

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

REOLINK INNOVATION INC.
and
SHENZHEN REOLINK TECHNOLOGY CO., LTD.,
Petitioner,

v.

THROUGHTTEK TECHNOLOGY (SHENZHEN) CO., LTD.
and
THROUGHTTEK CO., LTD.,
Patent Owner.

IPR2024-01193
Patent 10,602,448 B2

Before MICHAEL J. STRAUSS, DAVID C. McKONE, and
SHEILA F. McSHANE, *Administrative Patent Judges*.

McKONE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Reolink Innovation Inc. and Shenzhen Reolink Technology Co., Ltd. (collectively, “Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–3, 5, 7–13, 15–19, and 23–25 of U.S. Patent No. 10,602,448 B2 (Ex. 1001, “the ’448 patent”). Throughtek Co., Ltd. and Throughtek Technology (Shenzhen) Co., Ltd. (collectively, “Patent Owner”) did not file a Preliminary Response to the Petition. The Board instituted an *inter partes* review of the challenged claims pursuant to 35 U.S.C. § 314. Paper 6 (“Inst. Dec.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 8, “PO Resp.”), Petitioner filed a Reply (Paper 9, “Reply”), and Patent Owner filed a Sur-reply (Paper 10, “Sur-reply”). The parties then presented oral arguments via a hearing (November 3, 2025), and the Board entered a hearing transcript into the record (Paper 16).

For the reasons set forth in this Final Written Decision pursuant to 35 U.S.C. § 318(a), we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–3, 5, 7–13, 15–19, and 23–25 are unpatentable.

II. BACKGROUND

A. *Related Proceedings*

The parties identify *Throughtek Co., Ltd. v. Reolink Innovation Inc.*, Case No. 1:24-cv-00169-GBW (D. Del.) as involving the ’448 patent. Pet. 74; Paper 4, 2.

B. The '448 Patent

The '448 patent relates to remotely waking up a sleeping networked apparatus. Ex. 1001, code (57), 1:18–21. Figure 2 is reproduced below:

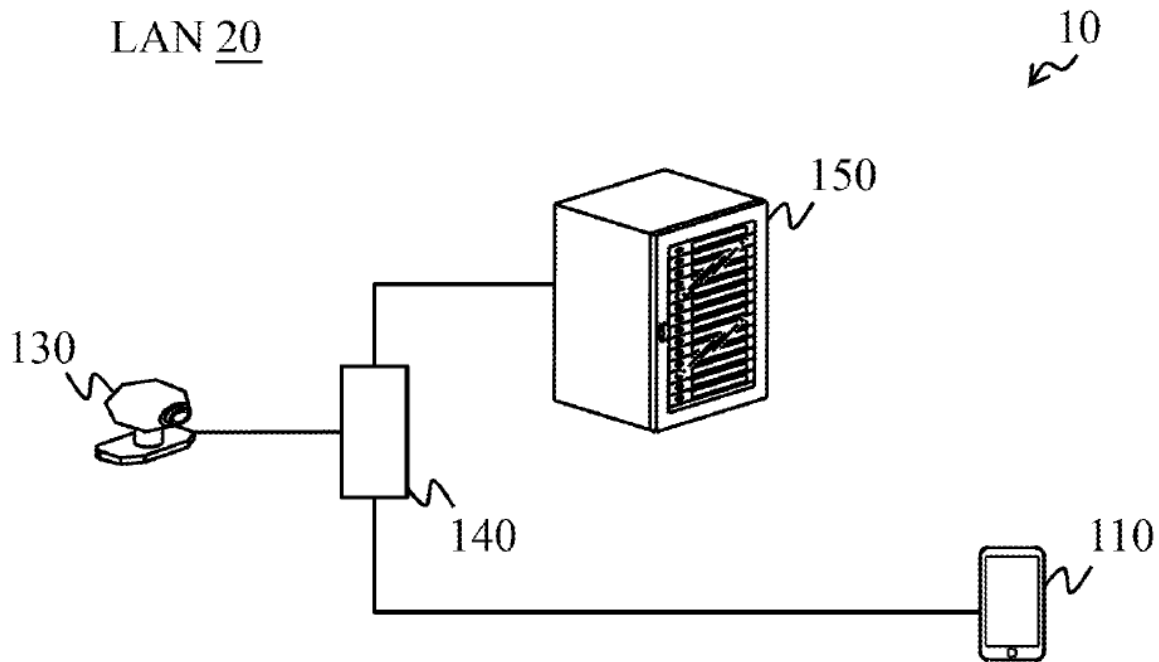


FIG. 2

Figure 2 is a schematic diagram of a network communications system. *Id.* at 2:53–55, 3:21–23. Network communications system 10 includes first apparatus 110, second apparatus 130, and connection server 150. *Id.* at 3:24–27. The network apparatuses can be personal computers, smartphones, tablet computers, video cameras, Internet Protocol (IP) cameras, or intelligent appliances, for example. *Id.* at 3:28–33.

Figure 3 is reproduced below:

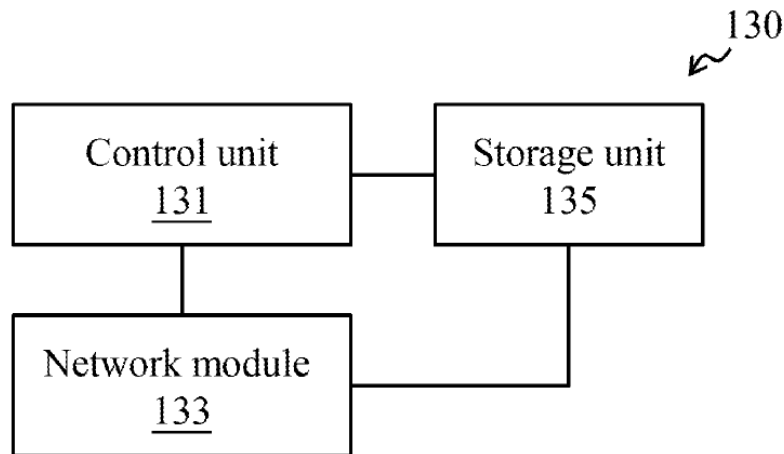


FIG. 3

Figure 3 is a block diagram of second apparatus 130. *Id.* at 2:56–57, 4:31–32. In second apparatus 130, control unit 131 is coupled to network module 133 and storage unit 135. *Id.* at 4:33–37. Second apparatus 130 can also include a functional module (not shown), such as a module with a photographing function when second apparatus 130 is an IP camera. *Id.* at 4:37–49. In this example, second apparatus 130 is a low power consumption apparatus with a power-saving (sleep) mode. *Id.* at 4:50–55. When second apparatus 130 is in sleep mode, network module 133 does not sleep and, instead, keeps running. *Id.* at 4:55–59.

Figure 4 is reproduced below:

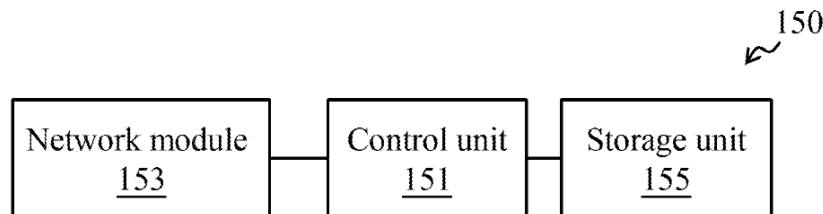


FIG. 4

Figure 4 is a block diagram of connection server 150. *Id.* at 2:58–59, 5:4–5. Connection server 150 includes control unit 151 connected to network module 153 and storage unit 155. *Id.* at 5:6–10. When first apparatus 110

needs to communicate with a sleeping second apparatus 130, it first wakes up second apparatus 130 by means of connection server 150. *Id.* at 5:11–15. This is shown in Figure 5, reproduced below:

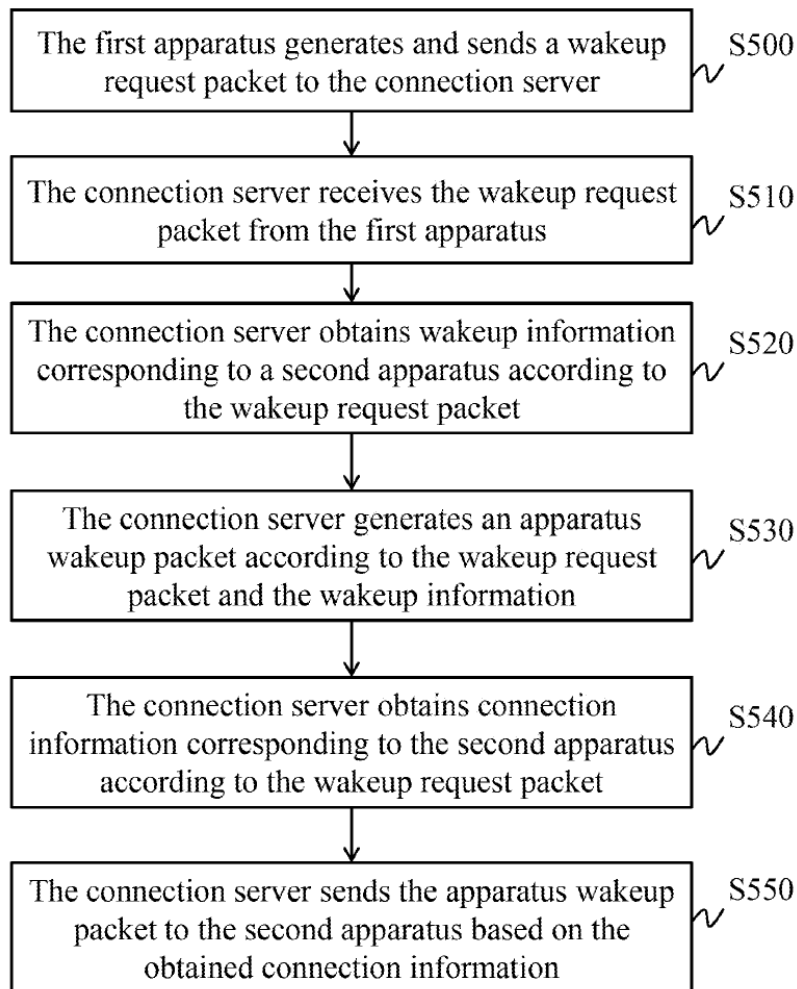


FIG. 5

Figure 5 is a flowchart of a first part of a remote wakeup method. *Id.* at 2:60–61, 5:16–17.

To wake up second apparatus 130, first apparatus 110 generates a wakeup request packet and sends it to connection server 150 through a network such as a local area network (LAN) or the Internet. *Id.* at 5:20–24, Fig. 5 (step S500). The wakeup request packet WRP includes general

information HD and device identifier ID of second apparatus 130. *Id.* at 5:24–31, Fig. 6 (schematic diagram of a wakeup request packet). After control unit 151 of connection server 150 receives wakeup request packet WRP from first apparatus 110, control unit 151 obtains wakeup information corresponding to second apparatus 130 from storage unit 155 according to device identifier ID. Control unit 151 then generates an apparatus wakeup packet according to wakeup request packet WRP and the wakeup information obtained from storage unit 155. *Id.* at 5:32–40, Fig. 5 (steps S510, S520, S530), Fig. 7 (block diagram of an apparatus wakeup packet). Control unit 151 also obtains connection information AD (e.g., including a network address) corresponding to second apparatus 130 from storage unit 155 according to the device ID. *Id.* at 6:1–7, Fig. 5 (step S540). Control unit 151 then sends apparatus wakeup packet EWP to second apparatus 130 through network module 153 based on connection information AD. *Id.* at 6:34–40, Fig. 5 (step S550).

Figure 8 is reproduced below:

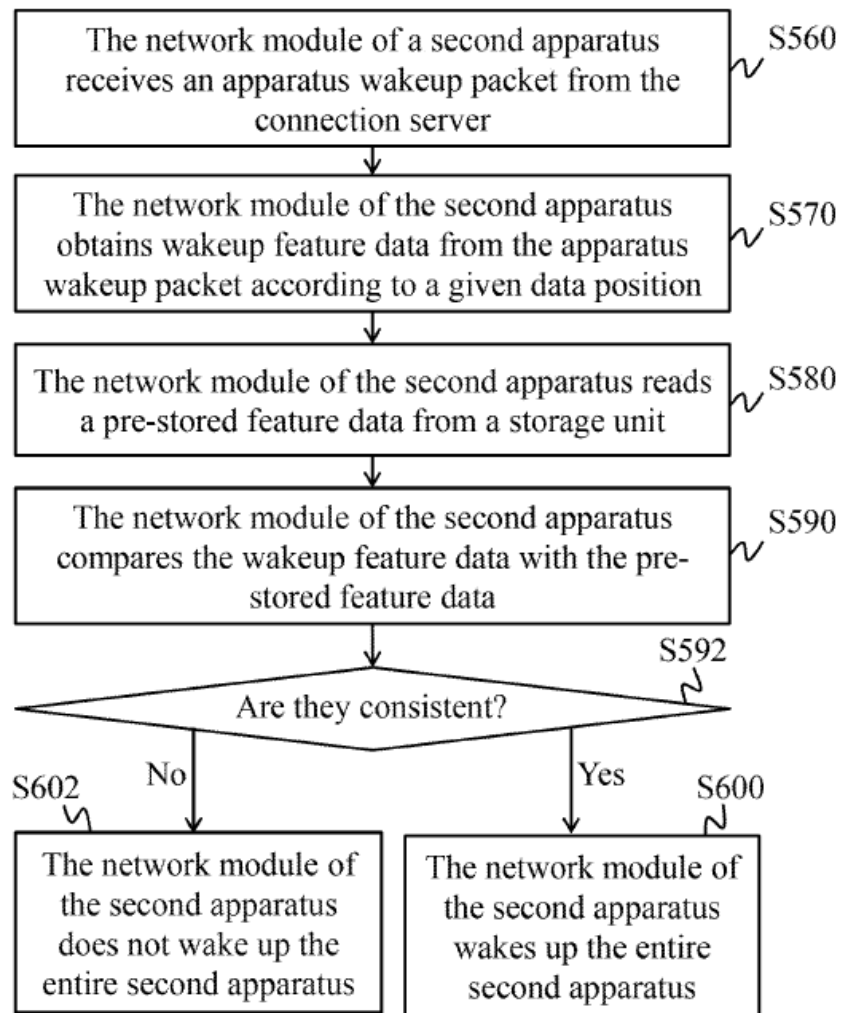


FIG. 8

Figure 8 is a flowchart of a second part of the remote wakeup method of Figure 5. *Id.* at 2:66–67, 6:41–42. Network module 133, which is still awake, receives apparatus wakeup packet EWP from connection server 150, obtains wakeup feature data from packet EWP, and reads feature data that is pre-stored in storage unit 135. *Id.* at 6:43–53, Fig. 8 (steps S560, S570, S580). Network module 133 compares the wakeup feature data from packet EWP with the pre-stored feature data and determines whether they are the same. *Id.* at 7:29–32, Fig. 8 (steps S590, S592). If so, network module 133

wakes up the entire second apparatus 130, so that second apparatus 130 can communicate with first apparatus 110. *Id.* at 7:32–37, Fig. 8 (step S600).

Claims 1 and 19, reproduced below, are illustrative of the claimed subject matter (bracketed numbering and formatting supplied to track those presented in the Petition at iv, viii–ix):

- [1pre] A remote wakeup method, comprising:
 - [1a] a connection server receiving a wakeup request packet from a first apparatus,
 - [1a.i] wherein the wakeup request packet comprises a device identifier of a second apparatus,
 - [1a.ii] wherein the first apparatus is connected to the connection server via local area network or internet;
 - [1b] the connection server obtaining wakeup information stored in the connection server according to the wakeup request packet,
 - [1b.i] wherein the wakeup information stored in the connection server is the same as wakeup information stored in the second apparatus;
 - [1c] the connection server generating an apparatus wakeup packet according to the wakeup request packet and the wakeup information,
 - [1c.i] wherein the apparatus wakeup packet comprises the device identifier of the second apparatus from the wakeup request packet and the obtained wakeup information;
 - [1d] the connection server obtaining a network address corresponding to the second apparatus from a storage unit of the connection server according to the wakeup request packet;
 - [1e] the connection server sending the apparatus wakeup packet to the second apparatus based on the network address,

[1e.i] wherein wakeup feature data is a segment of data of the apparatus wakeup packet and is for determining whether the entire second apparatus be awoken.

[19pre] A networking apparatus having a normal running mode and a sleep mode, comprising:

[19a] a network module;

[19b] a storage unit, which stores a device identifier and wakeup information; and

[19c] a control unit, which

[19c.i] connects to the network module and storage unit, and

[19c.ii] before entering the sleep mode, generates a pre-stored feature data according to the device identifier and the wakeup information and stores the pre-stored feature data in the storage unit,

[19d] wherein the pre-stored feature data comprises entire data or partial data of the device identifier and the wakeup information,

[19e] wherein: in the normal running mode, the control unit sends a normal login packet through the network module, to provide a network address of the networking apparatus;

[19f] in the sleep mode, the control unit sleeps, but the network module still keeps running and when receiving an apparatus wakeup packet sent to the network address of the networking apparatus from a connection server and generated by the connection server,

[19g] compares the pre-stored feature data and a wakeup feature data being a segment of data of the apparatus wakeup packet to determine whether to wake up the entire networking apparatus.

C. Evidence

Petitioner relies on the references listed below (Pet. 1–2).

Reference		Date	Exhibit No.
Zhang	US 2014/0298066 A1	Oct. 2, 2014	1004
Zill	US 2009/0210519 A1	Aug. 20, 2009	1005
Liu	US 2017/0366753 A1	Dec. 21, 2017	1006

Petitioner also relies on the Declaration of Vlad Kardashov (Ex. 1003) and the Second Declaration of Mr. Kardashov (Ex. 1101)¹.

Patent Owner did not submit evidence into the record.

D. The Asserted Grounds of Unpatentability

We instituted a trial under the following grounds (Inst. Dec. 10):

¹ “Patent Owner . . . objects to the second declaration from Mr. Kardashov as this is not a part of [the] original petition.” Sur-reply 9. However, Patent Owner does not further explain its objection nor identify with specificity any portion of the Second Declaration that exceeds the scope of evidence accompanying a proper reply brief. *See* 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the corresponding . . . patent owner response, or decision on institution.”). We also note that Patent Owner did not seek to exclude or strike Mr. Kardashov’s testimony. *See, e.g.*, Consolidated Trial Practice Guide (Nov. 2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“If a party believes that a brief filed by the opposing party raises new issues, is accompanied by belatedly presented evidence, or otherwise exceeds the proper scope of reply or sur-reply, it may request authorization to file a motion to strike.”). We consider and credit Mr. Kardashov’s testimony, as indicated below.

Claims Challenged	35 U.S.C. §	References
1, 7, 8, 10, 11, 15, 16, 18, 19, 23–25	102 ²	Zhang
1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, 23–25	103	Zhang, Zill
1–3, 5, 7–13, 15–18	103	Liu, Zhang

III. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner, relying on the testimony of Mr. Kardashov, contends that a person of ordinary skill in the art “would have had a bachelor’s degree in electrical engineering and two years of work experience with network and communication technologies.” Pet. 5 (citing Ex. 1003 ¶¶ 13–15). Patent Owner does not contest Petitioner’s proposal or provide a proposal of its own. On the complete record, we adopt Petitioner’s description of the level of ordinary skill in the art, as it is consistent with the technology described in the ’448 patent and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

B. Claim Construction

We construe a claim

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C.

[§] 282(b), including construing the claim in accordance with

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the ’448 patent and the application to which it claims priority were filed after March 16, 2013, the effective date of the relevant amendment, the AIA versions of §§ 102 and 103 apply. *See* AIA § 3(n)(1), 125 Stat. at 293; Ex. 1001, codes (22), (30).

the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Petitioner contends that “no claim elements need a formal construction for purposes of resolving controversies in this proceeding.” Pet. 5.

Patent Owner proposes constructions for “wakeup request packet,” “apparatus wakeup packet,” “connection information,” “wakeup information,” and “feature flag.” PO Resp. 3; Sur-reply 3–4. “Wakeup request packet” appears in claim 1, and “apparatus wakeup packet” and “wakeup information” appear in claims 1 and 19, but neither party makes any substantive arguments based on the constructions of these terms. Thus, we do not find it necessary to provide express claim constructions of these terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

The term “connection information” does not appear in any claim of the ’448 patent; thus, we see no need to construe it.

The term “feature flag” appears in claims 8, 16, 23, and 24. Claim 7 (which depends from claim 1) recites “receiving a sleep login packet,” and claim 8 (which depends from claim 7) recites “the sleep login packet has a feature flag, and the feature flag indicates that the running state of the second apparatus is the sleep state.” Similar language appears in claims 15, 16, and 23. Patent Owner contends that feature flags “are a software

development and product experimentation technique that turns certain functionality on and off during runtime, without deploying new code.” PO Resp. 4. Patent Owner cites to the webpage <https://www.optimizely.com/optimization-glossary/feature-flags/>, without explaining the relevance of that webpage or its authoritative value. This webpage appears to be a glossary of marketing terminology.

Petitioner (Reply 2–3) responds that Patent Owner’s proposed construction of “feature flag” is inconsistent with the language of claim 8, which states that “the feature flag indicates that the running state of the second apparatus is the sleep state.” Petitioner also argues that Patent Owner’s proposal is not supported by claim 24, which depends from claim 23 and states that “the feature flag is located at a header of the sleep login packet.” *Id.* at 3. We agree with Petitioner. The plain language of claim 8 states what a feature flag indicates. Claim 24 recites where the feature flag is located. Neither claim suggests any of Patent Owner’s additional limitations.

Petitioner also argues that Patent Owner’s proposed construction is contradicted by the specification. *Id.* at 2 (citing Ex. 1001, 10:32–33, 11:16–18, Fig. 13). Figure 13 of the ’448 patent is reproduced below:

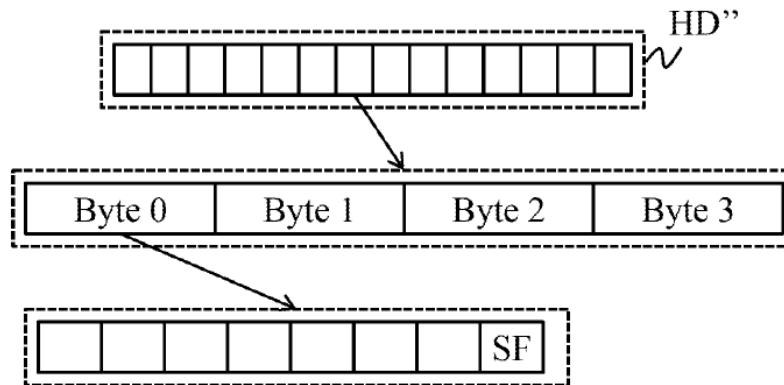


FIG. 13

Figure 13 is a schematic diagram of a position of a feature flag in a sleep login packet. Ex. 1001, 3:10–11. “[T]he feature flag SF may be located in a header HD” of the sleep login packet SLP, as shown in FIG. 12 and FIG. 13.” *Id.* at 11:16–18. According to the specification, “before entering the sleep mode, the control unit 131 reads login data LD from the storage unit 135 (step S910 [of Fig. 11]) and generates sleep login packet SLP according to the login data LD and a feature flag SF (step S920).” *Id.* at 10:8–12. “In some embodiments, the feature flag SF may be located in a header of the sleep login packet SLP.” *Id.* at 10:32–33. The specification provides:

In some embodiments, an essential difference between the sleep login packet SLP and the normal login packet is merely whether the feature flag SF is possessed. For example, if a login packet received by the connection server 150 from the second apparatus 130 has a feature flag SF (that is, the sleep login packet SLP), the control unit 151 of the connection server 150 determines that the running state of the second apparatus 130 is sleep. Otherwise, if a login packet received by the connection server 150 from the second apparatus 130 does not have a feature flag SF (that is, the normal login packet), the control unit 151 of the connection server 150 determines that

the running state of the second apparatus 130 is normally connect[ed].

Id. at 10:65–11:10.

From this disclosure, it is clear that a feature flag is a piece of information in the header of a sleep login packet sent from the second apparatus to the connection server that tells the connection server that the second apparatus is in a sleep state. As Petitioner states, “the specification contemplates that the feature flag can be merely a single bit in a header to indicate whether the packet is a ‘sleep login packet’ or a ‘normal login packet.’” Reply 3 (citing Ex. 1001, 10:5–20, 10:32–33; 10:56–11:18, Fig. 13; Ex. 1101 ¶ 13). We agree with Petitioner (*id.*) that nothing in this disclosure suggests that a feature flag is limited to “a software development and product experimentation technique that turns certain functionality on and off during runtime, without deploying new code,” as Patent Owner argues (PO Resp. 4).

Because the claim language is clear and Patent Owner has pointed to no persuasive evidence to support limiting “feature flag,” we decline to adopt Patent Owner’s limitations. Rather, a “feature flag,” as claim 8 states expressly, is a flag that “indicates that the running state of the second apparatus is the sleep state.”

No other terms need construction to resolve the parties’ dispute. *See Nidec*, 868 F.3d at 1017; *Vivid Techs.*, 200 F.3d at 803.

C. Alleged Anticipation by Zhang

Petitioner contends that claims 1, 7, 8, 10, 11, 15, 16, 18, 19, and 23–25 are anticipated by Zhang. Pet. 8–34.

“[A] prior art reference will anticipate if it ‘disclose[s] each and every element of the claimed invention . . . arranged or combined in the same way as in the claim.’” *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2016) (quoting *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (alteration by Federal Circuit)). “However, a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or combination.” *Id.* (quoting *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (alteration by Federal Circuit); *In re Petering*, 301 F.2d 676, 681 (CCPA 1962)).

For the reasons explained below, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1, 7, 8, 10, 11, 15, 16, 18, 19, and 23–25 are anticipated by Zhang.

1. Overview of Zhang

Zhang relates to securely waking a computer system over a network. Ex. 1004 ¶ 2. Figures 3 and 4 illustrate an example method according to Zhang. Figure 3 of Zhang is reproduced below:

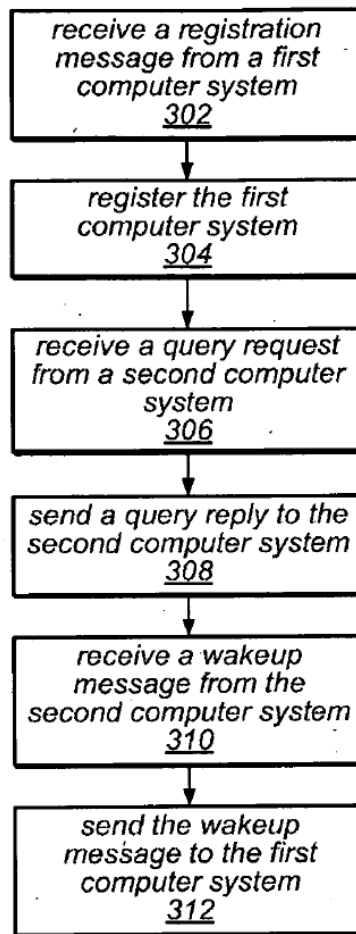


FIG. 3

Figure 3 is a flowchart of a method for securely waking a computer system over a network. *Id.* ¶ 26. Figure 4 of Zhang is reproduced below:

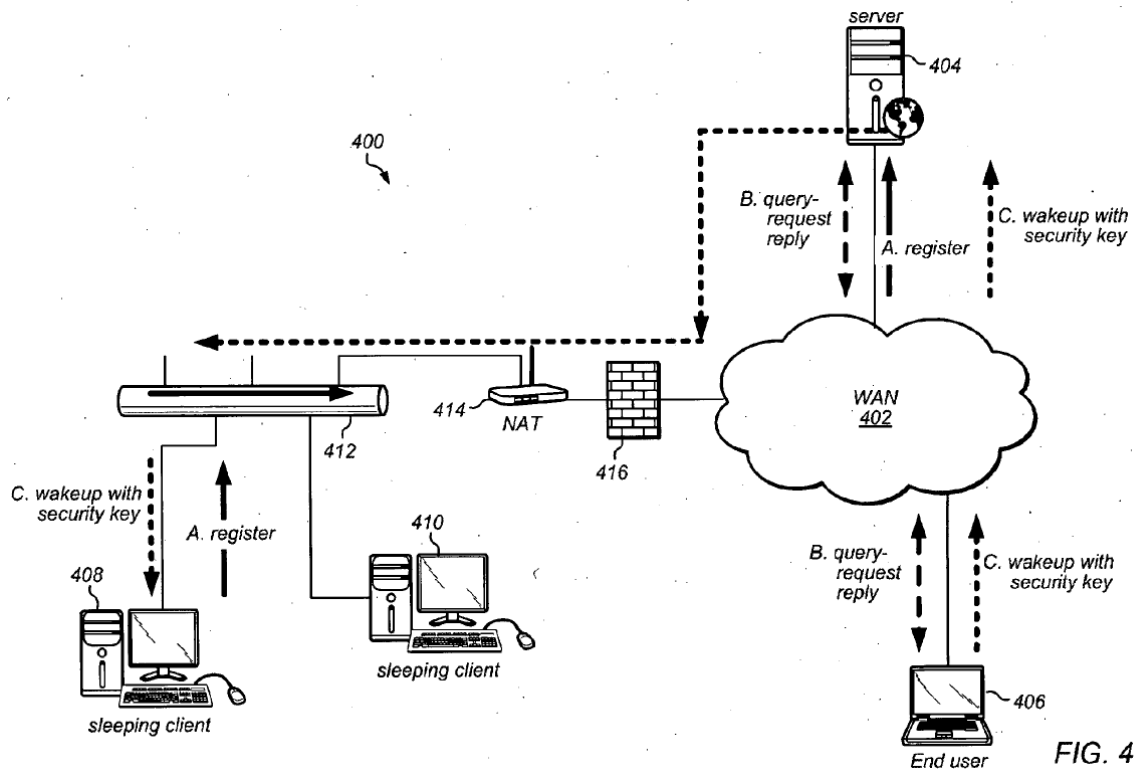


Figure 4 is a block diagram of a system of network devices that includes message flows. *Id.* ¶ 27.

System 400 includes network 402 (e.g., a wide-area network (WAN) such as the Internet), and server computer system 404, end user computer system 406, and sleeping client computer system 408 all connected to WAN 402 from different locations. *Id.* ¶ 73. A network interface card (NIC) of sleeping client 408 registers with server 404 while sleeping by sending a registration message with an encoded hostname of sleeping client 408, a nonce (e.g., a randomly generated octet), an encryption algorithm, and a password or other authentication information. *Id.* ¶¶ 53–55, 74, Fig. 3 (step 302). A registration message can be identified by an indicator in a command (CMD) field of a “secure wake over internet” (SWOI) header of the message. *Id.* ¶ 80. Server 404 registers sleeping client 408 by storing this information in a memory. *Id.* ¶¶ 56, 74, Fig. 3 (step 304).

To wake up sleeping client 408, end user 406 generates and sends a query request, including the encoded ID of sleeping client 408, to server 404. *Id.* ¶¶ 59, 75, Fig. 3 (step 306). When it receives the request from end user 406, server 404 sends a query reply, including the encoded ID, the nonce, and the encryption algorithm, to end user 406. *Id.* ¶¶ 61, 77, Fig. 3 (step 308). End user 406 then generates, with a security key, a wakeup message that includes the encoded ID and an encrypted version of the nonce (using the encryption algorithm). *Id.* ¶¶ 63–64, 77. End user 406 sends the wakeup message to server 404, which forwards the wakeup message to sleeping client 408. *Id.* ¶¶ 62, 66, 78, Fig. 3 (steps 310, 312). Server 404 may modify or authenticate the wakeup message before sending it to sleeping client 408. *Id.* ¶ 66. The NIC of sleeping client 408 receives the wakeup message, checks the encrypted nonce, and, if the nonce was encrypted using the right key, wakes up sleeping client 408. *Id.* ¶¶ 67–68, 78.

2. Claims 1, 10, 11, 18, and 19

a) Uncontested limitations of claim 1

Petitioner contends that Zhang’s “method for remotely waking a sleeping computer” discloses a “remote wakeup method,” as recited in the preamble of claim 1, assuming it is limiting.³ Pet. 8 (citing Ex. 1004 ¶¶ 36, 49–71, Fig. 3; Ex. 1003 ¶ 47). We agree and find that Zhang discloses a remote wakeup method, even if the preamble is limiting.

³ We need not determine whether the preamble of claim 1 is limiting, as we find, on the complete record, that it is disclosed in Zhang.

We find that Zhang’s query request (Fig. 3, step 306) sent by end user 406 (“a first apparatus”) to server 404 (“a connection server”) is a “wakeup request packet,” and that Zhang discloses claim limitation 1a. Ex. 1004

¶ 59. As to “wherein the wakeup request packet comprises a device identifier of a second apparatus,” as recited in claim limitation 1a.i, we find this disclosed by Zhang’s description of the query request including identification information for sleeping client 408, including a user-selected human-readable ID of the sleeping client. *Id.* ¶¶ 59, 75. As to “wherein the first apparatus is connected to the connection server via local area network or internet,” as recited in claim limitation 1a.ii, Zhang’s WAN shows that end user 406 is connected to server 404 via a local area network or Internet. *Id.* ¶¶ 73–74; *see also* Pet. 8–9 (citing Ex. 1004 ¶¶ 9, 16, 38, 49–67, 73–78, Fig. 4; Ex. 1003 ¶¶ 48–52).

As to claim limitation 1b, “the connection server obtaining wakeup information stored in the connection server according to the wakeup request packet,” we find this disclosed by Zhang’s description of Zhang’s query reply from server 404 to end user 406 with information, including a nonce stored in the server’s memory, needed by end user 406 to generate and send a wakeup message to sleeping client 408. Ex. 1004 ¶¶ 61, 76. As to claim limitation 1b.i, “wherein the wakeup information stored in the connection server is the same as wakeup information stored in the second apparatus,” we find this disclosed by Zhang’s description of sleeping client 408 storing the same nonce. *Id.* ¶¶ 55, 68, 74; *see also* Pet. 9–11 (citing Ex. 1004 ¶¶ 15, 43, 45, 55, 56, 58, 60, 61, 64, 68, 74, 76, 77; Ex. 1003 ¶¶ 53–57).

As to claim limitation 1d, “the connection server obtaining a network address corresponding to the second apparatus from a storage unit of the

connection server according to the wakeup request packet,” we find that Zhang discloses server 404 obtaining a network address of sleeping client 408, and that the network address is registered and stored by sleeping client 408 in the server’s memory and associated with the device identifier. Ex. 1004 ¶¶ 59, 61, 74; *see also* Pet. 17–18 (citing Ex. 1004 ¶¶ 31, 42, 43, 54, 56, 59, 61, 74; Ex. 1003 ¶¶ 64–65).

As to claim limitation 1e, “the connection server sending the apparatus wakeup packet to the second apparatus based on the network address,” we find that Zhang’s server 404 sends the wakeup packet to sleeping client 408 at the network address retrieved from the server’s memory. Ex. 1004 ¶¶ 66, 78. As to claim limitation 1e.i, “wherein wakeup feature data is a segment of data of the apparatus wakeup packet and is for determining whether the entire second apparatus be awoken,” we find that Zhang’s nonce is a segment of data qualifying as “wakeup feature data,” and that the nonce is used to determine whether to wake the entire sleeping client 408. *Id.* ¶¶ 68, 78; *see also* Pet. 18–19 (citing Ex. 1004 ¶¶ 34, 66–68, 78; Ex. 1003 ¶¶ 67, 68).

Patent Owner does not dispute any of Petitioner’s contentions as to these limitations of claim 1 or offer evidence to the contrary.

b) Claim limitations 1c and 1c.i

As to claim limitations 1c and 1c.i, Petitioner contends that Zhang’s end user 406 generates a wakeup message that includes both the device identifier of sleeping client 408 and the nonce. Pet. 11–16 (citing Ex. 1004 ¶¶ 17, 62–64, 66, 76, 77, 81; Ex. 1003 ¶¶ 58, 63). Petitioner acknowledges that end user 406 generates this message and sends it to server 404, but

argues that the server modifies the wakeup message by adding the IP address of sleeping client 408; thus, it is asserted, the server's modification of the incoming message results in server 404 generating a new packet that includes the device identifier and nonce. *Id.* at 12–16 (citing Ex. 1004 ¶¶ 18, 54, 56, 60, 61, 63, 64, 66, 70, 71, 78–82, Fig. 4; Ex. 1003 ¶¶ 58–62).

Mr. Kardashov testifies:

The server's modifying of the incoming message wakeup message results in the generation of a new outgoing wakeup message (the claimed apparatus wakeup packet) because the outgoing wakeup message includes information not present in the incoming wakeup message. The outgoing wakeup message . . . (the claimed ***apparatus wakeup packet***) must also include one or more items of registration information retrieved from the server's memory. For example, the outgoing wakeup message must include the IP address for the sleep enabled computer system which, as discussed, is not included in the incoming message because the IP address for the sleep enabled computer system is needed to properly address the message from the server to the sleeping client.

Ex. 1003 ¶ 59. Dr. Kardashov further testifies that “every message sent from a server to a computer system over the internet includes one or more IP packets that must be generated at the server.” *Id.* ¶ 60. Referring to the exemplary message format shown in Zhang's Figure 5, Mr. Kardashov testifies:

The IP headers must include a source address header (e.g., associated with the device sending the packet) and the destination address header (e.g., associated with the device receiving the packet) to send an IP packet from the server to the sleep-enabled computer system must be different from the source and destination headers used to deliver an IP packet from the requesting computer system to the server. . . . Therefore, the server generates at least one new outgoing packet

to send the outgoing wakeup message to the sleep-enabled computer system.

Id. (citing Ex. 1004 ¶¶ 79–82, Fig. 5); *see also* Ex. 1101 ¶¶ 16–20.

Mr. Kardashov’s testimony is consistent with and supported by Zhang and, therefore, is credible.

Patent Owner argues that Zhang’s end user 406, not server 404, generates the apparatus wakeup packet. PO Resp. 10–11 (citing Ex. 1004 ¶¶ 61, 65, 77). Patent Owner argues that “the server of Zhang merely *forwards* the previously generated apparatus wakeup request that was previously created.” *Id.* at 12 (citing Ex. 1004 ¶¶ 21, 78, Fig. 4 (steps 310, 312)); Sur-reply 9–10. According to Patent Owner, Zhang’s description of modifying or authenticating a wakeup message before sending it to the sleeping client “merely describes a relay operation, [in] which the server simply forwards the message to its [destination].” Sur-reply 8 (citing Ex. 1004 ¶¶ 66, 78–82). Patent Owner argues that “Zhang’s server does not generate the wakeup packet, upon request[] by a requesting apparatus, by obtaining the network address and wakeup information,” and that its “server does not generate the wakeup packet by obtaining any wakeup information and network address.” *Id.* at 8–9. We are persuaded, however, by Mr. Kardashov’s testimony (Ex. 1003 ¶¶ 58–60; Ex. 1101 ¶¶ 16–21) and Zhang’s disclosure (Ex. 1004 ¶¶ 54, 56, 66, 70–71, 79–82) that Zhang’s server modifies a wakeup message by adding at least address information to generate a packet that it sends to the sleeping client.

Patent Owner further argues that, even if the server modifies the wakeup message to add an additional IP address, “the server still does not *generate* the apparatus wakeup packet request message as claimed because it only supplements the apparatus wakeup request that has been previously

generated at the host with a connection address or host ID and wakeup information.” PO Resp. 12–13; Sur-reply 10. Patent Owner argues that

In Zhang the wakeup request packet and wakeup information are integrated into the “apparatus wakeup packet” by the second computer (requesting apparatus) and the information is unchanged when it passes through the server. The fact that the server may modify the [“]apparatus wakeup request” packet with the connection address data of the sleeping computer, as may be implicit in the server’s communication protocol, does not change the fact that it is the requesting apparatus that creates or generates the “apparatus wakeup request” packet with the recited information.

PO Resp. 13; Sur-reply 10. Similarly, in the Sur-reply, Patent Owner argues:

Zhang’s server does not generate the wakeup packet, upon request[] by a requesting apparatus, by obtaining the network address and wakeup information. Patent [O]wner submits that Zhang’s server merely replicates [the] wakeup packet for forwarding, Zhang’s server does not generate the wakeup packet by obtaining any wakeup information and network address.

Sur-reply 8–9.

We agree with Petitioner. Claim limitation 1c recites “the connection server generating an apparatus wakeup packet according to the wakeup request packet and the wakeup information.” As noted above, Zhang’s query request from end user 406 including identification information for sleeping client 408 corresponds to a “wakeup request packet.” *Id.* ¶¶ 59, 75. The nonce retrieved by server 404 according to the wakeup request packet and sent to end user 406 in a query reply corresponds to “wakeup information.” *Id.* ¶¶ 61, 76. Server 404 receives the query reply (including the wakeup information) and adds IP address header information to the

query reply to generate a packet (e.g., a “user datagram protocol (UDP) packet”). *Id.* ¶¶ 54, 56, 66, 78–82, Fig. 5; Ex. 1003 ¶¶ 59–60. Here, we credit Mr. Kardashov’s testimony that adding header information to the query reply before transmitting it constitutes generating a packet that includes the information from the query reply. Ex. 1003 ¶ 60; Ex. 1101 ¶ 22. This generated packet corresponds to an “apparatus wakeup packet,” as recited in claim limitation 1c. As this packet is generated by server 404 according to the wakeup request packet and the wakeup information, we find that Zhang discloses claim limitation 1c.

Patent Owner’s argument (PO Resp. 9–12) that this wakeup message is merely forwarded by server 404 to sleeping client 408 is not persuasive. This argument does not account for the information from the wakeup message being encapsulated by server 404 with header information necessary to route a packet properly to its destination. Ex. 1003 ¶ 60; Ex. 1101 ¶¶ 16–22. So, even if the information in the wakeup message is forwarded by server 404, the packet that includes the wakeup message is generated by server 404. Ex. 1003 ¶ 60; Ex. 1101 ¶¶ 16–22. Patent Owner offers no evidence that adding a header to received information would not have been understood to be generating a packet to rebut Petitioner’s evidence that it would have been. Patent Owner’s attorney argument (PO Resp. 12–13; Sur-reply 8–10) is not evidence. *See Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (“Saint-Gobain’s unsworn attorney argument to the contrary—made for the first time at oral argument on appeal—is not evidence and cannot rebut the video and other admitted evidence concerning Saint-Gobain’s manufacturing process.”);

Enzo Biochem, Inc. v. Gen-Probe, Inc., 424 F.3d 1276, 1284 (Fed. Cir. 2005) (“Attorney argument is no substitute for evidence.”).

As to claim limitation 1c.i, “wherein the apparatus wakeup packet comprises the device identifier of the second apparatus from the wakeup request packet and the obtained wakeup information,” we find this disclosed by Zhang’s description of including the user-selected human-readable ID of sleeping client 408 and the nonce in the apparatus wakeup packet. Ex. 1004 ¶¶ 62–64, 76–77; *see also* Pet. 16 (citing Ex. 1004 ¶¶ 17, 61–64, 76–77, 81; Ex. 1003 ¶ 63).

In sum, on the complete record, we find that Zhang discloses each limitation of claim 1. Accordingly, Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claim 1.

c) Claims 10, 11, 18, and 19

Claim 10 depends from claim 1 and adds “the steps of obtaining the wakeup information and the network address comprise: reading the wakeup information and the network address that correspond to the device identifier from a storage unit.” Zhang describes storing an IP address and nonce information from sleeping client 408 in a memory of server 404. Ex. 1004 ¶¶ 31, 43, 54–56. Zhang describes an embodiment in which the query request sent by end user 406 includes only a human readable ID of sleeping client 408. *Id.* ¶ 59. We agree with Mr. Kardashov that, in this embodiment, server 404 must retrieve the IP address and nonce from storage by associating them with the human-readable ID. Ex. 1003 ¶ 72; *see also* Pet. 20–21 (citing Ex. 1004 ¶¶ 31, 42–43, 54–56, 59, Fig. 2; Ex. 1003 ¶ 72). Thus, we find that Zhang describes the additional limitation of claim 10.

Patent Owner does not argue claim 10 separately. Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claim 10.

Claim 11 is independent and recites a connection server that performs functions similar to the steps of claim 1. We find that Zhang’s network interface controller (NIC) 206 corresponds to the “network module” of claim limitation 11a, Zhang’s memory corresponds to the “storage unit” of claim limitation 11b, and Zhang’s processor 202 corresponds to the “control unit” of claim limitation 11c. Ex. 1004 ¶¶ 43, 74, 78; *see also* Pet. 22–23 (citing Ex. 1004 ¶¶ 31, 42–43, 54–56, 67–68, 74, 78, Fig. 2; Ex. 1003 ¶¶ 74–76).

As to claim limitations 11c.i–11c.v, Petitioner refers to its argument and evidence for claim limitations 1c–1e.i. Pet. 23–24. Patent Owner argues that Zhang does not disclose claim limitation 11c.iv for the same reasons given for claim limitation 1c. PO Resp. 15–16. Otherwise, Patent Owner does not contest Petitioner’s allegations for claim 11. For the reasons given above for claim 1, we find that Zhang discloses claim limitations 11c.i–11c.v. Accordingly, Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claim 11.

Claim 18 depends from claim 11 and adds “the storage unit records the device identifier and correspondences between the device identifier and the wakeup information and between the network address and the wakeup information.” We agree with Petitioner and Mr. Kardashov and find that Zhang’s server 404 necessarily records a correspondence between a user-selected human-readable ID (“device identifier”) and both the nonce (“wakeup information”) and IP address (“network address”) for sleeping client 408. Ex. 1004 ¶¶ 54–56, 59; Ex. 1003 ¶ 89; Pet. 25–26. Patent Owner does not contest Petitioner’s additional allegations for claim 18.

Accordingly, Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claim 18.

Claim 19 is independent. Patent Owner admits that Zhang anticipates claim 19. PO Resp. 17 (“The Patent Owner agrees that claim 19, an independent apparatus claim is anticipated by Zhang . . .”). We agree, and, for the reasons stated in the Petition (Pet. 26–33) and our Institution Decision (Inst. Dec. 17–19), we find that Zhang discloses each limitation of claim 19. Accordingly, Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claim 19.

3. Claims 7, 8, 15, 16, and 23–25

Claim 7 depends from claim 1 and adds “receiving a sleep login packet from the second apparatus; and recording a running state of the second apparatus as a sleep state in the storage unit according to the sleep login packet.” Claim 15 depends from claim 11 and adds a similar limitation.

Petitioner contends that Zhang’s registration message from sleeping client 408 corresponds to “a sleep login packet from the second apparatus,” as recited in claim 7. Pet. 19–20 (citing Ex. 1004 ¶¶ 57–58; Ex. 1003 ¶ 69). We agree with Petitioner. “At step 302 [of Fig. 3, reproduced above], a registration message may be received by the server. . . . The registration message may be sent by the NIC while the first computer system is sleeping.” Ex. 1004 ¶ 53. “[T]he NIC of the [sleeping client 408] and the server may maintain an active connection for a pre-determined period of time after the first computer system sends the registration message to the server.” *Id.* ¶ 57. Here, Zhang’s server 404 records a running state of

sleeping client 408 as a sleep state when it receives a registration packet. Thus, we find that Zhang discloses the additional limitation of claim 7. Petitioner presents similar argument and evidence for claim 15. Pet. 24–25 (citing Ex. 1004 ¶¶ 57–58; Ex. 1003 ¶ 87). Patent Owner does not present separate arguments for claim 7 and 15. PO Resp. 13, 16. Accordingly, we find that Zhang discloses the additional limitations of claims 7 and 15.

Claim 8 depends from claim 7 and adds “wherein the sleep login packet has a feature flag, and the feature flag indicates that the running state of the second apparatus is the sleep state.” Claim 16 depends from claim 15 and adds the same limitation. Petitioner contends that the “CMD” field in Zhang’s registration message is a “feature flag” because the registration message is received by the server when sleeping client 408 is in the sleep state, and the CMD field indicates that the message is a registration message. Pet. 20 (citing Ex. 1004 ¶¶ 57–58, 80; Ex. 1003 ¶ 70), 25.

As shown in Figure 5 of Zhang, a message can include a “secure wake over internet” (SWOI) header that, in turn, includes a command (CMD) indicator that indicates a type of SWOI. Ex. 1004 ¶¶ 79–80, Fig. 5. The type of message can be a registration message. *Id.* ¶ 80. Sleeping client 408 periodically sends registration messages to server 404 as long as the sleeping client remains in the sleep mode. *Id.* ¶ 58; *see also* Reply 12 (citing Ex. 1101 ¶ 26). We find that the CMD field indicates to server 404 that the message is a registration message and, therefore, that sleeping client 408 is in the sleep state. Accordingly, we find that Zhang discloses the additional limitations of claims 8 and 16.

Claim 23 depends from claim 19 and adds “wherein the storage unit stores a login data, before entering the sleep mode, the control unit

generates, according to the login data and a feature flag, a sleep login packet having the login data, and the feature flag indicates that a running state of the networking apparatus is sleep.” We find that the identification name or number of Zhang’s sleeping client 408 is stored prior to the client entering sleep mode. Ex. 1004 ¶ 54; Ex. 1003 ¶ 109. For the reasons given for claims 7 and 8 above, we find that Zhang discloses generating, according to this login data, a sleep login packet (registration packet) having the login data (information identifying the sleeping client) and a feature flag (CMD field indicating a registration packet). Accordingly, we find that Zhang discloses the additional limitation of claim 23.

Claim 24 depends from claim 23 and adds “wherein the feature flag is located at a header of the sleep login packet.” As shown in Figure 5 of Zhang, the CMD field is located in a SWOI header. Ex. 1004 ¶ 80, Fig. 5; Ex. 1003 ¶ 110. Accordingly, we find that Zhang discloses the additional limitation of claim 24.

Claim 25 depends from claim 23 and adds “wherein in the sleep mode, the network module periodically sends the sleep login packet to the connection server.” Zhang discloses that sleeping client 408 periodically sends registration messages to server 404. Ex. 1004 ¶ 58; Ex. 1003 ¶ 111. Accordingly, we find that Zhang discloses the additional limitation of claim 25.

As to claim 8, Patent Owner contends that “the feature does not correspond to the claimed feature flag,” and that “a CMD field is not equivalent to a feature flag which indicates the running state of the network apparatus.” PO Resp. 13–14 (citing Ex. 1004 ¶ 80). Patent Owner incorporates this argument for claims 16 and 23–25. *Id.* at 16, 18. Patent

Owner does not further explain its position as to a feature flag. Presumably, Patent Owner contends that Zhang's CMD field is not "a software development and product experimentation technique that turns certain functionality on and off during runtime, without deploying new code," as Patent Owner proposes construing "feature flag." *Id.* at 4. However, as we explain in the Claim Construction section above, a "feature flag" is a flag that "indicates that the running state of the second apparatus is the sleep state," and does not include Patent Owner's additional proposed limitations. Thus, Patent Owner's argument is not persuasive.

In sum, Petitioner has proved, by a preponderance of the evidence, that Zhang anticipates claims 7, 8, 15, 16, and 23–25.

D. Alleged Obviousness Over Zhang and Zill

Petitioner contends that claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 would have been obvious over Zhang and Zill. Pet. 34–46.

A claim is unpatentable under 35 U.S.C. § 103 "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains." We resolve the question of obviousness 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 skill in the art; and

(4) objective evidence of nonobviousness, i.e., secondary considerations.⁴
See Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966).

For the reasons explained below, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 would have been obvious over Zhang and Zill.

1. Scope and Content of the Prior Art—Overview of Zill

Zill relates to systems and methods that facilitate efficient and transparent remote wakeup of computers over a network (e.g., a LAN).
Ex. 1005 ¶¶ 1–2. Figure 6 of Zill, reproduced below, illustrates an example:

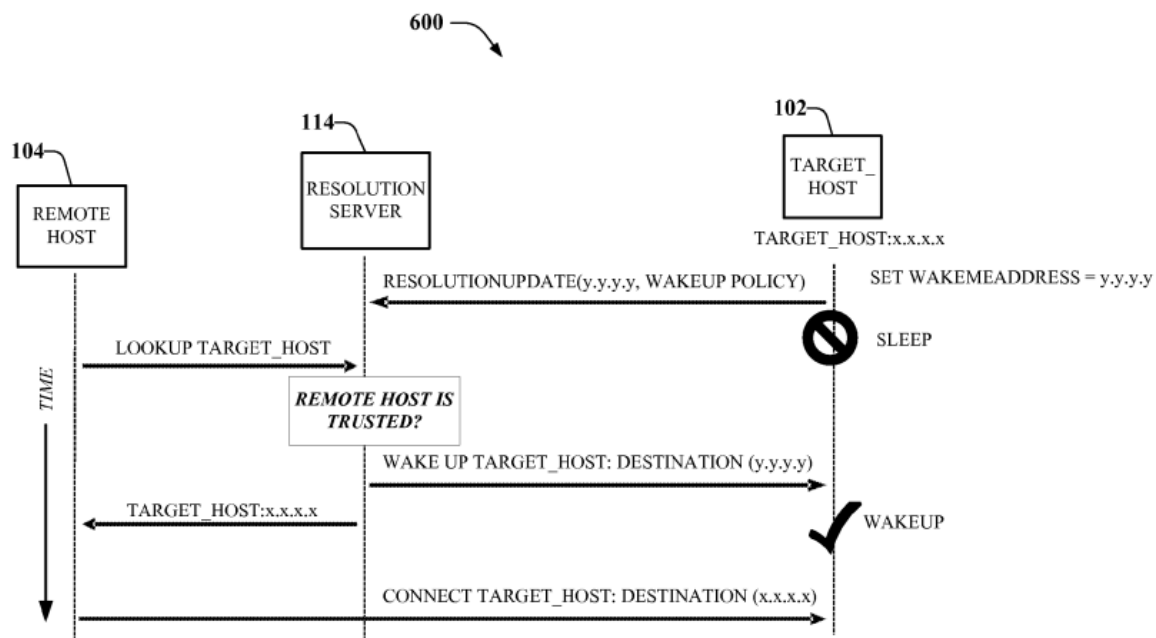


FIG. 6

⁴ The complete record does not include allegations or evidence of objective indicia of nonobviousness.

Figure 6 is a timing diagram of a process for remote wakeup of target host 102 in communication with remote host 104 and resolution server 114 in a network environment. *Id.* ¶¶ 27, 106. Prior to target host 102 entering a sleep mode, target host 102 sends an associated wakemeaddress (e.g., y.y.y.y) in a resolution update to resolution server 114. *Id.* ¶ 108. When resolution server 114 receives from remote host 104 a name resolution request for target host 102, resolution server 114 facilitates waking target host 102. *Id.* ¶ 109. Specifically, resolution server 114 sends a packet to target host 102 via the wakemeaddress to wake it up and responds to remote host 104 by sending a regular address associated with target host 102. *Id.* Target host 102 can then communicate with remote host 104 via the regular address. *Id.* ¶ 110.

2. *Differences, if any, between claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 and the prior art; reasons to combine*

Petitioner contends that a skilled artisan would have implemented Zhang, in light of Zill’s suggestion, to generate wakeup packets at Zhang’s server 404 rather than at end user 406. Pet. 36 (citing Ex. 1004 ¶¶ 61, 62; Ex. 1003 ¶¶ 112–119⁵). Petitioner contends that this combination provides an alternative teaching of claim limitations 1c, 11c.iv, and 19f. *Id.* at 40–41, 45–46. Specifically, Petitioner argues that, in this combination, Zhang’s server 404 would generate the wakeup message, including a nonce, pursuant

⁵ Patent Owner argues, without specificity, and thus unpersuasively, that Mr. Kardashov’s “opinions are not corroborated by other documents.” PO Resp. 23; *see also* Sur-reply 15 (same). We find that Mr. Kardashov’s opinions are supported sufficiently by the record, including the teachings of Zhang and Zill.

to end user 406's query request. *Id.* at 40–41 (citing Ex. 1004 ¶¶ 17, 61, 64, 66, 76; Ex. 1005 ¶¶ 109–11; Ex. 1003 ¶¶ 121–122). We find that, if combined in the manner proposed by Petitioner, Zhang and Zill teach claim limitations 1c, 11c.iv, and 19f.

As to the remaining limitations of claims 1, 11, and 19, Petitioner relies on its contentions for anticipation by Zhang. *Id.* at 39–40.

Patent Owner does not contest that Petitioner's proposed combination meets each limitation of claims 1, 11, and 19.⁶ Rather, Patent Owner contends that a skilled artisan would not have combined Zhang and Zill, at least not in the manner proposed by Petitioner. PO Resp. 22–32. According to Patent Owner, “[s]ince there is no valid reason that has been articulated to motivate a [person of ordinary skill in the art] to combine [Zill] and Zhang, and more specifically to then alter the location [where] the apparatus wakeup request is created, the Petitioner fails to establish that the claimed invention is *prima facie* obvious.” *Id.* at 32. We address the parties' respective arguments on reasons to combine Zhang and Zill and conclude that a skilled artisan would have had several reasons, with rational underpinning, to combine Zhang and Zill in the manner proposed by Petitioner.

⁶ In the Sur-reply, Patent Owner argues that “Zill does not disclose or suggest generating the apparatus wakeup packet at the server, upon request[] by a requesting apparatus, by obtaining the network address and wakeup information.” Sur-reply 13; *see also id.* at 15. Patent Owner did not raise this argument in the Patent Owner Response; thus, it is forfeited. *See* 37 C.F.R. § 42.23(b) (“A sur-reply may only respond to arguments raised in the corresponding reply . . .”). This argument also is not persuasive, as Petitioner (Pet. 9–11) cites Zhang for obtaining the network address and wakeup information. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”).

Petitioner first contends that combining the teachings of Zhang and Zill would have allowed Zhang to accommodate more types of requesting computers, including legacy hosts that might not have the software or hardware to securely process Zhang’s query replies and generate wakeup messages. *Id.* at 36–37 (citing Ex. 1004 ¶¶ 61, 62, 64, 65, 77; Ex. 1005 ¶ 111; Ex. 1003 ¶ 113). Zill states that,

Advantageously, . . . resolution server 114 can facilitate remote wake up of target host for all legacy remote hosts, depending on whether a remote host can be trusted or authenticated. In other words, assuming that the connection from the remote host does not time out before target host 102 resumes from a sleep mode, the remote wake up operation can be transparent from the legacy host’s point of view.

Ex. 1005 ¶ 111. Mr. Kardashov testifies that such legacy hosts “might not have the required software or hardware capability to execute the required software in order to securely process the query reply and generate the wakeup message,” and, thus, a skilled artisan “would have been motivated to instead generate the wakeup message at the server, as taught in Zill in order . . . to accommodate more types of requesting computer systems, including legacy computer systems.” Ex. 1003 ¶ 113.

Patent Owner acknowledges that Zill states that its system facilitates the remote wakeup of target hosts by legacy hosts, but argues that Zill does not explain how this feature is achieved. PO Resp. 23–24. However, Mr. Kardashov explains that a skilled artisan would have known that generating wakeup messages at the server would have accommodated legacy systems better. Ex. 1003 ¶ 113; *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419–20 (2007) (“One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of invention a

known problem for which there was an obvious solution encompassed by the patent's claims.'').

Patent Owner also argues that “this same benefit can also be replicated by Zhang’s system that generates the apparatus wakeup requests at the remote host by providing a legacy host with a security key.” PO Resp. 24. Patent Owner further argues that legacy apparatus could be integrated into Zhang’s system. *Id.* (citing Ex. 1006). Patent Owner’s arguments are unpersuasive. Even if a skilled artisan could have modified Zhang in the manner proposed by Patent Owner (which Patent Owner’s mere attorney argument does not establish), this does not undermine Petitioner’s proposed combination or suggest that a skilled artisan would not have modified Zhang as Petitioner proposes. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (“This court has further explained that just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.”); *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021) (“Our caselaw is clear. It’s not necessary to show that a combination is ‘the best option, only that it be a suitable option.’” (quoting *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014))). We find Petitioner’s proposed combination to be at least a suitable option. Thus, this is a situation where “a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way.” *KSR*, 550 U.S. at 417.

We find that Petitioner’s first proposed reason to combine Zhang and Zill has rational underpinning.

Petitioner next argues that generating the wakeup messages at the server would improve security, as servers would have been able to operate better security features. Pet. 37 (citing Ex. 1004 ¶ 36; Ex. 1005 ¶¶ 40, 111; Ex. 1003 ¶¶ 114–115). Mr. Kardashov testifies that

the server is able to operate better security features for managing the most sensitive information regarding the sleep-enabled computer system as compared to an end user computer system. The server management also allows centralized control over security measures that can be used to implement robust security protocols, encryption, and update policies to quickly address new threats. Servers are also better protected against physical and network based attacks as compared to an end user computer system.

Ex. 1003 ¶ 115.

Patent Owner argues that a skilled artisan would have recognized that Zhang describes encryption methods that already address exposure to malicious attacks and that Petitioner does not explain why these encryption methods are deficient or ineffective. PO Resp. 26–27 (citing Ex. 1004 ¶¶ 15, 17, 18, 55, 56, 61, 64, 68, 70). However, Petitioner does not contend that Zhang lacks encryption. Rather, Petitioner relies on expert testimony that Zhang’s server could have performed security and encryption more effectively when applying the teachings of Zill to generate wakeup messages at the server. Pet. 37 (citing Ex. 1003 ¶¶ 114–115). For example, Mr. Kardashov testifies that, although “Zhang’s encryption technique may be an effective way to improve the security of a message delivered *over a network*, they still would not eliminate the storage of sensitive information at an end-user computer and therefore the overall security of the sensitive information.” Ex. 1101 ¶ 35. Patent Owner’s argument does not rebut this evidence, and Patent Owner offers no evidence of its own on this point.

Patent Owner also argues that “there is no reason to seek a solution in Zill, because Zill provides no teachings regarding security nor makes any claims regarding the security of his system.” PO Resp. 26. Patent Owner further argues that, to the extent that a skilled artisan would have considered using Zill’s technology in Zhang, the artisan would have focused on Zill’s use of separate messages to the target server. *Id.* at 27 (citing Ex. 1005 ¶ 16). Patent Owner does not support this argument with evidence. Once again, even if a skilled artisan could have modified Zhang to use Zill’s separate messages to the target server (which Patent Owner’s attorney argument does not establish), this does not undermine Petitioner’s proposed combination. *See Mouttet*, 686 at 1334; *Intel*, 21 F.4th at 800.

We find that Petitioner’s second proposed reason to combine Zhang and Zill has rational underpinning.

Petitioner next argues that generating wakeup messages at the server would have reduced the quantity of exchanged messages that contain sensitive information, reducing the risk of interception by a malicious actor. Pet. 37–38 (citing Ex. 1003 ¶ 116). Mr. Kardashov testifies that mobile devices are more likely to connect to various network access points with varying levels of security and, therefore, are particularly vulnerable to having packets intercepted by malicious actors. Ex. 1003 ¶ 116.

Patent Owner admits that “there may be implicit advantages to providing a system that performs the same, but uses fewer messages.” PO Resp. 24. However, Patent Owner argues, Zhang teaches an embodiment in which the initial query and reply steps could be removed by having the end user provide the address of the sleeping client, and this “disclosure can therefore be considered to lead a [person of ordinary skill in the art] away

from the invention.” *Id.* at 24–25. Patent Owner, however, does not explain why this additional embodiment would lead a skilled artisan in a direction divergent from the invention, and we see no reason that it would. *Cf. In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.”).

Patent Owner also argues that, because Zill describes creating an additional wakeup packet for a second wakeup address of the sleeping target computer, the combination of Zill with Zhang actually would increase the overall load. PO Resp. 24–26. Petitioner, however, does not propose incorporating Zill’s additional wakeup packet into Zhang. Pet. 36; Reply 20–21. Rather, Petitioner argues that a skilled artisan would have incorporated Zill’s teaching of generating wakeup packets at the server. Pet. 36. Patent Owner argues that “Petitioner ignores the actual teaching and objectives of Zill, namely providing two separate addresses for the targeted sleeping apparatus, and myopically focuses on the fact that Zill’s invention used a server to create the apparatus wakeup message.” PO Resp. 23. Patent Owner’s argument unpersuasively assumes that a skilled artisan would have bodily incorporated Zill’s teachings into Zhang. *See Mouttet*, 686 F.3d at 1332–33 (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements. . . . Rather, the test for obviousness is what the combined teachings of the references would have suggested to those having ordinary skill in the art.”).

Patent Owner also argues that a skilled artisan would not have modified Zhang per Zill's teaching in order to improve security with mobile devices because Zill does not teach that a remote host may be mobile. PO Resp. 28–29. This argument is unpersuasive at least because Zill specifically states that handheld device 212 is an example of a remote host. Ex. 1005 ¶ 67; *see also id.* ¶ 35 (“[T]he term host can include, for example, a tablet personal computer (PC) device, a Smartphone, and/or a personal digital assistant (PDA), and so on.”).

We find that Petitioner's third proposed reason to combine Zhang and Zill has rational underpinning.

Petitioner further argues that it would have been more efficient to generate the wakeup message at the server, as Zill suggests, as the server can include optimized hardware. Pet. 38 (citing Ex. 1003 ¶ 117). Mr. Kardashov testifies that sending fewer messages between the server and the requesting computer would have been more efficient in terms of bandwidth usage and usage of computational and power resources. Ex. 1003 ¶ 117.

Patent Owner argues that Petitioner's contention is too vague and that Mr. Kardashov did not identify specific examples of optimized hardware, did not provide citations to prior art, and did not explain how such hardware would optimize performance or be compatible with a resolution server but not remote servers. PO Resp. 27–28. However, we find Mr. Kardashov's testimony logical and sufficiently specific and, therefore, credible.

We find that Petitioner's fourth proposed reason to combine Zhang and Zill has rational underpinning.

In addition to offering reasons to combine the references' teachings, Petitioner argues that a skilled artisan would have possessed ample skill to successfully combine Zhang and Zill because the combination would only require combining familiar elements according to known methods to yield predictable results. Pet. 38–39 (citing Ex. 1003 ¶¶ 118–119). According to Mr. Kardashov, “[c]onsidering the predictable electrical/network and software components involved in the combination, and the advanced state of the art at the time, a [person of ordinary skill in the art] would have reasonably expected success achieving the combination.” Ex. 1003 ¶ 118. Patent Owner argues that Petitioner’s contention is conclusory, but Patent Owner does not offer any evidence rebutting Petitioner’s evidence. PO Resp. 30. We find Mr. Kardashov’s testimony sufficiently detailed and credible. We find that a skilled artisan (an experienced engineer) would have had a reasonable expectation of success combining the teachings of Zhang and Zill.

For the reasons given above in our anticipation analysis, Zhang teaches claim limitations 1a–1b.i and 1c.i–1e.i; 11a–11c.iii and 11c.v–11g; and 19a–19e and 19g. As noted above, in Petitioner’s combination, Zhang and Zill teach claim limitations 1c, 11c.iv, and 19f. Thus, Zhang and Zill teach each limitation of claims 1, 11, and 19, and a skilled artisan would have had several reasons, with rational underpinning, to combine Zhang and Zill, with a reasonable expectation of success.

As explained in our analysis of anticipation above, Zhang teaches each limitation of claims 7, 8, 10, 15, 16, 18, and 23–25. Patent Owner does not present separate argument for claims 7, 10, 15, 18, or 24. PO Resp. 32–

33. For claims 8, 16, 23, and 25, Patent Owner refers to its “feature flag” arguments, which we find unpersuasive for the reasons given above. *Id.*

Claim 2 depends from claim 1 and adds “wherein the step of generating the apparatus wakeup packet comprises: combining the wakeup request packet and the wakeup information into an unencrypted packet; and performing an encryption calculation on the unencrypted packet to generate the apparatus wakeup packet.” Claim 12 depends from claim 11 and adds a similar limitation. Claim 3 depends from claim 2 and adds “wherein one encryption unit of the encryption calculation comprises entire data or partial data of the device identifier and the wakeup information.” Claim 13 depends from claim 12 and adds the same limitation. Patent Owner does not present separate argument for claims 2, 3, 12, and 13. PO Resp. 32.

Mr. Kardashov testifies that a skilled artisan would have understood that, in order to combine Zhang’s wakeup message with the nonce, the query message would be unencrypted to allow the server to process the query request and obtain the correct wakeup information. Ex. 1003 ¶ 124. Mr. Kardashov further testifies that Zhang describes encrypting wakeup messages. *Id.* (citing Ex. 1004 ¶ 13). Thus, Mr. Kardashov concludes, “[t]he Zhang and Zill combination discloses the server as **combining** the query request (the **wakeup request packet**) including the user-selected human-readable ID of the sleep-enabled computer and the nonce (the **wakeup information**) as part of the step of generating the **wakeup message**.” *Id.* ¶ 123 (citing Ex. 1004 ¶¶ 59, 63, 64, 75). We credit this uncontroverted testimony and find that Zhang and Zill teach the additional limitations of claims 2, 3, 12, and 13.

Claim 5 depends from claim 2. We agree with Petitioner and find that Zhang and Zill teach the additional limitations of claim 5 for the reasons stated in the Petition. Pet. 42–45 (citing Ex. 1004 ¶¶ 19, 20, 34, 54–56, 59, 62–64, 66–68, 74, 77, 78; Ex. 1003 ¶¶ 126–133). Patent Owner does not present separate argument for claim 5. PO Resp. 32.

In sum, we find that Zhang and Zill teach each limitation of claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 and that a skilled artisan would have had several reasons, with rational underpinning, to combine Zhang and Zill, with a reasonable expectation of success.

3. Conclusion of obviousness

As detailed above, we find that Zhang and Zill teach each limitation of claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 and that a skilled artisan would have had reasons, with rational underpinning, to combine Zhang and Zill, with a reasonable expectation of success. The record does not contain evidence of objective indicia of nonobviousness. Upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, and 23–25 would have been obvious over Zhang and Zill.

E. Alleged Obviousness Over Liu and Zhang

Petitioner contends that claims 1–3, 5, 7–13, and 15–18 would have been obvious over Liu and Zhang. Pet. 49–70. For the reasons explained below, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5, 7–13, and 15–18 would have been obvious over Liu and Zhang.

1. Scope and Content of the Prior Art—Overview of Liu

Liu describes facilitating a standby state for an IP camera to reduce power consumption. Ex. 1006 ¶¶ 6–7. Figure 7 of Liu, reproduced below, illustrates an example:

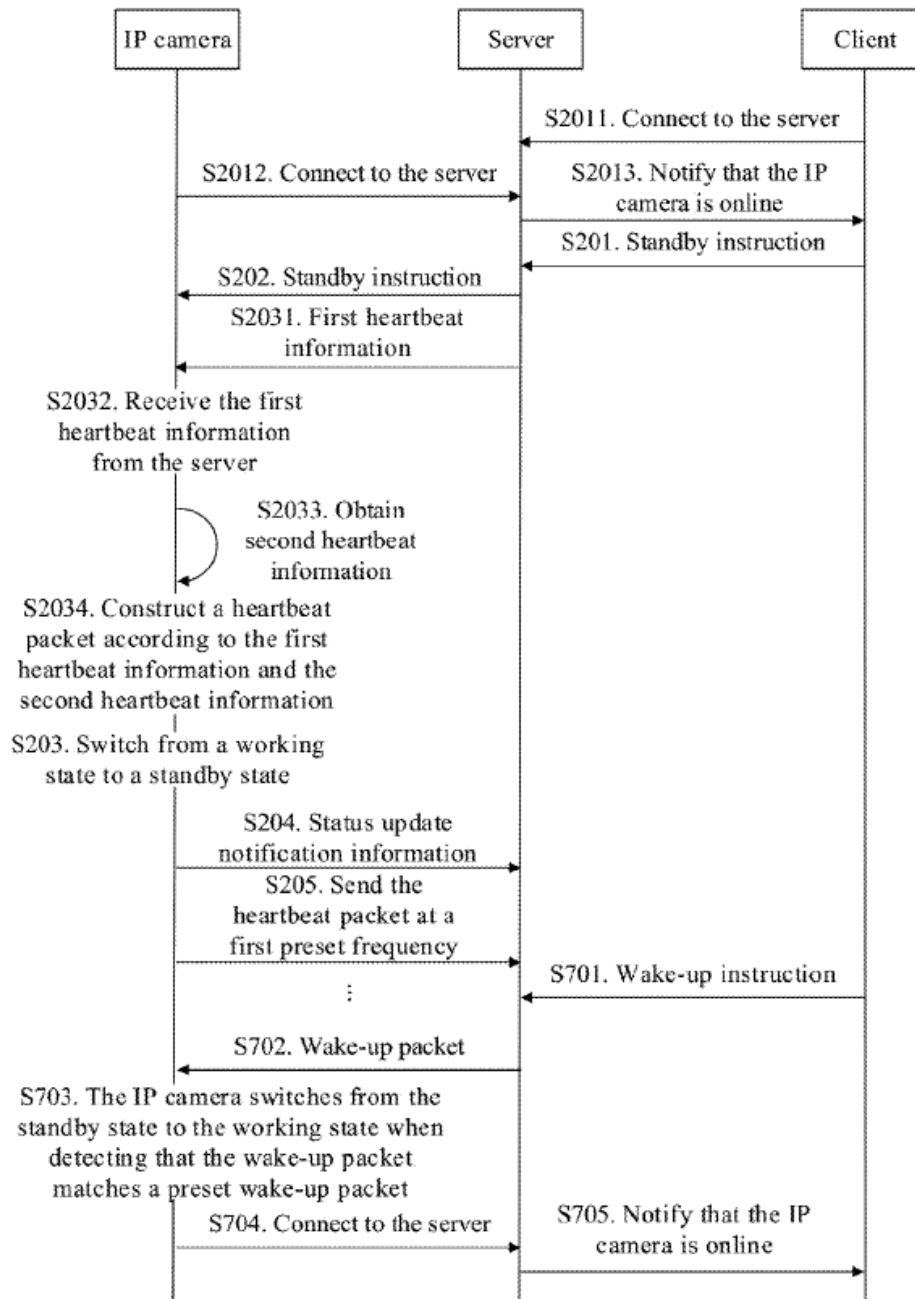


FIG. 7

Figure 7 is a signaling interaction diagram of an IP camera control method. *Id.* ¶¶ 35, 94. A client sends a wakeup instruction, including a port number and communication address of a sleeping IP camera, to a server. *Id.* ¶¶ 95–97, Fig. 7 (step S701). The server searches for a wakeup packet for waking up the IP camera according to the port number and address. *Id.* ¶ 99. The wakeup packet is pre-agreed between the server and the IP camera. *Id.* ¶ 100. The server sends a wakeup packet to the IP camera according to the port number and communication address. *Id.* ¶ 98, Fig. 7 (step S702). The IP camera switches from the standby state to a working state when it detects a wakeup packet from the server that matches a preset wakeup packet. *Id.* ¶¶ 101–102, Fig. 7 (step S703). The IP camera then connects to the server and the server notifies the client that the IP camera is online. *Id.* ¶¶ 103–105, Fig. 7 (steps S704, S705).

2. Differences, if any, between claims 1–3, 5, 7–13, and 15–18 and the prior art; reasons to combine

Petitioner proposes combining Liu and Zhang such that Liu’s system and method for remotely waking up an IP camera would use Zhang’s secure wakeup message and Liu’s wakeup packet. Pet. 49–50 (citing Ex. 1004 ¶¶ 9, 14, 19, 53, 65, 66; Ex. 1006 ¶¶ 98–100; Ex. 1003 ¶ 138).

Patent Owner does not contest that, if combined in the manner proposed by Petitioner, Liu and Zhang teach each limitation of claims 1 and 11. PO Resp. 34–38. However, Patent Owner argues that a skilled artisan would not have combined Liu and Zhang. *Id.* at 35–38.

Petitioner advances two reasons why a skilled artisan would have combined Liu and Zhang. Pet. 50–51. First, Petitioner argues that a skilled

artisan would have combined the teachings of Liu and Zhang to provide additional security to Liu's unsecured system. *Id.* at 50 (citing Ex. 1004 ¶¶ 7, 12, 13, 71; Ex. 1006 ¶¶ 95–102; Ex. 1003 ¶ 139). According to Petitioner, Liu is an example of an unsecured system that allows anyone to send the server a wake-up instruction to the IP camera, as long as they have the correct port number and communication address. *Id.* (citing Ex. 1006 ¶¶ 95–102). Zhang describes disadvantages of not using security when waking a sleeping client:

Without security, it may be possible for anyone to wake up a sleeping computer system given basic information (e.g., the IP address). This could occur maliciously, such as by a hacker, or because packets sent to the sleeping client accidentally match specified wake up patterns (such as Wake Over Lan (WOL) patterns).

Ex. 1004 ¶ 12. To address these concerns, “the systems and methods disclosed [in Zhang] may advantageously include authenticating wakeup messages by one or both of a wakeup server and the sleeping computer system itself.” *Id.* ¶ 13. Mr. Kardashov testifies that it would have been predictable to incorporate Zhang's teachings of using secure wakeup messages, as it would have provided the same advantages to Liu. Ex. 1003 ¶ 139; *see also KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

Patent Owner admits that “it may be advantageous to incorporate additional security measures as taught by Zhang.” PO Resp. 36; *accord* Sur-reply 18 (same). However, Patent Owner argues, if a skilled artisan were to combine Liu and Zhang, the skilled artisan “would follow all relevant

teachings of Zhang, including its election to create the apparatus wakeup request packet at the client.” PO Resp. 36–37; *accord* Sur-reply 18 (same). Thus, Patent Owner continues, the skilled artisan “would be disinclined to follow Zhang[’s] teaching and use the handheld device to create the apparatus wakeup message at the client or remote host.” PO Resp. 37; *accord* Sur-reply 18. Patent Owner does not cite any evidence for this argument. We agree with Petitioner (Reply 23–24), however, that Patent Owner’s argument improperly assumes that a skilled artisan would have bodily incorporated Zhang into Liu. *See Mouttet*, 686 F.3d at 1332–33.

Patent Owner also argues that Liu teaches exchanging multiple “heartbeat” and “beacon” messages between the server and the IP camera, and that a skilled artisan would not have encrypted and decrypted these messages because it would have imposed increased load and impeded the performance of Liu’s system. PO Resp. 37–38 (citing <https://www.censinet.com/perspectives/how-phi-encryption-impacts-system-performance#:~:text=Performance%20Hits%3A%20Encryption%20can%20increase,50%2D100ms%20latency%20to%20networks>⁷); Sur-reply 18–19.

Petitioner responds that its combination does not require encrypting and decrypting heartbeat messages. Reply 24. And Mr. Kardashov testifies that “even if the encryption technology incrementally ‘increased the load of the processors’ (POR, p. 38), this concern is not outweighed by the advantage of additional security measures.” Ex. 1101 ¶ 47. We find this

⁷ Patent Owner does not submit this reference as an exhibit, and it appears that the reference is not a working web page. Moreover, Patent Owner does not explain the relevance or authoritative value of this reference. We find it to be of little persuasive value.

testimony credible, and Patent Owner offers no evidence to the contrary. *See also Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”).

Patent Owner also argues that a skilled artisan “starting with Liu would be disinclined to follow these teachings because its ‘client’ that correspond is primary as mobile device.” PO Resp. 35–36 (citing Ex. 1006 ¶¶ 42, 47, Fig. 1). Patent Owner contends that Liu’s “clients are not optimized for the processing steps that are required by Zhang’s invention which creates an apparatus wakeup request and/or packet as described in Zhang’s disclosure.” *Id.* at 36. This argument is not persuasive because Patent Owner does not support it with evidence.

We find that Petitioner’s first proposed reason to combine Liu and Zhang has rational underpinning.

Petitioner next argues that Zhang’s human readable ID would have been easier to remember than a network address for a user of Liu’s system and, thus, would have predictably improved Liu’s system. Pet. 51 (citing Ex. 1004 ¶ 59; Ex. 1003 ¶ 140). Petitioner contends that the combination would only require combining familiar elements according to known methods to yield predictable results, and that a skilled artisan would have a reasonable expectation of success doing so. *Id.* at 51–52 (citing Ex. 1003 ¶ 141).

As to Liu, Patent Owner argues that “[t]he patented invention is an improvement over Liu because it does not require the user to enter the port number and communication ID, such as MAC or IP address into the mobile

device,” and that Liu’s procedure is “somewhat laborious as it requires the user to reference the user manual of the camera or to contact the manufacturer for port numbers and IP address, and accessing the WIFI camera’s configuration interface—which requires connection to the network in which the camera is located and entering the IP address,” and that “after the camera’s port numbers are identified, the router must be configured to enable remote access.” PO Resp. 34. Thus, Patent Owner appears to acknowledge that modifying Liu such that a user could input a unique device ID, rather than a MAC or IP address, would be an improvement. *Id.* at 34–35.

However, Patent Owner argues, if Zhang’s suggestion to use a user selected human-readable ID of the sleep-enabled computer were integrated with Liu’s system, “the entire system must be engineered to correlate such a user selected or human readable name to the stored device.” *Id.* at 38; *accord* Sur-reply 19 (same). According to Patent Owner,

While the use of such a human readable Client ID data may improve the user experience, the combination does not address how the connection address and port number data are entered or captured by the system and correlated with the required wakeup information for the remote sleeping apparatus, steps critical to the operation.

PO Resp. 38; *accord* Sur-reply 19–20 (same). However, Zhang describes correlating an encoded ID of the sleeping client to a location on the local area network. Ex. 1004 ¶¶ 54, 56, 71, 73–74, 78; Ex. 1003 ¶¶ 58–60; Ex. 1101 ¶ 49.

Moreover, we are persuaded by Mr. Kardashov’s testimony that “a [skilled artisan] would have possessed ample skill to successfully implement the combination, among other reasons, because making the combination

would simply require combining familiar elements according to known methods to yield predictable results,” and “considering the predictable electrical/network and software components involved in the combination and the relatively advanced state of the art at the time, a [skilled artisan] would have reasonably expected success achieving the combination.”

Ex. 1003 ¶ 141. Patent Owner offers no evidence in rebuttal to show that combining the teachings of Liu and Zhang would have required more than ordinary skill.

We find that Petitioner’s second proposed reason to combine Liu and Zhang has rational underpinning. We further find that a skilled artisan (an experienced engineer) would have had a reasonable expectation of success combining the teachings of Liu and Zhang.

As to claim 1, assuming the preamble is limiting, we find that Liu teaches a method for remotely waking up a camera. Ex. 1006 ¶ 94, Fig. 7; Ex. 1003 ¶ 142; Pet. 52.

As to claim limitation 1a, Zhang teaches end user 406 sending a wakeup message to server 404. Ex. 1004 ¶¶ 62, 65; Ex. 1003 ¶ 143; Pet. 52. For claim limitation 1a.i, we find that a skilled artisan would have added Zhang’s security to Liu’s wakeup instruction, and that the packet would have included a human-readable device identifier as shown in Zhang. Ex. 1004 ¶¶ 63, 65, 77, 78; Ex. 1003 ¶¶ 144; Pet. 52–53. As to claim limitation 1a.ii, we find that Liu’s mobile client and cloud-end server are connected via the Internet. Ex. 1006 ¶ 42, Fig. 1; Ex. 1003 ¶ 145; Pet. 53.

As to limitation 1b, we find that Liu’s server searches for a wakeup packet using the port number and communication address of the IP camera and, pursuant to Zhang’s teaching, would have searched in a memory

associated with the server. Ex. 1004 ¶¶ 15, 18, 43, Fig. 2; Ex. 1006 ¶ 99; Ex. 1003 ¶ 146; Pet. 53. We further find that, per Zhang’s teaching, the incoming wakeup message would include identification information for the IP camera rather than a communication address. Ex. 1006 ¶ 99; Ex. 1003 ¶ 147; Pet. 53–54. As to claim limitation 1b.i, we find that the wakeup packet obtained by the server is the same as a preset wakeup packet kept by Liu’s IP camera. Ex. 1006 ¶ 99; Ex. 1003 ¶ 148; Pet. 54.

As to claim limitations 1c and 1c.i, we find that Liu’s server generates a wakeup message with the obtained wakeup packet and, per Zhang, would have included the device identifier of the IP camera. Ex. 1004 ¶ 66; Ex. 1006 ¶¶ 98–100; Ex. 1003 ¶¶ 149–150; Pet. 54–55. In the Sur-reply, Patent Owner argues that “Liu does not disclose or teach generating an apparatus wakeup packet by obtaining both wakeup information and network address.” Sur-reply 17. Patent Owner did not make this argument in the Patent Owner Response and, therefore, has forfeited it. *See* 37 C.F.R. § 42.23(b). Moreover, the argument is unpersuasive on the merits because Patent Owner attacks Liu individually, while we find that the combination of Liu and Zhang teaches this aspect of claim 1. *See Keller*, 642 F.2d at 426.

As to claim limitation 1d, we find that it would have been predictable for Liu’s server, in combination with Zhang’s modified wakeup message, to obtain the IP address of the IP camera from the server’s memory in order to send the modified wakeup message to the IP camera. Ex. 1004 ¶¶ 62, 63, 65, 77, 78; Ex. 1003 ¶ 151; Pet. 55–56. We further find that Zhang describes an incoming wakeup message that is modified at the server to include an IP address of sleeping client 408. Ex. 1004 ¶¶ 54, 56, 65, 66; Ex. 1003 ¶ 152; Pet. 56–57. We find that a skilled artisan would have

incorporated Zhang’s teaching of a server managing the IP address of a sleep-enabled computer into Liu’s system to allow the system to function in additional network environments. Ex. 1004 ¶¶ 6, 10, 11, 22, 58; Ex 1003 ¶ 153; Pet. 57–58.

As to claim limitation 1e, we find that Zhang’s modified wakeup message would be sent to Liu’s sleeping IP camera. Ex. 1004 ¶¶ 66, 67, 78; Ex. 1003 ¶ 154; Pet. 58. We find that Liu’s wakeup packet, with Zhang’s wakeup message, is the wakeup feature data of claim limitation 1e.i. We further find that Liu’s wakeup packet is a segment of data of the modified wakeup message of the Liu/Zhang combination, and that Liu’s IP camera switches from a standby state to a work state when it detects that the wakeup packet and its stored preset wakeup packet match. Ex. 1006 ¶¶ 99, 102; Ex. 1003 ¶ 155; Pet. 58.

Thus, we find that Liu and Zhang teach each limitation of claim 1. For the same reasons, we find that Liu and Zhang teach each limitation of claim 11.

We find that Liu and Zhang teach each limitation of claims 2, 3, 5, 10–13, and 18 for the reasons given in the Petition (which we adopt as our own). Pet. 59–63, 66–67, 69–70. Patent Owner does not present separate argument for these claims. PO Resp. 39.

As to claims 7 and 15, we find that Liu’s update notification information is a sleep login packet. Ex. 1006 ¶ 78. We further find that Liu teaches recording a “working state” and a “standby state” (the later indicating that the second apparatus is in a sleep state). *Id.* ¶¶ 75, 78; Ex. 1003 ¶ 167; Pet. 62–63, 69. Thus, Liu and Zhang teach each limitation

of claims 7 and 15. Patent Owner does not present separate argument for these claims. PO Resp. 39.

As to claims 8 and 16, Mr. Kardashov testifies that Liu’s status update notification information would have included a field to indicate to the server the running state of the IP camera and that this field would have included a feature flag. Ex. 1003 ¶ 168. We credit Mr. Kardashov’s testimony and find that Liu and Zhang teach the additional limitations of claims 8 and 16.

Patent Owner argues as to claim 16 (but not claim 8) that “claim 16 is not obvious because it includes the feature flag element which is not taught or discussed by the combination and for the same reasons discussed in the proceeding sections.” PO Resp. 39. Patent Owner does not cite to evidence, and its reference to reasons discussed in proceeding sections is unclear. If Patent Owner refers to its claim construction argument (PO Resp. 4), we find that argument unpersuasive for the reasons given in the Claim Construction section above. If Patent Owner refers to its arguments opposing Petitioner’s anticipation ground based on Zhang (PO Resp. 13–14, 16), those arguments are inapposite, as Petitioner relies on Liu’s teaching, supported by expert testimony, for the recited “feature flag” in the obviousness ground based on Liu and Zhang (Pet. 63, 69; Ex. 1003 ¶ 168).

Claim 9 depends from claim 1, and claim 17 depends from claim 11. Claims 9 and 17 add substantially the same limitation to their respective independent claims. We find that Zhang’s query request is a connection request packet that is used to request a communication connection with sleeping client 408. Ex. 1004 ¶ 59. We further find that Zhang’s server 404 determines whether sleeping client 408 is asleep and sends a query reply to end user 406. *Id.* ¶ 61. Because the query reply asks for information to

generate a wakeup message, we find that the query reply is a reply to end user 406 that sleeping client 408 sleeps. *Id.*; Ex. 1003 ¶¶ 172–174. We credit Mr. Kardashov’s testimony that a skilled artisan would have found it advantageous to incorporate this feature of Zhang in Liu and would have had a reasonable expectation of success. Ex. 1003 ¶¶ 170–171. Accordingly, we find that Liu and Zhang teach the additional limitations of claims 9 and 17.

In sum, we find that Liu and Zhang teach each limitation of claims 1–3, 5, 7–13, and 15–18 and that a skilled artisan would have had reasons, with rational underpinning, to combine Liu and Zhang, with a reasonable expectation of success.

3. Conclusion of obviousness

As detailed above, we find that Liu and Zhang teach each limitation of claims 1–3, 5, 7–13, and 15–18 and that a skilled artisan would have had reasons, with rational underpinning, to combine Liu and Zhang, with a reasonable expectation of success. The record does not contain evidence of objective indicia of nonobviousness. Upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 1–3, 5, 7–13, and 15–18 would have been obvious over Liu and Zhang.

IV. CONCLUSION⁸

Petitioner has proved by a preponderance of the evidence that claims 1–3, 5, 7–13, 15–19, and 23–25 of the '448 patent are unpatentable.

The outcome for the challenged claims of this Final Written Decision is summarized in the following table:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 7, 8, 10, 11, 15, 16, 18, 19, 23– 25	102	Zhang	1, 7, 8, 10, 11, 15, 16, 18, 19, 23–25	
1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, 23–25	103	Zhang, Zill	1–3, 5, 7, 8, 10–13, 15, 16, 18, 19, 23–25	
1–3, 5, 7– 13, 15–18	103	Liu, Zhang	1–3, 5, 7–13, 15–18	
Overall Outcome			1–3, 5, 7–13, 15–19, 23–25	

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

It is hereby:

ORDERED that 1–3, 5, 7–13, 15–19, and 23–25 of the '448 patent are unpatentable; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2024-01193
Patent 10,602,448 B2

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