

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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UNIFIED PATENTS, LLC,  
Petitioner,

v.

COMMWORKS SOLUTIONS, LLC,  
Patent Owner.

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IPR2021-01297  
Patent 8,923,846 B2

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Before THU A. DANG, KEVIN C. TROCK, and  
JOHN R. KENNY, *Administrative Patent Judges*.

KENNY, *Administrative Patent Judge*.

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

## I. INTRODUCTION

Unified Patents, LLC (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–6, 9–13, and 16–20 (“the challenged claims”) of U.S. Patent No. 8,923,846 B2 (Ex. 1001, “the ’846 patent”). Paper 1 (“Pet.”). CommWorks Solutions, LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

On February 14, 2022, we instituted an *inter partes* review of all challenged claims. Paper 8. Patent Owner filed a Patent Owner Response (Paper 12, “PO Resp.”), and Petitioner filed a Reply (Paper 15, “Pet. Reply”). Patent Owner did not file a Sur-reply. A transcript of an oral hearing held on November 16, 2022 (Paper 21, “Tr.”) has been entered into the record.

We have jurisdiction under 35 U.S.C. § 6. For the reasons discussed below, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–6, 9–13, and 16–20 are unpatentable.

### A. *Related Proceeding*

The parties identify *CommWorks Solutions, LLC v. Comcast Cable Communications, LLC*, Case No. 6:21-cv-00366-ADA (W.D. Tex.) as a related matter involving the ’846 patent (“Related Litigation”). Pet. 62; Paper 4, 1.

### B. *’846 Patent*

The ’846 patent, titled “Recovery Techniques in Mobile Networks,” was filed on October 21, 2013,<sup>1</sup> and issued on December 30, 2014. Ex. 1001, codes (22), (45), (54). Embodiments of the ’846 patent relate to

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<sup>1</sup> The ’846 patent claims priority, through a series of continuation applications and a divisional application, to application No. 09/802,861, filed on March 12, 2001. Ex. 1001, code (60).

“technique[s] for recovering location information of a subscriber in a mobile network.” *Id.* at 1:54–2:16; *see also id.* at code (57) (“A technique for protecting location information of a subscriber in a mobile network is disclosed.”).

The specification of the ’846 patent (“Specification”) explains that “Mobile IPv6<sup>[2]</sup> allows a subscriber to move from one link to another without changing its IP address.” Ex. 1001, 3:11–12. “While a subscriber is attached to some foreign link away from home, it is also addressable by one of more care-of-addresses, in addition to its home address.” *Id.* at 3:30–32. The ’846 patent describes that a “care-of address is an IP address associated with a mobile node while the subscriber is visiting a particular foreign link.” *Id.* at 3:30–34. For this to work, “a mobile subscriber registers one of its care-of addresses with a router on its home link, requesting this router to function as the ‘home agent.’” *Id.* at 3:49–51. The home agent then “intercept[s] any IPv6 packets addressed to the subscribers’ home address (or home addresses) on the home link and tunnels each intercepted packet to the subscribers’ primary care-of address.” *Id.* at 3:59–62.

The ’846 patent “relates to protecting the Transport Address (TA) which is a current Care of Address of a mobile subscriber is reachable from loss and after Call State Control Function (CSCF) crashes and after reset situations of a network element realizing CSCF functionality.” Ex. 1001, 1:22–27. The Specification describes embodiments in the context of a 3G All-IP mobile network. *See id.* at 6:22–26. In a 3G All-IP network, the “S-CSCF [servicing-CSCF] that the subscriber is currently registered to and the TA of the roaming subscriber . . . must be known to and maintained by

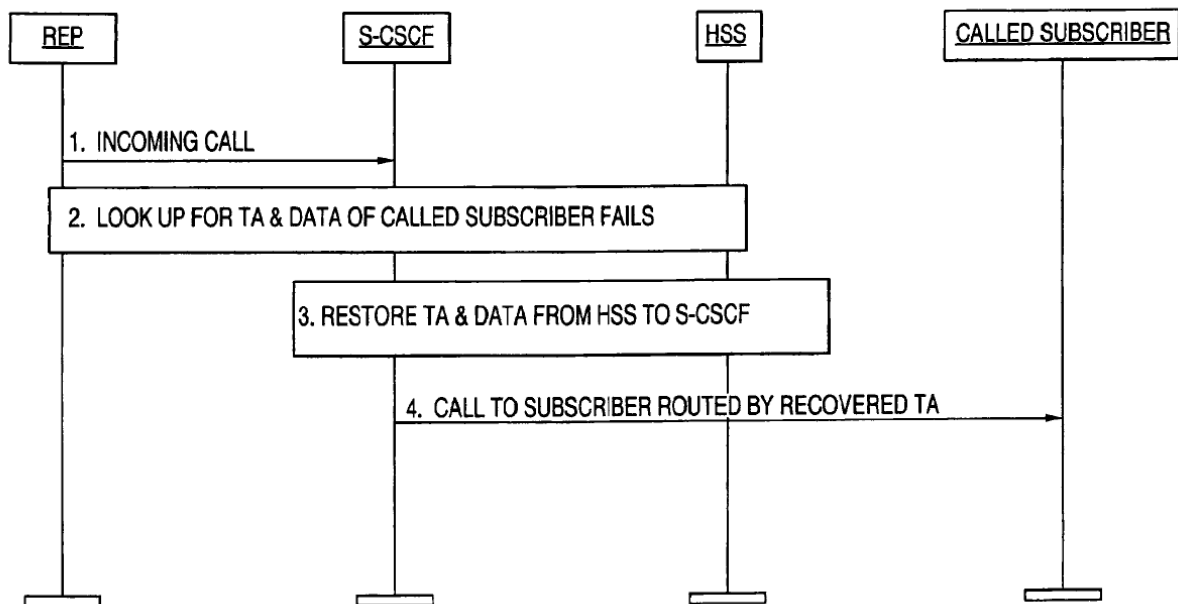
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<sup>2</sup> Internet Protocol Version 6. *See* Ex. 1001, 4:30–31.

the network.” *Id.* at 2:63–67. Specifically, “[k]eeping the address of the S-CSCF ensures that a call to a subscriber can be routed to the destination node,” and “[k]eeping the current TA of the subscriber ensures that a call made to the subscriber which arrives at the S-CSCF can finally reach the subscriber.” *Id.* at 3:66–4:3. But, “the information of the current S-CSCF (stored in the HSS [Home Subscriber Service]) is insufficient to reach the subscriber upon the loss of the subscriber TA.” *Id.* at 4:15–17. The Specification proposes several options to remedy this problem, including that “[t]he TA of the subscriber should be forwarded to the HSS at registration and downloaded from the HSS to the S-CSCF during recovery.” *Id.* at 4:27–29.

Figure 4A of the ’846 patent, reproduced below, illustrates an embodiment for “sending subscriber TA to S-CSCF and then forwarding it to HSS at registration” (*id.* at 2:39–40):

**FIG. 4A**



Ex. 1001, Fig. 4A. In the embodiment shown in Figure 4A above, “‘a safe copy’ of the subscriber’s TA is forwarded to the HSS for storage and protection” so that “[t]he TA and other data can then be restored to the S-CSCF upon the earlier loss of data by the S-CSCF.” *Id.* at 4:37–42. In particular, in step 1, “[a]n incoming call from an REP (Remote End-Point) is received by the S-CSCF.” *Id.* at 4:43–45. “In step 2, the S-CSCF looks for the subscriber’s TA so as to route the call but fails to find the subscriber’s TA.” *Id.* at 4:45–46. The S-CSCF then initiates restoration of the TA in step 3, and the call is routed to the subscriber using the recovered TA in step 4. *Id.* at 4:46–51.

*C. Challenged Claims*

Of the challenged claims, claims 1, 9, and 16 are independent. Ex. 1001, 6:31–8:18. Claims 2–6 depend from claim 1; claims 10–13 depend from claim 9; and claims 17–20 depend from claim 16. *Id.* Independent claim 1 is reproduced below.

1. [1P]<sup>3</sup> A method comprising:

[1.1] receiving, from a first server at a second server, a transport address and an address of the first server;

[1.2] receiving, at the second server, a request from the first server to restore the transport address; and

[1.3] in response to the request from the first server to restore the transport address, communicating the transport address to the first server from the second server.

*Id.* at 6:31–38.

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<sup>3</sup> For ease of reference, we use the designations set forth in the Petition for the preambles and limitations of the challenged claims.

*D. Applied References*

Petitioner relies on the following references in the asserted grounds.

Pet. 8.

| Reference                                                                                                                                                                                | Issue Date/<br>Publication Date | Exhibit  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------|
| U.S. Patent No. 6,788,936 B1 (“Rune”)                                                                                                                                                    | Sept. 7, 2004                   | Ex. 1003 |
| European Telecommunications Standards Institute, Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification (GSM 09.02) (version 5.3.0) (“ETSI”) | Aug. 1996 <sup>4</sup>          | Ex. 1004 |
| U.S. Patent No. 6,611,516 B1 (“Pirkola”)                                                                                                                                                 | Aug. 26, 2003                   | Ex. 1005 |

Petitioner also relies on two declarations from its expert, Dr. Haas: Declaration of Zygmunt J. Haas, Ph.D. (Ex. 1008) and the Supplemental Declaration of Zygmunt Haas, Ph.D. (Ex. 1023). Patent Owner has not submitted an expert declaration in this proceeding.

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<sup>4</sup> Petitioner submits the Declaration of Sylvia D. Hall-Ellis, Ph.D. attesting that ETSI was publicly available as of August 1996. Pet. 14–16 (citing Ex. 1006 ¶¶ 22–31). Petitioner contends ETSI is prior art to the challenged claims at least under 35 U.S.C. §§ 102(a), (b). Pet. 14. Patent Owner does not challenge the status of this reference as prior art. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that ETSI qualifies as a prior art printed publication. *See Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 (PTAB Dec. 20, 2019) (precedential).

*E. Asserted Grounds*

Petitioner sets forth its challenges to claims 1–6, 9–13, and 16–20 on the following grounds. Pet. 8.

| Claim(s) Challenged           | 35 U.S.C. §         | Reference(s)        |
|-------------------------------|---------------------|---------------------|
| 1–5, 9–12, 16–19              | 103(a) <sup>5</sup> | Rune, ETSI          |
| 1, 4–6, 9, 12, 13, 16, 19, 20 | 103(a)              | Pirkola, Rune, ETSI |

II. ANALYSIS

*A. Legal Standards*

Petitioner must demonstrate unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A claim is unpatentable under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said

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<sup>5</sup> Because the application leading to the ’846 patent has an earliest effective filing date before March 16, 2013, patentability is governed by the version of 35 U.S.C. §§ 102 and 103 preceding the Leahy-Smith America Invents Act (“AIA”), Pub L. No. 112-29, 125 Stat. 284 (2011).

subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.<sup>6</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). An obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, Petitioner must articulate a reason why an ordinarily skilled artisan would have combined the prior art references. *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

We analyze the asserted grounds of unpatentability in accordance with these principles to determine whether Petitioner has met its burden of proof.

*B. Level of Ordinary Skill in the Art*

We review the grounds of unpatentability in view of the understanding of an ordinarily skilled artisan at the time of the invention. *Graham*, 383 U.S. at 17. Petitioner contends that a person having ordinary skill in the art would have had “(1) an undergraduate degree in electrical engineering or closely related scientific field, such as computer engineering,

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<sup>6</sup> The parties have not asserted or otherwise directed our attention to any objective evidence of non-obviousness.

or similar post-undergraduate education; and (2) at least two years of experience in mobile telecommunications, with more education substituting for less experience and vice versa.” Pet. 5–6 (citing Ex. 1008 ¶¶ 30–32). Patent Owner does not contest Petitioner’s definition of an ordinarily skilled artisan. *See generally* PO Resp.

We adopt Petitioner’s proposed description of an ordinarily skilled artisan as it is supported by Dr. Haas’s testimony and is consistent with the ’846 patent and the asserted prior art.

*C. Claim Construction*

For this *inter partes* review proceeding claim terms

shall be construed 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 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) (2019). Further, “[a]ny prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the inter partes review proceeding will be considered.” *Id.*

Under the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc), claim terms are given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *See Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365–66 (Fed. Cir. 2012). Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp.*

*v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

*1. Transport Address*

Petitioner requests that we construe the term “transport address,” which is recited in challenged claims 1, 4–6, 9, 12, 13, 16, 19, and 20. Pet. 6–7.

*a. Parties’ Arguments*

Petitioner contends the term transport address should be construed as “the current address, other than its home address, through which the mobile subscriber can be reached, such as when a mobile subscriber has roamed outside of its home network.” Pet. 6 (emphasis omitted). Petitioner argues that the Specification describes a transport address as “the current address where the subscriber is reachable.” *Id.* (quoting Ex. 1001, 5:10–18). Petitioner further argues that the Specification refers to a transport address as a location or identity information and describes as an objective of the Specification protecting location information of a subscriber in a mobile network because the S-CSCF<sup>7</sup> (servicing-call state control function) may have no record of the subscriber identity due to a restart or another event. *Id.* at 6–7 (citing Ex. 1001, code (57), 1:54–2:3).

Petitioner asserts that the Specification distinguishes the transport address from the mobile subscriber’s home address by noting that the transport address is not the static home address, but instead is a temporary current address where the subscriber can be reached. *Id.* at 7 (citing Ex. 1001, 5:14–21). Further, Petitioner argues that the Specification

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<sup>7</sup> Petitioner identified this function as S-SCSF, but that appears to be a typographical error because the abstract, which Petitioner quoted, identifies the function as S-CSCF. Pet. 7; Ex. 1001, code (57).

describes the transport address as the current Care of Address of a mobile subscriber. *Id.* In addition, Petitioner asserts that the Specification discloses that the care of address alternatively serves as part of the transport address. *Id.* (citing Ex. 1001, 5:14–21).

In its Preliminary Response, Patent Owner proposed construing the term “transport address” as an “IP address associated with a mobile node while the subscriber is visiting a particular foreign link.” Prelim. Resp. 3.

For our Institution Decision, we accepted Petitioner’s proposed construction. Inst. Dec. 11–14. We indicated that the doctrine of claim differentiation with respect to claims 1 and 6 supported Petitioner’s proposed construction over Patent Owner’s. *Id.* at 12. We further indicated that the Specification teaches that its applications are not limited to All-IP mobile networks and thus the term transport address should not be construed to require an IP address. *Id.*

In its Response, Patent Owner again proposes that “a transport address” should be construed as an “IP address associated with a mobile node while the subscriber is visiting a particular foreign link.” PO Resp. 5. Patent Owner argues that prosecution history for the priority ’861 application<sup>8</sup>, sets forth that “the [transport address] *is defined as* the Care of Address *which is* an IP address associated with a mobile node.” *Id.* at 6 (quoting Ex. 2007, 28) (emphases by Patent Owner). Patent Owner further argues that the Specification expressly defines the term transport address as a current Care of Address of a mobile subscriber. *Id.* at 6 (citing Ex. 1001, 1:22–24).

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<sup>8</sup> US Serial No. 09/802,861.

Patent Owner argues that the Specification teaches that “care of address is an IP address associated with a mobile node while the subscriber is visiting a particular foreign link.” PO Resp. 6 (quoting Ex. 1001, 3:32–34.). Patent Owner further asserts that the ’846 patent and the prosecution history of the ’861 priority application explicitly reference an IP address and refer to the problem and identified solution of successfully routing to a subscriber within 3G All-IP networks. *Id.* at 7. Patent Owner also argues that the written description of the ’846 patent and the prosecution history of the ’861 priority application overcome any presumption arising from claim differentiation. *Id.* at 9. Further, Patent Owner asserts that there is no support for the requirement in Petitioner’s construction that the transport address not be a home address. *Id.* at 10. In addition, Patent Owner argues that the Western District of Texas construed the term “transport address” to be an IP address. *Id.* at 11.

In its Reply, Petitioner argues that the statements in the Specification of the ’846 patent that (i) a transport address is a care of address and (ii) a care of address is an IP address do not show a clear intent to redefine the term transport address. Pet. Reply 4. Further, Petitioner asserts that claim differentiation supports its proposed construction. *Id.* at 5. Petitioner argues that, even if a transport addresses must comprise a care of address, that does not mean the transport address must be an IP address because the Specification does not define a transport address to be a specific type of care-of address in a specific network. *Id.* at 5–6.

Petitioner contends that the prosecution of the ’861 priority application does not support Patent Owner’s proposed construction because the claims of the ’861 priority application were amended to recite that a

transport address was a care of address. Pet. Reply 7–8. Further, Petitioner argues that the district court’s construction of transport address is not pertinent because the litigation parties did not dispute whether a transport address was a care of address. *Id.* at 9. Petitioner also argues that the Board need not reach the dispute between the parties as to whether a transport address can be a home address. *Id.* at 10. Petitioner argues that none of its grounds map the transport address to a home address. *Id.*

*b. Analysis*

We construe a transport address as “the current address through which the mobile subscriber can be reached,” which is Petitioner’s proposed construction excluding Petitioner’s proposed requirement that a transport address excludes a home address.

The Specification supports the above construction. The Specification describes a transport address as “the current address where the subscriber is reachable.” Ex. 1001, 5:14–18. Moreover, Patent Owner does not dispute that a transport address is a current address where the mobile subscriber can be reached. PO Resp. 4–13.

As discussed above, Patent Owner argues that a transport address should not be construed, as Petitioner initially proposed, to exclude home addresses. PO Resp. 10–11. As further discussed above, however, Petitioner agrees that the construction of transport address in this proceeding does not need to exclude home addresses. Pet. Reply 10–11. In light of the parties’ agreement on this issue, our construction does not exclude home addresses.

As discussed above, Patent Owner further argues that a transport address should be construed to require an IP address, specifically an IP

address associated with a mobile node while the subscriber is visiting a particular foreign link. PO Resp. 6–10. We disagree.

We recognize that the Specification discloses that a transport address can be a current Care of Address and that the latter can be an IP address. In particular, the Field section of the Specification discloses: “[m]ore particularly, the present disclosure relates to protecting the Transport Address (TA) which is a current Care of Address of a mobile subscriber is reachable from loss.” Ex. 1001, 1:21–25. The Detailed Description of the Preferred Embodiments states: “[a] care-of address is an IP address associated with a mobile node while the subscriber is visiting a particular foreign link.” *Id.* at 3:32–34. We do not, however, interpret these combined disclosures from the Field section and Detailed Description of the Preferred Embodiments as requiring that every transport address have an IP address.

The Specification makes clear that its disclosure is not limited to 3G All-IP mobile networks: “the example embodiments of the present invention have been described with respect to currently used networks, such as 3[G] All-IP mobile networks, and standards for simplicity. It is, of course, understood that the present invention *is not limited thereto*.” *Id.* at 6:22–27 (emphasis added). We credit Dr. Haas’s testimony that limiting the term “transport address” to an IP address would limit the invention in a manner that is inconsistent with the above disclosure. Ex. 1023 ¶ 5. We further credit Dr. Haas’s testimony that the term IP address was well known by the effective filing of the ’846 patent, and that the choice by the Applicants to instead use the broader term transport address indicates that the Applicants did not intend to limit the claimed invention to IP networks. *Id.*

As discussed above, Patent Owner argues that the claimed invention could be limited to IP networks even if it were not limited to 3G All-IP networks. PO Resp. 9–10. Patent Owner proposes that the claimed invention could encompass later LTE and 5G networks and thus the term transport address should be construed to require an IP address. *Id.* at 10. We do not read the above passage from the Specification that the claimed invention is not limited to 3G All IP mobile networks as nevertheless limiting the claimed invention to 3G All IP mobile networks and later developed IP networks. The plain language of that passage does not support such an interpretation (Ex. 1001, 6:22–27; Ex. 1023 ¶ 5), and if Applicants had wanted to so limit that description, they easily could have done so. Ex. 1023 ¶ 5.

The only evidence Patent Owner cites for its interpretation of the description in the Specification that the claimed invention is not limited to 3G All IP networks is a 2019 article (Ex. 2008) that describes 5G networks. PO Resp. 10 n. 4; Ex. 2018. This article may demonstrate that, by 2019, years after the issuance of the '846 patent (in 2014), 5G was a recognized IP technology. Ex. 2008. That fact, however, provides no evidence that, as of the effective filing date or date of invention, an ordinarily skilled artisan would have viewed the claimed invention as limited to 3G All-IP mobile networks and future IP networks that had yet to be developed. Ex. 1001, code (45); Ex. 2018; Ex. 1023 ¶ 5. Further, Patent Owner provides no expert testimony to support this claim construction argument. PO Resp. 5–11.

Second, claim differentiation supports construing a transport address as not being limited to an IP address. As mentioned, Patent Owner argues

that a transport address should be limited to an IP address because in the specification (i) a transport address is limited to a care of address and (ii) a care of address is limited to an IP address. PO Resp. 5–6. Thus, Patent Owner’s proposed construction of a transport address as an IP address is premised on limiting a transport address to be a care of address. As noted in our Institution Decision, however, and as not disputed by Patent Owner, limiting a transport address to be a care of address would render the additional recitations of dependent claim 6 (versus claim 1) superfluous. As we explained in the Institution Decision, under the doctrine of claim differentiation, such a construction is disfavored:

[C]laim 6, which depends from claim 1, further recites “wherein the transport address comprises a care-of-address of a mobile subscriber.” Ex. 1001, 6:48–49. Construing transport address to be limited to the care-of-address would render claim 6 superfluous. *See Versa Corp. v. Ag-Bag Int’l Ltd.*, 392 F.3d 1325, 1330 (Fed. Cir. 2004) (“The doctrine of claim differentiation ‘create[s] a presumption that each claim in a patent has a different scope.’” (quoting *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed.Cir.1998))).

Inst. Dec. 12.

Patent Owner does not dispute that its proposed construction would render the additional recitations of claim 6 (versus claim 1) superfluous. PO Resp. 5–13. Patent Owner, however, argues that the written description and prosecution history of a patent can overcome any presumption arising from the doctrine of claim differentiation. *Id.* at 8–9. Although we agree that the written description and prosecution of a patent can overcome a presumption arising from the doctrine of claim differentiation, we do not agree that the

written description and prosecution of the '846 patent overcomes the presumption of claim differentiation between claims 1 and 6.

The written description of the '846 patent merely teaches that its disclosure “*relates to* protecting the Transport Address (TA) which is a current Care of Address of a mobile subscriber is reachable from loss.” Ex. 1001, 1:21–25 (emphasis added). It does not teach that, under all circumstances, the transport address must be a current care of address. *Id.* Further, the Specification discloses that its invention is not limited to the IP network it describes in its disclosed embodiments. *Id.* at 6:22–27. Thus, the Specification does not overcome the presumption of claim differentiation between claims 1 and 6. *See In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004) (“We have cautioned against reading limitations into a claim from the preferred embodiment described in the specification, even if it is the only embodiment described, absent clear disclaimer in the specification.”); *e.g.*, *Baxalta Inc. v. Genentech, Inc.*, 972 F.3d 1341, 1346–48 (Fed. Cir. 2020) (reversing district court finding that the statement “[a]ntibodies are immunoglobulin molecules . . .” defined “antibodies,” observing that such a construction would read out other examples in the specification and invalidate dependent claims).

Further, the prosecution history of the '861 priority application does not support construing a transport address to be an IP address. As Patent Owner notes, during the prosecution of the '861 priority application, Applicants stated: “[t]he TA [transport address] is defined as the Care of Address which is an IP address associated with a mobile node.” PO Resp. 6

(quoting Ex. 2007, 28<sup>9</sup>). Applicants made this statement in their March 1, 2004 Amendment, in which Applicants also amended pending claim 1 to expressly recite that the subscriber's transport address is a current care of address of the subscriber. Ex. 2007, 1, 14, 28. As amended, pending claim 1 read (with additions underlined and omissions struck through):

1. (Currently Amended) A method of recovering location information of a subscriber in a mobile network, the method comprising:

forwarding a registration request from the subscriber to ~~an S-CSCF~~ a (Serving-Call State Control Function) (S-CSCF) including the subscriber's ~~TA~~ (Transport Address) (TA) which is a current Care of Address of the subscriber;

forwarding a location update from the S-CSCF to ~~an HSS~~ (a Home Subscription Server (HSS)) including the subscriber's TA and ~~the an address of the S-CSCF~~ address; and

storing data including the subscriber's TA in the HSS so as to be protected against loss.

*Id.* at 14. The fact that in the March 1, 2004 Amendment, Applicant stated that the transport address is defined as the Care of Address does not support construing the term “transport address” of the challenged claims as limited to a care of address. Applicant expressly amended pending claim 1 of the '861 priority application to define a transport address as a care of address. *Id.* at 1, 14, 28. None of the challenged independent claims have such a recitation.<sup>10</sup> Ex. 1001, 6:31–8:18. Further, we agree with Petitioner that, if anything, this amendment shows that the term transport address need not be

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<sup>9</sup> Patent Owner and we cite to the page numbers that Patent Owner added when preparing this exhibit, rather than the amendment's original page numbers.

<sup>10</sup> Dependent claims 6, 13, and 20 each recite “wherein the transport address comprises a care-of-address of a mobile subscriber.” Ex. 1001, 6:48–8:18.

a Care of Address because Applicant found it necessary to add such a recitation to the pending claim to so limit its claim. Ex. 2007, 1, 4, 28; Pet. Reply 9.

Third, the district court in the Related Litigation did not substantively address the issue of whether the term “transport address” should be limited to an IP address. As Patent Owner notes (PO Resp. 11), the district court construed a transport address to be an IP address, providing the following construction for transport address:

IP address associated with a mobile node while the subscriber is visiting a particular foreign link. Note: transport address is different than a static home address.

Ex. 2001, 6. Neither party, however, has provided us with any analysis by the district court for this construction (and the district court appears not to have issued any such analysis). *See* Tr. 34. Further, each proposed construction by the litigation parties defined the term “transport address” as an IP address. Ex. 2006, 16. Thus, the district court was not presented with a dispute between the litigation parties as to whether the term “transport address” should be construed as an IP address. Without such a dispute before the district court, and without any analysis from the district court regarding its construction, the district court’s construction is not helpful to us in resolving whether the term “transport address” should be limited to an IP address.

We construe a transport address as “the current address through which the mobile subscriber can be reached.”

*D. Overview of the Asserted References*

*1. Rune*

Rune is titled “Gateway Location Register Fault Recovery.”

Ex. 1003, code (54). Rune “relates to mobile communications systems, and more specifically, to recovery of a gateway location register from a fault.”

*Id.* at 1:36–38. Figure 1 of Rune is reproduced below.

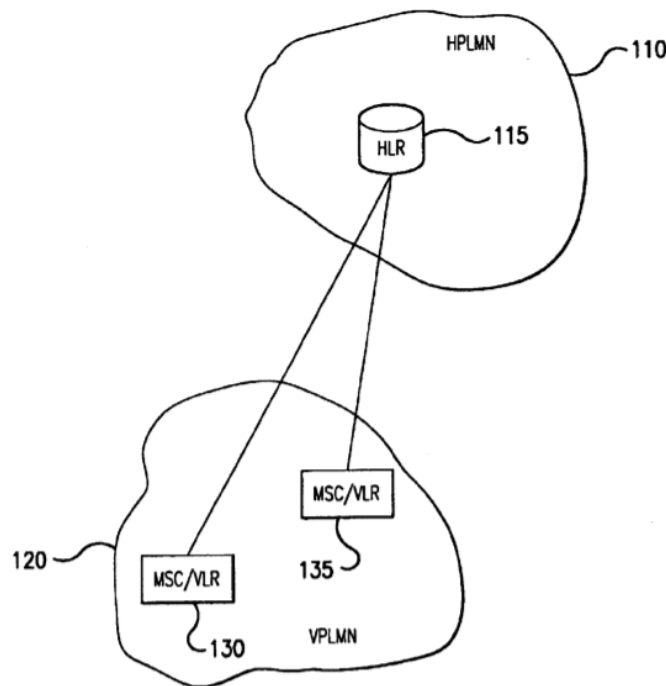


FIG.1

Figure 1 above “illustrates a wireless communication system in accordance with the Global System for Mobile communication (GSM) standard.” *Id.* at 1:39–41. Rune explains that, in the GSM standard, a “mobile subscriber typically has a subscription with a network which is designated as the mobile subscriber’s home public land mobile network 110 (HPLMN).” *Id.* at 1:45–48. The HPLMN 110 includes home location register 115 (HLR). *Id.* at 1:48–49. Rune further explains that, when a mobile subscriber is

roaming, the “visited public land mobile network 120 (VPLMN) . . . requires certain data regarding the mobile subscriber’s subscription.” *Id.* at 1:51–54. “The mobile subscriber’s profile is transferred from the HLR to a visitor location register (VLR) in the VPLMN,” (e.g., MSC/VLR 130 or 135). *Id.* at 1:56–58; *see id.* at 1:59–2:7. Rune specifies that “[t]he protocol used by GSM/UMTS (Universal Mobile Telecommunications System) systems for transferring data between VLRs and HLRs is the mobile applications part (MAP).” *Id.* at 2:39–41.

Figure 5 of Rune is reproduced below.

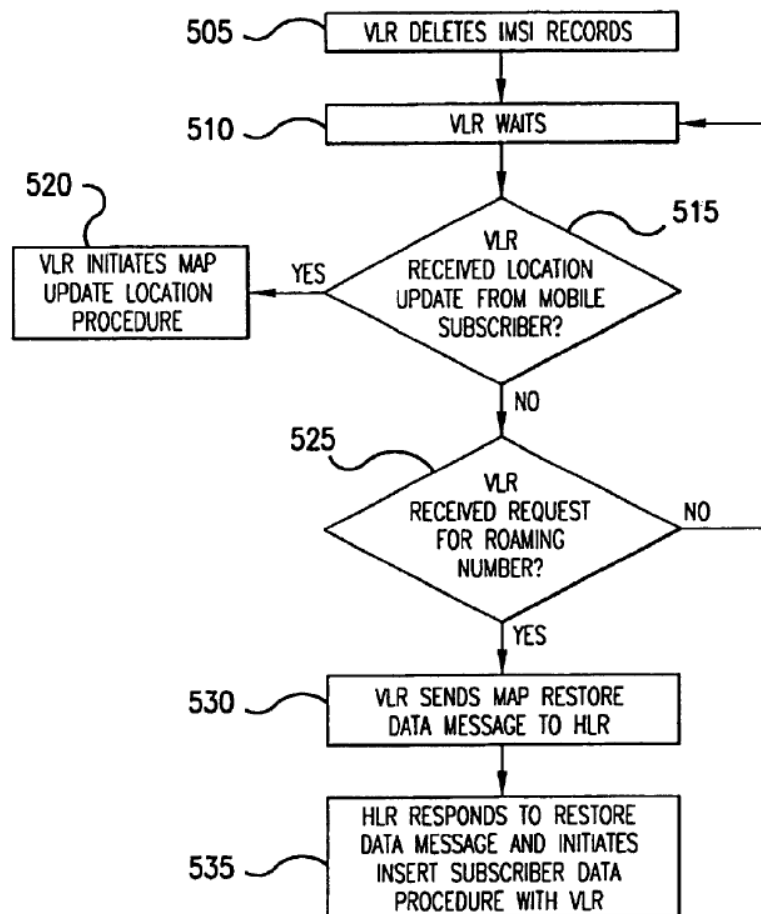


FIG.5

Ex. 1003, Fig. 5. Figure 5 above illustrates “a conventional method in a GSM system when a VLR is recovering from a fault.” *Id.* at 5:31–32. After a fault, in step 505, “the VLR, which does not have a non-volatile backup memory for its dynamic subscriber data, deletes all [International Mobile Subscriber Identity (IMSI)] records which remain in its dynamic memory.” *Id.* at 3:11–14.

The VLR waits for contact from a mobile subscriber or the HLR, and then “determines whether it has received a location update request from a mobile subscriber,” in steps 510 and 515. *Id.* at 3:14–18. If a location update request is received, “the VLR initiates the MAP\_UPDATE\_LOCATION procedure with the HLR associated with the mobile subscriber in accordance with step 520,” in order “to send data associated with a mobile subscriber from an HLR to a VLR.” *Id.* at 3:18–25. If no location update request is received, “the VLR determines whether it has received a roaming number request from an HLR in accordance with step 525.” *Id.* at 3:30–32. If no roaming request is received, the VLR will again wait for contact; but if a roaming request is received, “the VLR sends a MAP\_RESTORE\_DATA message, including an indication of the concerned subscriber whose data is being restored, to the HLR indicating that the VLR has experienced a fault in accordance with step 530.” *Id.* at 3:38–42. “In response to the MAP\_RESTORE\_DATA message the HLR initiates the . . . MAP\_INSERT\_SUBSCRIBER\_DATA procedure,” which provides subscriber data to the VLR in step 535. *Id.* at 3:42–46.

Rune “anticipate[s] that future versions of the GSM standard, also called Universal Mobile Telecommunications System (UMTS) will incorporate elements of other mobile communications systems.” Ex. 1003,

2:9–12. For example, Rune describes an embodiment that includes a gateway location register (GLR), which “is used to reduce internetwork signaling.” *Id.* at 2:12–15, 2:24–25. The GLR can behave transparently by “using an HLR interface towards the VLRs and a VLR interface towards the HLRs.” *Id.* at 2:44–46. Rune presents a number of exemplary fault recovery procedures for embodiments that include a GLR, acting in its capacity as an HLR, a VLR, or both. *See, e.g., id.* at 6:11–10:31. In these procedures, “[n]either the HLRs, nor the VLRs are affected, i.e., their behaviors do not have to be modified in order to cope with the GLR fault recovery procedure.” *Id.* at 10:39–42.

## 2. ETSI

ETSI is titled “Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification (GSM 09.02),” and is identified as version 5.3.0 of that specification. Ex. 1004, 1. ETSI states that MAP specifies “the requirements for the signaling system and procedures within the Digital cellular telecommunications system (Phase 2/Phase 2+) at application level.” *Id.* at 19. In particular, ETSI notes that it is “necessary to transfer between entities of a Public Land Mobile Network (PLMN) information specific to the PLMN in order to deal with the specific behaviour of roaming mobile stations,” and thus “describes the requirements for the signaling system and the procedures needed at the application level in order to fulfil[l] these signalling needs.” *Id.* at 21.

ETSI describes the configuration of the GSM network and of specific functions thereof. *See, e.g.,* Ex. 1001, 27 (describing the HLR and VLR); 299 (describing the MAP\_UPDATE\_LOCATION request); 104, 363–65, 371 (describing VLR fault recovery procedures, including the

MAP\_RESTORE\_DATA and MAP\_INSERT\_SUBSCRIBER\_DATA functions).

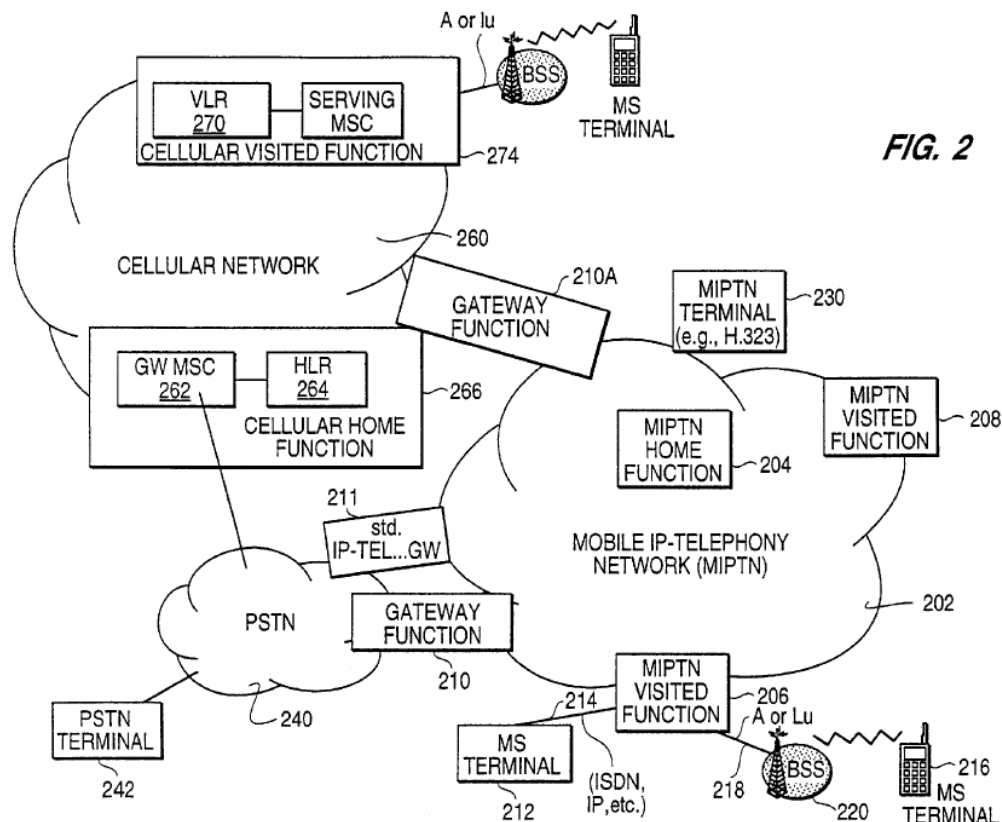
### 3. *Pirkola*

Pirkola is titled “Short Message Service Support Over a Packet-Switched Telephony Network.” Ex. 1005, code (54). Pirkola relates to “a technique that allows subscribers to roam between an IP-telephony network and a cellular network.” *Id.* at 1:21–23. Pirkola observes that in GSM a cellular subscriber can roam, but that “IP-telephony networks presently do not permit roaming or mobility within the IP-telephony network.” *Id.* at 2:51–52, 3:25–26. Further, “cellular networks and IP-telephony networks are distinct and incompatible networks and do not allow for roaming between” them. *Id.* at 3:27–29. Accordingly, Pirkola introduces a Mobile IP-Telephony Network (MIPTN) in which a “subscriber registers with a Visited Function where the subscriber is located” and “[t]he Visited Function then sends a message to the subscriber’s MIPTN Home Function to provide updated subscriber location information.” *Id.* at 3:67–4:4. “When a call is received that is intended for the subscriber, the IP address (or transport address) of the serving MIPTN Visited Function . . . is retrieved from the MIPTN Home Function,” and “[a]n IP-telephony call is then set up toward the IP address of the serving MIPTN Visited Function.” *Id.* at 4:4–9.

Pirkola describes an embodiment that supports roaming between an MIPTN and a cellular network by using a Gateway Function. Ex. 1005, 4:10–13. In such case, “the subscriber’s Home Function and Visited Function will be located in different types of networks” and “[t]he Gateway

Function performs the interworking between the PSTN/cellular message formats and signaling and those in the MIPTN.” *Id.* at 4:14–21.

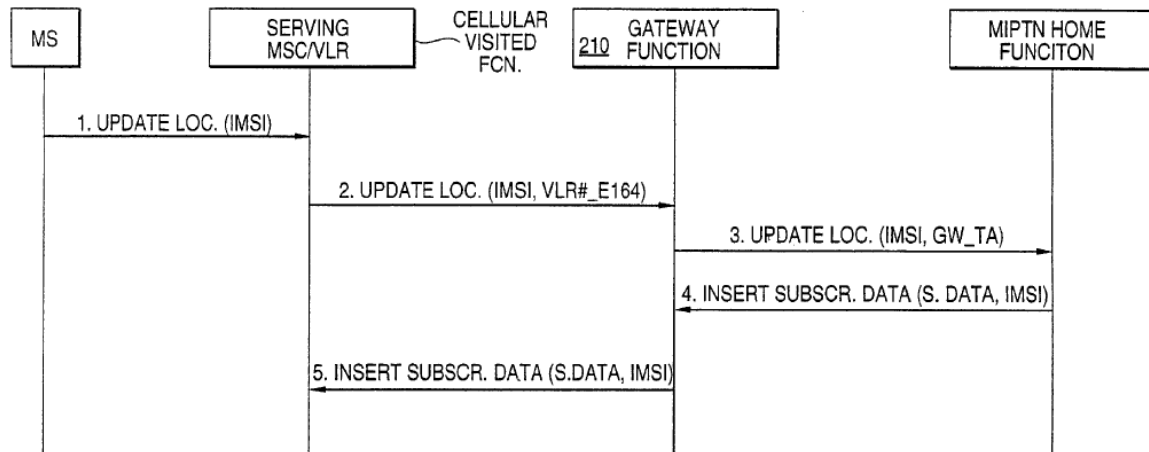
Figure 2 of Pirkola, reproduced below, illustrates a system architecture:



Ex. 1005, Fig. 2. Figure 2 above shows MIPTN 202 and cellular network 260 with interfacing Gateway Function 210A. *Id.* at 7:15–17. The Gateway Function stores “a dynamic correspondence or mapping between a subscriber identification and an address of a Visited Function (in either the cellular network 260 or the MIPTN 202) where the subscriber has roamed (or is located).” *Id.* at 7:23–29.

Figure 7 of Pirkola, reproduced below, illustrates a registration of a MIPTN subscriber roaming in a cellular network:

**FIG. 7**



Ex. 1005, Fig. 7. Figure 7 above shows, in step 1, that when an MIPTN 202 subscriber roams to cellular network 260, “the subscriber terminal (MS) sends an update location message to the serving MSC 272/VLR 270 in the serving cellular Visited Function 274 in cellular network 260.” *Id.* at 14:19–26. In step 2, serving VLR 270 sends an update location message as a cellular procedure, and in Step 3, Gateway Function 210 receives and translates the message from a cellular procedure to an MIPTN procedure, “which is sent along with the IP address of the Gateway Function 210 (GW\_TA) to the subscriber’s Home Function.” *Id.* at 14:29–47.

In step 4, Home Function 204 receives the update location message, stores the IP address (GW\_TA), and then issues an insert subscriber data message back to Gateway Function 210, including the subscriber’s profile or data and IMSI. *Id.* at 14:55–63. In step 5, Gateway Function 210 sends an insert subscriber data message as a cellular/PTSN procedure to serving VLR

270, which “then stores the subscriber profile corresponding to the IMSI.”  
*Id.* at 14:64–15:3.

*E. Asserted Obviousness over Rune and ETSI*

Petitioner asserts that claims 1–5, 9–12, and 16–19 would have been obvious over Rune and ETSI. Pet. 11–35. Patent Owner opposes, arguing that the asserted combination does not teach or suggest all limitations of the challenged claims. PO Resp. 13–19.

*1. Motivation to Combine and Reasonable Expectation of Success*

Petitioner argues that an ordinarily skilled artisan would have been motivated to combine the teachings of Rune and ETSI for three reasons. Pet. 18–19. First, Petitioner argues that ETSI provides additional teachings regarding details and implementation that are relevant to Rune’s teachings regarding device registration and recovery protocols from VLR system failures and the kinds of information that can be recovered. *Id.* at 18. Petitioner asserts that ETSI provides background knowledge relevant to Rune’s teachings related to GSM systems that would have been known to an ordinarily skilled artisan. *Id.*

Second, Petitioner argues that incorporating ETSI’s teachings into Rune’s teachings related to the recovery of a VLSR would have been a simple matter of combining familiar prior art elements (e.g., known MAC protocol services in a GSM system) to yield predictable results (e.g., the recovery of mobile subscriber location and profile information). Pet. 18.

Third, Petitioner argues that an ordinarily skilled artisan would have read and known about ETSI’s GSM documents and their relevance to Rune’s disclosure. Pet. 18. Petitioner asserts that Rune provides an explicit suggestion to consider ETSI’s teachings by mentioning versions of GSM 09.02 as background publications. *Id.* at 18–19.

Petitioner argues an ordinarily skilled artisan would have had a reasonable expectation of success in combining ETSI's and Rune's teachings because both references relate to mobile communications systems employing the same architecture and protocols. Pet. 19. Petitioner asserts that both references are directed to the components and methods used in GSM systems. *Id.* Petitioner further argues that, combined, these references teach a mobile communications system that recovers a mobile subscriber's location identity information from one server to another. *Id.* According to Petitioner, ETSI is part of the standards framework under which Rune's system exists, so incorporating ETSI's teachings into Rune's embodiments would have required at most minor modifications in server or database software and would have yielded predictable results consistent with thoroughly vetted GSM standards. *Id.*

Patent Owner does not dispute that an ordinarily skilled artisan would have been motivated to combine Rune's and ETSI's teachings, nor does Patent Owner dispute that an ordinarily skilled artisan would have had a reasonable expectation of success in combining these teachings. PO Resp. 13–19. As set forth below, however, Patent Owner disputes that the combination of Rune and ETSI teaches or suggests every limitation of the challenged claims. *Id.*

After reviewing the record, we determine that Petitioner has proven that an ordinarily skilled artisan would have been motivated to combine Rune's and ETSI's teachings in the manner proposed by Petitioner and had a reasonable expectation of success in so doing. *See, e.g.,* Ex. 1008 ¶¶ 52–56.

*2. Independent Claim 1*

*a. [1P] A method comprising:*

Petitioner asserts that Rune teaches a method. Pet. 20 (citing Ex. 1003, 3:10–11). Patent Owner does not present any counterarguments regarding this preamble recitation. *See generally* PO Resp.

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that Rune teaches a method and thus the preamble of claim 1.<sup>11</sup>

*b. [1.1] receiving, from a first server at a second server, a transport address and an address of the first server*

Petitioner asserts that the combination of Rune and ETSI teaches limitation 1.1. *See* Pet. 20–26. Petitioner relies on Rune’s wireless GSM network node comprising the VLR/MSC and the node comprising the HLR, as respectively teaching the claimed first and second servers. *See* Pet. 20–22; Ex. 1003, Fig. 1; *see also* Pet. 22 (noting that ETSI also “describ[es] the configuration of a GSM mobile network and the general functions of the HLR and VLR” (citing Ex. 1004, 27–28)). Relying on the testimony of Dr. Haas, Petitioner contends that a person of ordinary skill in the art “would recognize that the network nodes comprising the location registers, the HLR and VLR (or combined VLR/MSC) were ‘servers.’” Pet. 22 (citing Ex. 1008 ¶ 39).

Petitioner contends that, in a GSM network, a MAP\_UPDATE\_LOCATION request (i.e., a registration request) is sent from the VLR to the HLR. Pet. 22; *see* Ex. 1004, 41 (“When a mobile station [MS] registers for the first time in a VLR, the VLR has to initiate the update location

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<sup>11</sup> For example, Rune discloses, in Figure 5, “a conventional method in a GSM system when a VLR is recovering from a fault.” Ex. 1003, 3:10–11.

dialogue with the MS's HLR and a preceding dialogue for authentication information retrieval if the authentication information must be retrieved from the HLR.”).

Petitioner further argues that, as described in ETSI, this MAP\_UPDATE\_LOCATION request contains certain parameters including *inter alia* an LSMI and the VLR number. Pet. 22–23; *see* Ex. 1004, 299 (listing parameters contained in the MAP\_UPDATE\_LOCATION request). Petitioner contends that the VLR number corresponds to the claimed address of the first server. Pet. 22–23; *see* Ex. 1004, 299 (“VLR Number, the E.164 address of the VLR, to be used by the HLR when addressing the VLR”). Petitioner contends that the LSMI corresponds to the claimed transport address. Pet. 23; *see* Ex. 1004, 63, (“LSMI . . . refers to a local identify allocated by the VLR to a given subscriber for internal management of data in the VLR”), 299 (“[T]he LSMI . . . is a subscriber identifier local to the VLR, used for fast data base access”). Petitioner, relying on the testimony of Dr. Haas, asserts that a person of ordinary skill in the art “would have recognized that the LSMI was a ‘transport address.’” Pet. 23–24; Ex. 1008 ¶ 57. *See also* Ex. 1004, 70 (describing that the LSMI can be used by the short message service relay as the destination address).

Petitioner summarizes its position as to this claim limitation as follows:

Thus, Rune in view of ETSI renders obvious *receiving, from a first server at a second server* (e.g., receiving, from a VLR server at an HLR server), *a transport address* (e.g., an LSMI assigned to a mobile station by the VLR) *and an address of the first server* (e.g., the VLR number).

Pet. 25. Petitioner further contends that:

a [person of ordinary skill in the art] would have been motivated to combine, and would have had a reasonable expectation of success in combining, ETSI's teachings regarding the initial registration of the mobile device into Rune's system. Indeed, Rune references the concepts discussed in ETSI in its discussion of recovery of an HLR fault, and a [person of ordinary skill in the art] would have known that such concepts would have applied the service protocols consistent with ETSI's teachings.

*Id.* (citing Ex. 1003, 2:57–3:9; Ex. 1008 ¶¶ 52–56); *see also id.* at 18–19 (discussing motivation to combine in more detail).

Patent Owner disagrees with Petitioner's assertion that the LMSI is the recited transport address. PO Resp. 13–19. Patent Owner argues that “[n]either Rune nor ETSI consider IP networks as described in the ’846 patent and required by the *transport address* of the challenged claims.” *Id.* at 14. According to Patent Owner, “[n]one of these ‘identification number[s]’ [used for addressing a mobile subscriber in a GSM system] are IP addresses or anything like one.” *Id.* at 15. Patent Owner further asserts that “[Petitioner] and [Dr.] Haas do not contend that the LMSI is an IP address, nor could it function like one.” *Id.*

In its Reply, Petitioner argues that, with its proposed construction, a transport address need not be an IP address. Pet. Reply 11–12.

Upon review of the record, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Rune and ETSI teaches limitation 1.1. As set forth in Section II.C.1 above, with our construction, a transport address does not have to be an IP address. Thus, we disagree with Patent Owner's argument that the LMSI is not a transport address because it is not an IP address. Ex. 1008 ¶ 57.

*c. [1.2] receiving, at the second server, a request from the first server to restore the transport address*

Petitioner asserts that the combination of Rune and ETSI teaches limitation 1.2. *See* Pet. 26–29. According to Petitioner, “Rune discloses that in the event of a VLR fault, the HLR receives . . . a ‘MAP\_RESTORE\_DATA’ message . . . from the VLR . . . to send the mobile subscriber’s profile information.” Pet. 26–27; *see also* Ex. 1003, 3:10–42 (“FIG. 5 illustrates a conventional method in a GSM system when a VLR is recovering from a fault. . . . If the VLR has received a request for roaming number from an HLR, in accordance with the ‘Yes’ path out of decision step 525, then the VLR sends a MAP\_RESTORE\_DATA message, including an indication of the concerned subscriber whose data is being restored, to the HLR indicating that the VLR has experienced a fault in accordance with step 530.”).

Petitioner contends that “ETSI confirms [that the mobile subscriber’s profile information] would have included the LMSI (*i.e., to restore the transport address*).” Pet. 26–28; *see also* Ex. 1004, 363–65, 371 (describing VLR fault recovery procedures, including MAP\_RESTORE\_DATA). ETSI describes that the MAP\_RESTORE\_DATA service “is invoked by the VLR . . . to update the LMSI in the HLR, if provided, and to request the HLR to send all data to the VLR that are to be stored in the subscriber’s . . . record.” Ex. 1004, 104.

Petitioner summarizes its position as to this claim limitation as follows:

Thus, Rune in view of ETSI renders obvious, *receiving, at the second server* (e.g., the HLR), *a request from the first server* (e.g., a MAP\_RESTORE\_DATA request) *to restore the*

*transport address* (e.g., to provide all subscriber data, including to restore the LMSI).

Pet. 29.

Patent Owner does not present any counterarguments for limitation 1.2, separate from those discussed in Section II.E.2.b above regarding a “transport address.” *See generally* PO Resp.

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Rune and ETSI teaches limitation 1.2.

*d. [1.3] in response to the request from the first server to restore the transport address, communicating the transport address to the first server from the second server*

Petitioner asserts that the combination of Rune and ETSI teaches limitation 1.3. Pet. 29–32. According to Petitioner, “Rune discloses that, after receiving the MAP\_RESTORE\_DATA message from the VLR, the HLR responds by initiating a ‘MAP\_INSERT\_SUBSCRIBER\_DATA’ procedure with the VLR to provide subscriber data to the VLR.” *Id.* at 29 (citing Ex. 1003, 3:36–46; Ex. 1004, 364–65); *see also* Ex. 1003, Fig. 5.

Petitioner contends that “ETSI explains[ that] the service for inserting subscriber data includes ‘all subscriber data,’” and that a person of ordinary skill in the art “would have understood, the LMSI constitutes ‘subscriber data,’ and the HLR always includes the LMSI in communications from the HLR to the VLR.” Pet. 29–30 (citing Ex. 1004, 373; Ex. 1008 ¶ 50).

Petitioner summarizes its position as to this limitation as follows:

Thus, Rune in view of ETSI disclose[s], *in response to the request* (e.g., the MAP\_RESTORE\_DATA request) *from the first server* (e.g., the VLR) *to restore the transport address* (e.g., the LMSI), *communicating the transport address to the first server from the second server* (e.g., in response to the

MAP\_RESTORE\_DATA message the HLR provides the LMSI in subsequent communications, including confirmation messages).

Pet. 32 (some emphasis omitted).

Patent Owner does not present any counterarguments for limitation 1.3, separate from those discussed in Section II.E.2.b above regarding a “transport address.” *See generally* PO Resp.

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Rune and ETSI teaches limitation 1.3.

*e. Conclusion as to Claim 1*

We determine that Petitioner has proven by a preponderance of the evidence that claim 1 would have been obvious over the combination of Rune and ETSI.

*3. Independent Claims 9 and 16*

Independent claims 9 and 16 recite an apparatus and non-transitory computer-readable medium, respectively, for restoring a transport address, but otherwise recite limitations similar to those of claim 1. Ex. 1001, 6:31–8:7. Petitioner relies on the essentially the same teachings of Rune and ETSI for claims 9 and 16 as those discussed above for claim 1. Pet. 19–32. Petitioner, however, further explains how Rune and ETSI teach an apparatus and non-transitory computer readable medium and the other variations amongst the recitations of these claims. *See., e.g., id.* at 20, 31 n.8.

Patent Owner does not present any counterarguments for claims 9 and 16 that are separate from those discussed above for claim 1. PO Resp.

13–19. Upon review of the record, we determine that Petitioner has proven by a preponderance of the evidence that claims 9 and 16 would have been obvious over the combination of Rune and ETSI.

*4. Dependent Claims 2–5, 10–12, and 17–19*

Petitioner asserts that the combination of Rune and ETSI teaches each of the additional limitations of dependent claims 2–5, 10–12, and 17–19.

Pet. 32–35. Patent Owner does not dispute these assertions, or raise any counterarguments separate from those discussed above for independent claims 1, 9, and 16. PO Resp. 13–19.

Upon review of the record, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Rune and ETSI teaches the additional limitations of dependent claims 2–5, 10–12, and 17–19. Thus, we determine that Petitioner has proven by a preponderance of the evidence that claims 2–5, 10–12, and 17–19 would have been obvious over the combination of Rune and ETSI.

*F. Asserted Obviousness over Pirkola, Rune, and ETSI*

Petitioner asserts that claims 1, 4–6, 9, 12, 13, 16, 19, and 20 would have been obvious over Pirkola, Rune, and ETSI. Pet. 35–55. Patent Owner opposes, arguing that the asserted combination does not teach or suggest all limitations of the challenged claims. PO Resp. 19–23.

*1. Motivation to Combine Pirkola, Rune, and ETSI*

Petitioner argues that an ordinarily skilled artisan would have been motivated to combine Pirkola’s teachings related to an integrated Mobile-

IP/cellular communications system and Rune's system of server-function fault recovery (as combined with ETSI)<sup>12</sup> for two reasons. Pet. 38.

First, Petitioner argues that Pirkola and Rune provide express teachings, suggestions, or motivations to combine. Pet. 38. As an example, Petitioner asserts that an advantage of Pirkola's system is that it allows users to roam into different networks. *Id.* at 38–39. Petitioner further argues that Pirkola identifies the GSM cellular network as an exemplary embodiment that may benefit from its teachings. *Id.* Petitioner asserts that Rune describes that “[t]o increase the compatibility of GSM with other types of systems, it is anticipated that future versions of the GSM standard, also called Universal Mobile Telecommunications System (UMTS) will incorporate elements of other communications systems,” and even describes the use of a Gateway Location Register to be used as both an HLR and VLR for mobile subscribers roaming from other networks. *Id.* at 39.

Second, Petitioner argues that incorporating Rune's teachings (supplemented by ETSI's disclosure) regarding fault recovery into Pirkola's integrated network system would have simply required the application of known techniques (e.g., recovery of a VLR or gateway function/GLR) to improve similar systems (Pirkola's integrated cellular/Mobile-IP network) in the same way (i.e., to recover lost information, such as a transport address, about a subscriber from a subscriber's Home Function). Pet. 39. Petitioner further argues that the use of information replication in mobile

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<sup>12</sup> Petitioner relies on its analysis for Ground 1 as setting forth the motivation to combine Rune and ETSI and the reasonable expectation of success in so doing. Pet. 38–40.

communications networks was a known technique to improve availability and increase fault tolerance of a network. *Id.*

Petitioner argues that an ordinarily skilled artisan would have had a reasonable expectation of success in combining the teachings of Pirkola and Rune (as combined with ETSI) because both Pirkola and Rune relate to mobile communications systems employing similar architectures and protocols; specifically, they both are directed to the components and methods in a GSM network system, with Pirkola teaching a system that incorporates the entire GSM network into a larger, integrated network. Pet. 39–40. Petitioner asserts that, combined, these references teach a mobile communications system that successfully recovers a mobile subscriber's correct transport address in an integrated cellular/Mobile-IP system. *Id.* at 40. Further, Petitioner asserts that Rune indicates that an ordinarily skilled artisan would have recognized how to implement its teachings in other mobile communications systems employing a gateway. *Id.*

Petitioner asserts that incorporating the fault recovery techniques disclosed by Rune (which Petitioner argues post-dates Pirkola) into Pirkola's integrated system would have simply required the application of Rune's techniques, with predictable and possibly minor adjustments for parameters relevant to a mobile-IP system (e.g., using a transport address as the subscriber's location information) with Pirkola's overall architecture and methods. Pet. 40.

Patent Owner does not dispute that an ordinarily skilled artisan would have been motivated to combine Pirkola's, Rune's, and ETSI's teachings, nor does Patent Owner dispute that an ordinarily skilled artisan would have had

a reasonable expectation of success in combining these teachings. PO Resp. 19–23. As set forth below, however, Patent Owner disputes that the combination of Rune and ETSI teaches or suggests every limitation of the challenged claims. *Id.*

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that an ordinarily skilled artisan would have been motivated to combine Pirkola’s, Rune’s, and ETSI’s teachings in the manner proposed by Petitioner and had a reasonable expectation of success in so doing. *See e.g.*, Ex. 1008 ¶¶ 36–37, 68–71; Ex. 1003, 2:8–12, 2:21–23, 6:1–6, 7:49–51; Ex. 1005, 5:64–6:2.

## *2. Independent Claim 1*

### *a. [1P] A method comprising:*

Petitioner asserts that both Rune and Pirkola teach a method. Pet. 20 (citing Ex. 1003, 3:10–11), 40–41. Petitioner asserts that Figure 5 of Rune “illustrates a conventional *method* in a GSM system when a VLR is recovering from a fault.” *Id.* at 20 (quoting Ex. 1003, 3:9–14) (emphasis by Petitioner). Petitioner asserts that Pirkola also discloses a method. *Id.* at 41.

Patent Owner does not present any counterarguments regarding this preamble recitation. *See generally* PO Resp.

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that Rune teaches a method and thus teaches the preamble of claim 1.

### *b. [1.1] receiving, from a first server at a second server, a transport address and an address of the first server*

#### *i. Parties’ Arguments*

Petitioner asserts that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.1. *See* Pet. 41–45. Petitioner maps the

recited first and second servers to Pirkola's Gateway and MIPTN Home Functions, respectively. *Id.* at 41. Petitioner argues that the MIPTN Home Function receives from the Gateway Function a transport address consisting of the IP address of the Gateway Function 210 and a port number, which Petitioner argues is both the transport address and the address of a first server. *Id.* at 41–45.

In the Patent Owner Response, Patent Owner argues that the IP address of the Gateway Function and its port number are not the recited transport address because they are not the IP address of the mobile subscriber. PO Resp. 21. Patent Owner further asserts that they are not the IP address of the mobile subscriber because they are not an address for routing all the way to the mobile subscriber terminals. *Id.* at 21–22.

In its Reply, Petitioner argues that the address of the Gateway Server (GW\_TA) is the recited transport address of the mobile subscriber, asserting that the address of the Gateway Function is the address by which the subscriber is currently reachable. Pet. Reply 21–22. Petitioner further argues that the Gateway Function's address is the care of address of the foreign agent and is assigned to the subscriber as the subscriber travels to that foreign agent. *Id.* at 21.

*ii. Analysis*

We determine that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.1. Pirkola's Gateway Function and MIPTN Home Function are, respectively, the first and second servers recited in limitation 1.1. Ex. 1008 ¶ 68; Ex. 1005, Fig. 2.

Pirkola teaches receiving, from a first server (Gateway Function) at the second server (MITPN Home Function), a transport address (Gateway Function IP address and port number) and an address of the first server

(Gateway Function IP address). Ex. 1008 ¶ 68. Pirkola's Gateway Function (the first server) sends its IP address and a port number to the MIPTN Home Function (the second server). Ex. 1008 ¶ 65; Ex. 1005, 8:58–63, 9:48–55, 14:37–54, Fig. 7 (arrow 3), 20. The IP address and port number that the Gateway Function sends is the recited transport address. Ex. 1008 ¶ 65. Pirkola teaches that the IP address of its Gateway Function is a transport address. Ex. 1005, 9:48–55 (“The transport address identifying where the subscriber can be reached . . . will be the IP address of the Gateway Function if the MITPN subscriber has roamed to the cellular network 260.”). Further, Pirkola refers to the IP address that the Gateway Function sends to the MIPTN Home Function as GW\_TA. *Id.* at 14:43–47; *see also* Fig. 3, step 3. TA stands for transport address. *Id.* at 11:35–38 (“VF\_TA (for Visited Function *transport address*)” (emphasis added)).

The MITPN Home Function receives the transport address (IP address and port number) sent from the Gateway Function. Ex. 1005, 14:55–58 (“the MIPTN Home Function 204 *receives* the update location message, including the subscriber's IMSI and the *IP address of the Gateway Function* 210.” (emphases added)), Fig 3 (steps 3 and 4). Also, the IP address of the Gateway Function is an address of the Gateway Function (i.e., its IP address). Thus, Pirkola teaches receiving, from a first server (Gateway Function) at the second server (MITPN Home Function), a transport address (Gateway Function IP address and port number) and an address of the first server (Gateway Function IP address). Ex. 1008 ¶ 68.

As mentioned, although Patent Owner does not dispute that Pirkola refers to the IP address of the Gateway Function as a transport address, Patent Owner disputes that the IP address of Pirkola's Gateway Function is

the recited transport address. PO Resp. 21. Patent Owner argues that the IP address of Pirkola's Gateway Function is not the recited transport address because that IP address is not associated with the mobile subscriber in a manner that would allow routing all the way to the mobile subscriber's terminals. *Id.* at 21–22. We disagree.

First, Pirkola teaches that the IP address of the Gateway Function is associated with the mobile subscriber and his/her device: “The transport address identifying where the subscriber can be reached . . . will be the IP address of the Gateway Function if the MITPN subscriber has roamed to the cellular network 260.” Ex. 1005, 9:48–55. Second, claim 1 does not recite that the transport address by itself would allow routing all the way to the mobile subscriber's terminal. Ex. 1001, 6:31–38. Even Patent Owner's proposed construction for “transport address” does not require that the transport address by itself permit routing to the mobile subscriber's terminals. PO Resp. 5. Patent Owner's proposed construction merely requires that the IP address be associated with a mobile node while the subscriber is visiting a particular link. *Id.* The IP address of the Gateway Function satisfies this proposed construction because this IP address is associated with the mobile subscriber (“address identifying where the subscriber can be reached”) when the subscriber is visiting a particular foreign link (when the subscriber “has roamed to the cellular network 260”). Ex. 1005, 9:48–55; Ex. 1028 ¶ 8. Further, we credit Dr. Haas's testimony that the transport address described in Pirkola is the recited transport address. Ex. 1023 ¶ 8.

We determine that Petitioner has proven that Pirkola's MIPTN Home Function (the second server) receives from Pirkola's Gateway Function (the

first server) the IP address and a port number of the Gateway Function (the transport address and address of the first server). Thus, Petitioner has proven by a preponderance of the evidence that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.1. Ex. 1005, 7:14–21, 9:40–55, 13:15–21, 14:23–60, Fig. 2; Ex. 1028 ¶ 8.

*c. [1.2] receiving, at the second server, a request from the first server to restore the transport address*

*i. Parties' Arguments*

Petitioner asserts that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.2. Pet. 45. As discussed above, Petitioner argues that Pirkola's Gateway Function and MIPTN Home Functions are the recited first and second servers, respectively. Pet. 41–45; Ex. 1008 ¶ 68; Ex. 1005, Fig. 2. As also discussed above, Petitioner argues that the IP address and port number of the Gateway Function is the recited transport address. Pet. 41–45. Petitioner argues that "Rune discloses that in the event of a VLR fault, the HLR receives a 'MAP\_RESTORE\_DATA' message . . . from the VLR to send the mobile subscriber's profile information." *Id.* at 45–46. Petitioner further argues that Rune discloses a similar concept for a Gateway Location Register, which is analogous to Pirkola's Gateway Function 210. *Id.* at 46.

Petitioner asserts that Rune discloses methods of recovering faults in systems that include a HLR and a GLR, which would be applicable to the system shown in Figure 2 of Pirkola. Pet. 47. Petitioner further argues that when a GLR is behaving as a VLR to a Home Location Register, it may request information from the HLR, which is equivalent to Pirkola's MIPTN Home Function, to recover subscriber information by sending an error indication to the HLR and waiting to receive information from the VLR or

HLR. *Id.* at 47–48. According to Petitioner, if the GLR receives a roaming request from the HLR, the GLR will check if it has restored a subscriber's information from a location update; if not, the GLR will send an error message or alternatively initiate a MAP\_RESTORE\_DATA procedure with the HLR. *Id.* at 49.

Petitioner argues that, in its proposed combination, a restoration request would be sent from Gateway Function 210 to a mobile-IP Home function, which would prompt restoration of a subscriber's transport address. Pet. 49–50. Petitioner asserts that an ordinarily skilled artisan would have been motivated to employ Rune's fault recovery procedures in Pirkola's integrated mobile IP system because Rune and ETSI show that such recovery procedures were known and desirable in the context of similar mobile communication systems. *Id.* at 50. Petitioner argues that thus, an ordinarily skilled artisan would have been motivated to have Pirkola's mobile-IP Home Function (the second server) receive a request from Gateway Function 210 (the first server) to restore all subscriber data including the transport address and associated profile information. *Id.* at 50–51. Petitioner argues that this request from the Gateway Function 210 is analogous to Rune's MAP\_RESTORE\_DATA request. *Id.* at 50.

As discussed in Section II.F.2.b, Patent Owner argues that the IP address and port number of Pirkola's Gateway Function is not the recited transport address. PO Resp. 19. Patent Owner further argues that even if the IP address and port number of Pirkola's Gateway Function were the recited transport address, Petitioner's combination of Pirkola, Rune, and ETSI would not teach or suggest limitation 1.2 because Gateway Function 210 (the first server) would not request that its own IP address be restored by

Home Function 204 (the second server). *Id.* at 22–23. Patent Owner argues that Gateway Function 210 knows its own address, so it would not request its address from Home Function 204. *Id.* at 23.

In its Reply, Petitioner argues that, during a recovery operation, Gateway Function 210 would not specifically try to recover its own IP address but rather the binding between that address and the mobile node. Pet Reply 23. Petitioner further argues that Pirkola discloses providing a unique GW\_TA for a given subscriber. *Id.* Petitioner asserts that confirming the IP address and port after a fault would confirm that the Gateway Function is the current visited function from the perspective of the MITPN home Function. *Id.* at 23.

*ii. Analysis*

We determine that Petitioner has proven that its combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.2. As discussed in Section II.F.2.b, we are persuaded that the IP address and port number of Gateway Function 210 is the recited IP address. Further, we are persuaded by Petitioner’s evidence that, during a recover operation with its combination of Pirkola, Rune, and ETSI, Gateway Function 210 (first server) would make a request to the Home Function (second server) that would provide Gateway Function 210 with its IP address and port number.

We agree with Patent Owner that Gateway Function 210 would not, for the purposes of determining its own IP address, request its IP address from the Home Function. PO Resp. 23. As Patent Owner argues, and Petitioner does not dispute, Gateway Function 201 knows its own IP address. *Id.* Dr. Haas, however, provides other reasons why Gateway Function 210 would request its own IP address from the Home Function. Ex. 1023 ¶¶ 7–10. Dr. Haas explains that, for recovery, Gateway

Function 210 would want to obtain, and thus request, the binding between the Gateway Function's address and the mobile node, which includes the Gateway Function's address. *Id.* ¶ 9. Further, Dr. Haas explains that the Gateway Function can have multiple addresses that it can advertise to subscribers and, in the event of fault, the Gateway Function (which serves a foreign agent) would want to determine which address it instructed a Home Agent to use when attempting to redirect data to the mobile subscriber. *Id.*

Dr. Haas further explains that, during recovery, the Gateway Function as a foreign agent may also want to confirm that it is still the foreign agent for the mobile subscriber. Ex. 1023 ¶ 10. Dr. Haas testifies that by recovering the current transport address for the mobile subscriber (which would be the IP address and port of the Gateway Function if the Gateway Function is still the foreign agent), the Gateway Function can confirm that it is still the foreign agent for the mobile subscriber. *Id.* Dr. Haas explains that, if Gateway Function is no longer the foreign agent or care-of provider, then the Gateway Function can route any messages it receives for the mobile subscriber to the current transport address. *Id.* We credit this testimony by Dr. Haas. *Id.* ¶¶ 7–10; *see also* Ex. 1008 ¶¶ 61–66, 68 (which we also credit).

Patent Owner has not provided any evidence to support its assertion that an ordinarily skilled artisan would not have the Gateway Function request its IP address and the port number from the Home Agent. PO Resp. 22–23. Instead, to support this assertion, Patent Owner relies solely on unsupported attorney argument, which is not evidence. *Id.*; *Whitserve, LLC v. Computer Packages, Inc.*, 694 F.3d 10, 23 (Fed. Cir. 2012) (“arguments of counsel cannot take the place of evidence lacking in the

record”); *Estee Lauder Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997).

After reviewing the record, we determine that Petitioner has proven by a preponderance of the evidence that its combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.2. Ex. 1003, 2:24–38, 7:49–9:63, Figs. 3, 8; Ex. 1004, 424, 363, 374, Ex. 1008 ¶¶ 61–68, Ex. 1005, 9:40–48, 13:15–21, 14:55–60, 26:14–21; Ex. 1023 ¶¶ 7–10.

*d. [1.3] in response to the request from the first server to restore the transport address, communicating the transport address to the first server from the second server*

Petitioner asserts that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.3. Pet. 51. Petitioner repeats the arguments it presented for limitation 1.2 that, in its combination of Pirkola, Rune, and ETSI, the Gateway Function (first server) would request that the Home Function restore the mobile subscriber’s data including the mobile subscriber’s current transport address (the IP address and port of the appropriate Gateway Function). *Id.* at 51–52. Petitioner argues, that based on Rune’s teachings, the Home Function would communicate the subscriber’s current transport address (the IP address and port of the appropriate Gateway Function) to the Gateway Function after receiving a request for the transport address. *Id.*

Patent Owner presents the same arguments for limitation 1.3 that it presented for limitations 1.1 and 1.2: that (i) the IP address and port of the Gateway Function are not the recited transport address and (ii) the Gateway Function would not request its own IP address. PO Resp. 19–23.

As set forth in Sections II.F.2.b and II.F.2.c above, we determined that, in the proposed combination, the IP address and port of the Gateway

Function are the recited transport address and (ii) the Gateway Function would request the current transport address, which would be its own IP address and port (assuming it is still the foreign agent for the mobile subscriber). After reviewing the parties' arguments and the evidence of record, we further determine that based on Rune's teachings the Home Function in Petitioner's combination would communicate the subscriber's current transport address (the IP address and port of the appropriate Gateway Function) to the Gateway Function after receiving a request for the transport address. Ex. 1008 ¶ 68; Ex. 1023 ¶¶ 7–10. Thus, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Pirkola, Rune, and ETSI teaches or suggests limitation 1.3.

*e. Conclusion as to Claim 1*

We determine that Petitioner has proven by a preponderance of the evidence that claim 1 would have been obvious over the combination of Rune and ETSI.

*3. Independent Claims 9 and 16*

Independent claims 9 and 16 recite an apparatus and non-transitory computer-readable medium, respectively, for restoring a transport address, but otherwise recite limitations similar to those of claim 1. Ex. 1001, 6:31–8:7. Petitioner relies on the same teachings of Rune and ETSI for claims 9 and 16 as those discussed above for claim 1. Pet. 40–52.

For claims 9 and 16, Patent Owner does not present arguments separate from those discussed above with respect to claim 1. PO Resp. 19–23. Upon review of the record, we determine that Petitioner has proven that claims 9 and 16 would have been obvious over the combination of Rune and ETSI.

#### 4. *Dependent Claim 4*

Claim 4 recites the method of claim 1 further comprising “storing the transport address at the second server” (“limitation 4.1”). Ex. 1001, 6:43–44. Petitioner argues that Pirkola teaches or suggests limitation 4.1. Pet. 52–53. Petitioner asserts that Pirkola discloses storing the IP address and port number of the Gateway Function (transport address) at the Home Function (second server) in a Home Database. *Id.* at 53.

Patent Owner argues that, in Pirkola, an IP address of the mobile node is not stored at the Home Function. PO Resp. 22. Patent Owner asserts that, instead, the Home Function stores subscriber profiles and location information as well as a mapping between IMSI, MSISDN, and the transport address of the Visited Function where the subscriber can be reached. *Id.* Patent Owner argues that this data does not constitute the recited transport address. *Id.*

We determine that Pirkola teaches or suggests limitation 4.1. Pirkola discloses that “the HDB [Home Function Database 414] also *maintains* a mapping or correspondence between IMSI, MSISDN and *the transport address of the serving Visited Function where the subscriber can be reached.*” Ex. 1005, 9:45–48 (emphases added). Pirkola further teaches that “[t]he transport address identifying where the subscriber can be reached . . . will be the *IP address of the Gateway Function* if the MPTN subscriber has roamed to the cellular network 260.” *Id.* at 9:48–54 (emphasis added). Further, Pirkola discloses storing the port number of a Visited Function in the HDB 414. *Id.* at 9:40–43. Pirkola further teaches that Gateway Function 210 appears to be a MIPTN Visited Function 206 to the MIPTN Home Function 204 when the Home Function 204 receives updated location

information from a Serving cellular Visited Function 274. *Id.* at 9:24–28. The Home Function Database 414 is a component of Home Function 204. *Id.* at 9:36–39. Combined, these disclosures teach storing the IP address of the Gateway Function and a port (the transport address) in Home Function 204 (the second server), specifically in the Home Function Database 214 of Home Function 204. *Id.* at 9:24–54.

Regarding limitation 4.1, Patent Owner does not specifically explain why the transport address of the Visited Function stored in Home Function 204 in Pirkola is not the recited transport address. PO Resp. 22. As discussed above, however, for claim 1, Patent Owner argues that the IP address of the Gateway Function and a port, is not the recited transport address because it is not an address associated with the mobile subscriber. *Id.* at 21–22. As set forth in Section II.F.2.b above, we disagree with that argument.

After reviewing the evidence of record, we determine that Petitioner has proven by a preponderance of the evidence that Pirkola teaches limitation 4.1. Ex. 1005, 9:24–54, 13–15–21, 14:55–60. Thus, we determine that Petitioner has proven that claim 4 would have been obvious over the combination of Pirkola, Rune, and ETSI.

*5. Dependent Claims 5, 6, 9, 12, 13, 16, 19, and 20*

Petitioner asserts that the combination of Pirkola, Rune, and ETSI teaches each of the additional limitations of dependent claims 5, 6, 9, 12, 13, 16, 19, and 20. *See* Pet. 32–35. Patent Owner does not dispute these assertions, or raise arguments separate from those discussed above. PO Resp. 13–19.

Upon review of the record, we determine that Petitioner has proven by a preponderance of the evidence that the combination of Pirkola, Rune, and ETSI teaches the additional limitations of dependent claims 5, 6, 9, 12, 13, 16, 19, and 20. Thus, we determine that Petitioner has proven by a preponderance of the evidence that claims 5, 6, 9, 12, 13, 16, 19, and 20 would have been obvious over the combination of Pirkola, Rune, and ETSI.

### III. CONCLUSION

As set forth in the following table, Petitioner has proven, by a preponderance of the evidence, that all challenged claims are unpatentable:<sup>13</sup>

| <b>Claim(s)</b>                     | <b>35<br/>U.S.C.<br/>§</b> | <b>References</b>      | <b>Claims<br/>Shown<br/>Unpatentable</b> | <b>Claims Not<br/>Shown<br/>Unpatentable</b> |
|-------------------------------------|----------------------------|------------------------|------------------------------------------|----------------------------------------------|
| 1–5, 9–12,<br>16–19                 | 103(a)                     | Rune, ETSI             | 1–5, 9–12,<br>16–19                      |                                              |
| 1, 4–6, 9,<br>12, 13, 16,<br>19, 20 | 103(a)                     | Pirkola, Rune,<br>ETSI | 1, 4–6, 9, 12,<br>13, 16, 19, 20         |                                              |
| <b>Overall</b>                      |                            |                        | 1–6, 9–13,<br>16–20                      |                                              |

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<sup>13</sup> 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).

#### IV. ORDER

It is

ORDERED that claims 1–6, 9–13, and 16–20 of the '846 patent are unpatentable under 35 U.S.C. § 103; and

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

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