

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.

Petitioner

v.

KONINKLIJKE KPN N.V.

Patent Owner

Case IPR2023-00525

U.S. Patent 10,924,500

DECLARATION OF ZHI DING, Ph.D.

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I. Introduction

1. My name is Zhi Ding, and I have been retained by counsel for Patent Owner Koninklijke KPN B.V. (“Patent Owner”) as an expert witness to provide my objective, unbiased opinions on U.S. Patent 10,924,500 (“the ’500 Patent”). Specifically, I have been asked to consider the validity of the patent claims challenged (“Challenged Claims”) by Petitioner Ericsson Inc.’s Petition for *Inter Partes* Review (the “Petition”). I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called upon to do so, I would testify competently thereto.

2. I am being compensated for my time at my standard consulting rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter or on the pending litigation between Petitioner and Patent Owner.

3. My analysis here is based on my years of education, research, and experience, as well as my investigation and study of relevant materials, including those cited herein.

4. I may rely upon these materials, my knowledge and experience, and/or additional materials to rebut arguments raised by the Petition. Further, I may also

consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

5. My analysis of the materials produced in this proceeding is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

II. Background and Qualifications

6. I presently hold the title of Distinguished Professor in the Department of Electrical and Computer Engineering at the University of California, Davis. Before my appointment on July 1, 2020, I held the position of professor for the prior 23 years and have served as a faculty member at several United States universities for over 33 years. I am also a private technical consultant on various technologies related to information systems. In total, I have more than three decades of research experience on a wide range of topics related to data communications and signal processing.

7. I earned my Bachelor of Science degree in 1982 in wireless engineering from the Nanjing Institute of Technology (later renamed as Southeast University) in Nanjing, China. I earned my Master of Science degree in 1987 in electrical engineering from the University of Toronto in Toronto, Canada. I earned my Ph.D.

in 1990 in electrical engineering from Cornell University in Ithaca, New York.

8. My responsibilities as a Professor at University of California, Davis, include classroom instruction on various topics of communication systems and signal analysis, as well as mentoring undergraduate students and supervising graduate students in their research and development efforts on various topics related to digital communications. I have directly supervised such research and development works ranging from signal detection to wireless networking. As the chief academic advisor, I have also directly supervised the completion of over 20 Masters' theses and over 30 Ph.D. dissertations on various topics related to digital communications. I have served full time as a faculty member at three major research universities in the United States over the past 30 years, including Auburn University from 1990 to 1998, University of Iowa from 1999 to 2000, and University of California, Davis, from 2000 to present.

9. Since 1990, I have been selected as the principal investigator of multiple highly competitive federal and local research grants, including more than twenty major research projects supported by the National Science Foundation and two research projects funded by the U.S. Army Research Office. These competitive research projects focused on developing more efficient and effective digital communication transceivers, networks, and signal processing tools. I have also participated in several large-scale projects supported by the Defense Advanced

Research Projects Agency (DARPA) with teams of researchers. I have applied for, and received support from, other federal, state, and industry sponsors.

10. I have published over 210 peer-reviewed research articles in premier international journals, in addition to over 240 refereed technical articles at top international conferences on communications and information technologies. According to Google Scholar, my published works have been cited by over 13,000 times by peers. I also authored two books on communications technologies. My most recent book, coauthored with B.P. Lathi, is entitled, “Modern Digital and Analog Communication Systems,” 5th edition, and was published by the Oxford University Press in 2018. The 4th edition of this book (published in 2009) had been widely adopted as an introductory textbook to communication systems.

11. In addition to the over 450 published technical papers that have been cited over 16,000 times according to Google Scholar, I am also co-inventor of 4 issued U.S. patents on communication technologies.

12. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and was elevated to the grade of Fellow in January 2003 for contributions made in signal processing for communication. The IEEE is the world’s largest professional society of engineers, with over 400,000 members in more than 160 countries. The IEEE has led the development of many standards for modern digital communications and networking, most notably, the IEEE 802 series of network

standards. The IEEE Grade of Fellow is conferred by the Boards of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year does not exceed one-tenth of one percent of the total voting Institute membership.

13. I have served the IEEE in the following capacities:

- Chief Information Officer of the IEEE Communications Society from Jan. 2018 to present.
- Chief Marketing Officer of the IEEE Communications Society from Jan. 2020 to present.
- General Chair of the 2016 IEEE International Conference on Acoustics, Speech, and Signal Processing, the flagship conference of the IEEE Signal Processing Society.
- Chair of the Steering Committee for the IEEE Transactions on Wireless Communications from 2008 to 2010.
- Distinguished Lecturer of the IEEE Communications Society from January 2008 to December 2009.
- Technical Program Chair of the 2006 IEEE Globecom, one of two flagship annual IEEE Communication Society conferences.
- Distinguished Lecturer of the IEEE Circuits and Systems Society from 2004 to 2005.

- Associate Editor of the IEEE Transactions on Signal Processing from 1994 to 1997 and from 2001 to 2004.
- Member of the IEEE Statistical Signal and Array Processing for Communications Technical Committee from 1993 to 1998.
- Member of the IEEE Signal Processing for Communications Technical Committee from 1998 to 2004.

14. In 2012, I received the Wireless Communications Technical Committee Recognition Award from the IEEE Communications Society, an award given to a person with a high degree of visibility and contribution in the field of “Wireless and Mobile Communications Theory, Systems, and Networks.” I received the 2020 Education Award from the IEEE Communications Society. According to the Society, this award “recognizes distinguished and significant contributions to education within the Society’s technical scope.”

15. I have also served as a technical consultant for the telecommunication industry. For example, in 1995 I consulted for Analog Devices, Inc., on the development of the first generation DOCSIS cable modem systems. I have also consulted for other companies, including Nortel Networks and NEC US Laboratories. I worked as a visiting faculty research fellow at NASA Glenn Research Center in 1992 and at U.S. Air Force Wright Laboratory in 1993. I have served on multiple review panels of the National Science Foundation to evaluate competitive

research proposals in the field of communication. I have also reviewed a large number of research proposals at the request of the National Science and Engineering Research Council (NSERC) of Canada as an expert panelist from 2010 to 2013, and also at the request of the Research Grant Council (RGC) of Hong Kong as an external reviewer.

16. I have served as an expert witness or consulting expert on a number of matters related to intellectual property, mostly in the arena of telecommunications, including cellular communications, Wi-Fi technologies, Bluetooth, and optical communications. For example, since 2007, I have been engaged to work on various litigations involving cellular, WiFi, Bluetooth, and optical communication networks. Many of my technical expert works related to the standard essentiality of patents with respect to the 3GPP 2G/3G/4G/5G technical specifications, the IEEE 802.11 standards, and the Bluetooth standards. I have provided testimonies at court trials or hearings in a number of jurisdictions, both in the United States and internationally. I have submitted declarations to PTAB as expert on a number of *inter partes* reviews of challenged patents.

17. Further experience and a complete list of my publications are presented in my curriculum vitae. I understand that a copy of my curriculum vitae is attached as Exhibit 2002.

III. Legal Standards

18. I am not an attorney. For purposes of this declaration, I have been informed about certain aspects of the law that are relevant to my opinions, as set forth below.

A. Patentability

19. I understand that for an invention claimed in a patent to be valid and patentable, it must be, among other things, new and not obvious in light of what was known and came before it. That which was known or came before the invention claimed is generally referred to as “prior art.”

20. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can be shown to “anticipate” the claim. Second, the prior art can show that the claim was obvious to a person of ordinary skill in the field of the invention at the time the invention was made.

21. I understand that, for a patent claim to be “anticipated” by the prior art, each and every element or requirement of the claim must be found, expressly or inherently, in a single prior art reference.

22. It is my understanding that whether a claimed invention is obvious is a question of law, with underlying factual inquiries that are determined from the perspective of a person of ordinary skill in the art at the time of the claimed invention.

23. It is my understanding that a claimed invention is obvious if the

differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art (a “POSITA”).

24. It is my understanding that obviousness requires consideration of the following underlying factual inquiries:

- determining the scope and content of the prior art
- ascertaining the differences between the claimed invention and the prior art;
- resolving the level of ordinary skill in the art; and
- evaluating objective evidence or “secondary considerations” of non-obviousness, such as commercial success, long-felt but unresolved needs, failure of others, industry praise, and unexpected results.

25. It is my understanding that a reference must be analogous art to the claimed invention in order to be properly considered for use in an obviousness inquiry. It is my understanding that a reference is analogous art to the claimed invention if:

- the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or
- the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed

invention).

26. It is my understanding that whether a reference is reasonably pertinent turns on how the problem faced by the inventor is reflected, either explicitly or implicitly, in the specification.

27. It is my understanding that the following are exemplary rationales that may support a conclusion of obviousness:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known techniques to improve a similar method or product in the same way;
- Applying a known technique to a known method or product ready for improvement to yield predictable results;
- Obvious to try – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to

combine prior art reference teachings to arrive at the claimed invention.

28. In addition to the above, I understand that a person of ordinary skill in the art may resort to logic, judgment and common sense available to him or her at the time of the invention to find a claim feature obvious, even if the prior art relied on does not explicitly state or teach that feature. I understand that when common sense is relied on to find a feature obvious, the reasoning for that conclusion must be articulated with sufficient clarity.

29. I also understand that a patent claim is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. An obviousness determination requires finding both that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so. I understand that it is important to be careful not to allow hindsight reconstruction of references to produce the claimed invention, without any explanation as to how or why the references would be combined to produce the claimed invention.

30. Regarding “objective evidence” or “secondary considerations,” I understand that for such evidence to be relevant to the obviousness of a claim, there must be a causal relationship (called a “nexus”) between the claim and the evidence. I also understand that such objective evidence may include: commercial success of

products covered by the patent claims; long-felt need for the invention; failed attempts by others to solve the problem addressed by the invention; copying of the invention by others in the field; unexpected results achieved by the invention; praise of the invention; the taking of licenses under the patent by others; expressions of surprise by experts and those skilled in the art at the making or use of the invention; and that the patentee proceeded contrary to the accepted wisdom of the prior art.

31. I understand that a person of ordinary skill is also a person of ordinary creativity. I further understand that the obviousness analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, but instead can take into account “ordinary innovation” that does no more than yield predictable results, which are inferences and creative steps that a person of ordinary skill in the art would be understood to employ.

32. I understand that sometimes it will be necessary to look to interrelated teachings of multiple patents and publications; the effects of demands known to the relevant field or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art. I understand that all these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

B. Prior Art

33. I understand that for purposes of this proceeding, prior art includes

patents and printed publications in or outside the United States before the effective filing date of the claimed invention. I also understand that prior art includes U.S. patents, published U.S. patent applications, and published international applications (pursuant to the Patent Cooperation Treaty) that themselves have an effective filing date before the effective filing date of the claimed invention, as long as they name another inventor.

34. I also understand that prior art may include any public disclosure, including any products in public use, on sale, or otherwise available to the public, before the effective filing date of the claimed invention. I understand that information that constitutes prior art generally must be information that was publicly disclosed before the effective filing date of the claimed invention. I understand that there may be exceptions to what is prior art but have been instructed that they are not relevant for purposes of my opinions here.

C. Inherency

35. I understand that if a prior art reference does not expressly set forth a particular claim element, the prior art may still disclose that element if it is “inherent” in its disclosure. To establish inherency, it is my understanding that evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference. It is my understanding that inherency may not be established by probabilities or possibilities. In other words, it is my understanding

that the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency.

36. I understand that under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform a claimed method, then the method will be considered to be anticipated by the prior art device. I also understand that when the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process.

D. Person of Ordinary Skill In The Art

37. I understand that “a person of ordinary skill in the art” or POSITA is a hypothetical person who is presumed to have known the relevant art at the time of the invention. I understand that the term “person having ordinary skill in the art” or POSITA is sometimes used synonymously. Such a person would necessarily have the capability of understanding any scientific and engineering principles applicable to the pertinent art.

38. I understand that factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the following:

- a. the educational level of the inventor;
- b. the type of problems encountered in the art;
- c. prior art solutions to those problems;

- d. the rapidity with which innovations are made;
- e. the sophistication of the technology; and
- f. the educational level of active workers in the field.

39. I understand that a person of ordinary skill in the art is not a real person, but rather is a hypothetical individual having the qualities reflected by the factors above. This hypothetical person has knowledge of all prior art in the relevant field as if it were arranged on a workshop wall and takes from each reference what it would teach to a person of ordinary skill in the art.

40. I understand that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton. In many cases a person of ordinary skill will be able to fit the teachings of multiple prior art references together like pieces of a puzzle.

41. I understand that a person of ordinary skill in the art can collaborate with one or more other persons of ordinary skill in the art for one or more aspects with which the other person may have superior expertise, experience, and/or knowledge.

E. Claim Construction

42. It is my understanding that claim construction, or the interpretation of the claims of a patent, is ultimately a question of law. I have been informed that claim terms are generally presumed to carry their ordinary and customary meaning.

However, I understand that a patent applicant is his own lexicographer and is entitled to provide alternate definitions of words in common usage, but if the patent applicant uses a term that is in common usage without providing an alternate definition, then that term should generally be understood as having its common meaning.

43. I understand that a person of ordinary skill in the art is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent specification and the “file history” of the patent developed during examination by the Patent Office.

44. I understand that the claims, the specification, and the file history are referred to as “intrinsic evidence,” and are to be read as a person of ordinary skill in the art at the time of the invention would have done at the time of the alleged invention.

45. In addition to the intrinsic evidence, I understand that the court or tribunal may also consider other relevant evidence, which is called “extrinsic evidence,” concerning relevant scientific principles, the meaning of technical terms, and the state of the art. Such evidence includes the testimony of expert witnesses. Although extrinsic evidence may be used to resolve ambiguities that may exist after reviewing the intrinsic evidence, I understand that extrinsic evidence cannot be used to contradict a claim construction that is clear from the intrinsic evidence.

46. I understand that some claims are independent, and that those

independent claims are complete by themselves. Other claims refer to these independent claims, or other dependent claims, and are “dependent” on those claims. The dependent claims include all of the limitations of the claims on which they depend.

IV. Level of Ordinary Skill in the Art

47. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of one of ordinary skill at the time of the alleged invention, which I have been asked to assume is November 22, 2012.¹ However, I have not been asked to provide an opinion on the level of ordinary skill in the art at the time of the invention. For purposes of this Declaration only, I have instead been asked by Patent Owner to apply the definition of a person having ordinary skill in the art proposed by Petitioner:

a person of ordinary skill in the art (“POSITA”) would have had a degree in electrical engineering or a similar discipline, with at least two years of relevant industry or research experience, including designing or implementing network systems. A POSITA would also have familiarity with the wireless standards and protocols relating to subscriber management. This definition is approximate, and more education may substitute for industry experience or vice versa.

Pet., 17.

¹ I have not been asked to analyze or determine whether November 12, 2012 is the correct priority date.

48. All references to a person having ordinary skill in the art (“POSITA”) are made pursuant to that definition. However, my application of that definition is not a reflection of my agreement or disagreement with it. I reserve the right to provide my own opinion on the level of ordinary skill should there be further proceedings. Even before the filing date of the ’500 Patent, my level of skill in the art far exceeded that of a POSITA. I am thus qualified to provide opinions concerning what one of ordinary skill would have known and understood at that time, and my analysis and conclusions herein are from the perspective of one of ordinary skill as of that date.

V. Opinions on Claim Construction

49. I understand that claim terms are given their plain and ordinary meaning as understood by a POSITA. I have applied the plain and ordinary meaning of all claim terms at issue. To the extent I believe an explanation of the plain and ordinary meaning may be helpful, I have provided it where appropriate below.

VI. Opinions on Validity

A. Whether Eisl discloses “counting” a “certain predetermined signal” as claimed.

50. Independent claim 1 recites a telecommunication network arranged to “*count* in the core network a number of occurrences of a *certain predetermined signal* associated with the mobile telecommunications device,” where said signal “*indicates handover* of the mobile telecommunications device” and “represent[s] an

interaction between network devices ... for *normal processing of signals*.” Similarly, independent claim 11 recites “*counting* ... a number of occurrences of a *certain predetermined signal* associated with the mobile telecommunications device,” where the signal “*indicates handover* of the mobile telecommunications device” and “represent[s] an interaction between network devices in the core network for *normal processing of signals*.”²

51. Eisl does not disclose counting certain predetermined signals as claimed. Eisl teaches counting “actions” based on “collected data” indicative of the action, such as a handover. Beyond this, Eisl does not go into any further detail as to how the counted actions are being determined. *See, e.g.*, Ex. 1004 ¶¶ [0048] (“Those changes are detected by a network element based on the *data provided and/or collected* from other network elements and/or the mobile device(s).”), [0058] (discussing a network element that “collects *information about changes* to the connection of one or more mobile device.”) [0059] (discussing policy rules that are “used to check from *the collected data* if frequent changes to the connection of one or more mobile devices are detected”), [0062] (discussing “reporting *information* related to detected frequent changes”). In other words, Eisl only vaguely teaches counting “handover actions” based on collected *data* from the mobile device and/or

² All emphasis has been added to the quotes in my declaration, unless indicated otherwise.

network elements. As further explained below, a POSITA would thus conclude that Eisl does not include the requisite level of specificity to teach or disclose counting *certain predetermined signals* as claimed.

52. A POSITA would recognize that there is a well-known distinction between a *certain predetermined signal* amenable to *normal processing* of signals, and *data* generally. Within the context of the '500 Patent, the claimed *certain predetermined signal* would be understood by POSITA to be a waveform that carries data in a format specified in a technical specification, such as the 3GPP protocol. Ex. 2003, 32 (explaining that signals are electromagnetic waveforms that carry data); Ex. 2004, 3 (defining “signal” as “[a]ny electrectric quantity, such as voltage, current or frequency, that can be used to transmit information”). This is because the claimed signal is a “certain predetermined” signal that represents an interaction “for normal processing.” The specification of the '500 Patent provides several examples of such certain predetermined signals amenable to normal signal processing, such as attach request signals and handover signals used in a GSM or 2G network, UTMS or 3G network, or LTE or 4G network. Ex. 1001, 3:16-34 (discussing normal signal processing of an attach request), 7:5-20 (discussing the normal processing of signals in a 2G, 3G and 4G networks), 7:28-30, 8:27-30 (“In parallel with the *normal processing* of the attach requested the network performs the following steps.”)). In contrast to the claimed predetermined signal, *data* is

information conveyed *by* a signal that is not limited to *any specific format*. Thus, the claims are focused on counting a specific type of signal, where Eisl only vaguely refers to counting actions based on collected data.

53. A POSITA would have understood that counting a certain predetermined signal as claimed provides a major advantage over generally assessing collected data to identify and count handovers. For one, the counting of predetermined signals as claimed allows handovers to be identified more quickly, which is important when attempting to identify malicious activity in real time. For example, by counting predetermined signals amenable to normal processing, as soon as the number of times a predetermined signal exceeds a limit, the core network can make a determination on possible malicious behavior. On the other hand, counting collected data generally may lead to detection latency because said data may not be analyzed as quickly. Second, relying on predetermined signals takes advantage of the normal, established signaling interaction procedures used in telecommunications networks to determine the number of handovers. Rather than having to generate and monitor a new type of signal or data that is not compatible with “normal processing” to indicate handovers, the claims monitor the signals that have already been predetermined as part of the standards governing telecommunications networks. Consequently, the claimed invention relies on the existing signaling structure of a telecommunications network to more efficiently and quickly count handover actions.

54. Notably, the '500 Patent does disclose embodiments where the number of handover events for a mobile station is determined based on *data* generally. *See, e.g., id.* at 2:14-30. However, a POSITA would understand that the claims are not directed toward those embodiments. Rather, the claims are directed toward embodiments that count a ***certain predetermined signal*** that are subject to the ***normal processing of signals***. *See, e.g., id.* at 4:29-34 (“[T]he network monitors for, and detects when the frequency of a ***certain predetermined signal*** ... becomes too high.”); *Id.* at 7:24-30, 8:25-30 (“In parallel with the ***normal processing of*** the attach request the network performs the following steps.”).

55. A POSITA would have further understood that the prosecution history reflects a distinction between simply monitoring *data* and counting ***certain predetermined signals*** that are amenable to the ***normal processing of signals***. More specifically, the independent claims originally recited a telecommunication network “arranged to monitor an occurrence in the *data* streams of the data of the first type and is arranged to register when the occurrence exceeds a level indicating acceptable behaviour.” Ex. 1005, 155, 157. Based on this concept of monitoring data for occurrences, the Examiner issued several office action rejections. *Id.* at 170-181 (1st Office Action Rejection), 192-197 (1st Set of Amended Claims), 356-368 (2nd Office Action Rejection), 382-387 (2nd Set of Amended Claims), 413-425 (3rd Office Action Rejection), 435-440 (3rd Set of Amended Claims), 451-463 (4th Office Action

Rejection), 471-476 (4th Set of Amended Claims), 507-517 (5th Office Action Rejection), 535-541 (5th Set of Amended Claims); 557-568 (6th Office Action Rejection); 587-593 (6th Set of Amended Claims); 610-623 (7th Office Action Rejection). It was not until after the seventh office action that the claims were amended to eliminate the language requiring the monitoring of *data* and instead reciting that the telecommunications network is arranged to “count in the core network a number of occurrences of a ***certain predetermined signal*** associated with the mobile telecommunications device” and the “for ***normal processing*** of signals” language. *Id.* at 717-722 (7th Set of Amended Claims). The claims were then allowed with some additional Examiner-suggested amendments that the number of occurrences is “of the ***certain predetermined signal***” and further requiring that the predetermined signal “indicates ***handover*** of the mobile telecommunications device.” *Id.* at 740-748. A POSITA would thus understand that the claims were amended to more specifically require the counting of a ***certain predetermined signal*** that indicates ***handover*** and is subject to ***normal processing*** of signals.

56. The Petition states that that Eisl teaches counting a ***certain predetermined signal*** as claimed based on several citations to Eisl. However, in none of the citations provided by the Petition does Eisl actually disclose that claim limitation. I address each citation in turn below.

57. The Petition discusses paragraph [0047] of Eisl and specifically points

to Eisl’s “example of using a threshold for the number of handover actions in a policy rule.” Pet. at 32-34 (citing Ex. 1004 ¶¶ [0086]-[0087]). A POSITA would have understood that these disclosures merely teach that changes to a connection may be “detected” and that thresholds for determining when such changes are “abnormal” may be established. Ex. 1004 ¶ [0047], [0086]-[0087]. The cited disclosures do not disclose how the detection occurs, including whether said detection involves counting a *certain predetermined signal* associated with the mobile device or whether any such signal is amenable to *normal processing*. Therefore, a POSITA would not have understood these cited portions of Eisl to disclose counting certain predetermined signals as claimed.

58. The Petition also states that:

Eisl describes the use of policy rules which may be implemented in the core network, to detect abnormal behavior of mobile telecommunications devices—including embodiments where the system counts instances of connection changes and/or handover actions by generating parameters *from data* indicating the connection changes and/or handover actions (*i.e.*, predetermined signals) associated with the mobile device and compares them to a threshold.

Pet., 34 (citing Ex. 1004 ¶¶ [0038], [0076], [0077], [0079]–[0080]). A POSITA would have agreed that Eisl teaches determining the number of handover actions “from *data*.” However, that is not the same as counting *certain predetermined signals* that are associated with the mobile device and are subject to *normal signal*

processing. As explained before, a POSITA would not have understood a reference to determining the number of handover actions “from data” to be the same as the more specific requirement of counting certain predetermined signals as claimed.

59. The Petition further states that “Figure 4 shows that the network device *data* (i.e., signals) is used to generate network related parameters (4-10) including the number of completed actions (4-20) such as handovers, which are used for determining if policy rules are violated (4-2).” *Id.* at 35. The Petition follows this statement with the conclusion that “the number of signals indicating ‘the number of actions’ are counted to create a parameter.” *Id.* at 36. Here, the Petition mistakenly confuses “network device *data*” for the *certain predetermined signals* as claimed. But Eisl’s discussion of Figure 4 merely teaches that the number of handover actions can be determined from “network related *data*” (element 4-5). The discussion does not teach or suggest that the number of handover actions is determined by counting *predetermined signals* associated with the mobile device or that the alleged signals are amenable to *normal processing* of signals.

60. The Petitioner also states that “the number of *signals* indicating ‘the number of actions’ are counted to create a parameter....” *Id.* (citing Ex. 1004 ¶ [0083]–[0084], [0089]–[0090])). However, Eisl only teaches that the number of actions is determined based on network related *data* and that the number of *actions* is counted. As the Petition more accurately states in the following paragraph: “Eisl

specifically explains that the ‘number’ of *completed actions* or connection changes are determined because *they are ‘counted.’*” *Id.* at 37 (citing Ex. 1004, ¶ [0078]). However, Eisl only vaguely teaches counting actions (not certain predetermined signals) and identifying those actions based on collected *data*, not from counting *certain predetermined signals* associated with the mobile telecommunications device and amenable to *normal processing of signals*. Stated another way, Eisl is simply silent on how it determines the number of handovers, other than to ambiguously say it relies on “data” from the mobile device and/or other network elements indicating a planned or completed handover. A POSITA would thus have concluded that Eisl does not provide the requisite level of specificity to teach or disclose counting *certain predetermined signals* as claimed.

B. Whether Eisl renders obvious “counting” a “certain predetermined signal” as claimed.

61. The Petition asserts that “counting is an implementation detail that would have been obvious to a POSITA at the time of the ’500 Patent.” *Id.* The Petition is mistaken for the reasons discussed below.

62. The Petition alleges that “a POSITA would have been motivated to use counting to generate the number of, for example, signals indicating completed actions to reliably generate that information.” *Id.* However, the Petition does not explain how or why Eisl’s disclosed method of analyzing data to determine the number of completed actions is in any way “unreliable” or how counting *certain*

predetermined signals as claimed would somehow improve reliability over Eisl’s method, which collects data relating to a handover action and then counts the number of handover events. As the Petition itself acknowledges, Eisl teaches that it is able to determine the number of actions (e.g., handovers) from data indicating the handover actions to detect malicious activity. *Id.* at 34 (citing Ex. 1004 ¶¶ [0038], [0076], [0079]–[0080]). Nothing in Eisl suggests that its method is in any way unreliable or inaccurate or that Eisl recognized that counting predetermined signals as claimed could improve reliability or accuracy. As such, there is no factual basis for the assertion that a POSITA would have been motivated to “use counting” of predetermined signals as claimed to “reliably generate” signals indicating completed actions.

63. Petitioner also contends that “estimating the number of signals indicating an action would be less reliable and introduce unnecessary complication.” *Id.* at 37. But a POSITA would recognize that there is no teaching or suggestion in Eisl that it “estimates” the number of signals indicating an action to determine the number of actions. Given that Eisl does not teach or disclose using this allegedly “less reliable” method that may “introduce unnecessary complication,” there is no basis for a POSITA to have found it obvious to count predetermined signals as claimed to address this nonexistent problem. While the Petition refers to “other methods,” it does not explain or elaborate on what these “other methods” might be,

or how counting predetermined signals as claimed could potentially improve them. As such, this alleged motivation is simply too vague and conclusory for me to reasonably opine on.

64. The Petition also asserts that “POSITA would have understood that counting would have been the most obvious and natural way to arrive at a ‘number’ of performed or planned events such as handovers.” *Id.* at 38 (citing Ex. 1004, ¶¶ [0077], [0079]). However, there does not appear to be a dispute that Eisl “arrives at” the number of “actions” (handovers). The issue is that the number is based on a vague reference to collected *data*; Eisl does not teach that it is based on counting ***certain predetermined signals*** as claimed. In other words, the issue is not whether it would be obvious to arrive at *the number of actions* but whether it would be obvious to count ***certain predetermined signals*** as claimed. Petitioner’s obviousness analysis mistakenly focuses on the former issue, not the latter.

65. The Petition further states that a “POSITA would further have had a reasonable expectation of success in generating the number of actions through counting signals indicating associated actions because counting is routine and well-known practice.” *Id.* at 37-38. Even if the statement is accepted as true, it does not provide a motivation or reason for a POSITA to count predetermined signals as claimed. The statement is directed towards whether there would have been a reasonable expectation of success in modifying Eisl to count certain predetermined

signals as claimed, and the statement incorrectly assumes a POSITA would have already been motivated to make the modification in the first place.

C. Whether Eisl discloses counting a certain predetermined signal that “represent[s] an interaction between network devices in the core network.”

66. The ’500 Patent claims also require a certain predetermined signal that “represent[s] an *interaction between network devices in the core network* for normal processing of signals.” Ex. 1001, claims 1, 11. A POSITA would have understood that an “interaction between network devices” refers to an interaction between at least two network devices. A POSITA would also have understood that the at least two network devices must be “in the core network.”

67. It is unclear how Eisl is alleged to satisfy this limitation based on the Petition, which I have reviewed in detail. While the Petition attempts to address the claim requirement that the *counting* of certain predetermined signals must occur “in the core network” (Pet., 40-42) and is “for normal processing of signals” (Pet., 39-40), the Petition does not appear to address the “interaction between network devices in the core network” limitation. It is thus unclear based on the Petition how this limitation is alleged to be met by Eisl.

68. This lack of clarity is particularly problematic given that a “handover” refers to the transferring of a mobile device from one base station (or cell) to another base station (or cell). Ex. 1001, 2:52-64 (explaining handovers). As the ’500 Patent

accurately explains, neither the mobile device nor base stations are “in the core network” as claimed. *Id.* at 6:61-7:4 (explaining that the base station is not part of the core network, but transmits signals *to the core network*)). Specifically, base stations are part of the Radio Access Network (“RAN”) and are not part of the core network, while the mobile device itself is not part of the core network. Given this, it is unclear how the Petition contends that Eisl discloses counting predetermined signals that represent interactions between *multiple* network devices *in the core network* for normal processing of signals.

VII. Conclusion

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code. I further declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: July 10, 2023

By: _____

Dr. Zhi Ding, Ph.D.
Davis, California



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