

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner,

v.

INTELLECTUAL VENTURES II LLC,

Patent Owner.

Case No. IPR2025-00219

U.S. Patent No. 9,706,500

**DECLARATION OF DR. GARY LOMP IN SUPPORT OF
PATENT OWNER'S PRELIMINARY RESPONSE**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PROFESSIONAL BACKGROUND.....	2
III.	RELEVANT LEGAL STANDARDS	7
IV.	SPECIFICATION OF ‘500 PATENT	11
A.	Overview	11
B.	Terminology	14
1.	Fading and Fast Fading.....	14
2.	Channel	16
V.	CHALLENGED CLAIMS OF THE ‘500 PATENT	16
VI.	A PERSON HAVING ORDINARY SKILL IN THE ART	17
VII.	PRIOR ART RELIED ON IN PETITION	17
A.	Andersson.....	18
B.	Khan	21
C.	Zeira.....	24
VIII.	GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS	25
A.	The Petition’s Proposed Combination of Andersson and Khan Fails to Disclose or Suggest Key Claim 11 Limitations and Would Require Impermissible System-Level Redesigns Incompatible with Obviousness Principles.	25
1.	Ground 1 Fails Because the Proposed Combination of Andersson and Khan Would Require Impermissible Redesigns Contrary to 35 U.S.C. § 103.....	25
a.	Andersson and Khan, Alone or in Combination, Do Not Disclose or Suggest “Receiv[ing], on a Single Physical Channel, an Allocation of an Uplink Resource and the Multi-Level TPC command . . .,” as Required by Claim 11	26
(1)	Andersson’s Dedicated Channel Architecture	26

(2)	Khan’s Shared Channel Architecture is Fundamentally Incompatible.....	27
(3)	Technical Incompatibility Precludes the Proposed Combination	29
(4)	Flaws in Dr. Kotzin’s Opinion	30
b.	Purported Benefits Do Not Justify the Combination	31
B.	Independent Claim 11 Is Not Obvious Over the Alleged Combination of Andersson and Khan	34
C.	Independent Claim 17 Is Not Obvious Over Andersson and Khan for at Least the Same Reasons as Claim 11	35
D.	Dependent Claims 15, 16, 21 and 22 Are Not Obvious Over Andersson and Khan for at Least the Same Reasons as Their Respective Base Claims	35
IX.	Ground 2 – Claims 12, 13, 18 and 19 Are Not Obvious Over Andersson, Khan, and Baker Under 35 U.S.C. § 103	35
X.	Ground 3 – Claims 14 and 20 Are Not Obvious over Andersson, Khan and Dick.....	36
XI.	Ground 4 – Claims 11, 15-17, 21 and 22 Are Not Obvious Over Zeira, Khan, and Tong Under 35 U.S.C. § 103	36
A.	Zeira and Khan, Alone or in Combination, Do Not Disclose or Suggest “a Single Physical Channel” That Carries “an Allocation of an Uplink Resource and a Multi-Level Transmit Power Control (TPC) Command”	37
1.	No Motivation to Combine Zeira and Khan	37
a.	Zeira Teaches a Dedicated Control Channel With No Support for Scheduling Grants	38
b.	Khan Teaches a Shared Time-Multiplexed Control Channel—Not a Dedicated One	38
c.	The Petition Uses Ex. 1012 to Map Dedicated Channels (DCHs) to Physical Channels, Which Actually Provides Support For The Proposition that Zeira Would Not Provide “Dynamic Scheduling” On the Same Channel as The TPCs.....	39

d.	Zeira and Khan Operate on Fundamentally Incompatible Channel Architectures	40
e.	No Teaching or Suggestion That Scheduling Grants Are Transmitted on Zeira’s Dedicated Channel	41
2.	Purported Benefits of the Proposed Combination Do Not Justify the Structural Incompatibility Between Zeira and Khan	43
3.	The Proposed Modification Frustrates the Intended Purpose of Zeira	44
4.	No Reasonable Expectation of Success	44
B.	Independent Claim 11 Is Not Obvious Over the Alleged Combination of Zeira, Khan, and Tong	45
C.	Independent Claim 17 Is Not Obvious Over Zeira, Khan, and Tong for at Least the Same Reasons as Claim 11	46
D.	Dependent Claims 15, 16, 21 and 22 Are Not Obvious Over Zeira, Khan, and Tong for at Least the Same Reasons as Base Claims 11 and 17	46
XII.	Ground 5 – Claims 12, 13, 18 and 19 Are Not Obvious Over Zeira, Khan, Tong and Baker Under 35 U.S.C. § 103	47
XIII.	Ground 6 – Claims 14 and 20 Are Not Obvious Over Zeira, Khan, Tong and Dick Under 35 U.S.C. § 103	47
XIV.	Conclusion	47
XV.	DECLARATION	49

I, Dr. Gary Lomp, do hereby declare:

I. INTRODUCTION

1. I am making this declaration at the request of Intellectual Ventures II, LLC (“Intellectual Ventures”) in the matter of the *Inter Partes* Review (“IPR”) proceedings before the United States Patent and Trademark Office (“USPTO”) of U.S. Patent No. 9,706,500 (“the ‘500 Patent”) to provide expert technical opinions with respect to the ‘500 Patent.

2. I am being compensated for my work in this matter at my standard hourly rate of \$450 for such consulting services. My compensation in no way depends on the outcome of this case, and I have no financial interest in the outcome.

3. In preparing this Declaration, I considered the following materials, the subject matter of which are all within the scope of my education and professional experience:

- The ‘500 Patent, Ex. 1001;
- The Petition for *Inter Partes* Review of U.S. Patent No. 9,706,500 (“Petition”);
- the Declaration of Dr. Kotzin;
- U.S. Patent No. 6,334,047 (Ex. 1009)(“Andersson”);
- U.S. Patent Appln. Pub. No. 2004/0190485 (Ex. 1005)(“Khan”); and
- U.S. Patent No. 6,600,772 (Ex. 1004)(“Zeira”).
- Harri Holma & Antti Toskala, WCDMA for UMTS: Radio Access

II. PROFESSIONAL BACKGROUND

4. Based on my qualifications, education, knowledge, expertise, experience, and work background, I believe I am qualified to offer opinions relating to the technology described in the '500 Patent. Exhibit 2002 is a copy of my current *curriculum vitae* ("CV"), detailing my education and experience. Additionally, the following overview of my background pertains to my qualifications for providing expert testimony in this matter.

5. I am currently an Adjunct Professor in Wireless Communications at the NYU Tandon School of Engineering and President of TekTaktiks, a research and expert consulting company. My job duties include directing and performing research in, and technical evaluation of, advanced communication system design, especially new cellular technologies. I have over 45 years of experience in the field of wireless telecommunications, including advanced military communications systems, commercial satellite, WiFi and cellular systems research and development. I have over 20 years of experience in providing expert services in the field of wireless telecommunications. I hold Ph.D., Master's and Bachelor's degrees in Electrical Engineering, all from the Polytechnic Institute of New York (now part of NYU Tandon School of Engineering).

6. I am a named inventor on over 100 issued U.S. Patents in the field of wireless telecommunications. Most of these patents pertain to wireless communication, including communication system architecture, communication system signal processing and communication system protocols.

7. In addition to my technical experience in the field of wireless communications systems, I have been a principal and executive in multiple wireless technology corporations. In the late 1980s and early 1990s, I was Vice President and Chief Scientist at SCS Mobilecom, a wireless company that developed new technology based on spread spectrum technologies and advanced signal processing (DSP) techniques. Following the acquisition of SCS Mobilecom by InterDigital Communications, Corporation in 1992, I held various leadership roles at InterDigital, including General Manager of the Wireless Products Business Unit and Executive Vice President and Chief Technology Officer, where I helped develop 2G and 3G technologies. After InterDigital, I served in leadership positions at several wireless startups, including Symbol Technologies (where I led the Wide Area Wireless technology division), LayerOne Wireless Technologies Inc. (where I served as CEO) and incNetworks (where I served as CTO). I am also the Founder and President of The TekTacktics Group, Inc. a private company that has provided expert services and telecommunications consulting in the Telecommunications industry for the past 15 years.

8. In terms of commercial research and development (R&D) experience, I have worked extensively on the design and optimization of radio frequency (RF) communications systems for enhanced capacity and service coverage. A further object of my work has been to realize systems that are “converged” or are ingredients in a converged network concept. Convergence means the technical integration of heterogeneous services (such as voice, data, and multimedia) and heterogeneous radio technologies (macrocellular, microcellular, WiFi, cordless phone) into a seamless operating unit. This work requires cross functional design in which the respective heterogeneous technologies are made to interoperate.

9. During this career activity, I have had first-hand knowledge and exposure to numerous discussions, and debates in support of the advancement of new wireless technologies and paradigms. These new technologies addressed various air interface methods, including orthogonal frequency division multiplexing (OFDM) and Orthogonal Frequency Division Multiple Access (OFDMA), a closely related method of utilizing the OFDM format to provide shared access. My current research includes the presently evolving 5G cellular concept, which incorporates, among other things, MIMO-OFDM/OFDMA processing. As outlined above, my involvement in wireless R&D has also drawn me to fundamental system architecture issues and philosophies including the functional portioning of the overall wireless network. I have had the benefit of collaboration and debate with numerous top tier innovators,

from many industry-leading organizations in the field. In particular, I have detailed knowledge and recollection of the atmosphere surrounding the ongoing wireless technology revolution that began in the late 1980s and continues to the present day, including the period surrounding the present invention, and also including attempts by interested parties across the globe to promulgate and protect preferred ideas and intellectual property.

10. With respect to the technologies relevant to the '500 Patent, my experience includes over 20 years of research and development in the area of CDMA cellular telephone technology and systems, beginning at the very start of the commercialization of previously classified spread spectrum techniques, with which I had also a decade of prior experience. During that period of my career I had roles ranging from Senior Member of Technical Staff and Senior Principal Engineer to Chief Scientist and Chief Technology Officer heading a team of over 100 engineers in the development of the earliest WCDMA prototypes. I am a named inventor on 7 US Patents pertaining specifically to power control techniques in wireless systems, as well as many additional patents that cover all aspects of CDMA and post-CDMA wireless technology and systems. In addition to direct application to power control in cellular systems, in which numerous challenges and tradeoff analyses are required (as exemplified by the scope and depth of research and invention of concern in the current matter), I also had the benefit (earlier in my career) of 2 years of intensive study and

optimization of Delta Modulation for voice digitization, a project for which I was recognized for creating “the best 16 kilobit per second voice coder yet to be heard”. Many of the core issues that occur in power control of a wireless transmission over a randomly and often drastically varying radio channel are found in the application of delta modulation to voice encoding. An example is the well-known problem of choosing a step size and optimally varying the step size in order to cope with the dichotomous nature of the quantity being controlled (received radio frequency power level) or tracked (voice). In both applications, as dissimilar as they seem, the quantity of interest undergoes changes from near quiescence to rapid variation with large swings of level that challenge any algorithm attempting to stabilize or track said quantity.

11. To place the experience I have in the context of innovation and invention, I have been involved throughout my career in the evolution of many other basic radio communication technologies since their inception, such as MIMO, Multiuser Detection, and FEC coding advances, such as Turbo and LDPC, and soft output decoders such as the Soft Output Viterbi Algorithm (SOVA). A significant portion of the engineering design work I have performed has entailed the introduction of new techniques to provide capabilities that had not existed previously, such as a recently deployed novel baseband processor capable of robust demodulation and combining of signal components received on two antennas,

respectively, at very low signal to noise ratios. Most recently, I have designed an advanced form of OFDM in which the impairments due to channel dispersion are mitigated in both the time domain (as in conventional OFDM) and the frequency domain (which is an Achilles heel of OFDM). This achievement is the result of many years of perseverance culminating in the discovery of a mathematical tool of broad applicability (*to wit*, Simultaneous Approximate Singular Value Decomposition). Previously, a similar tenacity-fueled accomplishment produced the first and only complete closed-form theory of equalization of offset modulation formats (e.g. O-QPSK) in multipath channels, again a result of a persistent creative attack on the problem. In a word, I am well versed and well aware of the nuances of innovation and the toils of invention.

12. My CV contains further details on my education, experience, publications, and other qualifications to render an expert opinion in this case, Ex. 2002.

III. RELEVANT LEGAL STANDARDS

13. I have been asked to provide my opinion as to whether certain claims of the '500 Patent are obvious over US Patent No. 6,334,047 to Andersson et al. (hereinafter "Andersson") and U.S. Patent Appln. Pub. No. 2004/0190485 to Khan (hereinafter "Khan"). In addition, I have been asked to review whether the claims are

obvious over U.S. Patent No. 6,600,772 to Zeira et al. (U.S. Patent Appln. Pub. No. 6,600,772), Khan and U.S. Patent No. 6,529,741 to Tong et al. (hereinafter “Tong”).

14. The opinions I am expressing in this report involve the application of my knowledge and experience to the evaluation of certain references with respect to the ‘500 patent. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Volpe Koenig, who represent Intellectual Ventures, to provide me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply current principles related to patent validity to my analysis.

15. I understand that an IPR is a proceeding before the USPTO for evaluating the patentability of an issued patent’s claims based on prior-art patents and printed publications.

16. I understand that the claims of a patent are reviewed from the point of view of a hypothetical person of ordinary skill in the art (“POSITA”) at the time of the filing of the patent. The “art” is the field of technology to which a patent relates.

17. I understand that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to construe the claims.

18. I understand that, in this proceeding, Petitioners have the burden of proving that the challenged claims of the ‘500 Patent are unpatentable by a

preponderance of the evidence. I understand that “preponderance of the evidence” means that a fact or conclusion is more likely true than not true.

19. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can “anticipate” the claim. Second, the prior art can render the claim “obvious” to a POSITA. I understand that for an invention claimed in a patent to be patentable, it must not be anticipated and must not be obvious based on what was known before the invention was made. For purposes of this Declaration only, I have applied the definition of a POSITA proposed in the Petition.

20. I understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each and every limitation of the claim as construed by the court is found, either expressly or inherently, in a single prior art reference, such as a publication or patent, that predates the claimed subject matter. I also understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the

claimed invention and the prior art, and (4) any objective evidence of non-obviousness (i.e., “secondary considerations”).

21. I also understand that, when a party alleges obviousness based on a combination of references, that party should identify a reason why a POSITA would have been motivated to combine the asserted references in the manner recited in the claims and to explain why a POSITA would have had a reasonable expectation of success in making such combinations.

22. I understand that an obviousness analysis permits the application of “common sense” in examining whether a claimed invention would have been obvious to a POSITA. For example, I understand that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. And I understand a party asserting obviousness should still provide a specific motivation to combine the references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

23. I understand that one indicator of non-obviousness is when a prior art reference leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent’s result, or otherwise indicates that a seemingly inoperative device would be produced.

IV. SPECIFICATION OF '500 PATENT

A. Overview

24. U.S. Patent No. 9,706,500, titled “Power Control in a Wireless Network” and assigned to Intellectual Ventures II LLC, discloses an innovative hybrid power control architecture designed to improve uplink power control performance in wireless communication systems, with particular applicability to CDMA-based technologies such as UTRA TDD. Ex. 1001, 1:23-26, 5:49-50 13:5-8.

25. The patent addresses fundamental limitations of conventional power control schemes—namely, open-loop and closed-loop approaches—which have long been used to manage uplink transmit power in mobile networks. Ex. 1001, 2:16-51, 6:1-8:24. Open-loop power control schemes enable user equipment (UE) to estimate path loss based on the received strength of a known downlink beacon. Ex. 1001, 2:16-27. While this method offers rapid responsiveness to short-term variations in the channel (e.g., fast fading), it fails to account for interference seen at the base station and assumes a symmetry between uplink and downlink channels that may not exist in real-world conditions. Ex. 1001, 2:16-27, 7:42-64.

26. In contrast, closed-loop power control schemes operate by having the network monitor uplink signal quality—typically measured in terms of signal-to-noise-and-interference ratio (SNIR)—and issue binary transmit power control (TPC) commands (e.g., ± 1 dB) to incrementally adjust the UE's transmit power. Ex. 1001,

2:27-36, 6:50-57. These schemes offer precise adjustment capabilities that reflect actual interference conditions at the receiver but suffer from delayed convergence in dynamic environments, where many sequential commands are required to effect significant power changes. Ex. 1001, 2:36-43, 7:65-8:16.

27. The invention disclosed in the '500 Patent proposes a hybrid control mechanism that intelligently combines open-loop estimation with closed-loop feedback. Ex. 1001, 2:44-51, 8:17-32. In the open-loop component, the UE determines uplink path loss by measuring a downlink beacon signal transmitted at a known power level and calculating a “partial power” based on the measured path loss. Ex. 1001, 8:52-67. In parallel, the closed-loop component allows the network to measure uplink SNIR, compare it against a dynamically updated SNIR target (managed by an outer loop using observed error metrics such as block error rate), and transmit TPC commands to the UE. Ex. 1001, 10:6-10. The UE accumulates the TPC commands over a frame. Ex. 1001, 9:20-38, 10:11-15. In the combined closed-open-loop method, the UE determines its transmit power by essentially integrating the accumulated TPC commands with the calculated partial power for the current frame and adding in “adjustment factors.” Ex. 1001, 9:20-43, 10:21-33.

28. An advancement of the patented invention is the use of multi-level TPC commands in the closed-loop feedback. Ex. 1001, 9:9-10. Traditional systems utilize binary (up/down) TPC instructions with fixed step sizes, typically ± 1 dB. Ex. 1001,

7:65-8:3. This binary limitation restricts responsiveness in fast-changing environments. The patented system, by contrast, allows the network to transmit TPC commands that represent a range of predefined adjustment magnitudes—enabling larger or more nuanced transmit power changes in a single command. Ex. 1001, 7:65-8:9, 9:9-10. This substantially improves convergence speed and controls granularity, particularly under fast fading or sudden path loss conditions.

29. Another important enhancement disclosed in the ‘500 Patent is the integration of TPC commands with uplink resource allocation data on a single channel, improving signaling efficiency and reducing latency. Ex. 1001, 12:65-13:8. This design ensures that the UE receives consistent, timely control instructions, which is essential in environments where rapid adaptation to changing interference or fading conditions is required.

30. In sum, the ‘500 Patent discloses a robust and adaptive uplink power control methodology that overcomes the respective shortcomings of open- and closed-loop control schemes. Ex. 1001, 2:44-51, 8:17-24. By integrating fast, beacon-based path loss estimation with fine-grained, multi-level feedback control—and further optimizing command delivery via a unified signaling channel—the invention provides a significant improvement in managing uplink SNIR, reducing interference, and enhancing overall system performance, particularly in mobile and interference-prone wireless environments. Ex. 1001, 8:25-31, 9:9-10, 12:65-13:8.

B. Terminology

1. Fading and Fast Fading

31. In the context of wireless communications, and specifically the ‘500 Patent, the term “fading” refers to the fluctuation in the strength of a radio signal as it propagates through the environment from the transmitter (such as user equipment, or UE) to the receiver (typically a base station), or vice versa. Ex. 1001, 4:34-44, 5:14-15. These fluctuations are primarily the result of the signal taking multiple paths through the environment due to reflection, diffraction, and scattering caused by obstacles such as buildings, vehicles, trees, and terrain. *Id.* As the various versions of the signal travel different paths, they arrive at the receiver at slightly different times and with different phases. Depending on how these signal components align when they arrive, they can interfere either constructively—resulting in a stronger signal—or destructively—weakening or even canceling the signal. This interference pattern causes the amplitude, phase, and sometimes the frequency of the received signal to vary, a phenomenon referred to as fading.

32. Fading can be broadly categorized into several types, but in the context of this patent, the most relevant form is fast fading, also known as small-scale fading. Fast fading refers to rapid changes in signal strength that occur over very short time intervals (often milliseconds or less) or small physical distances, typically due to user mobility or dynamic changes in the propagation environment. *Id.* This contrasts with

slow fading (also called shadowing), which occurs more gradually and is caused by large-scale obstructions like buildings blocking the line-of-sight path. Fading can also be classified as flat fading, where the entire signal bandwidth is affected equally, or frequency-selective fading, where only portions of the bandwidth are impacted depending on the multipath delay spread.

33. The patent focuses on the challenges that fast fading poses for power control in uplink transmissions. Ex. 1001, 8:28-30. Because the channel conditions can change rapidly due to user movement or environmental shifts, the transmit power must be adapted quickly to maintain an acceptable signal-to-noise-and-interference ratio (SNIR) at the receiver. Ex. 1001, 6:47-63, 8:25-32, 9:1-9. This is particularly difficult for closed-loop power control schemes, which depend on the network measuring the uplink SNIR and sending transmit power control (TPC) commands back to the UE—typically in fixed increments such as 1 dB. *Id.* Since these adjustments are limited in size and subject to transmission delay, closed-loop control often cannot respond fast enough to compensate for deep fades or sudden increases in path loss. In contrast, open-loop power control—which allows the UE to estimate the path loss independently based on beacon signals transmitted at known power levels from the base station—can react more quickly to fast fading, since it does not rely on delayed network feedback. *Id.*

2. Channel

34. In the context of the ‘500 Patent, the term “channel” refers to the communication path over which radio signals are transmitted between a network entity, such as a base station, and a UE, such as a mobile phone or other wireless device. A wireless channel can be thought of as the radio link between the transmitter and receiver. In the ‘500 Patent, channels are discussed in the context of both the uplink (from UE to base station) and the downlink (from base station to UE). Ex. 1001, 1:32-34, 1:53-56, 4:29-31. Further, the ‘500 Patent specifically discloses, for the combined open-closed loop scheme, “a new physical channel on downlink [that] may be used to carry fast allocation and scheduling information to a user: Ex. 1001, 12:16-13:8. This channel may also be used to carry TPC commands. *Id.* Alternatively, instead of a new channel, “the combined scheme may be applied to existing channel types (dedicated or shared uplink physical channels) for UTRA TDD as well as to other TDD systems.” *Id.*

V. CHALLENGED CLAIMS OF THE ‘500 PATENT

35. Petitioner challenges independent Claims 11 and 17, and dependent claims 12-16 and 18-22 of the ‘500 Patent. Independent Claim 11 is representative, and recites:

11. A user equipment (UE) comprising:

a transmitter;

a receiver; and

a processor, operatively coupled to the transmitter and the receiver;
and

the processor and the receiver are configured to receive, on a single physical channel, an allocation of an uplink resource and a multi-level transmit power control (TPC) command;

wherein the processor is further configured to determine a transmission power level based on a value of the multi-level TPC command out of a plurality of potential values for the multi-level TPC command;

wherein the plurality of potential values for the multi-level TPC command includes at least two values up or at least two values down;
and

wherein the processor is configured to have the transmitter transmit an uplink signal on the allocated uplink resource at the determined transmission power level.

VI. A PERSON HAVING ORDINARY SKILL IN THE ART

36. For purposes of the institution decision only, I do not contest the definition of a person of ordinary skill in the art (“POSITA”) proposed in the Petition. Petition, 14:4-11. I reserve the right to contest Petitioner’s proposed definition of a POSITA if a trial is instituted.

VII. PRIOR ART RELIED ON IN PETITION

37. In Ground 1, Petitioner challenges independent claims 11 and 17, and certain dependent claims, as allegedly obvious over US Patent No. 6,334,047 to Andersson et al. (hereinafter “Andersson”) and U.S. Patent Appln. Pub. No.

2004/0190485 to Khan (hereinafter “Khan”). In Ground 4, Petitioner challenges independent claims 11 and 17, and certain dependent claims, as allegedly obvious over U.S. Patent No. 6,600,772 to Zeira et al. (U.S. Patent Appln. Pub. No. 6,600,772), Khan and U.S. Patent No. 6,529,741 to Tong et al. (hereinafter “Tong”). The remainder of the grounds address dependent claims only. Independent Claim 1 and dependent Claims 2-10 are not challenged.

A. Andersson

38. Andersson describes a technique for enabling fast and efficient adaptation of transmit power control in wireless systems. The reference is particularly focused on varying the step size and type of power control scheme used based on changing radio conditions, while minimizing signaling overhead. Ex. 1009, 10:27–31. This is achieved by “transmitting a single bit value with the transmit power control command,” which I understand to refer to a power control indicator (PCI) that signals which of multiple predefined power control behaviors the UE should follow. Ex. 1009, 10:27–31. From a wireless systems perspective, this approach enables the network to signal a “very fast power control type adjustment” to the UE “without much increase in overhead,” which is important in environments where fast fading or rapid mobility demand quick adaptation. Ex. 1009,10:31-39

39. Andersson also describes the transmission format used to deliver the TPC and power control indicator bits to the UE. These values are transmitted on the

Dedicated Physical Control Channel (DPCCH), a channel uniquely assigned to an individual UE. Ex. 1009, 9:12–16. In my experience, such a dedicated channel enables the network to issue frequent, per-UE-specific commands, including fast power control signaling without delay or contention.

40. As a general matter, regarding dedicated channels, etc., it is well-known in the art, at least as far back as 2G Digital Cellular, and even in Analog Cellular, to use **separate channels**, both at the Physical Layer (PHY) and Higher Layers (e.g., Logical Channels such as RLC Link Control Layer, RRC, etc.) to support signaling and control transmission between **individual** users (UE's) and the Access Network (**dedicated channels**), on the one hand, and between the Access Network and multiple UE's (**shared channels**) on the other hand. In the first case, only the intended UE demodulates and decodes (or transmits) the signal. In the second case, an entire set of UEs (possibly all) can demodulate a shared channel transmitted from the base station or transmit to a base station using a shared channel. In the dedicated case, frequency, time, and code resources are allocated to a single UE, preventing other UE's from receiving the dedicated channel. In the shared case, additional methods, namely multiplexing methods, must be added to organize the shared channel usage into non-interfering parts. The relevant aspect of the dichotomy is that only single UE's can receive a DCH signal. When a dedicated channel is used to transmit information to the UE, that information is packaged into a data payload carried within the physical

"container" of a well-defined discrete transmission. Thus, two time slots are not a single discrete transmission; they comprise two such transmissions, even when intended/transmitted for a single UE. Another distinguishing characteristic of a dedicated channel is that it is allocated for a specific user and is deallocated when that user no longer requires it. In more picturesque language, the channel is "nailed up" during the time it is allocated to the user, and the resources are unavailable to other users. Note, however, that two dedicated channels may be assigned to the same user, at least in principle. They may carry different information at different times and have frequencies (recurrence rates, not radio frequencies) of transmission. It is also logically possible to opportunistically, or conditionally, based on user operational state, utilize a dedicated channel to convey signaling information to a user when such information is ready for transmission. Such opportunistic use of a dedicated channel may decrease the need for the user to access shared resources (channels that are shared and that, therefore, have variable demand and load). Such use of a dedicated channel does not change the nature of the channel from "dedicated" to some other type.

41. The format of the DPCCH is illustrated in FIG. 5 of Andersson (reproduced below). As shown, the DPCCH is divided into 72 frames spanning 720 ms, with each 10 mS frame consisting of 16 time slots of 0.625 mS duration. Each time slot includes a pilot field, a TPC field (increase, decrease, or maintain), a power control indicator, and other bits. Ex. 1009, 9:16–22. Andersson does not define the

“other bits” nor does even hint at what those bits could be. It is important to note that Andersson also teaches a common channel over which the base station transmits “common signaling.” Ex. 1009, 8:10.

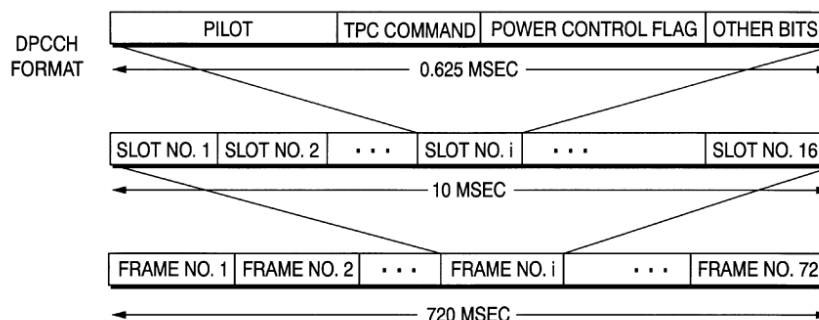


Fig. 5

B. Khan

42. Khan is directed to mechanisms for delivering control information—such as scheduling grants—for reverse link (i.e., uplink) packet access in a wireless communication system. See Ex. 1005, ¶ 11. Unlike systems such as described by Andersson, which rely on dedicated control channels (such as the Dedicated Physical Control Channel, or DPCCH) to transmit Power Control (TPC) commands to user equipment (UE), Khan focuses on architectures that leverage shared control channels to perform this function.

43. Khan explains that legacy voice-based systems traditionally used dedicated links between a base station and individual wireless units. See Ex. 1005, ¶ 4. However, as wireless networks evolved to accommodate bursty and delay-tolerant

data traffic—such as Internet applications—resource management in the uplink has become a significant design consideration. In this context, Khan observes that dedicated links may no longer be necessary, and that both uplink and downlink control channels can instead be shared among multiple UEs. See Ex. 1005, ¶ 5. Under this model, UEs contend for access to shared resources, with base stations managing uplink scheduling based on system-wide constraints, including received signal power and inter-cell interference. *Id.*

44. Khan identifies a specific problem that arises in time-multiplexed systems supporting reverse link packet access. In such systems, the forward link (FL) may use a time-slot structure that makes it difficult to allocate persistent or code-multiplexed channels for control signaling. See Ex. 1005, ¶¶ 11, 43. Consequently, Khan proposes mechanisms to transmit control information—including scheduling grants and TPC bits—over shared channels that align with the slot-based nature of the system. See Ex. 1005, ¶ 43.

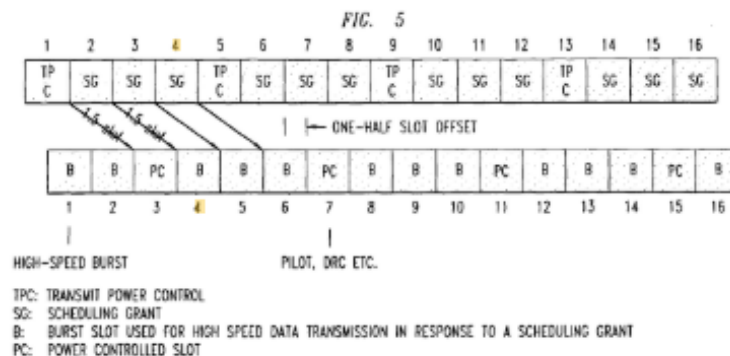
45. The detailed description of Khan presents two exemplary embodiments for delivering such control information to UEs:

- Using Orthogonal Walsh Covers (Ex. 1005, ¶¶ 45–47):

In this approach, each active UE is assigned a unique MAC index. These MAC indices are transmitted in bursts of 64 chips and can convey up to 6 bits of control information. To simultaneously support scheduling grants and TPC

bits, orthogonal Walsh codes are used to separate the information streams. In practical terms, this embodiment treats TPC and scheduling grant information as being transmitted over separate physical channels. See Ex. 1005, ¶¶ 37–41, 47.

- Using a TDD Channel Structure (Ex. 1005, ¶ 47 and FIG. 5):
In this embodiment, the forward link uses a time-division multiplexed structure where control information is distributed across different timeslots. For example, as illustrated in FIG. 5, TPC bits are transmitted in slots 1, 5, 9, and 13, whereas scheduling grants are sent in the intervening slots. In this manner, although both types of control information are sent over the same shared physical channel, they are separated in time rather than by code. The UE responds by transmitting in designated slots that are tied to its received scheduling grant. See Ex. 1005, FIG. 5.



46. Thus, Khan distinguishes itself by enabling TPC and scheduling control over shared media, rather than relying on dedicated physical control channels. This

design allows for scalable and efficient use of limited radio resources, particularly in environments characterized by dynamic user activity and asymmetric data demands.

C. Zeira

47. Zeira describes combined open loop and closed loop power control in a wireless TDD (Time Division Duplex) communication network. *See* Ex. 1004, FIG. 4; 3:25–26. The combined closed/open loop power controller 108 resides in a "transmitting station" 52, which can be either a user equipment (UE) or a network-side entity, such as a base station. Ex. 1004, FIG. 1004, 3:22-39.

48. With respect to the transmission of control information, Zeira, like Andersson, relies on dedicated control channels. Zeira explicitly states that a closed loop power control command b_{TPC} is typically transmitted via a dedicated channel established between the receiving station and the transmitting station. *See* Zeira, 4:27–30; 7:28–30. Thus, each UE is assigned a dedicated control channel for receiving power control commands from the base station, consistent with legacy UMTS architectures that prioritize link-specific reliability and latency. *See* Section A *supra*.

49. In sum, Zeira teaches a flexible power control mechanism that dynamically combines open and closed loop elements, with the ability to fall back to closed loop-only operation as needed. However, the transmission of power control information remains tied to dedicated channels, like Andersson, distinguishing Zeira

from later systems that leverage shared channels for improved scalability and efficiency.

VIII. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

A. The Petition's Proposed Combination of Andersson and Khan Fails to Disclose or Suggest Key Claim 11 Limitations and Would Require Impermissible System-Level Redesigns Incompatible with Obviousness Principles.

50. In Ground 1, Petitioner asserts that Claims 11, 15-17, 21 and 22 are obvious under 35 U.S.C. § 103 based on a purported combination of Andersson and Khan. In my opinion, the asserted ground is deficient for several technical reasons.

1. Ground 1 Fails Because the Proposed Combination of Andersson and Khan Would Require Impermissible Redesigns Contrary to 35 U.S.C. § 103

51. First, Petitioner has failed to establish a sound technical motivation to combine Andersson with Khan. The two references operate on fundamentally different control architectures, and integrating their teachings would require a substantial reengineering of Andersson's system—far beyond what is permissible under obviousness jurisprudence. Second, Petitioner relies heavily on conclusory assertions by its expert, Dr. Kotzin, both to fill in gaps where the cited references are silent and to justify the combination, rather than pointing to specific disclosures in the prior art.

a. Andersson and Khan, Alone or in Combination, Do Not Disclose or Suggest “Receiv[ing], on a Single Physical Channel, an Allocation of an Uplink Resource and the Multi-Level TPC command . . .,” as Required by Claim 11

52. The Petition asserts that the combination of Andersson and Khan renders obvious the claim feature requiring the UE to receive, on a single channel, both scheduling information and power control information that includes a multi-level TPC command. *See* Petition, 28:2-10. In my professional opinion, this argument reflects a misunderstanding of the fundamental differences between the channel types and signaling structures disclosed in Andersson and Khan. Moreover, the cited references are technically incompatible and cannot reasonably be combined to achieve the functionality required by Claim 11 of the '500 Patent.

53. Petitioner argues that a person of ordinary skill in the art (POSITA) would have been motivated to transmit both the TPC command and uplink scheduling grant on Andersson's dedicated physical control channel (DPCCH), using techniques allegedly taught by Khan. Petition, 20:10–15. The rationale advanced is that doing so would represent a predictable use of prior art elements and improve Andersson's system 'in the same way' Khan improves shared-channel systems.

54. This rationale, however, ignores key distinctions in channel architecture between the two references.

(1) Andersson's Dedicated Channel Architecture

55. Andersson discloses that TPC commands are transmitted on a dedicated physical control channel (DPCCH) assigned to each UE. As shown in FIG. 5 of Andersson, each 0.625 ms slot of the DPCCH includes several fixed fields: a TPC command, a pilot, a power control indicator bit, and an “other bits” field. See Ex. 1009, 9:12–22; FIG. 5. Andersson does not specify the content of the “other bits.”

56. Despite this silence, Petitioner speculates that a POSITA would have understood that the “other bits” could carry scheduling information, citing Khan as support. Petition, 22:13–17. This suggestion, however, is technically unsupported, for the reasons explained below. The only suggestion anywhere that the “other bits” could be “scheduling information” is the specification of the ‘500 Patent, which is impermissible hindsight under 35 U.S.C. § 103.

(2) Khan’s Shared Channel Architecture is Fundamentally Incompatible

57. Khan describes a channel model fundamentally different from that of Andersson. In particular, Khan teaches the use of a shared control channel, where a base station multiplexes control information—including scheduling grants and TPC commands—for multiple UEs. See Ex. 1005, ¶ 5. Khan’s scheduling structure is illustrated in FIG. 5 and comprises a time-multiplexed frame in which different slots are dedicated to different types of control data: some slots carry TPC commands (e.g., slots 1, 5, 9, 13), while others carry scheduling grants (e.g., slots 2–4, 6–8, 10–12, 14–16). Ex. 1005, ¶¶ 11, 43, 47.

58. Each of these control signals is directed to a different UE that listens on the shared channel, and the slots themselves are allocated according to type and timing constraints specific to the shared nature of the channel. For example, a UE that receives a scheduling grant in slot 2 is expected to transmit in slot 3. See Ex. 1005, ¶ 47 and FIG. 5.

59. This is in stark contrast to Andersson's dedicated DPCCH architecture, in which all control information in a given slot is addressed exclusively to a single UE, and every slot in the DPCCH frame structure carries all control fields (TPC, pilot, power control flag, and "other bits") simultaneously. See Ex. 1009, FIG. 5.

60. An important distinction is that Andersson teaches both dedicated channels and a common channel. Ex. 1009, 8:1-16. The petition does not explain why it is more likely that the alleged combination of Andersson with Khan would send scheduling information on the dedicated channel as Andersson's "other bits" rather than on Andersson's already established shared channel on which scheduling information is sent in Khan.

61. In general, historically, the dynamics of TPC and resource Scheduling have nothing to do with one another. TPC is only relevant when resources are in active use. What changes from this conventional wisdom, if anything, is that the uplink packet transmission dynamics are sporadic and it would be beneficial to have knowledge of both the resources to use and the power level to use when the uplink

packet event occurs. However, the suggestion that these two concepts would naturally be combined on the same channel using Andersson's "other bits" presumes a "magical" sentience in which the system "knows" both the scheduled transmission resources (which it does) and the appropriate power level, which is unlikely unless there is a more specific context in which TPC update along with scheduling information are simultaneously relevant. The notion of on demand resource utilization with on demand power level prescription (without any other context) is fallacious. The transmission of TPC and scheduling together must be predicated on a context, and that context comes from the '500 Patent, not from any a priori motivation or expectation.

(3) Technical Incompatibility Precludes the Proposed Combination

62. Given these architectural differences, a POSITA would not find it technically feasible—or even logical—to incorporate Khan's shared-channel scheduling mechanisms into Andersson's dedicated-channel framework without significantly reengineering the frame structure. Khan's system relies on shared slots and inter-UE coordination, while Andersson's DPCCH assumes an isolated, per-UE control channel. Simply put, Khan's control signaling methods are tailored for a shared environment and are not compatible with Andersson's per-slot, per-user DPCCH design.

63. Any attempt to graft Khan's shared scheduling grant mechanism into Andersson's dedicated DPCCH would require a substantial redesign of the DPCCH frame format, its timing, and the way in which control information is addressed and interpreted by the UE. Such a modification goes far beyond a mere "predictable use," and certainly does not improve Andersson's system 'in the same way' Khan improves shared-channel systems, instead would amount to creating an entirely new system architecture.

64. Andersson's opportunistic inclusion of "other bits" is not in the spirit of synchronized command/indication and subsequent response/action taught by Khan. Khan's FIG. 5 shows a deterministic relationship between slot contents in the downlink and uplink that reflects a rigid time offset and explicit signals/commands. The entire system timing and heartbeat of Khan hinges on the disclosed timing of and location of TPC and Scheduling signals. Anderson does not match this, and to import this structure into Andersson would require redesign of the Andersson system. In addition to the architectural difference between Andersson and Khan's system, there is a difference in the scope of the TPC commands themselves. In Khan, the scope of the TPC is a slot, whereas in Anderson, the scope of a TPC is a frame.

(4) Flaws in Dr. Kotzin's Opinion

65. Petitioner's expert, Dr. Kotzin, opines that a POSITA would need only "the technique, not the structure" from Khan to implement the claimed feature in

Andersson. See Ex. 1003, ¶ 64. I respectfully disagree with this assessment. The “technique” described in Khan—namely, delivering scheduling grants and TPCs on the same channel—is inseparable from its shared-channel structure. Khan explicitly distinguishes its approach from those that use dedicated links, acknowledging that its methods are motivated by the unique demands of shared-channel access. See Ex. 1005, ¶¶ 4–5. Ignoring this context and selectively borrowing only the outcome (i.e., co-delivery of control information), while discarding the mechanism, is not a sound basis for a 35 U.S.C. § 103 combination.

b. Purported Benefits Do Not Justify the Combination

66. Petitioner also identifies several purported benefits of the proposed combination, such as reduced signaling latency, simplified architecture, and support for a larger number of active UEs. Petition, 21:2-13. However, these benefits are predicated on the assumption that the proposed combination is technically feasible, which it is not. For example, Khan’s ability to support more active UEs arises specifically from its use of shared channels—not from adding scheduling information to a DPCCH. To realize that benefit, the DPCCH would need to be converted to a shared channel—something not suggested or supported by either reference. Andersson in fact already discloses a common channel, which is more likely to carry the scheduling information than the DPCCH, given that Khan is limited to shared channels.

67. In conclusion, Andersson and Khan operate on fundamentally incompatible architectural models—dedicated versus shared control channels—and no reasonable modification of Andersson using Khan’s techniques can produce the functionality required by Claim 1 without a substantial redesign of the system. Neither reference discloses, suggests, nor enables receiving both scheduling information and power control information “on a single channel” in the manner required. Accordingly, the asserted combination cannot support a finding of obviousness.

68. The Petition asserts that “not only would utilizing Khan’s technique in Andersson’s system have been advantageous, but a POSITA would have also found the combination predictable and would have had a reasonable expectation of success.” Petition, 22:2-4. In support of this assertion, the Petition cites two general statements from Andersson: (1) that certain signaling techniques are omitted to avoid obscuring the invention, and (2) that Andersson relies on “well-known CDMA techniques to distinguish between the various mobile station and base station communications.” Petition, 2:4-13.

69. However, in my expert opinion, neither of these statements supports a reasonable expectation of success in combining Andersson’s dedicated control channel framework with Khan’s shared, time-division multiplexed control signaling.

70. First, the Petition fails to account for the fact that Andersson’s DPCCH is inherently a dedicated channel—that is, each instance of the DPCCH is assigned to

and serves a single UE only. Thus, distinguishing among multiple users using CDMA techniques (e.g., through orthogonal codes) is unnecessary in this context, because user separation is already handled through dedicated channel allocation. Therefore, the reference to "well-known CDMA techniques" in Andersson is not applicable to the control channel architecture at issue.

71. Second, Khan does not rely on CDMA for distinguishing between UEs on its control channel. Rather, Khan explicitly acknowledges the use of time-domain multiplexing—not code-domain separation—as the means of organizing its forward link control signaling. As stated in Khan: “A code-multiplexed scheduling grant channel, in some cases, may not be used in the CDMA2000 HRPD. This may be attributed to the realization that the [forward link] may employ a time-multiplexed slot structure.” Ex. 1005, ¶ 5.

72. Khan further explains that this time-division multiplexing is necessary to accommodate its reverse link packet access scheme. See Ex. 1005, ¶¶ 11, 43. The use of time-multiplexed slots allows the system to interleave scheduling grants and TPC commands directed to different UEs within the same shared channel, an approach that is fundamentally distinct from the always-on, per-UE DPCCH structure disclosed in Andersson.

73. Given these architectural and functional differences, there is no basis for a POSITA to expect that Khan’s shared, time-slotted signaling mechanism could be

seamlessly integrated into Andersson's dedicated channel framework without significant system-level redesign. Simply put, Andersson is not designed to support time-multiplexed signaling to multiple UEs on a single control channel, and Khan's system cannot be adapted to Andersson's DPCCH without fundamentally altering its structure, timing, and resource allocation logic.

74. Therefore, in addition to failing to provide a proper motivation to combine these references, the Petition also fails to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success in doing so. The combination as proposed is neither straightforward nor predictable, and is not supported by the disclosures of either reference.

B. Independent Claim 11 Is Not Obvious Over the Alleged Combination of Andersson and Khan

75. For the reasons discussed above—including the absence of any disclosure or suggestion of an indication that TPC accumulation is enabled, the incompatibility of the channel structures in Andersson and Khan, and the lack of a reasonable expectation of success—Claim 11 is not rendered obvious by the proposed combination of Andersson, Baker, and Khan. Each reference addresses a distinct control signaling framework, and their integration would require substantial modifications not suggested by the cited art.

C. Independent Claim 17 Is Not Obvious Over Andersson and Khan for at Least the Same Reasons as Claim 11

76. Although Claim 17 is not identical to Claim 11, it recites similar features and is subject to the same core limitations—most notably, those concerning the receipt of scheduling and power control information on a single channel and the use of TPC accumulation. For the same technical reasons that Claim 11 is not obvious over the combination of Andersson, Baker, and Khan, Claim 17 likewise is not obvious over this combination.

D. Dependent Claims 15, 16, 21 and 22 Are Not Obvious Over Andersson and Khan for at Least the Same Reasons as Their Respective Base Claims

77. Claims 15 and 16 depend from Claim 11, and Claims 21 and 22 depend from Claim 17. Because both independent Claims 11 and 17 are not rendered obvious by the alleged combination of Andersson and Khan, as explained above, the same conclusion applies to each of these dependent claims. Accordingly, Claims 15, 16, 21 and 22 are not obvious over the alleged combination for at least the same reasons as their respective base claims.

IX. Ground 2 – Claims 12, 13, 18 and 19 Are Not Obvious Over Andersson, Khan, and Baker Under 35 U.S.C. § 103

78. Claims 12 and 13 depend from Claim 11, and Claims 18 and 19 depend from Claim 17. As discussed, Claims 11 and 17 are not obvious over the combination of Andersson and Khan. The additional reference, Baker, does not cure the

fundamental deficiencies in the combination of these references. Baker does not resolve the incompatibility between the dedicated and shared control channel architectures discussed above. Accordingly, Claims 12, 13, 18 and 19 are not obvious over the combination of Andersson, Khan and Baker.

X. Ground 3 – Claims 14 and 20 Are Not Obvious over Andersson, Khan and Dick

79. Claim 14 depends from Claim 11, and Claim 20 depends from Claim 17. As discussed, Claims 11 and 17 are not obvious over the combination of Andersson and Khan. The additional reference, Dick, does not cure the fundamental deficiencies in the combination of these references. Dick does not resolve the incompatibility between the dedicated and shared control channel architectures discussed above. Accordingly, Claims 14 and 20 are not obvious over the combination of Andersson, Khan and Dick.

XI. Ground 4 – Claims 11, 15-17, 21 and 22 Are Not Obvious Over Zeira, Khan, and Tong Under 35 U.S.C. § 103

80. The Petition asserts that Claims 11, 15-17, 21 and 22 are rendered obvious under 35 U.S.C. § 103 based on an alleged combination of Zeira, Khan, and Tong. In my expert opinion, this assertion is deficient for multiple reasons.

81. First, the Petition fails to establish an adequate motivation to combine Zeira and Khan – the proposed combination would require a substantial reengineering of Zeira’s system architecture, which is not supported by any teaching in the prior art.

Second, the Petition relies heavily on conclusory opinions by Petitioner’s expert, Dr. Kotzin, to fill in substantive gaps in the disclosures of Zeira and to supply reasons to combine the cited references—neither of which are supported by the references themselves.

A. Zeira and Khan, Alone or in Combination, Do Not Disclose or Suggest “a Single Physical Channel” That Carries “an Allocation of an Uplink Resource and a Multi-Level Transmit Power Control (TPC) Command”

82. The Petition contends that the combination of Zeira and Khan renders obvious the limitation of Claim 11 requiring that a UE receive both an allocation of an uplink resource and a Multi-Level TPC command on a single physical channel. *See* Petition, 58:2-6. In my expert opinion, this argument reflects a fundamental misreading of the respective channel structures disclosed in Zeira and Khan. It also disregards key disclosures in each reference that affirmatively teach away from the proposed combination. As such, Zeira and Khan cannot be properly combined to teach or suggest this claim limitation.

1. No Motivation to Combine Zeira and Khan

83. Petitioner argues that a person of ordinary skill in the art (POSITA) would have been motivated to apply Khan’s teaching of a “dedicated channel” that carries both an allocation of an uplink resource and a Multi-Level TPC command to Zeira’s closed-loop power control framework. *See* Petition, 59:7-11.

84. Petitioner points to Zeira’s reference to “assigned resource units” as an indication that Zeira implicitly contemplates some form of scheduling, and concludes that a POSITA would look to Khan to implement such scheduling functionality. *See* Petition, 59:12-60:9.

85. However, this argument is flawed for several reasons.

a. Zeira Teaches a Dedicated Control Channel With No Support for Scheduling Grants

86. Zeira discloses a power control system in which the TPC command, b_{TPC} , is transmitted from a base station to a UE via a dedicated control channel. The relevant disclosure is narrow and states: “The closed loop power control command, b_{TPC} , is typically sent in a dedicated channel. The dedicated channel is dedicated to the communication between the receiving station 50 and the transmitting station 52.” Ex. 1004, 4:27–30.

87. Zeira does not identify any other type of control information transmitted via this dedicated channel, nor does it describe the structure of the channel beyond this statement. In particular, Zeira is silent with respect to scheduling grants or any additional signaling to assign uplink resources to the UE.

b. Khan Teaches a Shared Time-Multiplexed Control Channel—Not a Dedicated One

88. By contrast, Khan discloses a shared control channel used by multiple UEs and explicitly distinguishes it from dedicated channels. Khan explains: “Data

communications, as such, may not require dedicated links on the downlink or the uplink, but rather enable one or more channels to be shared by a number of wireless units. By this arrangement, each of the wireless units on the uplink competes for available resources.” Ex. 1005, ¶ 5.

89. Khan’s control channel is time-multiplexed and structured such that individual slots are allocated to different types of control information. For example, as shown in Khan’s FIG. 5:

- Slots 1, 5, 9, and 13 carry TPC commands.
- Slots 2–4, 6–8, 10–12, and 14–16 carry scheduling grants. *See* Ex. 1005, ¶ 47.

90. Each slot is intended for different UEs sharing the same channel. The UE transmits in a later slot based on the timing of the received grant, typically a slot and a half later. *See id.*

c. The Petition Uses Ex. 1012 to Map Dedicated Channels (DCHs) to Physical Channels, Which Actually Provides Support For The Proposition that Zeira Would Not Provide “Dynamic Scheduling” On the Same Channel as The TPCs

91. The Petition relies on Ex. 1012, “WCDMA Enhanced Uplink – Principles and Basic Operation,” to show how Zeira’s dedicated channels are mapped to physical channels, to satisfy the limitation of Claim 11 of “a single physical channel.” However, the following excerpts from Petitioner’s Exhibit 1012 also show

that dynamic scheduling, at the least to extent it would allegedly be obvious to send it on Zeira's dedicated channel, is actually sent by the RNC, and not the base station that sends TPCs, "as part of the reconfiguration function of the RRC layer." Ex. 1012 at § 7.3.2. Accordingly, Petitioner's Exhibit 1012, to the extent it also teaches that DCHs are mapped to physical channels, also makes clear that a POSITA would not have incorporated dynamic scheduling via the dedicated channel as it clearly is not part of Zeira's technology foundation, and should, accordingly, not be read into it.

d. Zeira and Khan Operate on Fundamentally Incompatible Channel Architectures

92. Given these distinctions, a POSITA would not seek to "improve" Zeira using Khan's shared, slot-based control structure. Zeira's closed-loop control system is built around a dedicated control channel that exclusively serves a single UE. Khan, on the other hand, is concerned with efficient scheduling for multiple UEs competing for shared access. Petitioner's Ex. 1012 sheds even more uncertainty on the proposed combination, strongly suggesting that, to the extent dynamic scheduling is contemplated by Zeira, it would be sent by the RNC, and not the base station, as part of RRC configuration/reconfiguration.

93. Implementing Khan's scheduling scheme in Zeira's dedicated channel would, therefore, require substantial modifications, including:

- a redesign of Zeira's control channel to support multiplexed signaling;

- reengineering the timing and addressing assumptions that underlie Zeira’s power control feedback loop; and
- the addition of logic and signaling support to interpret shared scheduling grants—none of which are contemplated by Zeira.

94. Therefore, the two systems are not interchangeable, and a POSITA would not reasonably combine them without fundamentally altering Zeira’s architecture.

e. No Teaching or Suggestion That Scheduling Grants Are Transmitted on Zeira’s Dedicated Channel

95. Unlike in Ground 1, where the Petition attempted to rely on “other bits” in Andersson’s DPCCH as a possible vehicle for additional control information, Zeira provides no disclosure whatsoever of additional information (such as scheduling grants) being transmitted on its dedicated control channel. See Ex. 1004, 4:27–30.

96. Instead, Petitioner argues that, because Zeira mentions “assigned resource units,” a POSITA would naturally look to Khan to implement a dynamic scheduling scheme. Petition, 60:6-9. However, this argument mischaracterizes the meaning of “resource units” in Zeira and overlooks well-known industry practices at the time.

97. As understood by a POSITA, and as reflected in Zeira, “resource units” refer to a combination of time slots and spreading codes used for transmission. See Ex. 1004, 4:31–39. This is not the same as a scheduling grant as taught by Khan,

which includes identification, rate, and HARQ control information transmitted dynamically by the base station to schedule uplink transmissions. See Ex. 1005, ¶¶ 13–15.

98. At the time the application for the '500 Patent was filed, it was well known in 3G systems—particularly in time-division based systems—that such resource units were assigned statically by the Radio Network Controller (RNC), rather than dynamically by the base station as in Khan's architecture. See Ex. 2012. Thus, there would have been no reason for a POSITA to retrofit Zeira's dedicated-channel, closed-loop system to incorporate a shared, base-station-scheduled control framework such as that of Khan.

99. In conclusion, neither Zeira nor Khan discloses or suggests the use of a single physical channel to carry both scheduling information and power control information. Zeira uses a dedicated channel for TPC commands only, while Khan relies on a shared, time-multiplexed control channel that segments TPCs and scheduling grants into separate slots for different UEs. The two systems are architecturally and functionally incompatible, and the proposed combination is unsupported by either reference. A POSITA would not have been motivated to combine them in the manner suggested by the Petition, nor would they have had a reasonable expectation of success in doing so. Therefore, the cited references fail to teach or suggest the challenged limitation of Claim 11 of the '500 Patent.

2. Purported Benefits of the Proposed Combination Do Not Justify the Structural Incompatibility Between Zeira and Khan

100. The Petition references “several benefits” it claims would result from the proposed combination of Andersson and Khan—such as support for a larger number of active wireless units, reduced system complexity by transmitting scheduling grants and TPC commands on the same control channel, and reduced latency. Although these arguments are originally made in connection with Andersson and Khan, the Petition appears to rely on the same reasoning in support of its combination of Zeira and Khan. *See* Petition, 21:2-14.

101. Regardless, these purported benefits are inapplicable to the combination of Zeira and Khan for one fundamental reason: the references cannot be properly combined in a manner that would yield those benefits. For example, Khan’s support for a larger number of active wireless units is predicated on the use of a shared control channel, which allows multiple UEs to compete for uplink resources. Zeira, by contrast, teaches the use of a dedicated control channel for transmission of TPC commands to a single UE. *See* Ex. 1004, 4:27–30. To obtain the benefit cited in the Petition, a POSITA would have to replace Zeira’s dedicated channel structure with Khan’s shared channel—an approach not suggested or supported by either reference. Neither Petitioner nor any of the cited art proposes such a transformation.

3. The Proposed Modification Frustrates the Intended Purpose of Zeira

102. As discussed above, Zeira’s power control architecture is predicated on the use of a dedicated physical channel to transmit closed-loop TPC commands. *See* Ex. 1004, 4:27–30. The Petition proposes to modify Zeira by incorporating scheduling grants of the type taught in Khan, which are explicitly configured for use on a shared time-multiplexed channel. *See* Petition, 59:7–60:17; Ex. 1005, ¶ 47, FIG. 5. Because the channel structures are fundamentally different and serve different operational principles, there is no technically feasible way to integrate Khan’s scheduling grants into Zeira’s dedicated framework without a complete redesign of Zeira’s control channel architecture.

103. Accordingly, even if the Petition had articulated a sufficient motivation to combine—which it has not—the proposed modification would still fail because it would frustrate the intended operation of Zeira and violate the principle of compatibility required for a valid combination under 35 U.S.C. § 103

4. No Reasonable Expectation of Success

104. The Petition further asserts that a POSITA “would recognize that combining Khan’s scheduling grant technique with Zeira’s system is nothing more than combining prior art elements according to known methods to yield predictable results,” based on the suggestion that Zeira’s disclosure is not limited to any particular control channel. *See* Petition, 60:18-61:6.

105. This assertion is inaccurate. Zeira is explicit that the TPC command, b_{TPC} , is transmitted over a dedicated channel. *See* Ex. 1004, 4:27–30. The reference provides no disclosure—explicit or implicit—that b_{TPC} may be transmitted over a shared channel or in conjunction with any other control information, such as scheduling grants.

106. Implementing Zeira’s closed-loop control over a shared channel as taught by Khan would not only contradict the structure and assumptions of Zeira’s system, it would introduce timing, interference, and addressing challenges that Zeira does not contemplate or address. In my opinion, this type of fundamental redesign would not yield predictable results, and would pose significant technical uncertainty for a POSITA attempting to merge these two disparate systems.

107. Accordingly, Petitioner has not demonstrated a reasonable expectation of success in combining Zeira and Khan, and the proposed combination must be rejected under § 103.

B. Independent Claim 11 Is Not Obvious Over the Alleged Combination of Zeira, Khan, and Tong

108. For the reasons set forth above, Claim 11 is not rendered obvious by the proposed combination of Zeira and Khan. As discussed, none of these references support receiving scheduling and power control information on a single physical channel. The addition of Tong does not remedy these fundamental deficiencies.

Accordingly, Claim 11 is not obvious over the alleged combination of Zeira, Khan, and Tong.

C. Independent Claim 17 Is Not Obvious Over Zeira, Khan, and Tong for at Least the Same Reasons as Claim 11

109. Although Claim 17 differs in form from Claim 11, it recites similar limitations, including those directed to receiving scheduling information and power control information and the handling of TPC command accumulation. For at least the same reasons set forth above with respect to Claim 11, Claim 17 is not obvious over the combination of Zeira, Khan, and Tong.

D. Dependent Claims 15, 16, 21 and 22 Are Not Obvious Over Zeira, Khan, and Tong for at Least the Same Reasons as Base Claims 11 and 17

110. Claims 15 and 16 depend from Claim 11, and Claims 21 and 22 depend from Claim 17. As established above, both Claim 11 and Claim 17 are not obvious over the alleged combination of Zeira, Khan, and Tong. Because the dependent claims necessarily incorporate the limitations of their respective base claims, and because none of the additional references provide any teaching or suggestion that overcomes the deficiencies in the combination, Claims 15, 16, 21 and 22 likewise are not obvious over the same alleged combination.

XII. Ground 5 – Claims 12, 13, 18 and 19 Are Not Obvious Over Zeira, Khan, Tong and Baker Under 35 U.S.C. § 103

111. Claims 12 and 13 depend from Claim 11, and Claims 18 and 19 depend from Claim 17. As discussed above, neither Claim 11 nor Claim 17 is obvious over Zeira, Khan, and Tong. The additional reference, Baker, does not cure the deficiencies of that combination. Baker does not resolve the incompatibility between the dedicated and shared channel structures found in the cited references. Accordingly, Claims 12, 13, 18 and 19 are not obvious over the combination of Zeira, Khan, Tong, and Baker.

XIII. Ground 6 – Claims 14 and 20 Are Not Obvious Over Zeira, Khan, Tong and Dick Under 35 U.S.C. § 103

112. Claim 14 depends from Claim 11, and Claim 20 depends from Claim 17. As discussed above, neither Claim 11 nor Claim 17 is obvious over Zeira, Khan, and Tong. The additional reference, Dick, does not cure the deficiencies of that combination. Dick does not resolve the incompatibility between the dedicated and shared channel structures found in the cited references. Accordingly, Claims 14 and 20 are not obvious over the combination of Zeira, Khan, Tong, and Dick.

XIV. Conclusion

113. Based on my review of the cited prior art and the claim limitations of U.S. Patent No. 9,706,500, it is my professional opinion that none of the grounds asserted in the Petition establishes a reasonable likelihood that the challenged claims

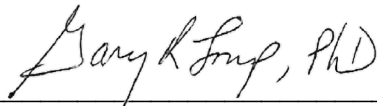
are unpatentable under 35 U.S.C. § 103. Specifically, the prior art combinations relied upon in Grounds 1-6 fail to disclose or suggest key limitations of independent Claims 11 and 17, including the receipt of scheduling information and power control information on a single physical channel. Moreover, the Petition's proposed combinations would require substantial architectural redesigns of the cited systems, are not supported by the references themselves, and rest on flawed technical assumptions and conclusory expert opinions.

114. Accordingly, it is my opinion that Claims 11-22 of the '500 Patent are not obvious over the cited references and that the Petition fails to demonstrate a reasonable likelihood of prevailing on any asserted ground.

XV. DECLARATION

I, Dr. Gary Lomp, 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 by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: April 9, 2025

By: 
Dr. Gary Lomp