

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,

Petitioner,

v.

NETSOCKET, INC.,

Patent Owner.

Patent No. 7,616,601

Filing Date: December 20, 2001

Issue Date: November 10, 2009

Inventors: Joakim Norrgard, Anders Larsson, and Olov Schelen

Title: NETWORK RESOURCE MANAGER IN A
MOBILE TELECOMMUNICATION SYSTEM

PATENT OWNER'S RESPONSE

Case No. IPR2023-00606

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EXHIBIT LIST

Exhibit No.	Description of Document
2001	Amended Docket Control Order, Dkt. 47, <i>NetSocket Inc. v. Cisco Systems, Inc.</i> , Case No. 2:22-cv-00172-JRG, dated February 2, 2023
2002	Cisco Systems, Inc.’s P.R. 3-3 Invalidity Contentions and Ineligibility Contentions in <i>NetSocket Inc. v. Cisco Systems, Inc.</i> , Case No. 2:22-cv-00172-JRG, dated March 22, 2023
2003	Declaration of Olov Schelen (“Schelen Decl.”), dated January 8, 2024 and Exhibit A, Curriculum Vitae of Olov Schelen
2004	Declaration of Paul Congdon (“Congdon Decl.”), dated January 10, 2024 and Exhibit A, Curriculum Vitae of Paul Congdon
2005	Deposition of R. Michael Buehrer, taken in <i>Cisco Systems, Inc., v. NetSocket Inc.</i> , IPR2023-00606 on December 15, 2023 (“Buehrer Depo.”)
2006	Defendant’s Patent Rule 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence, <i>NetSocket Inc. v. Cisco Systems, Inc.</i> , Case No. 2:22-cv-00172-JRG, dated January 9, 2024

I. INTRODUCTION

The Board should issue a Final Written Decision finding all of the Challenged Claims of the U.S. Patent No. 7,616,601 (Ex. 1001, the “’601 Patent”) not unpatentable because Cisco Systems, Inc. (“Petitioner” or “Cisco”) fails to show that any combination of U.S. Patent No. 7,043,225 filed on February 25, 2000 and issued on May 9, 2006 (“Patel-225” or “Ex. 1005”), an article titled “Performance of QoS Agents for Provisioning Network Resources” by named inventors Olov Schelén and Joakim Norrgård, among others, published by the IEEE in 1999 (“Schelen-1999” or “Ex. 1011”), an article titled “Sharing Resources through Advance Reservation Agents” by Olov Schelén et al., published by Chapman & Hall in 1997 (“Schelen-1997” or “Ex. 1031”), U.S. Patent No. 6,865,185 filed on February 25, 2000 and issued on March 8, 2005 (“Patel-185” or “Ex. 1008”), U.S. Patent No. 7,068,624 filed on February 25, 2000 and issued on June 27, 2006 (“Patel-624” or “Ex. 1010”), U.S. Patent No. 6,850,764 filed on December 17, 1999, and issued on February 1, 2005 (“Patel-764” or “Ex. 1007”), an article titled “Advance reservations for predictive service in the Internet” by Degermark and named inventor Olov Schelén, among others, published in 1997 (“Degermark” or “Ex. 1019”) discloses or renders obvious the inventions of Claims 1-9 (the “Challenged Claims”).

Petitioner does not assert any grounds of anticipation but asserts six grounds of obviousness. Any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-

185, Patel-624, Patel-764, and Degermark does not teach key claim elements of the '601 Patent's Challenged Claims, such as "[a] method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission," "handling radio resources within the RAN by using a radio resource manager," "controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS," "the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM," "the NRM checking that resources are available along a path," "the NRM pre-allocating resources in an IP network," "scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM," "communicating resource information between the NRM and the radio resource manager," and "reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS."

Several secondary considerations also weigh heavily in favor of non-obviousness. Specifically, the inventor of the '601 Patent testifies that the invention of the '601 Patent was embodied in an Operax AB product known as RC 5500, which was employed by the Royal Netherlands Army and received several awards and industry acclaim. There is a presumption of nexus between the claims of the '601

Patent and the presented secondary considerations due to the embodiment and co-extensivity of the '601 Patent with the RC 5500 product. Due to this presumption of nexus, the evidence of secondary considerations is persuasive that Petitioner's grounds of non-obviousness should be denied.

Patent Owner respectfully submits that Petitioner's deficient arguments, Patent Owner's arguments presented herein, and the additional evidence submitted herewith, such as the Declaration of Dr. Olov Schelen, Declaration of Dr. Paul Congdon, and the deposition testimony of Dr. R. Michael Buehrer, demonstrates that the Challenged Claims are patentable. Accordingly, the Board should issue a Final Written Decision finding all the Challenged Claims of the '601 Patent not unpatentable.

II. THE '601 PATENT

The '601 Patent is entitled "Network Resource Manager in a Mobile Telecommunication System" and issued on November 10, 2009. The '601 Patent claims priority to U.S. Provisional Patent Application No. 60/261,166, filed on Jan. 16, 2001. The '601 Patent is directed to a method and arrangement for providing end-to-end Quality of Service within a mobile telecommunication system. '601 Patent at Abstract. The '601 Patent explains that the mobile telecommunications network comprises one Core Network ("CN") and at least one Radio Access Network ("RAN"). One of the objectives of the invention is to manage resources

across both types of networks in order to provide end-to-end QoS. *Id.* at 1:18-24.

The '601 Patent achieves the goal of end-to-end QoS by providing a Network Resource Manager (“NRM”) that is in communication with a Radio Resource Manager. *Id.*, 6:8-23. The '601 Patent describes exemplary functionality of the NRM. *Id.* at 6:12-23. The NRM is described as computer implemented, either as hardware or software. *Id.* at 6:26-28. Additionally, as a further example, an NRM can obtain dynamic awareness of network topology and network characteristics.

The '601 Specification states “The NRMs and the bearer service manager, that controls the radio resources within the wireless part, communicate hence their resource needs between each other through the system in order to obtain end-to-end QoS.” *Id.*, 10:8-11.

III. LEVEL OF ORDINARY SKILL IN THE ART

Patent Owner utilizes Petitioner’s proposed level of skill in the art— a person of ordinary skill in the art (“POSITA”) would have had “a bachelor’s degree in computer science, computer engineering, electrical engineering, or an equivalent, and two years of experience working with wireless communication systems, including cellular networks that utilize IP-based core networks.” Petition, Paper No. 2, (“Petition” or “Pet.” at 11; Ex. 2004, ¶ 27. “Lack of work experience can be remedied by additional education, and vice versa.” *Id.*

IV. CLAIM CONSTRUCTION

37 C.F.R. § 42.104 governs the required content of the Petition. 37 C.F.R. § 42.104(b)(3) specifically requires the Petitioner to point out “[h]ow the challenged claim is to be construed” and also “[w]here the claim to be construed contains a means-plus-function or step-plus-function limitation as permitted under 35 U.S.C. § 112(f), the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” 37 C.F.R. § 42.104(b)(3).

A. Claim 1’s Preamble Should Be Limiting

In order to more fully establish the non-obviousness of the Challenged Claims, Patent Owner believes that the Board would benefit from expressly construing the preamble of Claim 1 as limiting to make clear Claim 1’s bounds in the context of Petitioner’s arguments. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (alteration in original) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”).

The preamble in Claim 1 recites: “A method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet

Protocol (IP) based transmission, the method comprising the steps of.” ’601 Patent, Claim 1. A preamble may be limiting if claims “depend[] on a particular disputed preamble phrase for antecedent basis” or the preamble “is essential to understand limitations or terms in the claim body.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (citations omitted).

A person of ordinary skill in the art would have found that several terms in the preamble provide antecedent basis for those same terms within Claim 1 and its dependent claims, and therefore are essential to understanding those limitations within Claim 1 and its dependent claims. Ex. 2004, ¶ 34. As an example, Claim 1’s preamble recites “end-to-end Quality of Service (QoS),” while subsequent limitations in Claim 1 rely on the preamble for antecedent basis by reciting “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide *said end-to-end QoS*” and “reserving the IP network resources along the path by the NRM to fulfill *the end-to-end QoS*.” *Id.*, (citing ’601 Patent, Claim 1) (emphasis added). As another example, Claim 1’s preamble recites “a Core Network (CN) connected to at least one Radio Access Network (RAN)” while dependent claims rely on the preamble for antecedent basis: Claim 2 recites the “[m]ethod according to claim 1, wherein the NRM is used within *the RAN and the CN*,” Claim 3 recites the “[m]ethod according to claim 1, wherein the NRM is used within *the RAN*,” and Claim 4 recites the “[m]ethod according to

claim 1, wherein the NRM is used within *the CN*.” *Id.* (citing ’601 Patent, Claims 2-4) (emphases added). In view of the several examples where Claim 1 itself and its dependent claims rely on phrases within the preamble for antecedent basis, a person of ordinary skill in the art would understand the preamble of Claim 1 to be limiting. *Id.* Notably, Petitioner also agrees that the preamble of Claim 1 of the ’601 Patent should be construed as limiting. *See* Ex. 2006, 6-7.¹

B. “a Core Network” Should Be Construed as “one Core Network”

In the preamble, “a Core Network” ought to be construed as “*one* Core Network.” Ex. 2004, ¶ 35. Although the word “a” generally means “one or more” in open-ended claims containing the transitional phrase “comprising,” *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000), that general rule does not apply when the specification or the prosecution history shows that the term was used in its singular sense. *See, e.g., Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977-79 (Fed. Cir. 1999) (“our cases emphasize that ‘a’ or ‘an’ can mean ‘one’ or ‘more than one,’ depending on the context in which the article is used,” and holding that the phrase “comprising . . . an upstanding feed tube” is limited to a single such

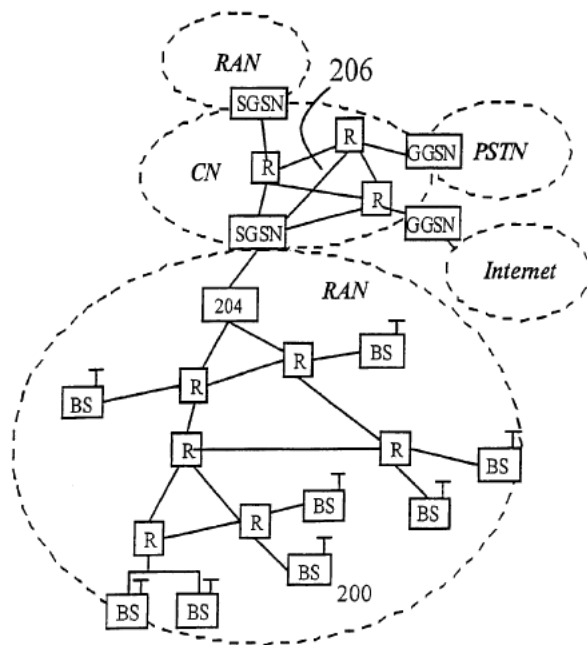
¹ While marked pages 6 and 7 in the document provided by Defendant/Petitioner in the district court litigation, for clarity, Patent Owner notes that the cite is to PDF pages 9 and 10.

feed tube based on the prosecution history); *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023-27 (Fed. Cir. 1997) (limiting the phrase “comprising . . . a metallic gas-confining chamber” to a single such chamber based on context gleaned from the specification).

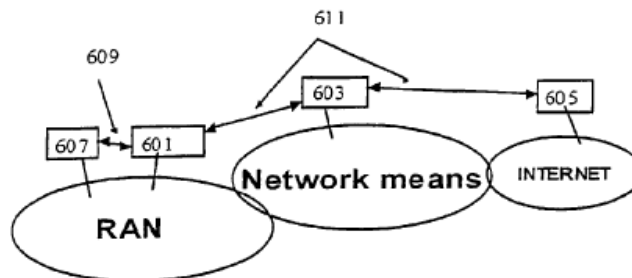
In *Norian Corp. v. Stryker Corp.*, the Court found that “a” meant “one” where the same claim referred to “at least one calcium source and at least one phosphoric acid source.” 432 F.3d 1356, 1359 (Fed. Cir. 2005). “If the patentee had meant to claim the use of at least one type of sodium phosphate in the recited solution, it would have been simple to use the same language in the second portion of the claim that was used in the first.” *Id.* Similarly, Claim 1’s preamble recites “a mobile telecommunications system comprising *a* Core Network (CN) connected to *at least one* Radio Access Network (RAN).” A person of ordinary skill in the art would have understood that the use of “at least one” in the same phrase as “a” indicates the lexicographical intent to differentiate between “a” and “at least one” in Claim 1’s preamble.

The claim language in this preamble strongly suggests the use of a single Core Network in Claim 1. Ex. 2004, ¶ 35. This understanding is supported by its usage throughout the patent specification. For example, the ’601 Patent describes “[t]he communication system comprises at least one network e.g. a Core Network (CN) and at least one Radio Access Network (RAN).” Ex. 2004, ¶ 35 (citing ’601 Patent,

Abstract, 1:20-23 (“a mobile telecommunication system comprising at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN)”). In other words, an example of one network in “the communication system” is one CN connected to at least one RAN. *Id.* Figs. 2 and 6 represented below also support the understanding that Claim 1 is reciting only one CN. *Id.*



'601 Patent, Fig. 2; Ex. 2004, ¶ 35.



'601 Patent, Fig. 6 (referring to a Core Network (CN) as a network means); *see id.*

at 1:21-23 (“at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission.”); Ex. 2004, ¶ 35.

Therefore, a person of ordinary skill in the art would have understood the preamble of Claim 1 to be limiting and, in particular, that “a Core Network” should be construed as “*one* Core Network.” *Id.*, ¶ 36.

C. “Radio Resource[s] [Manager]” and “Network Resource[s] [Manager] Should Be Construed to Have Different Meanings

Petitioner improperly construes “radio resource” and “network resource” in the same way. *See infra* Section VI.A.2; Ex. 2004, ¶ 37. Petitioner’s constructions of these terms run contrary to the general assumption that different terms have different meanings, and therefore should be rejected. *CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) (“In the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.”); *Neville v. Found. Constructors, Inc.*, 972 F.3d 1350, 1357 (Fed. Cir. 2020) (rejecting argument that “end plate” can be an indistinguishable part of the “protrusion” where claimed protrusion extends outwardly from an end plate; “While the ‘protrusion’ and ‘end plate’ structures must be connected in some fashion, the use of these ‘two terms in a claim requires that they connote different meanings.’”); *Apple Inc. v. Firstface Co.*,

No. 2021-1001, 2021 WL 4156323, at *1–*2 (Fed. Cir. Sept. 13, 2021) (aff'g PTAB non-obviousness; that one claim uses both “perform” and “initiate” reinforces that “performing” (without additional user input) means full performance of the function (without additional user input) not just initiating it).

As a result of Petitioner’s improper construction of these terms, Patent Owner requests that the Board provide an express claim construction that (i) “radio resource[s] [manager]” and “network resource[s] [manager]” are different.

D. “the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM, the NRM checking that resources are available along a path, and the NRM pre-allocating resources in an IP network”

Patent Owner notes that, in the related district court litigation, Petitioner construed an entire claim limitation, “the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM, the NRM checking that resources are available along a path, and the NRM pre-allocating resources in an IP network,” as indefinite. Petitioner did not raise this indefiniteness challenge in its Petition or provide an alternate construction and any future indefiniteness challenge ought to be precluded from raising it at this stage in the proceeding, at least because indefiniteness challenges are not within the purview of this Board unless considered in the context of substitute claims in a motion to amend. 35 U.S.C. § 311(b); *Cuozzo Speed Techs.*,

LLC v. Lee, 136 S. Ct. 2131, 2141–42 (2016) (“our interpretation [does not] enable the agency to act outside its statutory limits by, for example, cancelling a patent claim for ‘indefiniteness under § 112’ in inter partes review.”); Consolidated Trial Practice Guide, at 72-73 (November 2019) (“In contrast to 35 U.S.C. § 311(b), the statutory provision providing a right to a motion to amend, 35 U.S.C. § 316(d), does not prevent the Board from considering unpatentability under sections other than 35 U.S.C. §§ 102 and 103 with respect to substitute claims.”) (citing *Amazon.com, Inc. v. Uniloc Luxembourg S.A.*, Case IPR2017-00948, slip op. at 5 (P.T.A.B. Jan. 18, 2019) (Paper 34) (precedential)).

V. REQUIREMENTS UNDER 35 U.S.C. § 103

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 skill in the art, and (4) where in evidence, so called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). Failure to identify the differences between the claimed subject matter and the prior art is fatal to an obviousness challenge. See *Apple, Inc. v. Contentguard Holdings, Inc.*, IPR2015-00355, Paper 9 at 9-10 (P.T.A.B. June 26, 2015).

To arrive at obviousness, the Board must sufficiently explain and support the conclusions that the prior art references disclose all the elements recited in the

Challenged Claims and a relevant skilled artisan not only could have made but would have been motivated to combine all the prior art references in the way the patent claims. *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017).

Even if all the claim elements are found across a number of references, an obviousness determination must consider whether a POSITA would have been motivated to combine those references. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1368 (Fed. Cir. 2016); *Los Angeles Biomedical Rsch. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly Co.*, 849 F.3d 1049, 1067 (Fed. Cir. 2017).

The Supreme Court explained in *KSR Int'l Co. v. Teleflex Inc.* that “[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.” 550 U.S. 398, 418 (2007). This combination determination, as supported by an articulated motivation to combine, requires a plausible rationale as to why those prior art references would have worked together. *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1335 (Fed. Cir. 2013). Additionally, “knowledge of a problem and motivation to solve it are entirely

different from motivation to combine particular references.” *Innogenetics, N.V. v. Abbott Lab ’ys.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008).

VI. PETITIONER HAS NOT PROVED INVALIDITY OF THE CHALLENGED CLAIMS BY A PREPONDERANCE OF THE EVIDENCE

As set forth below, and in view of both the Petition (“Paper No. 2” or “Pet.”) and the Board’s Institution Decision (“Paper No. 11” or “Inst.”), Petitioner has failed to demonstrate by a preponderance of the evidence that the Challenged Claims are obvious in view of the asserted prior art.

A. Ground 1: The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Claims 1 and 4-6 Obvious

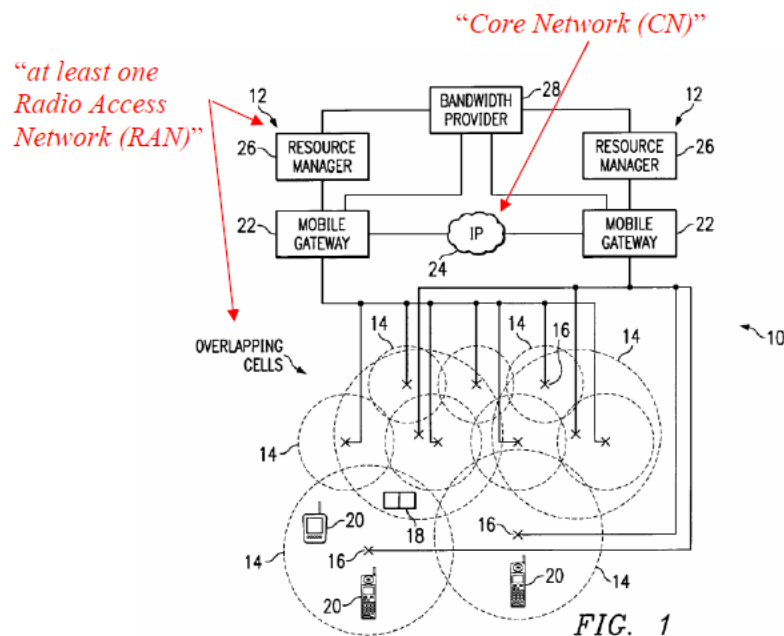
1. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “A method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” as Required by Claim 1

Claim 1 recites the limitation “[a] method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission.” Petitioner only relies on Patel-225 to disclose this limitation of “a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP)

based transmission.” *See* Pet. at 31-36; Ex. 2004, ¶ 38.

As described above in Section IV, the preamble should be construed as limiting, which means that Claim 1 requires “providing end-to-end Quality of Service (QoS) within a mobile telecommunication system” that comprises “one Core Network.” Ex. 2004, ¶ 39.

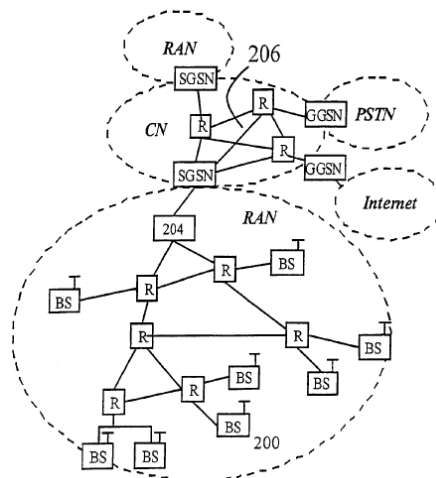
Petitioner incorrectly asserts that “the wireline IP network 24 renders obvious a Core Network (CN)” and that “one or more of Patel-225’s cellular networks 12 that use RF links to provide radio access render obvious at least one Radio Access Network (RAN)” based on an annotated version of Fig. 1 of Patel-225 represented below:



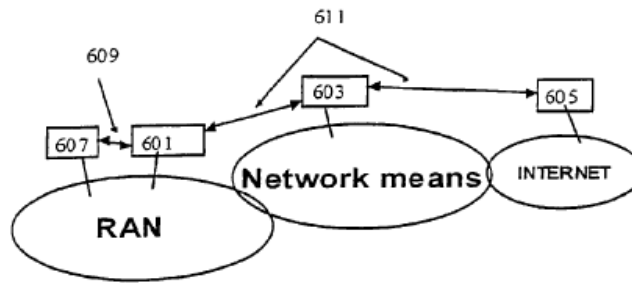
Ex.1005, Fig. 1 (annotated); Ex.1003, ¶151

Pet. at 31-33; Ex. 2004, ¶ 40.

However, contrary to Petitioner’s assertion, the cloud marked IP 24 in Patel-225 cannot be the recited Core Network. Ex. 2004, ¶ 41. Patel-225 describes that “IP 24” is “*a wireline portion 24 of the wireless network 10*” and that “*wireline portion 24 may be the Internet, intranet, extranet, or other suitable local or wide area network.*” *Id.*; Ex. 1005, 5:6-12 (emphasis added). A person of ordinary skill in the art would have understood that Patel-225’s “wireline portion” means a wired *portion* of a network instead of a full network on its own. Ex. 2004, ¶ 41. The ’601 Patent discloses that “*[b]oth the RAN and the CN are IP networks* where logical functions (e.g. Radio Resource Management (RRM)) are distributed, e.g. in the RNC and in the SGSN.” Ex. 2004, ¶ 41 (citing ’601 Patent, 2:33-35) (emphasis added). This understanding of the CN and each RAN as being their own IP networks is confirmed by the ’601 Patent’s representation of a telecommunications system with one CN and at least one RAN in Figs. 2 and 6:



Id. (citing ’601 Patent, Fig. 2).

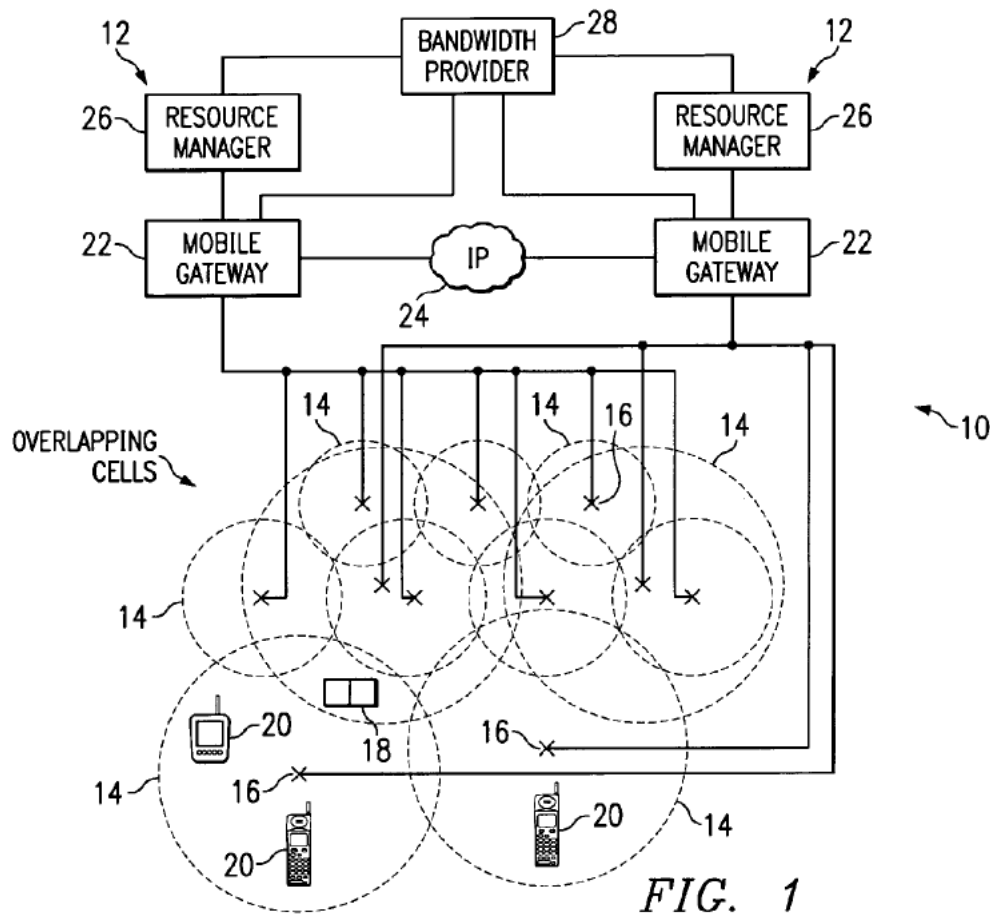


Id. (citing '601 Patent, Fig. 6 (referring to a Core Network (CN) as a network means) and '601 Patent, 1:21-23 (“at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission.”). Figs. 2 and 6 above also demonstrate that the CN is separate from the Internet unlike Patel-225 which notes that “*wireline portion 24 may be the Internet.*” Ex. 2004, ¶ 41 (citing Ex. 1005, 5:6-12 and '601 Patent, 6:39-43 (distinguishing the CN, RAN, and Internet since “[t]he NRM may thus be distributed to run on multiple nodes (e.g. the RAN, the CN and the Internet) and/or distributed geographically over a network”).

Moreover, Petitioner’s argument rests entirely on the misrepresentation that Patel-225 describes a telecommunications system based on CDMA or W-CDMA that inherently discloses the claimed CN or RAN. Ex. 2004, ¶ 42 (citing Pet. at 31-32). However, Patel-225 only refers to CDMA twice. *Id.* The first reference does not describe a full telecommunications system based on CDMA or W-CDMA but only notes that the *RF links for mobile devices* (noted as 14 in Patel-225’s Fig. 1 may be based on CDMA or W-CDMA:

Servers 16 provide a radio frequency (RF) link for mobile devices 20 in a corresponding cell 14. The wireless RF link to the mobile devices 20 in the cell 14 may be based on established standards such as IS-54 (TDMA), IS-95 (CDMA), GSM and AMPS, 802.11 based WLAN, or new upcoming standards such as CDMA2000 and W-CDMA or proprietary terrestrial or mobile radio interfaces. The mobile devices 20 may be cell phones, data phones, data devices, portable computers, or any other suitable devices capable of communicating information over a wireless link.

Id. (citing Ex. 1005, 4:19-27).



Id. (citing Ex. 1005, Fig. 1). A person of ordinary skill in the art would have understood that the RF link to the mobile device in a cell 14, as shown in Fig. 2, does

not correspond to what Petitioner is alleging is the disclosed CN (IP 24) or RAN (cellular network 12). *Id.* A person of ordinary skill in the art would have also understood that whether an RF link to a mobile device conforms to a standard does not imply that the entire system or all parts of the system are included as part of the CDMA or W-CDMA standard. *Id.*

The second, and only other, reference to CDMA and W-CDMA in Patel-225 refers generically to bandwidth usage in such a system. Ex. 2004, ¶ 43 (citing Ex. 1005, 4:39-42 (“In the complete spectrum sharing systems such as CDMA and W-CDMA, bandwidth usage in a particular area directly impacts the bandwidth available at different locations in the neighborhood.”)). A person of ordinary skill in the art would not imply any statement about a CN or RAN from the aforementioned statements in Patel-225. *Id.*

To the extent that other references describe telecommunications systems involving both one CN and at least one RAN, a person of ordinary skill in the art would therefore not seek to combine Patel-225 with such references to obviate Claim 1 because Patel-225 does not describe a system with a single CN and at least one RAN. *Id.*, ¶ 44.

Patel-225 is also silent regarding the claimed “end-to-end Quality of Service (QoS).” *Id.*, ¶ 45. Patel-225 only describes QoS in its background section as an example of provisions in tiered service offerings and that an advantage of Patel-225

is that “consumers may specify resource location, price, QoS policy and other parameters to bandwidth providers including service providers, network providers and bandwidth brokers, shop between providers and negotiate service parameters.” *Id.* (citing Ex. 1005, 1:29-43, 2:43-49). Outside of the background section of Patel-225, there is only one reference to QoS and it too refers to negotiating the terms of a service level agreement (SLA) between a customer and the network provider. *Id.* (citing Ex. 1005, 6:32-35 (“The service type parameters 35 include different class or quality of service (QoS) types such as gold, silver, bronze, premium, assured, and best efforts.”). A person of ordinary skill would not understand Patel-225 to be related to end-to-end QoS in the absence of any mention of the term. *Id.* As Petitioner’s expert acknowledges, end-to-end QoS refers to a network architecture that supports “providing a particular Quality of Service” “from the -- one end of the flow of packets to the other end of the flow of packets, so from origin to the destination.” *Id.* (citing Ex. 2005, 30:19-31:15). Therefore, a person of ordinary skill in the art would not be motivated to combine Patel-225 with any reference that does perform end-to-end QoS, since these different systems require different network architectures. *Id.*

In view of Petitioner’s failure to show that the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or motivates the claimed “method for providing end-to-end Quality of Service (QoS) within a mobile

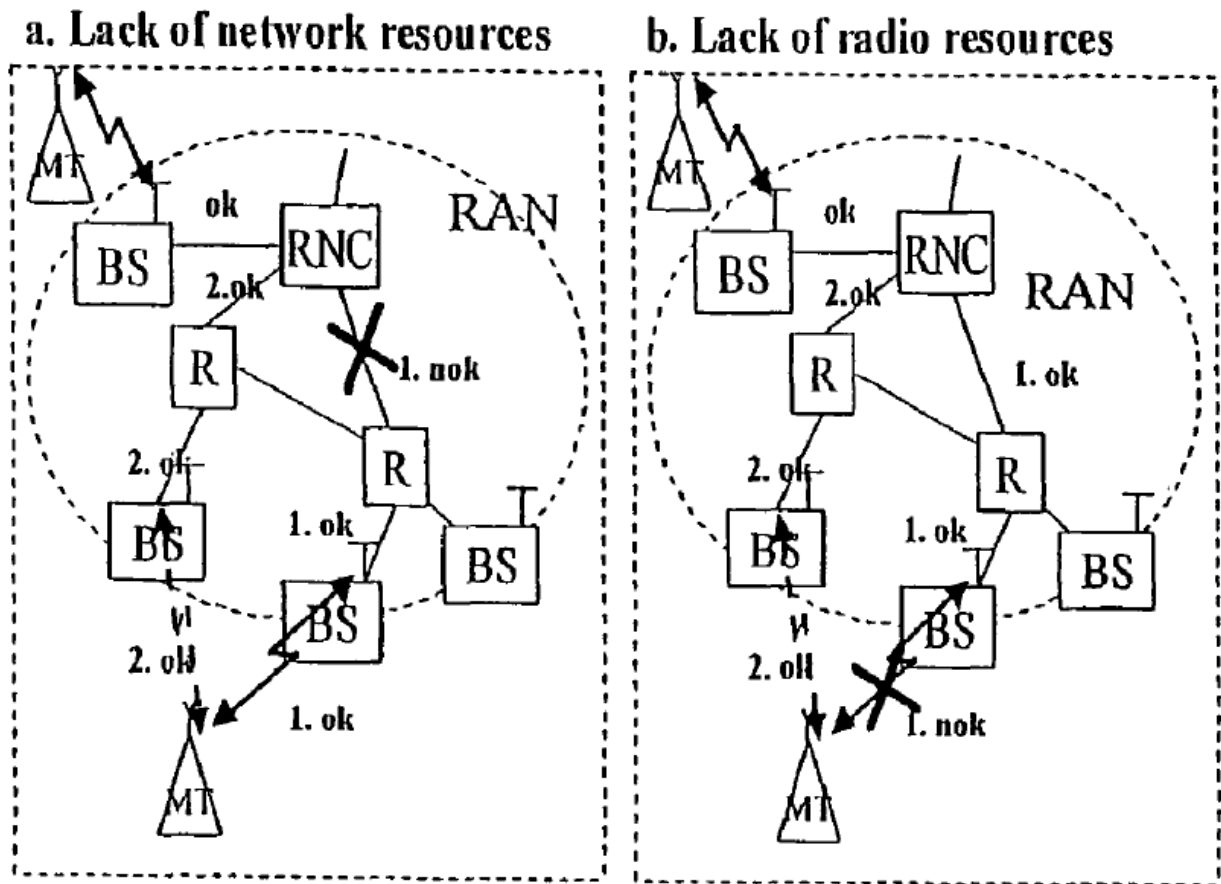
telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” the combination of Patel-225, Schelen-1999, and Schelen-1997 cannot render Claim 1 obvious. *Id.*, ¶ 46.

2. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*handling radio resources within the RAN by using a radio resource manager*,” as Required by Claim 1

Claim 1 recites the limitation “handling radio resources within the RAN by using a radio resource manager.” Petitioner only relies on Patel-225 to disclose this claim limitation. Ex. 2004, ¶ 47. However, Patel-225 does not disclose a radio resource manager. *Id.*

The ’601 Patent distinguishes between a *radio* resource manager and a *network* resource manager (NRM) throughout its specification. *Id.*, ¶ 48; *see, e.g.*, ’601 Patent, 5:14-19 (“The NRM monitors and/or manages and/or reserves *resources within the network with IP based transmission within the cellular telecommunication system* and a *bearer service manager, such as a RAB service manager, manages radio resources in the wireless part of the cellular telecommunication network.*”), 9:22-30 (“If bearer service entities that manage the *radio resources* and *network resources* (e.g. the RAB manager and NRMs) are tightly coupled, as described below, they will have complete information about how

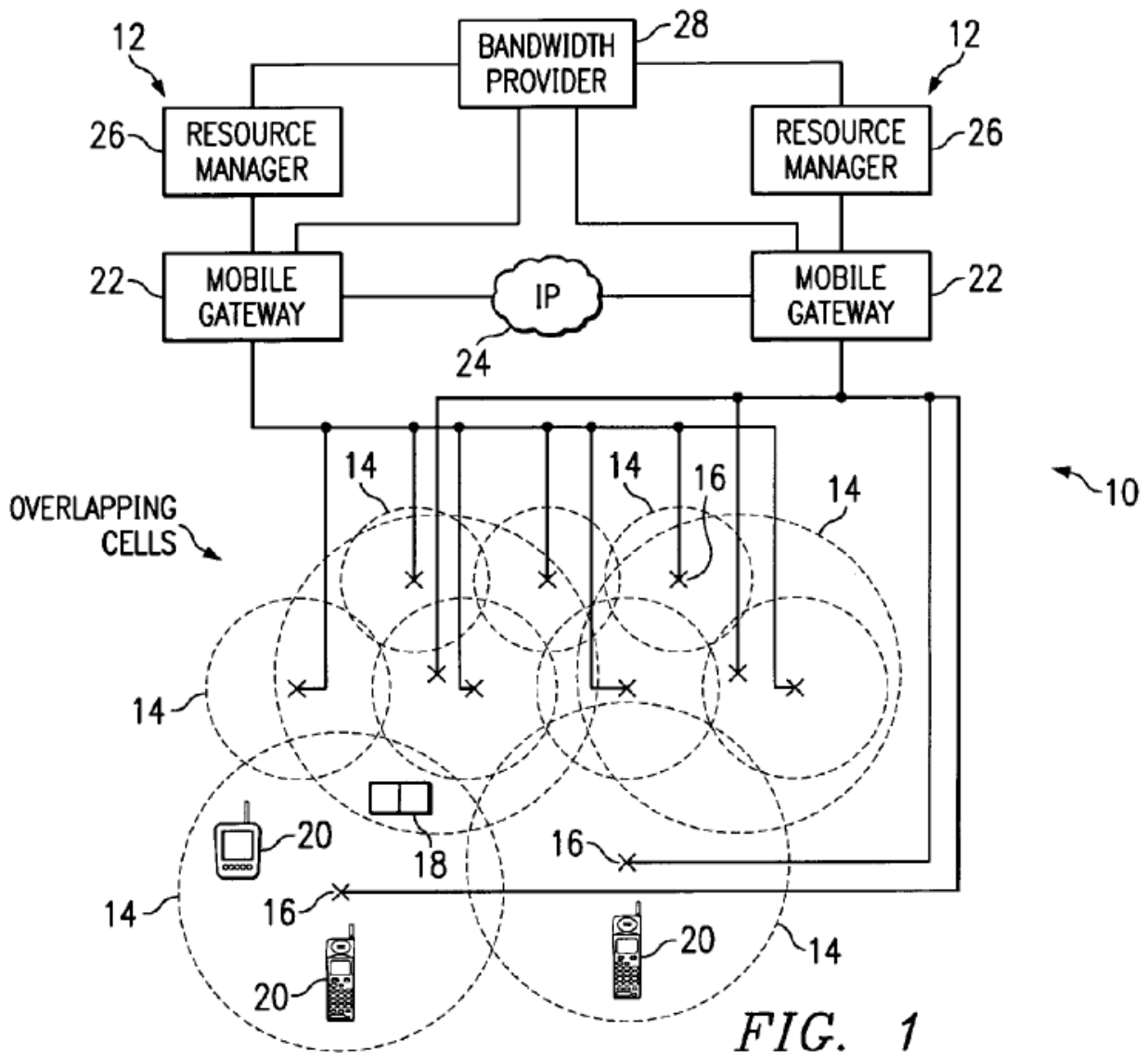
radio and IP network resources are used and where resources are available in the system. This makes it possible to make joint optimisation of **radio and IP network resources** and direct a handover to where resources are available for a session which otherwise would have been denied.”) (emphases added). As demonstrated in Fig. 5b (as distinguished from Fig. 5a that shows a lack of network resources), radio resources refer to the resources exchanged between the base station (BS) and mobile terminal (MT). Ex. 2004, ¶ 48. A person of ordinary skill would understand an example of a mobile terminal to be a mobile device:



Id., ¶ 48 (citing '601 Patent, Figs. 5a, 5b; 4:41-43 (“The session can be denied due

to lack of network resources as in FIG. 5a, lack of radio resources as in FIG. 5b, or lack of both radio and network resources as in FIG.5c.”)).

As described above, radio resources are resources in the wireless part of the cellular telecommunication network, *i.e.*, between the base station and mobile device. *Id.*, ¶ 49 (citing ’601 Patent, 5:14-19, Fig. 5b). Patel-225 does not disclose a manager of radio resources *in the wireless part* of the cellular telecommunication network or resources exchanged between the base station and mobile device, despite the fact that Patel-225 describes both a base station and mobile devices. *Id.* (citing Ex. 1005, 4:3-5 (“Each cell 14 has a base station, or server, 16 and may be subdivided into a plurality of geolocation areas 18.”)). Fig. 1 of Patel-225 and its accompanying description in the specification of Patel-225 shows that the only resource managers in Patel-225 are on the wireline side and not between base stations and mobile devices:



Id., ¶ 49 (citing Ex. 1005, Fig. 1).

Petitioner’s cited portions of Patel-225 describing Fig. 1’s resource manager confirm that Patel-225’s resource manager manages “suitable *network resources*,” “control[s] bandwidth *within a cellular network*,” or makes sure “the SLA will be checked and enforced/ensured by the network elements during use of the wireless service” instead of managing the claimed *radio* resources. *Id.*, ¶ 50; see Pet. at 35

(citing Ex. 1005, 5:311-39, 6:42-48). A person of skill in the art would understand that a radio resource manager handles strategies and algorithms for controlling parameters such as transmit power, user allocation, beamforming, data rates, handover criteria, modulation scheme, and/or error coding schemes. Ex. 2004, ¶ 50.

Therefore, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 51.

3. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS,” as Required by Claim 1

Claim 1 recites the limitation “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS.”

Since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests “providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” it therefore cannot disclose, teach, or suggest “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to *provide said end-to-end QoS*”. *See supra* Section VI.A.1; Ex. 2004, ¶ 52.

Petitioner incorrectly relies upon Patel-225's bandwidth provider 28 of Fig. 1 to disclose the claimed Network Resource Manager ("NRM"). Ex. 2004, ¶ 53. However, Patel-225's bandwidth provider 28 does not perform "**controlling** IP network resources," as required by the claim. *Id.* Petitioner's cites to Col. 1 of Patel-225 to show that "bandwidth brokers [] control and allocate Internet or other network bandwidth" are misleading as Patel-225 is only discussing the background of "recent proposals" in those cited portions of Patel-225. *Id.*; Pet. at 38; Ex. 1005, 1:52-60 ("**Recent proposals** for the IP QoS architecture include supporting bandwidth brokers that control and allocate Internet or other network bandwidth."). The actual disclosure of Patel-225 distinguishes from such bandwidth brokers in those recent proposals because Patel-225's description of its bandwidth providers show that they receive requests from consumers, broadcast the requests to capable network providers, and negotiate with the consumer with responses from those network providers:

One or more bandwidth providers 28 **communicate with the resource managers** 26 of the cellular networks 12 and/or mobile gateways 22 within the cellular networks 12 to **intelligently broker bandwidth and other suitable wireless resources of the network providers to third parties** based on time and space considerations such as geo-location of the demand and supply within the networks 12. The bandwidth providers may be a service provider such as an Internet Service Provider (ISP) or a bandwidth broker. The bandwidth broker may broker bandwidth of a service provider in addition to that of a

network provider. As described in more detail below, the ***bandwidth providers 28 may receive requests*** for wireless services directly from consumers and broadcast the request to network providers capable of providing the specified wireless services. The bandwidth provider 28 receives, analyzes and/or evaluates responses from the different network providers to ***generate a consumer response***. The consumer response may include an offer to provide wireless services at specified terms, several offers from several different network providers for evaluation and selection by the consumer, or one or more partial offers with ***open terms to be negotiated with the consumer***. The ***bandwidth provider 28 may also negotiate with network providers on behalf of consumers or facilitate negotiations between consumers and network providers***. After an agreement has been reached, the bandwidth provider 28 may ***process billing, termination and other suitable transactions*** regarding the wireless services.

Ex. 2004, ¶ 53 (citing Ex. 1005, 5:61-6:21) (emphasis added). A person of skill in the art would thus understand that Patel-225's bandwidth provider (*e.g.*, bandwidth broker) negotiates or "brokers" bandwidth instead of "controlling IP network resources." *Id.*, ¶ 53. The only disclosure in Patel-225 related to "controlling bandwidth" is with respect to Patel-225's resource manager 26, which Petitioner agrees does not disclose the recited NRM. *See* Section VI.A.2; Ex. 2004, ¶ 53 (citing Ex. 1005, 6:44-46 ("the resource manager 26 is implemented as a centralized system for controlling bandwidth within a cellular network 12.")).

Additionally, Patel-225 does not disclose, or even mention, the claimed "resource map." *Id.*, ¶ 54. Petitioner alleges that Patel-225 somehow "suggests"

using a resource map “by disclosing that the bandwidth broker is ‘programmed with. . .current allocation traffic, and new requests for allocations.’” Pet. at 39 (citing Ex.1005, 1:54-56); Ex. 2004, ¶ 54. However, a person of ordinary skill in the art would not make the leap between the vague “programming” disclosed in Patel-225 and “a resource map,” which Petitioner’s expert acknowledges “is a map of the resources in the overall network, and as an example, having a map of current allocated bandwidth and new requests for bandwidth would be one example of a resource map.” *Id.*, ¶ 54 (citing Ex. 2005, 55:18-56:2).

Therefore, Petitioner relies upon only one sentence in Schelen-1999 for disclosing the “resource map” of the claim limitation. *Id.*, ¶ 55; *see* Ex. 1011, at 17 (“Agents use the resource map to perform admission control in their domain.”). Even assuming Schelen-1999’s agents correspond to the claimed NRMs, Patel-225 is not a system that utilizes bandwidth brokers to “control” network resources, as described above. Ex. 2004, ¶ 55. Therefore, a person of ordinary skill in the art would not seek to combine Patel-225, a system that uses a bandwidth broker to negotiate resources with a customer, with a contradictory system, Schelen-1999, that describes “agents us[ing] the resource map to perform admission control.” *Id.*

For these reasons, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 56.

4. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM,*” as Required by Claim 1

Claim 1 recites the limitation “the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM.”

Since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS,” it therefore cannot disclose, teach, or suggest “the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM.” *See supra* Section VI.A.3; Ex. 2004, ¶ 57.

Relatedly, Patel-225 does not describe or even use the words, “admission control” or “path” or “path-sensitive,” further indicating that Patel-225 is not directed to admission control, let alone path-sensitive admission control. *Id.*, ¶ 58. Accordingly, a person of ordinary skill in the art at the time of the invention of the ’601 Patent would not be motivated to combine Patel-225 with any reference that does describe “path-sensitive call admission control.” *Id.*

For these reasons, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 59.

5. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “the NRM checking that resources are available along a path,” “the NRM pre-allocating resources in an IP network,” and “scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM,” as Required by Claim 1

Claim 1 recites the limitation “the NRM pre-allocating resources in an IP network,” “the NRM pre-allocating resources in an IP network,” and “scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM.”

Since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests “the NRM” or “path-sensitive call admission control,” it therefore cannot disclose, teach, or suggest “the NRM checking that resources are available along a path,” “the NRM pre-allocating resources in an IP network,” or “scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM.” *See supra* Sections VI.A.3 and VI.A.4; Ex. 2004, ¶ 60.

Therefore, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 61.

6. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “communicating resource information between the NRM and the radio resource manager,” as Required by Claim 1

Claim 1 recites the limitation “communicating resource information between the NRM and the radio resource manager.”

Since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests either “the NRM” or “the radio resource manager,” it therefore cannot disclose, teach, or suggest “communicating resource information between the NRM and the radio resource manager.” *See supra* Sections VI.A.2 and VI.A.3. Ex. 2004, ¶ 62.

Therefore, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 63.

7. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS,” as Required by Claim 1

Claim 1 recites the limitation “reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS.”

Since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests either “providing end-to-end

Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” “the NRM,” or “path-sensitive call admission control,” it therefore cannot disclose, teach, or suggest “reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS.” *See supra* Sections VI.A.1, VI.A.3, and VI.A.4. Ex. 2004, ¶ 64.

Therefore, Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997. *Id.*, ¶ 65.

8. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious Claims 2-8

Claims 2-8 depend upon Claim 1, and for at least the same reasons as Claim 1, any combination of Patel-225, Schelen-1999, and Schelen-1997 fails to obviate Claims 2-8. *Id.*, ¶ 66.

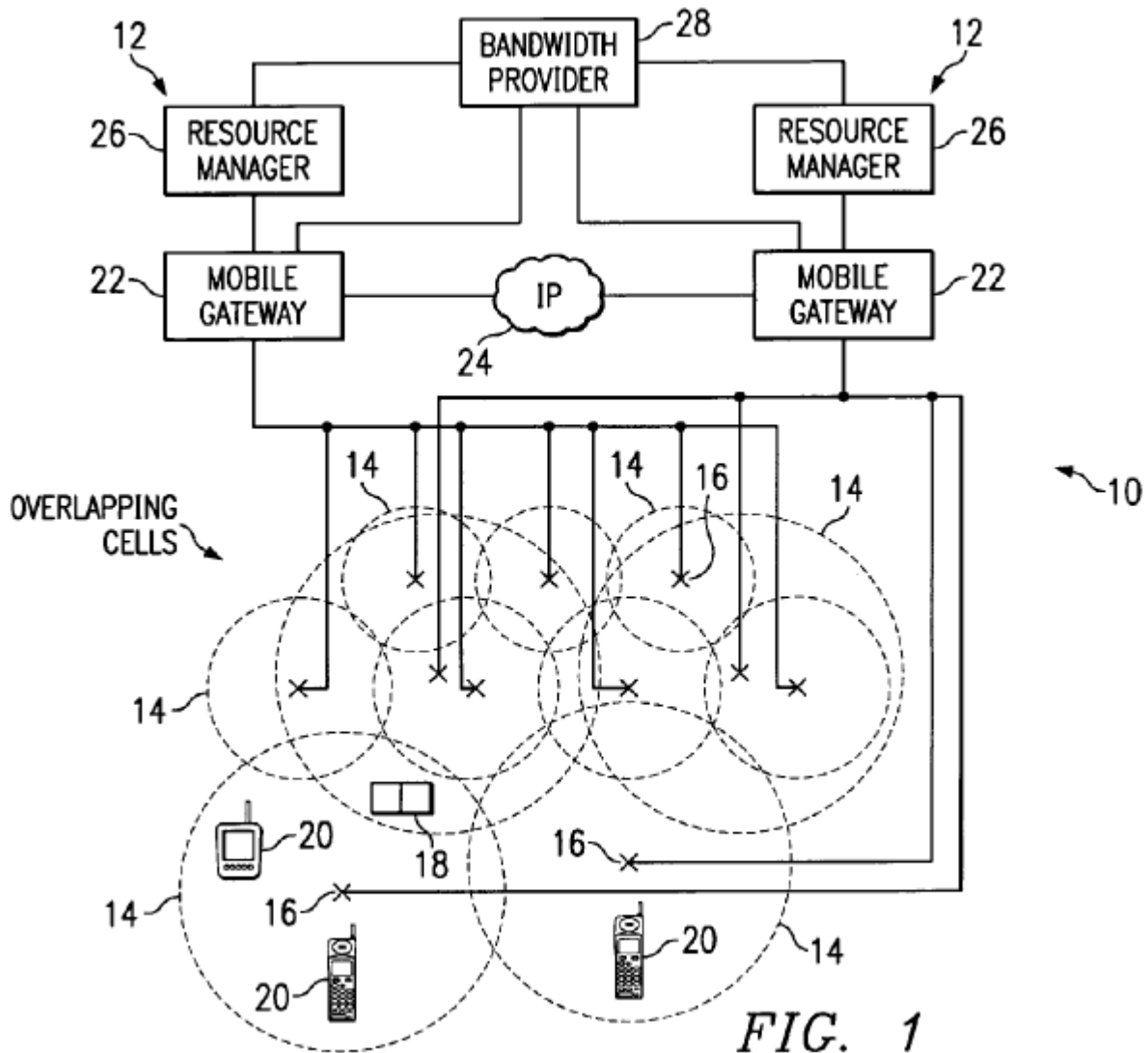
B. Ground 2: The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Claims 2-5 Obvious

1. The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Obvious “wherein the NRM is used within the RAN and the CN,” as Required by Claim 2, “wherein the NRM is used within the RAN,” as Required by Claim 3, and “wherein the NRM is used within the CN,” as Required by Claim 4

Claim 2 recites the limitation “wherein the NRM is used within the RAN and the CN,” Claim 3 recites “wherein the NRM is used within the RAN,” and Claim 4

recites “wherein the NRM is used within the CN.” While Petitioner adds Patel-764 to its Ground 1 combination of Patel-225, Schelen-1999, and Schelen-1997, Petitioner still relies entirely upon Patel-225 for its argument that “the bandwidth broker is ‘*used within*’ the wireline IP network 24 and the wireless network 12.” *See* Pet. at 73; Ex. 2004, ¶ 67.

However, Patel-225’s Fig. 1 and the accompanying description in the specification of Patel-225 show that Patel-225’s bandwidth broker or bandwidth provider 28 is not located within IP 24 or Resource Manager 26:



Ex. 2004, ¶ 68 (citing Ex. 1005, Fig. 1). The specification of Patel-225 describes that “[o]ne or more bandwidth providers 28 *communicate with* the resource managers 26 of the cellular networks 12 and/or mobile gateways 22 within the cellular networks 12 to intelligently broker bandwidth and other suitable wireless resources of the network providers to third parties” but they are not “used within” the cellular

network 12 or resource manager 26. Ex. 2004, ¶ 68 (citing Ex. 1005, 5:61-65) (emphasis added).

As described above, Patel-225's IP 24 is also not the claimed "one Core Network" and Patel-225's cellular networks 12 are not the claimed RANs. *See* Section VI.A.1; Ex. 2004, ¶ 69.

Therefore, for at least the same reasons disclosed in Section VI.A.1, Claims 2-4 are not rendered obvious by the combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764. *Id.*, ¶ 70.

2. The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Obvious "*signalling resource information between the NRM and at least a second NRM used within at least a second network domain*," as Required by Claim 5

Claim 5 recites the limitation "signalling resource information between the NRM and at least a second NRM used within at least a second network domain."

While Petitioner adds Patel-764 to its Ground 1 combination of Patel-225, Schelen-1999, and Schelen-1997, Petitioner still relies entirely upon Patel-225's bandwidth broker to disclose the claimed NRM. Pet. at 74-75; Ex. 2004, ¶ 71. A person of ordinary skill in the art would have understood Patel-764's bandwidth broker to be the same as Patel-225's bandwidth broker since, as Petitioner notes, "Patel-225 cites to and incorporates by reference Patel-764." Pet. at 67; Ex. 2004, ¶ 71. However, as described with respect to Petitioner's Ground 1 combination,

Patel-225's (and Patel-764's) bandwidth broker does not correspond to the claimed NRM, and therefore cannot disclose, teach, or suggest one NRM let alone a second NRM and the claimed "signalling resource information between the NRM and at least a second NRM used within at least a second network domain." *See supra* Section VI.A.3; Ex. 2004, ¶ 71.

Therefore, Claim 5 is not rendered obvious by the combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764. *Id.*, ¶ 72.

C. Ground 3: The Combination of Patel-225, Schelen-1999, Schelen-1997, and Degermark Does Not Render Claim 9 Obvious

Claim 9 depends upon Claim 1, and for at least the same reasons as Claim 1, any combination of Patel-225, Schelen-1999, Schelen-1997, and Degermark fails to obviate Claim 9. *Id.*, ¶ 73.

D. Ground 4: The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claims 1-8 Obvious

1. The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claim 1 Obvious

Petitioner notes that its "Claim 1 analysis of limitations [1.0.1]-[1.8] in Ground 1 remains the same in Ground 4" and that its reliance on Patel-185 is restricted to the limitation of "end-to-end QoS." Pet. at 83; Ex. 2004, ¶ 74. For at least the same reasons provided above for Claim 1 of Ground 1, any combination of

Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 fails to obviate Claim 1. *Id.*

2. The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claims 2-8 Obvious

Petitioner does not provide any further analysis with respect to its Ground 4 for Claims 2-8 other than referring to its “analysis at Claim 1 of Ground 4 and Claims 2-8 of Ground 1.” Pet. at 84; Ex. 2004, ¶ 75. For at least the same reasons provided above for Claim 1 of Ground 4 and Claims 2-8 of Ground 1, any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 fails to obviate Claims 2-8. *Id.*

E. Ground 5: The Combination of Patel-225 Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Patel-764 Does Not Render Claims 2-5 Obvious

Petitioner does not provide any further analysis with respect to its Ground 5 other than referring to its “analysis at Claim 1 of Ground 4 and Claims 2-5 of Ground 2.” Pet. at 85; Ex. 2004, ¶ 76. For at least the same reasons provided above for Claim 1 of Ground 4, any combination of Patel-225 Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Patel-764 fails to obviate Claims 2-5. *Id.*

F. Ground 6: The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Degermark Does Not Render Claim 9 Obvious

Petitioner does not provide any further analysis with respect to its Ground 6

other than referring to its “analysis at Claim 1 of Ground 4 and Claim 9 of Ground 3.” Pet. at 85; Ex. 2004, ¶ 77. For at least the same reasons provided above for Claim 1 of Ground 4 and Claim 9 of Ground 3, any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Degermark fails to obviate Claim 9.

Id.

VII. SECONDARY CONSIDERATIONS HEAVILY WEIGH IN FAVOR OF NON-OBVIOUSNESS OF THE CHALLENGED CLAIMS

Secondary considerations based on objective evidence of non-obviousness, if present, must be considered in an obvious determination. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). Secondary considerations may include any of the following: long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See id.* at 17; *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

“For objective evidence of secondary consideration to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *ClassCo, Inc., v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). A patentee is entitled to a presumption of nexus “when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper No. 33, at 32 (P.T.A.B. Jan. 24,

2020) (Precedential) (citing *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019)). However, “[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations.” *Id.* at 33 (citations omitted). “To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Id.* (citations omitted).

A. A Presumption of Nexus with the Presented Secondary Considerations is Warranted

A presumption of nexus with the secondary considerations noted below is warranted since the presented evidence is tied to the RC 5500 Product, which was developed by Operax AB, the former owner of the ’601 Patent. Ex. 2004, ¶ 78 (citing Ex. 2003, ¶¶ 4-5, 11-13). The RC 5500 embodied and was coextensive with the claimed features of the ’601 Patent for at least the following reasons shown in the chart below:

<u>Claim Limitations (Claim 1)</u>	<u>Embodiment by the RC 5500</u>
handling radio resources within the RAN by using a radio resource manager controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS	The RC 5500 comprised a network resource manager and radio resource manager
handling radio resources within the RAN by using a radio resource	The RC 5500 handled radio resources within a radio access network, such as

<u>Claim Limitations (Claim 1)</u>	<u>Embodiment by the RC 5500</u>
manager;	in the backhaul, when wireless and satellite links were used
providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM	controlled IP network resources using a resource map in order to provide end-to-end QoS, estimate routes, and log provision end and booked resources end-to-end
controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM, the NRM checking that resources are available along a path, and the NRM pre-allocating resources in an IP network;	performed path-sensitive call admission control based on setup requests coming from another entity (e.g., call manager/gatekeeper), because that entity was not aware of network paths and link resources
the NRM checking that resources are available along a path	checked resource availability along a communication path, because it had an understanding of routes that would be used, of link capacities, and of other approved bookings
the NRM pre-allocating resources in an IP network	pre-allocated resource requests in an IP network, in order to provide needed resources throughout mission critical calls;
scheduling resources over time by introducing a start and a stop time as a	scheduled resources over time by introducing start and stop times in a

<u>Claim Limitations (Claim 1)</u>	<u>Embodiment by the RC 5500</u>
parameter in a resource request handled by the NRM	resource requests, to accommodate pre-planned mission critical calls
communicating resource information between the NRM and the radio resource manager	communicated resource information among at least network and radio resource managers to monitor booking status and to plan network capacity and/or provisioning upgrades
reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS	reserved IP network resources along the communication path to fulfill end-to-end QoS and ensure end-to-end call quality

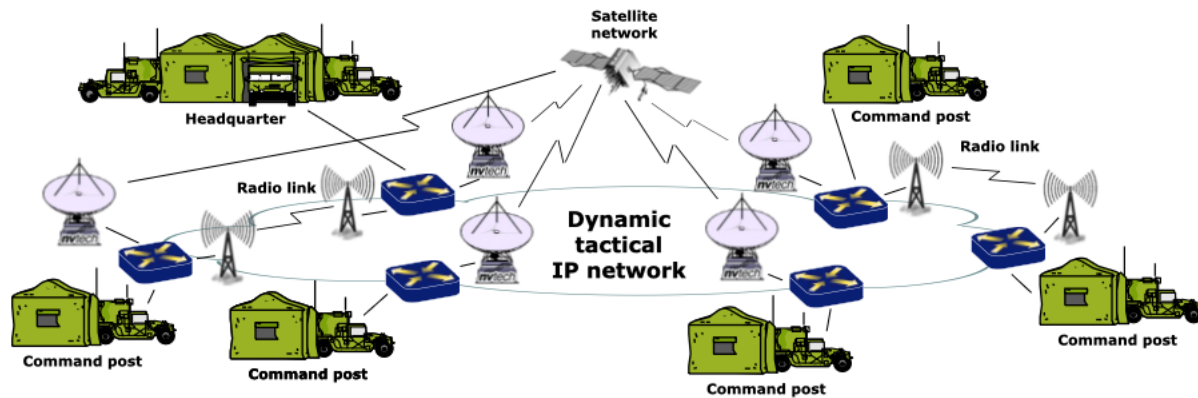
Ex. 2004, ¶ 78 (citing Ex. 2003, ¶ 7).

B. Secondary Considerations

1. The Invention of the '601 Patent Was a Commercial Success Through Its Use by the Royal Netherlands Army

As noted above, Operax AB employees developed technologies related to United States Patent No. 7,616,601. Ex. 2004, ¶ 79 (citing Ex. 2003, ¶¶ 4-5). One such project was the development of a product known as the RC 5500, which was sold by Operax AB to the Royal Netherlands Army. *Id.* (citing Ex. 2003, ¶ 6). The RC 5500 was successfully implemented by the Royal Netherlands Army within its TITAAN Project (“Theatre Independent Tactical Army and Airforce Network”). *Id.* (citing Ex. 2003, ¶ 8). A conceptual representation of how the RC 5500 was deployed by the Royal Netherlands Army is provided below:

Dynamic Tactical Network Architecture



Id. (citing Ex. 2003, ¶ 9).

The Royal Netherlands Army utilized the RC 5500 as a resource manager to control and manage wireless communication bandwidth in their TITAAN networks via mobile phones, IP call managers/gatekeepers, and satellite equipment. *Id.*, ¶ 80 (citing Ex. 2003, ¶ 10).

Therefore, the use of the RC 5500 by the Royal Netherlands Army represents the commercial success of the embodiment of the '601 Patent. *Id.*, ¶ 81.

2. The Invention of the '601 Patent Was Significantly Recognized and Praised by the Industry

Due in part to Operax AB's contribution to the TITAAN Project described above, the Royal Netherlands Army was awarded the best new Network Centric Warfare ("NCW") Programme within a NATO Coalition Nation by the United

States NCW community. Ex. 2004, ¶ 82 (citing Ex. 2003, ¶ 11, <https://apps.dtic.mil/sti/tr/pdf/ADA469709.pdf>)).

The success of Operax AB's contribution to the TITAAN Project via the utility of the '601 Patent is evidenced also in part by the Royal Netherlands Army's decisions to extend its involvement with Operax AB over time. *Id.*, ¶ 83 (citing Ex. 2003, ¶ 12, <https://www.lightreading.com/cable-technology/dutch-army-deploys-operax#close-modal>).

Industry recognition and praise of Operax AB's RC 5500 product is further evidenced by the InfoVision Award granted by the International Engineering Consortium and the Broadband World Forum Asia 2007 team. The InfoVision Award recognized Operax AB's RC 5500 being among "the most unique and beneficial to the telecommunications industry." *Id.*, ¶ 84 (citing Ex. 2003, ¶ 13, <https://www.ossnewsreview.com/operax-wins-iec-infovision-award-1265>).

The RC 5500 was additionally recognized as a "new and imaginative product[]" by the European Council of Applied Sciences, Technologies and Engineering, with the sponsorship and support of the European Commission, through its award of the 2007 European ICT Prize at CeBIT, Hannover. *Id.*, ¶ 85 (citing Ex. 2003, ¶ 14, <https://www.ossnewsreview.com/operax-awarded-2007-european-ict-prize-1147>).

Therefore, the numerous awards afforded to the RC 5500 represent the significant industry recognition and praise of the embodiment of the '601 Patent. *Id.*, ¶ 86.

3. The Invention of the '601 Patent Solved Long Felt but Unresolved Needs

The RC 5500 and the inventions disclosed in United States Patent No. 7,616,601 solved a long-felt but unsolved problem in the field of networking, since there was a need for path aware admission control and call managers/gatekeepers at the time of the invention did not have the required network awareness to perform such control. Ex. 2004, ¶ 87 (citing Ex. 2003, ¶ 15). Additionally, at that time, technologies such as RSVP were not used for per-call admission control in general, or in radio access networks. *Id.* Moreover, at the time RSVP did not support admission control for advance scheduling of call resources. *Id.* One example of the technology at the time was the IntServ model of RSVP, which certainly could not solve the long felt need of issue resource reservation in heterogeneous networks. *Id.*

The above limitations of the technologies that existed at the time of the invention of the '601 Patent led to unsolved problems, such as network link overload, inefficient over-dimensioning of network resources, and/or lack of scalability among routers doing RSVP on a per-flow basis. *Id.*, ¶ 88 (citing Ex. 2003, ¶ 16).

The RC 5500 was able to overcome these persistent and long-existing problems by implementing and embodying the invention of the '601 Patent, which is why it was recognized for its ingenuity in the field of networking, as noted above. *Id.*, ¶ 89 (citing Ex. 2003, ¶ 16).

A person of ordinary skill in the art at the time of the invention of the '601 Patent would have been aware of the existing problems noted above and the lack of a solution to those problems absent the '601 Patent. *Id.*, ¶ 90.

C. Even Without a Presumptive Nexus, the Presented Evidence is Highly Probative in Establishing that the Objective Evidence is Tied to the Invention

The submitted testimony and evidence in Section VII.2 above are directly tied to the invention disclosed by the '601 Patent. Ex. 2004, ¶ 78. Nevertheless, even if the PTAB does not grant the presumption of nexus to secondary considerations owed to Patent Owner, the PTAB may still determine that the presented secondary considerations evidence is probative in establishing that the asserted objective evidence is tied to the invention disclosed in the substitute claims. *Lectrosonics, Inc.*, IPR2018-01129, Paper No. 33, at 33 (Precedential) (citing *Fox Factory, Inc.*, 944 F.3d at 1373). Therefore, even in the absence of a presumption of nexus to secondary considerations, the presented evidence weighs heavily in favor of non-obviousness and the Board should determine that the Challenged Claims are non-obvious.

VIII. CONCLUSION

Petitioner's combinations fail to render obvious any Challenged Claim. The Board should issue a Final Written Decision finding the Challenged Claims not unpatentable.

Respectfully submitted,

Dated: January 10, 2024

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S RESPONSE specified in 37 C.F.R. § 42.24 has 9,200 words in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24. This word count was prepared using Microsoft Word for Office 365.

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CERTIFICATE OF SERVICE

A copy of the foregoing Patent Owner's Response and Exhibit 2003 to 2006
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