

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS
AMERICA, INC.,
Petitioner,

v.

TOT POWER CONTROL, S.L.,
Patent Owner.

IPR2022-01536
Patent 7,532,865 B2

Before MICHAEL R. ZECHER, LYNNE E. PETTIGREW, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Petitioner”) filed a Petition for *inter partes* review of claims 1–12 of U.S. Patent No. 7,532,865 B2 (Ex. 1001, “the ’865 patent”). Paper 1 (“Pet.”). Patent Owner, TOT Power Control, S.L., filed a Preliminary Response. Paper 14 (“Prelim. Resp.”).

Under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a), we have authority to institute an *inter partes* review if “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). After considering the parties’ briefing and the evidence of record, we conclude the information presented does not show there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of claims 1–12 of the ’865 patent. Accordingly, we do not institute an *inter partes* review.

II. BACKGROUND

A. Real Parties-in-Interest

Petitioner identifies Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. as the real parties-in-interest. Pet. 1. Patent Owner identifies TOT Power Control, S.L. as the only real party-in-interest. Paper 9, 1 (Patent Owner’s Mandatory Notices).

B. Related Matters

The parties identify the following pending district court proceedings related to the ’865 patent: *TOT Power Control, S.L. v. Samsung Elecs.*, No. 1:21-cv-01305 (D. Del.); *TOT Power Control, S.L. v. Apple, Inc.*, No. 1:21-cv-01302 (D. Del.); *TOT Power Control, S.L. v. LG Elecs. Inc.*,

No. 1:21-cv-01304 (D. Del.); *TOT Power Control, S.L. v. AT&T, Inc.*, No. 6:21-cv-00107 (W.D. Tex.); and *TOT Power Control, S.L. v. T-Mobile USA, Inc.*, No. 6:21-cv-00109 (W.D. Tex.). Pet. 1; Paper 9, 1. The parties also state that the Board denied a petition for *inter partes* review of the '865 patent in *Ericsson Inc. v. TOT Power Control, S.L.*, IPR2021-01092, Paper 7 (PTAB Dec. 10, 2021) (Institution Decision). Pet. 1–2 n.1; Paper 9, 1.

C. Overview of the '865 Patent

The '865 patent describes a method and device for use in outer loop power control systems in wireless telecommunication networks based on Wideband Code Division Multiple Access (WCDMA) technology. Ex. 1001, code (57), 1:18–20. Transmission power control in a WCDMA system includes inner loop power control, in which the relevant receiver (base station or mobile station) compares the value of the received signal to interference ratio (SIR) to the target SIR, which depends on the quality of service required for the specific connection and is set by the outer loop power control procedure. *Id.* at 2:20–25. The same receiver (e.g., base station) sends power control bits to the transmitter (e.g., mobile station) instructing it to increase transmission power (if the received SIR is less than the target SIR) or decrease transmission power (if the received SIR is greater than the target SIR). *Id.* at 2:26–31. Outer loop power control sets the target SIR used by the inner loop to maintain a quality of service objective. *Id.* at 2:33–36.

The method and device disclosed in the '865 patent relate to outer loop power control and focus on adjusting the target SIR during outer loop wind-up and unwinding modes. *Id.* at 1:18–26. Wind-up occurs when channel conditions suddenly worsen (e.g., there is a physical obstruction,

such as when a mobile station enters an elevator), so that power control bits sent between a base station and mobile station are not received, or because a transmitter has reached maximum power available for the connection. *See id.* at 2:47–3:7, 8:19–20. During wind-up, outer loop power control increases the target SIR to try to reach the target quality criterion (e.g., target frame error rate (FER)), but the received SIR is unable to follow the target SIR due to worsening conditions or saturation of the transmitter. *Id.* at 2:60–3:2. In this situation, outer loop power control continues to increase the target SIR to a level much higher than before conditions worsened or maximum power was reached. *Id.* at 3:3–7. Unwinding begins when conditions improve (e.g., when the physical obstruction is no longer present or sufficient transmission power is available) and the received SIR finally reaches the target SIR. *Id.* at 3:8–27.

The '865 patent explains that in the prior art, upon detecting the end of wind-up, outer loop power control typically returns to normal operation, which involves gradually reducing the target SIR that has substantially increased during wind-up. *Id.* at 3:65–4:6 (describing a method outlined in Chi,¹ one of the references asserted by Petitioner in this proceeding). When outer loop power control returns to normal operating mode at the start of unwinding, the target SIR converges gradually to a suitable value over an extended period of time. *Id.* at 3:18–37. As the '865 patent notes, the inflated target SIR during unwinding results in a received FER that is much lower than necessary and increases interference in the channel, which

¹ U.S. Patent Application Publ'n No. 2003/0148769 A1, published Aug. 7, 2003 (Ex. 1007, "Chi").

reduces capacity and degrades the quality in other connections. *Id.* at 3:8–17.

The outer loop power control method described in the '865 patent purports to address this problem that exists in prior art methods. *Id.* at 4:14–15. Specifically, at the start of unwinding, the method described in the '865 patent sets the target SIR “equal to a value suitably close to that which the [target SIR] had before the start of the wind-up” and then resumes normal operations. *Id.* at 4:23–34. Thus, the disclosed method reduces the duration of the period during which the target SIR is unnecessarily high by immediately lowering the target SIR at the start of unwinding to the target SIR value just prior to wind-up, rather than gradually lowering the target SIR from its wind-up value through normal operation. *Id.* at 5:9–23.

The outer loop power control method of the '865 patent is built into a controller in each base station and mobile station of a WCDMA network. *Id.* at 6:38–56, Fig. 2. The outer loop power control includes mechanisms for detecting the beginning and end of wind-up. *Id.* at 6:57–67.

Figure 4 of the '865 patent is reproduced below:

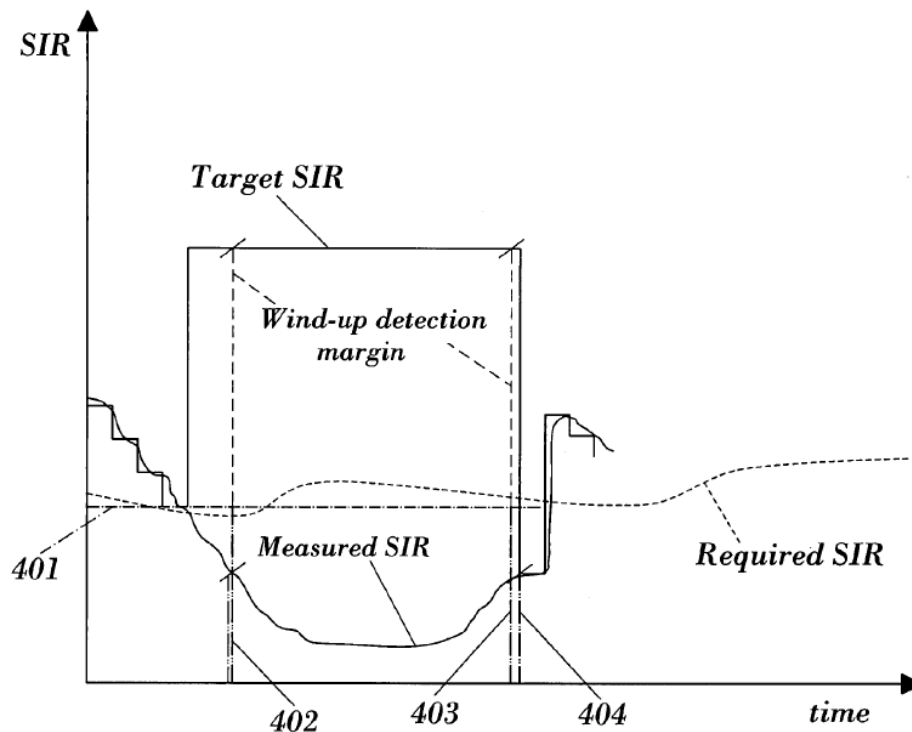


FIG. 4
400

Figure 4 above is a graph showing the development of the target SIR over time according to the method described in the '865 patent. *Id.* at 6:11–14. As shown in Figure 4, the detecting mechanism detects the start of wind-up at point 402 and detects the start of unwinding at point 403. *Id.* at 7:59–64. The device detects wind-up when the difference between the target SIR and the received (measured) SIR meets or exceeds a wind-up detection margin (M). *Id.* at 7:53–62. Mechanisms operating during wind-up may limit the target SIR so that it does not grow indefinitely. *Id.* at 7:38–43. At point 404, immediately after the start of unwinding at point 403, the target SIR is reduced by the same amount as the detection margin (M) to allow the target SIR to return to a value that is very close to the original value it had

just prior to the start of wind-up. *Id.* at 7:62–8:3. Figure 4 also shows the required SIR (dotted line), which is a theoretical minimum for a received SIR that satisfies the target FER. *Id.* at 7:44–48.

D. Illustrative Claim

Challenged claims 1 and 5 are independent; claims 2–4 depend directly or indirectly from claim 1; and claims 6–12 depend directly from claim 5. Claim 1 is illustrative of the claimed subject matter and is reproduced below:

1. Outer loop power control method for wireless communications systems, based on CDMA technology, the method comprising:

[1.a] estimating a desired signal to interference ratio received (SIR_{rec}) based on a data signal (107, 108) received from a base station (102, 103) or mobile station (104),

[1.b] setting a desired signal to interference ratio target (SIR_{target}) that is close to a signal to interference ratio required (SIR_{req})^[2] during the normal mode of the outer loop,

[1.c] detecting a start (402) of the outer loop wind-up,

[1.d] setting a specific desired signal to interference ratio target (SIR_{target}) during the outer loop wind-up, and

[1.e] detecting a start (403) of the outer loop unwinding,

[1.f] wherein the desired signal to interference ratio target (SIR_{target}) is modified at the start (403) of the outer loop unwinding, to match it to the outer loop power control in normal mode just prior to the start of the outer loop wind[-]up.

Ex. 1001, 8:45–64 (modified to include Petitioner’s identification of claim limitations).

² The parties agree that “ SIR_{rec} ” is a typographical error and should read “ SIR_{req} ” instead. Pet. 18; Ex. 1008, 2.

E. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable based on the following grounds (Pet. 17):

Claims Challenged	35 U.S.C. §	References
1–12	103(a) ³	Laakso, ⁴ TS214 ⁵
1–12	103(a)	Chi, ⁶ Laakso

In support of its contentions, Petitioner relies on the Declaration of Harry V. Bims, Ph.D. (Ex. 1003).

III. DISCUSSION

A. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. Because the ’865 patent has an effective filing date prior to the effective date of the applicable AIA amendment, we refer to the pre-AIA version of § 103.

⁴ Int’l Publ’n No. WO 01/20806 A1, published Mar. 22, 2001 (Ex. 1005, “Laakso”).

⁵ ETSI Technical Specification 125 214 V4.4.0 (2002-03), Universal Mobile Telecommunications Systems (UMTS); Physical Layer Procedures (FDD) (3GPP TS 25.214 version 4.4.0 Release 4), published Mar. 2002 (Ex. 1006, “TS214”).

⁶ See *supra* n.1.

skill in the art; and (4) when in evidence, objective indicia of non-obviousness.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art at the time of the alleged invention of the '865 patent “would have had at least a Bachelor’s degree in computer science, electrical engineering, computer engineering, or related field, with 2-3 years of experience in telecommunication systems and knowledge of telecommunication standards, with superior education compensating for less work experience.” Pet. 18 (citing Ex. 1003 ¶ 38). Patent Owner does not dispute Petitioner’s definition of a person of ordinary skill in the art for purposes of its Preliminary Response. Prelim. Resp. 20–21.

On the present record, we determine that Petitioner’s proposed level of ordinary skill in the art is consistent with the '865 patent and asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Therefore, we adopt Petitioner’s proposal for purposes of deciding whether to institute *inter partes* review, except that we do not include the qualifier “at least,” which would expand the required amount of education and experience indefinitely.

C. Claim Construction

In an *inter partes* review, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). In applying this standard, we generally give claim terms their ordinary and customary

⁷ With respect to the fourth *Graham* factor, the parties do not present arguments or evidence regarding objective indicia of non-obviousness.

meaning, as would have been understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–14.

Neither party proposes a construction for any claim term. Petitioner contends that no claim terms require express construction for purposes of applying the prior art. Pet. 17–18. Patent Owner submits that, at this stage of the proceeding, we should adopt the ordinary and customary meaning of the claim terms. Prelim. Resp. 21. For purposes of this decision, we determine that no claim terms require express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Overview of Asserted Prior Art References

1. Chi

Chi discloses a method and apparatus for performing outer loop power control in a CDMA system. Ex. 1007 ¶¶ 1, 8, 21. In particular, Chi’s method detects the start and end of outer loop wind-up and implements techniques to mitigate the effects of wind-up. *Id.* ¶ 8. According to Chi, its method is able to prevent excessive increases to the target SIR during wind-up by capping the amount by which the target SIR can increase, which results in a quicker convergence of the target SIR to the required SIR during unwinding, thus minimizing some of the harmful effects of wind-up. *Id.* ¶ 40. The ’865 patent refers to Chi and describes Chi’s method as prior art. Ex. 1001, 3:49–64.

Figure 8 of Chi is reproduced below:

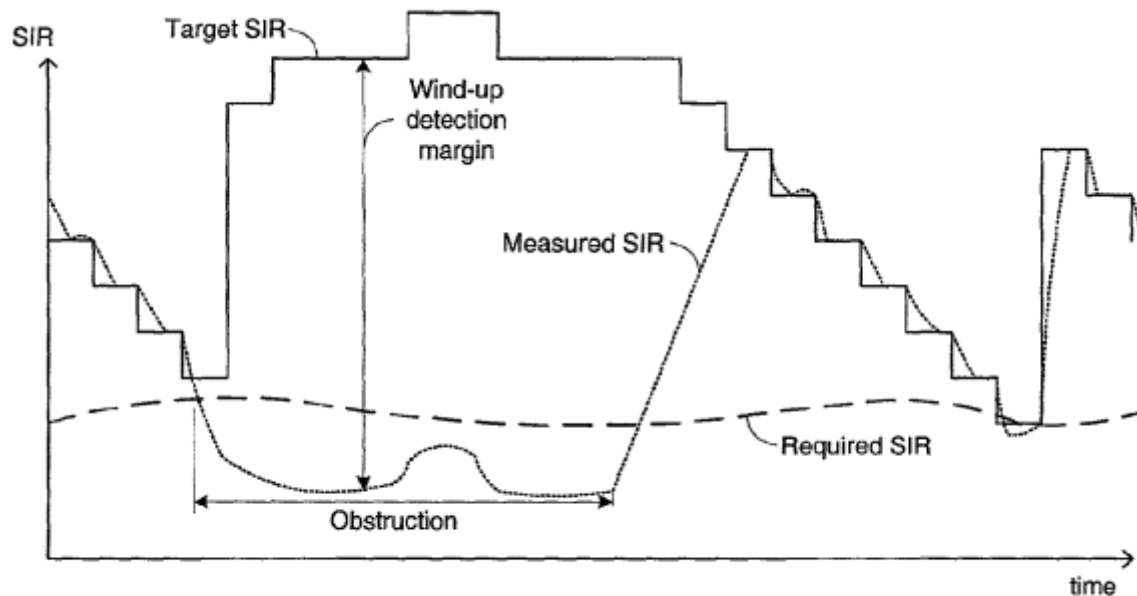


FIG. 8

Ex. 1007, Fig. 8. Figure 8 above depicts an idealized graphical representation of SIR values over time using Chi's disclosed method of outer loop power control to minimize wind-up. *Id.* ¶ 18. As shown in Figure 8, during the period of an "Obstruction," the measured (i.e., received) SIR falls below the required SIR, causing the outer loop to increase the target SIR. *Id.* ¶ 40. Due to the obstruction, the measured SIR continues to be less than the required SIR, so the system increases the target SIR again. *Id.* However, according to Chi's disclosed method, if the target SIR exceeds the measured SIR plus the wind-up detection margin, the system detects wind-up and caps the target SIR at the value of the measured SIR plus the wind-up detection margin. *Id.* ¶¶ 39–40. This prevents the target SIR from increasing excessively. *Id.* Although not depicted in Figure 8, Chi also discloses another method involving capping the target SIR by freezing it "at a

particular level, such that it is not a function of SIR” during wind-up. *Id.* ¶ 43.

As Figure 8 shows, when the obstruction clears, the measured SIR rapidly increases to converge with the target SIR. *Id.* ¶ 40. At that time, the system detects unwinding because the difference between the target SIR and received SIR is less than the detection margin, and the system returns to normal mode. *Id.* ¶¶ 40, 46. As depicted in Figure 8, during unwinding the “measured SIR ramps up to track the target, which then begins climbing down to track the required SIR” through normal mode operations. *Id.* ¶ 40. According to Chi, by limiting the target SIR during the period of the obstruction, “wind-up has been prevented (or at least minimized),” which results in “the loops converg[ing] more quickly, thus minimizing the time spent with excessive power transmitted from the base station” during unwinding. *Id.*

2. Laakso

Laakso discloses a transmission power control method for use in a WCDMA system. Ex. 1005, 1:5–8, 2:25–3:6. More specifically, Laakso describes an outer loop power control mechanism in which a radio network controller (RNC) generates a connection quality target, also referred to as a connection setpoint, and provides it to a base station for use in closed loop power control between the base station and mobile stations. *Id.* at 2:25–3:6, 9:20–33.

control functionality 18. *Id.* at 11:6–12. In normal operation, setpoint 17 follows setpoint 16, i.e., they have the same value. *Id.* at 11:12–19.

Laakso addresses the problem of a “power limitation situation” that can arise at the base station due to “an overload situation or a failure.” *Id.* at 3:29–4:2. A power limitation situation may lead to unnecessarily high setpoints and excessively high transmission power levels within the base station’s cell. *Id.* at 3:29–4:23. Laakso describes embodiments that prevent a power limitation situation from getting worse “by preventing a[n] unnecessary rise of the connection quality target or similar parameter influencing the transmission power in the cell.” *Id.* at 7:15–18. According to one embodiment, the base station’s load control functionality “may set limit values for the BS outer loop power control parameters or freeze the base station (OLPC/BS) so that the OLPC/BS no longer follows Eb/No-setpoint increase commands by an outer loop power control 16 from the RNC 5 (OLPC/RNC).” *Id.* at 12:2–7. The base station initiates the limiting or freezing procedure of the setpoint or target value when an uplink total wideband interference power level (PrxTotal) received at the base station digital receiver exceeds a given threshold value. *Id.* at 12:9–12. The base station measures PrxTotal on a cell-wide basis. *Id.* at 12:12–15.

During a power limitation situation, setpoints 16 and 17 in Figure 2 start to drift because base station setpoint 17 used for base station outer loop power control does not follow RNC setpoint 16. *Id.* at 16:4–15. After the power limitation situation ends, the OLPC/BS and OLPC/RNC return to normal operation. *Id.* at 16:17–18. Laakso explains that the drifting between the base station and RNC setpoints has to be removed during the recovery after the overload situation is over:

The base station can remove the drift internally because it knows the actual setpoint value 17 in at the base station 4 and also the setpoint value 16 in use at the RNC 5. Thus it is possible to set either the setpoint value 16 to equal with the actual setpoint 17 or vice versa before the operation is returned to a normal mode. In addition, history information can be used for the recovery, i.e. the setpoint values in the BS and the RNC can be returned to a value used by them before the power limitation situation was detected. It is also possible to use a default or nominal value to which the setpoint in the RNC and/or in the BS is returned at the beginning of the normal mode.

Id. at 16:22–17:2. Laakso further explains that

in order to provide a controlled recovery and to avoid any too “sharp” changes in the setpoint values, it may be preferred that the returning to the appropriate setpoint value is not done at once. This is especially the case when the quality of the connection is substantially bad. Therefore it may be preferred to use some procedure to gradually decrease the drifting.

Id. at 17:4–10. Laakso proceeds to describe algorithms for reducing the drift gradually over time. *Id.* at 19:20–23:2.

3. TS214

TS214 is a UMTS Technical Specification produced by the European Telecommunications Standards Institute (ETSI) 3rd Generation Partnership Project (3GPP). Ex. 1006, 5.⁸ It specifies and establishes the physical layer procedures in the frequency-division duplexing mode, including protocols for closed (inner) loop power control for transmissions between user equipment (i.e., a mobile station) and a base station. *Id.* at 12–15 (§ 5.1.2.2), 49 (Annex B.2).

⁸ All references to the page numbers in TS214 refer to the native page numbers in the top, center of each page—not the page numbers inserted by the Petitioner in the bottom, right-hand corner of each page.

E. Asserted Obviousness over Laakso and TS214

Petitioner contends that claims 1–12 of the '865 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Laakso and TS214. Pet. 29–47. Patent Owner opposes. Prelim. Resp. 22–45, 57. For the reasons discussed below, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 1–12 are unpatentable based on this asserted ground.

Independent claim 1 is directed to a method for “[o]uter loop power control for wireless communications systems, based on CDMA technology.” Ex. 1001, 8:45–46. For this preamble, Petitioner cites Laakso’s disclosure of an outer loop power control (OLPC) mechanism for a CDMA or WCDMA wireless communication system implemented in a base station and RNC. Pet. 33 (citing Ex. 1005, 1:12–29, 8:28–9:8, 9:20–10:29, 23:13–18, Fig. 2).

Limitation 1.a recites “estimating a desired signal to interference ratio received (SIR_{rec}) based on a data signal (107, 108) received from a base station (102, 103) or mobile station (104).” Ex. 1001, 8:48–50. For this limitation, which relates to closed (inner) loop power control, Petitioner relies on a combination of Laakso and TS214. Pet. 35. First, Petitioner contends that Laakso discloses closed loop power control in WCDMA. *Id.* (citing Ex. 1005, 2:14–23, 8:28–9:8, 9:20–30; Ex. 1003 ¶ 105). Petitioner also contends that a person of ordinary skill in the art would have been aware of closed loop power control standards, such as TS214, which require estimating SIR based on a data signal received from a base station or mobile station. *Id.* (citing Ex. 1006, 12–15 (§ 5.1.2.2), 49 (Annex B.2); Ex. 1003 ¶ 105). Petitioner further contends that a person of ordinary skill in the art would have been motivated to combine Laakso’s outer loop power control

and TS214's closed loop functionality with a reasonable expectation of success. *Id.* (citing Ex. 1003 ¶ 105); *id.* at 29–33 (citing Ex. 1003 ¶¶ 92–101) (addressing motivation to combine Laakso and TS214).

Petitioner relies on Laakso alone for the remaining limitations of claim 1. *Id.* at 36–39. For instance, limitation 1.b requires setting a target SIR that is close to a required SIR during the normal mode of the outer loop. Ex. 1001, 8:51–54. Petitioner asserts that Laakso's connection setpoint or connection quality target is a target SIR that must meet a minimal connection quality target (i.e., a required SIR). Pet. 36 (citing Ex. 1005, 3:8–27, 2:25–3:6; Ex. 1003 ¶ 106).

Limitations 1.c through 1.f relate to outer loop wind-up and unwinding. Ex. 1001, 8:55–64. Petitioner contends that a person of ordinary skill in the art would have understood that the “power limitation situation” problem addressed by Laakso is an example of wind-up. Pet. 25–26 (citing Ex. 1003 ¶ 82; Ex. 1005, 1:5–8, 3:29–4:23, 5:3–5). Petitioner further contends that Laakso teaches “detecting a start (402) of the outer loop wind-up,” as recited in limitation 1.c, when an uplink total interference power level ($PrxTotal$) at the base station receiver exceeds a given threshold value. *Id.* at 36–37 (citing Ex. 1005, 11:31–13:11, 13:29–14:7; Ex. 1003 ¶ 107). Alternatively, Petitioner asserts that Laakso teaches detecting the start of wind-up when “the interference level or some other indication of a power limitation situation is signaled from the BS to the RNC' via a ‘radio resource (RR) indication message.’” *Id.* at 37 (citing Ex. 1005, 15:26–16:2, 14:9–14; Ex. 1003 ¶ 107).

Limitation 1.d recites “setting a specific desired signal to interference ratio target (SIR_{target}) during the outer loop wind-up.” Ex. 1001, 8:57–58. Petitioner contends that Laakso teaches this limitation because it discloses

freezing the base station connection setpoint so that the OLPC/BS no longer follows the setpoint increase commands received from the RNC. Pet. 37 (citing Ex. 1005, 11:31–12:7, 12:9–12, 13:1–11, 14:9–14, 14:26–15:7, 15:26–16:2; Ex. 1003 ¶ 108).

Limitation 1.e recites “detecting a start (403) of the outer loop unwinding.” Ex. 1001, 8:59. Petitioner contends that the start of unwinding in Laakso occurs when the power limitation situation is over, and that Laakso detects the start of unwinding when the PrxTotal falls below the exceeded threshold. Pet. 37–38 (citing Ex. 1005, 13:1–11, 16:17–21; Ex. 1003 ¶ 109). Petitioner contends that Laakso also teaches “unwinding detection at the RNC when it receives a RR indication message of ‘the interference level or some other indication of a power limitation situation,’ which can also signal the end of wind-up.” *Id.* at 38 (citing Ex. 1005, 15:26–16:2; Ex. 1003 ¶ 109).

Claim 1 concludes with limitation 1.f, which recites that the SIR_{target} “is modified at the start (403) of the outer loop unwinding, to match it to the outer loop power control in normal mode just prior to the start of the outer loop wind-up.” Ex. 1001, 8:60–64. For this limitation, Petitioner relies on Laakso’s teaching that “‘history information can be used for the recovery, i.e. the setpoint values in the BS and the RNC can be returned to a value used by them before the power limitation situation was detected.’” Pet. 38 (quoting Ex. 1005, 16:28–31) (citing Ex. 1005, 16:17–17:2, 6:6–15; Ex. 1003 ¶ 110). Petitioner contends that “Laakso discloses ‘storage functionality’ to retain the pre-wind-up setpoint.” *Id.* (citing Ex. 1005, 10:31–11:4; Ex. 1003 ¶ 110). Further, Petitioner contends that a person of ordinary skill in the art “would have understood that by immediately returning the setpoint to its value before wind-up was detected, the

convergence time of unwinding would be essentially eliminated if the channel conditions pre- and post-wind-up were the same.” *Id.* at 38–39 (citing Ex. 1003 ¶ 110). Although Laakso discloses that “it may be preferred that the returning to the appropriate setpoint value is not done at once” when “the quality of the connection is substantially bad,” Petitioner argues that a person of ordinary skill in the art “would have understood that this disclosure merely describes an alternative option for a specific situation, and that it does not teach away from immediately returning the setpoint to its pre-wind-up value in most situations.” *Id.* at 39 (citing Ex. 1005, 16:17–17:2, 6:6–15, 17:7–10; Ex. 1003 ¶¶ 110–111) (case citations omitted).

In its Preliminary Response, Patent Owner argues that Petitioner’s reliance on Laakso fails for two primary reasons. First, Patent Owner contends that Laakso’s “power limitation situation” is not equivalent to the wind-up condition addressed in the ’865 patent. Prelim. Resp. 5–7, 25–28. Thus, Patent Owner argues that Laakso fails to teach, among other things, detecting the start of wind-up and detecting the start of unwinding, as required by limitations 1.c and 1.e. *Id.* at 6–7, 27–28. Second, Patent Owner contends that Laakso does not teach or suggest limitation 1.f (the “matching” limitation), which requires modifying the target SIR at the start of unwinding to match it to the value in normal mode “just prior to the start of outer loop wind[-]up.” *Id.* at 7, 30–31, 36–44. We address Patent Owner’s arguments in turn.

First, on the present record, we agree with Patent Owner that Petitioner has not shown sufficiently that Laakso’s “power limitation situation” teaches the claimed “wind-up” mode. The ’865 patent describes the “outer loop wind-up condition or mode” as a situation when “the outer loop power control (OLPC) method will increase the desired signal to

interference ratio target (SIR_{target}), to try to reach the target quality criterion . . . but the desired signal to interference ratio received (SIR_{rec}) will not be able to follow the desired signal to interference ratio target (SIR_{target}).” Ex. 1001, 2:61–67. Chi, which the ’865 patent cites as disclosing a method for detecting and controlling wind-up, similarly states that wind-up “occurs when the outer loop continually raises the target SIR by the up step size, and the inner loop requests more power, but the received SIR does not increase correspondingly.” Ex. 1007 ¶ 35; *see* Ex. 1001, 3:49–64. Thus, both the ’865 patent and Chi describe wind-up as a situation when outer loop power control continually increases the target SIR and the received SIR is unable to follow the target SIR.

Consistent with this understanding of wind-up, methods described in the ’865 patent and Chi detect the start of wind-up when the target SIR exceeds the received SIR by a specific detection margin. Ex. 1001, 3:51–56, 7:53–61; Ex. 1007 ¶ 39. Additionally, limitations 1.c and 1.e refer specifically to points 402 and 403 in Figure 4 of the ’865 patent as the start of wind-up and the start of unwinding, respectively. Ex. 1001, 8:56, 8:59–64. Figure 4 shows that wind-up starts at point 402, when the difference between the target SIR and the received SIR meets or exceeds a wind-up detection margin after the target SIR has increased substantially without the received SIR following it. *Id.* at Fig. 4.

In contrast to the wind-up situation described in the ’865 patent, Laakso does not describe a power limitation situation as one in which a received SIR fails to track a target SIR. Petitioner contends that Laakso’s connection setpoint is a target SIR, and Laakso discloses that the setpoint rapidly increases during a power limitation situation. Pet. 23; Ex. 1005, 4:2–4, 4:30–33. But Petitioner does not direct us to a teaching in Laakso

that, during a power limitation situation, a received SIR (e.g., at a mobile station) is unable to follow the target SIR, as is the case during the wind-up mode in the '865 patent. *See* Pet. 25–26, 36–37 (asserting that Laakso's power limitation situation is “wind-up”). Rather, as Patent Owner notes, Laakso describes a power limitation situation as one in which the base station suffers an overload situation or failure that results in excessively high power levels within the cell, which may result further in mobile stations at the edge of the cell losing their connections and dropping out. *See* Prelim. Resp. 22–24 & n.5; Ex. 1005, 3:29–4:23. Laakso also discloses that its procedure for freezing or limiting the setpoint during a power limitation situation begins when the total uplink interference power level at the base station (PrxTotal), measured on a cell-wide basis, exceeds a given threshold value. Ex. 1005, 12:9–15. These disclosures support Patent Owner's position that Laakso's power limitation situation concerns cell-wide power control at a base station, not whether a received SIR is able to follow a target SIR. *See* Prelim. Resp. 22–24, 27, 31–34. For at least these reasons, based on our review of the present record, we are not persuaded that Petitioner shows sufficiently that Laakso's “power limitation situation” teaches “wind-up” and “unwinding” as claimed in the '865 patent and specifically recited in limitations 1.c through 1.f.

Second, even assuming Laakso teaches “wind-up” in the form of a “power limitation situation,” we agree with Patent Owner that Petitioner does not make an adequate showing that Laakso teaches limitation 1.f, the “matching” limitation. Limitation 1.f requires modifying the target SIR “at the start (403) of the outer loop unwinding” to match it to the value “just prior to the start of the outer loop wind[-]up.” Ex. 1001, 8:60–64. The portion of Laakso that Petitioner cites for teaching this limitation describes

the “recovery” procedure after a power limitation situation is over.

Pet. 38–39. But as Patent Owner points out, the purpose of Laakso’s recovery procedure is to reduce the drift between the base station setpoint and RNC setpoint that arose during the power limitation situation, not to reduce the time for the target SIR and required SIR to converge, as in the ’865 patent. Ex. 1005, 6:6–15, 16:17–17:2, 19:4–25; *see* Prelim. Resp. 34–38, 43.

Limitation 1.f requires returning the target SIR to a particular, previously used *value* (the value just prior to wind-up) and setting the target SIR to this value *at a particular time* (at the start of unwinding). We are not persuaded that Laakso’s disclosed procedure for recovery from a power limitation situation teaches or suggests these two requirements. First, regarding the value, Petitioner relies on Laakso’s teaching that “history information can be used for the recovery” to return setpoint values in the base station and the RNC “to a value used by them before the power limitation situation was detected.” Pet. 38 (quoting Ex. 1005, 16:28–31). We agree with Patent Owner that this statement does not clearly refer to a setpoint value “just prior to the start of” the power limitation situation as opposed to some earlier time in history before the power limitation situation was detected. *See* Prelim. Resp. 37.

As for timing, we are not persuaded that Petitioner has shown sufficiently that Laakso teaches returning to the previous value “at the start . . . of . . . unwinding” (which Petitioner contends is when the power limitation situation is over). *See* Pet. 38. Laakso discloses that “in order to provide a controlled recovery and to avoid any too ‘sharp’ changes in the setpoint values, it may be preferred that the returning to the appropriate setpoint value is not done at once.” Ex. 1005, 17:4–8; *see id.* at 19:20–22

(stating that, “in order to avoid any too sharp changes in the setpoint values, a gradual Eb/No-setpoint adjustment can be accomplished”), Fig. 8. We do not understand this to be merely an “alternative option for a specific situation,” as Petitioner contends. Pet. 39. Rather, Laakso’s embodiments of a procedure for recovery from the problem of drift between the base station and RNC setpoints all gradually reduce the difference between the two setpoint values. Ex. 1005, 17:4–23:2, Figs. 3–6, 8.

Indeed, instead of pointing to a specific teaching in Laakso that a setpoint is reset to match its earlier value as soon as the end of the power limitation situation is detected, Petitioner contends that a person of ordinary skill in the art “would have understood that by *immediately* returning the setpoint to its value before wind-up was detected, the convergence time of unwinding would be essentially eliminated if the channel conditions pre- and post-wind-up were the same.” Pet. 38–39 (emphasis added) (citing Ex. 1003 ¶ 110). Here, Petitioner cites only Dr. Bims’s testimony, but Dr. Bims provides no citation or additional explanation for his statement. Ex. 1003 ¶ 110. Accordingly, we give his testimony little weight on this point. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Moreover, we see no support for Petitioner’s argument in Laakso itself because Laakso addresses the problem of drift between two setpoints, not the problem of slow convergence of the target SIR and required SIR after wind-up. *See* Ex. 1005, 6:6–15, 16:17–17:2, 19:4–25. Thus, we do not find that Petitioner has made a sufficient showing that Laakso teaches or suggests setting a target SIR to its value just prior to wind-up at the start of unwinding, as required by limitation 1.f.

For at least these reasons, based on the record before us, Petitioner has not shown sufficiently that the combination of Laakso and TS214 teaches or suggests all of the limitations of claim 1.⁹ Independent claim 5 contains substantially the same limitations as claim 1, and Petitioner presents the same analysis as for claim 1. *See* Pet. 29–39. Therefore, for the same reasons discussed above, Petitioner has not shown sufficiently that the combination of Laakso and TS214 teaches or suggests all of the limitations of claim 5. Accordingly, we determine the information presented does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that any one of independent claims 1 and 5 and dependent claims 2–4 and 6–12 of the ’865 patent is unpatentable under 35 U.S.C. § 103(a) for obviousness over the combination of Laakso and TS214.

F. Asserted Obviousness over Chi and Laakso

Petitioner contends that claims 1–12 of the ’865 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Chi and Laakso. Pet. 48–67. Patent Owner opposes. Prelim. Resp. 45–54, 58–60.

Petitioner relies on Chi alone for teaching most of the limitations of claim 1 of the ’865 patent and relies on Laakso for teaching limitation 1.f. Pet. 48–66. Petitioner’s analysis of limitation 1.f under this particular ground is substantially the same as for the ground based on Laakso and TS214. *Compare* Pet. 58–59, *with id.* at 38–39. Thus, for the same reasons

⁹ Our findings regarding Laakso are consistent with those of the China National Intellectual Property Administration in an Examination Decision on Invalidation Request dated January 25, 2022, reviewing the Chinese patent corresponding to the ’865 patent. *See* Ex. 2002, 5, 11–14; Prelim. Resp. 12–13.

discussed above, Petitioner has not shown sufficiently that the combination of Chi and Laakso teaches or suggests limitation 1.f.

Independent claim 5 includes limitation 5.g, which is substantially the same as limitation 1.f, and Petitioner presents the same analysis as for claim 1. *See* Pet. 58–59. Thus, for the same reasons discussed above, Petitioner has not shown sufficiently that the combination of Chi and Laakso teaches or suggests limitation 5.g.

For at least these reasons, based on the record before us, Petitioner has not shown sufficiently that the combination of Chi and Laakso teaches or suggests all of the limitations of independent claims 1 and 5. Therefore, we determine the information presented does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that any one of claims 1–12 of the '865 patent is unpatentable under 35 U.S.C. § 103(a) for obviousness over the combination of Chi and Laakso.

IV. CONCLUSION

After considering the parties' evidence and arguments, we determine that the information presented does not show a reasonable likelihood that Petitioner would prevail in establishing that at least one of claims 1–12 of the '865 patent is unpatentable on either of the two grounds asserted in the Petition.

V. ORDER

Accordingly, it is

ORDERED that the Petition is *denied*, and no *inter partes* review is instituted.

IPR2022-01536
Patent 7,532,865 B2

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