

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.,
Petitioner,

v.

KONINKLIJKE KPN N.V. and NEDERLANDSE ORGANISATIE VOOR
TOEGEPAST-NATUURWETENSCHAPPELIJK ONDERZOEK TNO,
Patent Owner.

IPR2023-00902
Patent 9,438,572 B2

Before ROBERT J. WEINSCHENK, NORMAN H. BEAMER, and
RUSSELL E. CASS, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Ericsson Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–17 (“the challenged claims”) of U.S. Patent No. 9,438,572 B2 (Ex. 1001, “the ’572 patent”). Koninklijke KPN N.V. and Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek TNO (collectively, “Patent Owner”) filed a Preliminary Response (Paper 5, “Prelim. Resp.”) to the Petition.

An *inter partes* review may not be instituted unless “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). Further, when instituting an *inter partes* review, we “will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a). Here, Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable. Thus, we institute an *inter partes* review of the challenged claims on all the grounds of unpatentability in the Petition.

B. *Real Parties in Interest*

Petitioner identifies Ericsson Inc. and Telefonaktiebolaget LM Ericsson as the real parties in interest. Pet. 2. Patent Owner identifies Koninklijke KPN N.V. and Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek TNO as the real parties in interest. Paper 3, 2.

C. Related Matters

The parties indicate that the '572 patent is not the subject of any other pending cases. Pet. 2; Paper 3, 2.

D. The '572 Patent

The '572 patent relates to “establishing a device-to-device (D2D) communication session between mobile devices.” Ex. 1001, 1:12–14. The '572 patent states that “[i]t is desirable to enable mobile devices which are typically connected to a mobile network to also directly communicate with each other.” *Id.* at 1:31–34. For example, D2D communication “offers advantages such as, e.g., enabling mobile communication between users outside a range of the mobile network, reducing of load from the base stations and/or from the core nodes of the mobile network, etc.” *Id.* at 1:49–56. But, according to the '572 patent, “[a] problem of [such] mobile networks and mobile devices is that an operator of the mobile network has no or only limited control over the D2D communication.” *Id.* at 2:11–13.

The '572 patent purports to address the aforementioned problem by “provid[ing] more control over the D2D communication between mobile devices which are connectable to a mobile network.” *Id.* at 2:23–25. Specifically, the '572 patent describes “a mobile network arranged for preloading an initiation key on the mobile device . . . when the mobile device is connected to the mobile network, the initiation key being associated with a validity period.” *Id.* at 3:7–11. This “measure[] offer[s] control to the operator over the D2D communication.” *Id.* at 4:37–38. For example, “[b]y using the initiation key in a key agreement procedure which is based on a match of the initiation keys used by the mobile devices, the operator obtains control in that not just any initiation key can be used in

establishing the D2D communications session.” *Id.* at 4:44–51. And “[b]y providing an initiation key which is associated with a validity period . . . , a time-based control mechanism is provided in that the initiation key is deemed valid only in a predetermined period.” *Id.* at 4:30–36.

E. Illustrative Claim

Of the challenged claims, claims 1 and 15–17 are independent. Claim 1 is reproduced below.

1. Method for establishing a device-to-device (D2D) communication session between mobile devices which are mutually connectable via a D2D communication channel and individually connectable to a mobile network, comprising:

preloading an initiation key on each of the mobile devices, the initiation key being associated with a validity period; and on each of the mobile devices:

verifying a validity of the initiation key based on a current time;

requesting a further initiation key via the mobile network if no initiation key is deemed valid;

if the initiation key is deemed valid, generating a session key using the initiation key by using the initiation key in performing a key agreement procedure between the mobile devices over the D2D communication channel, the key agreement procedure resulting in the session key based on a match of the respective initiation keys used by each of the mobile devices; and

establishing the D2D communication session over the D2D communication channel based on the session key.

Ex. 1001, 18:6–26.

F. Evidence

Petitioner submits the following evidence:

Evidence	Exhibit No.
Declaration of Dr. Angelos Keromytis (“Keromytis Declaration”)	1003
Teo, WO 2012/112124 A1, published Aug. 23, 2012 (“Teo”)	1005
Hawkes, US 2013/0067552 A1, published Mar. 14, 2013 (“Hawkes”)	1006
Network Working Group, Request for Comments: 4279 (Dec. 2005) (“RFC 4279”)	1007
Madoukh, US 2001/0019614 A1, published Sept. 6, 2001 (“Madoukh”)	1011
3GPP TSG SA WG3 Security – SA3#46b, S3-070234 (Mar. 2007) (“S3-070234”)	1013
Kumar, US 2007/0171910 A1, published July 26, 2007 (“Kumar”)	1016
Thakare, US 2009/0181643 A1, published July 16, 2009 (“Thakare”)	1018

G. Asserted Grounds

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 14	103	Teo, Madoukh
3–5, 15–17	103	Teo, Madoukh, Hawkes
6–9	103	Teo, Madoukh, RFC 4279
10	103	Teo, Madoukh, RFC 4279, Kumar
11, 12	103	Teo, Madoukh, S3-070234
13	103	Teo, Madoukh, Thakare

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art would have had “a degree in electrical engineering, computer science, or a similar

discipline, with at least 2–4 years of relevant industry or research experience in the network security industry,” as well as “familiarity with the wireless standards and protocols relating to mobile communications and the security of such communications.” Pet. 11–12 (citing Ex. 1003 ¶¶ 65, 66, 68).

Petitioner’s description of the level of ordinary skill in the art is supported by the testimony of Petitioner’s declarant, Dr. Angelos Keromytis. Ex. 1003 ¶¶ 63–68. Patent Owner does not dispute Petitioner’s description at this stage of the proceeding. We adopt Petitioner’s description for purposes of this Decision.

B. Claim Construction

In an *inter partes* review proceeding, a patent claim is construed using the same standard used in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of the 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).

Petitioner does not propose an express construction for any claim terms. Pet. 15. Patent Owner proposes construing the term “validity period” such that it “cannot be a single point in time.” Prelim. Resp. 10. Patent Owner also proposes construing the phrase “if the initiation key is deemed valid, generating a session key,” to mean that generating a session key “must be ***premised upon*** the initiation key having had its validity verified ‘based on a current time.’” *Id.* at 12.

As discussed below, on this record, Petitioner shows sufficiently that the asserted prior art teaches the disputed limitations of the challenged claims even under Patent Owner’s proposed constructions. *See* Section II.C.1. Thus, at this stage of the proceeding, we need not address Patent

Owner's claim construction arguments in order to resolve the parties' disputes about the asserted grounds of unpatentability.

C. Obviousness of Claims 1, 2, and 14 over Teo and Madoukh

Petitioner argues that claims 1, 2, and 14 would have been obvious over Teo and Madoukh. Pet. 16–38. For the reasons discussed below, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1, 2, and 14 would have been obvious over Teo and Madoukh.

1. Claim 1

Claim 1 recites a “[m]ethod for establishing a device-to-device (D2D) communication session between mobile devices which are mutually connectable via a D2D communication channel and individually connectable to a mobile network.” Ex. 1001, 18:6–10. Petitioner presents evidence that Teo teaches communication terminals that directly communicate with each other via a radio interface and also individually connect to a communication network. Pet. 18–21 (citing Ex. 1005, 4:10–17, 4:26–30, 5:11–13, 8:1–4, 8:12–15, 8:17–21, 10:4–6, Figs. 1, 2). Patent Owner does not dispute that the Teo and Madoukh combination teaches the preamble of claim 1. On this record, Petitioner shows sufficiently that the Teo and Madoukh combination teaches the preamble of claim 1.¹

Claim 1 recites “preloading an initiation key on each of the mobile devices, the initiation key being associated with a validity period.” Ex. 1001, 18:11–13. Petitioner presents evidence that Teo teaches transmitting a pre-shared Direct Communication Master Key (“DMK”) and

¹ At this stage of the proceeding, we need not decide whether the preamble is limiting because Petitioner presents evidence that the prior art teaches the recitations in the preamble of claim 1.

an associated lifetime for the DMK to each communication terminal before the terminals establish a direct communication session. Pet. 21–24 (citing Ex. 1003 ¶ 144; Ex. 1005, 4:28–30, 10:27–28, 13:4–14:19, 14:21–15:2, 18:7–19:3, 37:20–25, 38:1–7, 38:24–25, 63:9–13, Fig. 5). Petitioner also presents evidence that a person of ordinary skill in the art would have understood the DMK lifetime “to be some value that represents the duration (*e.g.*, in seconds) for which the DMK is valid.” *Id.* at 23–24 (citing Ex. 1003 ¶ 144).

Patent Owner contends that Petitioner does not show sufficiently that the DMK lifetime is a validity period. Prelim. Resp. 15–18. Specifically, Patent Owner argues that the DMK lifetime is “a single point in time: the ‘expiration’ time of the old encryption key.” *Id.* at 16. On this record, Patent Owner’s argument is unavailing. The evidence of record indicates that a person of ordinary skill in the art would have known that the term “lifetime” in Teo refers to a period of time during which the DMK is valid, rather than just a single point in time. Ex. 1003 ¶ 144. Thus, at this stage of the proceeding, Petitioner shows sufficiently that the DMK lifetime is a validity period.²

Claim 1 recites “on each of the mobile devices: verifying a validity of the initiation key based on a current time.” Ex. 1001, 18:14–15. Petitioner

² Patent Owner also argues that the “[t]imestamps such as T_{HR-BS} ’ and T_{HR-BS} ” in Teo are disclosed to be used to determine whether a received message is fresh,” and “are not taught as being used in relation to a ‘key_lifetime.’” Prelim. Resp. 15–16, 19–20. Even if Patent Owner is correct that the identified timestamps are not related to the DMK lifetime, as discussed above, the evidence of record still indicates that the DMK lifetime refers to a period of time, not just a single point in time. Ex. 1003 ¶ 144 (“valid . . . through the expiration of the DMK’s lifetime”).

presents evidence that Madoukh teaches a “key lifetime manager operable to monitor encryption key expiration dates and request new encryption keys upon the expiration of old encryption keys.” Pet. 24 (citing Ex. 1011 ¶ 7). Petitioner also presents evidence that it would have been obvious “to implement Madoukh’s key lifetime manager to monitor whether Teo’s DMK has expired by checking whether the current time falls within the range of the DMK’s lifetime.” *Id.* at 25 (citing Ex. 1003 ¶¶ 146–147) (emphases omitted).

Patent Owner contends that Petitioner does not show sufficiently that Madoukh’s key lifetime manager verifies a validity of Teo’s DMK based on a current time. Prelim. Resp. 15–18. In particular, Patent Owner argues that Madoukh’s key lifetime manager “monitors the expiration dates and timestamps independently, to flag expired keys or request new encryption key[s] upon the expiration of old keys, but this monitoring of expiration dates has no relation to the current time when an encryption key is actually used or intended to be used.” *Id.* at 17; *see id.* at 20 (“Each of such [key lifetime managers] would monitor the expiry of a key as a background process that is independent of a current time of using the key.”). According to Patent Owner, Petitioner does not “provide any reason why Madoukh’s procedure . . . would be applied in the context of Teo to compare a current time with a range of times that begins, for example, at the starting time of Teo’s DMK key, rather than by comparing the current time only with a single time—the expiration time.” *Id.* at 17.

On this record, Patent Owner’s argument is unavailing. Patent Owner interprets claim 1 to require comparing the time that an initiation key is used (or intended to be used) with a range of times. *See id.* But claim 1 only

recites “verifying” a validity of the initiation key “based on a current time.” Ex. 1001, 18:14–15. Claim 1, on its face, does not require that the “current time” be the time that the initiation key is used or that the “verifying” be performed using a range of times. *Id.* Further, as discussed above, Teo’s DMK lifetime is a period of time during which the DMK is valid. Ex. 1003 ¶ 144. Thus, even if Patent Owner is correct that Madoukh’s key lifetime manager simply compares a current time to the expiration of the DMK lifetime, doing so would determine whether the current time is within the DMK lifetime or not. *Id.* ¶ 146. Thus, Petitioner shows sufficiently that the combination of Teo and Madoukh teaches verifying a validity of the DMK based on a current time.

Claim 1 recites “on each of the mobile devices: . . . requesting a further initiation key via the mobile network if no initiation key is deemed valid.” Ex. 1001, 18:16–17. Petitioner presents evidence that Madoukh’s key lifetime manager “request[s] new encryption keys upon the expiration of old encryption keys.” Pet. 26 (citing Ex. 1011 ¶ 7). Petitioner also presents evidence that it would have been obvious “to implement Madoukh’s key lifetime manager in Teo’s mobile communication terminals such that the terminals request a new DMK from the base station . . . upon determining that a currently-held DMK has expired.” *Id.* at 26–27 (citing Ex. 1003 ¶¶ 149–150). Other than the arguments discussed above, Patent Owner does not dispute that the Teo and Madoukh combination teaches this limitation of claim 1. On this record, Petitioner shows sufficiently that the Teo and Madoukh combination teaches this limitation of claim 1.

Claim 1 recites “on each of the mobile devices: . . . if the initiation key is deemed valid, generating a session key using the initiation key by

using the initiation key in performing a key agreement procedure between the mobile devices over the D2D communication channel, the key agreement procedure resulting in the session key based on a match of the respective initiation keys used by each of the mobile devices.” Ex. 1001, 18:18–24. Petitioner presents evidence that Teo teaches generating a Direct Communication Traffic Encryption Key (“DTEK”) using the DMK in a pre-shared key approach between the communication terminals via the radio interface. Pet. 27–31 (citing Ex. 1005, 5:11–13, 5:23–27, 8:1–4, 8:17–21, 18:7–19:3, 31:6–8, 32:16–21, 32:23–30, 33:1–34:21, 37:23–25, 38:1–7, 38:14–16, 38:24–25, Fig. 12). Petitioner presents evidence that the pre-shared key approach generates the DTEK based on a match of the DMKs held by the communication terminals. *Id.* at 32–34 (citing Ex. 1005, 32:16–33:8, 37:7–8, 37:23–25, 38:1–6). Petitioner also presents evidence that a person of ordinary skill in the art would have understood that Teo’s pre-shared key approach occurs only after Madoukh’s key lifetime manager determines that the DMK is valid. *Id.* at 32 (citing Ex. 1003 ¶ 162).

Patent Owner contends that Petitioner does not show sufficiently that the combination of Teo and Madoukh teaches generating a session key if the initiation key is deemed valid. Prelim. Resp. 18–20. Patent Owner argues that Petitioner incorrectly “reason[s] that just because a ‘pre-shared key approach’ would occur after a DMK key is determined to be valid, it would follow that it would be premised upon the determination of validity.” *Id.* at 19. On this record, Patent Owner’s argument is unavailing. Petitioner presents evidence that, in the proposed combination, Teo’s pre-shared key approach occurs “*only after*” Madoukh’s key lifetime manager deems the DMK valid. Pet. 32; Ex. 1003 ¶ 162 (emphasis added). In other words,

Teo's pre-shared key approach would not occur *unless* Madoukh's key lifetime manager deems the DMK valid. *Id.* Thus, at this stage of the proceeding, Petitioner shows sufficiently that Teo's pre-shared key approach is premised on verifying the DMK's validity.

Claim 1 recites "on each of the mobile devices: . . . establishing the D2D communication session over the D2D communication channel based on the session key." Ex. 1001, 18:25–26. Petitioner presents evidence that Teo teaches establishing direct communication between the communication terminals based on the DTEK. Pet. 34–35 (citing Ex. 1005, 8:12–21, 38:24–25). Other than the arguments discussed above, Patent Owner does not dispute that the Teo and Madoukh combination teaches this limitation of claim 1. On this record, Petitioner shows sufficiently that the Teo and Madoukh combination teaches this limitation of claim 1.

2. Claims 2 and 14

Dependent claims 2 and 14 depend from claim 1. Ex. 1001, 18:27–31, 19:16–22. Petitioner presents evidence that the Teo and Madoukh combination teaches the limitations of claims 2 and 14. Pet. 35–38. Other than the arguments discussed above for claim 1, Patent Owner does not dispute that the Teo and Madoukh combination teaches the limitations of claims 2 and 14. On this record, Petitioner shows sufficiently that the Teo and Madoukh combination teaches the limitations of claims 2 and 14.

3. Reason to Combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the cited teachings of Teo and Madoukh. Pet. 16–17 (citing Ex. 1003 ¶ 103). In particular, Petitioner presents evidence that a person of ordinary skill in the art "would have been motivated to combine

Teo’s system for receiving and using keys with associated lifetimes with Madoukh’s ‘key lifetime manager’ for monitoring the expiration of keys, requesting new keys when old keys have expired, and deactivating expired keys.” *Id.* at 16 (emphases omitted). For example, a person of ordinary skill in the art “would have understood that Teo’s DMK would expire . . . and one would need to implement a component for tracking the DMK’s expiration, requesting a new DMK upon such expiration, and deactivating the expired DMK, such as Madoukh’s key lifetime manager.” *Id.* at 17 (citing Ex. 1003 ¶ 103) (emphases omitted). Petitioner also presents evidence that a person of ordinary skill in the art “would have reasonably expected success when combining Teo and Madoukh.” *Id.* (citing Ex. 1003 ¶ 104) (emphases omitted). At this stage of the proceeding, Petitioner shows sufficiently that it would have been obvious to combine the cited teachings of Teo and Madoukh.

4. Summary

For the foregoing reasons, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1, 2, and 14 would have been obvious over Teo and Madoukh.

D. Obviousness of Claims 3–5 and 15–17 over Teo, Madoukh, and Hawkes

Petitioner argues that claims 3–5 and 15–17 would have been obvious over Teo, Madoukh, and Hawkes. Pet. 39–49. Petitioner identifies evidence indicating that the Teo, Madoukh, and Hawkes combination teaches the limitations of claims 3–5 and 15–17, and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Other than the arguments discussed above, Patent Owner does not raise any arguments relating to this asserted ground. Prelim. Resp. 21–22. On this record,

Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 3–5 and 15–17 would have been obvious over Teo, Madoukh, and Hawkes.

E. Obviousness of Claims 6–9 over Teo, Madoukh, and RFC 4279

Petitioner argues that claims 6–9 would have been obvious over Teo, Madoukh, and RFC 4279. Pet. 50–59. Petitioner identifies evidence indicating that the Teo, Madoukh, and RFC 4279 combination teaches the limitations of claims 6–9, and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* We address Patent Owner’s arguments regarding claims 6 and 9 below.

Claim 6 recites, *inter alia*, “preloading a set of initiation keys on each of the mobile devices, the set of initiation keys being associated with a respective set of validity periods.” Ex. 1001, 18:44–46. Petitioner presents evidence that Teo teaches using its system “when several emergency rescue personnel need to directly communicate with each other in the event of a disaster, for example.” Pet. 53 (citing Ex. 1005, 1:18–23). Petitioner also presents evidence that it would have been obvious “in such a scenario, [that] there would be many terminals that would need to communicate with each other,” and, thus, “Teo’s base station would have transmitted several DMKs . . . to the terminals” with each DMK having “its own ‘key_lifetime.’” *Id.* (citing Ex. 1003 ¶ 203; Ex. 1007, 5) (emphasis omitted).

Patent Owner contends that Petitioner does not show sufficiently that the Teo, Madoukh, and RFC 4279 combination teaches preloading a set of DMKs with respective lifetimes on each communication terminal. Prelim. Resp. 23–24. Specifically, Patent Owner argues that just because “several emergency rescue personnel would need to directly communicate with each

other,” that does not “necessarily imply that a ‘set of initiation *keys*’ . . . , where ‘keys’ is plural, would be preloaded ‘on *each* of the mobile devices.’” *Id.* at 23. Patent Owner also argues that Petitioner does not “provide any showing based on Teo that a set of plural keys would necessarily be loaded on each mobile device where the set of (plural) initiation keys is ‘associated with a respective set of validity *periods*.’” *Id.*

On this record, Patent Owner’s arguments are unavailing. Patent Owner’s arguments raise issues of inherency. *See id.* (“Petitioner’s . . . attempt at inherent anticipation fails.”). But Petitioner does not rely on inherency for the disputed limitation of claim 6. *See* Pet. 53–54. Rather, Petitioner asserts that preloading a plurality of DMKs with respective lifetimes on each communication terminal would have been obvious to a person of ordinary skill in the art. *Id.* And, to support that assertion, Petitioner presents evidence that a person of ordinary skill in the art would have known that a device can have multiple pre-shared keys for use with several different parties. Ex. 1007, 5 (“Both clients and servers may have pre-shared keys with several different parties.”). Thus, at this stage of the proceeding, Petitioner shows sufficiently that the disputed limitation of claim 6 would have been obvious based on Teo, Madoukh, and RFC 4279.

Claim 9 recites “wherein the set of validity periods is constituted at least in part by different but overlapping validity periods.” Ex. 1001, 18:62–64. Petitioner presents evidence that a person of ordinary skill in the art “would have considered it a natural occurrence in a system that deploys several DMKs . . . that the set of validity periods would include some different but overlapping time periods.” Pet. 59 (citing Ex. 1003 ¶ 212; Ex. 1017 ¶¶ 50, 52, 59, 64). Patent Owner contends that Petitioner “refers to

the Park reference (Ex. 1017) as ‘an example of such an occurrence’ of overlapping time periods—but Park is not relied upon as a reference” in this asserted ground and thus “should . . . be given no weight.” Prelim. Resp. 24. We disagree. Petitioner appears to rely on Park as documentary evidence of the background knowledge of a person of ordinary skill in the art. *See* Pet. 59; Ex. 1003 ¶ 212. We are not persuaded that doing so is improper. *See Randall Manufacturing v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (Background knowledge “is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious.”). Thus, at this stage of the proceeding, Petitioner shows sufficiently that claim 9 would have been obvious based on Teo, Madoukh, and RFC 4279.

For the foregoing reasons, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 6–9 would have been obvious over Teo, Madoukh, and RFC 4279.

F. Obviousness of Claim 10 over Teo, Madoukh, RFC 4279, and Kumar

Petitioner argues that claim 10 would have been obvious over Teo, Madoukh, RFC 4279, and Kumar. Pet. 59–63. Petitioner identifies evidence indicating that the Teo, Madoukh, RFC 4279, and Kumar combination teaches the limitations of claim 10, and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Other than the arguments discussed above, Patent Owner does not raise any arguments relating to this asserted ground. Prelim. Resp. 25. On this record, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claim 10 would have been obvious over Teo, Madoukh, RFC 4279, and Kumar.

G. Obviousness of Claims 11 and 12 over Teo, Madoukh, and S3-070234

Petitioner argues that claims 11 and 12 would have been obvious over Teo, Madoukh, and S3-070234. Pet. 63–67. Petitioner identifies evidence indicating that the Teo, Madoukh, and S3-070234 combination teaches the limitations of claims 11 and 12, and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Other than the arguments discussed above, Patent Owner does not raise any arguments relating to this asserted ground. Prelim. Resp. 26. On this record, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 11 and 12 would have been obvious over Teo, Madoukh, and S3-070234.

H. Obviousness of Claim 13 over Teo, Madoukh, and Thakare

Petitioner argues that claim 13 would have been obvious over Teo, Madoukh, and Thakare. Pet. 68–70. Petitioner identifies evidence indicating that the Teo, Madoukh, and Thakare combination teaches the limitations of claim 13, and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Other than the arguments discussed above, Patent Owner does not raise any arguments relating to this asserted ground. Prelim. Resp. 26–27. On this record, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claim 13 would have been obvious over Teo, Madoukh, and Thakare.

III. CONCLUSION

Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable. Accordingly, we institute an *inter partes* review on all grounds of unpatentability in the Petition. At this stage of the proceeding, we have not

made a final determination with respect to the patentability of any of the challenged claims.

IV. ORDER

It is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–17 of the '572 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '572 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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For PETITIONER:

Chad C. Walters
Douglas M. Kubehl
Jeffrey S. Becker
Joseph Andrew Grado
BAKER BOTTS L.L.P.
chad.walters@bakerbotts.com
doug.kubehl@bakerbotts.com
jeff.becker@bakerbotts.com
andrew.grado@bakerbotts.com

For PATENT OWNER:

Lawrence P. Cogswell III
Timothy J. Meagher
Keith J. Wood
HAMILTON, BROOK, SMITH & REYNOLDS, P.C.
lawrence.cogswell@hbsr.com
timothy.meagher@hbsr.com
keith.wood@hbsr.com