

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZTE (USA) Inc.,

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

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

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-1003	Declaration of Stephen Gray
Ex-1004	Curriculum Vitae of Stephen Gray
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 Provisional</i> ")
Ex-1007	U.S. Patent Publication No. 2009/0191882 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 Provisional</i> ")
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> ").

I. RELIEF REQUESTED

ZTE Corporation, requests *inter partes* review under 35 U.S.C. § 311 of claims 1-24 of U.S. Patent No. 8,767,614 (Ex-1001), assigned to WSOU Investments LLC (“WSOU”) based on the following prior art and grounds:

Exhibit/ Name	Number	Filing Date	Publication Date	Prior Art Provision ¹
1005 “Chun”	2012/0033606	Apr. 21, 2009 (based on the Chun Provision Application No. 61/171,440)	Feb. 9, 2012	Pre-AIA 102(e)
1007 “Kovacs”	U.S. Patent Publication No. 2009/0191882	Jan. 25, 2008	Jul. 30, 2009	Pre-AIA 102(b)
1008 “Yang”	2010/0302946	May 29, 2009 (based on the Yang Provisional	Dec. 2, 2010	Pre-AIA 102(e)

¹ The ’614 patent was filed on June 15, 2012, and claims priority to PCT Application PCT/CN2009/075663, filed December 17, 2009. December 17, 2009 is thus the ’614 patent’s earliest possible priority date.

		Application No. 61/182,360)		
1010 “Sammour”	U.S. Patent Publication No. 2009/0196175	January 27, 2009	August 6, 2009	Pre-AIA 102(b)

Ground	References	Basis	Challenged Claim(s)
1	<i>Chun</i>	§ 103	1, 2, 4-5
2	<i>Chun, Kovacs</i>	§ 103	6-8, 10-14, 16, 18, 19, 21, 23, 24
3	<i>Chun, Kovacs, Sammour</i>	§ 103	17, 22
4	<i>Chun, Yang</i>	§ 103	3, 9
5	<i>Chun, Kovacs, Yang,</i>	§ 103	15, 20
6	<i>Yang</i>	§ 103	1-4, 7-10
7	<i>Yang, Kovacs</i>	§ 103	6, 12-16, 18-21, 23-24
8	<i>Yang, Kovacs, Sammour</i>	§ 103	17, 22

II. PRIOR ART

A. *Chun* is Prior Art

U.S. Patent Publication No. 2012/0033606 (Ex-1005, “*Chun*”), filed as U.S. Application No. 13/260,447, is a national stage application of PCT/KR2010/002467, filed on April 20, 2010, and claims priority to U.S. Provisional Application No. 61/171,440 filed on April 21, 2009 (“*Chun Provisional*”). *Chun* is therefore prior art to the ’614 patent under 35 U.S.C. § 102(e).

Chun is prior art to the ’614 patent under 35 U.S.C. § 102(e) because (1) claim 1 is disclosed in its provisional application (U.S. Provisional Application No. 61/171,440, “*Chun Provisional*”), and (2) the portions of *Chun* relied on have sufficient support in *Chun*’s provisional application. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1381 (Fed. Cir. 2015); *Ex parte Mann*, 2016 WL 7487271, at *5-6 (PTAB Dec. 21, 2016).

1. Part 1: Claim 1 of *Chun*’s Non-Provisional Is Supported in its Provisional

The *Chun* provisional supports *Chun*’s claim 1.

Claim 1 of <i>Chun</i>	Support in <i>Chun</i> Provisional
1. A method for data transmission by a relay node (RN) in a wireless	“RN transmits/receives data to/from multiple UEs, and also transmits/receives data to/from the

communication system, the method comprising:	DeNB.” Ex-1006, 57. “The RN is connected to the DeNB through wireless Backhaul link.” <i>Id.</i>
receiving, by the relay node, data from a plurality of user equipments (UEs);	“RN transmits/receives data to/from multiple UEs, and also transmits/receives data to/from the DeNB.” Ex-1006, 57.
generating, by the relay node, at least one parameter to improve a transmission of the received data to a network; and	<i>Chun</i> defines, “the at least one generated parameter,” as several items that can be sent by the RN, including, “the at least one parameter is related to a buffer capability or memory information of the relay node.” Ex-1005, [0088]. “RNB report[s] its Buffer capability to DNB.” Ex-1006, 78. “When DL buffer of RNB is full or above some threshold (percent, or configured absolute value), the RNB report this to DNB.” Ex-1006, <i>Id.</i>
transmitting the data and the at least one generated parameter to the network.	“RN transmits/receives data to/from multiple UEs, and also transmits/receives data to/from the DeNB.” Ex-1006, 57.

	“RNB report[s] its Buffer capability to DNB.” <i>Id.</i> , 78. “When DL buffer of RNB is full or above some threshold (percent, or configured absolute value), the RNB report[s] this to DNB.” <i>Id.</i>
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2. Part 2: The Portions of *Chun* Relied Upon Are Supported in *Chun*’s Provisional

The *Chun* Provisional supports the portions of *Chun* that this Petition cites.

Cited Portions of <i>Chun</i>	Supportive disclosure in the <i>Chun</i> Provisional
“[A]n improved method of managing a memory and a buffer in the LTE-A system.” Ex-1005, [0010]. <i>Chun</i> 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.” <i>Id.</i> , [0009]. <i>Chun</i> discloses “the DeNB may allocate a proper amount of the radio	“In LTE-Advanced study, the concept of ‘Relay Node’ (hereafter it is called RN) is introduced. By using RN, the Donor eNB (hereafter it is called DeNB) can extend its coverage. ... RN transmits/receives data to/from multiple UEs, and also transmits/receives data to/from the DeNB.” Ex-1006, 57. To optimize dl resource allocation for RNB, DNB can use/allocate several RNTIs to RNB. <i>Id.</i> , 58.

resource(s).” Ex-1005, [0075]. Further, “radio resource(s) should be allocated to the RN by the DeNB in order to transmit data from the RN to the DeNB.” <i>Id.</i>, [0084].	
<i>Chun</i> discloses that “the DeNB may need to receive a buffer status report (BSR) from the RN.” <i>Id.</i>, [0084]. <i>Chun</i> further discloses, the BSR includes information related to “an amount of data that should be transmitted to the DeNB” or “a transmitted BSR from the terminal connected to the RN.” <i>Id.</i> That information used by BSRs from terminals is described as “an amount of data stored in the buffer.” <i>Id.</i>, [0085]. <i>Chun</i> 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.” <i>Id.</i>, [0083].	“RNB report buffer status report to DNB. In this buffer status report, RNB report the amount of data in its buffer. Or, in this buffer status report, RNB report the total sum of buffer status report from UE. For example, let's assume the RNB has received BSR 1 from UE 1 and BSR from UE 2. And further assume that BSR 1 says that UE 1 has 1 MB data to transmit and BSR 2 says that UE 2 has 2 MB data to transmit. Then, RNB report that the amount of data expected is 3 MB to DNB. This report can inform the expected amount of data per UE. This report may also inform the time when each BSR report from UE is received. In the above report, RNB may exclude the

	amount of data that it already has received from UE.” <i>Id.</i> , 77-78.
<i>Chun</i> discloses, “DeNB may need to receive a buffer status report (BSR) from the RN.” <i>Chun</i> discloses that its Relay Node can generate, “at least one parameter ... related to a buffer capability or memory information of the relay node,” <i>id.</i>, [0088], or “a total number of UE or radio bearer that should receive the data transmission.” <i>Id.</i> The RN can also generate the parameter based on “applying the aforementioned exemplary embodiments,” <i>id.</i>, [0087], which would 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,” <i>id.</i>, [0082]. The buffer capabilities may include, “a number of memory that can be used to store the data in RN.” <i>Id.</i>, [0082]. <i>Chun</i> discloses its RN (i.e., relay node) sends a BSR and, “the BSR	“RNB report its Buffer capability to DNB. This buffer capability information can be separately delivered per DL/UL. When DL buffer of RNB is full or above some threshold (percent, or configured absolute value), the RNB report this to DNB. For example, if the DL buffer of RNB is 1 the RNB report this to DNB. For example, if the DL buffer of RNB is 1 MB and if it is full, the RNB report this to DNB. Then, DNB may stop sending DL data to RNB. When, this situation is over, the RNB report that the end of situation. Or, the above mechanism can be used also for UL. I.e., when UL buffer (i.e, the data received from UEs) of RNB is also full or above some configured threshold, then RNB report this to DNB. Or, above method can be used for total sum of DL/UL buffer.” <i>Id.</i>, 78. “RNB can use SPS(Semi persistent scheduling). RNB can

may be stored in the RN, and the BSR may include information related to an amount of data that should be transmitted to the DeNB.” <i>Chun</i>, [0084].	inform DNB: The number of user for which SPS is configured or required.” <i>Id.</i> “DNB has already given the RNB regarding the number of max RRC UE that RNB is allowed.” <i>Id.</i>, 72.
<i>Chun</i>’s notification may be transmitted through “a MAC control element, a RRC message, a PDCP status report, a RLC status report, [or] a physical channel such as a D-SR channel.” <i>Id.</i>, [0083]. <i>Chun</i> discloses its “BSR is generated in the format of a MAC control element (MAC CE).” <i>Id.</i>, [0048]. <i>Chun</i> discloses its BSR is “from the terminal to the base station,” <i>id.</i>, [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.” <i>Id.</i>, [0083].	“In above method, MAC CE (control element) or PDCP report or RLC report can be used. OR, RRC report can be used. Or, one-bit channel over physical resources such as D-SR channel can be used. I.e., eNB can configure a physical channel and when above condition is met, the UE informs the event by using the physical channel.” <i>Id.</i>, 78.

Chun discloses, “BSR (Buffer Status Report) formats” such as a “short BSR.” *Id.*, [0065].

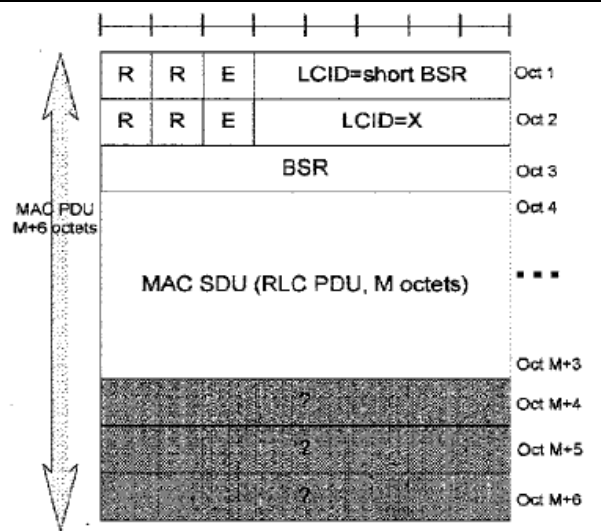
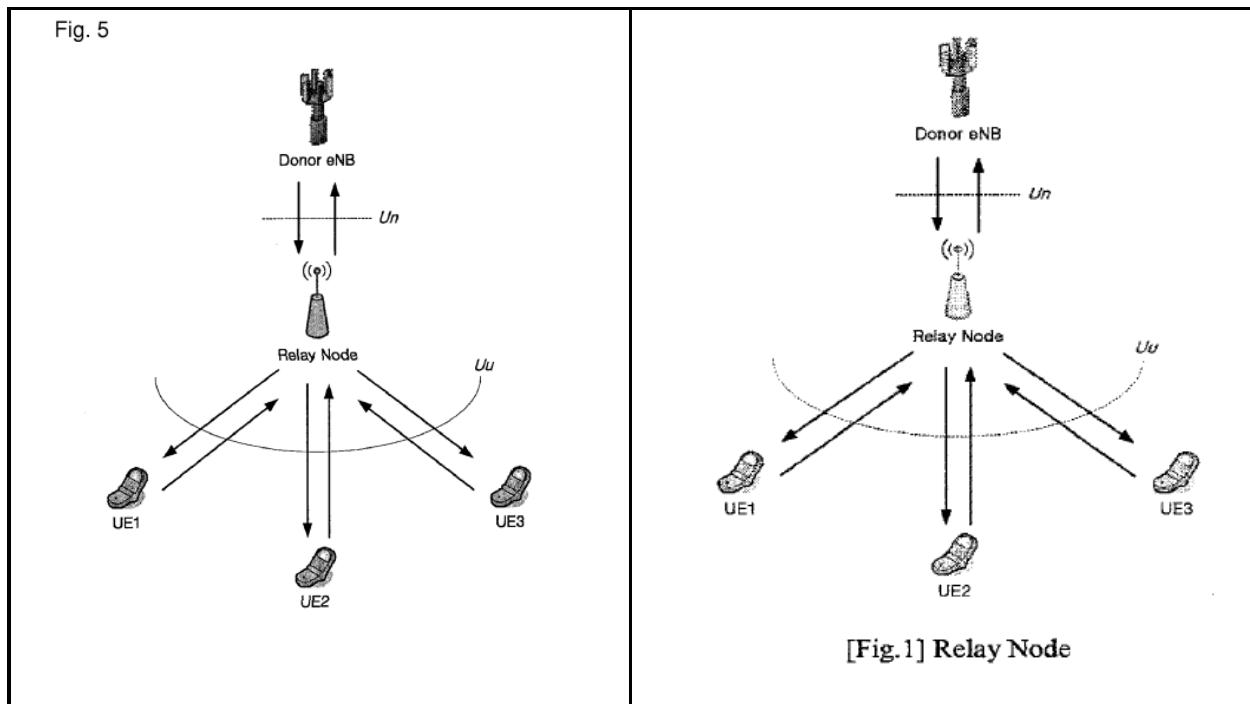


Fig. 1 Example 1

“In above figure 1, the MAC PDU size is M+6 octets and the MAC SDU size is M octets. To fill the 3 remaining octets, following options in figure 2 may be possible.” *Id.*, 86; *see id.*, 87-88.



B. Yang Is Prior Art

U.S. Patent Application Publication No. 2010/0302946 (Ex-1008, “Yang”) was filed as U.S. Application No. 12/784,352 and claims priority to U.S. Provisional Application No. 61/182,360, filed on May 29, 2009 (Ex-1009, “Yang Provisional”). Yang is therefore prior art to the ’614 patent under 35 U.S.C. § 102(e).

Yang is prior art to the ’614 patent under 35 U.S.C. § 102(e) because (1) claim 1 is disclosed in its provisional application (U.S. Provisional Application No. 61/182,360, “Yang Provisional”), and (2) the portions of Yang relied on have sufficient support in Yang’s provisional application.

1. Part 1: Claim 1 of *Yang*'s Non-Provisional Is Supported in its Provisional

The *Yang* Provisional supports *Yang*'s claim 1.

Claim 1 of <i>Yang</i>	Support of <i>Yang</i> Provisional
1. A method for operating a relay in a communication system, the method comprising:	1. A method for relay operation, the method comprising:
determining a buffer status of a buffer for data to be transmitted on a communications channel allocated from network resources controlled by a communications controller;	[1A] determining a buffer status of a data buffer; “The donor eNB may allocate a portion of its wireless resource (both UL and DL) to the RN so that the RN may service UEs.” Ex-1009, [0003]. “To efficiently use wireless resource, the donor eNB may adjust its wireless resource allocation to the RL based on buffer status information provided by the RN.” <i>Id.</i> , [0024].
determining a consumption rate or a filling rate for the buffer;	“The expected consumption rate of a UE may be obtained from recent data throughput history for the UE or a channel quality indicator reported from the UE.” <i>Id.</i> , [0029].

determining buffer status information in accordance with the buffer status and the consumption rate for the buffer; and	[1B] computing a buffer status information based on the buffer status; and “6. The method of claim 5, wherein the consumption time of the data buffer comprises an amount of data buffered in the data buffer divided by a consumption rate for the data buffer.” <i>Id.</i> , Claim 6.
transmitting the buffer status information to the communications controller.	[1C] transmitting the buffer status information to a donor device.

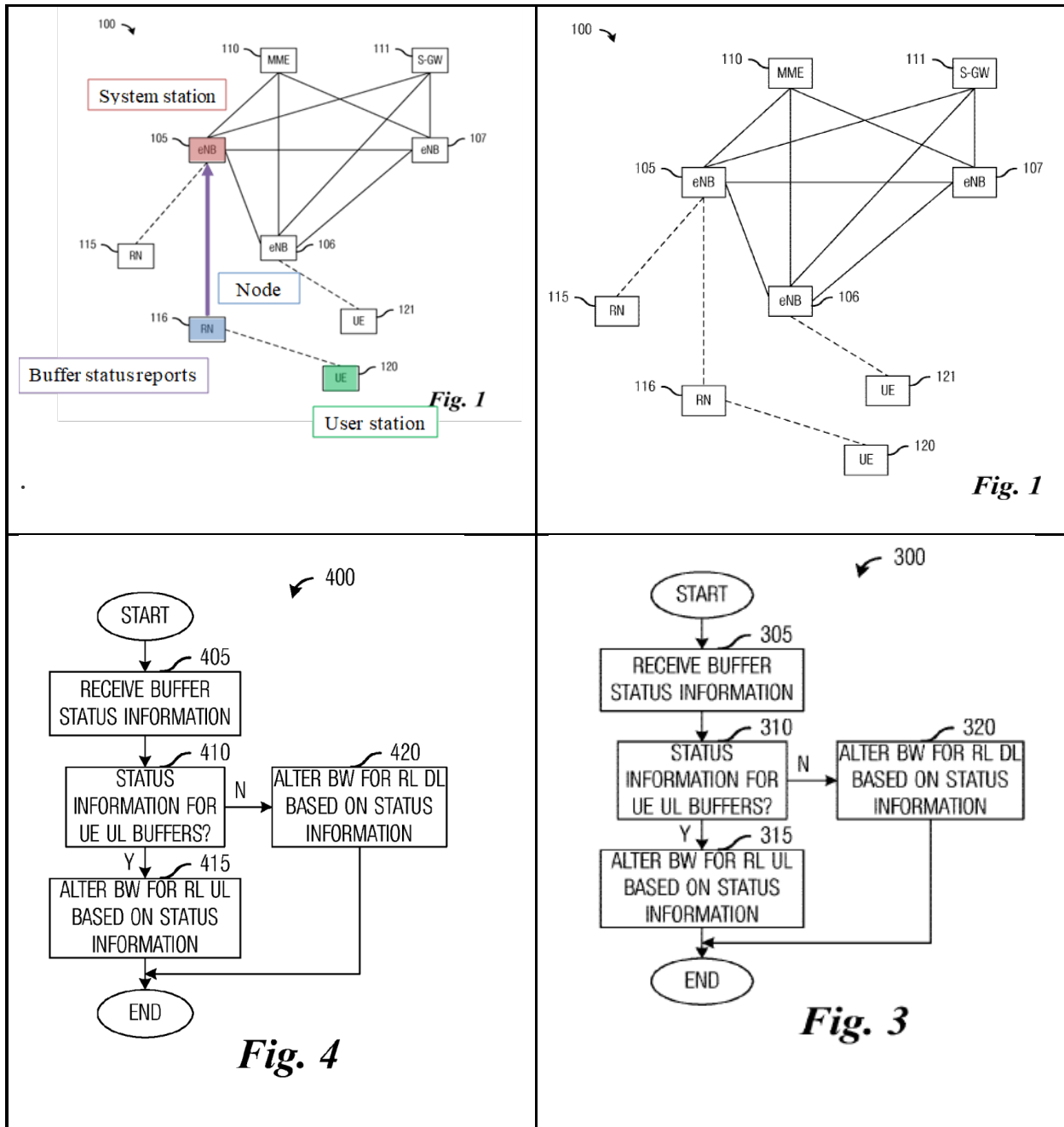
2. Part 2: The Portions of *Yang* Relied Upon Are Supported in *Yang*’s Provisional

The *Yang* Provisional supports the portions of the *Yang* nonprovisional application that this Petition cites.

Cited Portion of <i>Yang</i>	Support of <i>Yang</i> Provisional
<i>Yang</i> discloses, “the 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	“the RN may transmit an amount of data stored in a buffer (or an amount of unoccupied portion in a buffer) and an expected consumption rate to the donor eNB and let the donor eNB compute the

status of the buffer and/or to project a status of the buffer at a future time.” <i>Id.</i>, [0038]. <i>Yang</i> further discloses use of “BSR” messages that “may be used to transmit the concatenated buffer status information.” <i>Id.</i>, [0081].	expected time to buffer starvation (or the expected time to buffer congestion) itself.” Ex-1009, [0031]. “In another alternative embodiment, to reduce the number of transmissions to the donor eNB, the RN may concatenate the buffer status information of multiple UEs into a single message.” <i>Id.</i>, [0052].
<i>Yang</i> discloses, “[m]ultiple bits of information may be used to indicate the status of the buffer. For example, two-bits of information may be used to indicate the status of the buffer, with ‘00’ indicating that the buffer is empty, ‘01’ indicating that the buffer is almost empty (e.g., less than 15 percent filled), ‘10’ indicating that the buffer is almost filled (e.g., more than 85 percent filled), and ‘11’ indicating that the buffer is filled.” <i>Id.</i>, [0055].	“Multiple bits of information may be used to indicate the status of the buffer. For example, two-bits of information may be used to indicate the status of the buffer, with 00 indicating that the buffer is empty, 01 indicating that the buffer is almost empty (less than 15 percent filled), 10 indicating that the buffer is almost filled (more than 85 percent filled), and 11 indicating that the buffer is filled.” Ex-1009, [0028].
“Donor eNB [(system station)] operations 400 may begin with the donor eNB receiving buffer status information from the [relay node] (block 405). The buffer status	“Donor eNB operations 300 may begin with the donor eNB receiving buffer status information from the RN (block 305). The buffer status information from the RN may include DL buffer

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].” <i>Id.</i> , [0052].	status information, UL buffer status information, or both DL and UL buffer status information. The buffer status information may provide information about the status of each buffer at the RN.” <i>Id.</i> , [0025].
The consumption rate “may be obtained from recent data throughput history,” Ex-1008, [0057].	“The expected consumption rate of a UE may be obtained from recent data throughput history for the UE or a channel quality indicator reported from the UE.” <i>Id.</i> , [0029].
a “Buffer Status Report (BSR) message” that “may be used to convey buffer status information for [uplink], or [downlink], or both [uplink] and [downlink].” <i>Id.</i> , [0081].	“The BSR message may be used to convey buffer status information for UL, or DL, or both UL and DL.” <i>Id.</i> , [0053].



III. LEVEL OF ORDINARY SKILL IN THE ART

A 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 telecommunications, or equivalent

experience, education, or both. Ex-1003, 46. Lack of professional experience could be remedied by additional education, and lack of education could be remedied by additional professional experience. Ex-1003, 46.

IV. CLAIM CONSTRUCTION

A. PREVIOUS CONSTRUCTIONS

35 U.S.C. 112 ¶6 applies to multiple claim terms. For this Petition, Petitioner proposes the following constructions or adopts the construction from 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), which WSOU has not objected to with regards to the '614 patent:

CLAIM	TERM	CONSTRUCTIONS
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 ²	Function: underlined Structure: “Pursuant to <i>In re Katz</i> , the data processing unit 32,

² The entire underlined term should be the function. The court in the Western District of Texas found only a portion of the term to be the function because of how the parties briefed it. Although not considered before that court, Petitioner submits the term would be incomplete if the term were truncated immediately

		memory 31, and input/output interface 34 in Fig. 3, and equivalents.” Ex-1012; Ex-1001, 6:4-9.
6	means for <u>causing sending of an indication to the system station</u>	Function: underlined Structure: “Pursuant to <i>In re Katz</i> , the data processing unit 32, memory 31, and input/output interface 34 in Fig. 3, and equivalents.” Ex-1012; Ex-1001, 6:4-9.

following “system station” because the rest of the term describes where the buffer information report is sent from. Whether the Board construes a portion of this term to be the function or the entire term, there is no change in the corresponding structure found in the ’614 patent.

B. PROPOSED CONSTRUCTIONS

1. Means-Plus-Function Terms

35 U.S.C. 112 ¶6 applies to multiple claim terms because they recite “means for” language that “creates a rebuttable presumption” that 112 ¶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 communications between at least one user station and a system station</u>	Under Pre-AIA 35 U.S.C. 112 ¶6 Function: underlined Structure: “serving base station [20]” Ex-1001, 7:44.
12, 18	control means for <u>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</u>	Under Pre-AIA 35 U.S.C. 112 ¶6 Function: underlined Structure: “processor 14,” and “memory 15,”

	<u>indication, and for controlling communications between the system station and the node for relaying accordingly.</u>	in Fig. 1, and equivalents. Ex-1001, 5:65-67.
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2. Claim Differentiation

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).

Independent claims 1 and 7 must be broader than the “separate signaling,” as required in dependent claims 5 and 11, respectively. Accordingly, the “sending” required by claims 1 and 7 can be accomplished (1) in a single signal or message; or (2) with two signals or messages.

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

A. Claim 1

1. [1p] “A method comprising:”

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

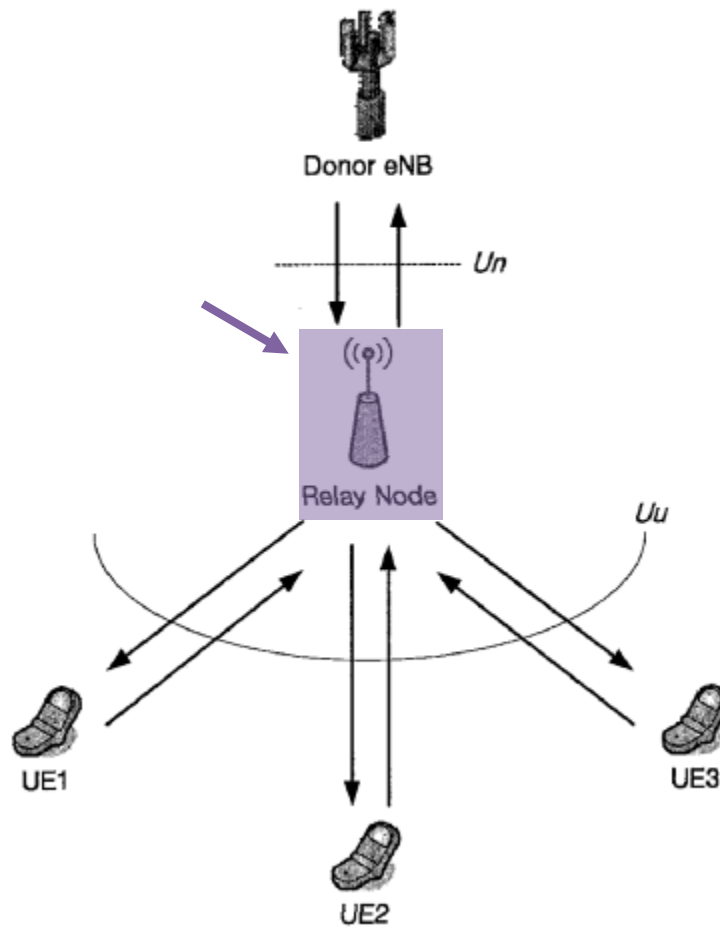
2. [1A] “sending a buffer information report to a system station from a node for relaying communications between at least one user station and the system station,”

Chun discloses [1A] because *Chun* discloses a serving base station, a Donor eNB (system station), that receives buffer status information from a Relay Node. The '614 patent explains, a system station can be “a donor eNB (DeNB).” Ex-1001, 10:34-37.

Chun’s “DeNB may need to receive a buffer status report (BSR) from the RN.” Ex-1005, [0084]. The BSR includes information related to “an amount of data that should be transmitted to the DeNB” or “a transmitted BSR from the terminal connected to the RN.” *Id.* Information used by BSRs from terminals is described as “an amount of data stored in the buffer.” *Id.*, [0085].

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].

Fig. 5



Ex-1005, FIG. 5.

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

Chun renders obvious [1B] because *Chun* discloses that buffer status reports are standard for use by a terminal (user station), stating, “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].

The ’614 patent discloses, “[t]he 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 admits the “report format” was known. *Id.*

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]. FIG. 11 illustrates “BSR (Buffer Status Report) formats” such as a short BSR. *Id.*, [0065]. *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]. 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. Ex-1003, 63.

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

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.

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...[or] 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.

Chun discloses that its Relay Node can generate, “at least one parameter ... related to a buffer capability or memory information of the relay node,” or “a total number of UE or radio bearer that should receive the data transmission.” Ex-1005, [0088]. The Relay Node can also generate the parameter based on “applying the aforementioned exemplary embodiments,” *id.*, [0087], which would 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.* *Chun*’s 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 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, it would have been obvious for a POSA that a Donor eNB sends the BSR separately from the parameter, for example, when an event is triggered such as a buffer being full or reaching a threshold. Ex-1003, 68; Ex-1005, [0084].

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.

Chun discloses claim 2.

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.” *Id.*, [0083]. A POSA would have understood that *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. Ex-1003, 70.

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

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]. A POSA would have found it obvious that *Chun*’s buffer status report could be sent through a MAC control element by its RN. Ex-1003, 71.

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.

Chun discloses claim 5 because *Chun* discloses its RN “may transmit the received data separately from the generated parameter.” Ex-1005, [0087]. As explained in Section V.C, *Chun* discloses its BSR can be generated through a MAC control element. *Id.*, [0083], [0085].

Chun also discloses, when its RN “notifies the information to the DeNB ... [radio resource control (“RRC”)] ... may be utilized.” *Id.*, [0081]. A POSA would have found it obvious that the generated parameter could be transmitted over the

RRC when it was generated like when an event is triggered. Ex-1003, 75 (citing Ex-1005, [0083]). BSRs similarly could be generated periodically or when the same or other events triggered. Ex-1003, 75 (citing Ex-1005, [0048]). 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 a protocol layer to correspond 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]; Ex-1003, 73. A POSA would have understood such a communication in any form, including RRC, would correspond to the claimed, “said indication in a radio resource control message or an admission control message.” Ex-1003, 73.

Chun similarly discloses, “the at least one generated parameter is transmitted to the network using ... [a] D-SR (Dedicated-SR) channel.” *Id.*, [0088]. A POSA would have 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]; Ex-1003, 74. *Tseng*, U.S. Patent No. 8,804,756, shows this was a well-known procedure. *Tseng*, 1:56-2:10; Ex-1003, 74.

VI. 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*

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..., and to enhance overall performance and deployment cost of the radio access network RAN.” Ex-1007, [0021]; Ex-1003, 76. 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. Ex-1003, 76.

A POSA would have had a reasonable expectation of success combining *Chun* and *Kovacs* because each disclosure concerns a Relay Node (RN) in a “LTE” system, and each disclosure uses buffer status reporting from a RN to a donor eNB. Ex-1007, [0041], [0064]; Ex-1008, [0003], [0081]; Ex-1003, 77.

B. Claim 6

1. [6P] “An apparatus comprising:”

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,”

Chun discloses “a method for data transmission by a relay node (RN) in a wireless communication system.” *Id.*, FIG. 5.

Chun does not disclose the structure of claim [6A] 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.” *Id.*, [0048].

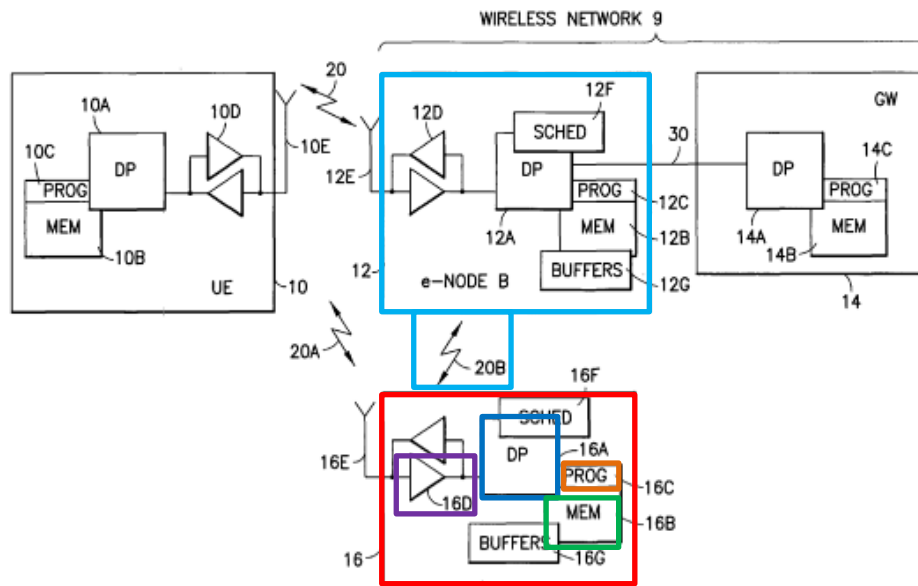


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VI.A. Ex-1003, 81.

Chun discloses the function of [6A] as explained for [1A] (Section V.A.2).

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

Chun renders obvious this element as explained for [1B] (Section V.A.3).

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.”

Chun does not expressly disclose the structure of [6C] but *Kovacs* does.

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 explained in Section VI.B.2. *Id.*, FIG. 2.

A POSA would have been motivated to combine *Kovac* with *Chun* as explained in Section VI.A. Ex-1003, 85.

Chun discloses or renders obvious the function of [6C] as explained for [1C] (Section V.A.4).

C. Claim 7

1. [7p] “A method comprising:”

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,”

Chun discloses or renders obvious this limitation as explained for [1A] (Section V.A.2). *Chun* teaches a base station, an eNB, that receives buffer status information from a Relay Node. *Id.*, [0036]. Similar to *Chun*’s RN that sends the BSR, *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].

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

Chun renders obvious [7B] as explained for [1B] (Section V.A.3).

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

Chun discloses or renders obvious this limitation as explained for [1C] (Section V.A.4). Similar to *Chun*’s RN that sends the parameter, *Chun*’s Donor eNB (base station) would receive the “generated parameter:” “the at least one generated parameter is transmitted to the network,” and “the network is a [Donor] eNB.” Ex-1005, [0088]. A POSA would have found it obvious the parameter could be sent separately from the BSR or within the BSR. Ex-1003, 91.

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

Chun discloses [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 (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]. A POSA would have understood that *Chun*’s DeNB would determine the requirement of the radio resources to be sent to the DeNB from *Chun*’s BSR, and 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]; Ex-1003, 92-93.

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

Chun discloses [7E] because *Chun* discloses “the DeNB may allocate a proper amount of the radio resource(s).” Ex-1005, [0075]. 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.”

Claim 8 is substantially similar to claim 2 aside from its dependency from claim 7. Ex-1003, 95. *Chun* discloses this limitation as explained for claim 2 (Section V.B).

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

Claim 10 is substantially similar to claim 4 aside from its dependency from claim 7. Ex-1003, 96. *Chun* discloses this limitation as explained for claim 4 (Section V.C).

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.”

Claim 12 is substantially similar to claim 5 aside from its dependency from claim 7. Ex-1003, 97. *Chun* discloses this limitation as explained for claim 5 (Section V.D).

G. Claim 12

1. [12p] “An apparatus comprising:”

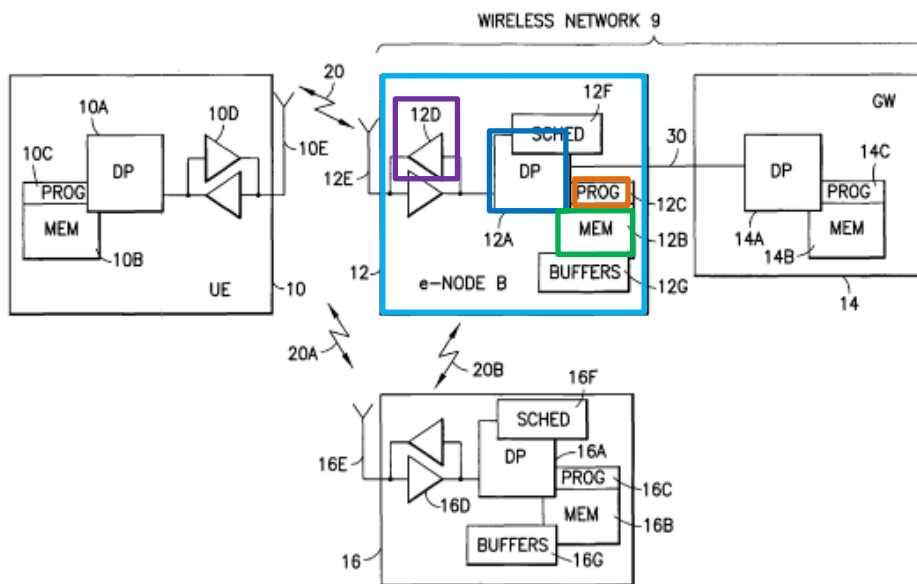
Chun discloses this claim limitation because it discloses, “a method for data transmission by a relay node (RN) in a wireless communication system.” Ex-1005, [0011].

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,”

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].

Chun does not disclose the structure of claim [12A] but *Kovacs* does.

Kovacs 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.

A POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VI.A. Ex-1003, 101.

Chun discloses the function of [12A] as explained for [7A] (Section VI.C.2).

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

Chun renders obvious this element as explained for [1B] (Section V.A.3).

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

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]. A POSA would further have found it obvious that the DeNB would be capable of understanding the information sent to it from the RN, including *Chun*’s parameter. Ex-1003, 104.

Chun does not disclose the structure of claim [12C-12E], but *Kovacs* does. As discussed in claim [12A], *Kovacs* discloses, “[t]he eNB 12” includes a data processor 12A, a memory MEM 12B that stores a [program] PROG 12C.” *Id.*, [0046]; Ex-1003, 106.

A POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VI.A. Ex-1003, 107.

Chun discloses the function of [12C] as explained for [7C] (Section VI.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”

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

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

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

H. Claim 13

1. [13p] “An apparatus, comprising:”

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”

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

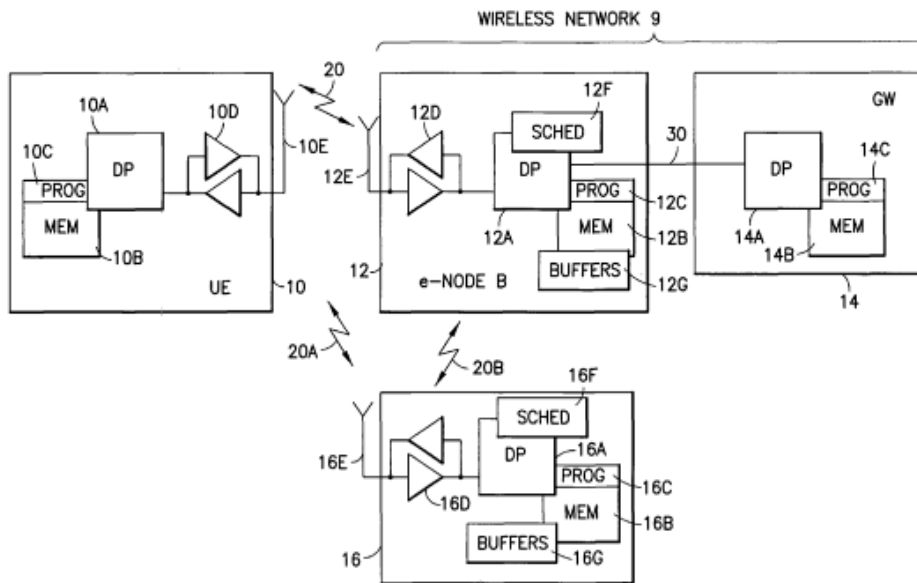


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 113.

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:”

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, “a RN 16, shown also as having a [data processor (DP)] 16A and a [memory (MEM)] 16B that stores a [program (PROG)] 16C.” Ex-1007, [0048]. *Kovacs* discloses, “software (computer readable instructions embodied on a computer readable medium).” *Id.*, [0081].

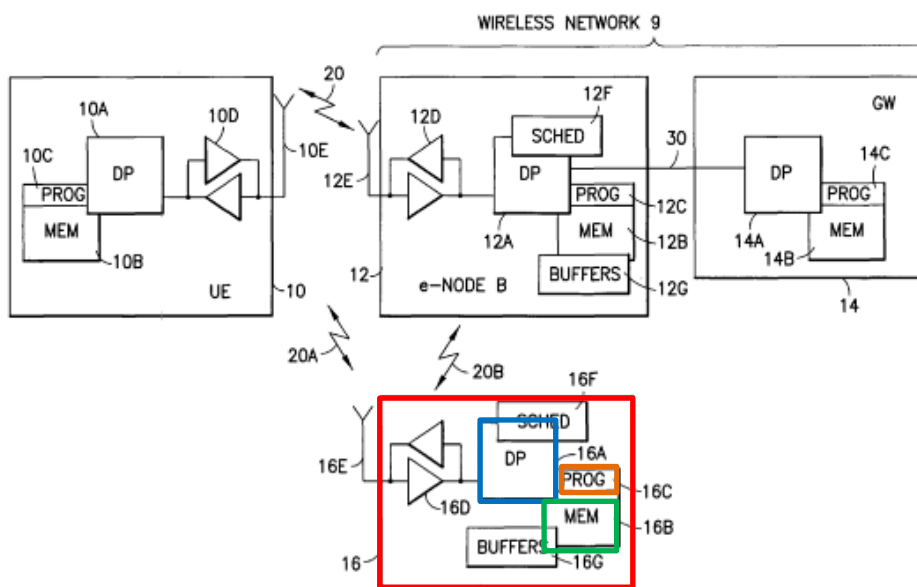


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 115.

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,”**

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

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

[13E] is substantially similar to claim [1B]. *Chun* renders obvious this limitation as explained for claim [1B] (Section V.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.”**

[13F] is substantially similar to [1C]. *Chun* discloses or renders obvious this limitation as explained for claim [1C] (Section V.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.”**

Chun does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VI.H.2-VI.H.3. A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 119.

The remainder of claim 14 is substantially similar to claim 2 aside from its dependency from claim 13. Ex-1003, 120. *Chun* discloses this limitation as explained for claim 2 (Section V.B).

- 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.”**

Chun does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VI.H.2-VI.H.3. A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 121.

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:”

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

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

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

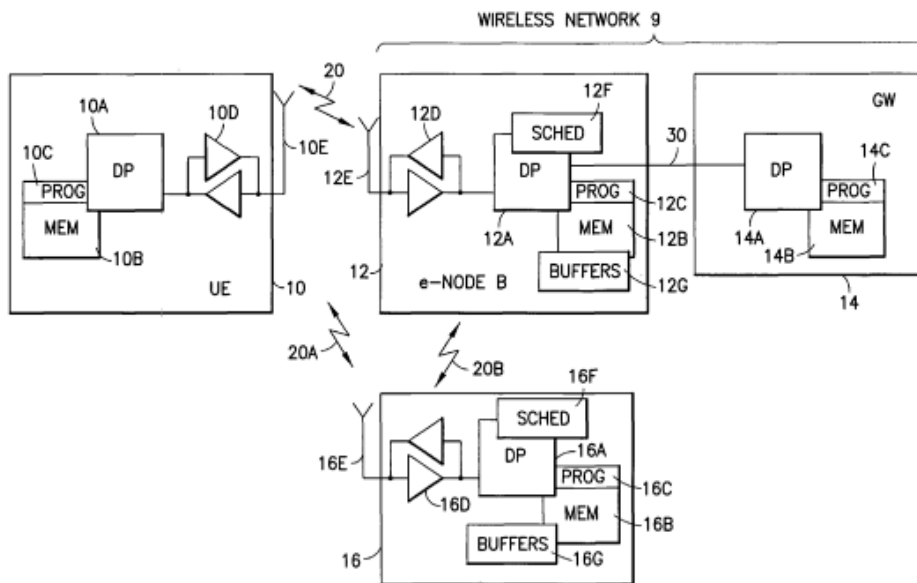


FIG. 2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 125.

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:”

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* 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].

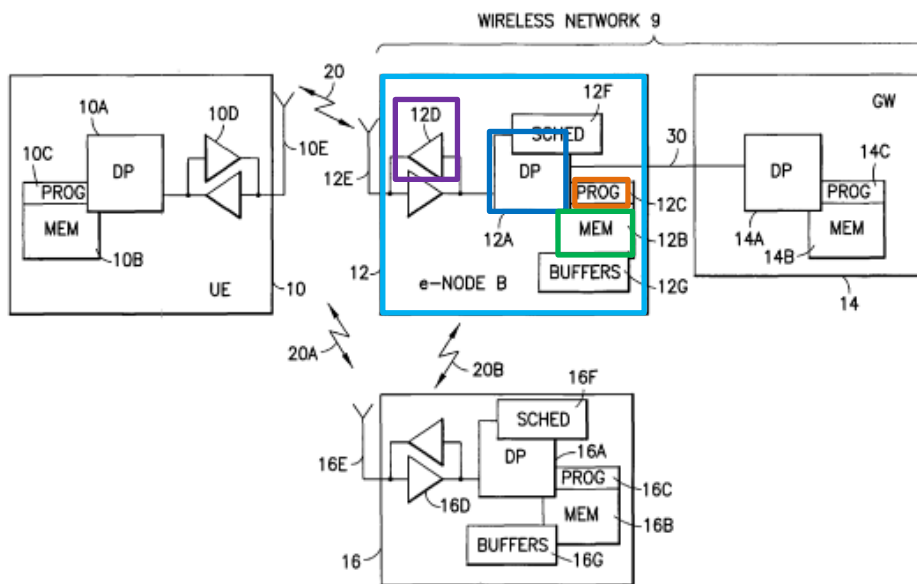


FIG. 2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Chun* and *Kovacs* as explained in section VI.A. Ex-1003, 127.

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”**

[18C] is substantially similar to [12A]-[12B], but without reciting a means.

Chun discloses this limitation as explained for claim [12A]-[12B] (Sections VI.G.2-VI.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.”**

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

Chun does not disclose memory, code, or a processor, but *Kovacs* does as explained in Sections VI.K.2-VI.K.3 for claims [18A]-[18B].

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 V.B).

- 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.”**

Chun does not disclose memory, code, or a processor but *Kovacs* does as explained in Sections VI.H.2-VI.H.3 for claims [13A]-[13B].

Claim 21 is substantially similar to claim 16 aside from its dependency from claim 18. *Chun* discloses this limitation as explained for claim 16 (Section VI.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.”**

Chun does not teach this claim, 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**.” *Id.*, [0048].



Ex-1007, FIG. 2.

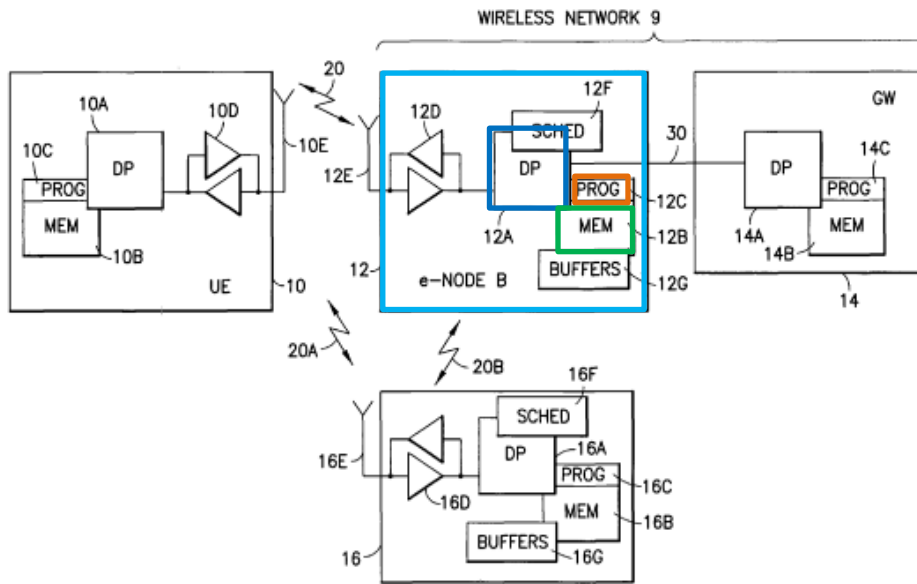
A POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VI.A. Ex-1003, 136.

- 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.”**

Chun does not teach this limitation, 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.” *Id.*, [0046].



Ex-1007, FIG. 2 (annotated).

A POSA would have been motivated to combine *Kovacs* with *Chun* as explained in Section VI.A. Ex-1003, 138.

VII. 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

Sammour discloses a Long Term Evolution (LTE) architecture including a wireless transmit receive unit (WTRU) and an evolved Node-B (eNB).” *Id.*, [0003]. *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]. 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.*; Ex-1003, 139.

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. Ex-1003, 140. A POSA thus 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, and to implement *Sammour*’s extended BSR for additional rational communication between the RN and eNB. *Id.*

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.”

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

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]. A POSA would have found it obvious that *Chun*’s information that makes up its generated parameter (indication), which can be in a BSR, could likewise be included “by extending the BSR” and providing the information in the extension. Ex-1003, 142; (citing Ex-1010, [0060]). 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. Ex-1003, 142. A POSA would have been motivated to combine *Sammour* with the *Chun/Kovacs* combination as explained in Section VII.A. *Id.*

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.”

Claim 22 is substantially similar to claim 17 aside from its dependency from claim 16. Ex-1003, 143. *Chun* in view of *Sammour* and *Kovacs* renders obvious this limitation as explained for claim 17 (Section VII.B). *Id.*

VIII. 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,”**

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.

As explained for claim 2 in Section V.B, *Chun* discloses its RN (relay node) sends a BSR that includes, “the BSR may be stored in the RN, and the BSR may include information related to an amount of data that should be transmitted to the DeNB.” *Chun*, [0084].

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

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. 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]; Ex-1003, 147. *Yang* thus discloses an "amount of data contained in a buffer" of a UE (buffer size of a user equipment) and "a fill rate or a consumption rate (the indication provides a buffer extension factor), corresponds to the claim limitation. *Id.*

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 better allocation of resources. Ex-1008, [0055]; Ex-1005, 148. *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]. 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. Ex-1003, 148.

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]; Ex-1003, 150.

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.”

Chun in view of *Yang* renders obvious this element because *Chun* discloses its RN can report buffering capabilities because “the memory information may refer to an amount of memory installed in the RN,” Ex-1005, [0082], as explained in Section VI.B, and *Yang* discloses bits of information reflecting buffer state, as explained in Section VII.A.1. The RN defines these buffering capabilities because *Chun*’s RN is implemented by a processor, Ex-1005, [0092], and it stores received data until it transmits it, *id.*, [0072]. 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]; Ex-1003, 151. *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.” Ex-1005, [0056]. Further, 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. Ex-1003, 150. This corresponds to the claim limitation. *Id.*

- 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.”**

Claim 9 is substantially similar to claim 3 aside from its dependency from claim 7. Ex-1003, 151. *Yang* discloses this limitation as explained for claim 3 (Section VIII.A).

IX. 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.”**

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 VI.H.2-VI.H.3. Ex-1003, 152. *Chun* in view of

Yang renders obvious the remainder of this claim as explained for claim 3 in Section VIII.A. 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. Ex-1003, 152.

- 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.”**

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 VI.H.2-VI.H.3. Ex-1003, 153.

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.

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].

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. Ex-1003, 156.

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.”

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

A. Claim 1

Yang renders obvious claim 1. Ex-1003, 158.

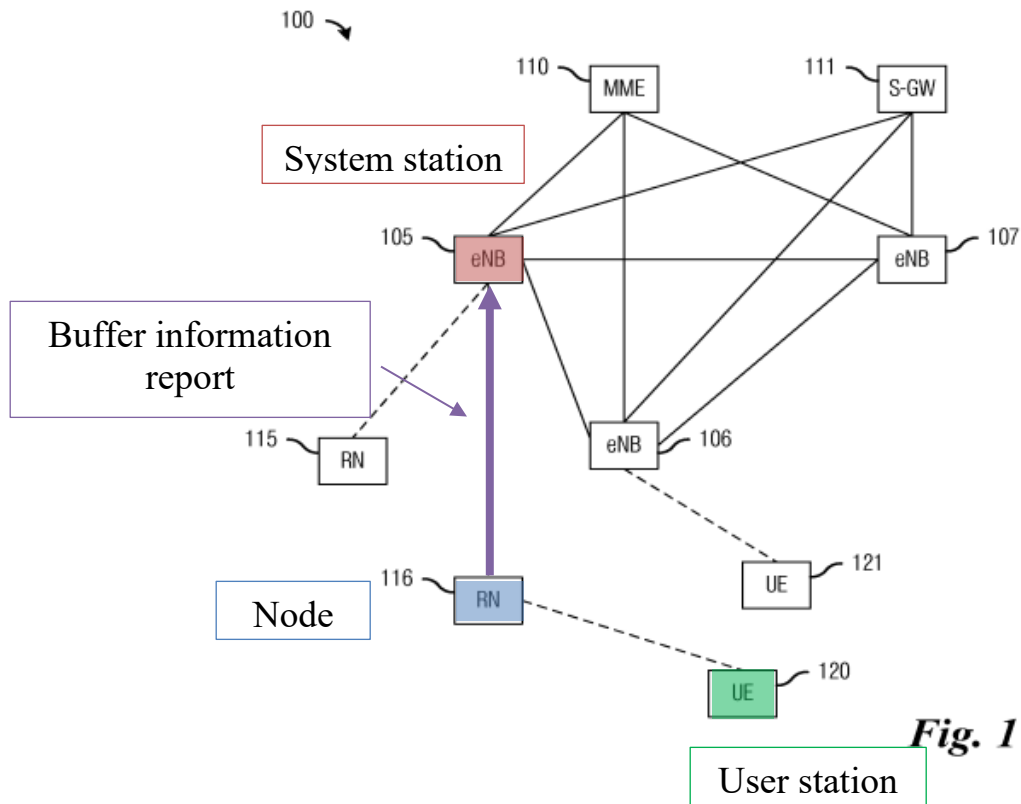
1. [1p]

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]

Yang discloses [1A] because *Yang* discloses a serving base station, a Donor eNB (system station), that receives buffer status information from a Relay Node. 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).

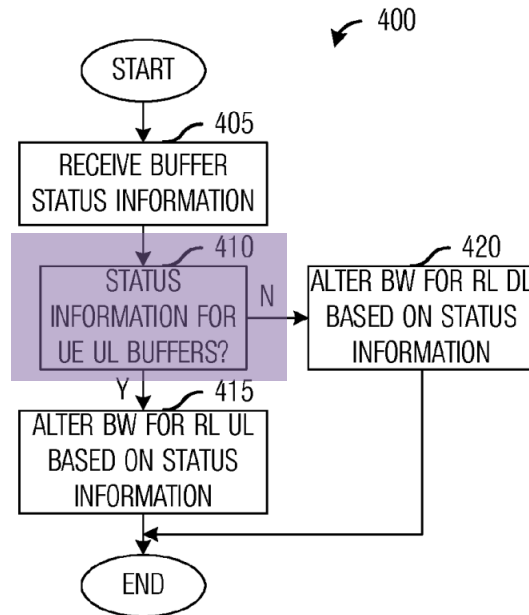


Fig. 4

Ex-1008, FIG. 4 (annotated).

Yang explains, “Donor eNB [(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. The buffer status information may provide information about the status of each buffer at the [relay node].” Ex-1008, [0052].

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”

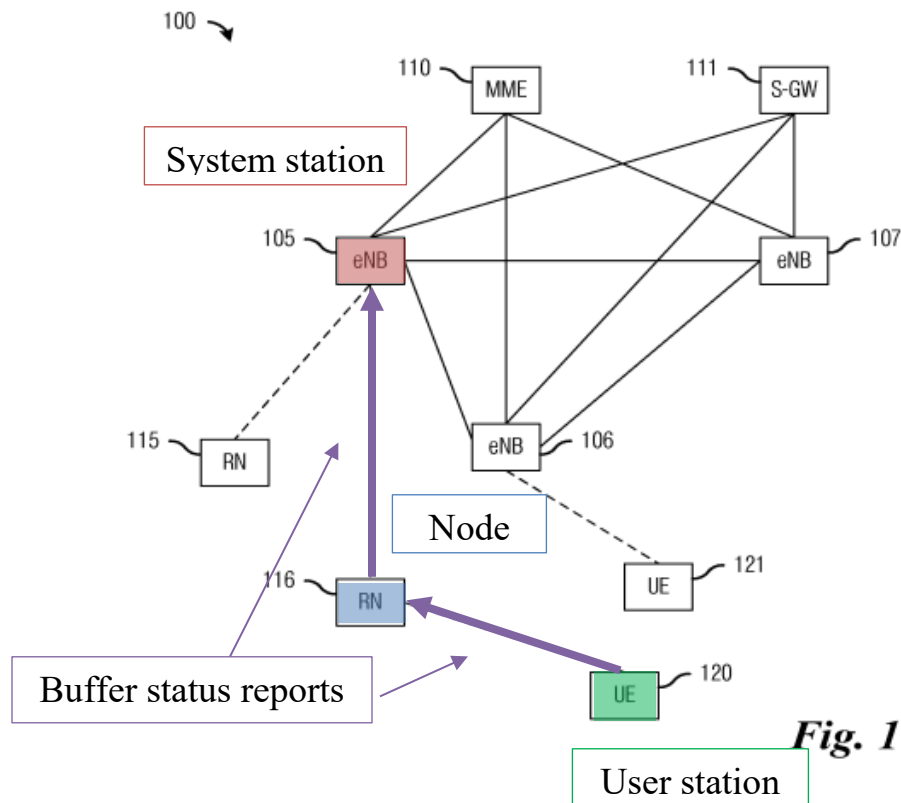
because, (1) “[o]n the [downlink], the [relay node] receives and buffers [downlink] data intended for [user equipments] ,” Ex-1008, [0005], and, (2) “[o]n the [uplink], the [relay node] receives and buffers [uplink] data from [user equipments],” *id.*, [0006].

3. [1B]

Yang renders obvious claim [1B].

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

Yang discloses several ways to report buffer status information to the donor eNB (system station), including a “Buffer Status Report (BSR) message” that “convey[s] buffer status information for [uplink], or [downlink], or both [uplink] and [downlink].” Ex-1008, [0081]. As FIG. 1 shows, BSRs come from both a user equipment (user station) and a Relay Node. *Id.*, FIG. 1. A POSA would have understood that the BSRs are used by user equipment to report on the uplink, including for buffer status information. Ex-1003, 165.



Ex-1008, FIG. 1 (annotated).

4. [1C]

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].

The '614 patent states, “the indication can be based on the number of user stations served by the node for relaying,” or it could be “an indication of the size of the buffer of the relay node.” *Id.*, 7:36-37.

Yang discloses an “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). *Yang*’s fill/consumption rate references “different buffering capabilities” because *Yang*’s 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 reflects “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]. *Yang*’s fill/consumption rate is reported as empty, full, or anywhere in between, *id.*, [0035], [0077], which corresponds to the ’614 patent’s “indication of the size of the buffer of the Relay Node.” Because *Yang*’s Relay Node reports a fill/consumption rate, the Relay Node provides an indication of different capabilities that the donor eNB uses to compute the expected time to buffer starvation. *Id.*, [0059]; Ex-1003, 168.

Yang 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]. A POSA would have understood the information for the uplink and downlink buffers would indicate the “different buffering capabilities,” because the

report carries different buffer information regarding user equipment buffers and relay node buffers. Ex-1003, 169.

Yang 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). A POSA would also have understood this to be an indication from *Yang*’s relay node reflecting differences from the user equipment uplink buffers and the relay node uplink buffers, as claimed. Ex-1003, 170.

B. [Claim 2]

Yang discloses claim 2.

Yang’s Relay Node “aggregate[s] 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. *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 (indication) includes information on the consumption rate (indication that the buffer size of the node for relaying is extended) and the amount of data in the buffer (size of the extension)

C. Claim 3

1. [3A]

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.

Yang discloses [3A] 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. [3B]

Yang discloses [3B] because *Yang*'s RN "provide[s] 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]

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]. 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. Ex-1003, 176. As confirmed by *Sung*, "[t]he MAC control PDU may be referred to as a MAC control element." Ex-1011, [127].

E. Claim 7

1. [7p]

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]

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 have understood, 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 (donor eNB) as seen in FIG. 1:

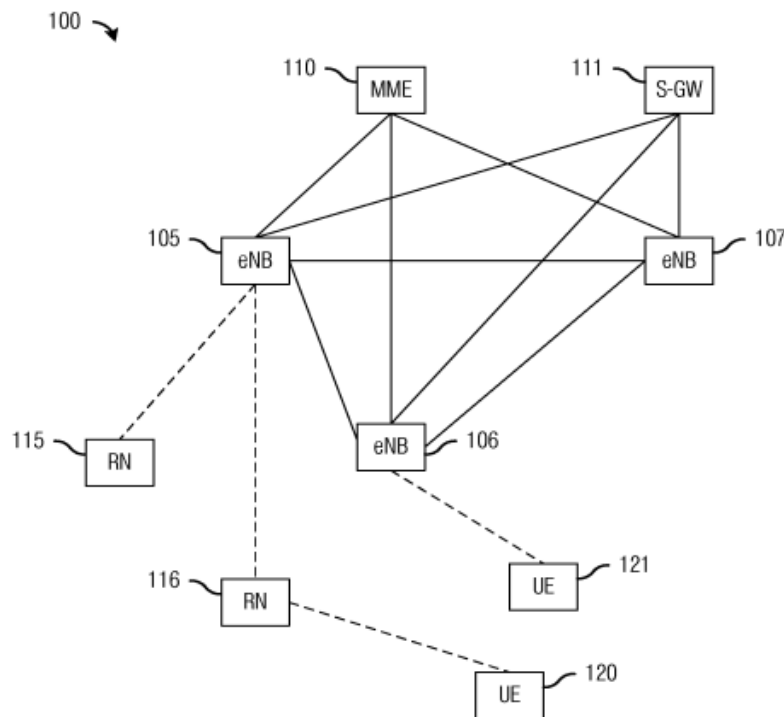


Fig. 1

Ex-1008, FIG. 1

Yang's "Donor eNB (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].

Yang's "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].

3. [7B]

Yang teaches this limitation as discussed above for [1B] in Section X.A.3. Ex-1003, 181.

4. [7C]

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]; Section X.A.4.

Yang's indications are computed by the relay node, and “[t]he RN may then transmit the buffer status information to the donor eNB.” Ex-1008, [0078].

5. [7C]

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.” 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]

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]

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 X.B).

G. [Claim 9]

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.C).

H. [Claim 10]

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 X.D).

XI. 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*

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..., and to enhance overall performance and deployment cost of the radio access network RAN." Ex-1007, [0021]; Ex-1003, 189. A POSA would thus 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. Ex-1003, 189.

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]; Ex-1003, 190.

B. Claim 6

1. [6P]

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]

Yang does not disclose the structure of [6A], 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...and over a second link 20B with the eNB 12 that is controlling the cell.” *Id.*, [0048].

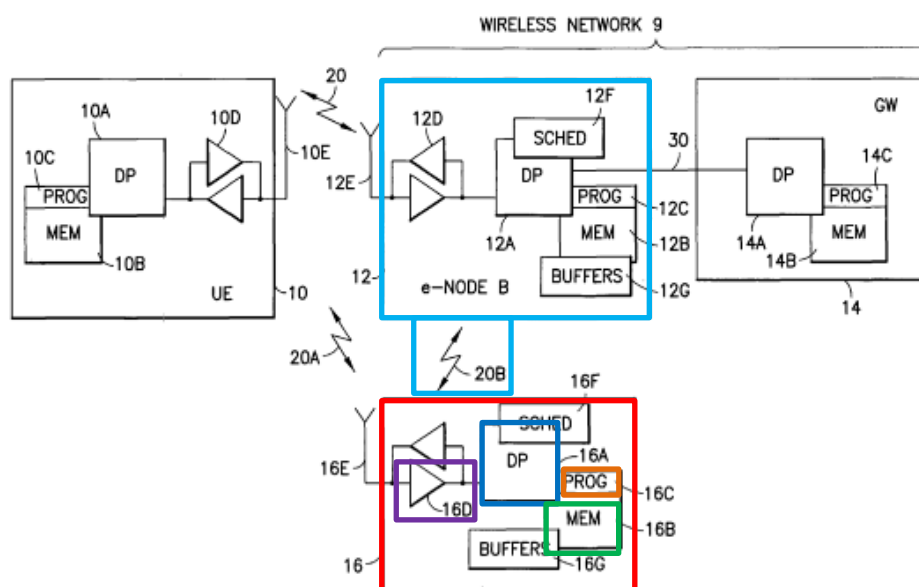


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XI.A. Ex-1003, 194.

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

3. [6B]

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

Kovacs discloses, “RN 16,” having a data processor 16A and memory 16B that stores a program 16C and using a transceiver (transmitter and receiver) 16D, Ex-1007, [0048], as discussed above in Section XI.B.2.

A POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XI.A. Ex-1003, 198.

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

C. Claim 12

1. [12p]

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]

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 have understood, 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 (donor eNB) in FIG. 1:

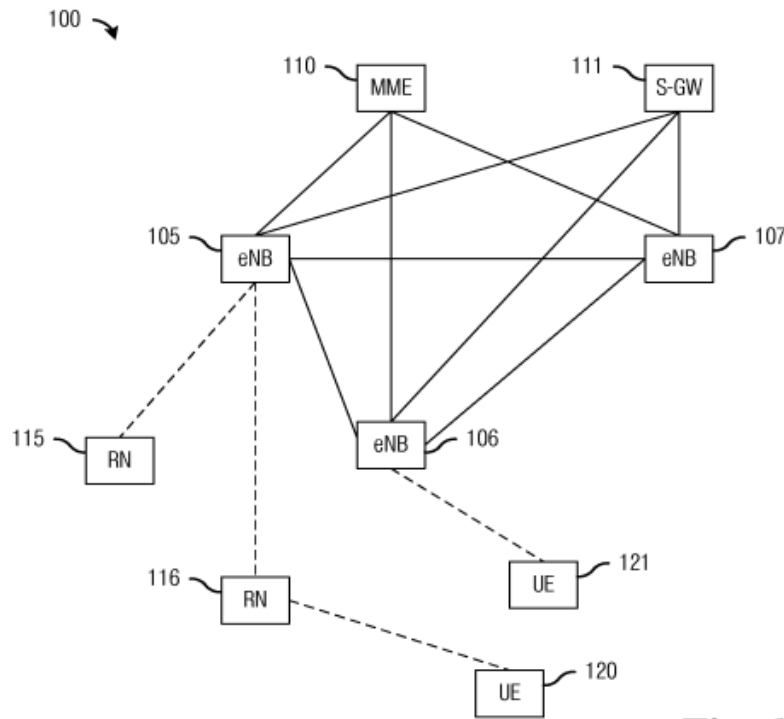


Fig. 1

Ex-1008, FIG. 1

Yang's , “Donor eNB (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].

Yang's “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 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].

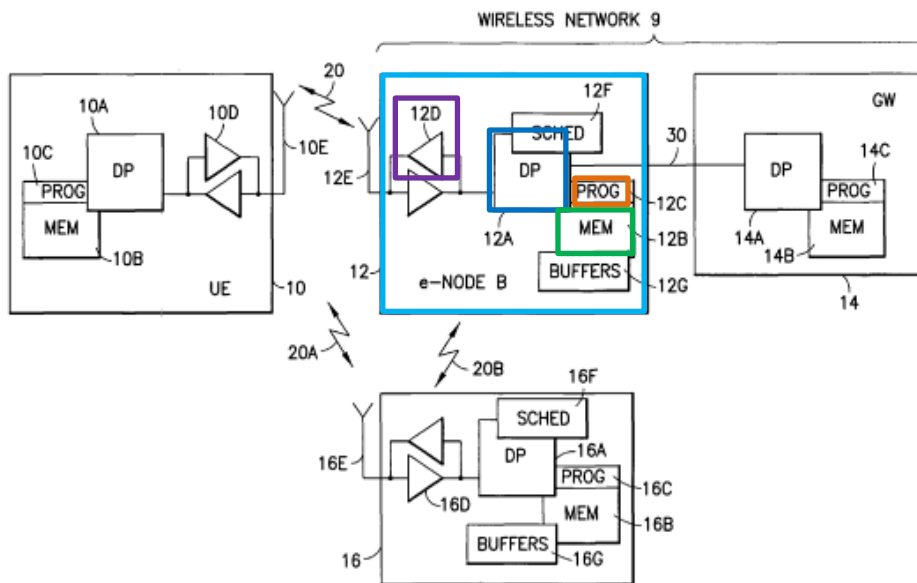


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Kovacs* with *Yang* as discussed above in Section XI.A. Ex-1003, 205.

3. [12B]

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

4. [12C]

Yang teaches this 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].

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 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). 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, the Relay Node is

providing an indication of different capabilities when it provides an amount of time to donor eNB. *Id.*; Ex-1003, 208.

Yang does not disclose the structure of claim [12C], but *Kovacs* does as explained in Section XI.C.2 for claim [12A].

A POSA would have been motivated to combine *Kovacs* with *Yang* as explained in Section XI.A. Ex-1003, 210.

5. [12D]

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]

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

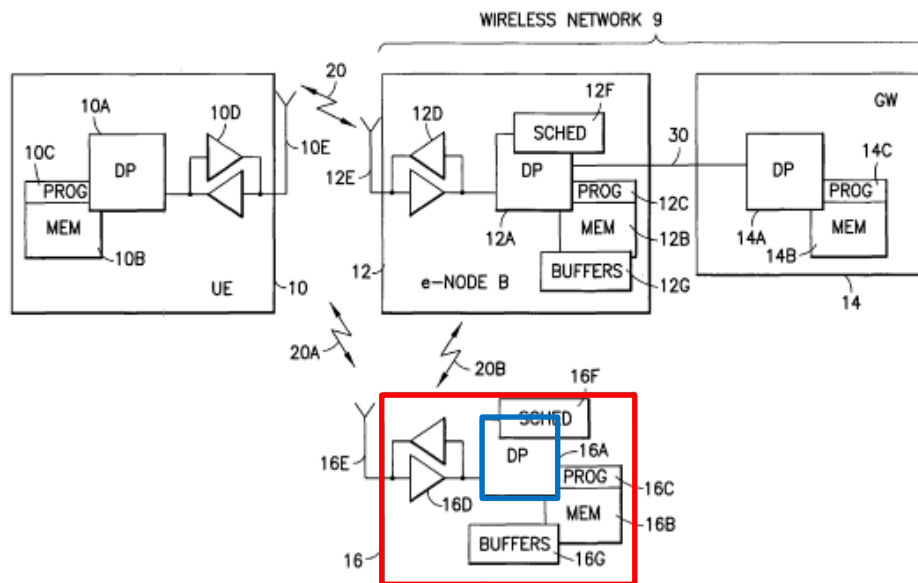
D. Claim 13

1. [13p]

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]

Yang in combination with *Kovacs* renders obvious [13A]. *Yang* does not expressly disclose a processor, but *Kovacs* does. “a RN 16, shown also as having a [data processor (DP)] 16A.” *Id.*, [0048].



Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Kovacs* with *Yang* as explained in Section XI.A. Ex-1003, 215.

3. [13B]

Yang in combination with *Kovacs* renders obvious [13B]. *Yang* does not expressly disclose the structure of [13B], but *Kovacs* does. *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.” *Id.*, [0048].

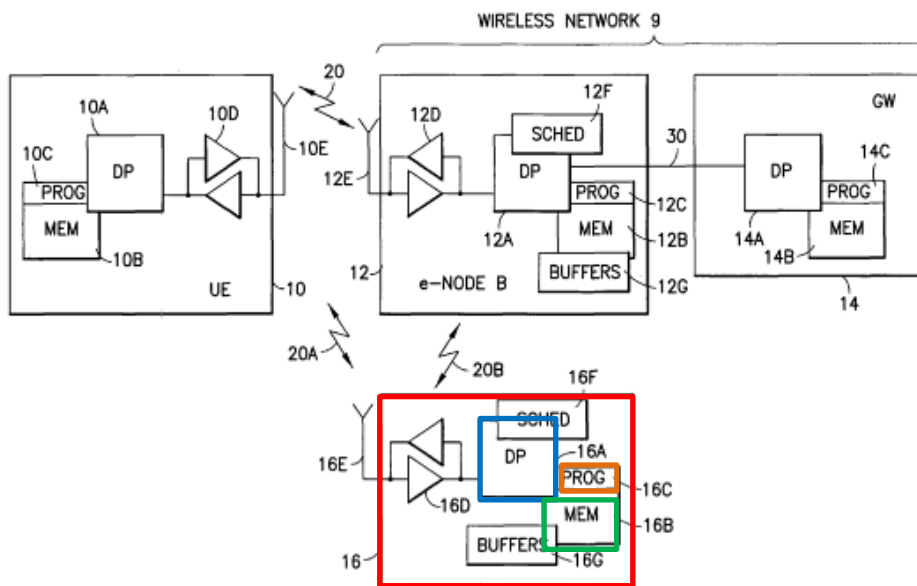


FIG. 2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Kovacs* with *Yang* as explained in Section XI.A. Ex-1003, 217.

4. [13C]

[13D] is substantially similar to [6A] but without reciting a means. *Yang* discloses this limitation as explained for claim [6A] (Section XI.B.2).

5. [13D]

[13E] is substantially similar to [6B] but without reciting a means. *Yang* discloses this limitation as explained for claim [6B] (Section XI.B.3).

E. [Claim 14]

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 X.B).

F. [Claim 15]

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 X.C.1-X.C.2).

G. [Claim 16]

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.” Ex-1008, [0081].

H. Claim 18

1. [18p]

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

2. [18A]

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

A POSA would have been motivated to combine *Yang* and *Kovacs* as explained in section XI.A. Ex-1003, 227.

3. [18B]

Yang does not disclose a processor, 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.” Ex-1007, [0046].

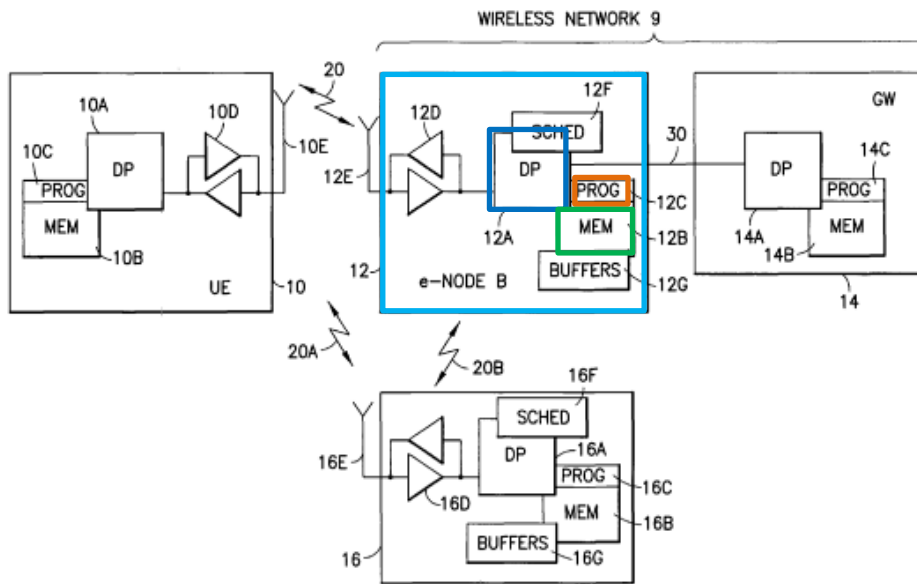


FIG.2

Ex-1007, FIG. 2.

A POSA would have been motivated to combine *Yang* and *Kovacs* as explained in section XI.A. Ex-1003, 229.

4. [18C]

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

5. [18D]

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

I. [Claim 19]

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 X.B).

J. [Claim 20]

As explained for [18A]-[18B] in Section XI.H.2-XI.H.3, *Kovacs* discloses the claimed memory, code, and processor.

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.

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].

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. Ex-1003, 237.

As disclosed by *Yang*, 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]

As explained for [18A]-[18B] in Section XI.H.2-XI.H.3, *Kovacs* discloses the claimed memory, code, and processor.

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 XI.G).

L. [Claim 23]

Yang does not teach this limitation, but *Kovacs* does. *Kovacs* discloses, “RN 16,” having a data processor 16A and a memory 16B that stores a program 16C.” Ex-1007, [0048].

M. [Claim 24]

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.” Ex-1007, [0046].

XII. 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

Sammour discloses a Long Term Evolution (LTE) architecture including a wireless transmit receive unit (WTRU) and an evolved Node-B (eNB).” *Id.*, [0003]. *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]. 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.*; Ex-1003, 245.

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. Ex-1003, 246. A POSA thus 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. *Id.*

B. [Claim 17]

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

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]. A POSA would have found it obvious that *Yang*’s fill/consumption rate (indication), which can be in a BSR, could likewise be included “by extending the BSR” and providing the information in the extension. Ex-1003, 248. (citing Ex-1010, [0060]). 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. Ex-1003, 248.

C. [Claim 22]

Claim 22 is substantially similar to claim 17 aside from its dependency from claim 16. *Yang* in view of *Sammour* and *Kovacs* renders obvious this limitation as explained for claim 17 (Section XII.B).

XIII. NON-INSTITUTION UNDER 35 U.S.C. § 314 IS IMPROPER

At this time, no factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5-6 (PTAB Mar. 20, 2020), weigh in favor of non-institution

under 35 U.S.C. § 314(a) because no trial date has been set in the parallel litigation and the parallel litigation is administratively stayed pending proper service of the complaint.

XVI. NON-INSTITUTION UNDER 35 U.S.C. § 325 IS IMPROPER

Non-institution under § 325 would also be improper because the asserted combinations are materially different from prior art in prosecution. The Examiner during U.S. prosecution applied no references in any rejection. Ex. 1002. The Examiner at the PCT receiving office applied only *Teyeb* and found two elements missing from *Teyeb*—“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.” Ex-1013, International Search Report, 3-4. The references in this Petition were identified in prosecution and are materially different from *Teyeb* because they teach the missing two elements, as explained above.

XVII. MANDATORY NOTICES

A. Real Parties-in-Interest

The real parties-in-interest are ZTE (USA) Inc. and ZTE Corporation.

B. Related Matters

Patent Owner has asserted the '614 patent in the following:

- *WSOU Investments, LLC v. ZTE Corporation et al.*, 6:22-cv-00136
(Feb. 8, 2022 W.D. Tex.).
- *WSOU Investments, LLC v. Oneplus Technology (Shenzhen) Co., Ltd.*,
6:20-cv-00953 (Oct. 14, 2020 W.D. Tex.).

C. Lead and Back-Up Counsel, and Service Information

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XVIII. GROUNDS FOR STANDING

The '614 patent is available for IPR and Petitioner is not barred or estopped from challenging the claims on the grounds herein.

XIX. CONCLUSION

Petitioner respectfully requests that the Board grant *inter partes* review and find all claims unpatentable.

Date: February 14, 2023

Respectfully Submitted,

/Lionel M. Lavenue/

Lionel M. Lavenue, Lead Counsel
Reg. No. 46,859

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing PETITION FOR *INTER PARTES* REVIEW contains 13,961 words, excluding the parts of this Petition that are exempted under 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Lionel M. Lavenue/

Lionel M. Lavenue, Lead Counsel

Reg. No. 46,859

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing **Petition for *Inter Partes* Review**, the associated **Power of Attorney**, and **Exhibits 1001 through 1014** are being served on February 14, 2023, by Priority Mail Express or by means at least as fast as Priority Mail Express at the following address of record for the subject patent.

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