

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZTE Corporation,

Petitioner,

v.

WSOU Investments LLC D/B/A Brazos Licensing and Development,

Patent Owner.

U.S. Patent No. 8,767,614

Case No. IPR2023-00498

**DECLARATION OF STEPHEN GRAY IN SUPPORT OF PETITION FOR
INTER PARTES REVIEW OF U.S. PATENT NO. 8,767,614**

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I. INTRODUCTION

1. I have been retained on behalf of ZTE Corporation for the above-captioned inter partes review (IPR) proceeding. I am being compensated for my time in connection with this IPR at my standard hourly consulting rate. I understand that this proceeding involves U.S. Patent No. 8,767,614 (“the ’614 patent”) titled “Reporting buffering information” by Lei Du et al., and that the ’614 patent is currently assigned to WSOU Investments, LLC.

2. I have reviewed and am familiar with the specification of the ’614 patent filed on December 17, 2009. I understand that the ’614 patent has been provided as Ex. 1001. I will cite the specification using the following format: Ex. 1001, 1:1-10. This example citation points to the ’614 patent specification at column 1, lines 1-10.

3. I have reviewed and am familiar with the prosecution history of the ’614 patent. I understand that the prosecution history has been provided as Ex-1002 and the Written Opinion of the International Search Authority has been provided as Ex-1013.

4. I am informed by ZTE’s counsel that December 17, 2009, is the ’614 patent’s earliest possible priority date.

5. In preparing this Declaration, I have also reviewed and am familiar with the following prior art used in the Petition for *Inter Partes* Review of the '614 patent and/or in my declaration below:

- U.S. Patent Publication No. 2012/0033606 to Chun et al. (“*Chun*”) (Ex-1005), filed on April 20, 2010, and published on February 9, 2012, with priority to U.S. Provisional Application 61/171,440, filed on April 21, 2009 (“*Chun Provisional*”) (Ex-1006).
- U.S. Patent Publication No. 2009/0191882 to Kovacs et al. (“*Kovacs*”) (Ex-1007), filed on January 25, 2008, and published on July 30, 2009.
- U.S. Patent Publication No. 2010/0302946 to Yang et al. (“*Yang*”) (Ex. 1007), filed May 20, 2010, and published on December 2, 2010, with priority to U.S. Provisional Application 61/182,360, filed on May 29, 2009 (“*Yang Provisional*”) (Ex-1009).
- U.S. Patent Publication No. 2009/0196175 to Sammour et al. (“*Sammour*”) (Ex. 1010), filed January 27, 2009 and published on August 6, 2009, with priority to U.S. Provisional Application 61/025,478, filed on Feb. 1, 2008.

- International Patent Publication No. 2009/022855 to Sung et al. (“*Sung*”) (Ex. 1007), filed August 13, 2008, and published on February 19, 2009.
- U.S. Patent No. 8,804,756 to Tseng (“*Tseng*”) (Ex. 1010), filed September 9, 2009 and published on April 1, 2010, with priority to U.S. Provisional Application 61/101,153, filed on September 30, 2008.

6. I have been asked to provide my technical review, analysis, insights, and opinions regarding the ’614 patent and the above-noted references that form the basis for the grounds of rejection set forth in the Petition for *Inter Partes* Review of the ’614 patent.

II. QUALIFICATIONS

7. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. A copy of my current *curriculum vitae* is provided as Ex-1004, and it provides a comprehensive description of my academic and employment history over the last thirty-plus years.

8. I received a B.S. degree in Economics from California Polytechnic University in 1973.

9. I have over thirty years of experience in the computer and communications industries. My background includes systems and software architecture, design and development, as well as senior management positions in development, marketing, and general management.

10. From 1973 to 1977, I worked as a systems programmer and a systems analyst at Burroughs Corporation. I worked on data communications software and held several design and product implementation positions in a mid-range and small system development groups.

11. From 1977 to 1979, I worked as a regional support manager at Olivetti Corporation. I worked on software support for a series of mini- and micro-computer systems. Applications of these computer systems included general business and on-line front-office banking.

12. From 1979 to 1982, I worked as a manager in communication controller software development at Computer Communications, Inc. I worked as a leader of architecture, design, development, and testing of a Systems Network Architecture (SNA) communications controller in the Multiple Virtual Storage (MVS) operating environment. Our group successfully designed, developed, and deployed the controller's operating software, diagnostics, host-based compilers, and system support software.

13. From 1982 to 1985, I worked as a manager in foreign system interconnect at Xerox Corporation. I Managed four professionals who defined and developed the technical interconnect strategy for electric page printers to wide-and local-area networks. Our group delivered host software, network, and printer engineering services. We developed a new printer interconnection technique, interfaces to Ethernet local area network, and designed connections to IBM mainframes using SNA and the System/370 channel.

14. From 1985 to 1987, I worked as a general manager in host software products at Xerox Corporation. As the founder and leader of the product delivery organization of a Xerox independent business unit, I managed 22 employees and 33 contract professionals. I directed the definition, architecture, design, development, test, product transfer and sustaining engineering of six products for electronic page printers connected to IBM mainframes (MVS, VSE, VM), Digital Equipment Corporation (DEC), virtual address extension (VAX), and IBM PC's.

15. From 1987 to 1988, I worked as a director in product marketing at Simpact Associates, Inc. I directed the full life cycle of definition, delivery, marketing and enhancement of four sets of IBM connectivity products, including: (a) systems network architecture (SNA) protocol support hardware and software for Digital Equipment Corporation (DEC) virtual address extension (VAX)

systems, (b) An IBM PC-based gateway product that supports SNA and other industry-standard communications architectures, (c) A Netware-based Token Ring Network adapter board and software for DEC VAX systems, and (d) A hardware/software product that receives financial market feeds and reformats the information for presentation to programs running a VAX via a proprietary applications programming interface (API).

16. From 2000 to 2001, I worked as a chief technical officer at NTN Communications, Inc., which is the parent corporation of two operating divisions: Buzztime Entertainment, Inc. and the NTN Network®. I developed and distributed sports and trivia games to a variety of interactive platforms including interactive television, the Internet, PDS and mobile phones. I was responsible for all of the technical aspects of the corporations as well as forward looking programs and business opportunities.

17. From 2001 to 2002, I worked as a chief technical officer at Networld Exchange Incorporated (NEI). NEI provides Fortune 2000 companies private trading exchange (PTX) solutions that automate their B2B commerce activities. NEI is a restart. NEI is funded by institutional investors in New York and Florida. I was recruited in 4Q01 by the investors as part of the new management team.

18. From 1984 to now, I have been working as a principal at Gray & Gray, LLC. I provide consulting services in a variety of technical area including communications, computer system and software.

19. My *curriculum vitae* contains further details on my education, experience, publications, and other qualifications to render an expert opinion. Ex-1004. My work on this case is being billed at a flat rate of \$425 per hour, with reimbursement for actual expenses. My compensation is not contingent upon the outcome of this *inter partes* review proceeding.

III. MATERIALS CONSIDERED

20. In forming my opinions, I have reviewed the following documents, and any other document cited in this declaration:

Exhibit	Description
Ex-1001	U.S. Patent No. 8,767,614 (the '614 patent)
Ex-1002	Prosecution File History of U.S. Patent No. 8,767,614
Ex-1005	U.S. Patent Publication No. 2012/0033606 to Chun et al. (" <i>Chun</i> ")
Ex-1006	U.S. Provisional Application 61/171,440 to Chun et al. (" <i>Chun</i> Provisional")
Ex-1007	U.S. Patent No. 8,462,743 to Kovacs et al. (" <i>Kovacs</i> ")
Ex-1008	U.S. Patent Publication No. 2010/0302946 to Yang et al. (" <i>Yang</i> ")
Ex-1009	U.S. Provisional Application 61/182,360 to Yang et al. (" <i>Yang</i> Provisional")
Ex-1010	U.S. Patent Publication No. 2009/0196175 to Sammour et al. (" <i>Sammour</i> ")
Ex-1011	WO 2009/022855 to Sung et al. (" <i>Sung</i> ").

Ex-1012	Report and Recommendation Regarding Claim Construction, <i>WSOU Investments LLC D/B/A Brazos Licensing and Dev., v. Oneplus Technology (Shenzhen) Co., Ltd.</i> , 6-20-cv-00952, Dkt. 93 (WDTX May 24, 2022).
Ex-1013	Written Opinion of International Search Authority
Ex-1014	U.S. Patent No. 8,804,756 to Tseng (“ <i>Tseng</i> ”).

21. I have also relied on my education, experience, research, training, and knowledge in the relevant art, and my understanding of any applicable legal principles described in this declaration.

22. All the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a person of ordinary skill in the art would have understood the claims of the ’614 patent at the time of the alleged invention. For purposes of this declaration, I have been asked to assume that the date of the alleged invention is the earliest claimed priority date: December 17, 2009.

23. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to me after the date of this declaration.

IV. LEGAL PRINCIPLES

24. For purposes of this declaration, I have been asked to opine on issues regarding obviousness and anticipation under pre-AIA 35 U.S.C. §§ 102 and 103. I have been informed of the following legal standards, which I have applied in forming my opinions.

25. I have been asked to provide my opinions as to whether the cited prior art renders obvious claims 1-24 of the '614 patent from the perspective of a person of ordinary skill in the art at the '614 patent's priority date in 2009, as described in more detail below.

26. I have been asked to provide my opinions as to whether the cited prior art anticipates/renders obvious claims 1-24 of the '614 patent.

27. For purposes of this declaration, I have been informed and understand certain aspects of the law as it relates to my opinions.

28. I have been advised and understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can “anticipate” the claim. Second, the prior art can make the claim “obvious” to a person of ordinary skill in the art. I understand that for an invention claimed in a patent to be patentable, it must not be anticipated and must not be obvious based on what was known before the invention was made.

29. I have been advised and understand the information used to evaluate whether an invention was new and not anticipated or obvious when made is generally referred to as “prior art.” I understand that prior art includes patents and printed publications that existed before the earliest filing date of the patent (which I have been informed is called the “effective filing date”). I have been informed and understand that a patent or published patent application is prior art if it was filed before the effective filing date of the claimed invention and that a printed publication is prior art if it was publicly available before the effective filing date.

30. I have been advised and understand that a dependent claim is a patent claim that refers back to another patent claim. I have been informed and understand that a dependent claim includes all of the limitations of the claim to which it refers.

31. I have been advised and understand that a patent claim may be invalid as anticipated under 35 U.S.C. § 102 if a prior art reference discloses each element of the claimed subject matter.

32. I have been advised and understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time the invention

was made. I have also been advised that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of non-obviousness (which I have been informed may also be called “secondary considerations”).

33. I have also been advised and understand that, where a party alleges obviousness based on a combination of references, that party must identify a reason why a person skilled in the art would have been motivated to combine the asserted references in the manner recited in the claims and to explain why one skilled in the art would have had a reasonable expectation of success in making such combinations.

34. I have been advised and understand that the law permits the application of “common sense” in examining whether a claimed invention would have been obvious to a person skilled in the art. For example, I have been advised that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. I understand, however, that a claim is not obvious merely because every claim element is disclosed in the prior art and that a party asserting

obviousness must still provide a specific motivation to combine the references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

35. I have been advised and understand that two references are considered to be in the same field of art when the references are either (1) in the same field of endeavor, regardless of the problems they address, or (2) reasonably pertinent to the particular problem being solved by the inventor in his patent.

36. I am not aware of any evidence of secondary considerations that would support a determination of non-obviousness of the claimed subject matter in the '614 patent.

37. I have been informed that in *inter partes* review proceedings, such as this one, the party challenging the patent bears the burden of proving unpatentability by a preponderance of the evidence. I understand that a preponderance of the evidence means “more likely than not.”

38. I have been informed by counsel that claim differentiation is a legal doctrine where, “the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005).

V. THE '614 PATENT

A. Overview

39. The '614 patent discloses only one modification, if even a modification at all, over the prior art—sending an indication to the system station that the node for relaying has different buffering capabilities than the user station.

40. The '614 patent introduces a "method" of sending information in a buffer information report from a node for relaying (i.e., relay node) to a system station (i.e., a base station or eNB), potentially including the claimed “indication.” Ex-1001, Claim 1.

41. The '614 patent explains use of buffer status reports in known systems for reporting information to base stations/eNBs: “[f]or example, LTE provides a mechanism known as buffer status reporting for providing the serving base station, and more particularly the serving LTE enhanced NodeB (eNB), with information about the amount of data available for transmission in the uplink buffers of the user equipment (Un). The particular reports generated and sent in the uplink to the serving base station by the user equipment are called buffer status reports (BSR).” Ex-1001, 2:25-32.

B. Prosecution History

42. No art was applied against the '614 patent in the United States Patent Office, and all pending claims (at the time, claims 1, 5, 6, 10, 19, 21, 25, 26, 29, 30, 39-48) were allowed. Ex-1002 at 262.

43. The Written Opinion of the International Searching Authority found novelty and an inventive step in all claims (at the time, claims 1-38) when considering the Patent. The Written Opinion states “[t]he differences of [independent] claims 1, 2, 21, 22, 33-37 compared with [WO 2009/095814 to Teyeb et al.] are that: in the claim 1, the report being generated based on a report format used for uplink reporting by a user station, and sending an indication to the system station that the node for relaying has different buffering capabilities than the user station.” Accordingly, the Written Opinion recognized that the first part of claim 1, sending a buffer status report from a relay node to a system station, is not novel or inventive.

C. Level of Ordinary Skill

44. In rendering the opinions set forth in this declaration, I have been asked to consider the '614 patent's claims and the prior art through the eyes of a person of ordinary skill in the art. I considered factors such as the educational level and years of experience of those working in the pertinent art, the types of problems

encountered in the art, the teachings of the prior art, patents and publications of other persons or companies, and the sophistication of the technology.

45. I have been instructed to assume a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

46. Taking the above factors into consideration, it is my opinion that a person of ordinary skill in the art (“POSA”) would have had at least a bachelor’s degree in electrical engineering, computer engineering, or a related engineering discipline and three years of industry experience in the field of communications, or equivalent experience, education, or both. Lack of professional experience could be remedied by additional education, and lack of education could be remedied by additional professional experience. The person would also have knowledge or familiarity with communications.

47. By May 12, 2009, I was at least a POSA in the art. I hold a B.S. in Economics from California Polytechnic University (1973) and have worked in the electronics and communications field since the mid-1970s. Since 1984, I have been an employee of Gray and Gray, LLC, and have had a variety of experiences related to communications including: being the CTO for multiple internet-based companies, designing computer networks for clients, designing and implementing

communications control devices for Computer Communication Incorporated, and developing and presenting numerous public and in-house courses in IBM, Unix, Internet and related operating system and networking technologies. In this declaration, and for all my opinions herein, I have applied the knowledge of a person of ordinary skill in the art as of May 12, 2009.

VI. CLAIM CONSTRUCTION

A. PREVIOUS CONSTRUCTIONS

48. Only claim terms “in controversy” need be construed in IPR “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) (citation omitted), cert. denied, 138 S. Ct. 1695 (2018).

49. I understand in Ex-1012, *WSOU Investments LLC D/B/A Brazos Licensing and Dev., v. Oneplus Technology (Shenzhen) Co., Ltd.*, 6-20-cv-00952, Dkt. 93 (W.D. Tex. May 24, 2022), the special master of the district court construed several terms in the ’614 patent and that Patent Owner has not contested the constructions. I understand during that case Patent Owner put forth constructions, some of which have been adopted. I understand Petitioner is advancing these constructions and I have been asked to apply them.

50. The constructions I applied are in the table below.

CLAIM	TERM	CONSTRUCTION
6	means for <u>causing sending of a buffer information report to a system station from a node for relaying communications between at least one user station and the system station</u> ; and ¹	(PO's Position) Plain and ordinary meaning <i>Alternatively—</i> 35 U.S.C. § 112, ¶ 6. Function: “for causing sending of a buffer information report” Structure: processor and memory (refer 6:4-9). (Partially Adopted by the WDTX) Subject to 35 U.S.C. § 112, ¶ 6

¹ Counsel for Petitioner has informed me the entire underlined term should be the function, although the court in the Western District of Texas only found a portion of the term to be the function. Regardless, there is no change in the corresponding structure found in the '614 patent.

		Function: causing sending of a buffer information report to a system station. Structure: Pursuant to In re Katz, the data processing unit 32, memory 31, and input/output interface 34 in Fig. 3, and equivalents.
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CLAIM	TERM	CONSTRUCTION
6	means for <u>causing sending of an indication to the system station</u>	(PO's Position) Plain and ordinary meaning <i>Alternatively—</i> 35 U.S.C. § 112, ¶ 6. Function: “for causing sending of an indication to the system station”

		Structure: processor and memory (refer 6:4-9). (Partially Adopted by the WDTX) Subject to 35 U.S.C. § 112, ¶ 6 Function: for causing sending of an indication to the system station Structure: Pursuant to In re Katz, the data processing unit 32, memory 31, and input/output interface 34 in Fig. 3, and equivalents.
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CLAIM	TERM	CONSTRUCTION
13	at least one processor; and at least one memory including computer program	(PO's Position)

	code the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus ... “sending of an indication to the system station” / “sending of a buffer information report to a system station”	Plain and ordinary meaning (Adopted by the WDTX)
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B. PROPOSED CONSTRUCTIONS

1. Means-Plus-Function Terms

51. I have been informed by counsel that 35 U.S.C. 112 para. 6 applies to multiple claim terms because they recite “means for” language that “creates a rebuttable presumption that § 112 para. 6 applies.” *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (citing *Personalized Media Communications, LLC v. International Trade Commission*, 161 F.3d 696, 703-04 (Fed. Cir. 1998)). For the purpose of this *Inter Partes Review*, my understanding is that Petitioner proposes the following constructions and I have been asked to apply them:

CLAIM	TERM	CONSTRUCTIONS
12	means for <u>receiving a buffer information report from a node for relaying</u>	Under Pre-AIA 35 U.S.C. § 112, sixth paragraph

	<u>communications between at least one user station and a system station</u>	Function: underlined Structure: “serving base station [20]” Ex-1001, 7:44.
12, 18	<u>control means for processing an indication that the node for relaying has different buffering capabilities than the user station, for determining the buffering capabilities of the node for relaying based on the received buffer information report and the indication, and for controlling communications between the system station and the node for relaying accordingly.</u>	Under Pre-AIA 35 U.S.C. § 112, sixth paragraph Function: underlined Structure: “processor 14,” and “memory 15,” in Fig. 1, and equivalents. Ex-1001, 5:65-67.

2. Claim Differentiation

52. I have been informed by counsel that claim differentiation is a legal doctrine where, “the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005).

53. In this case, counsel has asked me to apply multiple constructions because independent claims 1 and 7 must be broader than the “separate signaling,”

as required in dependent claims 5 and 11, respectively. Accordingly, counsel has asked me to apply two constructions: (1) the “sending” required by claims 1 and 7 can be accomplished in a single signal or message; or (2) two signals or messages.

VII. GROUND 1: CLAIMS 1, 2, 4, 5 ARE UNPATENTABLE OVER *CHUN*

A. Claim 1

54. It is my opinion that *Chun* renders obvious claim 1.

1. [1p] “A method comprising:”

55. *Chun* discloses [1p] because *Chun* discloses, “an improved method of managing a memory and a buffer in the LTE-A system.” Ex-1005, [0010].

2. [1A] “sending a buffer information report to a system station from a node for relaying communications between at least one user station and the system station,”

56. *Chun* discloses [1A] because *Chun* discloses a “system station”, i.e., a serving base station, a Donor eNB, that receives buffer status information from a Relay Node.

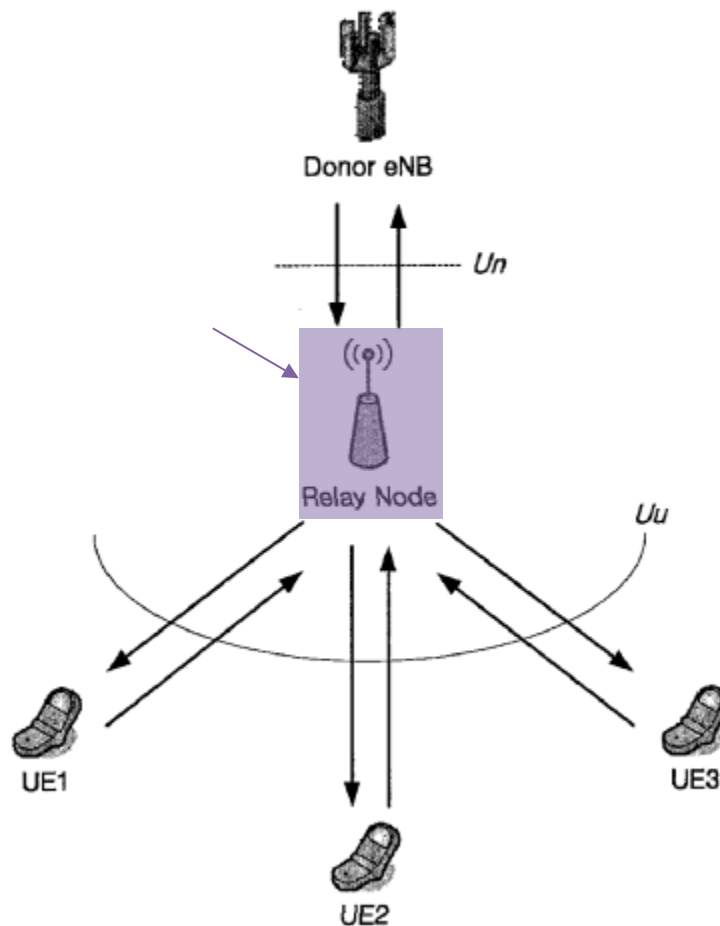
57. As the ’614 patent explains, a system station can be “a donor eNB (DeNB).” Ex-1001, 10:36-37.

58. *Chun* discloses that “the DeNB may need to receive a buffer status report (BSR) from the RN.” Ex-1005, [0084]. *Chun* further discloses, the BSR includes information related to “an amount of data that should be transmitted to the DeNB” or to “a transmitted BSR from the terminal connected to the RN.” *Id.* That

information used by BSRs from terminals is described as “an amount of data stored in the buffer.” *Id.*, [0085].

59. *Chun*’s FIG. 5 shows the relationship between *Chun*’s user equipments (UEs, the claimed, “at least one user station”), a Relay Node (RN), and a donor eNB (the claimed, “system station”):

Fig. 5



Ex-1005, FIG. 5.

60. *Chun* discloses, “a relay node (RN) is introduced in a LTE-A system, the terminal cannot directly transmit or receive data with the network. Instead, the data communication must be performed through the relay node.” *Id.*, [0009].

3. [1B] “the report being generated based on a report format used for uplink reporting by a user station; and”

61. *Chun* renders obvious [1B] because *Chun* discloses that buffer status reports are standard for use by a terminal (user station). *Chun* discloses, “when the terminal informs the base station that it has data to send, the terminal informs the base station of the amount of data stored in its buffer, which is called as a buffer status report (BSR).” *Id.*, [0047]. As discussed above, *Chun*’s terminal is a user equipment or mobile communication terminal. *Id.*, [0003], [0090].

62. The ’614 patent discloses that the “relay node reports the buffer status thereof in the same manner as user equipments report the status in the LTE when no relaying is used.” Ex-1001, 2:53-57. “The particular reports generated and sent in the uplink to the serving base station by the user equipment are called buffer status reports (BSR).” *Id.*, 2:30-32. The ’614 patent explains these features in the context of then-existing 3GPP LTE specifications, and thus admits the “report format” was known in the art and not novel.

63. *Chun* discloses the same BSRs within an LTE-A system, including that its “BSR is generated in the format of a MAC control element (MAC CE).”

Ex-1005, [0048]. *Chun* discloses that MAC formats are standard formats used “from the terminal to the base station,” *id.*, [0048], and discloses use of the same MAC formats by Relay Nodes: “the notification from the RN to the DeNB may be transmitted through at least one of a MAC control element.” *id.*, [0083]. In my opinion, a POSA would have found it obvious that *Chun*’s BSRs would be transmitted from the RN to the DeNB in a finite number of ways, including the disclosed MAC formats and already-existing BSR formats that were typically used to transmit BSRs from the terminal to the base station.

4. [1C] “sending an indication to the system station that the node for relaying has different buffering capabilities than the user station.”

64. *Chun* discloses or renders obvious [1C] because *Chun* discloses buffer status information reports from a Relay Node to a donor eNB (system station) that indicate the Relay Node has different buffering capabilities than the user station.

65. The ‘614 patent describes, “the indication can be based on the number of user stations served by the node for relaying. The indication may comprise the number of user stations served by the node for relaying. The indication may comprise an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.” Ex-1001, 4:3-9.

66. *Chun* discloses that its Relay Node can generate, “at least one parameter” of “a total number of UE or radio bearer that should receive the data transmission.” Ex-1005, [0088]. Thus, under, the ‘614 patent’s definition of an indication as “the number of user stations served by the node for relating,” *Chun* discloses its parameter would indicate the same information.

67. The Relay Node can also generate the parameter to include “buffer capability (or memory information) designated for a data transmission between the DeNB and RN and for a data transmission between the RN and the terminal,” *id.*, [0082]. The buffer capabilities may include, “a number of memory that can be used to store the data in RN.” *Id.* In my opinion, a POSA would have found it obvious that any parameter including buffer capabilities of the DeNB-RN data transmission and the RN-terminal transmission would indicate differences between those capabilities. In my opinion, the parameter would thus have “indicated” different buffer capabilities of the RN (claimed, “node for relaying”) and the terminal (claimed, “user station”). Additionally, under the ’614 patent’s definition that “an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension,” *Chun* discloses its parameter can indicate the memory used to store the data in the RN that is destined for the UE.

68. *Chun*'s parameter notification may be transmitted through "a MAC control element, a RRC message, a PDCP status report," "a RLC status report," or through "a physical channel such as a D-SR [Downlink Shared Reference] channel." *Id.*, [0083]. *Chun* discloses that its BSR could include the parameter in a single message or the parameter could be sent separately. *Id.*, [0087]. Further, as *Chun* discloses the parameter being sent as a separate process than sending a BSR, in my opinion, it would have been obvious for a POSA for a Donor eNB to send the BSR separately from the parameter, for example, when an event is triggered such as a buffer being full or reaching a threshold.

B. [Claim 2] A method as claimed in claim 1, wherein the indication comprises an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.

69. It is my opinion that *Chun* discloses claim 2.

70. *Chun* states, "[I]n order to effectively manage a buffer or a memory in the RN during a data relaying procedure, according to the present invention, the RN may notify information related to a buffer capability or memory information to the DeNB. Here, the buffer capability may refer to a maximum buffering capability of the RN, and the memory information may refer to an amount of memory installed in the RN or may refer to a number of memory that can be used to store the data in RN." Ex-1005, [0082]. *Chun* further discloses, "if the accumulated data

stored in the buffer of the RN increases in every 1 MB (Mega Byte), the RN may notify this to the DeNB. During this procedure, the information may indicate a certain level of the buffer capability (or memory information) designated for each of the Un interface and Uu interface,” *id.*, [0083], where the Uu interface is “between UE-RN.” *Id.*, [0037]. In my opinion, *Chun* explains the reporting can occur for each 1 MB that the RN accumulates for a UE because the Uu interface is between a UE and a RN. In my opinion, a POSA would understand that the buffer capability, of the RN buffer that is storing data for a UE, transferred to the DeNB corresponds to the claimed, “the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

C. [Claim 4] A method as claimed in claim 1, wherein the buffer information report comprises a medium access control control element.

71. It is my opinion that *Chun* renders obvious claim 4 because *Chun* discloses, “the BSR is generated in the format of a [media access control (“MAC”)] control element.” Ex-1005, [0048]. *Chun* discloses that its RN to DeNB communication “may be transmitted through ... a MAC control element.” *Id.*, [0083], [0085]. In my experience, a POSA would have found it obvious that *Chun*’s buffer status report could be sent through a MAC control element by its RN.

D. [Claim 5] A method as claimed in claim 1, comprising separate signalling of said indication in a radio resource control message or an admission control message and the buffer information report in a medium access control message.

72. In my view, *Chun* discloses claim 5 because *Chun* discloses its RN “may transmit the received data separately from the generated parameter.” *Id.*, [0087]. As discussed above in Section VII.C, *Chun* discloses its BSR can be generated through a MAC control element. *Id.*, [0048], [0083], [0085].

73. *Chun* also discloses, when its RN “notifies the information to the DeNB... [radio resource control (“RRC”)]... may be utilized.” *Id.*, [0081]. In my opinion, a POSA would have found it obvious that the generated parameter could be transmitted over the RRC. Further, *Chun* discloses its “generated parameter is transmitted to the network using ... a protocol layer,” among other options. *Id.*, [0088]. A POSA would have understood, in my opinion, that a protocol layer corresponds to “an admission control message” because *Chun* discloses “when the RN is first accessed to the DeNB,” it would use a protocol layer which would include known and predictable protocols “such as MAC/RLC/PDCP/RRC.” *Id.*, [0038]. Such a communication in known forms, including RRC, would correspond to the claimed, “said indication in a radio resource control message or an admission control message.”

74. *Chun* similarly discloses, “the at least one generated parameter is transmitted to the network using ... [a] D-SR (Dedicated-SR) channel.” *Id.*, [0088]. In my opinion, a POSA would have readily understood a dedicated scheduling request (D-SR) channel to correspond to an admission control message because the D-SR is used to request a radio resource when a terminal or RN has none. *Id.*, [0048]. *Tseng*, U.S. Patent No. 8,804,756, shows this was a well-known procedure. *Tseng*, 1:56-2:10. As a result of the dedicated scheduling request, the RN gains admission and is allocated resources, illustrating that the D-SR message corresponds to the claimed, “admission control message.”

75. Further, in my opinion, a POSA would have understood it to be obvious to send *Chun*’s BSR and *Chun*’s indication through disclosed, known formats such as a MAC control element for the BSR and MAC/RLC/PDCP/RRC and D-SR for the parameter, as BSRs were typically sent when generated or certain events occurred like when no uplink radio resource is allocated, Ex-1005, [0048], and *Chun*’s parameter could be triggered by an event like a full or near-full buffer. Ex-1005, [0083] (stating that a 80% buffer could be a threshold or when an accumulated amount of data is reached).

VIII. GROUND 2: CLAIMS 6-8, 10-14, 16, 18, 19, 21, 23, 24 ARE UNPATENTABLE OVER *CHUN* IN VIEW OF *KOVACS*

A. Motivation to Combine *Chun* and *Kovacs*

76. In my opinion, a POSA would have been motivated to implement *Kovacs*'s relay node and base station to process and implement *Chun*'s methods because *Kovacs* discloses, "introducing relay concepts in LTE can also be used to aid in the provisioning of high-bit-rate coverage in high shadowing environment, to reduce the average radio-transmission power at the UE which extends the UE's battery life, to enhance cell capacity and effective throughput (e.g., by increasing cell edge capacity and balancing cell load), and to enhance overall performance and deployment cost of the radio access network RAN." Ex-1007, [0021]. Further, in my experience, a POSA would thus have incorporated *Kovacs*'s relay concepts involving relay nodes and base station configurations into *Chun*'s method to achieve high-bit-rate coverage, reduce the average radio-transmission power, enhance cell capacity and throughput, and enhance overall performance.

77. I believe a POSA would have had a reasonable expectation of success combining *Chun* and *Kovacs* because each disclosure concerns a Relay Node (RN) in an "LTE" system, and each disclosure uses buffer status reporting from the RN to the Donor eNB (eNB_r). Ex-1007, [0041], [0064]; Ex-1005, [0009]-[0010].

B. Claim 6

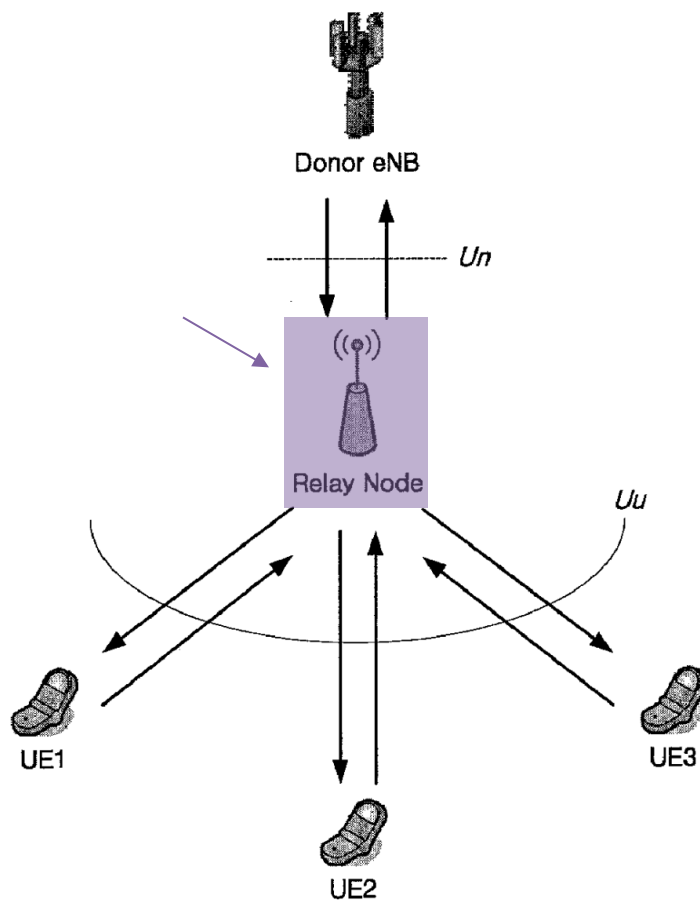
1. [6P] “An apparatus comprising:”

78. *Chun* discloses [6P] because *Chun* discloses “a method for data transmission by a relay node (RN) in a wireless communication system.” Ex-1005, [0011].

2. [6A] “means for causing sending of a buffer information report to a system station from a node for relaying communications between at least one user station and the system station,”

79. *Chun* discloses “a method for data transmission by a relay node (RN) in a wireless communication system.” *Id.*

Fig. 5



Ex-1005, FIG. 5 (annotated).

80. *Chun* does not disclose the structure of claim [6A] but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “a **RN 16**, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a

transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNBr 12 that is controlling the cell.” *Id.*, [0048].

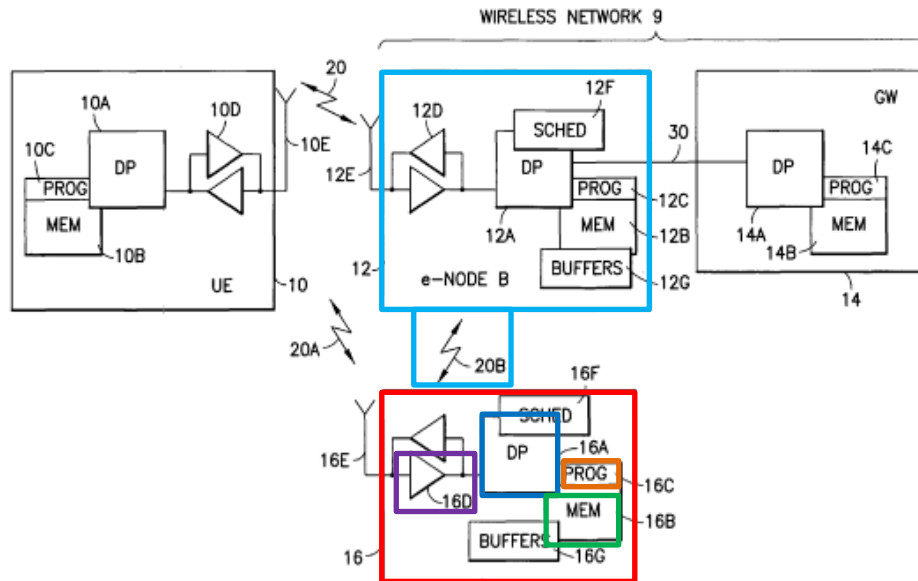


FIG.2

Ex-1007, FIG. 2.

81. As I stated above, a POSA would have been motivated to combine *Kovacs* with *Chun* as discussed above in Section VIII.A.

82. *Chun* discloses the function of [6A] as explained for [1A] (Section VII.A.2) because, as shown below, the language in underline is identical and the minor difference in language has no effect on the meaning of the claim.

Claim [1A]	Function of Claim [6A]
<u>sending a buffer information report</u> <u>to a system station from a node for</u> <u>relaying communications between</u> <u>at least one user station and the</u> <u>system station</u>	for causing <u>sending of a buffer</u> <u>information report to a system</u> <u>station from a node for relaying</u> <u>communications between at least</u> <u>one user station and the system</u> <u>station</u>

3. [6B] “the report being generated based on a report format used for uplink reporting by a user station; and”

83. *Chun* renders obvious this element as explained for [1B] (Section VII.A.3) because the language in underline is identical as shown below.

Claim [1B]	Claim [6B]
<u>the report being generated based on</u> <u>a report format used for uplink</u> <u>reporting by a user station; and</u>	<u>the report being generated based on</u> <u>a report format used for uplink</u> <u>reporting by a user station; and</u>

4. [6C] “means for causing sending of an indication to the system station that the node for relaying has different buffering capabilities than the user station.”

84. *Kovacs* discloses the structure of [6C], “data processing unit 32, memory 31, and input/output interface 34 in Fig. 3, and equivalents” because *Kovacs* discloses its RN has a processor, memory, and an interface to communicate with terminals and base stations as discussed above in Section VIII.B.2. *Id.*, FIG. 2.

85. In my view, a POSA would have been motivated to combine *Kovacs* with *Chun* as discussed above in Section VIII.A.

86. *Chun* discloses or renders obvious the function of [6C] as explained for [1C] (Section VII.A.4) because the language in underline is identical, as shown below, and the minor difference in language has no effect on the meaning of the claim.

Claim [1B]	Claim [6B]
<u>sending an indication to the system</u> <u>station that the node for relaying has</u> <u>different buffering capabilities than</u> <u>the user station</u>	causing <u>sending of an indication to</u> <u>the system station that the node for</u> <u>relaying has different buffering</u> <u>capabilities than the user station</u>

C. Claim 7

1. [7p] “A method comprising:”

87. *Chun* discloses this claim limitation because it discloses, “a method for data transmission by a relay node (RN) in a wireless communication system,” Ex-1005, [0011], including how the method relates to a receiving “eNB, base station.” *Id.*, [0036].

2. [7A] “receiving a buffer information report from a node for relaying communications between at least one user station and a system station,”

88. *Chun* teaches a base station, an eNB, that receives buffer status information from a Relay Node. *Id.*, [0036].

89. *Chun* discloses “the DeNB may need to receive a buffer status report (BSR) from the RN in order to allocate the radio resource(s) to the RN.” *Id.*, [0084]. As discussed above in Section VII.A.2, *Chun*’s buffer status report includes buffer information, and that buffer information report, included in a buffer status report, is sent by the RN and received by the DeNB.

3. [7B] “the report being generated based on a report format used for uplink reporting by a user station;”

90. *Chun* renders obvious [7B] as explained for [1B] (Section VII.A.3), this limitation again being identical to claim [1B]. Because *Chun*’s RN sends the BSR and *Chun*’s DeNB receives the BSR, this limitation is met here as well.

4. [7C] “receiving an indication that the node for relaying has different buffering capabilities than the user station;”

91. *Chun* discloses or renders obvious “an indication that the node for relaying has different buffering capabilities than the user station” as explained for [1C] (Section VII.A.4). *Chun*’s Donor eNB (i.e., base station) receives the “generated parameter.” “the at least one generated parameter is transmitted to the network,” and “the network is a [Donor] eNB.” Ex-1005, [0088]. *Chun* discloses that its BSR could include the parameter in a single message or the parameter could be sent, or received, separately. *Id.*, [0087]. Further, as *Chun* discloses the parameter (i.e., a number of UE, a number of data as discussed in Section VII.A.4) being sent as a separate process than sending a BSR, in my opinion, it would have been obvious for a POSA for a Donor eNB to receive the BSR separately from the parameter, for example, when an event is triggered such as a buffer being full or reaching a threshold.

5. [7D] “determining the buffering capabilities of the node for relaying based on the buffer information report and the indication; and”

92. *Chun* discloses or renders obvious [7D] because it discloses that the RN “may notify a total number of terminals to the DeNB such that the DeNB can allocate an appropriate amount of the radio resource(s) to the RN,” *id.*, [0074], and “information related to the terminal” may also be used and sent so, “the DeNB may

allocate a proper amount of the radio resource(s),” *id.*, [0075]. *Chun* discloses, for example, “the RN may transmit a BSR requiring 300 bytes of radio resources to the DeNB.” *Id.*, [0084]. *Chun* also discloses that the information of its generated parameter (i.e., the indication) “may indicate a certain level of the buffer capability (or memory information) designated for a data transmission between the DeNB and RN and for a data transmission between the RN and the terminal.” *Id.*, [0082]. In my opinion, a POSA would have found it obvious that *Chun*’s base station that receives the BSR and the parameter would be capable of reading the BSR and the parameter to understand the information relayed therein (i.e., the buffering capabilities).

93. Additionally, in my opinion, a POSA would have found it obvious that *Chun*’s DeNB would determine the requirement of the radio resources to be allocated by the DeNB from (1) *Chun*’s BSR, and (2) the information of a level of the buffer capability from *Chun*’s parameter, so that *Chun*’s base station can “allocate a proper amount of radio resource(s).” *Id.*, [0075]. In other words, the point of sending the BSR and parameter to the base station is so the base station can allocate resources based on available resources (i.e., buffering capabilities such as buffer size, radio bearer resources (RBRs), channel quality, and so on) versus

the required demand. Thus, a POSA would understand that *Chun*'s DeNB reads and understands the information that it receives from *Chun*'s BSR and parameter.

6. [7E] “controlling communications between the system station and the node for relaying accordingly.”

94. *Chun* discloses [7E] because *Chun* discloses “the DeNB may allocate a proper amount of the radio resource(s).” *Id.* Further, “radio resource(s) should be allocated to the RN by the DeNB in order to transmit data from the RN to the DeNB.” *Id.*, [0084].

D. [Claim 8] “A method as claimed in claim 7, wherein the indication comprises an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

95. Claim 8 is identical to claim 2, as shown below, aside from its dependency from claim 7. *Chun* discloses this limitation as explained for claim 2 (Section VII.B). *Chun* discloses its DeNB receives the parameter. Ex-1005, [0088].

Claim 8	Claim 2
<u>A method as claimed in claim 7,</u> <u>wherein the indication comprises an</u> <u>indication that the buffer size of the</u> <u>node for relaying is extended from</u> <u>that of the user equipment and</u>	<u>A method as claimed in claim 1,</u> <u>wherein the indication comprises an</u> <u>indication that the buffer size of the</u> <u>node for relaying is extended from</u> <u>that of the user equipment and</u>

<u>information of the size of the</u> <u>extension.</u>	<u>information of the size of the</u> <u>extension.</u>
--	--

E. [Claim 10] “A method as claimed in claim 7, wherein the buffer information report comprises a medium access control element.”

96. Claim 10 is substantially similar to claim 4 aside from its dependency from claim 7. *Chun* discloses this limitation as explained for claim 4 (Section VII.C). *Chun* discloses its DeNB receives the BSR. Ex-1005, [0084].

Claim 10	Claim 4
<u>A method as claimed in claim 7,</u> <u>wherein the buffer information</u> <u>report comprises a medium access</u> <u>control element.</u>	<u>A method as claimed in claim 1,</u> <u>wherein the buffer information</u> <u>report comprises a medium access</u> <u>control control element.</u>

F. [Claim 11] “A method as claimed in claim 7, comprising separate signalling of said indication in a radio resource control message or an admission control message and the buffer information report in a medium access control message.”

97. Claim 12 is identical to claim 5 aside from its dependency from claim 7. *Chun* discloses this limitation as explained for claim 5 (Section VII.D). *Chun* discloses its DeNB receives the parameter and the BSR. Ex-1005, [0084], [0088].

Claim 12	Claim 5
<u>A method as claimed in claim 7,</u> <u>comprising separate signalling of</u> <u>said indication in a radio resource</u> <u>control message or an admission</u> <u>control message and the buffer</u> <u>information report in a medium</u> <u>access control message.</u>	<u>A method as claimed in claim 1,</u> <u>comprising separate signalling of</u> <u>said indication in a radio resource</u> <u>control message or an admission</u> <u>control message and the buffer</u> <u>information report in a medium</u> <u>access control message.</u>

G. Claim 12

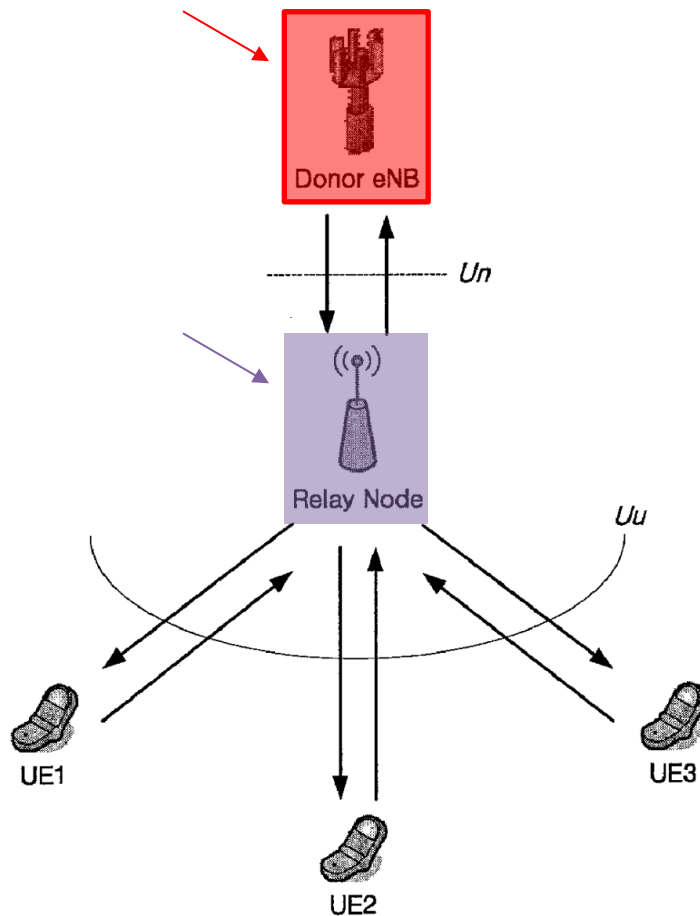
1. [12p] “An apparatus comprising:”

98. *Chun* discloses this claim limitation because it discloses, “relaying data between a user equipment (EU) and an Evolved Node B (eNB, base station).” Ex-1005, [0036].

2. [12A] “means for receiving a buffer information report from a node for relaying communications between at least one user station and a system station,”

99. *Chun* discloses “a method for data transmission by a relay node (RN) in a wireless communication system.” *Id.* *Chun* discloses “the DeNB may need to receive a buffer status report (BSR) from the RN in order to allocate the radio resource(s) to the RN.” *Id.*, [0084].

Fig. 5



Ex-1005, FIG. 5 (annotated).

100. *Chun* does not disclose the structure of claim [12A] but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the eNB 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNB 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a

sends the BSR and *Chun*'s DeNB receives the BSR, this limitation is met here as well.

4. [12C] “control means for processing an indication that the node for relaying has different buffering capabilities than the user station,

104. *Chun* discloses or renders obvious [12C] because it discloses that the RN “may notify a total number of terminals to the DeNB such that the DeNB can allocate an appropriate amount of the radio resource(s) to the RN,” *id.*, [0074], and “information related to the terminal” may also be used and sent so, “the DeNB may allocate a proper amount of the radio resource(s),” *id.*, [0075]. *Chun* discloses, for example, “the RN may transmit a BSR requiring 300 bytes of radio resources to the DeNB.” *Id.*, [0084]. *Chun* also discloses that the information of its generated parameter (i.e., the indication) “may indicate a certain level of the buffer capability (or memory information) designated for a data transmission between the DeNB and RN and for a data transmission between the RN and the terminal.” *Id.*, [0082]. In my opinion, a POSA would have found it obvious that *Chun*'s base station that receives the BSR and the parameter would be capable of reading the BSR and the parameter to understand the information relayed therein (i.e., the buffering capabilities). Additionally, in my opinion, a POSA would have found it obvious that *Chun*'s DeNB would determine the requirement of the radio resources to be

allocated by the DeNB from (1) *Chun*'s BSR, and (2) the information of a level of the buffer capability from *Chun*'s parameter, so that *Chun*'s base station can "allocate a proper amount of radio resource(s)." *Id.*, [0075]. In other words, the point of sending the BSR and parameter to the base station is so the base station can allocate resources based on available resources (i.e., buffering capabilities such as buffer size, radio bearer resources (RBRs), channel quality, and so on) versus the required demand. Thus, a POSA would understand that *Chun*'s DeNB reads and understands the information that it receives from *Chun*'s BSR and parameter.

105. *Chun* does not disclose the structure, "processor 14," and "memory 15," in FIG. 1, and equivalents, of claim [12C], but *Kovacs* does.

106. *Kovacs* discloses, "computer software executable by a data processor of the eNBr 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware." Ex-1007, [0080]. *Kovacs* further discloses, "[t]he eNBr 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E." *Id.*, [0046].

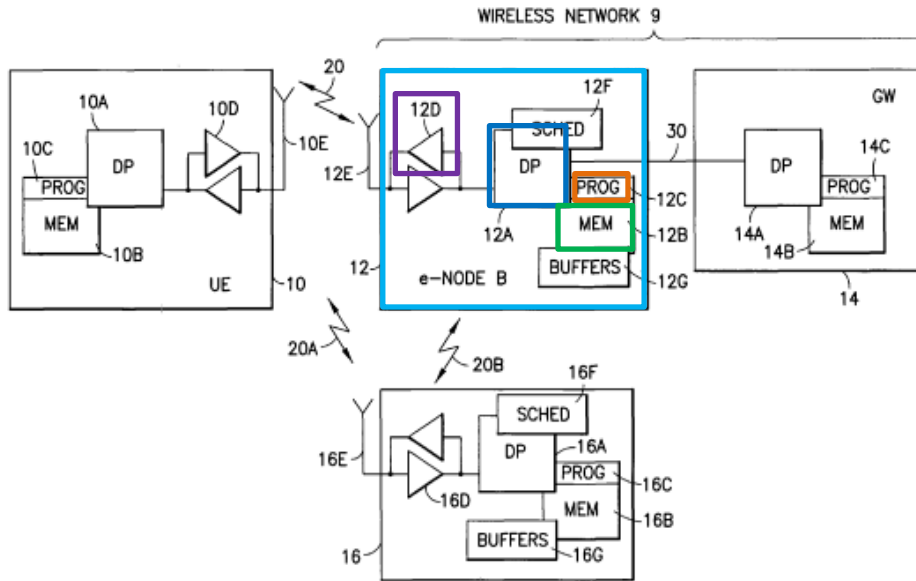


FIG.2

Ex-1007, FIG. 2.

107. In my opinion, a POSA would have been motivated to combine *Kovacs* with *Chun* as discussed above in Section VIII.A.

108. *Chun* discloses the function of [12C] as explained for [7C] (Section VIII.C.4).

5. [12D] “for determining the buffering capabilities of the node for relaying based on the received buffer information report and the indication, and”

109. *Chun* discloses the function of [12D] as explained for [7D] (Section VIII.C.5).

6. [12E] “for controlling communications between the system station and the node for relaying accordingly.”

110. *Chun* discloses the function of [12E] as explained for [7E] (Section VIII.C.6).

H. Claim 13

1. [13p] “An apparatus, comprising:”

111. *Chun* discloses [6P] because *Chun* discloses “a method for data transmission by a relay node (RN) in a wireless communication system.” Ex-1005, [0011].

2. [13A] “at least one processor; and”

112. *Chun* in combination with *Kovacs* renders obvious [13A]. *Kovacs* does not expressly disclose a processor, but *Kovacs* does. *Kovacs* discloses its RN includes a data processor “DP 16A.” Ex-1007, [0080].

113. A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

3. [13B] “at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:”

114. *Chun* in combination with *Kovacs* renders obvious [13B]. *Chun* does not expressly disclose a memory including a computer program causing the processor to perform certain functions, but *Kovacs* does. *Kovacs* discloses,

“computer software executable by a data processor of the RN 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* discloses, “embodiments may be implemented in hardware or special purpose circuits, software (computer readable instructions embodied on a computer readable medium), logic or any combination thereof.” *Id.*, [0081].

115. In my opinion, a POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

4. **[13D] “sending of a buffer information report to a system station from a node for relaying communications between at least one user station and the system station,”**

116. [13D] is substantially similar to claim [1A]. *Chun* discloses this limitation as explained for claim [1A] (Section VII.A.2).

5. **[13E] “the report being generated based on a report format used for uplink reporting by a user station; and”**

117. [13E] is substantially similar to claim [1B]. *Chun renders obvious* this limitation as explained for claim [1B] (Section VII.A.3).

6. **[13F] “sending of an indication to the system station that the node for relaying has different buffering capabilities than the user station.”**

118. [13F] is substantially similar to [1C]. *Chun* discloses or renders obvious this limitation as explained for claim [1C] (Section VII.A.4).

- I. [Claim 14] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

119. *Chun* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VIII.H.2-VIII.H.3. I believe a POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

120. The remainder of claim 14 is substantially similar to claim 2 aside from its dependency from claim 13. *Chun* discloses this limitation as explained for claim 2 (Section VII.B).

Claim 14	Claim 2
process an <u>indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.</u>	A method as claimed in claim 1, wherein the indication comprises an <u>indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.</u>

- J. [Claim 16] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: communicate the indication within the buffer information report.”**

121. *Chun* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VII.H.2-VII.H.3. I believe a POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

122. *Chun* discloses the remainder of claim 16 because *Chun* discloses, “a buffer status reports (BSR) is further transmitted to the network for transmission of the at least one generated parameter.” Ex-1005, [0088].

K. Claim 18

- 1. [18p] “An apparatus, comprising:”**

123. [18P] is identical to [13p]. *Chun* discloses this limitation as explained for claim [13p] (Section VII.H.1).

- 2. [18A] “at least one processor; and”**

124. *Chun* does not disclose a processor, but *Kovacs* does. *Kovacs* discloses, “a data processor of the eNB 12, such as the processor 12A shown.” Ex-1007, [0080].

125. In my opinion, a POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

3. [18B] “at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:”

126. *Chun* does not disclose a memory, a computer program, or a processor, but *Kovacs* does. *Chun* does not disclose the structure of claim [12A], but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the eNBr 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNBr 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” *Id.*, [0046].

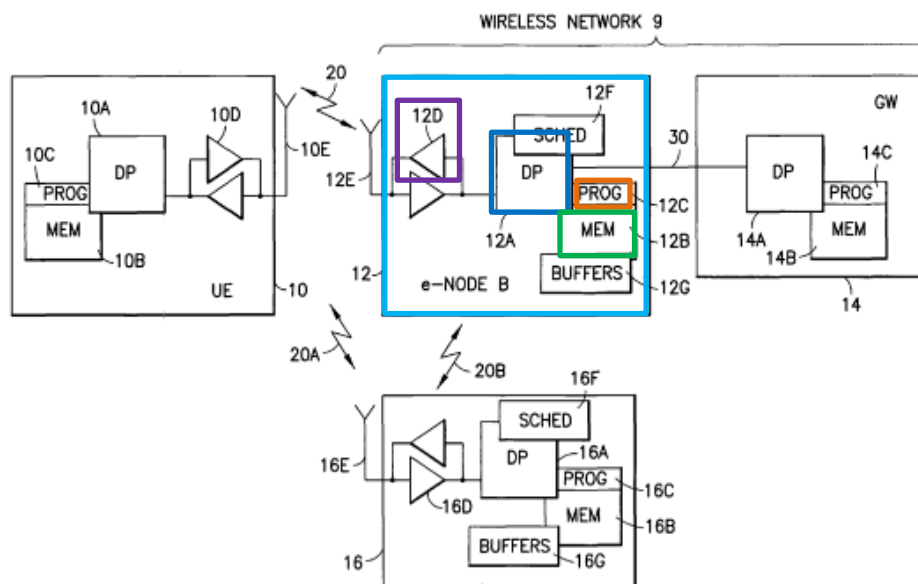


FIG.2

Ex-1007, FIG. 2.

127. A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VIII.A.

4. **[18C] “receiving a buffer information report from a node for relaying communications between at least one user station and a system station, the report being generated based on a report format used for uplink reporting by a user station; and”**

128. [18C] is substantially similar to [12A]-[12B], but without reciting a means. *Chun* discloses this limitation as explained for claim [12A]-[12B] (Sections VIII.G.2-VIII.G.3).

5. **[18D] “control means for processing an indication that the node for relaying has different buffering capabilities than the user station, for determining the buffering capabilities of the node for relaying based on the received buffer information report and the indication, and for controlling communications between the system station and the node for relaying accordingly.”**

129. [18D] is identical to [12C]-[12E]. *Chun* in view of *Kovacs* renders obvious this limitation as explained for claim [12C]-[12E] (Sections VIII.G.4-VIII.G.6).

- L. **[Claim 19] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process an indication that the**

buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

130. *Chun* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VIII.K.2-VIII.K.3.

131. Claim 19 is substantially similar to claim 2 aside from its dependency from claim 18. *Chun* discloses this limitation as explained for claim 2 (Section VIII.C).

M. [Claim 21] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: communicate the indication within the buffer information report.”

132. *Chun* does not disclose memory, code, or a processor but *Kovacs* does as explained in Sections VIII.H.2-VIII.H.3.

133. Claim 21 is identical to claim 16 aside from its dependency from claim 18. *Chun* discloses this limitation as explained for claim 16 (Section VIII.J).

N. [Claim 23] “A computer program product comprising a non-transitory computer-readable storage medium bearing computer program code embodied therein for use with a computer, the computer program code comprising code for performing the method of claim 1.”

134. *Chun* does not teach this limitation, but *Kovacs* does.

135. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or

by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “a **RN 16**, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNBr 12 that is controlling the cell.” *Id.*, [0048].

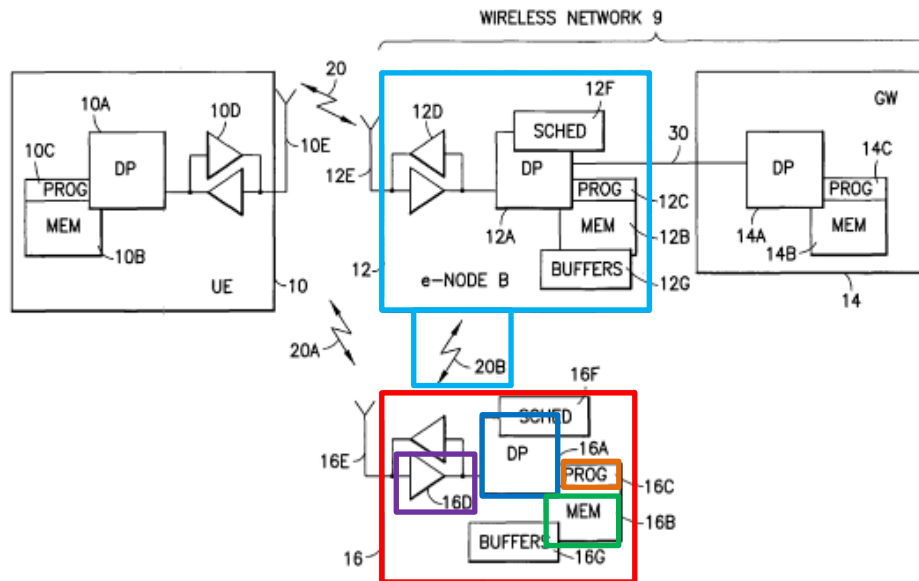


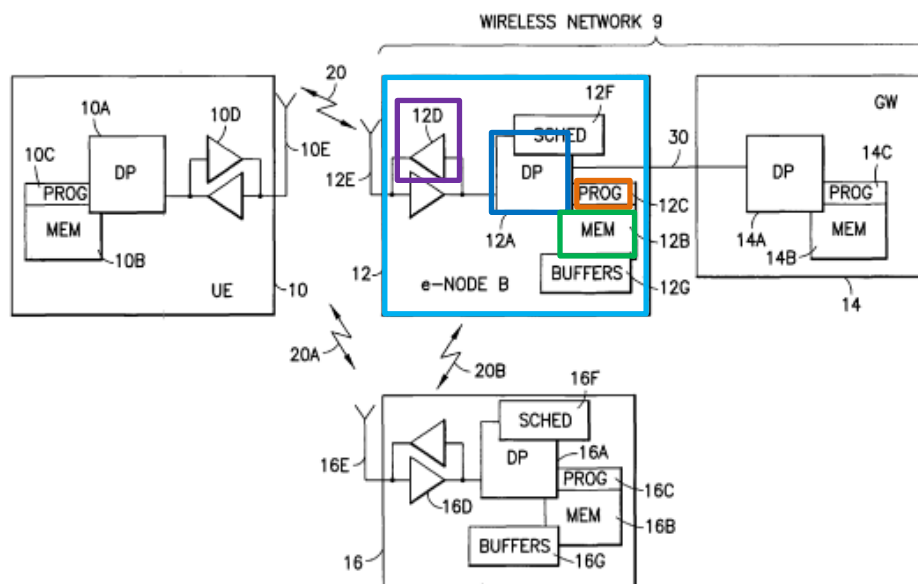
FIG.2

Ex-1007, FIG. 2.

136. As I state above, a POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VIII.A.

- O. [Claim 24] “A computer program product comprising a non-transitory computer-readable storage medium bearing computer program code embodied therein for use with a computer, the computer program code comprising code for performing the method of claim 7.”

137. *Kovacs* discloses, “computer software executable by a data processor of the eNB 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNB 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” *Id.*, [0046].



Ex-1007, FIG. 2 (annotated).

138. In my view, a POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VIII.A.

IX. GROUND 3: CLAIMS 17, 22 ARE UNPATENTABLE OVER *CHUN* IN VIEW OF *KOVACS* AND *SAMMOUR*

A. Motivation to Combine *Sammour* and the *Chun/Kovacs* Combination

139. *Sammour* discloses a Long Term Evolution (LTE) architecture including a wireless transmit receive unit (WTRU) and an evolved Node-B (eNB).” *Id.*, [0003]. *Sammour* discloses an invention to “receive a request to generate a token status report,” “to generate the token status report in response to the request,” and “to transmit a total amount of tokens as part of a buffer status report [BSR].” Ex-1010, [0019]. *Sammour* further discloses, “it would be beneficial to provide a method [or] an apparatus to initialize token buckets, to preserve token buckets upon certain events..., and to communicate the status of token buckets using enhanced BSRs.” *Id.*, [0016]. *Sammour* explains, “[t]he BSR is enhanced to provide token status report information by extending the BSR.” [0060]. In my opinion, a POSA would have been motivated to incorporate *Sammour*’s extended BSR into reporting from the *Chun/Kovacs* node in order to “enhance service continuity and to minimize service interruption.” *Id.*

140. In my experience, a POSA would have been likely to succeed in implement *Sammour*'s extended BSR because *Chun* and *Kovacs* already discloses the use of BSR in its reporting. It is thus my opinion that a POSA would have found it obvious to implement *Sammour*'s extended BSR reporting from a wireless transmit receive unit into *Kovacs*'s RN that includes memory and a processor for performing *Chun*'s methods. Further, a POSA would have found it obvious to implement *Sammour*'s extended BSR for additional rational communication between the RN and eNB.

B. [Claim 17] “An apparatus as claimed in claim 16, wherein the buffer information report comprises a buffer status report and said indication is included into an extension of the buffer status report.”

141. *Chun* in combination with *Sammour* renders obvious claim 17. As explained for claim 1 in Sections VII.A.2, *Chun* discloses a “buffer status report.”

142. *Sammour* discloses the claimed, “indication is included into an extension of the buffer status report” because *Sammour* discloses “[t]he BSR is enhanced to provide token status report information by extending the BSR. For example, the BSR may include an extension flag.” Ex-1010, [0060]. In my opinion, a POSA would have found it obvious that *Chun*'s information that makes up its generated parameter (i.e., indication), which can be in a BSR, could likewise be included “by extending the BSR” and providing the information in the

extension. *Id.* Thus, it is my opinion that a POSA would have understood that including *Chun*'s information into *Sammour*'s BSR extension is a matter of applying known methods of including information sent within the LTE network. The motivation to combine is discussed above (Section IX.A).

C. [Claim 22] “An apparatus as claimed in claim 18, wherein the buffer information report comprises a buffer status report and said indication is included into an extension of the buffer status report.”

143. Claim 22 is substantially similar to claim 17 aside from its dependency from claim 16. *Chun* in view of *Sammour* and *Kovacs* renders obvious this limitation as explained for claim 17 (Section IX.B). The motivation to combine is discussed above (Section IX.A).

X. GROUND 4: CLAIMS 3, 9 ARE UNPATENTABLE OVER *CHUN* IN VIEW OF *YANG*

A. [Claim 3]

1. [3A] “A method as claimed claim 1, wherein the buffer information report indicates the buffer size of a user equipment and the indication provides a buffer extension factor,”

144. The '614 patent provides examples of extension factors including, “a value that is indicative of how much the buffer size of the relay node shall be extended,” “based on the relay node buffer capability,” Ex-1001, 7:63-8:1, or “an integer number ... indicat[ing] how much to extend the buffer size,” *id.*, 8:8-10.

145. As explained for claim 2 in Section VII.B, *Chun* discloses its RN (i.e., relay node) sends a BSR, where “the BSR may include information related to an amount of data that should be transmitted to the DeNB.” Ex-1005, [0084].

146. To the extent it is argued that *Chun* does not disclose this element, *Yang* does.

147. *Yang* teaches “the buffer information report indicates the buffer size of a user equipment and the indication provides a buffer extension factor” because its RN “may provide an amount of data contained in a buffer along with a fill rate or a consumption rate.” Ex-1008, [0038]. *Yang*’s fill rate or consumption rate corresponds to the claimed “buffer extension factor” because, like the ‘614 patent, *Yang*’s fill or consumption rate is “based on the relay node buffer capability.” Ex-1001, 7:63-8:1. In my opinion, a POSA would have understood that *Yang*’s fill or consumption rate “may be based on the throughput on a data throughput for RN 300,” and could be an integer like “multiple bits of information” that indicate an empty/full state. Ex-1008, ¶¶[0035], [0055]. *Yang* thus discloses an “amount of data contained in a buffer” of a UE (i.e., buffer size of a user equipment) and “a fill rate or a consumption rate (i.e., the indication provides a buffer extension factor), corresponds to the claim limitation.

148. In my experience, a POSA would have been motivated to implement *Yang*'s buffer status information and fill or consumption rate as a multiple-bit integer to indicate the status of the RN buffer with *Chun* because *Yang* discloses that its multiple bit buffer status is superior to binary operation and "convey[s] additional information to the donor eNB," for example for better allocation of resources. Ex-1008, [0055]. *Yang* further discloses that including information of fill rates for a UE, explicitly or implicitly, "may be to enable the donor eNB to regulate the rate of data flow over the [relay link (RL)] to better match the potentially achievable rate of data flow over the access link for the UE." *Id.*, [0060]. In my opinion, a POSA would thus have incorporated *Yang*'s amount of data into *Chun*'s Buffer Status Report, and *Yang*'s multiple-bit fill/consumption rate reporting into *Chun*'s indication to better regulate the rate of data flow over the RL.

149. It is my experience that a POSA would have had a reasonable expectation of success combining *Chun* and *Yang* because each disclosure concerns a Relay Node (RN) in an "LTE" system, and each disclosure uses Buffer Status Reports from the RN to the Donor eNB. Ex-1005, [0035], [0084]; Ex-1008, [0003], [0081].

2. [3B] “the method comprising defining the buffer capabilities of the node for relaying as a function of the buffer size and buffer extension factor.”

150. *Chun* in view of *Yang* renders obvious this element because *Chun* discloses its RN can report buffering capabilities because it reports, “a number of memory that can be used to store the data in RN,” Ex-1005, [0082], as discussed above in Section VII.B, and *Yang* discloses bits of information reflecting buffer state, as discussed above in Section X.A.1. The RN defines these buffering capabilities because *Chun*’s RN forms the information before sending it to the receiving DeNB. Ex-1005, [0082]. In my opinion, a POSA would have found it obvious to define *Chun*’s RN buffering capabilities, like how full or empty the RN is, based on the RN’s “amount of data” and *Yang*’s “multiple bits to indicate a status of the buffer” like an empty/nearly-empty/full state or time to buffer starvation. Ex-1005, [0055]-[0056]. *Yang* discloses, “[t]he expected time to buffer starvation may be a function of the amount of data stored in the buffer and an expected consumption rate.” *Id.*, [0056]. Further, it is my opinion that a POSA would have understood the RN collects and forms the amount of data reported in the buffer status report and the fill/consumption rate “multiple bits of information,” which together provides RN buffer size and an empty/nearly-empty/full state of the

RN buffer respectively, to the recipient. It is my opinion that this corresponds to the claim limitation.

- B. [Claim 9] “A method as claimed in claim 7, wherein the buffer information report indicates the buffer size of a user equipment and the indication provides a buffer extension factor, the method comprising defining the buffer capabilities of the node for relaying as a function of the buffer size and buffer extension factor.”**

151. Claim 9 is substantially similar to claim 3 aside from its dependency from claim 7. *Yang* discloses this limitation as explained for claim 3 (Section X.A). *Chun*’s discloses its DeNB receives the parameter. Ex-1005, [0088].

XI. GROUND 5: CLAIMS 15, 20 ARE UNPATENTABLE OVER *CHUN* IN VIEW OF *KOVACS* & *YANG*

- A. [Claim 15] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process a buffer information report that indicates the buffer size of a user equipment, and wherein the indication provides a buffer extension factor and the buffer capabilities of the node for relaying are defined as a function of the buffer size and buffer extension factor.”**

152. *Chun* in view of *Kovacs* renders obvious the claimed “at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following,” as explained for claim [13A]-[13B] in Sections VIII.H.2-VIII.H.3. *Chun* in view of *Yang* renders obvious the remainder of this claim as explained for claim 3 in Section

X.A. In my view, it would have been obvious to a POSA to incorporate the *Chun/Kovacs* combination with *Yang* because *Kovacs*' RN including processors, memory, and interface, would be used to conduct efficient scheduling of radio resources, which is the goal of all three references.

B. [Claim 20] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: determine the buffer size of the node for relaying based on an extension factor that has been received earlier or based on a default extension factor.”

153. *Chun* in view of *Kovacs* renders obvious the claimed “at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following” as explained for claim [13A]-[13B] in Sections VIII.H.2-VIII.H.3

154. The '614 patent describes, “[t]he extension factor can be a value that is indicative of how much the buffer size of the relay node shall be extended.” Ex-1001, 7:63-64.

155. *Yang* discloses the remainder of claim 20 because *Yang* states its RN “may provide an amount of data contained in a buffer along with a fill rate or a consumption rate and allow a recipient of the buffer status information to infer a current status of the buffer and/or to project a status of the buffer at a future time.” Ex-1008, [0038].

156. In my view, a POSA would have understood that the “amount of data stored in the buffer” at the RN would be determined for a specific time based on the consumption rate (an extension factor) that reflects how much of the buffer size will be available at the RN at a given time.

157. The consumption rate “may be obtained from recent data throughput history,” Ex-1008, [0057], corresponding to the claimed, “an extension factor that has been received earlier.”

XII. GROUND 6: CLAIMS 1-4, 7-10 ARE UNPATENTABLE OVER YANG

A. Claim 1

158. It is my opinion that *Yang* renders obvious claim 1.

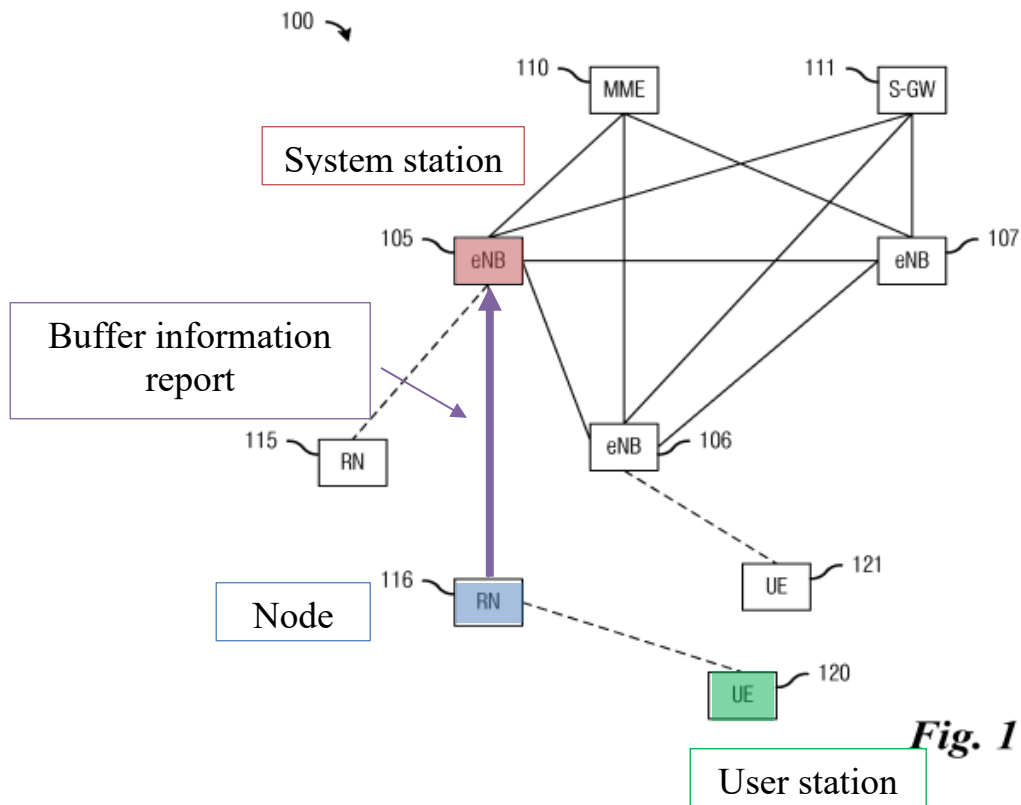
1. [1p] “A method comprising:”

159. *Yang* discloses [1p] because *Yang* discloses “a system and **method** for relay node flow control and/or congestion control in a wireless communications system.” Ex-1008, [0002].

2. [1A] “sending a buffer information report to a system station from a node for relaying communications between at least one user station and the system station,”

160. *Yang* discloses [1A] because *Yang* discloses a serving base station, a Donor eNB (system station), that receives buffer status information from a Relay Node. As the ’614 patent explains, a system station can be “a donor eNB (DeNB).” Ex-1001, 10:34-37. *Yang*’s FIGs. 1 and 4 shows the relationship between *Yang*’s

user equipment (UE) (user station), a Relay Node (RN), and a donor eNB (system station):



Ex-1008, FIG. 1 (annotated).

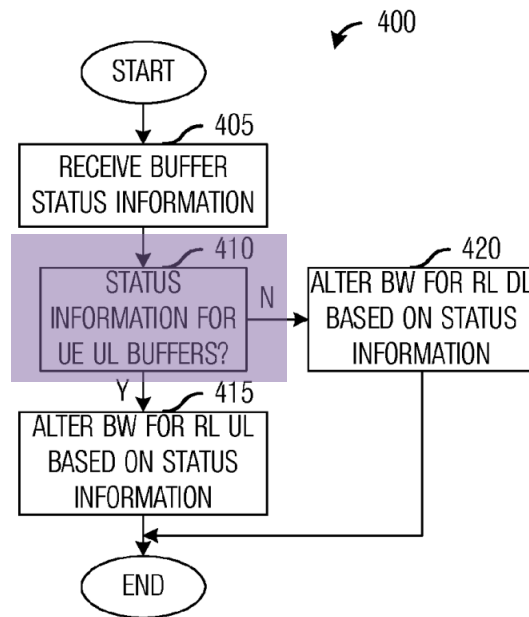


Fig. 4

Ex-1008, FIG. 4 (annotated).

161. As FIGs. 1 and 4 show, and *Yang* explains, “Donor eNB [(system station)] operations 400 may begin with the donor eNB/base station receiving buffer status information from the [relay node] (block 405). The buffer status information from the [relay node] may include [downlink] buffer status information, [uplink] buffer status information, or both [downlink] and [uplink] buffer status information. The buffer status information may provide information about the status of each buffer at the [relay node].” Ex-1008, [0052].

162. The ’614 patent explains entities “relaying between stations,” can be “relay nodes (RNs).” *Id.*, 2:12-13. Therefore, *Yang*’s “Relay Node (RN)” is “a

node for relaying communications between at least one user station and the system station” because, (1) “[o]n the [downlink], the [relay node] receives and buffers [downlink] data intended for [user equipments] being served by the [relay node] from the donor eNB over the [relay link],” Ex-1008, [0005], and, (2) “[o]n the [uplink], the [relay node] receives and buffers [uplink] data from [user equipments] that it is serving and then forwards the [uplink] data to the donor eNB over the [relay link].” *Id.*, [0006].

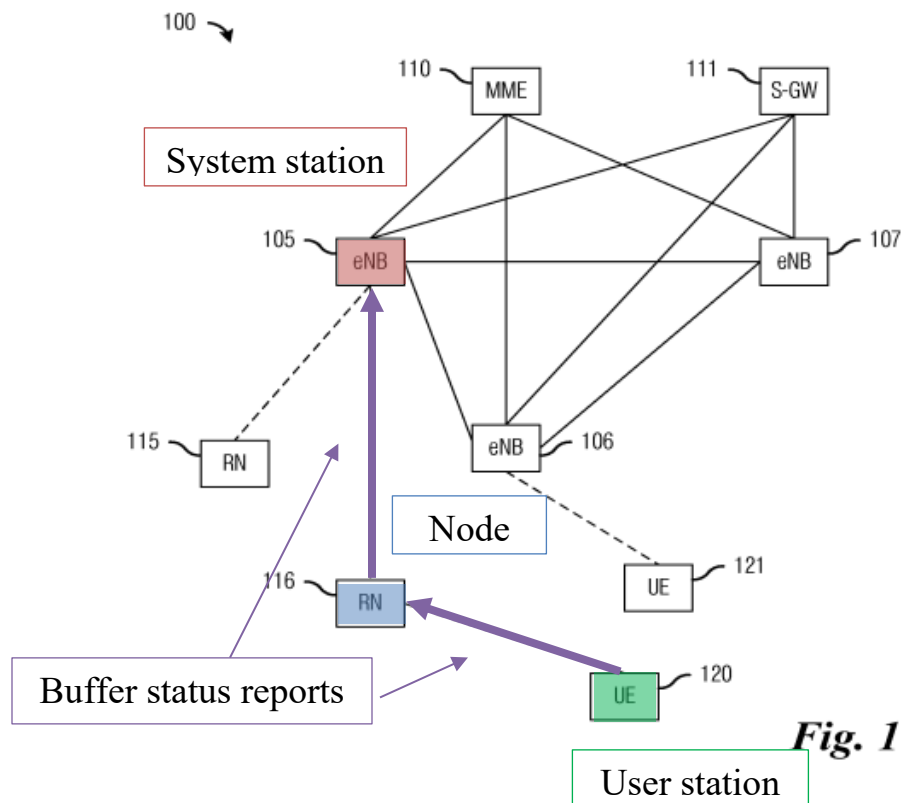
3. [1B] “the report being generated based on a report format used for uplink reporting by a user station; and”

163. *Yang* renders obvious claim [1B].

164. As discussed above in Section VII.A.3, the ’614 patent discloses that the “reports” from the relay node are “buffer status reports (BSR).” *Id.*, 2:30-32; 2:53-57. The ’614 patent explains these features in the context of then-existing 3GPP LTE specifications, and thus admits the “report format” was known in the art and not novel.

165. *Yang* discloses several ways to report buffer status information to the donor eNB (system station), including a “Buffer Status Report (BSR) message” that “may be used to convey buffer status information for [uplink], or [downlink], or both [uplink] and [downlink].” Ex-1008, [0081]. *Yang* discloses BSRs were “LTE Release 8 Buffer Status Report,” indicating they were known and used in

known LTE systems. Ex-1008, [0081]. As FIG. 1 shows, BSRs come from both a user equipment (user station) and a Relay Node. *Id.*, FIG. 1., [0081]. It is my opinion that a POSA would have understood that the BSRs are used by user equipment to report on the uplink, including for buffer status information. In my opinion, a POSA would have found it obvious, in view of *Yang*, that the BSR used by the RN is in the same type and format of message, having the same name and being referred to in the same way and also known in the art at the time, as that used by the UE.



Ex-1008, FIG. 1 (annotated).

4. [1C] “sending an indication to the system station that the node for relaying has different buffering capabilities than the user station.”

166. *Yang* discloses [1C] because *Yang* discloses information from a Relay Node to a donor eNB (system station) that indicate the Relay Node has different buffering capabilities than the user station. *See* Ex-1008, [0056]-[0059].

167. The ‘614 patent describes, “the indication can be based on the number of user stations served by the node for relaying,” and “[t]he indication may comprise an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension,” Ex-1001, 4:3-9, or “an indication of the size of the buffer of the relay node.” *Id.*, 7:36-37.

168. *Yang* discloses the claimed “indication ... that the node for relaying has different buffering capabilities than the user station” because *Yang*’s Relay Node “may transmit an amount of data stored in a buffer (or an amount of unoccupied portion in a buffer) **and** an expected consumption rate or fill rate.” Ex-1008, [0059] (emphasis added). The fill/consumption rate refers to claimed “different buffering capabilities” because *Yang* discloses its fill/consumption rate, like the indication the ‘614 patent describes, is “based on... number of communications devices present in the communications system,” *id.*, [0041], and

can reflect “an expected consumption rate or fill rate for a UE over the access link,” *id.*, [0060], or “a data throughput for a UE associated with the buffer” or “data throughput for RN 300.” *Id.*, [0035]. Further, *Yang* discloses its fill/consumption rate can be reported as empty, full, or anywhere in between, *id.*, [0035], [0077], which corresponds to the ‘614 patent’s example of “an indication of the size of the buffer of the Relay Node.” Because each Relay Node reports a fill/consumption rate, the Relay Node is providing an indication of different capabilities that the donor eNB then uses to compute the expected time to buffer starvation. *Id.*, [0059].

169. *Yang* further discloses “the donor eNB receiving buffer status information from the [relay node] (block 405). The buffer status information from the [relay node] may include ... both [downlink] and [uplink] buffer status information.” Ex-1008, [0052]. In my opinion, a POSA would have understood the information for the uplink and the downlink buffers would indicate the claimed, “different buffering capabilities,” because the report will carry different buffer information regarding user equipment buffers and relay node buffers.

170. *Yang* further discloses “the **RN may also further indicate the UL buffer status reported from each UE (in addition to its own UL buffers for each of the UEs)** as well as potential UL throughput that may be achievable over

the UL access links between the RN and the UEs.” Ex-1008, [0067] (emphasis added). This is an indication from *Yang*’s relay node reflecting differences from the user equipment uplink buffers and the relay node uplink buffers, corresponding to the claim. *Yang* further discloses indications that are transmitted in addition to buffer status information like the “fill rate or consumption rate,” and to transmit buffer status information as part of one transmission as part of a BSR or separate transmissions. Ex-1008, [0040], [0079], [0081].

B. [Claim 2] “A method as claimed in claim 1, wherein the indication comprises an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

171. *Yang* discloses claim 2.

172. *Yang*’s Relay Node “may aggregate the buffer status information for each UE that it is servicing (independent of traffic class) and provide the aggregated status information per UE to the donor eNB ... Alternatively, the RN may aggregate the buffer status information for all of the UEs that it is servicing based on UL/DL and provide the aggregated status information per link direction to the donor eNB.” Ex-1008, [0053]. The aggregate buffer status information including the “amount of data stored in a buffer,” *id.*, [0077], that further indicates the RN is servicing UEs corresponds to the claim. Further, *Yang* discloses, “[t]he

expected time to buffer starvation may be a function of the amount of data stored in the buffer and an expected consumption rate," *id.*, [0056], because the expected time (i.e., indication) includes information on the consumption rate (i.e., indication that the buffer size of the node for relaying is extended) and the amount of data in the buffer (i.e., size of the extension).

C. Claim 3

1. **“A method as claimed claim 1, wherein the buffer information report indicates the buffer size of a user equipment and the indication provides a buffer extension factor,”**

173. The '614 patent provides examples of extension factors including, “a value that is indicative of how much the buffer size of the relay node shall be extended,” “an integer representing the number of user equipments that are currently connected to the relay node,” “based on the relay node buffer capability,” or “an integer number ... indicat[ing] how much to extend the buffer size.” Ex-1001, 7:63-8:1, 8:8-10.

174. *Yang* discloses claim 3 because *Yang* discloses that a “buffer status report (BSR)” “may be used to transmit the concatenated buffer status information... for [uplink], or [downlink], or both [uplink] and [downlink].” Ex-1008, [0081]. *Yang* discloses examples of messages including an “implicit indication of normal buffer level, where N is the number of [user equipments],” an

“implicit indication of normal expected times, where N is the number of [user equipments],” and a “N [] number of [user equipments], data in buffer is the amount of data in the buffer for the [user equipment], and consumption rate is the [user equipment’s] consumption rate.” *Id.*, [0084]-[0086].

2. “the method comprising defining the buffer capabilities of the node for relaying as a function of the buffer size and buffer extension factor.”

175. *Yang* discloses this limitation because *Yang* discloses that its RN “may provide an amount of data contained in a buffer along with a fill rate or a consumption rate and allow a recipient of the buffer status information to infer a current status of the buffer and/or to project a status of the buffer at a future time.” Ex-1008, [0038].

D. [Claim 4] “A method as claimed in claim 1, wherein the buffer information report comprises a medium access control control element.”

176. *Yang* discloses claim 4 because *Yang*’s “RN may directly transmit the buffer status information to the donor eNB using a Media Access Control (MAC) control Protocol Data Unit (PDU).” Ex-1008, [0078]. In my view, a POSA would have understood the Protocol Data Unit is an element because it is part of the larger communication, disclosed by *Yang* as being used for control. As confirmed

by U.S. Patent No. 8,391,311 to Sung et al., “[t]he MAC control PDU may be referred to as a MAC control element.” Ex-1011, [127].

E. Claim 7

1. [7p] “A method comprising:”

177. *Yang* teaches this claim limitation because *Yang* discloses “a system and **method** for relay node flow control and/or congestion control in a wireless communications system.” Ex-1008, [0002].

2. [7A] “receiving a buffer information report from a node for relaying communications between at least one user station and a system station,”

178. *Yang* teaches a serving base station, a Donor eNB, that receives buffer status information from a Relay Node. As the ’614 patent recognizes, and as a POSA would understand, a base station can be “a donor eNB (DeNB).” Ex-1001, 10:34-37. Further, “a node for relaying communication between at least one user station and the system station,” can be a “relay node (RN).” *Id.*, 10:24-26. *Yang* discloses the relationship between user equipment (UE), a relay node (RN), and a base station (i.e., donor eNB) as seen in FIG. 1:

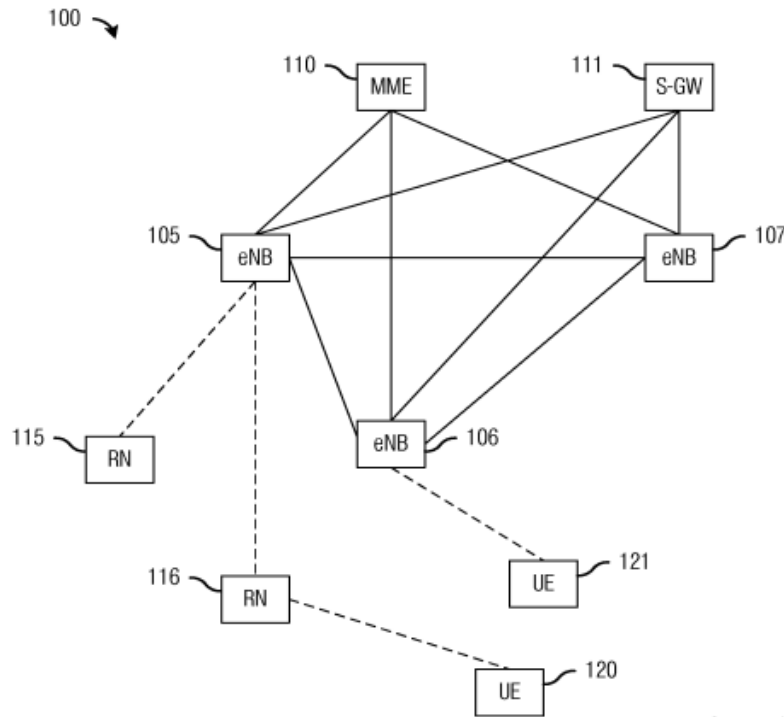


Fig. 1

Ex-1008, FIG. 1

179. *Yang* discloses, “Donor eNB (i.e., system station) operations 400 may begin with the donor eNB receiving buffer status information from the [relay node] (block 405). The buffer status information from the [relay node] may include [downlink] buffer status information, [uplink] buffer status information, or both [downlink] and [uplink] buffer status information ... at the [relay node].” Ex-1008, [0052].

180. *Yang* discloses a “Relay Node (RN)” is “a node for relaying communications between at least one user station and the system station” because, “[o]n the [downlink], the [relay node] receives and buffers [downlink] data

intended for [user equipments] being served by the [relay node] from the donor eNB over the [relay link].” Ex-1008, ¶[0005]. Further, “[o]n the [uplink], the [relay node] receives and buffers [uplink] data from [user equipments] that it is serving and then forwards the [uplink] data to the donor eNB over the [relay link].” *Id.*, [0006]. *Yang* discloses the information can be received as a buffer status report. *Id.*, [0081].

3. [7B] “the report being generated based on a report format used for uplink reporting by a user station;”

181. *Yang* renders obvious this limitation as discussed above for [1B] in Section XII.A.3.

4. [7C] “receiving an indication that the node for relaying has different buffering capabilities than the user station;”

182. *Yang* teaches this claim limitation because *Yang* discloses a number of types of indications from a Relay Node to a donor eNB that indicate “to the system station that the node for relaying has different buffering capabilities than the user station.” *See* Ex-1008, [0056]-[0059]; Section XII.A.4 (e.g., *Yang* discloses sending information “based on... number of communications devices present in the communications system,” *id.*, [0041], and that can reflect “an expected consumption rate or fill rate for a UE over the access link,” *id.*, [0060], or “a data

throughput for a UE associated with the buffer” or “data throughput for RN 300.” *Id.*, [0035].”).

183. *Yang* discloses this information (i.e., the claimed, “indication”) like the “fill rate or consumption rate,” are transmitted in addition to or as a part of buffer status reports. Ex-1008, [0040], [0079], [0081]. Thus, *Yang*’s donor eNB receives this information and the buffer status reports together or separately. *Id.*

5. [7C] “determining the buffering capabilities of the node for relaying based on the buffer information report and the indication; and”

184. *Yang* discloses [7C] because *Yang* discloses “the donor eNB compute[s] the expected time to buffer starvation (or the expected time to buffer congestion) itself,” based on the RN transmitted “an amount of data stored in a buffer (or an amount of unoccupied portion in a buffer) and an expected consumption rate or fill rate.” Ex-1008, [0059]. *Yang* also discloses that “the donor eNB may map the buffer status information into a probability value for a certain reaction. Then the donor eNB generates a random value between 0 and 1, compare it with the probability value, and react accordingly. For example, if the buffer status information reports multiple bits of buffer status information per buffer, then the donor eNB may be able to generate a probability value using the multiple bits of buffer status information.” *Id.*, [0072].

6. [7D] “controlling communications between the system station and the node for relaying accordingly.”

185. *Yang* discloses [7D] because *Yang* discloses “[t]he wireless resource of the [relay link] may be controlled by eNB 105.” Ex-1008, [0028].

F. [Claim 8] “A method as claimed in claim 7, wherein the indication comprises an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

186. Claim 8 is substantially similar to claim 2 aside from its dependency from claim 7. *Yang* discloses this limitation as explained for claim 2 (Section XII.B).

G. [Claim 9] “A method as claimed in claim 7, wherein the buffer information report indicates the buffer size of a user equipment and the indication provides a buffer extension factor, the method comprising defining the buffer capabilities of the node for relaying as a function of the buffer size and buffer extension factor.”

187. Claim 9 is substantially similar to claim 3 aside from its dependency from claim 7. *Yang* discloses this limitation as explained for claim 3 (Section XII.C).

H. [Claim 10] “A method as claimed in claim 7, wherein the buffer information report comprises a medium access control element.”

188. Claim 10 is substantially similar to claim 4 aside from its dependency from claim 7. *Yang* discloses this limitation as explained for claim 4 (Section XII.D).

XIII. GROUND 7: CLAIMS 6, 12-16, 18-21, 23, 24 ARE UNPATENTABLE OVER YANG IN COMBINATION WITH KOVACS

A. Motivation to Combine *Yang* and *Kovacs*

189. In my view, a POSA would have been motivated to implement *Kovacs*'s relay node and base station to process and implement *Yang*'s methods because *Kovacs* discloses, "introducing relay concepts in LTE can also be used to aid in the provisioning of high-bit-rate coverage in high shadowing environment, to reduce the average radio-transmission power at the UE which extends the UE's battery life, to enhance cell capacity and effective throughput (e.g., by increasing cell edge capacity and balancing cell load), and to enhance overall performance and deployment cost of the radio access network RAN." Ex-1007, [0021]. It is thus my opinion that a POSA would have incorporated *Kovacs*'s relay concepts involving relay nodes and base station configurations into *Yang*'s method to achieve high-bit-rate coverage, reduce the average radio-transmission power, enhance cell capacity and throughput, and enhance overall performance.

190. It is my experience that a POSA would have had a reasonable expectation of success combining *Yang* and *Kovacs* because each disclosure concerns a Relay Node (RN) in an "LTE" system, and each disclosure uses buffer status reporting from the RN to the Donor eNB. Ex-1007, [0041], [0064]; Ex-1008, [0003], [0081].

B. Claim 6

1. [6P] “An apparatus comprising:”

191. *Yang* discloses [6P] because *Yang* discloses “a **system** and method for relay node flow control and/or congestion control in a wireless communications system.” Ex-1008, [0002].

2. [6A] “means for causing sending of a buffer information report to a system station from a node for relaying communications between at least one user station and the system station, the report being generated based on a report format used for uplink reporting by a user station; and”

192. *Yang* does not disclose the structure of [6A], but *Kovacs* does.

193. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “a **RN 16**, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNB 12 that is controlling the cell.” *Id.*, [0048].

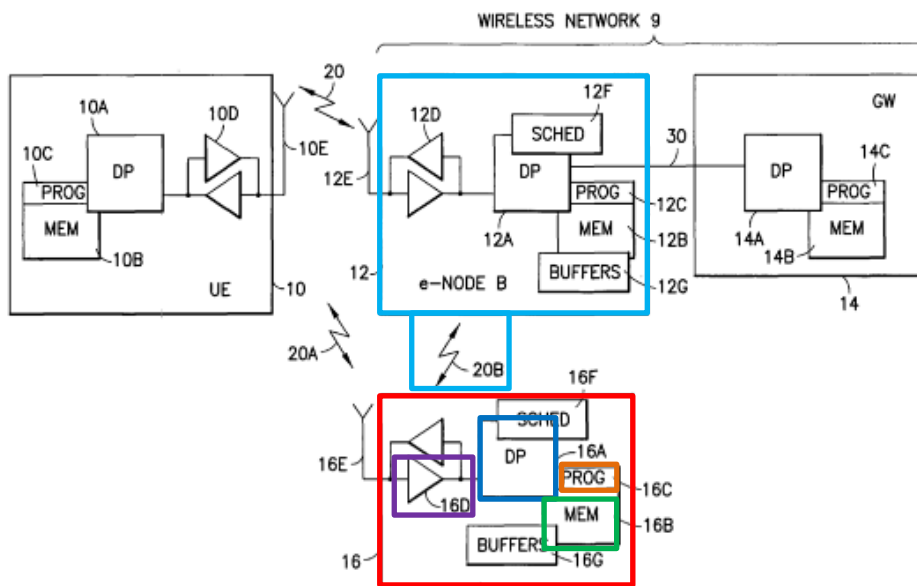


FIG. 2

Ex-1007, FIG. 2.

194. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

195. *Yang* discloses the function of [6A] as explained for [1A] and [1B] (Sections XII.A.2-XII.A.3).

3. [6B] “means for causing sending of an indication to the system station that the node for relaying has different buffering capabilities than the user station.”

196. *Yang* does not disclose the structure of [6B], but *Kovacs* does.

197. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further

discloses, “a **RN 16**, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNBr 12 that is controlling the cell.” *Id.*, [0048].

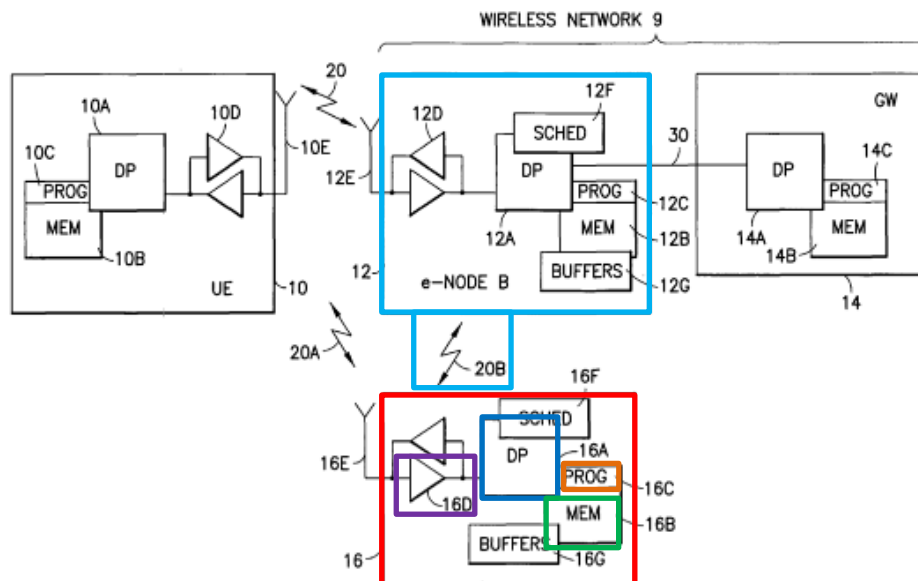


FIG.2

Ex-1007, FIG. 2.

198. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

199. *Yang* discloses the function of [6C] as explained for [1C] (Section XII.A.4).

C. Claim 12

1. [12p] “An apparatus comprising:”

200. *Yang* discloses [12p] because *Yang* discloses “a **system** and method for relay node flow control and/or congestion control in a wireless communications system.” Ex-1008, [0002].

2. [12A] “means for receiving a buffer information report from a node for relaying communications between at least one user station and a system station,”

201. *Yang* teaches a serving base station, a Donor eNB, that receives buffer status information from a Relay Node. As the ’614 patent recognizes, and as a POSA would understand, a base station can be “a donor eNB (DeNB).” Ex-1001, 10:34-37. Further, the entities “relaying between stations,” can be “relay nodes (RNs).” *Id.*, 2:12-13. *Yang* discloses the relationship between user equipment (UE), a relay node (RN), and a base station (i.e., donor eNB) in FIG. 1:

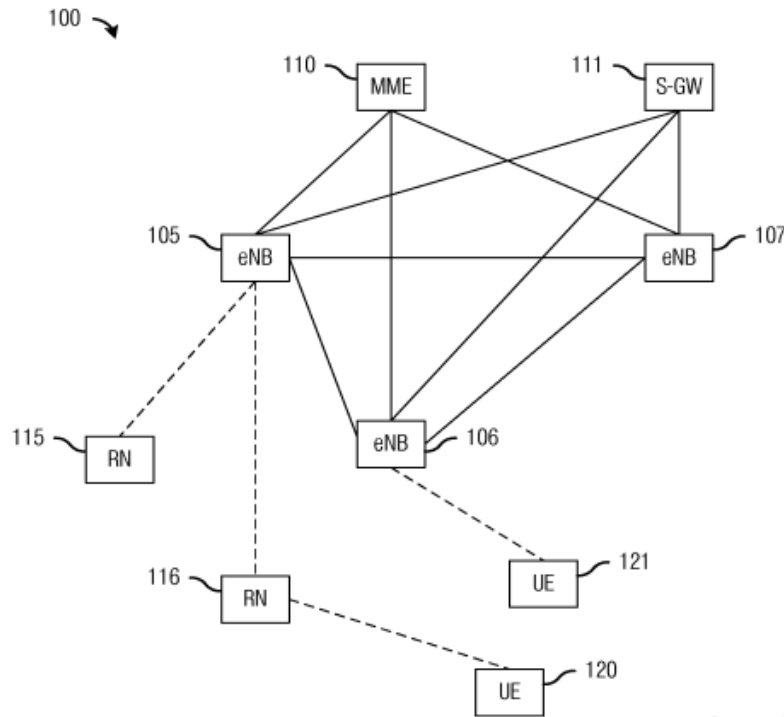


Fig. 1

Ex-1008, FIG. 1

202. *Yang* discloses, “Donor eNB (i.e., system station) operations 400 may begin with the donor eNB receiving buffer status information from the [relay node] (block 405). The buffer status information from the [relay node] may include [downlink] buffer status information, [uplink] buffer status information, or both [downlink] and [uplink] buffer status information ... at the [relay node].” Ex-1008, [0052].

203. *Yang* discloses a “Relay Node (RN)” is “a node that relays communications between at least one user station and the system station” because, “[o]n the [downlink], the [relay node] receives and buffers [downlink] data

intended for [user equipments] being served by the [relay node] from the donor eNB over the [relay link].” Ex-1008, [0005]. Further, “[o]n the [uplink], the [relay node] receives and buffers [uplink] data from [user equipments] that it is serving and then forwards the [uplink] data to the donor eNB over the [relay link].” *Id.*, [0006]. *Yang* discloses the information can be received as a buffer status report. *Id.*, [0081].

204. *Yang* does not disclose the structure of claim [12A], but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the eNB 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNB 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” *Id.*, [0046].

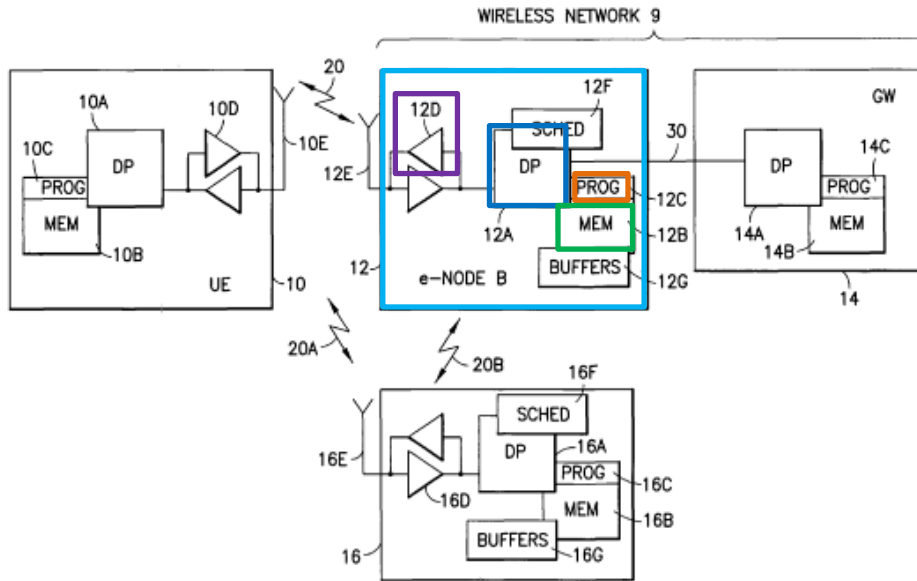


FIG. 2

Ex-1007, FIG. 2.

205. In my view, a POSA would have been motivated to combine Kovacs with Yang as discussed above in Section XIII.A.

3. [12B] “the report being generated based on a report format used for uplink reporting by a user station; and”

206. *Yang* renders obvious this limitation as discussed above for claim [1B] (Section XII.A.3).

4. [12C] “control means for processing an indication that the node for relaying has different buffering capabilities than the user station,”

207. *Yang* teaches this claim limitation because *Yang* discloses a number of buffer status information reports from a Relay Node to a donor eNB that indicate

“to the system station that the node for relaying has different buffering capabilities than the user station.” *See* Ex-1008, [0056]-[0059].

208. *Yang* teaches this claim limitation because *Yang* discloses its Relay Node, “may transmit an amount of data stored in a buffer (or an amount of unoccupied portion in a buffer) **and** an expected consumption rate or fill rate to the donor eNB and let the donor eNB compute the expected time to buffer starvation (or the expected time to buffer congestion) itself.” Ex-1008, [0059] (emphasis added). In my opinion, a POSA would have understood the amount of data stored in the buffer refers to the Relay Node because *Yang* discloses a “buffer at the RN,” *id.*, [0052], and the consumption rate refers to the User Equipment because *Yang* discloses, “a [User Equipment] has an expected consumption rate,” *id.*, [0056]. Because each Relay Node reports an amount of data stored in a buffer of a Relay Node and a consumption rate of a user equipment, it is my opinion as a POSA that the Relay Node is providing an indication of different capabilities when it provides an amount of time to donor eNB. *Id.*

209. *Yang* does not disclose the structure of claim [12C], but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the eNB 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNB

12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” *Id.*, [0046].

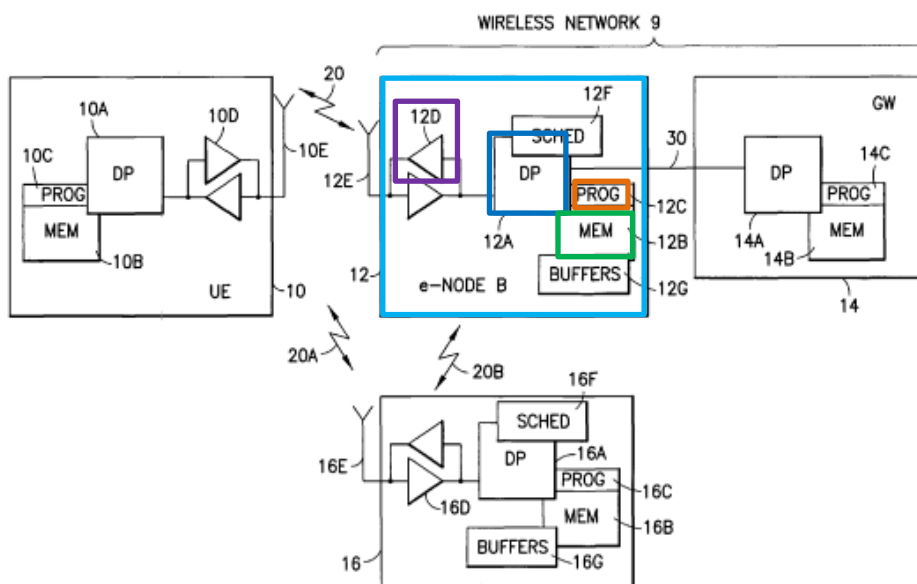


FIG.2

Ex-1007, FIG. 2.

210. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

5. [12D] “for determining the buffering capabilities of the node for relaying based on the received buffer information report and the indication, and”

211. *Yang* teaches this claim limitation because *Yang* discloses, “the donor eNB compute[s] the expected time to buffer starvation (or the expected time to buffer congestion) itself.” Ex-1008, [0059].

6. [12E] “for controlling communications between the system station and the node for relaying accordingly.”

212. *Yang* teaches this limitation because *Yang* discloses, “[t]he wireless resource of the RL may be controlled by eNB 105.” Ex-1008, [0028].

D. Claim 13

1. [13p] “An apparatus, comprising:”

213. *Yang* discloses [13p] because *Yang* discloses “a **system** and method for relay node flow control and/or congestion control in a wireless communications system.” Ex-1008, [0002].

2. [13A] “at least one processor; and”

214. *Yang* in combination with *Kovacs* renders obvious [13A]. *Yang* does not expressly disclose a processor, but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “a **RN 16**, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNB 12 that is controlling the cell.” *Id.*, [0048].

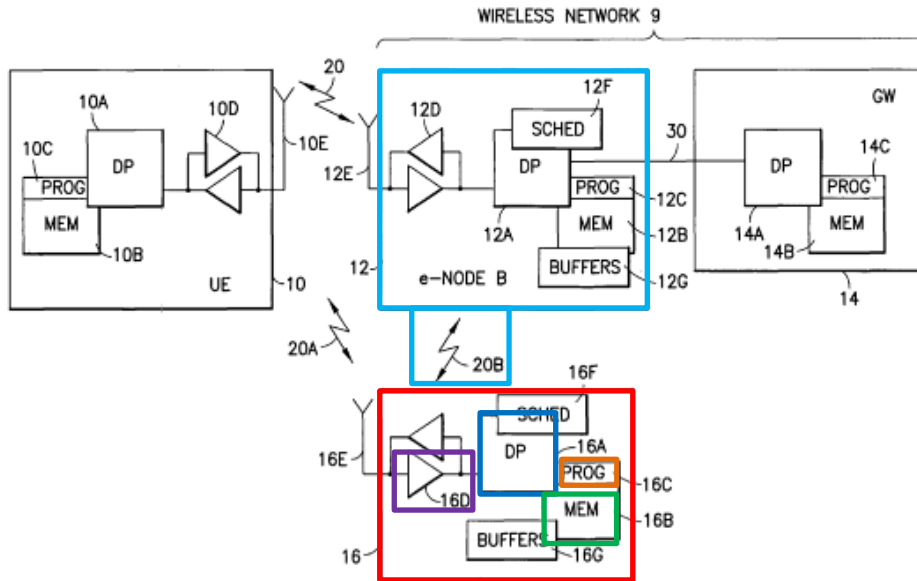


FIG.2

Ex-1007, FIG. 2.

215. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

3. [13B] “at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:”

216. *Yang* in combination with *Kovacs* renders obvious [13B]. *Yang* does not expressly disclose the structure of [13B], but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the RN [(relay node)] 16, such as the processor 16A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “a **RN 16**, shown also

as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNBr 12 that is controlling the cell.” *Id.*, [0048].

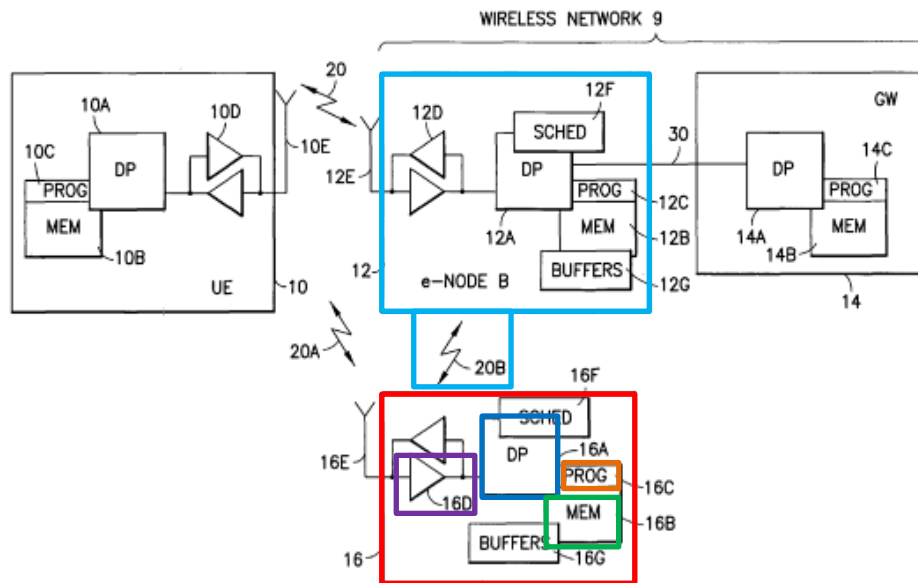


FIG.2

Ex-1007, FIG. 2.

217. In my opinion, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

4. **[13C] “sending of a buffer information report to a system station from a node for relaying communications between at least one user station and the system station, the report being generated based on a report format used for uplink reporting by a user station; and”**

218. [13D] is substantially similar to [6A] but without reciting a means.

Yang discloses this limitation as explained for claim [6A] (Section XIII.B.2).

5. **[13D] “sending of an indication to the system station that the node for relaying has different buffering capabilities than the user station.”**

219. [13E] is substantially similar to [6B] but without reciting a means.

Yang discloses this limitation as explained for claim [6B] (Section XIII.B.3).

- E. **[Claim 14] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process an indication that the buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.**

220. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.B.2-XIII.B.3.

221. Claim 14 is substantially similar to claim 2 aside from its dependency from claim 13. *Yang* discloses this limitation as explained for claim 2 (Section XII.B).

- F. **[Claim 15] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process a buffer information**

report that indicates the buffer size of a user equipment, and wherein the indication provides a buffer extension factor and the buffer capabilities of the node for relaying are defined as a function of the buffer size and buffer extension factor.”

222. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.B.2-XIII.B.3.

223. Claim 15 is substantially similar to claim 3 aside from its dependency from claim 13. *Yang* discloses this limitation as explained for claim 3 (Section XII.C.1-XII.C.2).

G. [Claim 16] “An apparatus as claimed in claim 13, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: communicate the indication within the buffer information report.”

224. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.B.2-XIII.B.3.

225. *Yang* discloses claim 16 because *Yang* discloses, “[t]he BSR message may be used to convey buffer status information for UL, or DL, or both UL and DL. Exemplary message formats may include:...consumption time...indication of normal buffer level...indication of normal expected times...consumption rate.” Ex-1008, [0081]-[0082]. Thus, it is my opinion that *Yang* discloses its consumption time, normal buffer level, expected times, and consumption rate (all of which satisfy the claimed, “indication”) can be included in a BSR.

H. Claim 18

1. [18p] “An apparatus, comprising:”

[18P] is identical to [13p]. *Yang* discloses this limitation as explained for claim [13p] (Section XIII.C.1).

2. [18A] “at least one processor; and”

226. *Yang* does not disclose a processor, but *Kovacs* does. *Kovacs* further discloses, “[t]he eNB 12 also includes a [data processor] DP 12A.” *Id.*, [0046].

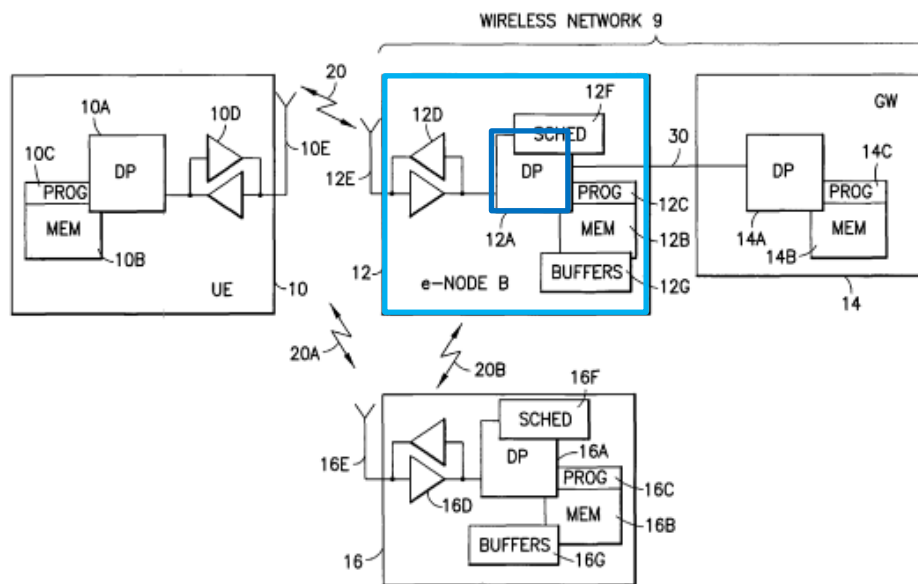


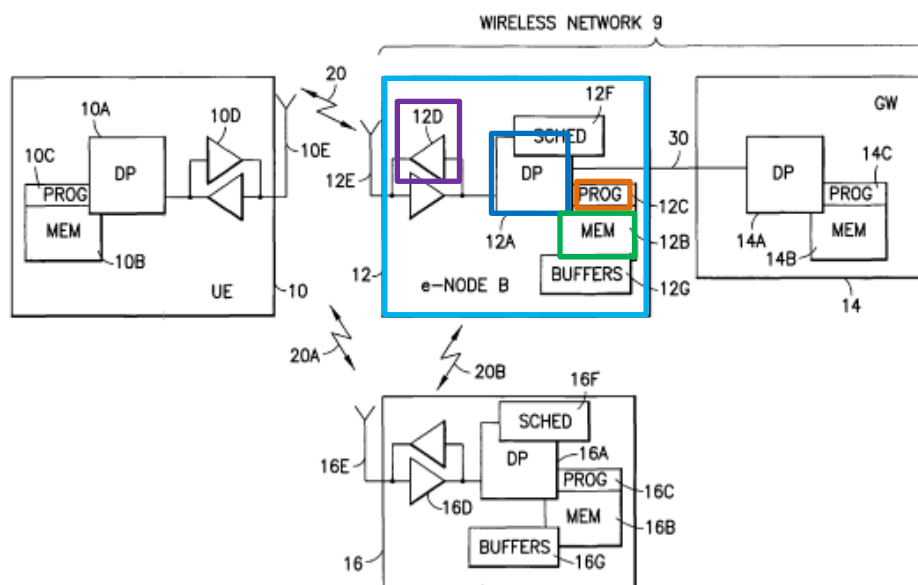
FIG. 2

Ex-1007, FIG. 2.

227. In my opinion, a POSA would have been motivated to combine *Yang* and *Kovacs* as explained in section XIII.A.

3. [18B] “at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:”

228. *Yang* does not disclose a processor, but *Kovacs* does. *Kovacs* discloses, “computer software executable by a data processor of the eNBr 12, such as the processor 12A shown, or by hardware, or by a combination of software and hardware.” Ex-1007, [0080]. *Kovacs* further discloses, “[t]he eNBr 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” *Id.*, [0046].



Ex-1007, FIG. 2.

229. In my opinion, a POSA would have been motivated to combine *Yang* and *Kovacs* as explained in section XIII.A.

4. **[18C] “receiving a buffer information report from a node for relaying communications between at least one user station and a system station, the report being generated based on a report format used for uplink reporting by a user station; and”**

230. [18C] is substantially similar to [12A]-[12B] but without reciting a means. *Yang* discloses this limitation as explained for claim [12A]-[12B] (Section XIII.C.2-XIII.C.3).

5. **[18D] “control means for processing an indication that the node for relaying has different buffering capabilities than the user station, for determining the buffering capabilities of the node for relaying based on the received buffer information report and the indication, and for controlling communications between the system station and the node for relaying accordingly.”**

231. [18D] is identical to [12C]-[12E]. *Yang* in view of *Kovacs* renders obvious this limitation as explained for claim [12C]-[12E] (Section XIII.C.4-XIII.C.6).

- I. **[Claim 19] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: process an indication that the**

buffer size of the node for relaying is extended from that of the user equipment and information of the size of the extension.”

232. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.C.2, XIII.C.4.

233. Claim 19 is substantially similar to claim 2 aside from its dependency from claim 18. *Yang* discloses this limitation as explained for claim 2 (Section XII.B).

J. [Claim 20] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: determine the buffer size of the node for relaying based on an extension factor that has been received earlier or based on a default extension factor.”

234. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.C.2, XIII.C.4.

235. The '614 patent describes, “[t]he extension factor can be a value that is indicative of how much the buffer size of the relay node shall be extended.” Ex-1001, 7:63-64.

236. *Yang* discloses the remainder of claim 20 because *Yang* states: its RN “may provide an amount of data contained in a buffer along with a fill rate or a consumption rate and allow a recipient of the buffer status information to infer a

current status of the buffer and/or to project a status of the buffer at a future time.”

Ex-1008, [0038].

237. In my opinion, a POSA would have understood that the “amount of data stored in the buffer” at the RN would be determined for a specific time based on the consumption rate (i.e. an extension factor) that reflects how much of the buffer size will be available at the RN at a given time.

238. The consumption rate “may be obtained from recent data throughput history,” Ex-1008, [0057], corresponding to the claimed, “an extension factor that has been received earlier.”

K. [Claim 21] “An apparatus as claimed in claim 18, wherein the at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus to perform at least the following: communicate the indication within the buffer information report.”

239. *Yang* does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections XIII.C.2, XIII.C.4.

240. The remaining limitation of claim 21, “communicate the indication within the buffer information report,” is substantially similar to claim 16 aside from its dependency from claim 18. *Yang* discloses this limitation as explained for claim 16 (Section XIII.F).

L. [Claim 23] “A computer program product comprising a non-transitory computer-readable storage medium bearing computer

program code embodied therein for use with a computer, the computer program code comprising code for performing the method of claim 1.”

241. *Yang* does not teach this limitation, but *Kovacs* does. *Kovacs* discloses, “a RN 16, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C, and using a transceiver (transmitter and receiver) 16D for communications via at least one antenna 16E over a first link 20A with the UE 10 (as well as other UEs under the RN's control) and over a second link 20B with the eNBr 12 that is controlling the cell.” Ex-1007, [0048].

242. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

M. [Claim 24] “A computer program product comprising a non-transitory computer-readable storage medium bearing computer program code embodied therein for use with a computer, the computer program code comprising code for performing the method of claim 7.”

243. *Yang* does not teach this limitation, but *Kovacs* does. *Kovacs* discloses, “[t]he eNBr 12 also includes a [data processor] DP 12A, a [memory] MEM 12B, that stores a [program] PROG 12C, and a suitable RF transceiver 12D coupled to one or more antennas 12E.” Ex-1007, [0046].

244. In my view, a POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XIII.A.

XIV. GROUND 8: CLAIMS 17, 22 ARE UNPATENTABLE OVER YANG IN VIEW OF KOVACS AND SAMMOUR

A. Motivation to Combine *Sammour* and the *Chun/Kovacs* Combination

245. *Sammour* discloses a Long Term Evolution (LTE) architecture including a wireless transmit receive unit (WTRU) and an evolved Node-B (eNB).” *Id.*, [0003]. *Sammour* discloses an invention to “receive a request to generate a token status report,” “to generate the token status report in response to the request,” and “to transmit a total amount of tokens as part of a buffer status report [BSR].” Ex-1010, [0019]. *Sammour* further discloses, “it would be beneficial to provide a method [or] an apparatus to initialize token buckets, to preserve token buckets upon certain events..., and to communicate the status of token buckets using enhanced BSRs.” *Id.*, [0016]. *Sammour* explains, “[t]he BSR is enhanced to provide token status report information by extending the BSR.” [0060]. In my opinion, a POSA would have been motivated to incorporate *Sammour*’s extended BSR into reporting from the *Chun/Kovacs* node in order to “enhance service continuity and to minimize service interruption.” *Id.*

246. In my experience, a POSA would have been likely to succeed in implementing *Sammour*'s extended BSR because *Yang* and *Kovacs* already discloses the use of BSR in its reporting. Thus, in my view, a POSA would have found it obvious to implement *Sammour*'s extended BSR reporting from a wireless transmit receive unit into *Kovacs*'s RN that includes memory and a processor for performing *Yang*'s methods, and to implement *Sammour*'s extended BSR for additional rational communication between the RN and eNB.

B. [Claim 17] “An apparatus as claimed in claim 16, wherein the buffer information report comprises a buffer status report and said indication is included into an extension of the buffer status report.”

247. *Yang* in combination with *Sammour* renders obvious claim 17. As explained for claim [1A]-[1B] in Sections XII.A.2-XII.A.3, *Yang* discloses a “buffer status report.”

248. *Sammour* discloses the claimed, “indication is included into an extension of the buffer status report” because *Sammour* discloses “[t]he BSR is enhanced to provide token status report information by extending the BSR. For example, the BSR may include an extension flag.” Ex-1010, [0060]. I believe a POSA would have found it obvious that *Yang*'s information that makes up its generated parameter (i.e., indication), which can be in a BSR, could likewise be included “by extending the BSR” and providing the information in the extension.

Id. In my opinion, a POSA thus would have understood that including *Chun*'s information into *Sammour*'s BSR extension is a matter of applying known methods of including information sent within the LTE network.

C. [Claim 22] “An apparatus as claimed in claim 18, wherein the buffer information report comprises a buffer status report and said indication is included into an extension of the buffer status report.”

249. Claim 22 is substantially similar to claim 17 aside from its dependency from claim 18. *Yang* discloses this limitation as explained for claim 17 (Section XIV.B).

XV. CONCLUSION

It is thus my opinion that claims 1-24 are unpatentable as obvious.

Date: February 14, 2023

Respectfully Submitted,



Stephen Gray