

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. IPR2025-00217
U.S. Patent No. 10,952,153

PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	‘153 PATENT SPECIFICATION	4
A.	Background	5
1.	Power Control in Wireless Networks.....	5
2.	Tradeoffs Between Open-loop Power Control and Closed-loop Power Control	5
3.	Problem Addressed By The ‘153 Patent.....	6
B.	Detailed Description.....	6
1.	Node-B Sends a Parameter to the UE, Instructing it to Enable Accumulation	7
2.	Accumulation of TPC Commands	7
a)	Accumulation in Closed-loop Only Scheme	7
b)	Accumulation in Combined Open and Closed-loop Scheme	7
3.	Multi-Level TPC Command	9
4.	Node-B Transmits a Single Physical Channel That Carries Both Fast Allocation/Scheduling Information and TPC Commands	10
III.	CLAIM CONSTRUCTION	10
A.	“TPC COMMAND ACCUMULATION”	11
1.	Claim Language	12
2.	Intrinsic Support.....	13
3.	Prosecution History	15
4.	Extrinsic Evidence.....	15
5.	Conclusion.....	17
B.	“On a Single Physical Channel”	18
IV.	REFERENCES/EVIDENCE RELIED ON IN THE PETITION.....	19
A.	Andersson.....	19
1.	Power Control Routine.....	20
2.	Power Control Indicator	21
3.	Dedicated Physical Control Channel (DPCCH)	21

B.	Baker	22
C.	Khan	23
1.	Orthogonal Walsh Covers	25
2.	Time Multiplexed Channel Structure	26
D.	Zeira	27
1.	Implementation of Closed/Open-loop Power Control	28
2.	Zeira Notes an Operator May Use Solely Open Loop or Solely Closed Loop	29
E.	Declaration of Michael D. Kotzin, PH.D.	29
V.	THE PETITION FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS	31
A.	Ground 1 – Claims 1, 2, 4, 5, 11, 12, 14 and 15 Are Not Obvious Over Andersson, Baker and Khan Pursuant To 35 U.S.C. § 103	31
1.	Andersson and Baker, Alone or in Combination, Do Not Disclose or Suggest “The Processor is Configured to Cause: The Receiver to Receive, From a Network Device, an Indication that Transmit Power Control Command (TPC) Accumulation is Enabled,” As Required By Claim 1	32
2.	Andersson and Khan, Alone or in Combination, Do Not Disclose or Suggest “Receiv[ing], From the Network Device, on a Single Channel, Scheduling Information and Power Control Information...,” As Required By Claim 1	38
a)	Motivation to Combine	38
1)	In Andersson, and Its Base Technology, the UE’s Dedicated Uplink Transport Channel Was Semi-Statically Configured Using RRC Signaling	40
2)	The RRC Signaling Used to Configure the UE’s Dedicated Uplink Transport Channel Was an RNC Function	41
3)	Andersson and Khan Use Fundamentally Incompatible Channel Multiplexing Structures	43
b)	Alleged Benefits of Petitioner’s Proposed Combination	46
1)	Larger Number of Active Wireless Units	47
2)	Reduced Complexity	48
3)	Reduced Latency	48

4)	A POSITA Would Understand that Scheduling Information is Control Information that Naturally Belongs Within a Control Channel.....	49
3.	Ground 1 - Conclusion	49
B.	Ground 2 – Claims 3 and 13 are Not Obvious Over Andersson, Baker, Khan and Dick Pursuant to 35 U.S.C. § 103	49
C.	Ground 3 – Claims 1, 2,4, 5, 10-12, 14, 15 and 20 Are Not Obvious Over Zeira, Baker, Khan and Tong Pursuant to 35 U.S.C. § 103.....	50
1.	Zeira and Baker, Alone or in Combination, Do Not Disclose or Suggest “The Processor is Configured to Cause: The Receiver to Receive, From a Network Device, an Indication that Transmit Power Control Command (TPC) Accumulation is Enabled,” As Required By Claim 1	50
2.	Zeira and Khan, Alone or in Combination, Do Not Disclose or Suggest “a Single Physical Channel That Carries “Scheduling Information and Power Control Information”	54
a)	Motivation to Combine	55
1)	In Zeira, and Its Base Technology, the UE’s Dedicated Uplink Transport Channel Was Semi-Statically Configured Using RRC Signaling	57
2)	The RRC Signaling Used to Configure the UE’s Dedicated Uplink Transport Channel Was an RNC Function.....	58
3)	Zeira’s Disclosure of Resource Grants Would Not Imply to a POSITA a Scheduling Function Beyond What the Underlying Technology Was Already Using	59
4)	Zeira and Khan Use Fundamentally Incompatible Channel Multiplexing Structures	60
b)	Alleged Benefits of Petitioner’s Proposed Combination Fail for the Same Reasons as Ground 1	62
1)	Larger Number of Active Wireless Units.....	63
2)	Reduced Complexity	63
3)	Reduced Latency	64
4)	A POSITA Would Understand that Scheduling Information is Control Information that Naturally Belongs Within a Control Channel.....	64

3.	Ground 3 - Conclusion	65
4.	Ground 4 – Claims 3 and 13 Are Not Obvious Over Zeira, Baker, Khan, Tong and Dick Pursuant to 35 U.S.C. § 103	65
VI.	CONCLUSION.....	65

PATENT OWNER'S EXHIBIT LIST

EX2001	Petitioner's Answer to Complaint and Counterclaim, dated June 20, 2024, in <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2002	Docket from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2003	Scheduling Order from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2004	Defendant's Second Supplemental Preliminary Invalidity Contentions, dated January 9, 2025, in District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
EX2005	Declaration of Gary Lomp
EX2006	Resume of Gary Lomp
EX2007	Notice of Allowance in U.S. Patent Appln. Serial No. 10/917,968
EX2008	IPR2018-01773 DECISION Instituting <i>Inter Partes</i> Review
EX2009	IPR2018-01773 ORDER <i>Granting</i> Joint Motion to Terminate
EX2010	<i>de Jager, F. (February 1952). "Delta modulation, a method of PCM transmission using the 1-unit code" (PDF) Philips Research Reports. 7: 442–466. Archived (PDF) from the original on 2024-05-18.</i>
EX2011	<i>Data Sheet Motorola part MC3417</i>
EX2012	<i>Data Sheet Motorola Part MC3418</i>
EX2013	<i>3GPP TS 25.224 V5.9.0 (2005-12)</i>
EX2014	<i>3GPP TS 25.211 V3.10.0 (2002-03)</i>
EX2015	<i>3GPP TS 25.331 V3.10.0 (2002-03)</i>
EX2016	Declaration of Gary Lomp

I. INTRODUCTION

Petitioner challenges Claims 1-5, 10-15 and 20 (“Challenged Claims”) of US10,952,153 (“’153 Patent”) on four grounds. The ‘153 Patent has 20 total Claims, with 1 and 11 being independent. In Ground 1, Petitioner challenges independent claims 1 and 11, and certain dependent claims, as allegedly obvious over US6,334,047 (“Andersson”), US2001/0036238 (“Baker”) and US2004/0190485 (“Khan”). In Ground 3, Petitioner challenges independent claims 1 and 11, and certain dependent claims, as allegedly obvious over US6,600,772 (“Zeira”), Baker, Khan and US6,529,741 (“Tong”). The remainder of the grounds address dependent claims only. Dependent Claims 6-9 and 16-19 are not challenged.

An overarching theme in the Petition is that this patent has a legacy. Petition, 6:2-9. This family has been pending since August 2004 and includes ten issued patents. The Petition imparts a negative meaning to this legacy, stating that the “claims [are] no longer directed to the allegedly novel technique described in the specification.” *Id.*. This is simply not true. The first Office Action ever issued in this family rejected the Claims *over the same primary reference (“Zeira”)* the Petition relies on in Grounds 3 and 4. EX1011, p. 811. The applicant filed a Reply, Zeira was distinguished, and the application was allowed. The Notice of Allowance gave reasons for allowability, stating:

[A]s a whole, none of the prior art cited alone or in combination provides **the motivation to teach** receiving, **on a single physical channel** by the UE **if accumulation is enabled**, **an allocation of a scheduled uplink resource and a TPC command**, **wherein the TPC command is accumulated with other received TPC commands** . . .

EX2007, 3:1-5 (emphasis added) (different font colors show the relationship between the allowable subject matter of the earlier Patent and the ‘153 Patent language). As can be seen, the allowable subject matter of the earlier patent was very similar to the Claim language of the ‘153 Patent. For example, Claim 1 of the ‘153 Patent recites in relevant part:

the processor is configured to cause:

the receiver to **receive**, from a network device, **an indication that transmit power control (TPC) command accumulation is enabled**,

the receiver to receive, from the network device, **on a single physical control channel**, **scheduling information and power control information**....

Zeira was in fact cited during prosecution of two related applications in the ‘153 Patent family, each of which granted as a patent. The Claims of the ‘153 Patent therefore reflect the USPTO’s careful consideration of Zeira and other prior art. Far from being “devoid of invention,” the claims were deliberately refined during a lengthy prosecution history to capture the true inventive features while distinguishing over the closest art. That history underscores, not undermines, the validity of the ‘153 Patent. Indeed, the very arguments Petitioner now rehashes

against the “single channel” limitation of Claim 1 were already considered and rejected by the USPTO multiple times.

Petitioner overstates the significance of prior IPRs in this family. Its suggestion that earlier institutions show the Board ‘agreed these features were likely unpatentable’ is misleading. Petition, 6. In the IPR against the ‘828 Patent, the Board did not adopt Petitioner’s reading of Zeira; it merely noted that Patent Owner’s prior arguments lacked detail, focusing on a ‘shared channel’ instead of the broader ‘single channel.’ EX2008, 12:14–20. The Board never held that Zeira disclosed the claimed limitation. In IPR2018-01773, the Board never reached the merits at all, as the case was terminated by agreement. EX2009, 3:7–8. This Response directly addresses Zeira’s failure to disclose the ‘single channel’ limitation and Petitioner’s lack of a rational motivation to combine it with Khan. Prior institutions provide no basis for institution here.

Petitioner also attempts to bolster its Zeira-based case by adding three more references in Grounds 3 and 4 and substituting Andersson in Grounds 1 and 2. These additions do not cure the defects. The references in Grounds 3 and 4 cannot be properly combined with Zeira, and Andersson suffers from the same deficiencies. Khan, cited in all grounds, was already considered during prosecution of a related family member, and the claims were allowed. Khan adds nothing and cannot be

meaningfully combined with Zeira or Andersson. The complete record confirms Petitioner's case rests on combinations that fail both legally and technically.

Petitioner's arguments regarding a UE receiving an indication that accumulation is enabled also fail. Andersson and Baker do not teach TPC command accumulation at all—let alone an indication that accumulation is enabled, as required under the plain meaning directed by the Board. ID, 8:15–16, 23–24. Nor does Zeira, even when combined with Baker, disclose such an indication from Node-B to the UE.

Accordingly, the claims of the '153 Patent remain patentable over both Zeira and Andersson, alone or in combination with Baker, Khan, Tong, or Dick. The prosecution history confirms this, and Petitioner's combinations fare no better here. The Petition should be denied because it offers nothing new, and nothing sufficient, to call into question the validity of the '153 Patent.

II. '153 PATENT SPECIFICATION

The '153 Patent addresses combining open- and closed-loop power control for UE uplink transmissions, implemented at the UE and/or BS. EX1001, 8:24-31. It discloses sending a parameter to the UE to enable accumulation, applying closed-loop control, and using a single physical channel for both TPC commands and dynamic uplink allocations. See EX1001, Claims 1, 11.

A. Background

In its Background section, the ‘153 Patent generally describes power control in wireless networks, including open and closed-loop power control mechanisms, and the tradeoffs between using open versus closed-loop power control in practice.

1. Power Control in Wireless Networks

The ‘153 Patent’s Background explains that in wireless networks, UE uplink transmit power affects both user performance and that of other UEs on the same link. EX1001, 1:35-41. Excessive power may yield higher speeds or lower error rates but also interferes with other signals. EX1001, 1:47-57. To maintain a target error rate, systems employ power control schemes, conventionally using closed-loop or open-loop methods. EX1001, 1:38-60.

2. Tradeoffs Between Open-loop Power Control and Closed-loop Power Control

Using closed-loop power control, the network determines and sends each UE a target signal-to-noise-plus-interference ratio (SNIR). EX1001, 2:24-26. The UE uses this information, along with received signal strength, to set its transmit power. EX1001, 2:28-31. In contrast, open-loop methods address fast channel fading by measuring path loss on a per-frame basis and adjusting transmit power. EX1001, 2:31-33. Fading may result from user position or obstructions. EX1001, 4:43-53. But open-loop is slow to react to interference from other UEs. EX1001, 2:33-35, 7:59-63; 4:54-57.

In closed-loop control, the network measures SNIR from UE signals and issues transmit power control (TPC) commands to raise or lower transmit power by fixed dB steps. EX1001, 2:36-44. However, closed-loop cannot fully compensate for fast fading, since large power changes require many TPC iterations and delays beyond the step size. EX1001, 2:44-51.

3. Problem Addressed By The ‘153 Patent

Because there are drawbacks to both open-loop and closed-loop uplink power control methods conventionally used by wireless networks, a mechanism was needed “that better balances the conflicting goals of reducing errors in a received signal,” reduces “interference imposed on signals received at other receivers,” and reduces “the overall residual SNIR fluctuations experienced by each user[‘]s signal at a receiver.” EX1001, 2:52-59.

B. Detailed Description

The Detailed Description of the ‘153 Patent specification describes a combined closed-loop and open-loop power control scheme for UE uplink power control. “Some embodiments of the present invention advantageously combine elements of both open-loop and closed-loop schemes to control power levels, thereby avoiding one or more of the disadvantages associated with either of the separately used schemes.” EX1001, 8:24-31.

1. Node-B Sends a Parameter to the UE, Instructing it to Enable Accumulation

The '153 Patent describes a parameter, configurable at a Node-B or RNC, that instructs a UE whether to set uplink power using path loss, TPC commands, or both. EX1001, 13:12-20. The parameter, sent via signaling or broadcast, may specify open-loop, closed-loop, or combined control. Id. Accumulation can be disabled under conditions such as when a UE exceeds a speed threshold. EX1001, 13:60-64.

2. Accumulation of TPC Commands

When closed-loop power control is enabled, alone or with open-loop, the UE receives TPC commands from the network. EX1001, 6:59-65, 9:13-18; EX2016. These commands are added to an integrator (or accumulator) at set intervals to adjust transmit power. EX1001, 7:15-22, 9:28-42. With open-loop only, no TPC commands are used and accumulation does not occur. EX2016, ¶¶35-45.

a) Accumulation in Closed-loop Only Scheme

If only the closed-loop power control scheme is enabled, TPC commands are accumulated “[e]very time a TPC command is received.” “[A]n integrator in the UE is used within the inner loop to update the UE transmit power by a step amount $\pm \Delta$ dB.” EX1001, 7:15-22.

b) Accumulation in Combined Open and Closed-loop Scheme

In a combined open and closed-loop UE uplink power control scheme, TPCs will be accumulated using the equation:

$$\sum_{k-K}^k TPC^i \quad (\text{Equation 1})$$

where k is the current frame, K is the first frame after accumulation is reset (or the first frame), and i is the current time slot. EX1001, 9:28-30, 10:23-33.

The entire transmit power equation, which includes the TPC calculation (Equation 1 – in red font below for ease of reference) for a combined open and closed-loop scheme is as follows:

$$P_{Tx}(k) = P_{open}(k) + step \cdot \sum_{k-K}^k TPC^i + \gamma_{SF} + \beta_{TFC} \quad (\text{Equation 2})$$

EX1001, 10:42. The transmit power, $P_{Tx}(k)$, is updated “every frame period,” “each time a new TPC command is received” (i.e., every slot, i), or “only when either a TPC command or a new power level is received from the network.” EX1001, 9:34-39. In other words, when a combined scheme is indicated by the parameter (see sub-heading II.B.I *infra*), the TPC commands received in each slot are accumulated either once per slot or over one or more frames. *Id.*

The UE accumulates TPC commands and uses them to set transmit power for future uplink transmissions. EX1001, 10:14-17. The resulting power level $P_{Tx}(k)$ is applied to uplink user data. EX1001, 10:33-35. This process is shown in FIG. 4 of the ‘153 Patent, with relevant boxes highlighted below.

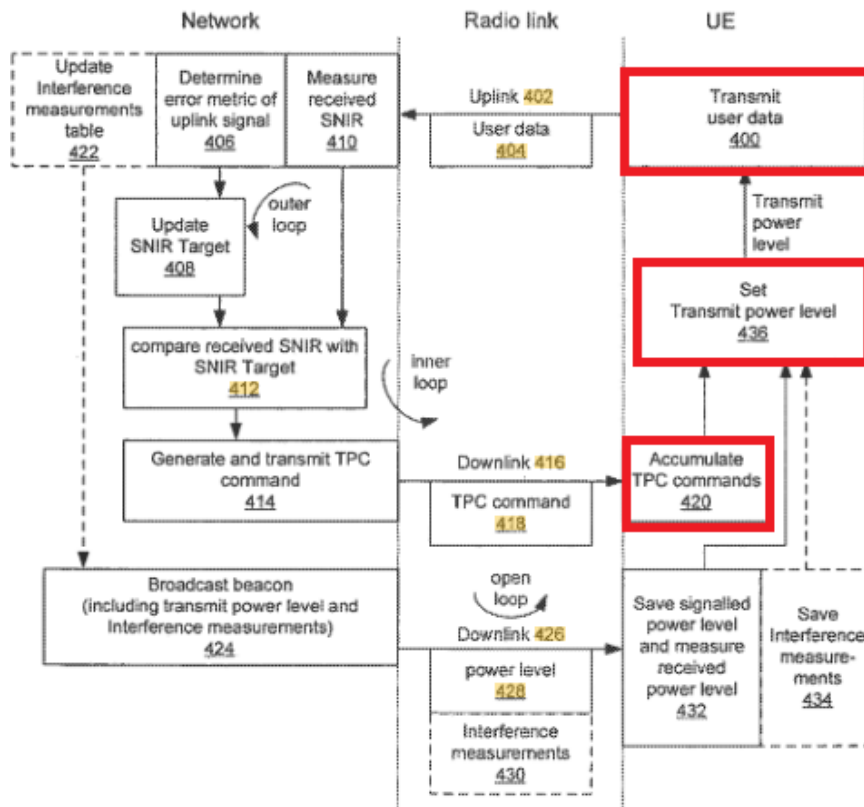


FIGURE 4

3. Multi-Level TPC Command

Conventionally, TPC commands were only fixed amounts, typically +1dB or -1dB. EX1001, 6:58-62, 8:6-11, 9:15-17, 11:1-6. The ‘153 Patent adds the option of “a multi-level TPC command.” EX1001, 9:17-18. Referring to Equation 2 above:

[F]or the current frame k , the UE may calculate the transmit power $P_{Tx}(k)$ as shown [in Equation 2] where K is the initial frame number determined when the power control process begins; $TPCi$ is -1 for a down TPC command and +1 for an up TPC command and 0 if no TPC command is received; and step is the magnitude of the amount added to an accumulator upon receipt of each TPC command.

EX1001, 9:28-34. (Emphasis added).

4. Node-B Transmits a Single Physical Channel That Carries Both Fast Allocation/Scheduling Information and TPC Commands

The '153 Patent introduces “a new physical channel on the downlink [that] may be used to carry fast allocation and scheduling information to a user, thereby informing the UE of the uplink resources that it may use.” EX1001, 12:66-13:2. This new physical channel can “also be used as the feedback channel for the combined power control scheme,” carrying TPC commands in addition to the scheduling information. EX1001, 13:3-6.

III. CLAIM CONSTRUCTION

PO maintains that the Challenged Claims should have their plain and ordinary meaning. However, a determination that a claim term “needs no construction” or has the “plain and ordinary meaning” may be inadequate when a term has more than one “ordinary” meaning or when reliance on a term’s “ordinary” meaning does not resolve the parties’ dispute.” *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008); *see also* Institution Decision (“ID”), 6:5-8, 8:13-24. Instead, “[t]he terms used in the claims bear a presumption that they mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art.” *Honeywell Int’l, Inc. v. ITC*, 341 F.3d 1332, 1338 (Fed. Cir. 2003). Accordingly, “Properly viewed, the ‘ordinary meaning’ of a

claim term is its meaning to the ordinary artisan after reading the entire patent.”
Aylus Networks, Inc. v. Apple Inc., 856 F.3d 1353, 1358 (Fed. Cir. 2017).

A. “TPC COMMAND ACCUMULATION”

While not expressly construed in the Petition, the Board found that “the parties’ dispute on [the issue of whether TPC command accumulation would have been obvious over the asserted combination of Andersson and Baker] turns on claim construction.” ID,8:13. Having found that Petitioner and PO rely on different plain meaning interpretations of “TPC command accumulation,” it asked that the Parties address the proper construction for this term in the instituted trial. ID, 8.

Regarding the manner in which Petitioner used “TPC command accumulation” in the Petition, the Board stated: “Petitioner’s approach requires we read ‘accumulation’ as updating transmission power for each received TPC command.” ID, 8:14-15. Regarding the manner in which PO used “TPC command accumulation” in PO’s Preliminary Response, the Board stated: “PO’s approach requires only that TPC commands cumulatively affect transmission power.” ID, 8:19-21. The Board found that, while Petitioner’s interpretation was consistent “with some aspects of the ‘153 patent’s description,” “it appears that the Specification supports PO’s broader construction.” ID, 8:15-16, 23-24.

Claims in an inter partes review are construed under the Phillips standard (37 C.F.R. § 42.100(b)). Under that standard, words of a claim are given their ordinary

and customary meaning as understood by a POSITA at the time of the invention, in view of the specification and prosecution history (*Phillips v. AWH*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc)).

1. Claim Language

The claim language itself requires only that “transmit power control (TPC) command accumulation” is enabled. EX1001, Claim 1 (“ . . . the processor is configured to cause . . . the receiver to receive, from a network device, an indication that transmit power control (TPC) command accumulation is enabled).

The claim language itself does not impart any specialized meaning to the term “accumulation.” It simply requires that “TPC command accumulation” be enabled. This language is broad on its face. Nothing in the claim text imposes temporal restrictions, such as requiring that each and every received TPC command immediately trigger a transmit power update.

Petitioner nonetheless asserts that “accumulation” means “iteratively adjusting the UE’s transmit power with each received TPC command.” Petition, 8, 21. That reading improperly narrows the claim by importing a method and frequency requirement that the claims do not recite. The ordinary meaning of “accumulate” is to collect or gather together so that the accumulated items have a combined effect. Applied here, the plain language requires only that TPC commands cumulatively

affect transmit power, such as by being added into an accumulator—even if the effect is applied once per frame or otherwise less frequently.

Petitioner’s construction, by contrast, rewrites the claim to cover only a single arithmetic procedure. The Federal Circuit has repeatedly cautioned against such narrowing by embodiment. Absent clear lexicography or disavowal, claim terms are given their full breadth of ordinary meaning. *See Thorner v. Sony*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Because there is no disclaimer or redefinition here, “accumulation” should be afforded its full breadth. Nothing in the claim text limits “accumulation” to a step-by-step, iterative update applied upon receipt of every individual TPC command as Petitioner suggested.

2. Intrinsic Support

The ‘153 Patent specification consistently uses “accumulation” in its plain and ordinary sense, gathering TPC commands so that they collectively affect transmit power, without requiring that every individual command be immediately applied to update transmit power, as Petitioner suggests.

For example, Figure 3 illustrates a closed-loop scheme in which the UE “accumulates 320 the TPC commands and uses the accumulated TPC commands to set 322 a transmit power for future uplink transmissions 300.” EX1001, 7:42-46. This disclosure emphasizes that accumulation is performed in the UE using an integrator to collect step instructions, which can then be used to adjust the transmit

power level. Nowhere does the patent mandate that transmit power must be updated upon receipt of each command. Instead, it allows that commands may be “accumulated” and applied together.

Similarly, Figure 4 shows a combined open/closed-loop system where “the UE accumulates 420 the TPC commands and uses the accumulated TPC commands in part to set 436 the transmit power level for future uplink transmissions.” EX1001, 10:13-17. Again, the operative concept is that multiple commands are collected over time and considered in setting transmit power. The specification expressly provides that “[t]he transmit power $P_{TX}(k)$ may be updated for every frame period ... [or] each time a new TPC command is received ... [or] only when either a TPC command or a new power level is received from the network.” EX1001, 9:34-40. This text confirms that accumulation encompasses a variety of timing implementations, per-frame, per-command, or conditional, not just the iterative update process that Petitioner advances.

Taken together, the specification makes clear that “accumulation” means storing or integrating multiple TPC commands so they have a combined effect on transmit power. There is no limitation that requires accumulation to occur at specific time intervals (i.e., each time a TPC command is received), as the Petitioner suggest. Petitioner’s attempt to narrow the term to iterative, per-command updating is

contradicted by the express disclosure that accumulation may be applied in different ways, including only once per frame.

3. Prosecution History

The prosecution history of the ‘153 Patent provides no basis for narrowing the term “TPC command accumulation.” The only rejections entered were double patenting rejections, and no substantive prior art rejections were ever raised. EX1002, 70-82, 153-159. After the first double patenting rejection, the applicant canceled claims 1–8 and added claims 9–28 without commentary. EX1002, 108-113. Following the second rejection, the applicant made only minor informalities type corrections. EX1002, 61, 64-68.

Because the applicant never distinguished prior art on the meaning of “accumulation” or otherwise made any limiting statements, there is no disclaimer or redefinition in the intrinsic record. Thus, the prosecution history confirms that “accumulation” must be given its full breadth of ordinary meaning as supported by the claim language and specification, not the narrower construction Petitioner advances.

4. Extrinsic Evidence

Extrinsic evidence further confirms that “accumulation” should be understood in its ordinary, broad sense, not the narrow definition Petitioner proposes.

As explained by PO's expert, Dr. Lomp, the concept of "accumulation" in closed-loop power control is directly analogous to Delta Modulation ("DM"), a foundational technique developed in the 1950s for analog-to-digital conversion. EX2016, ¶¶35-42; EX2010. In DM, an integrator keeps a running tally of incremental "up," "down," or "no change" instructions, which collectively track the target input signal. This process is not confined to instantaneous updates; rather, it involves maintaining a history of incremental instructions that are summed over time to determine the net adjustment. EX2010, 450–51.

The analogy to power control is straightforward: in a wireless system, the "input voice signal" in DM corresponds to the uplink SNIR target, while the incremental "up" and "down" commands correspond to TPC commands. Just as in DM, where the integrator matches the input by accumulating small increments, the UE in closed-loop power control maintains an accumulator that sums the TPC commands and uses the result to set transmit power. EX1001, 3:39–43, 7:15–29, 9:27–42; EX2016, ¶¶35-42. This is precisely what the '153 patent describes: the UE accumulates . . . the TPC commands and applies the accumulated value to determine transmit power.

Dr. Lomp further explains that accumulation is particularly valuable because it enables the UE to calculate the net adjustment required over time, rather than reacting to each individual TPC command in isolation. This avoids oscillations in

transmit power, smooths the adjustment process, and provides robustness against transient SNIR fluctuations. EX2006, ¶¶35-42. This evidence strongly supports PO's broader construction: "accumulation" refers to the process of collecting and summing TPC commands so that they cumulatively affect transmit power, regardless of whether the update occurs once per command, once per frame, or at another interval.

Finally, adaptive extensions of DM, such as Continuously Variable Slope Delta-Modulation (CVSD), confirm that those skilled in the art understood "accumulation" to cover a variety of aggregation methods, including dynamic step sizes and leaky integrators. *Id.* These teachings reinforce that a POSITA in the relevant time frame would not equate "accumulation" with a single arithmetic procedure but would instead recognize it as a general aggregation process.

For these reasons, the extrinsic evidence corroborates the intrinsic record in showing that "accumulation" must be afforded its ordinary, plain meaning, and Petitioner's attempt to limit the term to iterative, per-command updating should be rejected.

5. Conclusion

PO respectfully submits that the claim language "TPC command accumulation" should be construed to mean "adding a TPC command value to an integrator". PO believes this is consistent with "TPC commands cumulatively affect

transmit power,” which the Board found supported by the ‘153 Patent specification. ID, 8:19-24; EX2016, ¶43. This construction preserves the claim’s plain and ordinary meaning, aligns with the specification, and avoids improperly importing limitations from preferred embodiments. Petitioner’s narrowing construction should, therefore, be rejected.

B. “On a Single Physical Channel”

“On a single physical channel” means on the same physical channel instance addressed to the UE for the relevant uplink transmission, not merely in the same system across different channelization codes or different time slots. Compare EX1004, 1:33-34 (a TDD “resource unit” is the combination of a single code in a single time slot (code+time define the L1 bearer); EX1005, ¶¶37–41 (forward-link Walsh channels identified by MACIndex/covers within time-multiplexed slots); EX2016, ¶49. The ‘153 Patent specification expressly describes a single downlink physical channel that carries fast allocation/scheduling and power-control feedback (TPC) to the UE. EX1001, 12:66–13:6; EX2016, ¶49.

A POSITA would therefore understand “physical channel” here as the specific L1 bearer (defined by code and timing) addressed to the UE, not a collection of different covers or slot fields shared across users—consistent with Zeira’s code×timeslot resource unit and Khan’s mapping of MACIndex to distinct Walsh-covered channels. EX1:33-34, Background; EX1005 ¶¶37–41; EX2016, ¶49.

This excludes Khan’s orthogonal-cover embodiment (distinct Walsh covers ⇒ distinct physical channels) and its time-multiplex embodiment (TPC and grants placed in different slots of a shared forward-link structure, addressed to users via MACIndex/AT-ID), neither of which teaches co-carriage to the same UE on the same physical channel as claimed. EX1005 ¶45 (AT-ID/MACIndex to a particular UE); ¶47 (orthogonal covers or time-multiplexing); Fig. 5 (TPC in some slots, SG in others).

IV. REFERENCES/EVIDENCE RELIED ON IN THE PETITION

The Petition advances two grounds against independent Claims 1 and 11 of the ‘153 Patent. In Ground 1, the Petitioner asserts that Claims 1 and 11 are obvious over US6,334,047 (“Andersson”) in combination with US2001/0036238 (“Baker”) and US2004/0190485 (“Khan”). In Ground 3, the Petition asserts that Claims 1 and 11 are obvious over US6,600,772 (“Zeira”) in combination with Baker, Khan and US6,529,741 (“Tong”).

A. Andersson

The Petition relies on Andersson as its primary reference for Ground 1. Andersson is focused on “varying the step size and even the type of power control scheme employed” by “transmitting a single bit value with the transmit power control command” EX1009, 10:27-31. This allows the network to signal a “very

fast power control type adjustment” to be carried out “without much increase in overhead.” EX1009, 10:32-36.

1. Power Control Routine

Andersson describes a power control routine, which may be implemented by a wireless network. The power control routine is illustrated in flow chart format in FIG. 4 (reproduced below for convenience with relevant steps outlined in red). As shown, the network sends a “transmit power control command” to the UE “to either raise, lower, or make no change to the transceiver’s current transmit power level (block 206).” EX1009, 9:4-6.

A power control indicator is added to the transmit power control command, and in its simplest form, may be a single flag bit. The power control indicator indicates whether a first type or a second type of power control adjustment should be used depending upon the difference (block 209).

EX1009, 9:6-11.

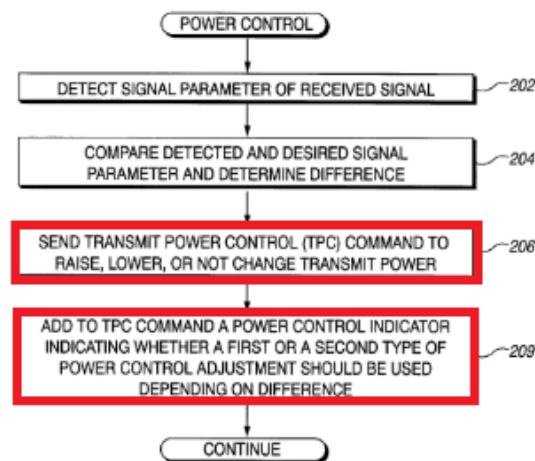


Fig. 4

In other words, in Andersson, for UE uplink power control, the UE receives both (1) a power control indicator and (2) the TPC. The TPC is a conventional TPC that indicates whether to raise, lower or make no change to the UE's uplink transmit power. The power control indicator indicates whether to use a first type or a second type of power control adjustment.

2. Power Control Indicator

Andersson provides two examples of power control adjustment. In one, the first and second adjustments use different step sizes—for instance, a conventional ± 1 dB step versus a larger 8 dB step to allow faster transmit power changes. EX1009, 9:45-54. In the second, the adjustments use different schemes: a traditional ± 1 dB TPC per slot versus a sequence of increasing and decreasing steps (e.g., 2 dB, 2 dB, 4 dB, 4 dB, 8 dB, 8 dB, 4 dB, 4 dB, etc.), illustrated in Table 1. EX1009, 10:40-58.

Power control scheme	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
First scheme	1 dB	1 dB	1 dB	1 dB	1 dB	1 dB	1 dB	1 dB
Second scheme	2 dB	2 dB	4 dB	4 dB	8 dB	8 dB	4 dB	4 dB

3. Dedicated Physical Control Channel (DPCCH)

In Andersson, the network sends the TPC commands and power control indicators to UEs using DPCCHs. EX1009, 9:12-16. An example DPCCH format is provided in FIG. 5 of Andersson (reproduced below for convenience).

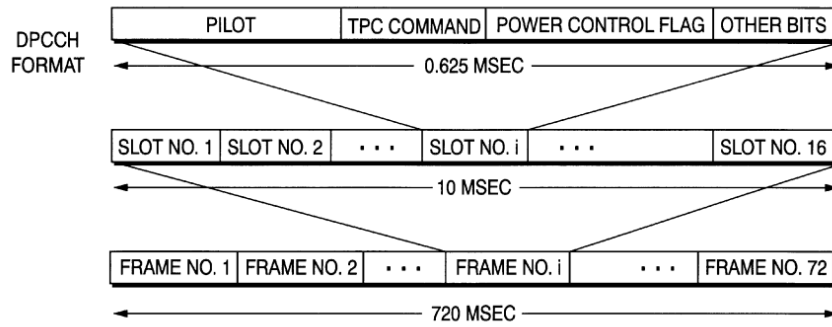


Fig. 5

As shown in FIG. 5, the DPCCH is divided into 72 frames, which correspond to a 720 msec time period (thus each frame is 10 msec long). EX1009, 9:12-16. Each 10 msec frame includes 16 time slots, each lasting 0.625 msec, and each 0.625 msec slot includes a pilot field, a TPC command (increase, decrease or maintain), a power control indicator/flag, and “other bits.” EX1009, 9:16-22.

B. Baker

The Petition cites Baker as a secondary reference for Grounds 1 and 3. Baker addresses UE uplink power control using two-state TPC commands sent once per slot. EX1010, ¶21. Step size is set by two parameters, PCA and ΔTPC , yielding three effective sizes. Id. Table 2 shows that with PCA=1, ΔTPC =1 or 2, the UE decreases or increases power by ΔTPC dB depending on the TPC bit. EX1010, ¶22. With PCA=2, ΔTPC =1, and the UE combines five TPC commands, increasing power by ΔTPC dB only if all five are “1.” EX1010, ¶23. Thus, depending on parameters,

values of +1, -1, +2, -2, or 0 may be added to an accumulator, though Baker does not describe this as “accumulation.” EX2016, ¶74, Table 1.

TABLE 2

PCA	TPC Command	Δ TPC	UE Action
1	0	1 or 2	Reduce Transmit Power by Δ TPC
	1	1 or 2	Increase Transmit Power by Δ TPC
2	0	1	Combine TPCs in groups of 5. If all 5 TPCS are 1, increase transmit power by Δ TPC; if all 5 TPCs are 0, decrease transmit power by Δ TPC; otherwise, do not change Transmit Power.

C. Khan

The Petition relies on Khan as a secondary reference for Grounds 1 and 3. Khan is directed toward mechanisms for “carrying control information, such as scheduling grants, for reverse link [or uplink] packet access transmission.” EX1005, ¶11. In contrast to Andersson, however, which uses dedicated channels (DPCCHs) to send TPCs to UEs, Khan is focused on the use of shared channels for this purpose. In particular, Khan explains that, “[f]or voice applications, conventional cellular communication systems employ dedicated links between a wireless unit and a BS.”

EX1005, ¶4. However, “[w]ith the explosion of the Internet and the increasing demand for data, resource management has become a growing issue in cellular communications systems.” EX1005, ¶5.

Unlike voice, however, data communications may be relatively delay tolerant and potentially bursty in nature. 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. Resources to be managed in the uplink include the received power at the base station, and the interference created by each user to other users in the same sector or cell, as well as in other sectors or cells, for example.

EX1005, ¶5.

The problem solved by Khan, therefore, is described as follows:

Further evolution of 3G standards may include high-speed reverse link packet access, such as from wireless unit to base station, for example. However, a time-multiplexed slot structure may be employed in certain systems supporting reverse link packet access. In these systems, a scheduling grant channel may be difficult to realize, given the time-multiplexed slot structure. Consequently, a need exists for a method of carrying control information, such as scheduling grants, for reverse link packet access transmission.

EX1005, ¶11 (emphasis added).

This is reiterated in paragraph 43 of Khan, which states:

[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 FL may employ a time-multiplexed slot structure. Consequently, a method for transmitting control information, including [sic] at least one scheduling grant(s), and/or transmit power control (“TPC”) information, for reverse link packet transmission is required. Such a method for transmitting the control information for reverse link packet transmission may incorporate various

differing schemes, detailed hereinbelow, including, for example, the use of a MAC field in the forward link slot to carry the scheduling grants for RL packet transmission.

EX1005, ¶43 (Emphasis added).

The Detailed Description of Khan provides two potential mechanisms a network can use to transmit control information to UEs using shared control channels, one using orthogonal Walsh covers and the other using a time domain multiplexing channel structure. EX1005, ¶71. Both are implementations of the CDMA2000 HRPD. EX1005, ¶43.

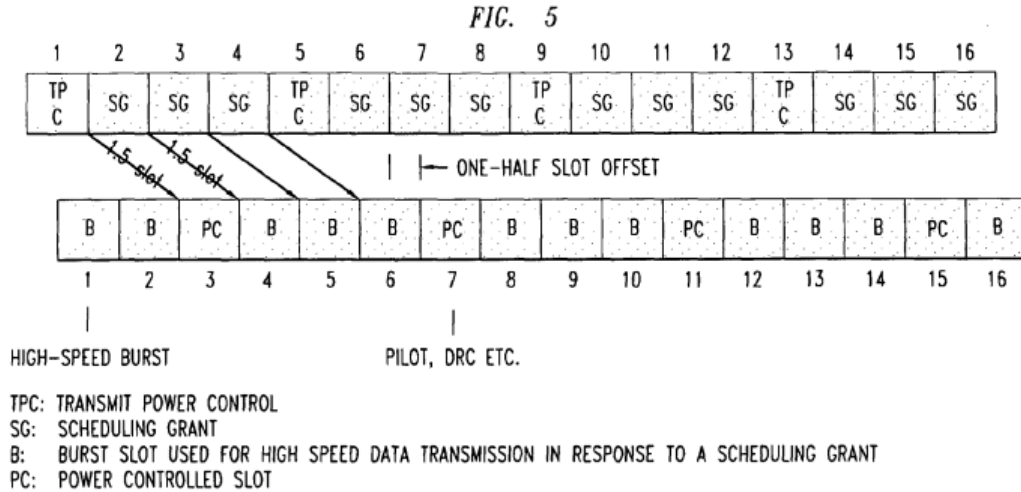
1. Orthogonal Walsh Covers

In this embodiment of Khan, each active UE is allocated a unique medium access control (MAC) index, which is used to indicate to a UE whether it has been scheduled for uplink transmission. EX1005, ¶45. The MAC indices can be transmitted in 64 chip length bursts, leaving 6 bits of control information that can be carried in each MAC index. EX1005, ¶46. However, “[i]n order to support both the TPC bits and the scheduling grant dedicated MACIndex transmission simultaneously, orthogonal Walsh covers may be needed.” EX1005, ¶47. Practically speaking, this means that, using this embodiment, the TPCs and scheduling grants are considered to be sent over separate physical channels. EX1005, ¶¶37-41; EX2016, ¶80. The Petition seems to agree with this statement, noting that “Khan

discloses that this control information may be transmitted...over the same Walsh channel, which a POSITA would understand is a physical channel.” Petition, 24.

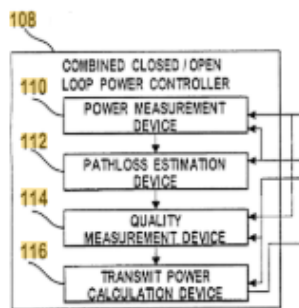
2. Time Multiplexed Channel Structure

In this embodiment of Khan, a typical shared channel time domain multiplexed structure is used. EX1005, ¶47; EX2016, ¶80. FIG. 5 (reproduced below) shows the proposed time multiplexed structure. Using the illustrated time multiplexed structure, each downlink slot carries different information. As can be seen in FIG. 5, for example, TPCs are sent in slots 1, 5, 9 and 13 while scheduling grants are sent in slots 2-4, 6-8, 10-12 and 14-16. EX1005, FIG. 5. Accordingly, in this embodiment of Khan, TPCs and scheduling grants, while sent on the same shared physical channel using time multiplexing, are sent in separate slots. EX1005, FIG. 5. The UE is also restricted to transmitting in certain slots. As shown in FIG. 5, for example, a UE that receives an SG in slot 2 transmits in the second half of PC slot 3, and a UE that receives an SG in slot 3 may send a high speed data transmission in response to the SG in the second half of slot 4.



D. Zeira

The Petition relies on Zeira as its primary reference for Ground 3. Zeira describes a “combined closed/open-loop power controller” 108, as illustrated in FIG. 4 (the relevant portion of FIG. 4 is reproduced below). EX1004, 3:25-26. The combined closed/open-loop power controller 108 resides within a “transmitting station” 52, which can be a UE or network entity. EX1004, 3:25-28, 5:13-17.



1. Implementation of Closed/Open-loop Power Control

The transmit power calculation device 116 within the controller 108 “sets the transmit power level of the receiving station (BS) 150 using equations 4 and 6. EX1004, 5:58-6:20. Equations 4 and 6 of Zeira are re-numbered below as Equation 3 and Equation 4 and are referred to as such in the discussion below.

The transmit power calculation device 116 uses Equation 3, below, to determine the UE’s transmit power:

$$P_{TS}: P_{TS} = P_0 + G(n) + \alpha L \quad (\text{Equation 3})$$

P_0 is the power level at which the receiving network entity desires to receive the transmitting station’s communication in dB. EX1004, 5:67 – 6:6. $G(n)$ is the “closed-loop power control factor” and is represented by Equation 4, below:

$$G(n) = G(n - 1) + b_{TPC} \Delta_{TPC} \quad (\text{Equation 4})$$

$G(n - 1)$ is the “previous closed-loop power control factor.” EX1004, 6:17-21. The power command, b_{TPC} , for use in Equation 4 is either +1 or -1.” EX1004, 6:21-23. b_{TPC} is transmitted to the UE by the network. EX1004, 2:2:3, 19-21, 27-28; 6:23-25. “ Δ_{TPC} is the change in power level,” which is typically 1 dB. EX1004, 6:26-27. “[T]he closed-loop factor increases by 1 dB if b_{TPC} is +1 and decreases by 1 dB if b_{TPC} is -1.” EX1004, 6:27-31. L is estimated pathloss, which is estimated at the UE. EX1004, 5:18-51. α is a weighting factor and is determined by the UE and “is a measure of the quality of the estimated path loss....” EX1004, 6:32-33; EX2016, ¶86.

2. Zeira Notes an Operator May Use Solely Open Loop or Solely Closed Loop

Zeira mentions that a network operator “may desire to use solely open-loop or solely closed-loop power control.” EX1004, 7:18-20. Zeira provides a single example as to how solely closed-loop power control can be used, stating in one sentence that “the operator may use solely closed-loop power control by setting α to zero.” EX1004, 7:20-22. In other words, a network operator can choose to disable the portion of the transmit power control function (Equation 3) corresponding to open-loop processing by setting α , the weighting factor applied to the estimated pathloss calculation, to zero. Zeira does not mention how the network sets the weighting factor to zero (or which entity might do it) and also gives no details for how to implement solely open-loop power as there is no variable that can be readily set to zero in the same way α is. EX2016, ¶¶87, 136-141.

E. Declaration of Michael D. Kotzin, PH.D

The expert declaration submitted by Dr. Michael D. Kotzin, (EX1003), should be afforded little weight because it offers no meaningful analysis beyond what is already stated in the Petition. A significant portion of Dr. Kotzin’s declaration merely parrots the Petition nearly verbatim, with only cosmetic differences such as the inclusion of direct quotations in place of pinpoint citations. *See, e.g.*, EX1003, ¶¶46-51, 53, 56-84, 88-94, 96-102, 104-149, 151, 152, 156-177. Such repetition does not constitute expert analysis and fails to provide the type of independent technical

reasoning that might assist the Board. Consistent with *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15-17 (PTAB Aug. 24, 2022) (precedential), expert declarations that do little more than restate a petitioner’s conclusory assertions—without additional technical rationale—are entitled to little or no weight. This is especially true here, where the explanation is used not to explain the prior art, but to impermissibly fill gaps in the disclosures of Andersson and Zeira.

For instance, to support its flawed mapping of the Claimed “single channel” to Andersson’s DPCCH, the Petition and expert declaration assert:

[A]ndersson recognizes that “other bits” may be transmitted along with the TPC command and power control indicator in the dedicated physical control channel (DPCCH). A POSITA would have found it obvious that those other bits may include a scheduling grant as described by Khan.

Petition, 28; EX1003, ¶76 (emphasis added)(citations removed). Yet the declaration offers no citation to Andersson (or other evidence) supporting this assertion. This omission is telling because Andersson does not disclose or even suggest what the “other bits” may be, nor does it disclose or suggest a need in the art for scheduling UEs. To the contrary, as identified by Dr. Lomp (EX2016, ¶¶102-111), using Andersson’s DPCCH, one of ordinary skill in the art would not have gone looking for information on how to dynamically schedule UEs because it not mentioned whatsoever in Andersson, which instead used RRC signaling from the RNC to configure the UE’s dedicated uplink transport channel. EX1009, 7:18-21; EX2016,

¶¶62-63, 71. Further, as elaborated on in detail below, with significant support in Dr. Lomp's declaration and contemporaneous technical standards, dynamic scheduling grants were not even used in Andersson nor were they commonly used in its (or Zeira's) underlying technology at the time those applications were filed, a fact that Dr. Kotzin does not even address in his declaration at all. EX2016, ¶¶62-63, 110, 113-114, 148, 151-152. As in *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1340-41 (Fed. Cir. 2020), where the Federal Circuit affirmed that *expert testimony should be discounted when it merely repeats unpersuasive attorney argument without substantiating analysis*, the Board should accord little weight to Dr. Kotzin's conclusory statements.

Ultimately, Petitioner's expert is not interpreting Andersson or Zeira but is, instead, re-writing them to conform to the Claim limitations—precisely the kind of improper hindsight reconstruction prohibited under § 311(b). The declaration's failure to offer independent analysis, combined with its unsupported assertions that contradict the cited reference, confirms that it should be afforded little probative value.

V. THE PETITION FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

A. Ground 1 – Claims 1, 2, 4, 5, 11, 12, 14 and 15 Are Not Obvious Over Andersson, Baker and Khan Pursuant To 35 U.S.C. § 103

In Ground 1, the Petition relies on an alleged combination of Andersson, Baker and Khan in challenging Claims 1, 2, 4, 5, 11, 12, 14 and 15 as allegedly obvious under 35 U.S.C. § 103. This allegation is deficient for a number of reasons. First, Andersson does not teach or suggest an indication, sent to the UE, that TPC accumulation is enabled. Second, Petitioner has not properly established a motivation to combine Andersson and Khan. The alleged combination of these references would, instead, require a complete re-design of Andersson’s system, which is impermissible.

1. Andersson and Baker, Alone or in Combination, Do Not Disclose or Suggest “The Processor is Configured to Cause: The Receiver to Receive, From a Network Device, an Indication that Transmit Power Control Command (TPC) Accumulation is Enabled,” As Required By Claim 1

The Petition argues, in one alternative, that Andersson teaches a UE that “receive[s], from a network device, an indication that transmit power command (TPC) accumulation is enabled.” Petition, 34. More specifically, the Petition asserts that the “power control indicator,” taught in 9:6-11 of Andersson, is “an *indication* that a particular type of power control adjustment is *enabled*.” *Id.* This is incorrect at least because, in Andersson, binary TPC accumulation will always be enabled, regardless of which power control scheme is used. EX2016, ¶93. Accordingly, Andersson does not teach or suggest an indication, sent to the UE, that TPC accumulation is enabled.

Andersson teaches UE uplink transmit power control using TPC commands. The TPC commands themselves “either raise, lower, or make no change to the transceiver’s current transmit power.” EX1009, 9:4-6; EX2016, ¶¶93. While accumulation is not specifically mentioned in Andersson, to the extent it is implied, the TPC commands would be used to raise, lower or make no change to the UE transmit power level by adding the TPCs to an accumulator. *Id.* When the TPCs indicate + or -, the value in the accumulator either increases or decreases. The concept of TPC accumulation, as well as an explanation as to how the concept has evolved since its infancy, is described in detail in the declaration of Gary Lomp. EX2016, ¶¶35-42.

Andersson also teaches the concept of a power control indicator, which is a single bit appended to the TPC commands. The power control indicator itself, in every possible scheme described in Andersson, signifies the magnitude of the increase or decrease to be added to the accumulator. For example, in some embodiments, the power control indicator bit indicates either a 1 dB or 8 dB magnitude, depending on the value of the power control indicator bit. EX1009, 9:45-50; EX2016, ¶¶94-95. In other embodiments, the power control indicator bit indicates either that the magnitude of the TPC added to the accumulator is the same (e.g., 1 dB for each slot in a frame) or different depending on the slot number within the frame. EX1009, 10:40-58; EX2016, ¶¶94-95. In both cases, however, the TPC is

always added to the accumulator, and only the magnitude of the TPC changes. EX1009, 9:50-54, 10:43-49; EX2016, ¶94-95.

Accordingly, in Andersson, accumulation is always enabled, regardless of the value of the power control indicator bit, and is never disabled. Therefore, the power control indicator bit is not an indication that TPC command accumulation is enabled, as alleged in the Petition.

The Petition takes the higher-level position that the power control indicator “indicates whether a first type or a second type of power control adjustment should be used” and extrapolates from that statement that “a well-known type of power control adjustment before the ‘153 patent was TPC accumulation.” Petition, 20. However, this interpretation of the power control indicator is inapposite to the manner in which the power control indicator is actually used in Andersson. EX2016, ¶96. For Petitioner’s argument to be true, the power control indicator would need to completely negate the TPC that it is appended to. EX2016, ¶96. In other words, in Andersson, the TPC can indicate “no change” (or $TPC = 0$), so there would be no reason for the network to send a TPC and append to it an indication that accumulation is not enabled. EX1009, 8:45-48 (stating “[t]he TPC commands may include one or more bits which indicate...in some cases no change in transmit power”), 9:3-5 (*stating* “[a] transmit power control command is sent to the radio transceiver to either raise, lower, or make no change to the transceiver’s current

transmit power), FIG. 4, step 206 (“SEND TRANSMIT POWER CONTROL (TPC) COMMAND TO RAISE, LOWER OR NOT CHANGE TRANSMIT POWER). EX2016, ¶96-97. There is simply no disclosure or suggestion, anywhere in Andersson, explicitly or implicitly, that accumulation can ever be completely disabled and, therefore, the power control indicator cannot be read as an indication “that transmit power control (TPC) command accumulation is enabled,” as alleged.

In the alternative, the Petition argues:

To the extent Andersson does not explicitly teach “*transmit power control (TPC) command accumulation*” as a “type of power control adjustment” that may be indicated by Andersson’s power control indicator, doing so would have been obvious in view of Baker

Petition, 35:5-8. For this assertion, the Petition relies on a “Power Control Algorithm (PCA)” parameter taught by Baker. Petition, 35. Like the power control indicator in Andersson, however, the PCA parameter of Baker is not an indication that TPC command accumulation is enabled. This is because, like Andersson’s power control indicator, both values of the PCA parameter in Baker result in a TPC being added to an accumulator. EX2016, ¶99.

As explained in detail above, the PCA in Baker can take one of two values: 1 or 2. The significance of the value 1 or 2 PCA is summarized in FIG. 3 (below) of Baker. As clearly shown in FIG. 3, there is no value of PCA that ever results in ΔTPC not being added to an accumulator. If PCA is 1, $\Delta\text{TPC} = 1$ or $\Delta\text{TPC}=2$ is added to the accumulator. If PCA =2, $\Delta\text{TPC} = 1$ is added to the accumulator. While

not shown in FIG. 3, Baker also makes clear that if $PCA = 2$, “the transmission power is unchanged.” EX1010, ¶¶22-23. This simply means that a value of $\Delta TPC = 0$ is added to the accumulator and is not synonymous with disabling accumulation. EX2016, ¶¶99-103. This is an important distinction because disabling accumulation goes a step further, and would potentially result in a reset of the value stored in the accumulator at the time TPC command accumulation is disabled. Similarly, if TPC command accumulation is enabled after being disabled, the value in the accumulator is initialized to some predetermined value. This is consistent with the way TPC command accumulation is explained in the ‘153 Patent. EX1001, 9:28-31 (explaining, for example, that “K is the initial frame number determined when the power control process begins” (emphasis added)).

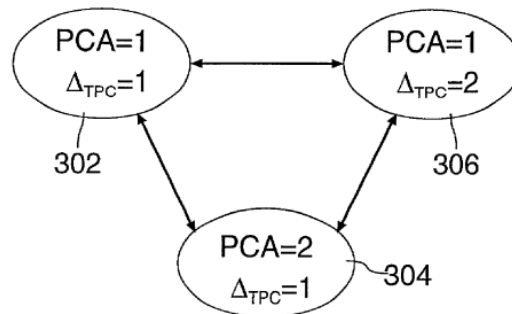


FIG. 3

The Petition assumes that, when PCA is 2, since the TPC binary values are compared and used to determine the magnitude of a change to be made to the UE UL transmit power, TPC command accumulation is disabled. Petition, 35; EX2016, ¶¶99-103. This assumption is invalid since, when $PCA = 2$, some value will be

integrated with the UE UL transmit power (either $\Delta\text{TPC} = 1$ or $\Delta\text{TPC} = 0$). The only difference is that when $\text{PCA}=2$, accumulation occurs every 5 slots, whereas when $\text{PCA}=1$, accumulation occurs during every slot. *Id.* This is, again, consistent with the teachings of the ‘153 Patent, which indicates that accumulation can occur per slot or per frame (i.e., more than one slot). EX1001, 9:35-40. As mentioned above, if TPC command accumulation were in fact disabled, it would effectively reset the value of the UE transmit power, which is clearly not the intent of the disclosure.

It is important to note that Andersson and Baker are both completely silent with respect to “accumulation” per se. Accordingly, all discussions of how TPCs may be integrated to arrive at an adjusted transmit power are merely academic in both cases. While accumulation is assumed for purposes of this discussion, the disabling of accumulation cannot similarly be assumed without explicit disclosure as there is simply no indication in either reference that the TPCs are ever not integrated as part of determining the UE’s UL transmit power. Simply put, disabling accumulation would result in a loss of the value temporarily stored in the accumulator, and neither reference provisions for that scenario. Accordingly, it is clear that both references should be interpreted such that TPC command accumulation, to the extent it is used in either reference, is always enabled, without any indication being sent to the UE directing it to enable TPC command accumulation.

2. Andersson and Khan, Alone or in Combination, Do Not Disclose or Suggest “Receiv[ing], From the Network Device, on a Single Channel, Scheduling Information and Power Control Information...,” As Required By Claim 1

The Petition argues that “[t]he combination of Andersson and Khan renders obvious” the Claim feature “receiv[ing], from the network device, on a single physical channel, scheduling information and power control information that includes a multi-level TPC command.” Petition, 36. This argument, however, is based on a fundamental misunderstanding of the various channels described in each of the Andersson and Khan references and ignores portions of these documents that lead away from the alleged combination. These references cannot, in fact, be properly combined to arrive at this feature of Claim 1 of the ‘153 Patent.

a) Motivation to Combine

Petitioner argues that a POSITA would have been motivated to transmit both the TPC command, taught by Andersson, and the uplink scheduling grant, taught by Khan, using Andersson’s dedicated physical control channel (DPCCH) “because it would improve Andersson ‘in the same way’ and require nothing more than ‘the predictable use of prior art elements according to their established function.’” (citing *KSR*, 550 U.S. at 417). Petition, 26. Petitioner’s theory is this: Andersson (allegedly) discloses both receiving TPC commands *from a BS/Node-B* and transmitting an uplink communication *to a BS/Node-B*. *Id.* From this disclosure, Petitioner argues, a POSITA would have been motivated to seek out and use the teachings of Khan,

“which discloses such signaling techniques used by a BS for allocating uplink resources and in a spread-spectrum communication system that similarly transmits TPC commands,” to graft a scheduling grant, as taught by Khan, onto the DPCCH of Andersson using Andersson’s “other bits”. *Id.* (emphasis added). *Id.* at 26-27.

Petitioner’s theory appears straightforward at first glance: if a UE receives a TPC command, from a Node-B, on a downlink channel, why would a POSITA not also want to receive a scheduling grant for that uplink transmission on the same channel? The flaws in this reasoning are equally straightforward. First, it assumes that fast per TTI scheduling was the technology to use for the UE’s uplink transmission to the BS/Node-B. Second, it assumes that the “scheduling” signaling originates from the BS/Node-B. Both these assumptions are wrong.

Even assuming a Petitioner would have ignored the teachings of Andersson and its underlying technology, a POSITA would not have sought out or applied Khan, as Petitioner suggests, as it would not have “improved” Andersson in the same way or achieved predictable results because Andersson and Khan use fundamentally incompatible channel multiplexing structures. Thus, even if a POSITA happened upon Khan, in their search for a way to combine TPCs and fast scheduling grants on the same channel, the changes would not improve Andersson in the same way to achieve predictable results, but would have instead required a substantial re-design of the channels such that a POSITA would not have applied Khan’s teachings at all.

Finally, Petitioner offers four “advantages” to the proposed combination that would have allegedly been obtained “by transmitting TPC commands and uplink scheduling information” over Andersson’s DPCCH. Petition, 26-27. These purported benefits, (1) supporting a larger number of active wireless units, (2) reduced complexity, (3) reduced latency, and (4) the notion that a POSITA would have understood scheduling information as “control information” naturally belonging on the DPCCH, do not withstand scrutiny. As explained below, each is based on a misreading of Andersson and Khan, ignores the fundamental architectural differences between WCDMA and CDMA2000 HRPD, *and in fact highlights why a skilled artisan would have avoided such a combination rather than pursued it.*

1) In Andersson, and Its Base Technology, the UE’s Dedicated Uplink Transport Channel Was Semi-Statically Configured Using RRC Signaling

Petitioner assumes that a UE’s uplink transmission to a BS necessarily implies fast, per-TTI scheduling grants from the BS to the UE. Petition, 26 (alleging that Khan would improve Andersson “in the same way” due to Andersson’s uplink transmissions). That assumption is wrong. During the relevant time period, dynamic per-TTI scheduling grants were not used to “schedule” UEs’ uplink transmissions in WCDMA (UMTS/FDD), the underlying technology of the Andersson patent. EX2016, 62-63; EX2015, § 8.6. Instead, uplink transport channels were configured semi-statically through RRC signaling. *Id.* A UE’s dedicated uplink transport

channel was initially established by RRC configuration, and thereafter required reconfiguration only when circumstances changed—such as a change in QoS or data rate requirements, a handover or cell reselection, or the activation of additional services or radio bearers. *Id.* Andersson itself confirms this framework, explaining that “Radio network controllers (RNCs) 12 and 14 control various radio network functions including for example radio access bearer setup, diversity handover, etc.” EX1009, 7:3–10. Accordingly, Petitioner’s premise, that Andersson’s uplink transmissions imply fast per-TTI scheduling via downlink grants, is inconsistent with how WCDMA operated at the time, as explained by Dr. Lomp and confirmed by the WCDMA (UMTS/FDD) specifications. EX2016, ¶111.

2) The RRC Signaling Used to Configure the UE’s Dedicated Uplink Transport Channel Was an RNC Function

Additionally, Petitioner assumes that in Andersson the BS/Node-B would have sent scheduling information to the UE. Petition, 26 (alleging that Khan would improve Andersson “in the same way” because it discloses downlink transmission of TPCs from the BS as well as uplink transmissions to the BS). That is incorrect. In Andersson—and under the contemporaneous WCDMA standards—the RRC signaling used to configure uplink channels originated from the RNC, not the BS/Node-B. EX2016, 62-63; EX2015, § 8.6. In other words, Andersson separates these functions: the RNC provided the “scheduling” configuration signaling, while

the Node-B received uplink transmissions from the UE. *Id.* Thus, Petitioner's assumption that Andersson's "scheduling grants" and uplink transmissions would have originated from the same entity is contrary to Andersson itself and the governing standards.

Andersson's FIG. 1 (below) is illustrative. As shown, in WCDMA, the RNC 12/14 was part of the UTRAN and sat at the edge of the radio access network (RAN) on the core network (CN) side, acting as the gateway between the RAN the CN. Accordingly, when the RAN provided RRC signaling, such as to configure an uplink transport channel for a UE (MS16/18/20/22/28/30), the BS/Node-B would act as a relay only, forwarding it to the UE/MS. EX1009, FIG. 1; EX2016, § 8.6.

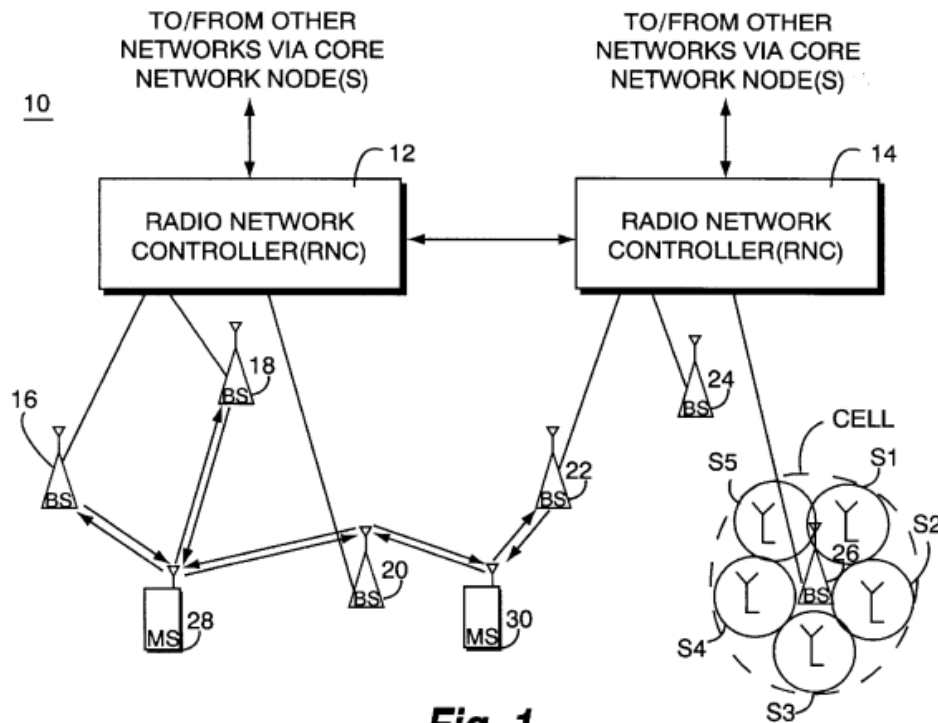


Fig. 1

Petitioner's argument rests on a dynamic scheduling grant on a single physical channel transmitted by the BS/Node-B. Since the RRC signaling originates from the RNC, while the TPC originates from the BS/Node-B, they cannot be transmitted on the same physical channel.

3) Andersson and Khan Use Fundamentally Incompatible Channel Multiplexing Structures

Khan's disclosure arises from a different technology family than Andersson's, namely CDMA2000 High Rate Packet Data (HRPD).¹ In Khan's time domain multiplexing embodiment, the forward link is organized into time-multiplexed slots, where different types of control information such as TPC bits and scheduling grants can be transmitted in distinct fields within the same downlink slot. EX1005, Fig. 5; ¶¶ [0045]–[0047]. This slot-by-slot time-multiplexing is fundamentally different from the control channel described in Andersson. EX2016, ¶111. Andersson discloses a DPCCH in which every 0.625 msec uplink slot carries a fixed structure of control fields, a TPC command, a power control flag, and other bits, repeated in each slot without time-multiplexing or dynamic scheduling. See EX1009, 9:12–22, Fig. 5. Because these channels operate with different multiplexing structures, combining them would not have been a predictable or natural design choice. EX2016,

¹ Khan discloses two types of CDMA2000 HRPD: orthogonal Walsh covers and time domain multiplexing. In the Walsh cover embodiment, TPCs and scheduling grants would be considered sent over separate physical channels. EX1005, ¶¶37-41, EX2016, ¶71, Petition, 24. This discussion therefore is limited to the time domain multiplexing embodiment.

¶58-61, 78-80, 111. Andersson's DPCCH simply could not have predictably supported dynamic scheduling assignments.

Under *KSR*, obviousness requires that the prior art be combined “in the same way” to achieve predictable results. Here, the combination fails on both counts. EX2016, ¶116-117. Andersson's WCDMA dedicated physical channels, uplink DPCCH, and downlink DPCH, were defined as continuous streams with fixed slot structures. EX2016, ¶58-61, 111, 116-117. Each uplink slot carried pilot, TFCI, FBI, and TPC bits, while each downlink slot carried user data multiplexed with fixed control fields including pilot, TFCI, FBI, and TPC bits. *Id.* In contrast, Khan's HRPD disclosure arises from a different technology family, in which the forward link was explicitly organized into time-multiplexed slots that could carve out separate fields for TPC commands and scheduling grants. EX2016, ¶78-80, 111, 116-117. A POSITA in 2004, when the '153 Patent was filed, would not have viewed these channels as operating “in the same way,” nor would they have expected predictable results from trying to merge them. TPC commands must be transmitted continuously and with extremely high reliability in every slot to maintain closed-loop power control, whereas scheduling information is larger, bursty, and tied to a different timing cycle. EX2016, ¶116. Attempting to combine these functions within the fixed structures of the DPCCH/DPCH would either disrupt the timing-critical TPC stream or constrain scheduling flexibility, undermining both. EX2016, ¶116-

117. Kahn in fact highlighted the extremely narrow application of the channel over which TPCs and scheduling grants were sent, limiting it to the specific time multiplexed CDMA2000 HRPD slot structure it used. EX1005, ¶¶ 11, 43. A POSITA therefore would have recognized that putting TPC and scheduling together on these channels was not a predictable or natural design choice, but rather a hindsight reconstruction that would require substantial re-design of Andersson’s DPCCH/DPCH channel. EX2016, ¶¶116-117.

Although both WCDMA and CDMA2000 HRPD were “CDMA” systems, they evolved in different standards bodies and followed fundamentally different architectures. In the WCDMA technology explicitly described in Andersson, scheduling was performed semi-statically by the RRC in the RNC, while the Node-B handled only fast power control on the DPCCH. EX2016, ¶¶117. By contrast, CDMA2000 HRPD employed base-station-centric, slot-by-slot scheduling, where scheduling grants and TPC bits were multiplexed into the same forward-link slot. Ex.1005 (Khan), ¶¶ [0043]–[0047]. These approaches were not interchangeable. A POSITA in 2004 would have looked to 3GPP standards for WCDMA scheduling, not HRPD, because adopting HRPD’s architecture would have required moving scheduling from the RNC to Node-B and redesigning the physical channel structure — a fundamental departure from WCDMA, not a predictable combination. EX2016, ¶¶117.

Finally, in general, the dynamics of TPC and resource scheduling have historically been unrelated. EX2016, ¶118. TPC is only relevant when resources are actively in use. What changes, if at all, under uplink packet transmission, is that traffic can be sporadic, making it desirable to know both which resources will be assigned and what power level to apply when the transmission event occurs. *Id.* However, the notion that these two functions would naturally be combined on the same channel using Andersson’s “other bits” assumes a kind of omniscience—that the system not only “knows” the scheduled transmission resources (which it does) but also the appropriate power control setting, which is not realistic absent a specific context in which TPC updates and scheduling are simultaneously relevant. *Id.* The idea of coupling on-demand resource allocation with on-demand power prescriptions, without that context, is fallacious. *Id.* Any meaningful joint transmission of TPC and scheduling must be grounded in such a context, which comes from the ‘153 Patent, not from any a priori teaching, motivation, or expectation. *Id.*

b) Alleged Benefits of Petitioner’s Proposed Combination

In addition to its “in the same way” motivation to combine argument, Petitioner purports certain “benefits” of the proposed combination: (1) allowing for a larger number of active wireless units, (2) reduced complexity, (3) reduced latency, and (4) “a POSITA evaluating how Andersson’s UE receives uplink scheduling

information would understand that scheduling information is control information and naturally belongs within a control channel, such as Andersson's" DPCCH. Petition, 26-27. These arguments also fail because they rely on mischaracterizations of both references and overlook fundamental architectural differences between UMTS (Andersson) and CDMA2000 HRPD (Khan). EX2016, ¶119-123. Andersson's solution was expressly designed to provide fast, reliable, and low-overhead inner-loop power control via a dedicated channel, whereas Khan's scheme multiplexes diverse control information in a manner tailored to a different system with different constraints. *Id.* Importing Khan's multiplexing into Andersson would not yield the claimed benefits, but instead would compromise power control stability, increase implementation burden, and degrade system performance.

1) Larger Number of Active Wireless Units

Petitioner's premise ignores the fundamental difference in channel design. Andersson teaches that TPC commands are carried reliably on the dedicated physical control channel (DPCCH), which ensures every active user receives continuous, slot-by-slot feedback for closed-loop power control. EX2016, ¶120. By contrast, Khan's multiplexed grants are designed for a very different CDMA2000 HRPD architecture where scheduling decisions dominate and TPC frequency can be reduced. *Id.* Importing that approach into Andersson would not support "more active units"; it would simply deprive users of the reliable per-slot power control that

Andersson expressly requires to maintain system stability. *Id.* The supposed capacity increase comes at the cost of destabilizing the power control loop, undermining the very problem Andersson solved.

2) Reduced Complexity

Combining Andersson and Khan would in fact **increase** complexity. EX2016, ¶121. Andersson's innovation was to minimize overhead and signaling by embedding a simple one-bit indicator with TPC, avoiding the need to carry detailed adjustment data in every slot. *Id.* Khan, by contrast, multiplexes diverse control information, including grants, IDs, HARQ, and TPC, into time-shared fields. *Id.* Overlaying Khan's scheme onto Andersson's would require significant additional logic in both the UE and BS to parse mixed control types, coordinate power adjustments with scheduling bursts, and resolve timing conflicts. *Id.* This is not a simplification; it is the introduction of two incompatible control paradigms. *Id.*

3) Reduced Latency

Andersson already addresses latency by ensuring fast, 0.625 msec inner-loop power control updates. EX2016, ¶122. That is the lowest-latency feedback path possible in UMTS. *Id.* Khan's multiplexed slotting actually slows down the frequency of TPC delivery—because TPC bits must share space with scheduling and HARQ information. *Id.* Thus, adopting Khan's structure would risk less frequent or delayed power updates, not faster ones. *Id.* In short, Andersson's design is latency-

optimized for its environment, and grafting on Khan’s HRPD scheduling constructs would only degrade responsiveness. *Id.*

4) A POSITA Would Understand that Scheduling Information is Control Information that Naturally Belongs Within a Control Channel

Andersson, and the WCDMA framework in which it operates, directly refutes this alleged benefit. In WCDMA/Andersson, the uplink control channel is not configured through dynamic downlink grants, but rather through higher-layer RRC signaling. EX2016, ¶123. A POSITA would therefore not have equated uplink scheduling information with the Layer 1 control channel functions described in Andersson, because the system architecture assigned that task to Layer 3 signaling. *Id.* In short, the technology handled uplink configuration fundamentally differently, and a skilled artisan would have recognized that scheduling information did not “naturally belong” on Andersson’s DPCCH. *Id.*

3. Ground 1 - Conclusion

Claim 1 is, therefore, not obvious over Andersson, Baker, and Khan. Claim 11 includes features similar to Claim 1 and, therefore, is not obvious over Andersson, Baker and Khan for at least the same reasons as Claim 1. Claims 2, 4, 5, 12, 14 and 15 are not obvious over the alleged combination of Andersson, Baker, and Khan, for at least the same reasons as Claims 1 and 11.

B. Ground 2 – Claims 3 and 13 are Not Obvious Over Andersson, Baker, Khan and Dick Pursuant to 35 U.S.C. § 103

Claim 3 and 13 depend from Claim 1 and Claim 11, respectively. Dick does not make up for deficiencies of Andersson, Baker, and Khan, as set forth above. Accordingly, Claims 3 and 13 are not obvious over Andersson, Baker, Khan, and Dick.

C. Ground 3 – Claims 1, 2, 4, 5, 10-12, 14, 15 and 20 Are Not Obvious Over Zeira, Baker, Khan and Tong Pursuant to 35 U.S.C. § 103

In Ground 3, the Petition relies on an alleged combination of Zeira, Baker, Khan, and Tong in challenging Claims 1, 2, 4, 5, 10-12, 14, 15 and 20 as allegedly obvious under 35 U.S.C. § 103. This allegation is deficient for a number of reasons. First, Zeira does not teach or suggest an indication, sent by a BS to the UE, that TPC accumulation is enabled. Second, Petitioner has not properly established a motivation to combine Zeira and Khan. The alleged combination of these references would, instead, require a complete re-design of Zeira's system, which is impermissible.

1. Zeira and Baker, Alone or in Combination, Do Not Disclose or Suggest “The Processor is Configured to Cause: The Receiver to Receive, From a Network Device, an Indication that Transmit Power Control Command (TPC) Accumulation is Enabled,” As Required By Claim 1

In one alternative, the Petition argues that Zeira teaches a UE that receives, from a network device, an indication that TPC command accumulation is enabled. Petition, 77:11-14. More specifically, the Petition asserts that the “weighting factor

α ,” taught in Zeira, is “the recited *indication that TPC command accumulation is enabled*.” Petition, 56. This is incorrect at least because, in Zeira, the weighting factor α Petitioner claims is the sent by the BS/Node-B is dynamically calculated at the UE. EX1004, 7:16–22.

The claim requires the UE to receive from the network an indication that TPC command accumulation is enabled. That is not satisfied by a step-size flag (Zeira) or a choice to aggregate over five slots (Baker). Those merely change how large or how often contributions are added; accumulation—the integrator that sums TPC effects—remains always on. Nor does Zeira disclose a network indication; α is a UE weighting of path-loss confidence and the only example ($\alpha=0$) removes the open-loop term without any teaching of a BS-originated indication. Petitioner’s theory never identifies a network signal to toggle accumulation on/off at the UE.

As explained above, Zeira describes a combined open and closed-loop power control scheme implemented using the function $P_{TS} = P_0 + G(n) + \alpha L$. EX1004, 5:67-6:3; EX2016, ¶131. Using this equation, the UE transmit power, P_{TS} , is adjusted starting with P_0 , the power level at which the network entity would like to receive transmissions from the UE, and adding in the closed-loop power control factor, $G(n)$, and the open-loop power control factor, αL . See EX1004, 5:67-6:3; EX2016, ¶131. While Zeira is silent with respect to “accumulation,” the closed-loop power control factor $G(n)$ represents $G(n-1)$, the previous closed-loop power control

factor (e.g., based on the last calculation of $G(n)$, in a previous slot, frame, etc.), updated based on the power command, b_{TPC} , and the change in power level, Δ_{TPC} . EX1004, 6:16-23; EX2016, ¶¶131, 132. The Petition refers to this as “TPC command accumulation.” Petition, 55.

Zeira mentions that a network operator may desire to use solely open-loop or solely closed-loop power control, and may use solely closed-loop power control by setting the weighting factor α to zero. EX1004, 7:18-22; EX2016, ¶¶132-134. Practically, this means that when $\alpha = 0$, L , the open-loop power control factor is given a weight of “0” and, accordingly, αL is zero’d out of the equation, leaving:

$$P_{TS}: P_{TS} = P_0 + G(n) + \alpha L$$

EX1004, 5:67-6:4, 7:18-22; EX2016, ¶¶132-134. Zeira does not disclose, or even suggest, how the UE would be made aware that the weighting factor α is set to zero. The cited passage merely states that “the network operator may desire to use solely open-loop or closed-loop power control” (Ex. 1004, 7:16–22), but it provides no disclosure of any mechanism for communicating this information to the UE. Weighing heavily against this is that α is a dynamic weighting factor calculated locally at the UE. *See* § III.D.1 *infra*. Nothing in Zeira describes the UE receiving an indication, from the BS/Node-B, that α should be set to zero. This does not change the fact that Zeira does not say this, or the fact that α is calculated at the UE.

As PO's expert explains, combined open- loop and close-loop control are at the core of Zeira's disclosure, as is the weighting factor α , used to determine how much open- and closed-loop control the system uses. EX2016, ¶132-137. A network operator, determining to completely negate one of the two from the calculator, would be a departure from that scheme. *Id.* at ¶132-139. How they go about doing it is outside of the scope of the disclosure—Zeira never says how or why the network operator would do this, a decision that would largely affect how it's implemented. *Id.* It is in fact highly unlikely that it would be done dynamically as there is no apparent reason to import this functionality into the Node-B, which would require a substantial re-design after the fact to implement. *Id.* The more likely option is a network operator policy of using one or the other, implemented in a SIM card. *Id.*

Accordingly, there is no scenario taught by Zeira in which the UE receives an “indication that TPC command accumulation is enabled,” and Zeira, alone, does not disclose or suggest “the processor is configured to cause: the receiver to receive, from a network device, an indication that transmit power control (TPC) accumulation is enabled.”

In the alternative, the Petition argues that:

To the extent Zeira does not explicitly describe its UE receiving from the network operator the α parameter to indicate which power control mode is enabled, such communication between a base station and a UE was well known and conventional in wireless communications, and thus obvious. Specifically, whether a patent Claim would have been obvious in light of prior art references is determined from the

perspective of a POSITA. Here, the perspective of a POSITA is informed by the basic understanding of how wireless communication systems operate.

Petition, 58 (citations removed). The Petition then cites to Baker for alleged implementation details about “adjusting power control parameters.” Petition, 58. Baker does not, however, make up for the deficiencies of Zeira, as set forth above, with respect to enabling TPC command accumulation, which is not disclosed or suggest by either reference. EX2016, ¶¶141-144.

Accordingly, Zeira, in combination with Baker, also does not disclose or suggest “the processor is configured to cause: the receiver to receive, from a network device, an indication that transmit power control (TPC) accumulation is enabled,” as required by Claim 1 of the ‘153 Patent.

2. Zeira and Khan, Alone or in Combination, Do Not Disclose or Suggest “a Single Physical Channel That Carries “Scheduling Information and Power Control Information”

The Petition argues that “Zeira and Khan render obvious receiving scheduling information and TPC commands on a *single physical channel*.” Petition, 64. Like the similar argument made in Ground 1 relative to the alleged combination of Andersson and Khan, this argument is based on a fundamental misunderstanding of the various channels described in each of the Zeira and Khan references and ignores portions of these documents that lead away from the alleged combination. EX2016,

¶142. These references cannot, in fact, be properly combined to arrive at this feature of Claim 1 of the ‘153 Patent.

a) Motivation to Combine

Petitioner argues that a POSITA would have been motivated to transmit both the TPC command, taught by Zeira, and the uplink scheduling grant, taught by Khan, using Zeira’s dedicated channel “because it would improve Zeira ‘in the same way’ and require nothing more than ‘the predictable use of prior art elements according to their established function.’” Petition, 65-66 (citing *KSR*, 550 U.S. at 417). Petitioner’s theory is this: Zeira discloses both receiving TPC commands *from a BS/Node-B* and transmitting an uplink communication *to a BS/Node-B* “in the appropriate codes of the assigned resource units.” From this disclosure, Petitioner argues, a POSITA would have been motivated to seek out and use the teachings of Khan, “which discloses such signaling techniques used by a BS for allocating uplink resources and in a spread-spectrum communication system that similarly transmits TPC commands,” to graft a scheduling grant, as taught by Khan, onto the dedicated channel of Zeira. Petitioner argues that “Zeira’s reference to ‘assigned resource units’” would indicate to a POSITA that Zeira contemplates some scheduling function located at the receiving station that allocates such resources for uplink transmission. *Id.*

Petitioner's theory appears straightforward at first glance: if a UE receives a TPC command, from a Node-B, on a downlink channel, why would a POSITA not also want to receive a scheduling grant for that uplink transmission on the same channel? The flaws in this reasoning are equally straightforward. First, it assumes that fast per TTI scheduling was the technology to use for the UE's uplink transmission to the BS/Node-B. Second, it assumes that the "scheduling" signaling would be transmitted by the BS/Node-B. Finally, it not only assumes, but explicitly states, that "resource grants" imply dynamic per TTI scheduling grants. All three of these assumptions are wrong.

Even assuming a Petitioner would have ignored the teachings of Andersson and its underlying technology, a POSITA would not have sought out or applied Khan, as Petitioner suggests, as it would not have "improved" Zeira in the same way or achieved predictable results because Zeira and Khan use fundamentally incompatible channel multiplexing structures. Thus, even if a POSITA happened upon Khan, in their search for a way to combine TPCs and fast scheduling grants on the same channel, the changes would not improve Zeira in the same way to achieve predictable results, but would have instead required a substantial re-design of the channels such that a POSITA would not have applied Khan's teachings at all.

Finally, Petitioner offers four "advantages" to the proposed combination that would have allegedly been obtained "by transmitting TPC commands and uplink

scheduling information” over Zeira’s dedicated channel. Petition, 26-27 (Petitioner uses the same advantages as the Andersson and Khan combination). These purported benefits, (1) supporting a larger number of active wireless units, (2) reduced complexity, (3) reduced latency, and (4) the notion that a POSITA would have understood scheduling information as “control information” naturally belonging on the dedicated, do not withstand scrutiny. As explained below, each is based on a misreading of Zeira and Khan, ignores the fundamental architectural differences between UTRA/TDD and CDMA2000 HRPD, and in fact highlights why a skilled artisan would have avoided such a combination rather than pursued it.

**1) In Zeira, and Its Base Technology, the UE’s
Dedicated Uplink Transport Channel Was Semi-
Statically Configured Using RRC Signaling**

Petitioner assumes that a UE’s uplink transmission to a BS necessarily implies fast, per-TTI scheduling grants sent by the BS/Node-B to the UE. Petition, 65-66 (alleging that Khan would improve Zeira “in the same way” due to Zeira’s uplink transmissions). That assumption is wrong. During the relevant time period, dynamic per-TTI scheduling grants were not used to “schedule” UEs’ uplink transmissions in UMTS/TDD, the underlying technology of the Zeira patent. EX2016, 62-63; EX2015, § 8.6. Instead, uplink transport channels were configured semi-statically through RRC signaling. *Id.* A UE’s dedicated uplink transport channel was initially established by RRC configuration, and thereafter required reconfiguration only

when circumstances changed, such as a change in QoS or data rate requirements, a handover or cell reselection, or the activation of additional services or radio bearers. *Id.* Accordingly, Petitioner’s premise, that Zeira’s uplink transmissions imply fast per-TTI scheduling via downlink grants, is inconsistent with how WCDMA operated at the time, as explained by Dr. Lomp and confirmed by the UMTS/TDD specifications.

2) The RRC Signaling Used to Configure the UE’s Dedicated Uplink Transport Channel Was an RNC Function

Additionally, Petitioner assumes that in Zeira the BS/Node-B would have sent scheduling information to the UE. Petition, 65-66 (alleging that Khan would improve Zeira “in the same way” because it discloses downlink transmission of TPCs from the BS as well as uplink transmissions to the BS). That is incorrect. In Zeira, and under the contemporaneous UMTS/TDD standards, the RRC signaling used to configure uplink channels was sent by the RNC, not the BS/Node-B.² EX2016, 62-63; EX2015, § 8.6. In other words, Zeira separates these functions: the RNC provided the “scheduling” configuration signaling, while the Node-B received uplink transmissions from the UE. *Id.* Thus, Petitioner’s assumption that Zeira’s

² See Sub-Section V.A.2.a).ii *infra* for a diagram and explanation on how the various network entities were related, how the signaling was transmitted from one entity to another, and how a single physical channel would not have originated at both the RNC and the Node-B.

“scheduling grants” and uplink transmissions would have originated from the same entity is contrary to Zeira itself and the governing standards.

3) Zeira’s Disclosure of Resource Grants Would Not Imply to a POSITA a Scheduling Function Beyond What the Underlying Technology Was Already Using

As understood by a POSITA, and as reflected in Zeira, “assigned resource units” refer to a combination of time slots and spreading codes used for transmission. *See* Ex. 1004, 4:31–39; EX2016, ¶151. 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 BS to schedule uplink transmissions. *See* Ex. 1005, ¶¶ 13–15. Accordingly, while Petitioner tries to impart some meaning on the “assigned resource units,” beyond the RRC signaling used in the underlying technology, this is not supported by Zeira or Khan and is not a reason to change the underlying RRC channel configuration functionality that would have been used by UMTS/TDD at the time. EX2016, ¶151.

Petitioner specifically alleges in this case that the “assigned resource units” would have specifically “motivated a POSITA to seek out Khan, which discloses such a scheduling function in a BS for allocating uplink resources in a spread-spectrum communication system that similarly transmits TPC commands.” Petition, 66. As established, however, Zeira was based on UMTS/TDD technology, which used RRC signaling to configure the uplink transport channel for the UE rather than

dynamic, per-TTI scheduling, and the “assigned resource units” would not have implied the former, Petitioner’s motivation to combine fails, and therefore Ground 3 should be dismissed. EX2016, ¶113.

4) Zeira and Khan Use Fundamentally Incompatible Channel Multiplexing Structures

Khan’s disclosure arises from a different technology family than Zeira’s, namely CDMA2000 High Rate Packet Data (HRPD). In Khan’s time-multiplexing embodiment, the forward link is organized into time-multiplexed slots, where different types of control information, such as TPC bits, scheduling grants, rate indication, and HARQ, are transmitted in distinct fields within the same downlink slot. Ex.1005, Fig. 5; ¶¶ [0045]–[0047]. This slot-by-slot time-multiplexing of disparate control functions is fundamentally different from the control channel described in Zeira. EX2016, ¶115, 152. Zeira is directed to UTRA-TDD in UMTS Release 99, where a dedicated channel is used to carry continuous TPC commands at Layer 1 in every time slot to maintain closed-loop power control. EX2016, ¶152. Zeira’s disclosure is limited to physical-layer power control mechanisms; the underlying UMTS architecture handled scheduling and channel configuration separately through Layer-3 RRC signaling procedures such as *Transport Channel Reconfiguration* and *Physical Channel Reconfiguration* in TS 25.331. *Id.*, ¶ 62-63, 152. Because these channels operate with different multiplexing structures and at

different protocol layers, combining them would not have been a predictable or natural design choice.

Under *KSR*, obviousness requires that the prior art be combined “in the same way” to achieve predictable results. Here, the combination fails on both counts. *Id.* at ¶ 153. In Zeira’s UTRA/TDD context, the dedicated channel is defined as a continuous slot-based stream for TPC bits, while channel grants are delivered by slow RRC reconfiguration messages. *Id.* By contrast, Khan’s HRPD disclosure arises from a different technology family, in which the forward link was explicitly organized to carry **fast, slot-level scheduling grants together with TPC**. EX1005, ¶¶ [0043]–[0047]; EX2016, ¶ 153. A POSITA in 2004 would not have viewed these channels as operating “in the same way,” nor would they have expected predictable results from trying to merge them. *Id.* TPC commands must be transmitted continuously and with extremely high reliability in every slot to maintain closed-loop stability, whereas scheduling information is bursty, variable in size, and tied to a different timing cycle. *Id.* Attempting to combine these functions within Zeira’s TDD dedicated channel would either disrupt the timing-critical TPC stream or constrain scheduling flexibility, undermining both. *Id.* A POSITA therefore would have recognized that putting TPC and scheduling together on Zeira’s dedicated channel was not a predictable or natural design choice, but rather a hindsight

reconstruction that would require substantial re-design of the UTRA-TDD protocol stack. *Id.*

b) Alleged Benefits of Petitioner’s Proposed Combination Fail for the Same Reasons as Ground 1

In addition to its “in the same way” motivation-to-combine argument, Petitioner purports certain “benefits” of the proposed combination: (1) allowing for a larger number of active wireless units, (2) reduced complexity, (3) reduced latency, and (4) “a POSITA evaluating how Zeira’s UE receives uplink scheduling information would understand that scheduling information is control information and naturally belongs within a control channel, such as Zeira’s dedicated channel.” These arguments also fail because they rely on mischaracterizations of both references and overlook fundamental architectural differences between UMTS/TDD (addressed in Zeira) and CDMA2000 HRPD (addressed in Khan). *Id.*, ¶ 154-157. Zeira’s solution was expressly designed to provide reliable closed-loop power control via a dedicated channel in every TDD frame, whereas Khan’s scheme multiplexes diverse control information in a manner tailored to a different system with different constraints. *Id.* Importing Khan’s multiplexing into Zeira would not yield the claimed benefits, but instead would compromise power control stability, increase implementation burden, and degrade system performance. *Id.*

1) Larger Number of Active Wireless Units

Petitioner's premise ignores the fundamental difference in channel design. Zeira teaches that TPC commands are carried continuously on a dedicated channel within the TDD slot structure, ensuring that every active user receives regular closed-loop power control updates. *Id.*, ¶ 155. By contrast, Khan's multiplexed grants are designed for CDMA2000 HRPD, where scheduling decisions dominate and the frequency of TPC updates can be reduced. Ex.1005, ¶¶ [0043]–[0047]; EX2016, ¶ 155. Importing that approach into Zeira would not support “more active units”; it would simply deprive users of the reliable slot-by-slot power control that Zeira requires to maintain stability in its weighted open/closed-loop scheme. EX2016, ¶ 155. The supposed capacity increase comes at the cost of destabilizing the power control loop—undermining the very problem Zeira solved. *Id.*

2) Reduced Complexity

Combining Zeira and Khan would in fact increase complexity. Zeira's innovation was to stabilize TDD power control by weighting open- and closed-loop inputs, a method that depends on receiving simple, continuous TPC feedback on a dedicated channel. EX2016, ¶ 156. Khan, by contrast, multiplexes diverse control information, including grants, IDs, HARQ, and TPC, into shared slot fields. *Id.* Overlaying Khan's scheme onto Zeira's design would require significant additional logic in both the UE and BS to parse mixed control types, coordinate weighted power

adjustments with scheduling bursts, and resolve timing conflicts. *Id.* This is not a simplification; it is the introduction of two incompatible control paradigms. *Id.*

3) **Reduced Latency**

Zeira already addresses latency by ensuring fast, frame-by-frame closed-loop power control updates (approximately 100 Hz in TDD). *Id.*, ¶ 157. That is the designed feedback cycle for UMTS TDD. Khan's multiplexed slotting actually slows down the frequency of TPC delivery—because TPC bits must share space with scheduling and HARQ information. Ex.1005, Fig. 5; EX2016, ¶157. Thus, adopting Khan's structure would risk less frequent or delayed power updates, not faster ones. EX2016, ¶157. In short, Zeira's design is latency-optimized for its environment, and grafting on Khan's HRPD scheduling constructs would only degrade responsiveness. *Id.*

4) **A POSITA Would Understand that Scheduling Information is Control Information that Naturally Belongs Within a Control Channel**

Zeira, and the UMTS TDD framework in which it operates, directly refutes this alleged benefit. In UMTS TDD/Zeira, uplink configuration is not conveyed by dynamic downlink grants, but rather by higher-layer **RRC signaling** procedures such as *Transport Channel Reconfiguration* and *Physical Channel Reconfiguration* in TS 25.331. *Id.*, ¶ 158. A POSITA would therefore not have equated uplink scheduling information with the Layer 1 control channel functions described in Zeira

because the system architecture assigned that task to Layer 3 signaling. *Id.* In short, UMTS TDD handled uplink configuration fundamentally differently, and a skilled artisan would have recognized that scheduling information did not “naturally belong” on Zeira’s dedicated TPC channel. *Id.*

3. Ground 3 - Conclusion

Claim 1 is, therefore, not obvious over Zeira, Baker, and Khan. Tong does not make up for the deficiencies of Zeira, Baker, and Khan, as set forth above. Accordingly, Claim 1 is not obvious over Zeira, Baker, Khan and Tong. Claim 11 includes features similar to Claim 1 and, therefore, is not obvious over Zeira, Baker, Khan and Tong, for at least the same reasons as Claim 1. Claims 2, 4, 5, 10, 12, 14, 15 and 20 depend from Claim 1 or Claim 11 and, therefore are not obvious over Zeira, Baker, Khan, Tong and Dick for at least the same reasons as Claims 1 and 11.

4. Ground 4 – Claims 3 and 13 Are Not Obvious Over Zeira, Baker, Khan, Tong and Dick Pursuant to 35 U.S.C. § 103

Claims 3 and 13 depend from Claims 1 and 11, respectively, and, therefore, are not obvious over Zeira, Baker, Khan, Tong, and Dick for at least the same reasons.

VI. CONCLUSION

Petitioner has not shown a prima facie case of obviousness for the alleged combinations in Grounds 1 or 3. Andersson, Zeira, and Baker are cumulative and do not disclose or suggest TPC command accumulation, as required by all challenged claims. Moreover, Andersson and Zeira employ technologies and slot structures

incompatible with Khan, undermining the proposed combinations. Petitioner has therefore failed to meet its burden, and the Board should find no unpatentability of the Challenged Claims.

Respectfully submitted,

Dated: September 22, 2025

By: /Brandon R. Theiss/
Brandon R. Theiss
Registration No. 70,507
Counsel for Patent Owner
Intellectual Ventures II LLC

CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Patent Owner's Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 13,999 words, excluding the parts of this Patent Owner's Response that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Response.

Respectfully submitted,

Dated: September 22, 2025

By: /Brandon R. Theiss/
Brandon R. Theiss
Registration No. 70,507
Counsel for Patent Owner
Intellectual Ventures II LLC

CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S RESPONSE** was served via email (as consented to by counsel) on September 22, 2025 to lead and backup counsel of record for Petitioners as follows:

Scott T. Jarratt
scott.jarratt.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Jonathan Bowser
jon.bowser.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Eric Horsley
eric.horsley.ipr@haynesboone.com
HAYNES AND BOONE, LLP
2801 N. Harwood Street, Suite 2300
Dallas, TX 75201

Ashraf Fawzy
afawzy@tesla.com
TESLA, INC.
1 Tesla Road
Austin, Texas 78725

Dated: September 22, 2025

By: /Brandon R. Theiss/
Brandon R. Theiss
Registration No. 70,507
Counsel for Patent Owner
Intellectual Ventures II LLC