

DECLARATION OF STAN McCLELLAN IN SUPPORT OF IPR PETITION FOR U.S.
PATENT No. 9,413,502

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC. AND NOKIA OF AMERICA CORPORATION

Petitioners,

v.

HEADWATER PARTNERS II LLC

Patent Owner.

Case No. IPR2025-_____

U.S. Patent No. 9,413,502

Declaration of Dr. Stan McClellan in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,413,502

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

TABLE OF CONTENTS

	Page
1. BACKGROUND AND QUALIFICATIONS	1
2. COMPENSATION	3
3. MATERIALS CONSIDERED	3
4. LEGAL STANDARDS	4
5. LEVEL OF ORDINARY SKILL IN THE ART	8
6. OVERVIEW OF THE '502 PATENT.....	10
6.1 Challenged Claims.....	12
7. CLAIM CONSTRUCTION.....	21
8. GROUNDS OF UNPATENTABILITY	22
8.1 Ground 1: Claims 1-5, 12-17, 26, 28, 30-32, 37, 38, 40 and 43 Are Rendered Obvious by Ishii and Further in View of a Person of Ordinary Skill in the Art.....	22
8.1.1 Ishii	23
8.1.2 1[pre] / 28[pre] / 30[pre]. A system comprising: 31[pre]. A base station, comprising: 40[pre]. A backhaul user equipment (bUE) device the bUE device operative to: 43[pre]. A method of providing backhaul, comprising:	26
8.1.3 1[a] / 30[a]. a base station (BS) operable to communicate directly with a first data network; 28[a]. a base station (BS) operative to directly communication with a first data network; 31[a]. [a base station comprising] means for communicating directly ith a first data network;	27
8.1.4 1[b] / 30[b]. a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to cmmunicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network; 28[b]. a backhaul user equipment (bUE) device, the bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the bUE device operable to communicate with a second data network through at least a second communication technology; 31[b]. [a base station comprising] means for wirelessly communicating with each of a plurality of backhaul user equipment (bUE) devices through at least a first communication technology, wherein the plurality of bUE devices are each operable to communicate with a second data network through at least a second communication technology; 40[a]. [a backhaul user equipment configured to] wirelessly communicate with a base station (BS); 40[b]. communicate a second data network through at least a	

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

second communication technology; wherein 40[c]. the bUE device is one of a plurality of bUE devices, wherein each of the bUE devices is also operable to communicate with second data network; 43[a]. wirelessly communicating, by at least one of a plurality of backhaul user equipment (bUE) devices, with a base station (BS) through at least a first communication technology; 43[b]. communicating, by at least one of the plurality of bUE devices, with a second data network through at least a second communication technology;.....28

8.1.5 1[c]. the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology; 28[c]. the BS operative to: communicate with the first data network over at least a third communication technology; 28[d]. [the BS operative to:] wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through the third communication technology; 30[c]. the BS operative to: communicate with the first data network through at least a third communication technology; 30[d]. [the BS operative to:] wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the first data network or the second data network through one or more of the plurality of bUE devices or the third communication technology; 31[c]. means for wirelessly communicating with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices or to the first data network through a third communication technology; 40[g]. the BS wirelessly communicates with the one or more user equipment (UE) devices, and network connects the one or more UE devices to the second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the first data network is different than the second data network. 43[c]. wirelessly communicating, by the BS, with one or more user equipment (UE) devices, and network connecting the one or more UE devices to the a second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the second data network is different than the first data network; 34

8.1.6 1[d] / 30[e]. [the BS operative to:] communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices; 28[e]. [the BS operative to:] communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices; 31[d]. a controller

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

- operative to select one or more of the plurality of bUE devices for backhaul (BH) traffic to the second data network or the BS for BH traffic directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices; 40[d]. the bUE further operative to: be selected from the plurality of bUE devices for backhaul (BH) traffic to the second data network, wherein the BH traffic comprises access traffic associated with one or more UE devices; 43[d]. selecting, one or more of the plurality of bUE devices for backhaul (BH) traffic to the second data network or the BS for BH traffic to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices;.....37
- 8.1.7 1[e] / 30[f]. [the BS operative to:] aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and 28[f]. [the BS operative to:] aid in selecting a transmission power level of at least one of the bUE devices, and at least one of the one or more UE devices; and 31[e]. the controller operative to aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and 40[e]. [the bUE further operative to:] receive from the BS a signal for aiding in selecting a transmission power level; 43[e]. aiding, by the BS, in selecting a transmission power level of at least one of the plurality of bUE devices, or at least one of the one or more UE devices; and.....41
- 8.1.8 1[f] / 28[g] / 30[g]. [the BS operative to:] transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices. 31[f]. means for transmitting resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices. 40[f]. [the bUE further operative to:] receive from the BS transmit resource block (RB) scheduling information for the BH traffic; wherein 43[f]. transmitting, by the BS, resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices. 42
- 8.1.9 2. The system of claim 1, wherein the plurality of bUE devices wirelessly communicate with the BS over one or more of wireless communication technologies, wherein the one or more wireless communication technologies comprise at least one of WiFi, WiMax, 3, 4G, LTE, Orthogonal frequency division multiple access (OFDMA), Wideband code division multiple access (WCDMA). 45
- 8.1.10 3. The system of claim 1, wherein the one or more UE devices wirelessly communicate with the BS and the plurality of bUE devices wirelessly communicate with the BS utilizing a same wireless communication technology.
4. The system of claim 3, wherein the one or more UE devices wirelessly communicate with the BS, and the plurality of bUE devices wirelessly

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

communicate with the BS utilizing the same wireless communication technology and a shared one or more frequency channels. 32. The BS of claim 31, wherein the one or more UE devices wirelessly communicate with the BS and the plurality of bUE devices wirelessly communicate with the BS utilizing a same wireless communication technology.....	46
8.1.11 5. The system of claim 1, wherein at least one of the plurality bUE devices is at least one of associated with or a part of a small cell BS, wherein the small cell BS comprises client side modem functionality.....	47
8.1.12 12. The system of claim 1, wherein the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is used in part on the data flow parameter. 37. The BS of claim 31, wherein the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is based in part on the data flow parameter.	48
8.1.13 13. The system of claim 1, wherein the BS operative to aid in selecting the transmission power level of at least one of the plurality of bUE devices, or the one or more UE devices is assisted by a signal transmitted by the BS.....	49
8.1.14 14. The system of claim 1, wherein a resource block comprises a partition of a carrier or frequency channel for the wirelessly communicating. 15. The system of claim 14, wherein the partition comprises one or more of a unit of time, a unit of frequency, a code	50
8.1.15 16. The system of claim 1, wherein the wireless communication between the plurality of bUE devices and the BS is enhanced relative to the wireless communication between the BS and at least one of the one or more UE devices, wherein the enhanced wireless ommunication comprises one or more of better antenna gain, more antennas, outdoor installation, better processing power, better transmit or receive analog or digital performance, lower transmit power, higher or outdoor installation, improved link parameters, improved number of antennas.....	51
8.1.16 17. The system of claim 1, further comprising classifying and prioritizing the BH traffic based on the access traffic, and wherein the RB scheduling information for the BH traffic is based on the BH traffic prioritization. 38. The BS of claim 31, wherein the controller of the BS is further operative to classify and prioritize the BH traffic based on the access traffic, and wherein the RB scheduling information for the BH traffic is based on the BH traffic prioritization.....	53
8.1.17 26. The system of claim 1, wherein at least a first bUE device of the plurality of bUE devices transmits or receives access traffic associated with the first bUE.	55

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

8.2	Ground 2: Claims 6-11, 19, 29, 33-36, 39, 41 and 44-46 Are Rendered Obvious by Ishii and Sfar and Further in View of a Person of Ordinary Skill in the Art.....	55
8.2.1	Sfar	56
8.2.2	Motivations to Combine Ishii and Sfar	57
8.2.3	6. The system of claim 1, wherein the BS is further operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS. 33. The BS of claim 31, wherein the controlle of the BS is further operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS. 44. The method of claim 43, further comprising obtaining one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.....	59
8.2.4	7. The system of claim 6, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters. 34. The BS of claim 33, wherein the selection of the one or more of the plurality of bUE devices for th BH traffic is based on the first parameters. 45. The method of claim 44, wherein the selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters.	60
8.2.5	8. The system of claim 6, wherein the one or more first parameters comprises one or more of a link quality, link quality statistics, link quality variation, path loss, fading, shadowing, Signal to Noise Ratio (SNR), Signal to Interference and Noise Ratio(SINR), Packet Error Rate (PER), received interference, interference generated to other devices, Channel Quality Indicator (CQI), Channel State Information (CSI), Modulation and Coding Scheme (MCS), Precoding Matrix Indicator (PMI), rank indicator (RI), single user or multiuser Multiple Input Multiple Output (SU-MIMO or MU-MIMO) information.....	61
8.2.6	9. The system of claim 1, wherein the BS is further operative to obtain one or more second parameters associated with the second data network through at least the second communication technology. 35. The BS of claim 31, wherein the controller of the BS s further operative to obtain one or more second parameters associated with the second data network through at least the second communication technology.....	63
8.2.7	10. The system of claim 9, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the one or more second parameters. 36. The BS of claim 35, wherein the selection of the one or more of the plurality of bUE evices for the BH traffic is based on the one or more second parameters.	64
8.2.8	11. The system of claim 9, wherein the one or more second parameters comprise one or more of a link quality, bandwidth, throughput, cost, latency, jitter, QoS, PER.....	65

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

8.2.9	19. The system of claim 1, wherein a bUE device selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication between the bUE device and the BS or one or more second parameters of associatd with the second data network through at least the second communication technology. 39. The BS of claim 31, wherein a bUE selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication with the BS or one or more second parameters of the second communication technology. 46. The method of claim 43, wherein a bUE selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication with the BS or one or more second parameters of the second communication technology.....	66
8.2.10	29. The system of claim 28, wherein the BS is further operative to obtain one or more third parameters associated with the first data network through at least the third communication technology.	66
8.2.11	41. The bUE device of claim 40, further operative to process a BH traffic header information based on the second data network through the at least a second communication technology.....	67
9.	CONCLUSION.....	69

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

I, Dr. Stan McClellan, declare and state as follows:

1. I have been retained on behalf of Ericsson Inc. and Nokia of America Corporation (“Petitioners”) as an independent technical expert in this proceeding before the United States Patent and Trademark Office (“PTO”) regarding U.S. Patent No. 9,413,502 (the “’502 Patent”). I have been asked to consider whether certain references disclose or suggest the features recited in Claims 1-17, 19, 26, 28-41 and 43-46 of the ’502 Patent (the “Challenged Claims”). My opinions are set forth below.

1. Background and Qualifications

2. I am currently serving as the Director of the JSC Engineering, Technology and Science Program (JETS) at Texas State University, a partnership with Jacobs Technology Group and NASA’s Johnson Space Center (JSC). Previously, I held the following positions at Texas State:

- Professor in the Ingram School of Engineering from 2013-2023;
- Co-Director of the Connected Infrastructure initiative for Education, Demonstration, and Research (CIEDAR) from 2019 to 2023;
- Director of the Ingram School of Engineering from 2013 to 2018;
- Associate Director of the Ingram School of Engineering from 2011 to 2013;
- and
- Associate Professor in the Ingram School of Engineering from 2008 to 2013.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

My other academic experience is as an Associate Professor of Electrical and Computer Engineering at the University of Alabama at Birmingham from 1995 to 2002.

3. I received my Ph.D. from Texas A&M University (1995) in Electrical Engineering (EE) with a specialization in communication and data processing. Also from Texas A&M, I received a M.S. in EE (1991) and a B.S. in EE (1986).

4. My research activities at Texas State involved the development and management of FCC-licensed private 5G and LTE wireless networks, and the management of a regional LoRaWAN wireless network for low-rate, real-time data collection in multiple projects at CIEDAR. During my time as a Professor, I developed performance enhancements for Internet transport protocols and packet handling based on signal processing and machine learning algorithms, and designed a multi-building “5G-capable” core network to support multiple faculty re-search projects as well as academic priorities. During my time as an Associate Professor, I investigated various Smart Grid systems and advanced technologies for broadband networking (e.g. 40/100Gb Ethernet), developed novel PHY layer for low-frequency communication via power lines, and developed performance enhancements for IP transport protocols.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

5. I also have technical experience from my time in the private sector. I previously held executive or senior engineering positions at companies including Power Tagging Technologies, ZNYX Networks, SBE, Hewlett Packard, General Dynamics and LTV Aerospace and Defense Company. I have also served as a technical consultant for companies such as Cisco, American Express, 3COM, BellSouth, N.E.T., Alcatel, AT&T, Research in Motion (RIM), F5 Networks, LSU Medical Center, and the U.S. National Science Foundation.

6. I have published dozens of books and peer-reviewed research papers in this field, and have given numerous related technical talks world-wide. I am a named inventor on fourteen patents and have served as a technical expert witness in numerous patent litigation cases.

7. My full qualifications and experience are set forth in my Curriculum Vitae, which is attached as Exhibit A to this declaration.

2. Compensation

8. I am being compensated at my standard hourly rate of \$350 per hour for my work performed in connection with this matter. My compensation does not depend in any way upon the outcome of this matter.

3. Materials Considered

9. I have relied on the following documents in forming my opinions:

- a. The '502 Patent;

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

- b. The '502 Patent's File History (U.S. Application No. 14/053,561);
- c. U.S. Provisional Application No. 61/714,135;
- d. U.S. Patent No. 9,544,827 ("Ishii"); and
- e. International Application No. WO2013/037903A2 ("Sfar").

4. Legal Standards

10. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed by Counsel about certain aspects of the law that are relevant to my analysis, as summarized below.

11. I have been informed by Counsel that the first step in an invalidity analysis involves construing the claims, as necessary, to determine their scope. I have also been informed by Counsel that claims are generally given their ordinary and custom meaning as understood by a person of ordinary skill in the art ("POSITA") at the time of the invention, in light of the patent's claims, specification and file history.

12. I have additionally been informed by Counsel that claim construction is a matter of law and that the final claim constructions for this proceeding will be determined by the Patent Trial and Appeal Board ("PTAB").

13. I have further been informed by Counsel that a patent claim is obvious under 35 U.S.C. §103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

based on one or more prior art and/or knowledge of a POSITA. I have been further informed by Counsel that a claim is invalid under 35. U.S.C. § 102 if it is anticipated, which requires that every element of a claim is disclosed in a single prior art reference, arranged as in the claim.

14. I have additionally been informed by Counsel that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long-felt but unmet need, failure of others, copying by others, and skepticism of experts).

15. I have been informed by Counsel that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I have further been informed by Counsel that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I have further been informed by Counsel that a POSITA is presumed to understand the relevant prior art. I have also been informed by Counsel that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

16. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed by Counsel that the following principles may be considered:

- a. whether the references to be combined involve non-analogous art;
- b. whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- c. whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- d. whether the combination is of familiar elements according to known methods that yields predictable results;
- e. whether a combination involves the substitution of one known element for another that yields predictable results;
- f. whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- g. whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- h. whether the combination is “obvious to try”;

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

i. whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces, where the variations are predictable to a POSITA;

j. whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;

k. whether the combination requires modifications that render the prior art unsatisfactory for its intended use;

l. whether the combination requires modifications that change the principle of operation of the reference;

m. whether the combination is reasonably expected to be a success; and

n. whether the combination possesses the requisite degree of predictability at the time the invention was made.

17. I have been informed by Counsel that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have further been informed by

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

Counsel that the existence of an explicit teaching, suggestion or motivation to combine known elements of the prior art is a sufficient, but not a necessary, condition to finding of obviousness. This so-called “teaching-suggestion-motivation” test is not the exclusive test and is not to be applied rigidly in an obviousness analysis.

18. I have been informed by Counsel that “a person of ordinary skill in the art” is a hypothetical person to whom an expert in the relevant field could assign a routine task with reasonable confidence that the task would be successfully carried out. I have also been informed by Counsel that evidence of the level of ordinary skill in the art can be found in the patent-in-question.

19. I have been informed by Counsel that a method claim is composed of a series or sequence of steps, each of which state an operation to be performed. I am further informed by Counsel that the sequential arrangement of the steps is not important unless it is essential to the invention itself, and to determine whether the steps recited in a method claim must be performed in the sequence in which they appear in the claim in order, one must look to the nature of the steps themselves and to the written description of the method in the specification.

5. Level of Ordinary Skill in the Art

20. I have reviewed the relevant disclosures of the Patent-in-Suit (“the ’502 Patent”) as well as relied on the documents identified above, and on my education

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

and experience, to arrive at my opinions regarding the level of a person of ordinary skill in the art ordinary skill in the art.

21. In my opinion, a person of ordinary skill in the art in the field of the '502 Patent in the relevant time frame would have been someone with at least (1) a bachelor's degree in electrical engineering, computer engineering/science, or a related scientific field, and (2) either (a) a master's degree in electrical engineering, computer engineering/science, or a related field, or (b) two or more years of work or research experience in wireless networking and/or computing.

22. In determining the level of ordinary skill in the art, I considered, for example, the type of problems encountered in the art, prior art solutions to those problems, the rapidity with which innovations were made, the sophistication of the technology, and the educational level of active workers in the field.

23. I met the definition of a POSITA in the relevant time frame. I also had greater knowledge and experience than a POSITA in the relevant time frame. I render my opinions, however, from the perspective of a POSITA, based on my knowledge and research and teaching experience. Indeed, my opinions concerning the '502 Patent and the prior art are from the perspective of a POSITA.

6. Overview of the '502 Patent

24. Below, I provide a brief summary of the background technology and the state of the art as of the priority date of the '502 Patent as context for understanding the disclosure and claims of the '502 Patent.

25. The '502 Patent claims priority to a U.S. Provisional Application No. 61/714,135, filed on October 15, 2012.

26. The '502 Patent relates to a system, methods, and apparatuses comprising a BS operable to connect UE devices to data networks through multiple backhaul pathways. ('502 Patent, Abstract.)

27. The backhaul portion of a communication network is the link between a core network and the access points of the communication network (e.g., a BS). ('502 Patent, Fig. 3.)

28. Figure 3 below shows an example embodiment of the alleged invention of the '502 Patent:

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

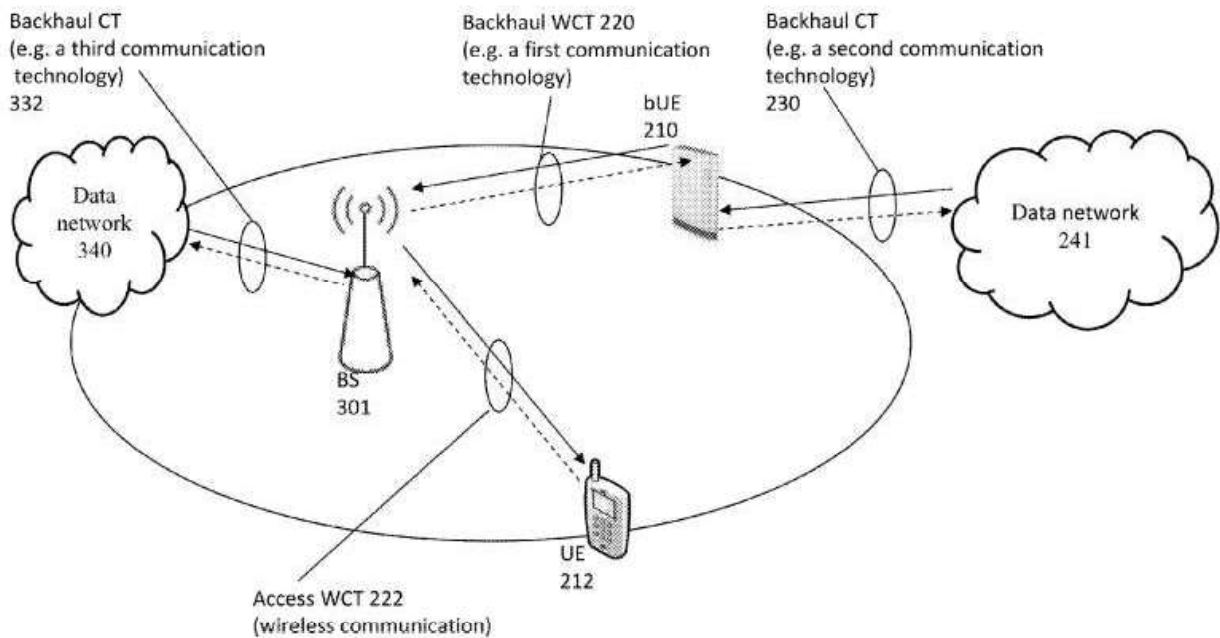


Figure 3

(’502 Patent, Fig. 3.) As shown in Figure 3, the BS (301) communicates with a UE (212) through a wireless communication technology. (’502 Patent, Fig. 3.) The BS (301) also has (i) a first backhaul pathway (332) directly to a first data network (340), and (ii) a second backhaul pathway (220, 230) to a second data network (241) via backhaul user equipment device (210). (’502 Patent, Fig. 3.) While not pictured, the base station can have multiple backhaul pathways via bUE devices. (’502 Patent, 10:59-62.) Each leg of these backhaul pathways (i.e., connection from BS to first data network, connection from BS to bUE, and connection from bUE to second data network) can employ a different communication technology. (’502 Patent, cl. 1.)

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

29. The UE communicates access traffic to the base station. ('502 Patent, 3:65-4:2.) In turn, the base station selectively chooses one of those backhaul pathways to communicate the backhaul traffic associated with that access traffic. ('502 Patent, 10:36-42.)

30. In some embodiments, the BS selects the appropriate backhaul pathway based on a characteristic of the access traffic. ('502 Patent, 9:18-23.) In other embodiments, the BS selects the appropriate backhaul pathway based on one or more characteristics of the backhaul pathways. ('502 Patent, 12:34-39.)

31. Finally, the base station also helps coordinate (i) the transmission power level of the UE and bUE devices, and (ii) radio resource sharing between the various network entities. ('502 Patent, cl. 1.)

6.1 Challenged Claims

32. This Declaration addresses Claims 1-17, 19, 26, 28-41 and 43-46 of the '502 Patent, which I have been informed by Counsel are the challenged claims. I have added indices of the form 1[pre], 1[a], 1[b], etc. to the claim limitations for ease of reference.

33. The '502 Patent has six independent claims (1, 28, 30, 31, 40 and 43) that are substantially similar to one another. For example, Independent Claim 1 describes the use of a BS and backhaul user equipment ("bUE") to route backhaul

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

traffic from UEs to two different data networks, and Independent Claim 28 does not add any significant limitations:

Claim 1	Claim 28
1. A system comprising: a base station (BS) operable to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network; the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology;	28. A system comprising: a base station (BS) operative to directly communication with a first data network; a backhaul user equipment (bUE) device, the bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the bUE device operable to communicate with a second data network through at least a second communication technology; the BS operative to: communicate with the first data network over at least a third communication technology; wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through the third communication technology;

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices; aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.	communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices; aid in selecting a transmission power level of at least one of the bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.
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Independent Claim 30 also does not add any significant limitations:

Claim 1	Claim 30
1. A system comprising: a base station (BS) operable to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second	30. A system comprising: a base station (BS) operative to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

communication technology, wherein the second data network is different than the first data network; the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology; communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices; aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of	communication technology, wherein the second data network is different than the first data network; the BS operative to: communicate with the first data network through at least a third communication technology; wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the first data network or the second data network through one or more of the plurality of bUE devices or the third communication technology; communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first network through the third communication technology wherein the BH traffic comprises access traffic associated with the one or more UE devices; aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of
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DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

bUE devices and the access traffic of at least one of the one or more UE devices.	bUE devices and the access traffic of at least one of the one or more UE devices.
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Independent Claim 31 is an apparatus claims for the BS used in the system of

Independent Claim 1:

Claim 1	Claim 31
1. A system comprising: a base station (BS) operable to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network; the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network though a third communication technology;	31. A base station, comprising: means for communicating directly with a first data network; means for wirelessly communicating with each of a plurality of backhaul user equipment (bUE) devices through at least a first communication technology, wherein the plurality of bUE devices are each operable to communicate with a second data network through at least a second communication technology; means for wirelessly communicating with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices or to the first data network through a third communication technology;

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices; aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.	a controller operative to select one or more of the plurality of bUE devices for backhaul (BH) traffic to the second data network or the BS for BH traffic directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices; the controller operative to aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and means for transmitting resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.
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Independent Claim 40 is an apparatus claim for the bUE used in the system of

Independent Claim 1:

Claim 1	Claim 40
1. A system comprising: a base station (BS) operable to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology,	40. A backhaul user equipment (bUE) device the bUE device operative to: wirelessly communicate with a base station (BS); communicate a second data network through at least a second communication technology; wherein

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

and the plurality of bUE devices each operable to communicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network; the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology; communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises	the bUE device is one of a plurality of bUE devices, wherein each of the bUE devices is also operable to communicate with second data network; the bUE further operative to: be selected from the plurality of bUE devices for backhaul (BH) traffic to the second data network, wherein the BH traffic comprises access traffic associated with one or more UE devices; receive from the BS a signal for aiding in selecting a transmission power level; receive from the BS transmit resource block (RB) scheduling information for the BH traffic; wherein the BS wirelessly communicates with the one or more user equipment (UE) devices, and network connects the one or more UE devices to the second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the first data network is different than the second data network.
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DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

access traffic from the one or more UE devices; aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.	
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Independent Claim 43 is a method claim for the system of Independent Claim 1:

Claim 1	Claim 43
1. A system comprising: a base station (BS) operable to communicate directly with a first data network; a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network; the BS operative to:	43. A method of providing backhaul, comprising: wirelessly communicating, by at least one of a plurality of backhaul user equipment (bUE) devices, with a base station (BS) through at least a first communication technology; communicating, by at least one of the plurality of bUE devices, with a second data network through at least a second communication technology;

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology;	wirelessly communicating, by the BS, with one or more user equipment (UE) devices, and network connecting the one or more UE devices to the a second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the second data network is different than the first data network;
communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices;	selecting, one or more of the plurality of bUE devices for backhaul (BH) traffic to the second data network or the BS for BH traffic to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices;
aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and	aiding, by the BS, in selecting a transmission power level of at least one of the plurality of bUE devices, or at least one of the one or more UE devices; and
transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.	transmitting, by the BS, resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.

34. Dependent Claims 2-17, 19, 26, 29, 32-39, 41 and 44-46 add various limitations to the independent claims. For example:

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

6. The system of claim 1, wherein the BS is further operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.

7. The system of claim 6, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters.

9. The system of claim 1, wherein the BS is further operative to obtain one or more second parameters associated with the second data network through at least the second communication technology.

10. The system of claim 9, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the one or more second parameters.

12. The system of claim 1, wherein the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is based in part on the data flow parameter.

29. The system of claim 28, wherein the BS is further operative to obtain one or more third parameters associated with the first data network through at least the third communication technology.

7. Claim Construction

35. I have been informed by Counsel that for the purposes of this Petition, the Petitioners have proposed the following construction:

Claim Term	Petitioners' Proposed Construction
client side modem functionality (Claim 5)	"a subset of a UE device or bUE device functionality"

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

36. I have been asked by Counsel to consider the construction of “client side modem functionality” proposed by Petitioners. In my opinion, a POSITA at the time of the ’502 Patent’s filing would have understood “client side modem functionality” to mean “a subset of a UE device or bUE device functionality” by reading the specification because the specification explains that “client side modem functionality” includes, for example, “a subset of a UE device or bUE device functionality.” (’502 Patent, 6:46-50 (“For at least one embodiment a small cell BS (for example one or more of a microcell, a picocell, a relay node, femtocell) includes client side modem functionality (for example *a subset of a UE device or bUE device functionality*).”).).)

8. Grounds of Unpatentability

37. I am informed by Counsel that Claims 1-17, 19, 26, 28-41 and 43-46 of the ’502 Patent are challenged. As explained below, an element-by-element analysis of the challenged claims demonstrates that the Challenged Claims are disclosed or taught by the prior art.

8.1 Ground 1: Claims 1-5, 12-17, 26, 28, 30-32, 37, 38, 40 and 43 Are Rendered Obvious by Ishii and Further in View of a Person of Ordinary Skill in the Art

38. I have been asked by Counsel to review and provide my opinion as to the validity of Challenged Claims 1-5, 12-17, 26, 28, 30-32, 37, 38, 40 and 43 of the

'502 Patent over Ishii, either alone or in view of a person of ordinary skill's knowledge.

8.1.1 Ishii

39. Ishii relates to a wireless network where a BS can connect a UE device to a network via multiple backhaul pathways. (Ishii, Abstract.)

40. Figure 5 shows an example embodiment:

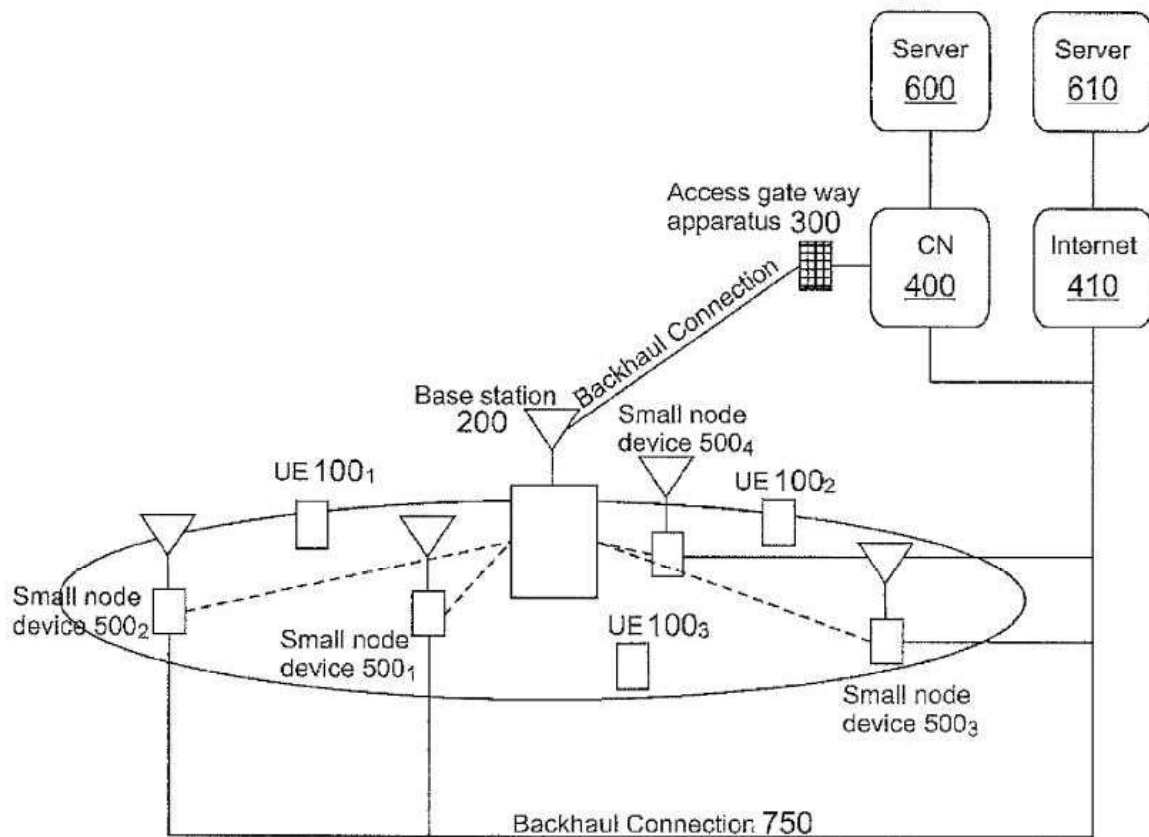


FIG. 5

(Ishii, Fig. 5.)

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

41. As shown in Figure 5, the BS (200) is in communication with UE devices (100₁-100₃). (Ishii, Fig. 5, 6:36-37, 10:46-48.) The BS (200) is also in communication with a number of small node devices (500₁-500₄). (Ishii, Fig. 5, 10:46-50.) The BS (200) is connected to a core network (400) via a backhaul connection, while the small node devices (500₁-500₄) are connected to the core network (400) and a second network (the Internet) (410) via a different backhaul connection (750). (Ishii, Fig. 5, 6:47-49, 10:46-53.)

42. Figure 3 of Ishii further explains how data flows through Ishii's network architecture:

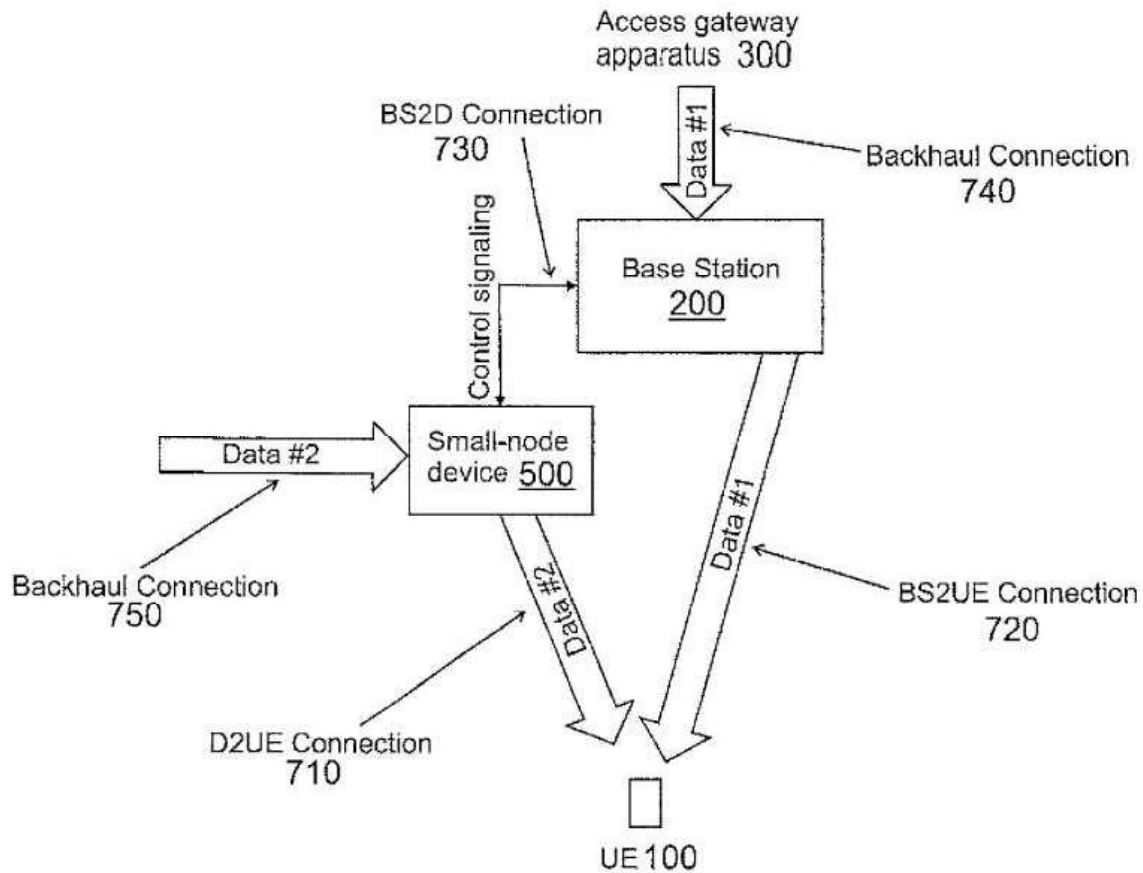


FIG. 3

(Ishii, Fig. 3.) While Figure 3 shows data flowing in the downlink direction, Ishii explains that data may also flow in the uplink direction. (Ishii, 10:1-22.) When a UE attempts to communicate with a data network, the BS selects the appropriate backhaul path for the UE (either via (i) BS2UE Connection 720 and Backhaul Connection 740, or (ii) D2UE Connection 710 and Backhaul Connection 750). (Ishii, 10:1-22.)

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

43. The BS selects the appropriate backhaul path by considering characteristics of the access traffic and the connection between the UE and the small-node device or BS. (Ishii, 10:5-8, 10:27-37.) The BS then sends control signaling to the UE (100) via BS2UE Connection (720) and to the small-node device (500) via BS2D Connection (730), and the UE communicates with a data network in accordance with the BS's instructions. (Ishii, 10:22-27.)

44. As discussed above, Backhaul Connection 750 may be to a different data network (the Internet) than Backhaul Connection 740 (a core network). (Ishii, Fig. 5, 6:47-49, 10:46-53.)

45. Just as in the '502 Patent, the base station of Ishii also helps coordinate (i) the transmission power level of the UE and bUE devices, and (ii) radio resource sharing between the various network entities. (Ishii, 14:52-15:21, 12:39-13:24.)

8.1.2 1[pre] / 28[pre] / 30[pre]. A system comprising:

31[pre]. A base station, comprising:

40[pre]. A backhaul user equipment (bUE) device the bUE device operative to:

43[pre]. A method of providing backhaul, comprising:

46. To the extent the claims' preambles are limiting, in my opinion Ishii discloses these limitations.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

47. As discussed in detail below and in Section 8.1.1, Ishii discloses systems and methods for offloading backhaul traffic through a backhaul user equipment device. (*See, e.g.*, Ishii, Abstract, 2:42-3:42, cls. 1-23.) These systems and methods include a base station. (*See, e.g.*, Ishii, 2:51-63.) Furthermore, as discussed in more detail below, the systems and methods disclosed in Ishii make use of “advanced user equipment” and “small node devices,” both of which are bUEs. (*See, e.g.*, Ishii, 5:3-8:67.)

8.1.3 **1[a] / 30[a]. a base station (BS) operable to communicate directly with a first data network;**

28[a]. a base station (BS) operative to directly communication with a first data network;

31[a]. [a base station comprising] means for communicating directly with a first data network;

48. In my opinion, Ishii discloses a system and methods comprising a base station operable to communicate directly with a first data network because it discloses a base station that connects to a higher layer station, which is part of the core network. (Ishii, 6:34-53 (“Base station 200 is connected to a higher layer station, for example, an access gateway apparatus 300. In turn, access gateway 300 is connected to a core network (CN) 400.”), 9:17-22, Fig. 1a, Fig. 1b). This core network is a first data network.

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

49. Unlike the other independent claims, Claim 31 requires a base station comprising “means for communicating directly with a first data network.” The ’502 Patent explains that these means may be any “modules, circuits, or other means.” (’502 Patent, 48:25-27.)

50. In my opinion, this limitation is also met because Ishii explains that the base station comprises a “backhaul communication section” which communicates with the core network, and the backhaul communication section corresponds to the means of the ’502 Patent. (Ishii, 21:22-27.)

8.1.4 1[b] / 30[b]. a plurality of backhaul user equipment (bUE) devices, each of the plurality of bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the plurality of bUE devices each operable to communicate with a second data network through at least a second communication technology, wherein the second data network is different than the first data network;

28[b]. a backhaul user equipment (bUE) device, the bUE devices operable to wirelessly communicate with the BS through at least a first communication technology, and the bUE device operable to communicate with a second data network through at least a second communication technology;

31[b]. [a base station comprising] means for wirelessly communicating with each of a plurality of backhaul user equipment (bUE) devices through at least a first communication technology, wherein the plurality of bUE devices are each operable to communicate with a second data network through at least a second communication

technology;

**40[a]. [a backhaul user equipment configured to] wirelessly communicate with a base station (BS);
40[b]. communicate a second data network through at least a second communication technology; wherein
40[c]. the bUE device is one of a plurality of bUE devices, wherein each of the bUE devices is also operable to communicate with second data network;**

43[a]. wirelessly communicating, by at least one of a plurality of backhaul user equipment (bUE) devices, with a base station (BS) through at least a first communication technology;

43[b]. communicating, by at least one of the plurality of bUE devices, with a second data network through at least a second communication technology;

51. In my opinion, Ishii discloses a plurality of backhaul user equipment devices operable to wirelessly communicate with (1) the base station through at least a first communication technology, and (2) a second data network through at least a second communication technology, wherein the second data network is different than the first data network.

52. First, Ishii discloses “advanced user equipment” (“UE-A”) and “small-node devices.” (Ishii, 3:32-35 (“the first architecture uses a novel network device denoted as an advanced user equipment (UE-A).”), 6:66-7:6 (“A second architecture is shown in FIG. 1b. Like the UE-A of the first architecture, the second architecture uses a cellular network device that enables a user to offload traffic from a macrocell base station without the prior art drawbacks discussed earlier.”).)

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

53. The UE-A and small-node devices described in Ishii function in materially the same way. (Ishii, 30:39-43 (“Thus, as used herein, a “small-node device” is synonymous with an “advanced user equipment” unless the BS2D link is a modified X2 interface.”) In my opinion, as explained below, these UE-A and small node devices function as backhaul user equipment devices.

54. With respect to the UE-A, Ishii explains that UE-A “shares a number of features in common with conventional user equipment (UE). . . . [but] with respect to a UE, a UE-A may be a network-side device analogous to a base station or other network-side node. . . . In contrast to a conventional UE, the UE-A of the first architecture allows offloading of data traffic that would otherwise have to be carried by the link between the macrocell base station and the UE.” (Ishii, 5:11-23.) Ishii further explains that “[t]he UE-A has a backhaul link to the core network and/or the Internet to accommodate the offloaded data.” (Ishii, 5:23-25.)

55. With respect to small-node devices, Ishii explains that “[i]n an analogous fashion to the UE-A of the first architecture, the second the second architecture uses a cellular network device that enables a user to offload traffic from a macrocell base station The cellular network devices of the second architecture opportunistically offload traffic from the macro base stations and are denoted as small-node devices hereinafter.” (Ishii, 6:66-7:6.) Like the UE-A, Ishii explains that

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

“[t]o perform this offloading of data traffic, the small-node devices have a backhaul link, which is connected to the Internet or the core network so as to communicate with a server in the Internet or the core network.” (Ishii, 7:49-52.)

56. As shown in Figures 1a and 1b, the system disclosed in Ishii, whether employing UE-A (Fig. 1a) or small-node devices (Fig. 1b), comprises not just one but a plurality of bUEs (500₁ through 500₃):

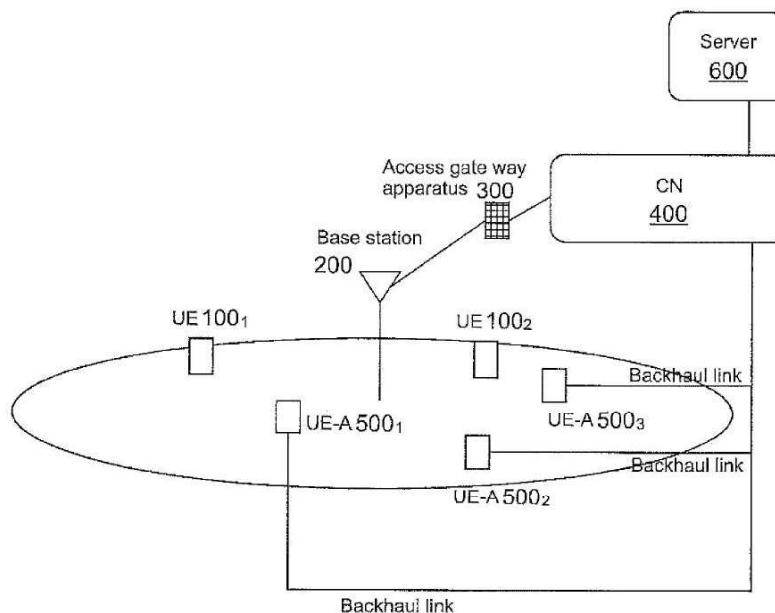


FIG. 1a

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

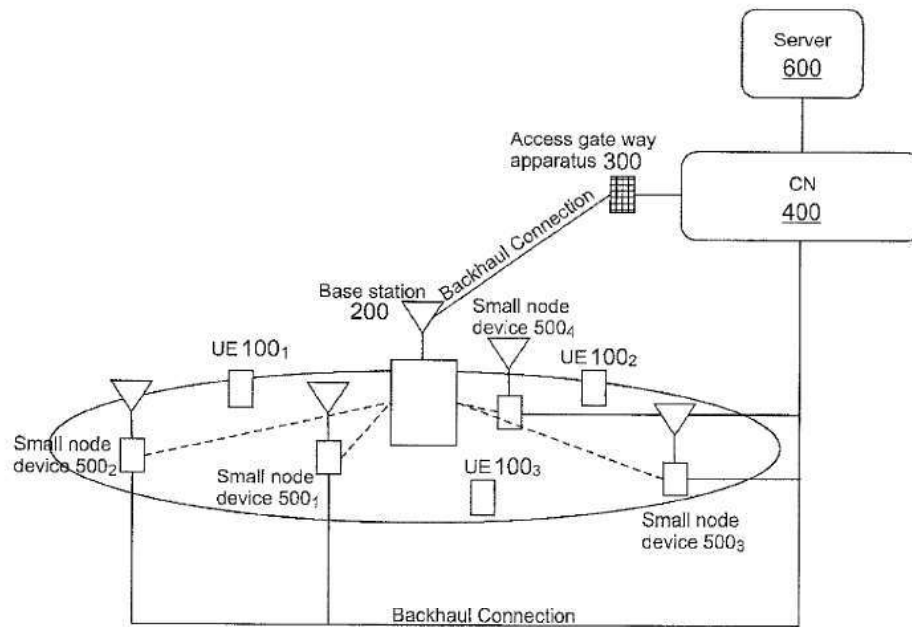


FIG. 1b

(Ishii, Fig. 1a, Fig. 1b, 9:3-5.)

57. Second, Ishii discloses that its plurality of bUE devices wirelessly communicate with the base station through a first communication technology. (Ishii, 9:35-39 (“Small-node devices 500 communicate with base station 200 using a base-station-to-small-node-device (BS2D) link. For example, the BS2D link may comprise a wired X2 interface link. Alternatively, *the BS2D link may be a wired or wireless link* that is different from an X2 link.”).) The wireless link disclosed in Ishii is a first wireless communication technology.

58. Finally, Ishii discloses that the UE-A or small node devices may connect to the Internet. (Ishii, 5:23-25 (“The UE-A has a backhaul link to the core

network and/or the Internet to accommodate the offloaded data.”), 7:49-52 (“To perform this offloading of data traffic, the small-node devices have a backhaul link, which is connected to the Internet or the core network so as to communicate with a server in the Internet or the core network.”))

59. As shown in Ishii’s Figure 5 below, the internet (410) is a second data network different from the first core data network (400).

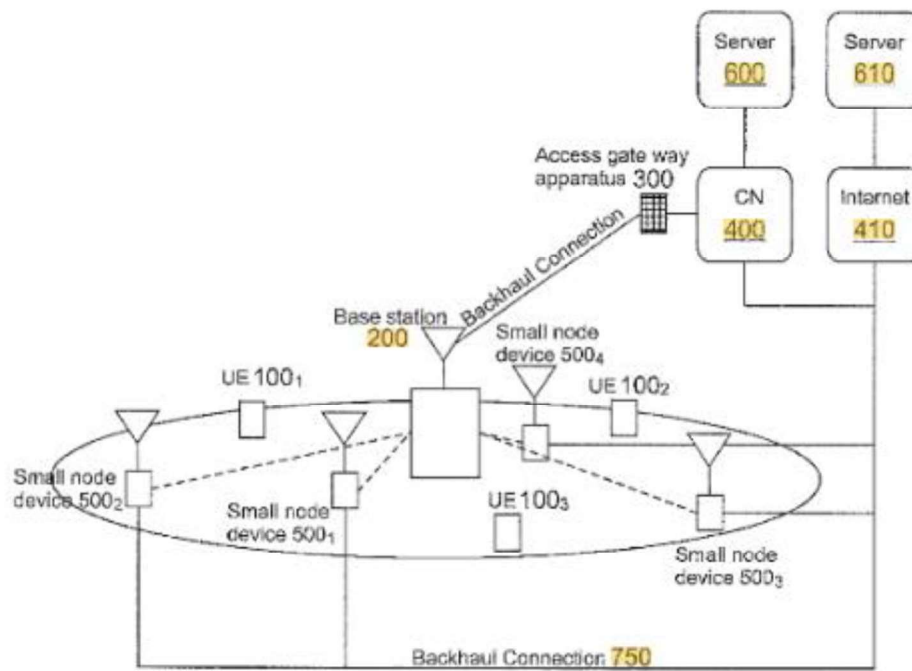


FIG. 5

(Ishii, Fig. 5.) The UE-A or small node devices communicate with the Internet through WiFi or a cellular connection. (Ishii, 7:52-55 (“The backhaul link to the small-node device is not limited to a wired connection to the Internet, but may be a wireless connection to the Internet, such as a WiFi or cellular connection.”).) This

WiFi or cellular connection is a second communication technology that is different from the first communication technology (*i.e.*, an X2 interface or LTE). (Ishii, 9:35-39.)

8.1.5 **1[c]. the BS operative to: wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through a third communication technology;**

28[c]. the BS operative to: communicate with the first data network over at least a third communication technology;
28[d]. [the BS operative to:] wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices, or directly to the first data network through the third communication technology;

30[c]. the BS operative to: communicate with the first data network through at least a third communication technology;
30[d]. [the BS operative to:] wirelessly communicate with one or more user equipment (UE) devices, and network connect the one or more UE devices to the first data network or the second data network through one or more of the plurality of bUE devices or the third communication technology;

31[c]. means for wirelessly communicating with one or more user equipment (UE) devices, and network connect the one or more UE devices to the second data network through one or more of the plurality of bUE devices or to the first data network through a third communication technology;

40[g]. the BS wirelessly communicates with the one or more user equipment (UE) devices, and network connects the one

or more UE devices to the second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the first data network is different than the second data network.

43[c]. wirelessly communicating, by the BS, with one or more user equipment (UE) devices, and network connecting the one or more UE devices to the a second data network through one or more of the plurality of bUE devices or to a first data network through a third communication technology, wherein the second data network is different than the first data network;

60. In my opinion, Ishii discloses a base station that wirelessly communicates with one or more user equipment and is able to network connect the one or more user equipment devices (1) to the second data network through one or more of the plurality of bUE devices, or (2) directly to the first data network through a third communication technology.

61. First, Ishii explains that the base station communicates with the UE through a wireless BS2UE connection. (Ishii, 3:3-11 (“In accordance with a second aspect of the disclosure, a user equipment (UE) configured to receive offloaded data from a small-node device in a cellular telecommunication system is provided that includes: *a macro-base-station-to-the-user-equipment (BS2UE) communication section configured to receive a first control-plane message and user-plane data from the base station over a wireless BS2UE link . . .*.”).)

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

62. Second, Ishii explains that through control plane signaling,¹ the base station network connects the UE: (1) to the second data network through one or more of the plurality of bUE devices, or (2) directly to the first data network:

[T]here must be an entity that decides what data will be offloaded through the small-node devices as opposed to a conventional exchange between the user equipment and the base station. Because the base station receives radio link quality reports from the user equipment and/or the small-node devices, ***the base station is a natural choice for the data partition decision (i.e., deciding what data should be offloaded).***

* * *

Control-plane signaling is transmitted in BS2D connection 730 so that base station 200 can control the establishment, reconfiguration, release, and handoff of D2UE connection 710. Control signaling is transmitted also in BS2UE connection 720 so that base station 200 can perform these functions for D2UE connection 710.

(Ishii, 10:2-22.)

¹ The '502 Patent contemplates that data uplink data passes from the UE through the base station to the bUE. I do not believe that this is a requirement of the Challenged Claims, but to the extent the Board believes that a BS is only operable to “network connect” a UE to a bUE if data flows from the UE to the BS to the bUE, Ishii still meets this limitation. Ishii discloses that the data from the UE may pass through the base station before reaching the small node device or UE-A. (Ishii, 9:54-60 (“In other embodiments, small-node devices 500 may be connected to base station 200, instead of the core network 400. In this case, data plane traffic flows in base station 200, but data processing in the base station 200 can be minimized, because data processing in lower layers such as physical layer or MAC layer is handled by small-node device 500.”).)

63. Finally, Ishii discloses that the base station communicates with the first data network through a third communication technology. (Ishii, 6:40-46 (“Evolved Universal Terrestrial Radio Access (E-UTRA)/Universal Terrestrial Radio Access Network (UTRAN) (also denoted as Long Term Evolution (LTE)) is applied in the system of FIG. 1b but it will be appreciated that a wide variety of other wireless protocols such as WiMAX, WiFi, or LTE Advanced may also be implemented in the system.”), 9:10-16; 17:11-16 (“Backhaul communication section 506 is connected to core network 400 via a backhaul link. The backhaul link may be a wired connection or a wireless connection or a mixture of a wired connection and a wireless connection. The wireless connection may be a connection provided by a WiFi (Wireless LAN) or cellular system.”).)

8.1.6 1[d] / 30[e]. [the BS operative to:] communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic from the one or more UE devices;

28[e]. [the BS operative to:] communicate backhaul (BH) traffic through a selectable one of to the second data network through the one or more of the plurality of bUE devices, and directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices;

31[d]. a controller operative to select one or more of the plurality of bUE devices for backhaul (BH) traffic to the

second data network or the BS for BH traffic directly to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices;

40[d]. the bUE further operative to: be selected from the plurality of bUE devices for backhaul (BH) traffic to the second data network, wherein the BH traffic comprises access traffic associated with one or more UE devices;

43[d]. selecting, one or more of the plurality of bUE devices for backhaul (BH) traffic to the second data network or the BS for BH traffic to the first data network, wherein the BH traffic comprises access traffic associated with the one or more UE devices;

64. In my opinion, Ishii discloses that the base station communicates backhaul traffic through a selectable one or more of the plurality of bUE devices to the second data network and directly to the first data network. (Ishii, 10:1-22, 12:56-13:9.)

65. Ishii's Figure 3 is demonstrative:

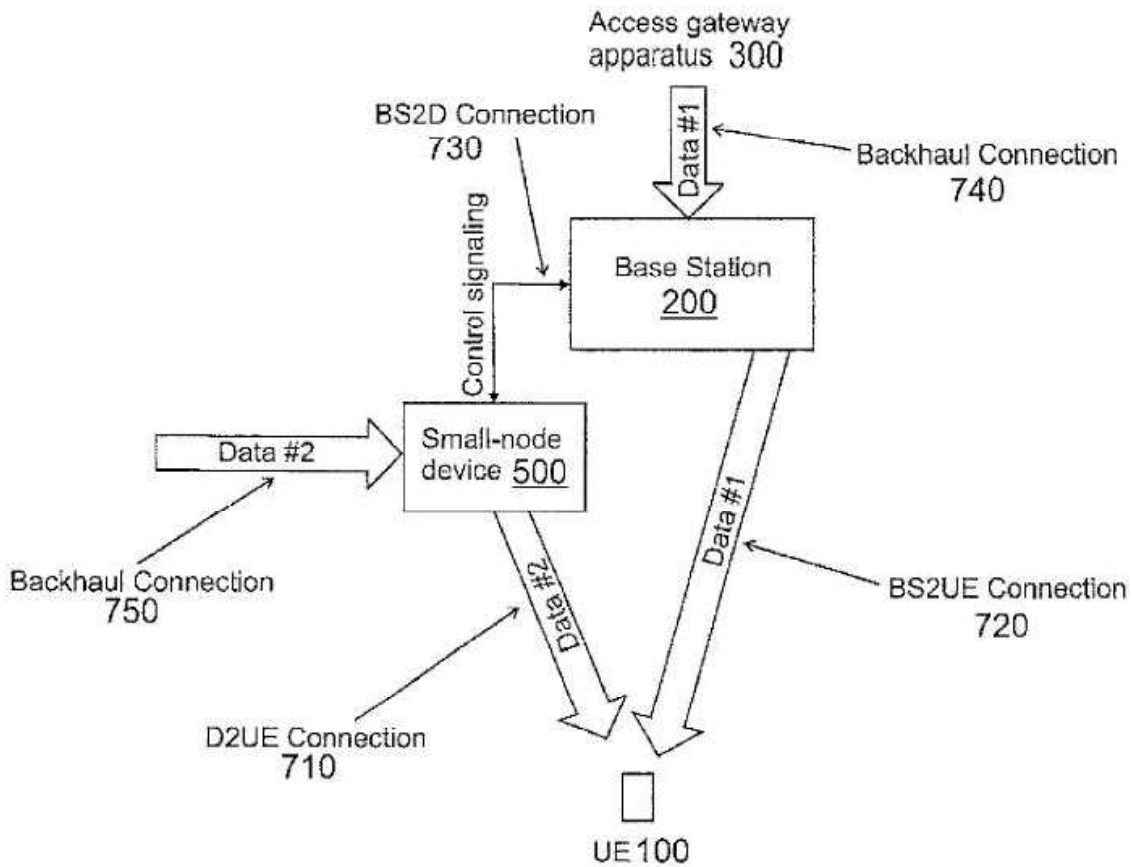


FIG. 3

(Ishii, Fig. 3.)

66. Ishii explains that in Figure 3, the base station communicates backhaul traffic to and from the UE both through the base station and through the small node device, and the base station selects which device to use when offloading backhaul traffic:

FIG. 3 illustrates data flow in the communication system of FIG. 2. In that regard, there must be an entity that decides what data will be offloaded through the small-node devices as opposed to a conventional exchange

between the user equipment and the base station. Because the base station receives radio link quality reports from the user equipment and/or the small-node devices, the base station is a natural choice for the data partition decision (i.e., deciding what data should be offloaded). With regard to FIG. 3, a decision has been made to offload some data but also have other data not be offloaded. *The non-offloaded data is designated as Data #1, which is transferred from the access gateway apparatus 300 to the base station 200 in backhaul connection 740 and then transmitted to user equipment 100 in BS2UE connection 720 in downlink (DL), and vice versa in uplink (UL).* The flow for Data #1 is thus be transmitted in a conventional fashion. In addition to Data #1, *offloaded Data #2 is transferred from core network 400 to small-node device 500 in backhaul connection 750 and then transmitted to user equipment 100 in D2UE connection 710 in DL, and vice versa in UL. Control-plane signaling is transmitted in BS2D connection 730 so that base station 200 can control the establishment, reconfiguration, release, and handoff of D2UE connection 710. Control signaling is transmitted also in BS2UE connection 720 so that base station 200 can perform these functions for D2UE connection 710.*

(Ishii, 10:1-22, 12:56-13:9 (“In that regard, base station 200 may select the appropriate connection (D2UE connection 710 or BS2UE connection 720) that should be preferentially utilized in the communications for each radio bearer.”).)

67. While Figure 3 explains that Data #2 is offloaded to the first data network, Ishii explains that Data #2 may be offloaded to a second data network instead. (Ishii, 11:12-15 (“It may also be determined by data bearers whether data should flow via the small-node devices and the Internet 410, or via the small-node devices and core network 400, or via the small-node devices and base station 200.”); Fig. 5.)

68. And while Figure 3 shows arrows denoting downlink traffic, Ishii explains that Data #1 and Data #2 travel in both the downlink (DL) and uplink (UL) directions. (Ishii, 10:1-22.) Since the traffic includes uplink (UL) traffic from the UE to the UE-A/small node device (Data #2 through D2UE connection 710) and base station (Data #1 through BS2UE connection 720), the corresponding uplink backhaul traffic comprises access traffic associated with the UE. (Ishii, 10:1-22, Fig. 3.)

8.1.7 1[e] / 30[f]. [the BS operative to:] aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and

28[f]. [the BS operative to:] aid in selecting a transmission power level of at least one of the bUE devices, and at least one of the one or more UE devices; and

31[e]. the controller operative to aid in selecting a transmission power level of at least one of the plurality of bUE devices, and at least one of the one or more UE devices; and

40[e]. [the bUE further operative to:] receive from the BS a signal for aiding in selecting a transmission power level;

43[e]. aiding, by the BS, in selecting a transmission power level of at least one of the plurality of bUE devices, or at least one of the one or more UE devices; and

69. In my opinion, Ishii discloses that the base station is operative to aid in selecting a transmission power level of at least one of the plurality of bUE devices,

and at least one of the one or more UE devices in both the downlink (DL) and uplink (UL) directions

70. As explained in Ishii:

Base station 200 may set the maximum transmission power for DL or UL in D2UE connection 710 based on the number of the user equipment in the cell where the small-node device provide radio communication service. For example, the base station sets the maximum transmission power to be higher in case that the number of the user equipment in the cell is relatively small. ***Conversely, the base station will set the maximum transmission power to be lower if the number of the user equipment in the cell is large.*** As a result, an interference level in the carrier used in D2UE connection 710 can be reduced by making the maximum transmission power low in a high density deployment. In case that there are relatively few user equipment, coverage area of D2UE connection 710 can be increased by making the maximum transmission power relatively high. Another power selection scheme is discussed further below with regard to an FDD enhancement for the D2UE link.

(Ishii, 14:60-15:21.) This is aiding in the selection of a transmission power level.

71. With respect to the D2UE connection, DL communications are transmitted from the small node device or UE-A while UL communications are transmitted by the UE. By disclosing that the base station sets the transmission power level of both the DL and UL communications of the D2UE connection, Ishii discloses that the base station aids in selecting a transmission power level of both the bUE devices and UE devices.

8.1.8 1[f] / 28[g] / 30[g]. [the BS operative to:] transmit resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic

of at least one of the one or more UE devices.

31[f]. means for transmitting resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.

40[f]. [the bUE further operative to:] receive from the BS transmit resource block (RB) scheduling information for the BH traffic; wherein

43[f]. transmitting, by the BS, resource block (RB) scheduling information for the BH traffic of at least one of the plurality of bUE devices and the access traffic of at least one of the one or more UE devices.

72. In my opinion, Ishii inherently discloses that the base station is operative to transmit resource block scheduling information for the access traffic of at least one of the one or more UE devices.

73. As explained in Ishii:

Base station 200 may control the radio resource allocation for D2UE connection 710. The radio resources may be allocated selectively in the time domain, frequency domain, and code domain resources. For example, base station 200 may configure D2UE connection 710 to use a non-overlapping spectrum with regard to any other D2UE connections such as by controlling a carrier center frequency. As a result, interference problems caused by other D2UE connections can be mitigated. Similarly, base station 200 may configure the time resource in D2UE connection 710 so that it does not overlap with the time resource utilized in other D2UE connections. Alternatively, base station 200 may configure the code resource in D2UE connection 710 so that it does not overlap with the code resource utilized in other D2UE connections. As a result, interference problems caused by other D2UE connections can be mitigated.

(Ishii, 14:10-25.) The traffic transmitted by the D2UE connection is access traffic.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

74. In order for the base station to control radio resource allocation of the D2UE connection (*i.e.*, access traffic) as disclosed in Ishii, the base station must send resource block scheduling information. For instance, Ishii explicitly states that “[t]he invention focuses on the Physical (PHY) and Link Layer design of systems such as 3GPP’s Long Term Evolution (LTE).” (Ishii, 9:43-47.) In LTE, radio resources are managed using resource block allocations. Therefore, in my opinion, a POSITA would understand based on the disclosure that the invention of Ishii focuses on LTE systems that radio resource control in LTE would be implemented by having the BS transmit resource block scheduling information.

75. In my opinion, Ishii also inherently discloses that the base station is operative to transmit resource block scheduling information for the backhaul traffic of the at least one of the plurality of bUE devices because it discloses transmitting backhaul traffic according to a half-duplex FDD radio resource assignment. (Ishii, Abstract (“The user equipment can send and receive data through the small-node device using the backhaul link according to a half-duplex FDD radio resource assignment in a wireless link between the user equipment and the small-node device.”).) In my opinion, the base station must be the network entity controlling radio resource allocation of the backhaul link (by, as discussed above, transmitting resource block scheduling information), because it is the entity sending control plane

signaling to the bUE and UE devices and controlling radio resource allocation for the D2UE connection. (Ishii, 10:22-27; 14:10-25.)

76. In the alternative, a POSITA would find it obvious to modify Ishii such that the BS would transmit RB scheduling information for the backhaul traffic of the at least one of the plurality of bUE devices. Radio resource management was and is a common issue in wireless systems, and prioritization and classification of traffic to be placed on limited capacity channels was an ongoing concern as of October 15, 2012. Ishii discloses that the BS may be in communication with a plurality of bUE devices, each with a BH connection to the same data network. (Ishii, Fig. 5, 6:47-49, 10:46-53.) A POSITA would understand that the plurality of bUE's would need to share radio resources when transmitting backhaul traffic on a limited capacity channel, and, for the reasons discussed above, it would be obvious to modify the base station of Ishii to control the radio resource allocation of the backhaul traffic of the plurality of bUEs by sending resource block scheduling information.

8.1.9 2. The system of claim 1, wherein the plurality of bUE devices wirelessly communicate with the BS over one or more of wireless communication technologies, wherein the one or more wireless communication technologies comprise at least one of WiFi, WiMax, 3G, 4G, LTE, Orthogonal frequency division multiple access (OFDMA), Wideband code division multiple access (WCDMA).

77. Claim 2 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii.

78. In my opinion, Ishii further discloses that the plurality of bUE devices wirelessly communicate with the BS over one or more wireless communication technologies, including at least LTE. (Ishii, 9:38-39 (“Alternatively, the BS2D link may be a wired or wireless link that is different from an X2 link.”); 11:42-51 (“Similarly, base station 200 configures BS2D connection 730 between base station 200 and small-node devices 500. . . . In some other embodiments, the protocol design may be an LTE interface.”); cl. 7 (“7. The small-node device of claim 1, wherein the BS2D link is an LTE link.”); 6:40-46 (“Evolved Universal Terrestrial Radio Access (E-UTRA)/Universal Terrestrial Radio Access Network (UTRAN) (also denoted as Long Term Evolution (LTE)) is applied in the system of FIG. 1b but it will be appreciated that a wide variety of other wireless protocols such as WiMAX, WiFi, or LTE Advanced may also be implemented in the system.”), 9:10-16.)

8.1.103. The system of claim 1, wherein the one or more UE devices wirelessly communicate with the BS and the plurality of bUE devices wirelessly communicate with the BS utilizing a same wireless communication technology.

4. The system of claim 3, wherein the one or more UE devices wirelessly communicate with the BS, and the plurality of bUE devices wirelessly communicate with the BS utilizing the same wireless communication technology and a shared one or more frequency channels.

32. The BS of claim 31, wherein the one or more UE devices wirelessly communicate with the BS and the plurality of bUE

devices wirelessly communicate with the BS utilizing a same wireless communication technology.

79. Claim 3 is dependent upon Claim 1, and Claim 32 is dependent on Claim 31, all limitations of which are disclosed in or rendered obvious by Ishii. Claim 3 and 31 further require that the one or more UE devices and the bUE devices wirelessly communicate with the BS using the same technology. Claim 4 is dependent on Claim 3. Claim 4 also requires that the UE and bUE devices communicate with the BS with one or more shared frequency channels.

80. In my opinion, Ishii discloses that the one or more UE devices wirelessly communicate with the BS (i.e., the BS2UE link in Ishii) and the bUE devices to wirelessly communicate with the BS (i.e., the BS2D link in Ishii) using the same wireless communication technology (i.e., LTE) across one or more shared frequency channels. (Ishii, 5:35-38 (“In an LTE embodiment, *the LTE links (the Macro2UE and Macro2D) links may operate at 2 GHz* whereas the D2UE link operates at a different frequency such as, for example, 3.5 GHz.”) (emphasis added))

8.1.115. The system of claim 1, wherein at least one of the plurality bUE devices is at least one of associated with or a part of a small cell BS, wherein the small cell BS comprises client side modem functionality.

81. Claim 5 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

82. In my opinion, Ishii further discloses that at least one of the plurality of bUE devices is at least one of associated with or a part of a small cell BS, wherein the small cell BS comprises client side modem functionality.

83. As discussed above in Section 7, the specification of the '502 Patent defines "client side modem functionality" to mean at least "a subset of a UE device or bUE device functionality." ('502 Patent, 6:46-50.) Therefore, bUE devices would always "comprise client side modem functionality." As explained above, the UE-A and small node devices of Ishii are bUE devices, and thus "comprise client side modem functionality." (*Supra* Section 8.1.4.)

84. Furthermore, in my opinion, the small node devices disclosed in Ishii are associated with or part of a small cell BS. (Ishii, 7:13-15 ("The small-node device is analogous to a femto or pico base station[.]").)

8.1.1212. The system of claim 1, wherein the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is based in part on the data flow parameter.

37. The BS of claim 31, wherein the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is based in part on the data flow parameter.

85. Claim 12 is dependent upon Claim 1, and Claim 37 is dependent on Claim 31, all limitations of which are disclosed in or rendered obvious by Ishii.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

86. In my opinion, Ishii further discloses that the access traffic associated with the one or more UE devices is classified into two or more data flows based on a data flow parameter and the selection of the one or more plurality of bUE devices for the BH traffic is based in part on the data flow parameter:

Base station 200 may also configure one or more radio bearers for the communications such as in BS2UE link 720 and D2UE link 710. ***Control signaling for configuring the radio bearers is transmitted to user equipment 100 in BS2UE connection 720.*** Similarly, control signaling for configuring the radio bearers is transmitted to small-node device 500 in BS2D connection 730.

The radio bearers for BS2UE connection 720 may be the same or different from the ones for the D2UE connection 710. ***For example, radio bearers for packets of non-real-time services, such as web browsing, e-mail, and FTP, may be configured in D2UE connection 710. Conversely, radio bearers for packets of real-time services, such as VoIP and streaming, may be configured for BS2UE connection 720. Alternatively, the radio bearers for packets of non-real-time services are configured for both D2UE connection 710 and in BS2UE connection 720 such that packets of non-real-time services may be transmitted preferentially in D2UE connection 710. In yet another alternative, the radio bearers for the packets of real-time services are configured both in D2UE connection 710 and in BS2UE connection 720 such that the real-time services packets may be transmitted preferentially in BS2UE connection 720. Such prioritization or priority for the packets may be configured by base station 200. In that regard, base station 200 may select the appropriate connection (D2UE connection 710 or BS2UE connection 720) that should be preferentially utilized in the communications for each radio bearer.***

(Ishii, 12:49-13:9.)

8.1.13 13. The system of claim 1, wherein the BS operative to aid in selecting the transmission power level of at least one of the

plurality of bUE devices, or the one or more UE devices is assisted by a signal transmitted by the BS.

87. Claim 13 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii.

88. As discussed above, in my opinion, Ishii further discloses that the BS is operative to aid in selecting the transmission power level of at least one of the plurality of bUE devices, or the one or more UE devices is assisted by a signal transmitted by the BS. (*See* Section 8.1.7.)

8.1.1414. The system of claim 1, wherein a resource block comprises a partition of a carrier or frequency channel for the wirelessly communicating.

15. The system of claim 14, wherein the partition comprises one or more of a unit of time, a unit of frequency, a code

89. Claim 14 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii. Claim 14 adds the limitation that a resource block comprises a partition of a carrier or frequency channel for the wirelessly communicating. Claim 15 is dependent on Claim 14, and further requires that the partition comprises one or more of a unit of time, a unit of frequency, a code.

90. In my opinion, Ishii discloses that a resource block may comprise a partition of a carrier or frequency channel for wireless communicating, where the partition comprises one or more of a unit of time, frequency, or code:

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

Base station 200 may control the radio resource allocation for D2UE connection 710. ***The radio resources may be allocated selectively in the time domain, frequency domain, and code domain resources.*** For example, base station 200 may configure D2UE connection 710 to use a non-overlapping spectrum with regard to any other D2UE connections such as by controlling a carrier center frequency. As a result, interference problems caused by other D2UE connections can be mitigated. Similarly, base station 200 may configure the time resource in D2UE connection 710 so that it does not overlap with the time resource utilized in other D2UE connections. Alternatively, base station 200 may configure the code resource in D2UE connection 710 so that it does not overlap with the code resource utilized in other D2UE connections. As a result, interference problems caused by other D2UE connections can be mitigated.

(Ishii, 14:10-25.)

8.1.1516. The system of claim 1, wherein the wireless communication between the plurality of bUE devices and the BS is enhanced relative to the wireless communication between the BS and at least one of the one or more UE devices, wherein the enhanced wireless communication comprises one or more of better antenna gain, more antennas, outdoor installation, better processing power, better transmit or receive analog or digital performance, lower transmit power, higher or outdoor installation, improved link parameters, improved number of antennas.

91. Claim 16 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii.

92. In my opinion, it would have been obvious for a POSITA to modify Ishii to enhance the wireless communication between the bUE devices and the BS relative to the wireless communication between the BS and UE devices through better antenna gain, more antennas, outdoor installation, better processing power,

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

better transmit or receive analog or digital performance, lower transmit power, higher or outdoor installation, improved link parameters, improved number of antennas.

93. As of October 15, 2012, enhancements to wireless communications links had been the staple of many modern communications technologies for many years, and mechanisms including antenna improvements, multiple-input/multiple-output (MIMO) architectures, increased symbol density, higher-order modulation and encoding techniques, and similar were commonly leveraged approaches to wireless communications networks including 2G/3G/LTE/4G “cellular”, IEEE 802.11a/b/g/n/ax “WiFi,” and many others. The standardization paths of these technologies can be found in, for example, 3GPP specifications such as 3GPP TR 36.912 v.10.0.0 Release 10, “Feasibility Study for Further Advancements for E-UTRA (LTE-Advanced)” and 3GPP TS 36.101 v.10.6.0 Release 10, “Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) Radio Transmission and Reception.” These standards were published in March 2011 and March 2012, respectively, and establish prospective direction for mobile devices and radio access network systems. The standards address issues, architectures, and requirements including spectral efficiency through various MIMO architectures for transmit/receive diversity, control channels spanning multiple channel symbols,

wider channel bandwidth via component carrier aggregation, spatial multiplexing, uplink/downlink power control, subframe utilization, and modulation/coding assignments.

94. A POSITA would recognize that it would be desirable to enhance the communication between the bUE and BS relative to the communication between the BS and UE because the BS may be managing multiple relay nodes or bUE systems in addition multiple directly connected UE systems. As a result, the control signaling between BS and bUE would need to be more robust, including potentially higher bandwidth, different types of modulation, and more sophisticated resource allocation. Ishii explicitly states that “[t]he invention focuses on the Physical (PHY) and Link Layer design of systems such as 3GPP’s Long Term Evolution (LTE),” thus it would be obvious for a POSITA to leverage mechanisms which were known in LTE for enhancing the wireless communication between the bUE and BS. (Ishii, 9:43-47.)

8.1.1617. The system of claim 1, further comprising classifying and prioritizing the BH traffic based on the access traffic, and wherein the RB scheduling information for the BH traffic is based on the BH traffic prioritization.

38. The BS of claim 31, wherein the controller of the BS is further operative to classify and prioritize the BH traffic based on the access traffic, and wherein the RB scheduling

information for the BH traffic is based on the BH traffic prioritization.

95. Claim 17 is dependent upon Claim 1, and Claim 38 is dependent on Claim 31, all limitations of which are disclosed in or rendered obvious by Ishii.

96. In my opinion, a POSITA would further understand that Ishii inherently discloses that the BH traffic is classified and prioritized based on the access traffic, and wherein the RB scheduling information for the BH traffic is based on the BH traffic prioritization.

97. As discussed above with respect to the independent claims, Ishii discloses transmitting RB scheduling information for the BH traffic of at least one of the plurality of bUE devices.

98. A POSITA would also understand that the RB scheduling information for the BH traffic must necessarily be based on some method of prioritization of the BH traffic.

99. A POSITA would further understand that the classification/prioritization of uplink BH traffic must necessarily be based on traffic characteristics evaluated or expressed on the access links and imparted by the network ingress device. This approach to ingress marking is common in all forms of packet-based networking.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

100. Other references from before the '502 Patent's priority date confirm my understanding. For example, Feng, *et. al.* describe packets as being "classified and marked with appropriate type-of-service (ToS) value at the edges of the network." This marking and classification is subsequently leveraged by core systems, which "simply support priority handling of packets based on their ToS values." (Wu-chang Feng, D. D. Kandlur, D. Saha and K. G. Shin, "Adaptive packet marking for providing differentiated services in the Internet," Proceedings Sixth International Conference on Network Protocols (Cat. No.98TB100256), Austin, TX, USA, 1998, pp. 108-117, doi: 10.1109/ICNP.1998.723731.)

8.1.1726. The system of claim 1, wherein at least a first bUE device of the plurality of bUE devices transmits or receives access traffic associated with the first bUE.

101. Claim 26 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii.

102. As discussed above, Ishii further discloses that at least a first bUE device of the plurality of bUE devices transmits or receives access traffic associated with the first bUE. (*See* Section 8.1.6.)

8.2 Ground 2: Claims 6-11, 19, 29, 33-36, 39, 41 and 44-46 Are Rendered Obvious by Ishii and Sfar and Further in View of a Person of Ordinary Skill in the Art

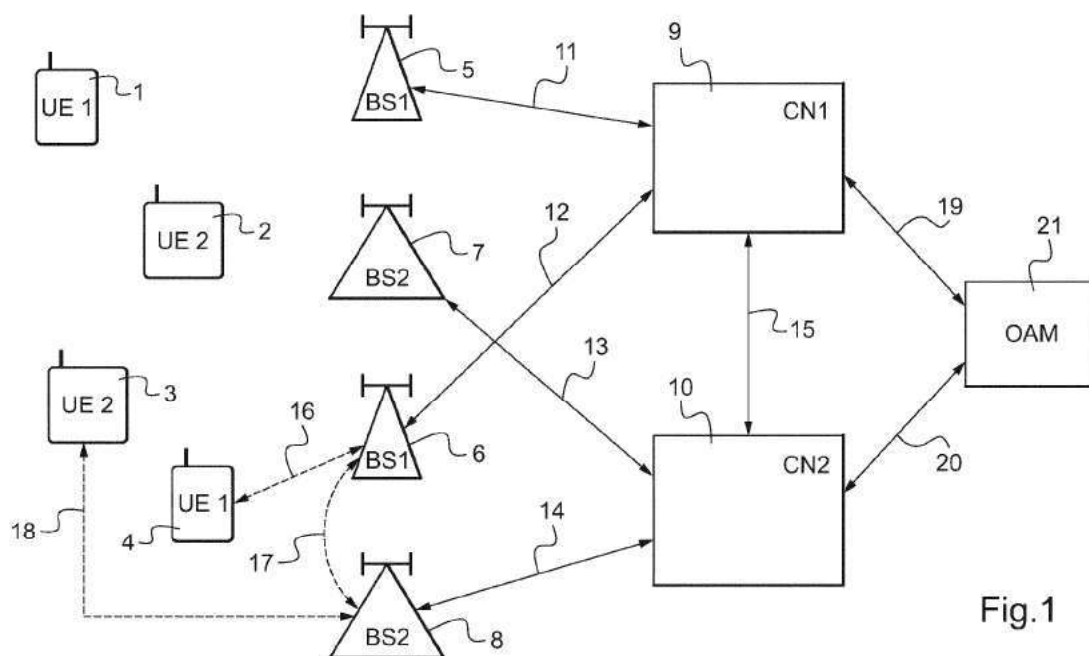
103. I have been asked by Counsel to review and provide my opinion as to the validity of Challenged Claims 6-11, 19, 29, 33-36, 39, 41 and 44-46 of the '502

Patent over Ishii in view of Sfar and further in view of a person of ordinary skill's knowledge.

8.2.1 Sfar

104. Sfar relates to a method of communication in a cellular network where a base station is able to select an alternative backhaul path if its primary backhaul path cannot satisfy a request from a UE. (Sfar, Abstract.)

105. Figure 1 shows the general network architecture of Sfar:



(Sfar, Fig. 1.)

106. There exists a first BS (6) connected to a first core network (9) and a second BS (8) connected to a second core network (10). (Sfar, Fig. 1, 7:10-8:5.) When a UE (4) sends a request to the first base station to communicate with the first

core network, the first base station generally communicates the corresponding backhaul traffic via the backhaul path with the first core network (12). (Sfar, Fig. 1, 7:10-8:5.) However, if that backhaul path is unable to satisfy the request, then the first base station will “find base station 8 of second network as available and as providing sufficient quality of service for its backhaul to satisfy request of mobile user equipment 4 of first network” via connection 17. (Sfar, Fig. 1, 7:10-8:5.)

8.2.2 Motivations to Combine Ishii and Sfar

107. In my opinion, a POSITA would have been motivated to combine the teachings of Ishii with Sfar. Ishii recognized that devices serving as backhaul user equipment could be could be used to offload backhaul traffic when the primary backhaul option was not satisfactory. (Ishii, Abstract, cls. 1-23.) A POSITA faced with the problem of trying to improve backhaul would have looked to Sfar because Ishii and Sfar are in the same technological field and are trying to solve the exact same problem in almost the exact same way. (Sfar, Abstract.)

108. Both Ishii and Sfar were trying to improve the backhaul of wireless networks comprising UE, BS, and a core network. In the networks disclosed in both Ishii and Sfar, the UE connects to the base station, and the base station has a primary backhaul path to a core network. (*Compare* Ishii, 6:34-49 *with* Sfar, 2:19-25.) Ishii and Sfar both recognized that this primary backhaul path was not satisfactory, and both came up with the same solution: to employ bUE devices that could offload

some or all of the backhaul traffic of the UE. (*Compare* Ishii, 6:66-7:12 *with* Sfar, 2:26-32.) A POSITA would thus naturally look to combine Ishii and Sfar to solve the problem of offloading some or all of the backhaul traffic associated with a UE.

109. Moreover, because it was known that base stations selectively communicate backhaul traffic either to a first data network directly or to a second data network through a bUE device, as explained above in Section 8.1.6, it would have been obvious to try making that selection based on a finite number of parameters.

110. Specifically, in my opinion, it would have been obvious to a POSITA to obtain and use Sfar's first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the base station in Ishii's system; second parameters associated with the second data network in Ishii's system; or third parameters associated with the first data network in Ishii's system in deciding whether or not backhaul traffic should be offloaded to the second data network through a bUE device. Indeed, such first, second and third parameters are three of only a few possible variable types in the simple system with so few elements. For the reasons discussed above, a POSITA would have anticipated a high likelihood of success using first, second or third parameters to determine whether or not the second data network could receive offloaded backhaul traffic. Additional, and more

specific, reasons for combining these references are discussed below with respect to specific claim features.

8.2.3 6. The system of claim 1, wherein the BS is further operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.

33. The BS of claim 31, wherein the controller of the BS is further operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.

44. The method of claim 43, further comprising obtaining one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.

111. Claim 6 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii. Likewise, Claim 33 is dependent upon Claim 31 and Claim 44 is dependent upon Claim 43, all limitations of which are disclosed in or rendered obvious by Ishii in view of Sfar.

112. In my opinion, Sfar further discloses that the BS is operative to obtain one or more first parameters associated with the wireless communication between one or more of the plurality of bUE devices and the BS.

113. Sfar discloses that if a UE connects to the base station of a first network, but the base station is unable to provide sufficient backhaul for the UE's traffic, then the base station of the first network may find a base station of a second network to

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

serve as a bUE and provide that backhaul as long as the base station is (i) available, and (ii) able to provide sufficient quality of service for its backhaul to satisfy the UE's requirements. (Sfar, 7:10-32, cl. 1 ("main base station (6) or core network (9) of first network trying to select another neighbour base station (8) of at least a second cellular network different from first network, according at least to availability of a backhaul of said another neighbour base station (8) and/or to offered quality of service of the backhaul of said another neighbour base station (8)").) Sfar further explains that the first base station connects to the second base station via an air interface, which is a wireless communication. (Sfar, 3:1-5.) By determining whether the second base station is "available," the first base station is obtaining a parameter associated with the wireless communication between one of more of the bUE devices.

8.2.4 7. The system of claim 6, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters.

34. The BS of claim 33, wherein the selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters.

45. The method of claim 44, wherein the selection of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters.

114. Claim 7 is dependent upon Claim 6, all limitations of which are disclosed in or rendered obvious by Ishii in view of Sfar. Likewise, Claim 34 is

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

dependent upon Claim 33 and Claim 45 is dependent upon claim 44, all limitations of which are disclosed in or rendered obvious by Ishii in view of Sfar.

115. In my opinion, Sfar further discloses that the selection [by the BS] of the one or more of the plurality of bUE devices for the BH traffic is based on the first parameters. Sfar discloses that if a UE connects to the base station of a first network, but the base station is unable to provide sufficient backhaul for the UE's traffic, the base station of the first network may find a base station of a second network to provide that backhaul as long as the base station is (i) available, and (ii) able to provide sufficient quality of service for its backhaul to satisfy the UE's requirements. (Sfar, 7:10-32, cl. 1 ("main base station (6) or core network (9) of first network trying to select another neighbour base station (8) of at least a second cellular network different from first network, according at least to availability of a backhaul of said another neighbour base station (8) and/or to offered quality of service of the backhaul of said another neighbour base station (8)").)

116. The availability of the second base station to act as a bUE is a parameter of the second base station, and the selection of the second base station for backhaul traffic by the first base station is determined by this availability factor.

8.2.5 8. The system of claim 6, wherein the one or more first parameters comprises one or more of a link quality, link quality statistics, link quality variation, path loss, fading, shadowing, Signal to Noise Ratio (SNR), Signal to

Interference and Noise Ratio (SINR), Packet Error Rate (PER), received interference, interference generated to other devices, Channel Quality Indicator (CQI), Channel State Information (CSI), Modulation and Coding Scheme (MCS), Precoding Matrix Indicator (PMI), rank indicator (RI), single user or multiuser Multiple Input Multiple Output (SU-MIMO or MU-MIMO) information.

117. Claim 8 is dependent upon Claim 6, all limitations of which are disclosed in or rendered obvious by Ishii in view of Sfar.

118. In my opinion, Sfar further discloses that the parameter obtained by the first base station that is associated with the communication between the first base station and second base station can comprise one or more of a link quality, link quality statistics, link quality variation, path loss, fading, shadowing, Signal to Noise Ratio (SNR), Signal to Interference and Noise Ratio (SINR), Packet Error Rate (PER), received interference, interference generated to other devices, Channel Quality Indicator (CQI), Channel State Information (CSI), Modulation and Coding Scheme (MCS), Precoding Matrix Indicator (PMI), rank indicator (RI), single user or multiuser Multiple Input Multiple Output (SU-MIMO or MU-MIMO) information.

119. As discussed above, Sfar discloses that the selection by the BS of the one or more of the plurality of bUE devices for the BH traffic is based on (i) availability, and (ii) ability to provide sufficient quality of service for the backhaul to satisfy the UE's requirements. In my opinion, a POSITA understands that link

quality is a parameter that can indicate that the second base station is available to offload backhaul traffic of the first base station and provide sufficient quality of service.

8.2.6 9. The system of claim 1, wherein the BS is further operative to obtain one or more second parameters associated with the second data network through at least the second communication technology.

35. The BS of claim 31, wherein the controller of the BS is further operative to obtain one or more second parameters associated with the second data network through at least the second communication technology.

120. Claim 9 is dependent upon Claim 1, all limitations of which are disclosed in or rendered obvious by Ishii. Likewise, Claim 35 is dependent upon Claim 31, all limitations of which are disclosed in or rendered obvious by Ishii.

121. In my opinion, Sfar further discloses that the BS is operative to obtain one or more second parameters associated with the through at least the second communication technology. The second communication technology disclosed in claims 9 and 35 is the communication technology used by the bUE to communicate with the second data network. Sfar discloses that if a UE connects to the base station of a first network but the base station is unable to provide sufficient backhaul for the UE's traffic, the base station of the first network may find a base station of a second network to serve as a bUE and provide backhaul to the second data network as long as the base station is (i) available, and (ii) able to provide sufficient quality of service

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

for its backhaul to satisfy the UE's requirements. (Sfar, 7:10-32, cl. 1 (“main base station (6) or core network (9) of first network trying to select another neighbour base station (8) of at least a second cellular network different from first network, according at least to availability of a backhaul of said another neighbour base station (8) and/or to offered quality of service of the backhaul of said another neighbour base station (8)”)).)

122. By determining that the second base station is able to provide sufficient quality of service for its backhaul to satisfy the UE's requirements, the base station of the first network is obtaining a parameter associated with the second data network through at least the second communication technology.

8.2.7 10. The system of claim 9, wherein a selection of the one or more of the plurality of bUE devices for the BH traffic is based on the one or more second parameters.

36. The BS of claim 35, wherein the selection of the one or more of the plurality of bUE devices for the BH traffic is based on the one or more second parameters.

123. Claim 10 depends upon Claim 9, and Claim 36 depends upon Claim 35. As discussed above, Ishii in view of Sfar discloses each limitation of Claims 9 and 35.

124. In my opinion, Sfar further discloses that the selection of the one or more of the plurality of bUE devices for the backhaul traffic is based on the one or more second parameters. As discussed above, Sfar discloses that the first base station

obtains a second parameter associated with the through at least the second communication technology. (*See supra* 8.2.6.) Sfar further discloses that the first base station selects the second base station for backhaul traffic based in part on this second parameter. (Sfar, 7:10-32, cl. 1 (“***main base station (6) or core network (9) of first network trying to select another neighbour base station (8) of at least a second cellular network different from first network, according at least to availability of a backhaul of said another neighbour base station (8) and/or to offered quality of service of the backhaul of said another neighbour base station (8)***”).)

8.2.8 11. The system of claim 9, wherein the one or more second parameters comprise one or more of a link quality, bandwidth, throughput, cost, latency, jitter, QoS, PER.

125. Claim 11 depends upon claim 9, all limitations of which are disclosed in or rendered obvious by Ishii in view of Sfar.

126. In my opinion, Sfar further discloses that the one or more second parameters comprise one or more of a link quality, bandwidth, throughput, cost, latency, jitter, QoS (quality of service), and PER because Sfar discloses that the selecting a second base station for backhaul based on offered quality of service. (Sfar, 7:10-32, cl. 1 (“***main base station (6) or core network (9) of first network trying to select another neighbour base station (8) of at least a second cellular network different from first network, according at least to availability of a backhaul of said***”).

another neighbour base station (8) and/or to offered quality of service of the backhaul of said another neighbour base station (8)”).)

8.2.9 19. The system of claim 1, wherein a bUE device selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication between the bUE device and the BS or one or more second parameters of associated with the second data network through at least the second communication technology.

39. The BS of claim 31, wherein a bUE selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication with the BS or one or more second parameters of the second communication technology.

46. The method of claim 43, wherein a bUE selection of one or more of the plurality of bUE devices is based on one or more first parameters of the wireless communication with the BS or one or more second parameters of the second communication technology.

127. As discussed above, in my opinion, Ishii in view of Sfar discloses that the BS may select a bUE device based on one or more first parameters. (*See supra* 8.2.4.) In my opinion, Ishii in view of Sfar also discloses that the BS may select a bUE device based on one or more second parameters. (*See supra* 8.2.7.)

8.2.1029. The system of claim 28, wherein the BS is further operative to obtain one or more third parameters associated with the first data network through at least the third communication technology.

128. Claim 28 depends upon claim 27, all limitations of which are disclosed in or rendered obvious by Ishii.

DECLARATION OF STAN McCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

129. In my opinion, Sfar discloses that the BS is operative to obtain one or more third parameters associated with the first data network through at least the third communication technology. Sfar explains that if the first base station receives a request from a UE, it will first check if the request can be satisfied through its own backhaul according to traffic load. (Sfar, cl. 1 (“a) main base station (6) of a first cellular network receiving a request from or to a mobile user equipment (4) of the first network; b) main base station (6) checking if request can be satisfied through own backhaul according to traffic load”).)

130. By checking whether the first base station’s backhaul link to the first network is able to satisfy a UE’s request, the first base station is obtaining a third parameter associated with the first data network through the third communication technology (the technology used by the first base station to connect to the first network.)

8.2.11 41. The bUE device of claim 40, further operative to process a BH traffic header information based on the second data network through the at least a second communication technology.

131. Claim 41 depends upon Claim 40, all limitations of which are disclosed in or rendered obvious by Ishii.

132. In my opinion, a POSITA would further understand that Ishii in view of Sfar inherently discloses that the bUE device is operative to process a BH traffic

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

header information based on the second data network through the at least a second communication technology.

133. This claim describes an activity where a relay device (bUE) is configured to “process a BH traffic header” in a manner that involves a “second data network” which may use a “second communication technology.” A POSITA would understand that this is just a description of conventional routing of packets on a data network, where the forwarding device (here, the bUE) inspects header information from ingress packets (here, from the UE), and selects an egress port or link on which to forward the packets. The egress port comprises a “second data network” and may be configured to use a “second communication technology.”

134. Other references from before the '502 Patent's claimed priority date confirm my view. Sharma, *et. al.* describe a similar process in cooperative communications networks which dynamically select relay nodes for forwarding traffic. In the paper, the authors address issues related to “multi-hop flow routing and relay node assignment” through an “innovative approach to perform branching operations” which selects an optimal path through a network with multiple relay nodes each having multiple possible egress links. (S. Sharma, Y. Shi, Y. T. Hou, H. D. Sherali, S. Kompella and S. F. Midkiff, “Joint Flow Routing and Relay Node Assignment in Cooperative Multi-Hop Networks,” in IEEE Journal on Selected

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502

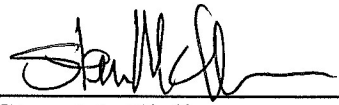
Areas in Communications, vol. 30, no. 2, pp. 254-262, February 2012, doi: 10.1109/JSAC.2012.120203.) Kim, *et. al.* explains that the concept of “flow routing” is well-known to include examination of packet headers to determine the next-hop forwarding destination for each packet in a sequence of packets (a flow), and the well-known concept of packet header examination for flow routing is discussed in multiple references, including Kim, *et. al.* (J. -Y. Kim and J. W. -K. Hong, “Distributed QoS monitoring and edge-to-edge QoS aggregation to manage end-to-end traffic flows in Differentiated Services networks,” in Journal of Communications and Networks, vol. 3, no. 4, pp. 324-333, Dec. 2001, doi: 10.1109/JCN.2001.6596963.)

9. Conclusion

135. I reserve the right to supplement my opinions in the future to respond to any arguments or positions that the Patent Owner may raise, taking account of new information as it becomes available to me.

136. I declare that all statements made herein of my knowledge are true to the best of my knowledge, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

DECLARATION OF STAN MCCLELLAN ISO IPR PETITION FOR U.S. PATENT NO.
9,413,502



Stan McClellan

Dated: September 25, 2024