriving corresponding coefficients for it. In both cases, Berke simply saves

coefficients known to produce “particularly robust eye heights or eye widths.” EX-1004, ¶¶30-31. In other words, Berke merely remembers what produced good results – it does not define, characterize, or index to discrete models.

79. Furthermore, Berke’s whitelists are a collection of empirically derived “robust” coefficient settings—not a classification of predefined channel representations. Recognizing that a channel *has* characteristics is fundamentally different from defining discrete “channel models” that allegedly represent different configurations of those characteristics. The organizing principle in Berke is output quality (robust eye performance), not an input model of the channel. Each whitelist entry is simply a coefficient set known to produce robust performance—it “corresponds to” good eye openings, not to any characteristics of the channel. There is no disclosure in Berke that each whitelisted set of coefficients is organized around, indexed by, or defined to match a defined model of the channel or its characteristics as alleged by Petition.

80. Berke’s teachings regarding selection among whitelisted coefficients reinforces the lack of channel-model-indexed coefficient sets. For example, Berke teaches that after using a first whitelist set for training, “control logic module 140 operates to monitor the performance of the serial channel. ... If the performance of serial channel 100 falls below the desired performance level, then control logic module 140 selects a second whitelist set of equalization coefficients.” EX-1004,

¶33. This is a try-one-then-fallback mechanism where the selection criterion is real-time performance feedback, not a determination of which predefined “channel model” applies. In contrast, the claims imply a model-based selection where the system identifies or assumes a channel model and selects the register that corresponds to it. Berke provides no mechanism for identifying a channel model or mapping an identified model to a particular register.

81. I note that Berke never uses the term “channel model” or any equivalent concept. Dr. Chen attempts to bridge this gap by asserting that “variations in channel loss or distortion arise from differences in channel characteristics—such as design, settings, and environmental conditions—where different channel characteristics correspond to different channel models.” EX-1003, ¶53. But this flawed reasoning proves too much: any coefficient set is influenced by some set of real-world conditions, and by this logic, every stored coefficient set in any system would “correspond to a channel model.” Such an application would render the “channel model” limitation meaningless and is inconsistent with the prosecution history of the ’111 patent, where this limitation was the specific basis for allowance.

82. Dr. Chen lists specific channel characteristics – such as insertion loss, impedance, temperature, and circuit design variations – that allegedly affect performance in Berke. EX-1003, ¶56. But awareness that channel characteristics

influence equalization is fundamentally different from defining discrete “channel models” and indexing equalization coefficient registers to those models. Berke’s awareness of channel characteristics is simply part of the background knowledge any designer would have; it does not constitute the structured model-to-register mapping that the claims require.

83. Rather, Berke contradicts the notion of a one-to-one mapping between different sets of whitelisted coefficients and discrete channel models representing or assuming different channel conditions. Berke acknowledges that “multiple different sets of compensation values” can “result in acceptable BER or receiver eye characteristics in serial channel 100.” EX-1004, ¶13. As such, different sets of whitelisted coefficients might work acceptably for the same channel conditions in Berke. The whitelist is thus a pool of known, good starting points for Berke’s training algorithm, not a mapping where each entry uniquely covers a distinct channel condition.

84. Moreover, Berke explains that “even on a particular information handling system, operating at different times, the back channel adaptation mechanism may operate to provide different sets of compensation values based upon minute variations in the operating condition.” EX-1004, ¶13. This confirms the lack of correspondence between channel conditions and coefficients.

85. Finally, as noted above, the prosecution history of the '111 Patent confirms that the “channel model” limitation carries substantive weight and should not be reduced to a truism. In the non-final Office Action dated July 9, 2020, the Examiner rejected original claims 1, 6-10, and 17-19 as obvious under §103 in view of Kolze (EX-1017), Thirumoorthy (EX-1018), and Binder (EX-1019). EX-1002, 000331-000345. The Examiner relied on Kolze for selecting pre-equalizer settings and updating coefficients, and Thirumoorthy for storing pre-equalizer coefficients in registers, *i.e.*, two references that collectively taught storing multiple coefficient sets in registers and using them during equalization training. EX-1002, 000334–000340. Yet in the same Office Action, the Examiner identified at least claims 2, 14 and 20, which recited that “each of the multiple registers corresponds to a different channel model,” as containing allowable subject matter. EX-1002, 000340.

86. This prosecution history distinguishes the claimed invention from the generic practice of storing empirically-validated coefficient sets in a whitelist, as Berke teaches. The Examiner, who had before him references allegedly teaching multiple stored coefficient sets in registers (Kolze + Thirumoorthy), nonetheless found the “channel model” limitation to recite non-obvious subject matter. If “channel model” merely meant “any stored coefficient set that was influenced by channel conditions,” the limitation presumably would have been met by the

combination of Kolze and Thirumoorthy, and the Examiner would not have identified it as allowable. The “channel model” feature as claimed requires more than merely having coefficients informed by channel conditions stored in registers, and Dr. Chen’s theory for this ground cannot be reconciled with this prosecution history.

**c) Berke Does Not Perform All Of The Claimed Steps
“In A Transceiver”**

87. The preamble [1pre] of Claim 1 expressly states that the method comprises, “in a transceiver,” the steps of [1a], [1b], and [1c]. The use of the singular article “a transceiver” followed by all three limitations indicates that a single transceiver performs all three steps. A POSITA reading this claim language would understand that the selecting [1a], updating [1b], and using [1c] all occur within the same transceiver—not distributed across two different devices at opposite ends of a serial link.

88. Berke teaches “a high speed serial channel 100 of an information handling system” that “includes a transmitter 110, a transmission channel 120, and a receiver 130.” EX-1004, ¶12, FIG. 1. Berke explains that “[s]erial channel 100 represents one half of a bi-directional serial data link for communicating data from transmitter 110 located at a first component to receiver 130 located at a second component.” EX-1004, ¶12 (emphasis added). Berke further explains that “[t]he

other half of the bi-directional serial data link is similar to serial channel 100, but with a receiver in the first component, and a transmitter in the second component, for communicating data back from the second component to the first component.”

EX-1004, ¶12. Dr. Chen relies on this bidirectional structure to argue that each component constitutes a “transceiver” (having both a transmitter and receiver).

EX-1003, ¶46.

89. Dr. Chen maps the “selecting” limitation [1a] to Berke’s control logic module 140. Specifically, Dr. Chen quotes from Berke to explain that it is the receiver-side control logic module 140 that “operates to monitor the performance of the serial channel” and “[i]f the performance of serial channel 100 falls below the desired performance level, then control logic module 140 selects a second whitelist set of equalization coefficients.” EX-1003, ¶52, quoting EX-1004, ¶33. The control logic module 140 that performs this selection resides at receiver 130 on the second component – the component that receives data from transmitter 110. EX-1004, ¶¶12, 16, FIG. 1. Thus, the purported selection decision is made by the receiver at the second component.

90. Likewise, Dr. Chen relies on Berke’s control logic module 140, which resides at receiver 130 on the second component, to supply the “updating” limitation [1b] to. Specifically, Dr. Chen asserts that Berke teaches a training process that updates the pre-equalizer coefficient values, where the receiver-side

control logic module 140 runs a training phase and “then, in future runs of the training algorithm, control logic module 140 only utilizes the narrowed set of knob settings for the selected knobs to converge on a best set of equalization settings.” EX-1003, ¶¶58-61.

91. In contrast, Dr. Chen maps the “using” limitation [1c] to Berke’s FFE module 114, which “uses the pre-equalizer coefficients to process a serial data stream, outputs the pre-equalized signals to a channel output module 112, which in turn outputs the transmit data stream for transmission on channel 120.” EX-1003, ¶63. FFE module 114 is part of transmitter 110 at the first component: “Transmitter 110 includes a channel output module 112, feed-forward equalization (FFE) module 114, a channel management module 116, and an equalization coefficient whitelist 118.” EX-1004, ¶14. The “using” step – conveying a transmit data stream using the pre-equalized coefficients – is necessarily performed by the transmitter at the first component.

92. The first component and the second component are different physical devices—they are the two endpoints of the serial channel, connected by transmission channel 120. EX-1004, ¶12. Even though each component may be called a “transceiver” (because it has both a transmitter for one direction and a receiver for the other), the control logic module 140 that selects the whitelist set is at the second component’s receiver, while the FFE module 114 that uses the

coefficients to transmit data is at the first component's transmitter. These are not the same transceiver; they are at opposite ends of the link.

93. The claim requires all three steps “in a transceiver”—a single transceiver. Dr. Chen's mapping places [1a] in one transceiver (the second component) and [1c] in a different transceiver (the first component), in contravention of the claim's structural requirement. Berke does not disclose the “using” [1c] limitation performed by the same transceiver as the “selecting” [1a] and “updating” [1b] limitations.

2. Claim 8

a) A POSITA Would Not Have Been Motivated to Combine Berke and Cornelius

94. Claim 8 is directed to a “chip-to-module communication link.” EX-1001, Claim 8. Dr. Chen argues that a POSITA would have been motivated “to apply Berke's teachings to the serial communication paths for Cornelius's active cable [in the context of chip-to-module communications link] because it would have simply used Berke's known serial techniques to improve similar devices (e.g., Cornelius' serial channels) in the same way as taught by Berke.” EX-1003, ¶78.

95. This is a generic KSR-style rationale that does not specifically address why or how a POSITA would have combined these references to relocate, in the context of a communications link between a host and Cornelius' active cable,

Berke's transmitter-side whitelist/register/FFE/controller architecture into Cornelius' cable plug and split Berke's tightly-coupled transmitter-receiver training system across a host to cable boundary and to repurpose Cornelius's management-oriented communication channels for iterative equalization training as taught by Berke.

96. Dr. Chen adds that "Cornelius teaches pre-equalization for its communications link" and Berke's best-effort link training techniques would "help Cornelius achieve its goal of providing the desired equalization for its communications link." EX-1003, ¶80. But Cornelius's mention that CDR circuits "may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits as appropriate" (EX-1005, 6:30–42) is a bare, optional statement with no detail about FFE filters, coefficient values, registers, or training processes. It does not constitute a suggestion to implement Berke's elaborate coefficient whitelist, register selection, and training architecture.

97. Dr. Chen also contends that "a POSITA would have had a reasonable expectation of success in the combination because it would have been a straightforward combination that simply applies Berke's serial communications techniques to Cornelius's serial links." EX-1003, ¶81. I disagree. Berke's training system is designed for endpoint-to-endpoint operation where both the transmitter and receiver are co-located within a single information handling system and the

receiver has full observability and control of the channel's effect on the transmitted signal. EX-1004, ¶¶13, 19–20. Splitting Berke's transmitter components into a cable plug and keeping the receiver in a "port transceiver" at the host introduces a new cable-to-host boundary between the transmitter and receiver. This is not "simply us[ing] Berke's known serial techniques to improve similar devices"—it is re-engineering both references to create a system that neither teaches or suggests.

98. As explained with respect to claim 1 (Ground 1), the proposed combination effectively requires transplanting into Cornelius's cable plug: (a) Berke's FFE module 114; (b) Berke's channel management module 116; (c) Berke's equalization coefficient whitelist 118; and (d) the entire register-based selection and training architecture described in Berke's paragraphs 19–33. None of these elements exists in Cornelius's cable plug. The result is not a combination of two references – it is Berke's system re-housed in Cornelius's physical form factor, without any teaching from Cornelius suggesting such a configuration. This is the hallmark of impermissible hindsight reconstruction.

99. Furthermore, Berke's equalization teachings are directed to a fundamentally different cable architecture than that of Cornelius. Berke's training relies on a backchannel between the transmitter's channel management module 116 and the receiver's control logic module 140, through which "adaptation instructions" flow. EX-1004, ¶19. Berke teaches that "management module 116

and channel management module 142 represent a separate side-band communication channel for communicating adaptation instructions between transmitter 110 and receiver 130.” EX-1004, ¶19. This dedicated adaptation channel must carry real-time performance feedback and coefficient adjustment instructions in an iterative, convergence-driven process.

100. Cornelius discloses communication pathways between host devices and cable plugs—specifically, an LSx sideband bus for “configuration and identification information” and messaging between port microcontrollers and cable microcontrollers for sharing “cable feature information,” “diagnostics and fault isolation,” and “power management optimization.” EX-1005, 6:43–57, 7:7–17. None of these pathways is described as carrying iterative equalization coefficient training instructions.

101. The LSx bus is a low-speed management channel designed for reading and writing cable configuration and vendor identification data. The microcontroller messaging is for cable feature sharing, diagnostics, fault isolation, and power optimization. Berke’s adaptation channel is expressly for real-time performance feedback and coefficient adjustment – a fundamentally different function requiring different bandwidth, latency, and protocol characteristics. Petitioner and Dr. Chen provide no explanation of how Berke’s iterative coefficient training would be established over Cornelius’s management pathways.

102. In particular, Berke’s training involves “running through the various combinations of settings for the equalization setting, the gain settings, the DFE taps settings, and the FFE tap settings, and recording for each combination, an associated eye height and eye width, or an associated BER.” EX-1004, ¶20. This requires rapid, iterative exchange of coefficient settings and performance metrics. Cornelius’s low-speed management channels are not designed for, and are not disclosed as capable of supporting, this kind of high-bandwidth, low-latency adaptation protocol.

103. Finally, Cornelius describes calibration, but it is fundamentally different from Berke’s receiver-driven iterative training. Cornelius’s Figure 11 illustrates a loopback-based procedure in which a near end of the cable is placed in loopback mode, a signal is transmitted and received via the loopback path, and “transmit and receive parameters for the near-end circuits may be optimized,” followed by the same procedure for the far end. EX-1005, 11:45–62. This loopback calibration operates locally—the host transmits a signal, it loops back at the near-end cable plug, and the host receives its own signal back. There is no disclosed mechanism for the host receiver to send coefficient adjustment instructions to the cable plug’s transmitter. The calibration optimizes circuits in isolation as a batch process, not through Berke’s iterative convergence based on receiver-side performance monitoring across the full link.

b) Berke Does Not Disclose Multiple Registers For Coefficients Each Corresponding To A Different Channel Model

104. Limitation [8b] requires “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model, the controller using one of the registers to set initial coefficient values for the one or more transmit filters.” Petitioner relies solely on Berke to supply the “each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model” feature of limitation [8b]. EX-1003, ¶¶84. Berke does not disclose multiple registers each containing a set of initial coefficient values corresponding to a different channel model for the same reasons as limitation [1a]. I incorporate by reference my discussion of the “channel model” feature of limitation [1a] and Berke in the background section as if fully set forth herein. *See* Section VII.A.1.b).

3. Claim 11

a) A POSITA Would Not Have Been Motivated to Combine Berke and Cornelius

105. Claim 11 is directed to a “chip-to-module communication link.” EX-1001, Claim 11. Dr. Chen argues that a POSITA would have been motivated to combine Berke and Cornelius in the context of a chip-to-module communications link for the same reasons explained with respect to claim 8. EX-1003, ¶91. I

disagree for the same reasons as claim 8, which are incorporated by reference as if fully set forth herein. *See* Section VII.A.2.a).

b) Berke And Cornelius Do Not Disclose “The Port Transceiver Determines a Performance Characteristic”

106. Limitation [11b] requires “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values for which the port transceiver determines a performance characteristic, the controller using one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters.” Petitioner relies on Cornelius to supply the “port transceiver” feature and Berke to supply the “performance characteristic” feature of limitation [11b]. EX-1003, ¶¶75, 92.

Specifically, Claim 11 requires that “the port transceiver determines a performance characteristic” for each register and that “the controller [uses] one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters.” This creates a specific functional architecture: the host-side port transceiver evaluates multiple register-stored coefficient sets, determines which performs best, and the module-side controller implements the host’s selection.

Dr. Chen maps Berke’s receiver-based control logic module 140 to the functionality of the “port transceiver” and argues it selects whitelisted coefficients

in a register by determining their performance. EX-1003, ¶94. Under Dr. Chen's theory, the control logic module 140, configured as part a host-based port transceiver in Ran's chip-to-module serial communication link, must: (a) determine performance characteristics for multiple coefficient sets stored in registers in the optical module; (b) select the best-performing register; and (c) instruct the module-side controller to use that register.

Cornelius does not teach this process. Cornelius teaches communication pathways between host devices and active cable plugs, including "two active plugs...one on each end of cable," each with "dual clock and data recovery circuits for retiming data" and a cable microcontroller to configure those circuits – it does not teach the host evaluating multiple stored coefficient sets in the module for performance and selecting among them. EX-1005, 6:6-24, Figs. 5-6.

Berke does teach evaluating performance metrics (eye height/width, BER) and selecting among whitelist sets based on performance. EX-1004, ¶33. But Berke performs this evaluation and selection within a single endpoint system where the receiver directly observes the transmitter's signal. Under Petitioner's mapping for claim 11, this process must occur *across* the chip-to-module boundary: the port transceiver (host receiver) must evaluate coefficient sets stored *in the module's controller* and select among them. Neither Berke nor Cornelius teaches this cross-boundary performance evaluation and selection.

4. Claim 16

107. Dr. Chen argues that the combination of Berke and Cornelius renders obvious claim 16 for the same reasons set forth with respect to claim 8 under Ground 2. EX-1003, ¶103. I disagree for the same reasons as claim 8, which are incorporated by reference as if fully set forth herein. *See* Section VII.A.2.

B. Ground 2

108. Ground 2 challenges Claims 1, 3, 4, 6-8, 10, 11, 13-17, and 19 of the '111 patent under 35 U.S.C. § 103 based on the combination of Berke and Ran. Petitioner relies on Ran for a chip-to-module serial communication link with SerDes and on Berke to supply teachings for pre-equalization techniques for high-speed serial communications. EX-1003, ¶106.

1. Claim 1

109. Petitioner argues that Berke and Ran render obvious Claims 1, 3, 4, 6, and 7 for the same reasons as Berke and Cornelius under Ground 1. EX-1003, ¶113. I disagree for the same reasons explained for Claims 1, 3, 4, 6, and 7 under Ground 1, which are incorporated by reference as if fully set forth herein. *See* Section VII.A.1).

2. Claim 8

a) A POSITA Would Not Have Been Motivated to Combine Berke and Ran

110. Claim 8 is directed to a “chip-to-module communication link.” EX-1001, Claim 8. Dr. Chen argues that a POSITA would have been motivated “apply Berke’s teachings to the serial link of Ran because it would have simply used Berke’s known serial techniques to improve similar devices (e.g., Ran’s serial link) in the same way as taught by Berke.” EX-1003, ¶¶119-120.

111. This is a generic KSR-style rationale that does not specifically address why a POSITA would graft Berke’s multi-register whitelist of empirically-determined coefficient sets onto Ran’s management entity, which is a relay mechanism with no native coefficient storage, or how Berke’s comprehensive multi-parameter training (which sweeps through coefficient combinations) would be implemented through Ran’s one-coefficient-at-a-time adjustment protocol and across a chip-to-module boundary, when Ran’s architecture provides no mechanism for such cross-boundary multi-register evaluation.

112. Dr. Chen argues that “Berke’s technique of configuring pre-equalization coefficient values provided an efficient and effective process” that addresses a problem Ran recognizes—namely that “fixed equalization as done in existing C2M AUIs may not work well in 100 Gb/s per lane.” EX-1003, ¶122. But

Ran already addresses this problem through its own mechanism: a management-entity-driven adaptation protocol that enables “continuous modification of the selected equalization coefficients ... after the communications link is established to handle varying operating conditions such as temperature and humidity.” EX-1006, Abstract. A POSITA would not have been motivated to discard Ran’s purpose-built adaptation mechanism in favor of importing Berke’s fundamentally different whitelist-and-training approach, particularly when the two architectures are incompatible at the protocol level (comprehensive sweep vs. one-tap-at-a-time).

113. Dr. Chen also argues the combination “would not have changed the principle of operation for either reference because it uses Berke’s serial communications techniques for exactly the purpose taught by Berke: to improve pre-equalization for serial communications.” EX-1003, ¶123. However, importing Berke’s whitelist architecture into Ran’s management-entity framework does change how both references operate. Berke’s system operates within a single endpoint where the receiver has direct observability and control over the transmitter’s coefficients through a dedicated backchannel. EX-1004, ¶¶13, 19–20. Ran’s system operates through a multi-register relay protocol where the management entity copies requests and responses between host and module registers one coefficient at a time. EX-1006, 3:14–28, 11:65–12:31, FIG. 3E. These are fundamentally different adaptation architectures, and combining them does not

produce predictable results—it produces an undefined hybrid that neither reference supports.

114. Furthermore, Ran’s on-tap-at-a-time adaptation is fundamentally different from Berke’s comprehensive training process. In particular, Berke’s training process involves “running through the various combinations of settings for the equalization setting, the gain settings, the DFE taps settings, and the FFE tap settings, and recording for each combination, an associated eye height and eye width, or an associated BER.” EX-1004, ¶20. This comprehensive sweep requires the ability to configure multiple parameters simultaneously and evaluate the joint result.

115. Berke’s iterative refinement further narrows to “a small number of variables in the equalization coefficients that, when altered from one setting to another, produce a wide variance in the measured performance of serial channel 100, in terms of eye height and width, or in terms of BER.” EX-1004, ¶24. This sensitivity analysis requires configuring specific coefficient combinations and measuring performance – an operation that requires more than one-tap-at-a-time adjustability.

116. In contrast, Ran’s equalization adaptation protocol allows “changing one equalization coefficient at a time, with a directed change request and arbitrarily fine steps.” EX-1006, 3:14–28. Each request-response cycle involves: (1) the

module receiver writes a coefficient select and coefficient request to the module request register; (2) the management entity copies this to the host request register; (3) the host transmitter adjusts the single identified coefficient by one increment or decrement; (4) the host writes a response to the host response register; and (5) the management entity copies this to the module response register.

117. Ran's one-coefficient-at-a-time protocol is fundamentally incompatible with Berke's training approach, which requires sweeping through *combinations* of settings across multiple equalization parameters simultaneously. Dr. Chen does not explain how Berke's comprehensive multi-parameter sensitivity analysis would be implemented through Ran's sequential, single-coefficient adjustment protocol. A POSITA attempting to implement Berke's whitelist-based selection and training through Ran's management architecture would face a fundamental architectural mismatch: Berke's algorithm assumes the ability to configure complete coefficient sets and evaluate their joint performance, while Ran's protocol permits only incremental single-coefficient nudges.

b) Berke Does Not Disclose Multiple Registers For Coefficients Each Corresponding To A Different Channel Model

118. Limitation [8b] requires "a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model, the controller using one of the registers to set initial

coefficient values for the one or more transmit filters.” Petitioner relies solely on Berke to supply the “each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model” feature of limitation [8b]. EX-1003, ¶125.

119. Berke does not disclose multiple registers each containing a set of initial coefficient values corresponding to a different channel model for the same reasons as limitation [1a]. I incorporate by reference my discussion of the “channel model” feature of limitation [1a] and Berke in the background section as if fully set forth herein. *See* Section VII.A.1.b).

3. Claim 11

a) A POSITA Would Not Have Been Motivated to Combine Berke and Ran

120. Claim 11 is directed to a “chip-to-module communication link.” EX-1001, Claim 11. Dr. Chen argues that a POSITA would have been motivated to combine Berke and Ran in the context of a chip-to-module communications link for the same reasons explained with respect to claim 8. EX-1003, ¶127. I disagree for the same reasons as claim 8, which are incorporated by reference as if fully set forth herein. *See* Section VII.B.2.a).

b) Berke And Ran Do Not Disclose “The Port Transceiver Determines a Performance Characteristic”

121. Limitation [11b] requires “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values for which the port transceiver determines a performance characteristic, the controller using one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters.” Petitioner relies on Ran to supply the “port transceiver” feature and Berke to supply the “performance characteristic” feature of limitation [11b]. EX-1003, ¶¶116, 128.

122. Specifically, Claim 11 requires that “the port transceiver determines a performance characteristic” for each register and that “the controller [uses] one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters.” This creates a specific functional architecture: the host-side port transceiver evaluates multiple register-stored coefficient sets, determines which performs best, and the module-side controller implements the host’s selection.

123. Dr. Chen maps Berke’s receiver-based control logic module 140 to the functionality of the “port transceiver” and argues it selects whitelisted coefficients in a register by determining their performance. EX-1003, ¶129. Under Dr. Chen’s theory, the control logic module 140, configured as part a host-based port

transceiver in Ran's chip-to-module serial communication link, must: (a) determine performance characteristics for multiple coefficient sets stored in registers in the optical module; (b) select the best-performing register; and (c) instruct the module-side controller to use that register.

124. Ran does not teach this process. Ran teaches a management entity that copies requests between registers – it does not teach the host evaluating multiple stored coefficient sets in the module for performance and selecting among them. Ran's initial condition request field "is used to select one of three predefined transmitter equalizer configurations ('presets')" (EX-1006, 10:6–14), but Ran does not disclose any process of determining a performance characteristic for each preset and selecting based on that determination. The selection mechanism for the initial condition in Ran is entirely undisclosed as it is simply a two-bit field that is set to some value through an unspecified process.

125. Berke does teach evaluating performance metrics (eye height/width, BER) and selecting among whitelist sets based on performance. EX-1004, ¶33. But Berke performs this evaluation and selection within a single endpoint system where the receiver directly observes the transmitter's signal. Under Petitioner's mapping for claim 11, this process must occur *across* the chip-to-module boundary: the port transceiver (host receiver) must evaluate coefficient sets stored

in the module's controller and select among them. Neither Berke nor Ran teaches this cross-boundary performance evaluation and selection.

4. Claim 16

126. Dr. Chen argues that the combination of Berke and Ran renders obvious claim 16 for the same reasons set forth with respect to claim 8 under Ground 2. EX-1003, ¶131. I disagree for the same reasons as claim 8, which are incorporated by reference as if fully set forth herein. *See* Section VII.B.2.

C. Grounds 3 and 4

127. Grounds 3 and 4 challenge Claims 2, 5, 9, 12, and 18 of the '111 patent under 35 U.S.C. § 103 based on the combination of Berke, Cornelius and Stauffer or Berke, Ran and Stauffer, respectively. Petitioner adds Stauffer to Ground 1 (Berke and Cornelius) and Ground 2 (Berke and Ran) to supply teachings for insertion loss/package loss and error signal energy. EX-1003, ¶133.

1. Claims 2 and 9

128. Dependent Claims 2 and 9 require that “at least some of the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics.”

129. Dr. Chen argues that Berke teaches channel models corresponding to different “insertion loss and other signal degradations of transmission channel” and

it would have been “obvious for Berke’s ‘other signal degradations of transmission channel’ to include package loss.” EX-1003, ¶140. I disagree.

130. First, as explained with respect to claim 1 (Ground 1), Berke does not teach registers corresponding to different “channel models.” Indeed, Dr. Chen’s reasoning imposes two separate requirements on Berke’s whitelisted coefficients: “they must [i] yield high performance (e.g., robust eye heights or eye widths, low BER) and [ii] fit a set of channel characteristics of a channel model so as to compensate for channel loss/distortion.” EX-1003, ¶140. Berke, however, does not require coefficients to “fit a set of channel characteristics of a channel model.” Berke requires only that coefficients are known to produce “robust eye height or eye width.” EX-1004, ¶30.

131. Second, Dr. Chen’s reliance on Stauffer falls short. Claim 2 does not merely require awareness that package loss exists. Claim 2 requires that “channel models” account for “different insertion loss and package loss characteristics.” Dr. Chen asserts that Stauffer’s discussion of “package models” teaches package loss is a cause of signal degradation. EX-1003, ¶¶141, 143. Stauffer’s “package models” are transfer function representations of the chip package used in an offline channel analysis – the process of evaluating whether a channel design will support adequate BER performance using statistical simulation tools, channel transfer function, and transmitter/receiver transfer functions. EX-1008, 000031, 000033-34.

They are not part of any channel model used for selecting equalization coefficients during system operation.

2. Claims 5, 12 and 18

132. Dependent Claims 5, 12, and 18 each require that “the performance characteristic is an error signal energy.”

133. Dr. Chen argues that it would have been obvious to modify Berke based on Stauffer to use error signal energy as a metric of channel performance on top of Berke’s existing eye-based metrics for initial pre-equalizer coefficients. EX-1003, ¶¶149-50. I disagree.

134. First, Dr. Chen cites Stauffer’s discussion of “root-mean-square value.” EX-1003, ¶149. However, a careful reading of Stauffer reveals that the “root-mean-square” discussion occurs in the context of *random jitter* specification. EX-1008, 000031-33. Random jitter is distinguishable from other types of jitter, such as deterministic jitter (DJ). EX-1008, 000033 (explaining that RJ “does *not* correlate with the data pattern being sent” whereas “several components of DJ are dependent on the data pattern being sent”). Specifically, Stauffer states:

The rationale for specifying different types of jitter is that some of the jitter can be corrected. For instance, the FFE in the transmitter device alters the transitions of the data edges based on the pattern of 1’s and 0’s being sent. In effect, the FFE is used to inject DJ on the transmitter output.

...

On the other hand, RJ is not predictable, and therefore cannot be corrected by equalization. It is important to limit the amount of RJ on the serial link.”

EX-1008, 000033.

135. This is confirmed by Dr. Chen’s own description of “equalization”: “Since the digital communication signal would go through the transmitter, physical channel, and then the receiver, the overall equalization can be jointly co-designed between transmitter pre-equalization and receiver equalization to compensate for the channel loss and hence minimize ISI or data-dependent jitter (“DDJ”).” EX-1003, ¶11.

136. Since the type of jitter that Stauffer specifies using RMS (random jitter) “cannot be corrected by equalization,” then a POSITA reading Stauffer would understand that RMS jitter metrics are not useful for evaluating or selecting among equalization coefficient sets. As such, Stauffer’s use of “root-mean-square” is not as a performance characteristic for evaluating or selecting among pre-equalizer coefficient sets.

137. Second, Dr. Chen argues that “root-mean-square value” as a metric in the context of signal integrity is the square root of MSE (mean square error), which is “a commonly used measure of error signal energy,” such that teaching RMS is equivalent to teaching error signal energy. EX-1003, ¶148. While this mathematical relationship holds in the abstract, it conflates two distinct concepts:

(a) **RMS of jitter:** A statistical measure of the timing variation in bit transitions, used to specify random jitter in interface standards. EX-1008, Page 000032. This measures *timing* variation, not *amplitude* error between received and expected signals.

(b) **MSE of error signals:** A measure of the energy content of the error signal, defined as the difference between the received signal and the expected signal. EX-1027, 000002 (“[MSE] has a clear physical meaning—it is the natural way to define the energy of the error signal.”); EX-1022, 000033 (“There are several algorithms that can be used for adapting the equalizer. The most popular one for compact hardware implementation is mean-square error (MSE) calculated between the recovered signal and the training data in the time domain at sampling points[.] ... The LMS algorithm optimizes the filter coefficients based on minimizing the mean-squared error.”). This measures amplitude discrepancy between what was received and what was expected.

138. These are fundamentally different quantities applied to different signal characteristics (timing jitter vs. amplitude error). The mathematical relationship between RMS and MSE as abstract statistical concepts does not mean that teaching RMS jitter specification is equivalent to teaching MSE-based error signal energy evaluation for equalization coefficient selection.

139. Third, Dr. Chen’s assertion that “no additional data collection or measurement would have been required to determine error signal energy” given Berke’s use eye diagram and BER oversimplifies the distinction between discrete bit-error counting and continuous error-signal energy computation. While Berke does compare received patterns to expected patterns during BER calculation (EX-1004, ¶¶24-26), calculating BER (counting bit errors) is a categorically different operation from computing error signal energy (calculating the mean square of the continuous-time amplitude difference between received and expected waveforms). BER counts discrete errors; MSE quantifies continuous-amplitude deviations. EX-1003, ¶149. The data used to compute BER (bit-level comparisons) is not the same data used to compute MSE (sample-level amplitude differences), and the computational infrastructure for the two is different.

140. Fourth, Berke already discloses using eye height/width and BER as its performance metrics for evaluating and selecting among whitelist coefficient sets. EX-1004, ¶¶20, 24, 33. Even if one accepted that use of error signal energy as measured by MSE was known and could be applied on top of Berke’s performance metrics, the mere availability of MSE metrics does not suffice to explain why a POSITA would have adopted an additional approach on top of Berke’s existing solution.

141. To the extent that Dr. Chen argues that Berke's eye-based metrics consisted merely of visual indicators less precise than the MSE of the error signal (EX-1003, ¶150), I disagree. Berke teaches using precise eye height and eye width measurements for evaluating and selecting among whitelist coefficient sets. EX-1004, ¶¶24, 30-33.

D. Ground 5

142. Ground 5 challenges Claims 1-19 of the '111 patent under 35 U.S.C. § 103 based on the combination of Ran, Mejia, and Stauffer. Dr. Chen relies on Ran for a chip-to-module serial communication link with SerDes. Dr. Chen relies on Mejia for disclosure of a "preset search" of equalizer settings. Dr. Chen relies on Stauffer for teaching use of registers to store equalization coefficients. I incorporate by reference my analysis of Ran and Stauffer from Grounds 2-4.

1. Claim 1

a) A POSITA Would Not Have Been Motivated to Combine Ran, Mejia, and Stauffer

143. Dr. Chen asserts that a POSITA would have included Mejia in combination with Ran because Mejia is "analogous art," is "in the same field," and "relates to ensuring reliable data transmission through a communication channel." EX-1003, ¶158. Dr. Chen asserts that both Ran and Mejia teach selecting preset equalizer coefficients. In particular, Dr. Chen asserts that "Ran teaches selecting

preset values for the transmitter FFE by setting the module request register's two-bit 'initial condition request field 304' 'to select one of three predefined transmitter equalizer configurations (presets).'" *Id.* at ¶164. Dr. Chen also asserts that Mejia teaches "a 'preset search' technique for selecting the initial pre-equalizer coefficient values from multiple sets of initial pre-equalizer coefficient values." *Id.* at ¶165. Dr. Chen describes in detail the different selection procedures disclosed in Ran and Mejia, but fails to explain why a POSITA would have used Mejia's teachings when Ran already discloses a process for selecting predefined transmitter equalizer configurations or "presets."

144. This is another generic KSR-style rationale that does not specifically address why a POSITA would graft Mejia's coefficient selection process onto Ran's management entity, or how Mejia's coefficient selection process would be implemented given that Ran already discloses an intricate request and response process for selecting presets.

145. Dr. Chen asserts that "Ran teaches selecting one preset from multiple presets but does not limit how [...] the selection is performed." EX-1003, ¶171. It is true that Ran does not expressly limit how the preset selection is performed. However, as Dr. Chen acknowledges, Ran teaches particular and detailed request and response procedures for performing the selection. *Id.* at ¶¶163–164. Dr. Chen also acknowledges that Mejia teaches its own particular and detailed coefficient

selection procedures, which are different from Ran's procedures. *Id.* at ¶¶165–

167. Dr. Chen identifies no teaching in Ran or Mejia that would invite or motivate a POSITA to replace or modify Ran's selection procedures to incorporate the different selection procedures described in Mejia.

146. Dr. Chen argues that a POSITA would have been motivated “to apply Mejia's preset search technique to implement Ran's selection of a preset, because it simply applies a known technique (e.g., the preset search technique) to a known method/system ready for improvement (e.g., Ran's equalization training method/serial channel) in the same way to obtain a predictable result (e.g., selecting a preset set of pre-equalizer coefficient values with optimum performance).” EX-1003, ¶171. I disagree for two reasons: Dr. Chen fails to explain the “how” and the “why.”

147. First, Dr. Chen fails to sufficiently explain how a POSITA would “apply Mejia's preset search technique to implement Ran's selection of a preset.” EX-1003, ¶171. As Dr. Chen acknowledges, Ran and Mejia each teach their own detailed procedures for selecting coefficients, and Dr. Chen does not explain how a POSITA would have combined those different procedures. For example, Dr. Chen provides no explanation of how Mejia's “preset search” procedures would fit into Ran's five-step request-response selection procedures. *Id.* at, ¶¶171-175; EX-1006, 3:14-61.

148. Dr. Chen generally asserts that “the teachings of Ran and Mejia were readily compatible with each other. Ran and Mejia are in the same field of serial communications... [and] both [...] support serial communications compliant with the PCIe standard.” *Id.* at ¶175. Dr. Chen also asserts that “both Ran and Mejia teach selecting a preset [...] to provide initial pre-equalizer coefficient values for equalization training.” *Id.* Dr. Chen then concludes that “a POSITA would have a reasonable expectation of success [...] because *it* would not have changed the principle of operation of either Ran or Mejia.” *Id.* (emphasis added). Missing in Dr. Chen’s analysis is any explanation of what “it” is. Dr. Chen fails to explain which part(s) of Mejia’s selection procedures would be used or what part(s) of Ran’s five-step selection procedures would require modification to accommodate the Mejia procedures. The fact that two references both teach coefficient selection procedures in the same field of endeavor does not mean that a POSITA could simply combine those procedures without making necessary modifications. Dr. Chen provides no explanation of the necessary modifications or why a POSITA would have been motivated to make them.

149. Second, Dr. Chen fails to sufficiently explain why a POSITA would have used Mejia’s coefficient selection process to modify Ran’s preset selection process. Ran already taught its own iterative, five-step selection process, which Ran proposed to solve a particular problem. The problem Ran solves is that at high

speeds “the variations between modules will likely require different equalization settings, and variable operating conditions will have a higher effect on circuits and boards.” EX-1006, 2:26-39. Ran aims to address this problem by having a receiver adjust equalization settings for a transmitter using a detailed request-response procedure performed by a management entity. EX-1006, 3:14-61. Dr. Chen identifies no teaching in Ran that would have invited a POSITA to look elsewhere for alternative selection procedures. Given that Ran already includes a detailed preset selection process, there would be no reason for a POSITA to do so. Further, as I explain below, neither Ran nor Mejia teaches using channel models.

b) Neither Ran Nor Mejia Teaches Using Channel Models

150. Dr. Chen does not appear to assert that Ran teaches the use of channel models. I agree that it does not. Instead, Ran describes coefficient change requests that use the three-bit “coefficient select” field 312 to identify a specific target coefficient, e.g., $c(0)$, $c(-2)$, $c(-1)$, and $c(1)$, and the two-bit “coefficient request” field 314 to specify incrementing, decrementing or holding its value or setting it to “No equalization.” EX-1006, 10:25-48; FIGS. 3D-3E. Ran describes beginning the process with one of three presets, but Ran does not disclose what these presets contain, how they differ, or what channel characteristics, if any, each is designed to address. Ran also does not use the term “channel model.”

151. Dr. Chen does assert that Mejia teaches presets that “correspond to different channel models.” EX-1003, ¶168. I disagree. As a preliminary matter, Mejia does not use the term “channel model” and does not describe storing presets in hardware registers indexed to channel models. Mejia also does not disclose a controller that selects among registers based on channel model identification.

152. The “preset search” that Dr. Chen identifies in Mejia is the opposite of using channel models because it requires testing each preset to identify which one works best at that particular moment. Mejia explains the process as follows: “a flow (that may be automated) is provided to evaluate the system performance at different recommended equalization preset values and select the best equalization preset for the given system.” EX-1009, ¶10. Mejia further explains that the preset search process (shown in Figure 3) evaluates different presets by restarting the link with each preset, measuring performance (including jitter margin), and repeating “until all presets are evaluated.” EX-1009, ¶31, FIG. 3. “Once done, ... the preset with the highest margins is selected and the link is retained using that preset.” EX-1009, ¶31. This process appears to assume that the system knows nothing about the channel, which is why it requires testing all of the presets to see which one works best. If the system stored different presets for different channels, then there would be no need to test every single preset each time the system initializes, restarting the

link with each preset to see how it performs compared to the other presets. EX-1009, ¶12.

153. Mejia acknowledges that the “optimal preset... may be a function of channel insertion loss” and other characteristics of the channel. EX-1009, ¶36. However, that does not mean that each of Mejia’s presets is “corresponding to a different channel model,” as claim 1 requires. If each of Mejia’s presets corresponded to a particular channel model, then there would be no need to test every preset to see how it performs. One could simply select the preset that corresponds to the current channel model, which would be much more efficient. Mejia’s selection process, which requires restarting the link to test each preset, teaches the opposite.

2. Claim 8

a) A POSITA Would Not Have Been Motivated to Combine Ran, Mejia, and Stauffer

154. A POSITA would not have been motivated to combine Ran, Mejia, and Stauffer for claim 8 for the same reasons I explained for claim 1.

b) Neither Ran Nor Mejia Teaches Using Channel Models

155. Largely mirroring its analysis from [1a], Dr. Chen again relies on Ran and Mejia as the teaching for [8b], which requires “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values

corresponding to a different channel model.” EX-1003, ¶¶206–207. For the same reasons I explained above under claim 1, neither Ran nor Mejia teaches storing or using different sets of coefficient values that correspond to different channel models. *See* Section VII.D.1.b.

3. Claim 11

a) A POSITA Would Not Have Been Motivated to Combine Ran, Mejia, and Stauffer

156. A POSITA would not have been motivated to combine Ran, Mejia, and Stauffer for claim 11 for the same reasons I explained for claim 1. *See* Section VII.D.1.a.

b) Neither Ran Nor Mejia Teaches a Port Transceiver Determining a Performance Characteristic

157. Dr. Chen relies on the general combination of Ran and Mejia as the teaching for [11b], which requires “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values for which the port transceiver determines a performance characteristic.” EX-1003, ¶¶214-216.

158. As I explained above, Claim 11 and [11b] create a specific functional architecture: the host-side port transceiver evaluates multiple register-stored coefficient sets, determines which performs best, and the module-side controller implements the host’s selection.

159. Ran does not teach the right functionality. As Dr. Chen correctly notes Ran teaches that the management entity sets the pre-equalizer coefficients. EX-1003, ¶216. Ran teaches that the management entity is separate from the pluggable module transceiver. EX-1006, Figs. 2b, 2c.

160. .Ran does not teach a transceiver evaluating multiple stored coefficient sets in the module for performance and selecting among them. Further, Ran’s initial condition request field “is used to select one of three predefined transmitter equalizer configurations (‘presets’)” (EX-1006, 10:6–14), but Ran does not disclose any process of determining a performance characteristic for each preset and selecting based on that determination. The selection mechanism for the initial condition in Ran is entirely undisclosed as it is simply a two-bit field that is set to some value through an unspecified process.

161. Dr. Chen also asserts that Mejia teaches the determination and selection under its analysis of [11b], but Mejia does not fill the gap in Ran’s teaching. In particular, Dr. Chen cites paragraphs 31 and 32 of Mejia, including this sentence fragment: “recommend the best equalization preset values(s) based on information from the RX (Receive) circuits.” EX-1003, ¶216; EX-1009, ¶ 31. This snippet from Mejia does not teach the structure or functionality of claim 11 or [11b] in particular. First, Dr. Chen fails to identify which entity in Mejia corresponds to the claimed port transceiver. Second, by selectively quoting only a

fragment of a sentence, Dr. Chen likewise fails to identify which entity “recommend(s) the best equalization preset value(s).” *Id.* Looking at the broader context of paragraph 31, Mejia itself fails to identify which entity provides the recommendation. EX-1009, ¶ 31.

162. To the extent Dr. Chen meant to assert that the “RX (Receive) circuits” constitute the claimed port transceiver, that assertion would not match the requirements of claim 11. Whatever entity provides the recommendation in Mejia, it clearly is *not* the RX (Receive) circuits because Mejia explains that the recommendation may be “based on information *from* the RX (Receive) circuits.” EX-1009, ¶ 31 (emphasis added). Therefore, Mejia does not teach a host-side port transceiver configured to perform the required selection of coefficients. To the extent Dr. Chen incorporates his analysis of [8b], including citations to other teachings from Ran and Mejia, I likewise incorporate my analysis above for [8b].

4. Claim 16

163. Dr. Chen argues that the combination of Ran, Mejia, and Stauffer renders obvious claim 16 for the same reasons set forth with respect to claim 8 under Ground 5. EX-1003, ¶226. I disagree for the same reasons as claim 8, which are incorporated by reference as if fully set forth herein. *See* Section VII.C.2.

VIII. MATERIALS CONSIDERED

164. 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.

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

IX. CONCLUSION

166. For all the reasons I have noted in the foregoing paragraphs, I am of the opinion that Petitioner has failed to show that any of the challenged claims are unpatentable.

167. 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.

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: May 12, 2026

By: *Tim Arthur Williams*
Tim A. Williams

EXHIBIT 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

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

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.

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement wireless LANs	Morgan Miller and Blair	Proxim v. 3Com	3Com.	Complete			2001	D. Del.	1:2001-cv-00155; 1:2001-cv-00755
Patent Infringement Networking ICs	Simpson Thacher & Bartlett LLP	3Com Inc. v. D-Link/ Realtek Inc.	3Com	Complete			2002	N.D. CA	03-cv-02177
Patent Infringement Wireless LANs	Weil Gotshal & Manges	Agere Systems v. Broadcom Inc.	Broadcom	Complete			2003	E.D. PA	03-cv-03138
Patent Infringement Digital Subscriber Loop (DSL)	Heller Ehrman White & McAuliffe	GlobespanVirata v. Texas Instruments	Texas Instruments; Stanford University	Complete	Y	Y	2003	D.N.J.	03-cv-02854
Patent Infringement Cellular Phones	McKool Smith	Ericsson Inc v. Samsung Inc.	Ericsson	Complete	Y		2004	ITC	337-TA-577
Patent Infringement PBX services	Howrey	Foundry Networks v. Alcatel Inc.	Foundry Networks	Complete			2004	E.D. TX	2:04-cv-00040
Patent Infringement PBX services	Howrey	Foundry Networks v. Lucent Technologies Inc.	Foundry Networks	Complete	Y		2004	E.D. TX	2:04-cv-00040
Patent Infringement Wireless ICs	Kirkland and Ellis LLP	Intel Corp. v. Wi-LAN Inc.	Intel	Complete			2004	N.D. CA	08-cv-04555
Patent Infringement VoIP Recording	Fish and Richardson	STS Networks v. Witness Systems	Witness Systems	Complete	Y	Y	2004	N.D. Ga.	04-cv-02111
Patent Infringement Telephone Systems	Sidley Austin LLP	C2 Comm. Tech Inc. v. AT&T Inc.	AT&T	Complete			2006	E.D. TX	2:06-cv-00241
Patent Infringement Networking ICs	Simpson Thacher & Bartlett LLP	Commil USA LLC v. Cisco Systems Inc.	Cisco	Complete			6-Nov-07	E.D. TX	2:07-cv-341; 2:11-cv-00417; 2:11-cv-00265
Patent Infringement PBX services	Fish and Richardson	Microsoft Inc. v. Alcatel Inc.	Microsoft	Complete			2006	ITC	337-TA-598
Patent Infringement and Trade Secret Cellular Phones	Heller Ehrman White & McAuliffe	Qualcomm Inc v. Broadcom Inc.	Qualcomm	Complete			2006	S.D. CA	06-cv-0660

Dr Tim A Williams Case History

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Patent Infringement Telephone Systems	Jones Day LLP	in re Katz Patents	Experian	Complete			2007	C.D. CA	07-ml-01816
Patent Infringement Telephone Systems	Howrey	in re Katz Patents	General Electric	Complete	Y		2007	C.D. CA	07-ml-01816
Patent Infringement Wireless Networks	Heller Ehrman LLP and Covington & Burling LLP	Intermec Tech. V. Palm Inc.	Palm	Complete	Y		2007	D. Del.	1:2007-cv-00272
Patent Infringement Cellular Phones	Cooley Godward Kronish LLP	Qualcomm Inc. v. Broadcom Inc.	Qualcomm	Complete			2007	S.D. CA	08-cv-01607; 08-cv-01829
Patent Infringement Cellular Phones	DLA Piper	Qualcomm Inc. v. Nokia Inc.	Qualcomm	Complete			2007	W.D. WI; S.D. CA; S.D. CA	3:07-cv-00187; 3:07-cv-01366; 3:05-cv-02063
Patent Infringement	Howrey LLP	Minerva Inc. v Motorola Inc. et al.	Research in Motion	Complete			2007	E.D. TX	2:2007-cv-00229
Patent Infringement	Covington & Burling; Cooley; Howrey; DLA Piper	Saxon Innovations LLC. v. Nokia Corp. et al.	Samsung; Nintento; RIM; Palm	Complete			2007	E.D. TX	6:2007-cv-00490
Patent Infringement	Baker Botts LLP	AT&T v Airbiquity	AT&T	Complete			2008	N.D. TX	08-cv-01637
Patent Infringement	Quinn Emanuel LLP	ESN v Cisco	Cisco	Complete			2008	E.D. TX	5:08-cv-00020
Patent Infringement Telephone Call Processing	Jones Day LLP	in re Katz Interactive Call Processing	Citizens Communications	Complete	Y		2008	C.D. CA	07-ml-01816
Patent Infringement VoIP	Kilpatrick Stockton LLP	Verizon Corp. v. Cox Inc.	Cox	Complete	Y	Y	2008	E.D. VA	1:08-cv-00157
Patent Infringement	Latham & Watkins LLP	Freedom Wireless Inc. v. Cricket Communications Inc et al.	Cricket Comm.	Complete	Y		2008	E.D. TX	2:06-CV-504
Patent Infringement	Irell & Manella LLP	eBay Inc. v. IDT Corp. et al.	eBay.	Complete	Y		2008	W.D. AR	4:08-cv-04015
Patent Infringement	Foley & Lardner LLP	SPH America LLC v. Kyocera Wireless Corp. et al.	Kyocera.	Complete			2008	S.D. CA	3:08-cv-02146; 3:09-cv-00299; 3:09-cv-00572
Patent Infringement Wireless Devices	Ropes & Grey LLP	Motorola Inc. v. Research in Motion Inc.	Motorola	Complete			2008	N.D. TX	3:08-cv-00284
Patent Infringement	Banner & Witcoff	Paradox Ltd. v. ADT Ltd.	Paradox	Complete	Y		2008	E.D. TX	2:06-cv-00462

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Patent Infringement	Gibson Dunn LLP	Broadcom v Emulex	Emulex	Complete			2009	C.D. CA	09-cv-01058
Patent Infringement	Keker & Van Nest LLP	Intel Corp. v. CSIRO Inc.	Intel	Complete	Y		2009	E.D. TX	06-cv-00551
Patent Infringement	Foley and Lardner LLP	SPH v Nokia	Nokia	Complete			2009	S.D. CA	3:2009-cv-02535
Patent Infringement	Fish and Richardson LLP	Tekelec v Performance Technologies Inc.	Performance Technologies; Inc.	Complete			2009	E.D. NC	09-cv-00531
Patent Infringement	McDermott Will & Emery LLP	Telecommunications Systems Inc. v Sybase 365 Inc.	Sybase	Complete			2009	E.D. VA	09-cv-00387
Patent Infringement	Kecker & Van Nest LLP	Kodak v HTC	HTC	Complete			2010	ITC	337-TA-831
Patent Infringement	Howrey LLP	WiAV v Motorola	Motorola	Complete	Y		2010	E.D. VA	3:09-cv-00447
Patent Infringement	Quinn Emanuel LLP	WiAV v Sony	Sony	Complete	Y		2010	E.D. VA	3:09-cv-00447
Patent Infringement	Covington LLP	Fujitsu v Belkin et al.	Fujitsu	Complete	Y	Y	2011	N.D. CA	10-cv-03972-LHK
Patent Infringement	Finnegan Henderson LLP Keker & Van Nest LLP	HTC v Apple Inc.	HTC	Complete	Y	Y	2011	ITC	337-TA-721
Patent Infringement	Hogan Lovells LLP	MOSAID v Cisco Inc.	MOSAID	Complete	Y		2011	ITC	337-TA-778
Patent Infringement	Quinn Emanuel LLP	Motorola v Apple Inc.	Motorola	Complete	Y		2011	S.D. FL; D. Del.	1:2010-cv-23580 1:2010-cv-00867
Patent Infringement	Finnegan Henderson LLP	HTC v Apple Inc.	HTC	Complete	Y		2012	ITC	337-TA-808
Patent Infringement	Proskauer LLP	MMI v Apple Inc.	MMI	Complete	Y		2012	D. Del.	1:10-cv-00258
Patent Infringement	Ropes and Grey LLP	Motorola v Microsoft Inc.	Motorola	Complete	Y	Y	2012	W.D. WA.	10-cv-01823
Patent Infringement	Quinn Emanuel LLP	Samsung v Apple Inc.	Samsung	Complete	Y	Y	2012	N.D. CA	11-cv-01846
Patent Infringement	Fish and Richardson LLP	VirneTX v Avaya	Avaya	Complete	Y		2013	E.D. TX	6:11-cv-00018
Patent Infringement and Trade Secret Cellular Phones	Heller Ehrman White & McAuliffe	Broadcom Inc. v Qualcomm Inc.	Qualcomm	Complete	Y		21-Jan-03	S.D. CA	05-cv-1392
Patent Infringement	Baker & McKenzie LLP and Kilpatrick Stockton LLP	Data Treasury Corp. v. Wells Fargo. et al.	Wells Fargo and Wachovia.	Complete	Y		6/27/05	E.D. TX	2:2005-cv-00291; 2:2005-cv-00293
Patent Infringement	Morrison & Foerster	Class v Apple	Apple	Complete			9/22/06	Unknown	Unknown

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Cravath Swaine & Moore	Broadcom Inc. v Qualcomm Inc.	Qualcomm	Complete			10-Jan-07	C.D. CA	05-cv-00467
Patent Infringement	Cooley Godward Kronish LLP	Broadcom Inc. v Qualcomm Inc.	Qualcomm	Complete	Y	Y	13-Jan-08	ITC	337-TA-543
Arbitration	Cooley, Godward, Kronish LLP	Qualcomm v Panasonic	Qualcomm	Complete			6/24/09	Arbitration	None
Arbitration	Sidley Austin LLP	AT&T v. Intrado	AT&T Mobility LLC (f/k/a Cingular Wireless LLC) (_AT&TÓ);	Complete	Y		3-Nov-09	Arbitration	
Patent Infringement	Nixon Peabody; K&L Gates; Altson and Bird; Greenberg Traurig; Spotts Fain; Winston & Strawn; Goodwin Proctor	SPH America v Acer Inc. et al	Sierra Wireless; Novatel; Nokia; Hewlett Packard; UT Starcom; Motorola Solutions; Motorola Mobility.	Complete	Y		4/14/10	S.D. CA	3:2009-cv-02535
Patent Interference	Foley and Lardner LLP	Application Serial No 10/304,121 and U.S. Patent No. 7,084,529, Patent Interference No. 105,755(RES)	EnOcean GMBH	Complete			21-Jul-10	USPTO	Application Serial No 10/304,121 and U.S. Patent No. 7,084,529, Patent Interference No.
Patent Infringement	Mayer Brown LLP	MOSAID v Cisco	MOSAID	Complete	Y		9/10/10	D. Del.	10-cv-00687
Patent Infringement	Kilpatrick Townsend LLP	Golden Bridge v Motorola.	Motorola	Complete			5/20/11	D. Del.	1:2010-cv-00428
Patent Infringement	Quinn Emanuel LLP	Barnes & Noble v LSI	Barnes & Noble	Complete			6/14/11	N.D. CA	11-cv-02709
Patent Infringement	Covington LLP; Fish and Richardson LLP; Brinks Hofer Gilson & Lione LLP; Alston & Bird LLP	Interdigital v Huawei et al.	Huawei; LG; ZTE; Nokia	Complete	Y	Y	8/18/11	ITC	337-TA-800
Patent Infringement	Cravath LLP	Parkervision v Qualcomm	Qualcomm	Complete	Y	Y	11/2/11	MDFL	11-cv-00179
Patent Infringement	Latham & Watkins LLP	Sprint Communications v Time Warner Cable et al.	Time Warner Cable	Complete			1/30/12	D. KS	2:2011-cv-02686
Patent Infringement	Kilpatrick Townsend LLP	Digitide v Motorola	Motorola	Complete			14-Feb-12	ITC.	337-TA-827

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Dechert LLP	Intellectual Ventures I LLC and Intellectual Ventures II LLC v. AT&T Mobility LLC; AT&T Mobility II LLC; New Gingular Wireless Services Inc.; SBC Internet Services Inc.; Wayport Inc.; T-Mobile USA Inc.; Nextel Operations Inc.; Sprint Spectrum L.P.; United States Cellular Corporation; and Telephone and Data Systems Inc.	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete	Y		7/5/12	D. Del.	1:2012-cv-00193
Patent Infringement	McKenna Long & Aldridge LLP	Comerica v Maxim Integrated Products	Comerica	Complete			8/1/12	W.D. PA	12-mc-00244
Patent Infringement	DLA Piper LLP	Technology Properties Limited LLC ("TPL");Phoenix Digital Solutions LLC ("PDS") and Patriot Scientific Corporation ("PTSC") v Samsung Electronics Co. Ltd. And Samsung Electronics America Inc.	Samsung	Complete			11/7/12	ITC	337-TA-853
Patent Infringement	Goodwin Procter LLP	WIAV Solutions v. ZTE Corporation. et al.	ZTE Corporation and ZTE (USA)	Complete			17-Dec-12	E.D. VA	1:12CV907
Patent Infringement	Fish and Richardson LLP	Ericsson v Samsung	Samsung	Complete			10-Jan-13	ITC	337-TA-862
Patent Infringement	Kirkland & Ellis LLP	SimpleAir Inc. v. Microsoft Corp. et al.	Samsung Electronics Co.; Ltd.; Samsung Electronics America; Inc.; and Samsung Telecommunications America LLC	Complete			19-Mar-13	E.D. TX	2:11-cv-00416-JRG
Patent Infringement	Winston & Strawn LLP	Adaptix v Motorola Mobility LLC et al.	Motorola Mobility	Complete			22-Mar-13	E.D. TX Tyler	6:12-cv-00016-MHS
Patent Infringement	Winston & Strawn LLP	Adaptix v Motorola Mobility LLC et al.	Motorola Mobility	Complete			22-Mar-13	N.D. CA	5:13-cv-01774-PSG
Patent Infringement	Bunsow De Mory Smith & Allison LLP	Cassidian Communications v. microData GIS Inc.; microData LLC; and TeleCommunications Systems Inc.	Cassidian Communications	Complete	Y	Y	1-Apr-13	E.D. TX Marshall	2:09-cv-00395-JRG
Patent Infringement	Kilpatrick Townsend & Stockton LLP	SimpleAir Inc. v. Microsoft Corporation et al.	Google Inc.	Complete	Y	Y	2-Apr-13	E.D. TX	2:11-cv-00416-JRG
Patent Infringement	Ropes & Gray LLP	InterDigital Technology Corp.IPR Licensing Inc. and InterDigital Holdings Inc	Samsung Electronics Co.; LTD.; Samsung Electronics America; Inc.; and Samsung Telecommunications America; LLC	Complete	Y		8-Apr-13	ITC Del.	337-TA-868 and Case No. 13-cv-00011
Patent Infringement	Covington & Burling LLP	InterDigital Technology Corp.IPR Licensing Inc. and InterDigital Holdings Inc	Huawei	Complete	Y		12-Jun-13	ITC Del.	337-TA-868 and Case No. 13-009 (RGA)).

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Covington & Burling LLP	InterDigital Technology Corp. IPR Licensing Inc. and InterDigital Holdings Inc.	Huawei	Complete			12-Jun-13	Arbitration	
Patent Infringement	Brinks Hofer Gilson & Lione	InterDigital Technology Corp. IPR Licensing Inc. and InterDigital Holdings Inc.	ZTE Corporation and ZTE (USA) Inc.	Complete			12-Jun-13	ITC Del.	337-TA-868 and Case No. 13-009 (RGA)).
Patent Infringement	Alston & Bird LLP	InterDigital Technology Corp. IPR Licensing Inc. and InterDigital Holdings Inc.	Nokia Corporation and Nokia Inc.	Complete			20-Jun-13	ITC Del.	337-TA-868 and Case No. 13-010 (RGA)).
Patent Infringement	Tensegrity Law Group LLP	Intellectual Ventures I LLC and Intellectual Ventures II LLC v Canon Inc. Canon U.S.A. Inc. and Canon Solutions America Inc.	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete	Y		12-Jul-13	Del.	1:13-CV-00473-SLR (D. Del.)
Patent Infringement	Tensegrity Law Group LLP	Intellectual Ventures I LLC and Intellectual Ventures II LLC v Ricoh Company Ltd. Ricoh Americas Corporation and Ricoh Electronics Inc.	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete			12-Jul-13	Del.	1:13-CV-00474-SLR (D. Del.)
Patent Infringement	OMelveny & Myers LLP	Commonwealth Scientific and Industrial Research Organisation v. MediaTek Inc. et al.	Samsung Electronics Co.; Ltd.; Samsung Semiconductor Inc.; and Samsung Telecommunications America; LLC	Complete			19-Jul-13	E.D. TX	6:12-cv-578-LED
Patent Infringement	Feinberg Day Alberti & Thompson LLP	Intellectual Ventures v PNC Bank, Capital One, First National Bank of Omaha, JP Morgan Chase, Fifth Third Bank, Bank of America, BBVA Compass Bank, Commerce Bank, Suntrust, and M&T	Intellectual Ventures	Complete	Y		30-Aug-13	E.D. VA	1:13-cv-740-AJT/TRJ
Patent Infringement	Feinberg Day Alberti & Thompson LLP	Intellectual Ventures v PNC Bank, Capital One, First National Bank of Omaha, JP Morgan Chase, Fifth Third Bank, Bank of America, BBVA Compass Bank, Commerce Bank, Suntrust, and M&T	Intellectual Ventures	Complete			30-Aug-13	W.D. PA	2:13-cv-00740-AJS
Patent Infringement	Gibson Dunn	AIP Acquisition LLC v. Cablevision Systems Corporation, et al.	CSC Holdings LLC	Complete			3-Sep-13	D. Del.	1:12-cv-01688-GMS)
Patent Infringement	Cooley LLP	Monec Holding AG v. Motorola Mobility LLC, et al.,	Exedeia, Inc	Complete			27-Sep-13	CA	11-798-LPS-SRF
Patent Infringement	Cooley LLP	Monec Holding AG v. Motorola Mobility LLC, et al.,	HTC Corporation	Complete	Y		27-Sep-13	CA	11-798-LPS-SRF
Patent Infringement	Kilpatrick Townsend & Stockton	Monec Holding AG v. Motorola Mobility LLC, et al.,	Motorola Mobility LLC	Complete	Y		27-Sep-13	CA	11-798-LPS-SRF

Dr Tim A Williams Case History

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Patent Infringement	Fish & Richardson P.C.	Monec Holding AG v. Motorola Mobility LLC, et al.,	Samsung Electronics America, Inc. and Samsung Electronics, Inc.	Complete	Y		27-Sep-13	CA	11-798-LPS-SRF
Arbitration	Covington & Burling LLP	Sasken Communication Technologies Limited v. Spreadtrum Communications, Inc. and Spreadtrum Communications USA Inc	Spreadtrum	Complete	Y	Y	30-Sep-13	American Arbitration Association International Centre for Dispute Resolution	50-117-T-00924-12
Patent Infringement	FINNEGAN, HENDERSON, LLP and HOLLAND & HART LLP	Cellport v. ZTE et al.	HTC Corp., et al	Complete			27-Oct-13	CO	1:13-cv-173 - RBJ
Patent Infringement	Dickstein Shapiro LLP, Lathrop & Gage, LLP	Cellport v. ZTE et al.	LG Electronics, Inc., et al	Complete			27-Oct-13	CO	1:13-cv-175 - RBJ
Patent Infringement	FOX ROTHSCHILD LLP, KING & SPALDING LLP	Cellport v. ZTE et al.	Nokia Corp., et al.	Complete			27-Oct-13	CO	1:13-cv-178 - RBJ
Patent Infringement	BAKER & MCKENZIE LLP	Cellport v. ZTE et al.	Pantech Co. Ltd., et al	Complete			27-Oct-13	CO	1:13-cv-179 - RBJ
Patent Infringement	GREENBERG TRAURIG, LLP	Cellport v. ZTE et al.	Samsung Electronics Co., Ltd., et al	Complete			27-Oct-13	CO	1:13-cv-180 - RBJ
Patent Infringement	Sheppard Mullin Richter & Hampton LLP	Cellport v. ZTE et al.	ZTE Corporation and ZTE	Complete			27-Oct-13	CO	1:12-cv-3296
Patent Infringement	Ropes & Gray LLP	Broadcom Corp. v. NXP Semiconductors USA, Inc.	Broadcom	Complete			11-Feb-14	CDCA	CV SA 8:13-829-MRP(MANx)
Patent Infringement	Quinn Emanuel LLP	GENBAND US LLC v. Metaswitch Networks Ltd., et. al.	Metaswitch Networks Ltd.	Complete	Y	Y	27-Feb-14	E.D. TX	2:14-CV-33-JRG-RSP
Patent Infringement	O'Melveny & Myers LLP	Concinnitas, LLC and George Hindman v. Samsung Telecommunications America, LLC, et al,	Electronics America, Inc. and Samsung	Complete			22-Apr-14	E.D. TX	2: 13-CV-824-JRG-RSP
IPR	Hill, Kertscher & Wharton, LLP	Regarding the U.S. Patent No. 8,400,926 B2	HTC Corporation	Complete			9-May-14	USPTO	U.S. Patent No. 8,400,926 B2
IPR	Hill, Kertscher & Wharton, LLP	Regarding the U.S. Patent No. 8,134,600, 8,477,197, 8581,991	HTC Corporation	Complete			9-May-14	USPTO	U.S. Patent No. 8,134,600, 8,477,197, 8581,991
IPR	Morgan, Lewis & Bockius, LLP	Regarding the U.S. Patent No. 6,819,923	NEC Casio Mobile Communications Ltd. and NEC Corp of America	Complete			25-Jun-14	USPTO	U.S. Patent No. 6,819,923

Dr Tim A Williams Case History

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IPR	Everett Upshaw, PLLC	Regarding the U.S. Patent No. 7,215,962	ZTE Corporation and ZTE (USA)	Complete	Y		25-Jun-14	USPTO	U.S. Patent No. 7,215,962
Patent Infringement	Fenwick & West LLP	Cellular Communications Equipment LLC v. Amazon.com, Inc. et al	Amazon Inc.	Complete			1-Jul-14	E.D. TX	TXED-6-13-cv-00569; consolidated with Case No. 6-13-cv-00507
Patent Infringement	Pillsbury Winthrop Shaw Pittman	Cellular Communications Equipment LLC v. HTC Corporation et al	HTC Corporation	Complete			1-Jul-14	E.D. TX	6:13-cv-00507
IPR	H.C. Park & Associates, PLC	Regarding the U.S. Patent No. 7,218,923	Pantech Co. Ltd., et al	Complete			2-Jul-14	USPTO	U.S. Patent No. 7,218,923
Patent Infringement	Pillsbury Winthrop Shaw Pittman	SPH America LLC v. ZTE Corp et. al.	ZTE Corporation and ZTE (USA) Inc.	Complete			10-Jul-14	ED TX	3:13-cv-02326
Patent Infringement	Pillsbury Winthrop Shaw Pittman	Novatel Wireless, Inc. v. ZTE Corp. et. al.	ZTE Corporation and ZTE (USA) Inc.	Complete			16-Jul-14	ED TX	3:12-cv-02576
IPR	Pillsbury Winthrop Shaw Pittman	Regarding Vringo patents	ZTE Corporation and ZTE (USA) Inc.	Complete			21-Aug-14	USPTO	U.S. Patents
Patent Infringement	Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.	OpenTV Inc. et. al. v. Apple, Inc.	OpenTV, Inc. and Nagravision, SA of the Kudelski Group	Complete			22-Sep-14	N.D. CA	14-cv-01622-JST
IPR	Foley and Lardner LLP	Regarding the U.S. Patent No. 8,532,231, 8,565,346	Huawei Technologies Co., Ltd., Futurewei Technologies, Inc. and Huawei Device USA,	Complete			14-Oct-14	USPTO	Regarding the U.S. Patent No. 8,532,231, 8,565,346
Patent Infringement	Desmarais LLP	Intellectual Ventures I LLC and Intellectual Ventures 11 LLC v. Nikon Corp., et al	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete			11-Nov-14	Del.	1:11-CV-1025-SLR
Patent Infringement	Cooley LLP	ParkerVision, Inc. v Qualcomm Incorporated, et al	Qualcomm	Ongoing			15-Dec-14	MDFL	6:14-cv-00687
Patent Infringement	DLA Piper LLP	Technology Properties Ltd LLC et al. v. Samsung Electronics Co., Ltd	Samsung Electronics Co., Ltd.	Complete			22-Jan-15	N.D. CA	3:12-cv-03879

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Paul Hastings	Summit 6 LLC v. HTC Corp.	HTC Corp and HTC America	Complete			3-Apr-15	NDTX	7:14-cv-00014
Patent Infringement	Kolpatrick Townsend & Stockton LLP	Summit 6 LLC v. Motorola	Google/Motorola	Complete			8-Apr-15	NDTX	7:14-cv-00014
Patent Infringement	Quinn Emanuel LLP	Cellular Communications Equipment LLC v. Samsung Electronics Co., Ltd et al	Samsung Electronics Co., Ltd.,	Complete			8-Jun-15	E.D. TX	6:14-cv-759-JRG
IPR	Sterne, Kessler, Goldstein&Fox PLLC	Int'l Bus. Machines Corp. v IV	IV	Complete	Y		10-Jun-15	USPTO	2015-00089, 2015-00092
Patent Infringement	Novak, Druce Connolly Bove + Quigg LLP	Sonus Networks, Inc. v Inventergy, Inc. and Inventergy Global, Inc	Inventergy, Inc. and Inventergy Global, Inc	Complete			24-Jul-15	N.D. CA	15-cv-00322
Patent Infringement	Novak, Druce Connolly Bove + Quigg LLP	Sonus Networks, Inc. v Inventergy, Inc. and Inventergy Global, Inc	Inventergy, Inc. and Inventergy Global, Inc	Complete			24-Jul-15	MA	15-cv-10207
Patent Infringement	Novak, Druce Connolly Bove + Quigg LLP	Sonus Networks, Inc. v Inventergy, Inc. and Inventergy Global, Inc	Inventergy, Inc. and Inventergy Global, Inc	Complete			24-Jul-15	E.D. TX	14-cv612
Report	Norton Rose Fulbright US LLP	The Smallest Salable Patent-Practicing Unit (SSPPU): Theory and Evidence	Qualcomm	Complete			8-Sep-15	N/A	N/A
Arbitration	Mayer Brown LLP	Nokia Technologies Ltd and LG Electronics, Inc.	LG Electronics, Inc.	Complete	Y		25-Sep-15	Arbitration	None
IPR	Sterne, Kessler, Goldstein&Fox PLLC	LM Ericsson v IV	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete	Y		18-Dec-15	USPTO	2015-01872
IPR	Sterne, Kessler, Goldstein&Fox PLLC	Old Republic Group Inc. v IV	Intellectual Ventures I LLC and Intellectual Ventures II LLC	Complete	Y		18-Dec-15	USPTO	IPR2015-01992, CBM2015-00184
IPR	Sterne, Kessler, Goldstein&Fox PLLC	LM Ericsson v IV	Intellectual Ventures I LLC and Intellectual	Complete	Y		26-Dec-15	USPTO	2015-01873
Patent Infringement	Cooley LLP	ParkerVision, Inc. v Qualcomm Incorporated, et al	Qualcomm	Complete			1-Feb-16	ITC	337-TA-982
Patent Infringement	Fish & Richardson P.C.	TiVo Inc. v. Samsung Electronics Co., Ltd., et al.,	Electronics Co., Ltd. and Samsung	Complete			14-Mar-16	EDTX	2:15-CV-1503

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	RuyakCherian LLC	Brocade Communications Systems, Inc.	Brocade Communications Systems, Inc.	Complete			4-May-16	None	None
Report	Norton Rose Fulbright US LLP	European Commission Sapphire Investigation (Case AT.40220 - Qualcomm)	Qualcomm	Ongoing			5-May-16	European Commission	
IPR	Bragalone Conroy PC	Securus Technologies, Inc. v. Global Tel*Link Corporation	Securus Technologies, Inc.	Complete	Y		6-May-16	USPTO	IPR2016-01123
Patent Infringement	Cooley LLP	Skky, LLC v. Facebook, Inc. et al.	Facebook, Inc.	Complete			7-Jun-16	?	16-cv-00094-WMW-FLN
IPR	Pillsbury Winthrop Shaw Pittman	Cellular Communications Equipment LLC v. AT&T et al	HTC Corporation, HTC America	Complete	Y		7-Jul-16	USPTO	Regarding U.S. Patents 8,457,676 and 8,570,957
IPR	Pillsbury Winthrop Shaw Pittman	Cellular Communications Equipment LLC v. AT&T et al	ZTE Corporation and ZTE (USA), Inc.	Complete			7-Jul-16	USPTO	Regarding U.S. Patents 8,457,676 and 8,570,957
Patent Infringement	Desmarais LLP	Uniloc USA, Inc. and Uniloc Luxembourg S.A. v. Cisco Systems, Inc.	Cisco Systems, Inc.	Complete			15-Jul-16	E.D. TX	6:15-CV-1175-JRG
Patent Infringement	Quinn Emanuel LLP	GENBAND US LLC v. Metaswitch Networks Ltd., et. al.	Metaswitch Networks Ltd.	Complete	Y		15-Jul-16	E.D. TX	2:16-cv-582-JRG-RSP
Patent Infringement	Duanne Morris	Ruckus Wireless, Inc. v Chrimar Systems d/b/a CMS Technologies and Chrimar Holding Company LLC	Ruckus Wireless	Complete			27-Jul-16		
Patent Infringement	Singularity IP & Foster Pepper PLLC	CommScope Technologies LLC v. Dali Wireless, Inc.,	CommScope Technologies LLC	Complete			17-Aug-16	N.D. Tx	3:16-cv-00477
Patent Infringement	Quinn Emanuel LLP	Huawei Technologies, Co. Ltd et al v. Samsung Electronics Co, Ltd. et al	Electronics Co., Ltd. and Samsung Electronics	Complete	Y		23-Aug-16	NDCA	3:16-cv-02787
Patent Infringement	Foster Pepper PLLC	CommScope Technologies LLC v. Dali Wireless, Inc.,	CommScope Technologies LLC	Complete			15-Oct-16	N.D. Tx	3:16-cv-00477
Technology Review	Foster Pepper PLLC	Dali Wireless, Inc.	Dali Wireless, Inc.	Complete			28-Oct-16	None	None
Patent Analysis	Foster Pepper PLLC	Dali Wireless, Inc v. Fiplex Communications, Inc.	Dali Wireless, Inc	Complete			29-Oct-16		
Patent Infringement	Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.	Certain Digital Cable and Satellite Products, Set-Top Boxes, Gateways, and Components Thereof	Sony Corporation	Complete			8-Dec-16	ITC	337-TA-1049
Patent Infringement	Irell & Manella, LLP	various patent disputes involving Mobile Telecommunications Technology, LLC ("MTel") and regarding United States Patents Nos. 5,590,403, 5,659,891, and 5,915,210.	Juniper Networks, Inc.	Complete			29-Dec-16		

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Dechert, LLP, Winston & Strawn	Tech Pharmacy Services, LLC v. Alixa RX LLC., et al.	Alixa RX LLC	Complete	Y		6-Jan-17	EDTX	4:15-cv-766
Patent Infringement	Sheppard Mullin Richter & Hampton LLP	Papst Licensing GMBH & Co. KG v. ZTE Corporation and ZTE (USA), Inc.	ZTE (USA), Inc.	Complete	Y		27-Jan-17	EDTX	6: 15-cv-1100
Antitrust	Freitas Angell & Weinberg LLP	Intellectual Ventures I LLC v Capital One	Intellectual Ventures	Complete			15-Feb-17	MD	8:14-cv-111 (PWG)
IPR	Knobbe, Martens, Olson, & Bear LLP	Symantec Corporation ("Symantec") v, IV's U.S. Patent No. 7,757,298	IV	Complete			16-Feb-17	USPTO	2016-01433
Patent Infringement	Cooley LLP	Uniloc USA, Inc. et al. v. Facebook, Inc. et al.	Facebook, Inc.	Complete			17-Feb-17	EDTX	2:16-cv-00728
Patent Infringement	Feinberg Day Alberti & Thompson LLP	OpenTV Inc. v. NFL Enterprises, LLC	OpenTV, Inc.	Complete			23-Mar-17	EDTX	6:17-cv-00031
IPR	Finnegan, Henderson, Farabow, Garret & Dunner, L.L.P.	Unified Patents (6,014,089, 7,346,313)	Unified Patents	Complete			4/8/17	USPTO	(6,014,089, 7,346,313)
Patent Infringement	Irell & Manella, LLP	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. v. Sirius XM Radio, Inc.,	Fraunhofer	Complete			17-May-17		<u>17-184-VAC-SRF</u>
Technology Review	RuyakCherian LLC	XR Communications, LLC., dba Vivato Technologies v. Ruckus Wireless, Inc.	Ruckus Wireless	Complete			13-Jun-17	CDCA	2:17-cv-02961
Patent Infringement	DLA Piper LLP	Mobile Telecommunications Technologies, LLC v. Aruba Networks, Inc., et al.,	Aruba/HPE and HP	Complete			25-Aug-17	MD	16-md-2722
Patent Infringement	Dechert, LLP	Intellectual Ventures I LLC v. T-Mobile USA, Inc., T-Mobile US, Inc., Ericsson Inc., and Telefonaktiebolaget LM Ericsson	IV	Complete	Y	Y	29-Aug-17	EDTX	2:17-cv-00577-JRG
Patent Infringement	Cooley LLP	Silver State Intellectual Tech., Inc. v. Facebook, Inc. et al.	Facebook, Inc.	Complete			19-Sep-17	ND CA	4:17-cv-03349-JSW
Patent Infringement	Quinn Emanuel LLP	QCOM v Apple SD Cal	Qualcomm	Complete	Y		15-Nov-17	SD. Cal,	5:17-cv-0108-GPC-MDD,
Patent Infringement	Norton Rose	QCOM v Apple	Qualcomm	Complete	Y		15-Nov-17	ND Cal	5:17-md-02773-LHK,
Patent Infringement	Norton Rose	QCOM v Apple	Qualcomm	Complete	Y		15-Nov-17	ND Cal	5:17-cv-00220-LHK
Patent Infringement	Quinn Emanuel LLP	In the Matter of CERTAIN MOBILE ELECTRONIC DEVICES AND RADIO FREQUENCY AND PROCESSING COMPONENTS THEREOF	Qualcomm	Complete	Y		10-Jan-18	ITC	U.S. PATENT NO. 9,608,675
Patent Infringement	Paul Hastings	3G Licensing, S.A. et al v. HTC Corporation	HTC Corporation	Complete			7-Mar-18	Del.	1:17-cv-00083-LPS-CJB
Patent Infringement	Fish & Richardson P.C.	Sonus Networks, Inc. v. Metaswitch Networks Ltd. et al,	Metaswitch Networks Ltd.	Complete			19-Jun-18	EDTX Marshall	18-cv-00057-RWS, 18-cv-00058-RWS, IPR
Request for Reexam	Dentons US LLP	Request for Reexam re: patent 7,814,216	Dentons	Complete			6-Sep-18	USPTO	US Patent 7,814,216

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Contract Dispute	Jones Day	Qualcomm, Inc. v. Apple, Inc.	Qualcomm	Complete	Y		28-Sep-18	San Diego Superior Ct	37-2017-00041389-CU-BC-NC
Patent Infringement	O'Melveny & Myers LLP	Top Victory Electronics (Taiwan) Co. Ltd. v. American Patents LLC	Top Victory Electronics	Complete			13-Dec-18	EDTX	4:18-cv-00768-ALM
Patent Infringement	Birch, Stewart, Kolasch & Birch, LLP	Blitzsafe Texas LLC v Mitsubishi Electric Corp, et al.	Mitsubishi	Complete			19-Feb-19	EDTX	2:17-cv-00430-JRG
IPR	Jones Day	Qualcomm/Intel PTAB Matters (U.S. Patent No. 9,608,675)	Qualcomm	Complete	Y		20-Feb-19	USPTO	IPR2018-01326 to 01330 and IPR2018-01340
Patent Infringement	Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.	Uniloc Luxembourg S.A., Uniloc 2017 LLC ("Uniloc") v LG Electronics Inc., LG Electronics U.S.A., Inc., and LG Electronics MobileComm U.S.A., Inc. ("LG")	LG	Complete			11-Mar-19	NDCA	3:18 cv-06737-JST, 5:18-cv-06738-LHK, 3:18-cv-06739-JST, 3:18-cv-06740-JST) and PTO
Ex Parte	Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.	TCL Communication Technology Holdings Ltd. ("TCL").	TCL	Complete			13-Mar-19	USPTO	U.S. Patent No. 7,149,510
Patent Infringement	Mayer Brown LLP	Maxell, Ltd., et al., v. Apple Inc.	Maxell	Complete	Y		15-Apr-19	EDTX	5:19-cv-00036-RWS
Patent Infringement	Maschoff Brennan	ICON Health & Fitness, Inc. v. Tme Fitness Technology, Inc	ICON	Complete			29-May-19	Missouri	4:18-cv-00439
Patent Infringement	Gibson Dunn	Sprint Communications Co. L.P. v. Cequel Communications, UC et al.	Altice USA	Complete	Y		17-Jun-19	Del.	1:18-cv-01752-RGA
Patent Infringement	Charhon Callahan Robson & Garza, PLLC	United Access Technologies, LLC ("UAT") in connection with UAT's lawsuits against AT&T, Verizon, Frontier and CenturyTel,	UAT	Complete	Y		17-Jun-19		1:05-cv-00866-LPS, 1:11-cv-00338-LPS, 1:11-cv-00341-LPS
Patent Infringement	Susman Godfrey I.L.P.	Sol IP, LLC v. AT&T Mobility LLC, et al.	Sol IP	Complete	Y		24-Jul-19	E.D. Tex.	2:18-cv-00526; 2:18-cv-00527; 2:18-cv-00528
IPR	Kelley Drye & Warren LLP	Zomm / Apple PTAB Matters (U.S. Patent No. 9,608,675)	Zomm, LLC	Complete	Y		30-Jul-19	USPTO	IPR2019-275, IPR2019-277, IPR2019-1030
Patent Infringement	Fish & Richardson P.C.	Bell Northern Research, LLC v. LG Electronics Inc., et al.,	LG Electronics, Inc.	Complete			6-Aug-19	SD. Cal	18-cv-2864-CAB-BLM
Technology Consulting	Norton Rose Fulbright US LLP	Sanyo v. Intel	Sanyo	Complete	Y		3-Dec-19	Chancery of Delaware	C.A. No. 2018-0723-MTZ
Patent Infringement	Sidley Austin LLP	LG Electronics Inc. v. Hisense Electronics Manufacturing Company of America	LG	Complete			15-Jan-20	CDCA	2:19-cv-09474-SJO-E
Patent Infringement	Ahmad, Zavitsanos, Anaipakos, Alavi, Mensing	Cellular Evolution, LLC v. AT&T Mobility, LLC and Cricket Wireless, LLC	Cellular Evolution	Complete			30-Jan-20	EDTX	19-cv-00228

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Ahmad, Zavitsanos, Anaipakos, Alavi, Mensing	Cellular Evolution, LLC v. T-Mobile, US, Inc. and T-Mobile USA, Inc.,	Cellular Evolution	Complete			30-Jan-20	EDTX	19-cv-00232
Patent Infringement	Cooley LLP	ParkerVision v. Apple	Qualcomm	Complete			11-Feb-20	MDFL	3:15-cv-01477
Patent Infringement	Cooley LLP	ParkerVision v. Qualcomm	Qualcomm	Complete	Y		11-Feb-20	MDFL	6:14-cv-00687
IPR	Wolf Greenfield LLP	MediaTek v NTT	MediaTek	Complete	Y		2-Jul-20	USPTO	Re U.S. Patent Nos. 7,280,551 and 7,400,616
Patent Infringement	Mintz, Levin	Parus Holdings, Inc.	Parus Holdings	Complete			31-Aug-20	WDTX	Not specified
Patent Infringement	Venable LLP	Blitzsafe Texas LLC v. Fiat Chrysler Automobiles N.V., FCA US LLC et al.	Maserati North America Inc. and FCA US LLC	Complete	Y		8-Sep-20	EDTX	2:19-cv-00378-JRG
IPR	Wolf Greenfield LLP	Bose Corporation v. KOSS Corporation	Bose	Complete	Y		20-Oct-20	USPTO	U.S. Patent No. 10,368,155
Patent Infringement	Shearman & Sterling LLP	StratosAudio, Inc. v. Volkswagen Group of America, Inc	Volkswagen	Complete	Y		13-Jan-21	WDTX	6:20-cv-1131
Patent Infringement	Fish & Richardson P.C.	Ericsson Inc v. Samsung Electronics Co.	Samsung	Complete			11-Mar-21	ITC and EDTX	337-TA-1248 and No. 2:20-cv-380 (E.D. Tex.),
Patent Infringement	Dechert, LLP	IPCom v AT&T Inc, Verizon, Sprint	IPCom	Settled	Y		17-Mar-21	EDTX	PCom Gmbh & Co. KG v. AT&T Inc. et al., Case No. 2:20-cv-00322 (E.D. Tex.); IPCom Gmbh & Co. KG v. Verizon Communications Inc. et al., Case No. 2:20-cv-00323 (E.D. Tex.); and IPCom Gmbh & Co. KG v. Sprint Spectrum L.P. et al., Case No. 2:20-cv-00321 (E.D. Tex.)
Patent Infringement	Desmarais LLP	Cellspin Soft, Inc. v. Google Fitbit, Inc.	Google / Fitbit	Complete			1-Jun-21	NDCA	4:17-cv-05928-YGR
Patent Infringement	Sidley Austin LLP	WSOU v. Hewlett Packard	Hewlett Packard	Settled			4-Jun-21	WDTX	U.S. Patent Nos. 7,280,534; 7,386,630; 7,443,832; 7,519,056; 7,646,729; 8,462,774; and 9,398,629
Patent Infringement	DLA Piper LLP	Cellspin Soft, Inc. v. Nike Inc	Nike	Complete			28-Jul-21	NDCA	4:17-cv-05931-YGR
Patent Infringement	Harness Dickey	Cellspin Soft, Inc. v. Under Armour, Inc.	Under Armour	Complete			4-Aug-21	NDCA	4:17-cv-05932-YGR
Patent Infringement	Lamkin IP	Cellspin Soft, Inc. v. Garmin, Inc.	Garmin	Complete			6-Aug-21	NDCA	4:17-cv-05934-YGR

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Fish & Richardson P.C.	Cellspin Soft, Inc. v. Fossil, Inc.	Fossil	Complete			18-Aug-21	NDCA	4:17-cv-05933-YGR
Patent Infringement	Morrison & Foerster	Cellspin Soft, Inc. v. Nikon, Inc.	Nikon	Complete			23-Aug-21	NDCA	4:17-cv-05936-YGR
Patent Infringement	Fish & Richardson P.C.	Smart Mobile Technologies, LLC v. Samsung Electronics	Samsung	Complete			1-Oct-21	CDTX	6:21-cv-00701-ADA
Patent Infringement	Ruyak Cherian LLP	Bright Data Ltd. v. NetNut Ltd.	Bright Data	Complete	Y		7-Oct-21	EDTX	2:21-cv-00225-JRGRSP
Patent Infringement	Quinn Emanuel LLP	Verkada, Inc. v. Motorola Solutions Inc.	Verkada	Complete	Y	Y	25-Oct-21	ITC	Inv. No. 337-TA-1281
Patent Infringement	Mayer Brown LLP	Maxell, Ltd., v. Lenovo Group Ltd., Lenovo (United States) Inc., and Motorola Mobility LLC	Maxell	Complete			9-Nov-21	WDTX	6:21-cv-01169
Patent Infringement	Mayer Brown LLP	Maxell, Ltd., v. Lenovo Group Ltd., Lenovo (United States) Inc., and Motorola Mobility LLC	Maxell	Complete			9-Nov-21	ITC	Inv. No. 337-TA-1324
Patent Review		Collision Communications	Collision	Complete			1-Feb-22		
Patent Infringement	Kasowitz Benson Torres LLP	IV v GM	IV	Complete			18-Feb-22	WDTX	6:21-cv-01088-ADA
Patent Infringement	Kasowitz Benson Torres LLP	IV v Toyota	IV	Complete			18-Feb-22	WDTX	2:21-CV-00389-JRG-RSP
Patent Infringement	Kasowitz Benson Torres LLP	IV v Honda	IV	Complete			18-Feb-22	WDTX	2:21-CV-03090-JRG-RSP
Patent Infringement	LTL Attorneys LLP	Howlink Global LLC v. Verizon Comm'ns, et al.	Howlink	Complete			21-Mar-22	EDTX	22-cv-00040
Patent Infringement	LTL Attorneys LLP	Howlink Global LLC v. AT&T, Inc., et al.	Howlink	Complete			21-Mar-22	EDTX	22-cv-00042
Patent Infringement	Heim Payne Chorush LLP	Telecom Network Solutions v. AT&T	Telecom Network Solutions	Complete			20-Apr-22	EDTX	2:21-cv-00415-JRG,
Patent Infringement	Heim Payne Chorush LLP	Telecom Network Solutions v. Verizon,	Telecom Network Solutions	Complete			20-Apr-22	EDTX	2:21-cv-00416-JRG,
Patent Infringement	Heim Payne Chorush LLP	Telecom Network Solutions v. T-Mobile	Telecom Network Solutions	Complete			20-Apr-22	EDTX	2:21-cv-00418-JRG,
Patent Infringement	Baker Botts LLP	LG Electronics Inc. v. TCL Electronics Holdings Ltd. et al.,	LG Electronics, Inc.	Complete			17-May-22	EDTX	2:22-cv-00122
Patent Infringement	Ruyak Cherian LLP	Bright Data Ltd. Various IPRs	Bright Data	On Hold	Y		1-Jun-22	USPTO	IPR 2022-00861, IPR 2022-00862
Report	Norton Rose Fulbright US LLP	A Study of the IPlytics Platform and its Semantic Essentiality Score	Qualcomm	Complete			11-Sep-22	N/A	N/A
Patent Infringement	K&L Gates LLP	Competitive Access Systems, Inc. v. Oracle Corporation	CAS	Complete			23-Sep-22	EDTX	2:22-cv-00287

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Jones Day	BJ's Wholesale Club Holdings, Inc. v. Walmart Apollo, LLC	Walmart	Complete	Y		11-Nov-22	USPTO	IPR2022-01471, IPR2022-01528, IPR2022-01561, IPR2022-01563, IPR2022-01564
Patent Infringement	Ruyak Cherian LLP	Metacluster LT, UAB v. Bright Data Ltd.	Bright Data	On Hold	Y		1-Feb-23	EDTX	2:22-cv-11-JRG-RSP
Patent Infringement	BartlitBeck LLP	General Access Solutions Ltd. V. Verizon, et. al.	GAS	Complete			7-Feb-23	USPTO	IPR
Patent Infringement	Sterne, Kessler, Goldstein&Fox PLLC	Roku, Inc. v Dolby International AB	Roku	Complete			8-Feb-23	USPTO	IPR - '757 Patent
Patent Infringement	Susman Godfrey L.L.p.	Koninklijke KPN N.V. v Ericsson	KPN	Complete			7-Mar-23	EDTX	2:22-cv-282
Patent Infringement	Jones Day	The Talisman Group, LLC. v Light and Wonder (LNU Gaming, Inc)	LNU	Complete			14-Apr-23	USPTO	IPR
Patent Infringement	Mintz, Levin	Mullen Industries v Apple Inc.	Mullen	Complete	Y		3-May-23	USPTO	IPR
Patent Infringement	Baker Botts, LLP	AGIS Software Development, LLC v Samsung Electronics Co, Ltd.	Samsung	Complete			16-May-23	EDTX	2:22-cv-00263-JRG-ADA
Patent Infringement	Fish & Richardson P.C.	Entropic Communications, LLC v DISH Network Corp.	DISH	Complete	Y		30-Jun-23	USPTO	IPR
Patent Infringement	Russ August &Kabat	Headwater Research LLC	Headwater	Complete			8-Sep-23		
Patent Infringement	Russ August &Kabat	Cobblestone Wireless, LLC v. T-Mobile USA, Inc.,	Cobblestone	Complete	Y		1-Dec-23	EDTX	2:22-cv-477
Patent Infringement	Russ August &Kabat	Cobblestone Wireless, LLC v. Cellco Partnership d/b/a Verizon Wireless,	Cobblestone	Complete	Y		1-Dec-23	EDTX	2:23-cv-382
Patent Infringement	Anand & Anand	QCOM v Transsion (India - Anand & Anand)	Qualcomm	Complete			1-Dec-23	India High Court	
Patent Infringement	Anand & Anand	LG Electronics Inc. versus Vivo Mobile India Private Limited & Ors.	LG	Complete			12-Dec-23	Delhi High Court	CS. (Comm) 665 of 2023
Patent Infringement	twobirds, Licks Attorneys	QCOM v Transsion (Brazil, The Philippines, Indonesia)	Qualcomm	Complete			1-Feb-24		
Patent Infringement	Susnan Godfrey LLP	Pegasus Wireless Innovation LLC v. AT&T Inc. et al.	Pegasus	Complete	Y		7-Feb-24	ED TX	23-cv-638
Patent Infringement	Susnan Godfrey LLP	Pegasus Wireless Innovation LLC v. Verizon Comm. Inc. et al.	Pegasus	Complete	Y		7-Feb-24	ED TX	23-cv-640
Patent Infringement	Susnan Godfrey LLP	Pegasus Wireless Innovation LLC v. T-Mobile US, Inc. et al.	Pegasus	Complete	Y		7-Feb-24	ED TX	23-cv-639
Patent Infringement	King Spalding	Fleet Connect Solutions, LLC v. Peloton Interactive, Inc.	Peloton	Complete			14-Mar-24	WD TX	1:23-cv-00682
Patent Infringement	Kramer Alberti	Adaptive Spectrum and Signal Alignment, Inc. v. Charter Communications, Inc., et al.,	ASSIA	Complete			25-Apr-24	ED TX	2:24-cv-00124-JRG-RSP
Patent Infringement	Kramer Alberti	RavenWhite Licensing LLC v. The Home Depot, Inc. et al.,	RavenWhite	Complete			7-May-24	EX TX	
Patent Infringement	Mayer Brown	Powermat Technologies Ltd. v. Anker Innovations Ltd.	Powermat	Complete	Y		11-May-24	EX TX	5:23-cv-00052-RWS
Patent Infringement	Finnegan	DIRECTV, LLC v. Entropic Communications, LLC:	DirectTV	Complete	Y		30-Jun-24	USPTO	IPR2024-01064 (PTAB) , 01063, 01061,

Dr Tim A Williams Case History

Case Type	Firm	Case Name	Client	Status	Deposition	Trial Testimony	Engagement	Venue	Case Number(s)
Patent Infringement	Jones Day	Rally AG LLC v. Apple	Rally	On Hold			30-Oct-24	D Del	IPR2024-01446 and case 1-23-cv-01106
Patent Infringement	Fish	VideoAmp v Nielson	VideoAmp	Complete	Y		9-Dec-24	USPTO	IPRs
Patent Infringement	Mayer Brown	Powermat Technologies Ltd. v. Belkin International, Inc.	Powermat	Ongoing			10-Apr-25	CDCA	2:24-cv-2595=MEMF-PVC
Patent Infringement	Avantech Law	AutoConnect v various entities including Toyota, GM, Ford	AutoConnect	Ongoing			14-Nov-24		
Patent Infringement	Devlin	AX Wireless, LLC v. Sony, et al	AX Wireless	Complete	Y		30-Jan-25		
Patent Infringement	Quinn Emanuel LLP	Cloud Byte, LLC v Dell, Inc	Cloud Byte	Ongoing			3-Sep-24	EDTX	2:24-cv-00637-JRG
Patent Infringement	Fish & Richardson P.C.	DISH v. Entropic Communications, LLC:	DISH	Complete	Y		30-Jun-24	USPTO	
Patent Infringement	Mayer Brown	Maxell, Ltd. V. TCL Electronics Holdings Ltd.	Maxell	Complete	Y		10-Oct-24	CDCA	PTAB and 5:23-cv-00108-RWS-JBB
Patent Infringement	Cherian LLP	QPrivacy USA LLC v. Cisco Systems, Inc	Qprivacy	On Hold			30-Dec-24	EDTX	2:24-cv-855-JRG
Patent Infringement	Russ August &Kabat	XR Communications, LLC. v. AT&T Services, Verizon Comm.	XR	Complete	Y		27-Sep-24	EDTX	2:23-cv-202-JRG-RSP and 2:23-cv-470-JRG Consolidated
Patent Infringement	Sterne, Kessler, Goldstein&Fox PLLC	ISG v Dell, HP, Lenovo	ISG	Complete	Y	Y	1-Jun-25	ITC	337-TA-1429
Patent Infringement	Stinson	Competitive Access Systems, Inc. v. Apple Inc	CAS	Ongoing			17-Jun-25	NDCA	5-25-cv-04595, NDCA
Patent Infringement	Latham & Watkins	Estelgia LLC v ASUSTek, D-Link, Linksys	Estelgia	Complete	Y		28-Jul-25	ITC	337-TA-1454
Patent Infringement	Klarquist	Fleet Connect Solutions v Portable Multimedia (NextBase)	NextBase	OnHold			5-Nov-25		
Patent Infringement	Reichman	Malikie Innovations v Vantia SA	Malikie	Ongoing			20-Nov-25	EDTX	2:25-cv-00163-JRG-RSP
Patent Infringement	Russ August &Kabat	Cobblestone Wireless, LLC v. Apple Inc.,	Cobblestone	Ongoing			12-Jan-26	WDTX	7:24-cv-232-ADA