

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD.
Petitioner,

v.

PANTECH CORPORATION,
Patent Owner.

IPR2025-00763
U.S. Patent No. 11,212,838

**DECLARATION OF DR. TITUS LO,
IN SUPPORT OF PETITION FOR
INTER PARTES REVIEW**

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EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent No. 11,212,838 (“’838 patent” or “’838Pat.”)
1002	File History of the ’838 Patent (“’838FH”)
1003	Declaration of Dr. Titus Lo (“Lo”) in Support of Petition
1004	Dr. Titus Lo Curriculum Vitae
1005	U.S. Patent Application Publication No. 2004/0114574 A1 (“Zeira”)
1006	U.S. Patent Application Publication No. 2005/0174956 A1 (“Yi”)
1007	3GPP TS 36.300 v8.0.0 (2007-03) Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); E-UTRAN overall description; Stage 2
1008	3GPP TS 25.104 V7.7.0 (2007-06) Technical Specification Group Radio Access Network; Base Station (BS) radio transmission and reception (FDD)
1009	3GPP TS 25.101 V7.8.0 (2007-06) Technical Specification Group Radio Access Network; User Equipment (UE) radio transmission and reception (FDD)
1010	https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/ev-do-rev-a-and-b-wireless-broadband-for-the-masses-whitepaper.pdf , (EV-DO Rev. A and B: Wireless Broadband for the Masses)
1011	3GPP TS 25.201 V7.3.0 (2007-05) Technical Specification Group Radio Access Network; Physical layer - General description
1012	3GPP TR 25.913 V7.3.0 (2006-03) Technical Specification Group Radio Access Network; Requirements for Evolved UTRA (E-UTRA) and Evolved UTRAN (E-UTRAN)
1013	https://www.qualcomm.com/news/onq/2017/08/understanding-3gpp-starting-basics , (Understanding 3GPP – starting with the basics)
1014	https://www.ericsson.com/en/about-us/history/company/timeline-placeholder/timeline-2010-4g-arrives , (2010: 4G arrives)

Exhibit	Reference
1015	3GPP TS 36.932 v.12.1.0 (2013-03): Technical Specification Group Radio Access Network; Scenarios and requirements for small cell enhancements for E-UTRA and E-UTRAN
1016	3GPP TS 23.401 V1.1.0 (2007-07) Technical Specification Group Services and System Aspects; GPRS enhancements for E-UTRAN access
1017	RESERVED
1018	3GPP TS 25.331 V7.5.0 (2007-06) Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol specification
1019	3GPP TR 22.944 V7.0.0 (2007-06) Technical Specification Group Services and System Aspects; Report on service requirements for UE functionality split
1020	RESERVED
1021	3GPP TS 25.321 V7.5.0 (2007-06) Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification
1022	<i>Pantech Corp.et al. v. Oneplus Tech. (Shenzhen) Co., Ltd.</i> , 5:24-cv-00038-RWS-JBB (E.D. Tex.), Dkt. No. 1, Complaint
1023	<i>Pantech Corp.et al. v. Oneplus Tech. (Shenzhen) Co., Ltd.</i> , 5:24-cv-00038-RWS-JBB (E.D. Tex.), Dkt. No. 9, Waiver of Service
1024	<i>Pantech Corp.et al. v. Oneplus Tech. (Shenzhen) Co., Ltd.</i> , 5:24-cv-00038-RWS-JBB (E.D. Tex.), Dkt. No. 49, Joint Claim Construction and Prehearing Statement

I, Titus Lo, do hereby declare as follows:

I. INTRODUCTION

1. My name is Titus Lo, and I have been retained by counsel for Petitioner OnePlus Technology (Shenzhen) Co., Ltd. (“Petitioner”) as a consultant to provide my opinion regarding certain prior art references and U.S. Patent No. 11,212,838 (the “’838 Patent”).

2. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters stated herein.

3. I have been asked to provide my expert opinion in connection with the *Inter Partes* Review of the ’838 Patent to Pelletier *et al.* concerning whether it is unpatentable over certain prior art. This declaration is a statement of my opinions on issues relating to the patentability of claims 1-10 (the “Challenged Claims”) of the ’838 Patent. As I explain more fully below, it is my opinion that all of the Challenged Claims would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention.

4. I am being compensated for my work in this matter at my standard hourly rate. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the specifics of my testimony.

5. I have reviewed and considered the following documents in connection

with my analysis of the '838 Patent:

- EX1001: U.S. Patent No. 11,212,838 (“’838 patent”)
- EX1002: File History of the '838 Patent (“’838FH”)
- EX1005: U.S. Patent Application Publication No. 2004/0114574 A1 (“Zeira”)
- EX1006: U.S. Patent Application Publication No. 2005/0174956 A1 (“Yi”)
- EX1007: 3GPP TS 36.300 v8.0.0 (2007-03) Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); E-UTRAN overall description; Stage 2
- EX1008: 3GPP TS 25.104 V7.7.0 (2007-06) Technical Specification Group Radio Access Network; Base Station (BS) radio transmission and reception (FDD)
- EX1009: 3GPP TS 25.101 V7.8.0 (2007-06) Technical Specification Group Radio Access Network; User Equipment (UE) radio transmission and reception (FDD)
- EX1010: <https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/ev-do-rev-a-and-b-wireless-broadband-for-the-masses-whitepaper.pdf>, (EV-DO Rev. A and B: Wireless

Broadband for the Masses)

- EX1011: 3GPP TS 25.201 V7.3.0 (2007-05) Technical Specification Group Radio Access Network; Physical layer - General description
- EX1012: 3GPP TR 25.913 V7.3.0 (2006-03) Technical Specification Group Radio Access Network; Requirements for Evolved UTRA (E-UTRA) and Evolved UTRAN (E-UTRAN)
- EX1013:
<https://www.qualcomm.com/news/onq/2017/08/understanding-3gpp-starting-basics>, (Understanding 3GPP – starting with the basics)
- EX1014: <https://www.ericsson.com/en/about-us/history/company/timeline-placeholder/timeline-2010-4g-arrives>, (2010: 4G arrives)
- EX1015: 3GPP TS 36.932 v.12.1.0 (2013-03): Technical Specification Group Radio Access Network; Scenarios and requirements for small cell enhancements for E-UTRA and E-UTRAN
- EX1016: 3GPP TS 23.401 V1.1.0 (2007-07) Technical Specification Group Services and System Aspects; GPRS enhancements for E-UTRAN access
- EX1018: 3GPP TS 25.331 V7.5.0 (2007-06) Technical Specification Group Radio Access Network; Radio Resource Control (RRC);

Protocol specification

- EX1019: 3GPP TR 22.944 V7.0.0 (2007-06) Technical Specification Group Services and System Aspects; Report on service requirements for UE functionality split
- EX1021: 3GPP TS 25.321 V7.5.0 (2007-06) Technical Specification Group Radio Access Network; Medium Access Control (MAC) protocol specification

6. In forming the opinions expressed below, I have considered:

- a) the documents listed above;
- b) the relevant legal standards as explained to me by the Petitioner's counsel, including the standard for obviousness, and any additional authoritative documents as cited in the body of this declaration;
- c) my own knowledge and experience based upon my work in the field of wireless communications as described below; and
- d) any other documents not listed above but cited below.

7. I may rely upon these materials, my knowledge and experience, and/or additional materials to rebut arguments raised by the Patent Owner. Further, I may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

8. My analysis of the materials produced in this proceeding is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

9. Unless otherwise noted, all emphasis in any quoted material has been added.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

10. I am an expert in the field of telecommunication systems. I have studied, researched, and practiced in this field for over thirty years. My complete qualifications and professional experience are described in my *Curriculum Vitae*, a copy of which can be found in Exhibit 1004. The following is a brief summary of my relevant qualifications and professional experience.

11. I earned my Bachelor of Applied Science degree in Electrical Engineering from the University of British Columbia in Vancouver, British Columbia, Canada in 1986. I earned my Master of Engineering degree in 1989 and Doctor of Philosophy (Ph.D.) degree in 1995, both in Electrical Engineering from McMaster University in Hamilton, Ontario, Canada. My Ph.D. dissertation, entitled “MLE and RBF for AOA estimation in a Multipath Environment”, is about the concept and principle for application of artificial intelligence to antenna signal

processing.

12. From 1989 to 1997, I worked full time, first as a research engineer and then as a senior research engineer/project manager, at Communications Research Laboratory, McMaster University, where I had been involved in numerous research and development projects related to antenna beamforming technology applied to mobile communications, satellite communications, and spaceborne radar systems. It was during this period that, foreseeing the important role of beamforming technology in future wireless communications, I was able to establish my international leading position in this field. I co-authored a technical reference book, entitled *Digital Beamforming in Wireless Communications*, the first of its kind in the field, published in 1996 by Artech House. After more than twenty years later, it is now a well-known fact that antenna beamforming is one of the cornerstone technologies employed in the 5th generation (5G) wireless communications networks.

13. It was because of both the importance of antenna beamforming technology to its wireless business and my exceptional expertise in the field that AT&T Wireless Services had persuaded me to join its Strategic Technology Group (STG) in 1997. At AT&T, as part of system design and engineering, I led the research and development of advanced radio technologies in an orthogonal frequency division multiplexing (OFDM) system, including antenna array

processing, signal acquisition, synchronization, channel estimation, space-time coding, and transmission diversity, all of which were the critical elements to AT&T's fixed wireless network – the world's first carrier-grade and commercially deployed orthogonal frequency division multiple access (OFDMA) system.

14. From 2001, I embarked on my startup endeavor in pursuing the development of advanced technologies to telecommunications. I worked in a number of startups subsequently. In 2001, I joined NextComm, Inc., a Kirkland, WA based startup that designed and developed application-specific integrated circuits (ASICs) for wireless local area network (WLAN) devices, where I was responsible for system engineering, including the design, implementation, and test, of IEEE 802.11a (OFDM-based) and 802.11b (spread spectrum-based) standard (a.k.a. Wi-Fi) compliant chipsets. During my tenure at NextComm, I participated in and contributed to the IEEE 802.11 Standard Working Group in the development of the 802.11g amendment. In 2003, I served as the vice president of engineering and operations at Waltical Solutions, Inc., Bellevue, WA, where I directed an engineering team in the design and development of broadband wireless communications technologies (including 801.16e/WiMax) and systems. In 2006, I served as the vice president at Neocific, Inc., a 4G pioneer based in Bellevue, WA, where I managed and mentored a team of researchers and engineers in the research and development of 4th generation (4G) wireless technologies, including key radio

functionalities such as synchronization, random access, inter-cell interference mitigation, power control, and control signaling. In 2011, I engaged in consulting services to my clients by providing analysis, evaluation, and due diligence investigation of technical aspects of intellectual property portfolios related to various wireless technologies, including 4G/LTE and IEEE 802.11.

15. Throughout my professional career, I have been granted more than 180 U.S. and foreign patents in the area of wireless communications. I have published more than 80 technical papers in peer-reviewed international journals (e.g., IEEE Transactions and IEE Proceedings) and conference proceedings (e.g., IEEE International Conferences and SPIE's International Symposiums). All my works have been cited by more than 7000 researchers and practitioners in the field over the years.

16. Throughout my career as a wireless technology expert, I have been privileged to share my knowledge and expertise by presenting and lecturing at a wide variety of industry and professional venues, as well as engaging with diverse technical and industrial communities. My work has focused on advancing the understanding and application of LTE/4G wireless technology, enabling me to deliver impactful presentations and conduct specialized training sessions for a broad spectrum of audiences, including:

- Large and Small Corporations: Within the wireless industry, I have

collaborated with organizations of varying sizes, offering tailored insights into current and future LTE capabilities and features to help them address challenges and drive innovation.

- The Broader Wireless Community: I have actively contributed to professional gatherings such as IEEE workshops and forums, where I have shared knowledge on emerging trends in wireless communication systems.

- Academic Institutions: Through academic seminars, I have supported the advancement of wireless technology research and development by connecting theoretical concepts with practical applications.

17. In addition to these endeavors, I have taken on leadership roles in organizing numerous global and local summits, conferences, and workshops centered on 4G/5G technology. These events have served as vital platforms for facilitating collaboration among industry experts, researchers, policymakers, and stakeholders.

18. I was appointed as an affiliated professor in the Department of Electrical & Computer Engineering at the University of Washington, Seattle, WA from 2008 to 2012. I have also served or am serving in various leadership positions in the Institute of Electrical and Electronics Engineers (IEEE). For example, I have been serving as an organization committee member for IEEE 5G World Forum since its inception in 2018. I have been a senior IEEE member since 1998 and was

inducted into the IEEE Eta Kappa Nu Honor Society in 2019.

III. LEVEL OF ORDINARY SKILL IN THE ART

19. My analysis reflects the views of a person of ordinary skill in the art in the field of the '838 Patent as of September 28, 2007, which I understand is the alleged time of invention.

20. I have been advised by the Petitioner's counsel and understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems. I understand that a POSITA is not a specific real individual, but rather is a hypothetical individual having the qualifications reflected by the factors above. I understand that a POSITA would also have knowledge from the teachings of the prior art, including the art cited below.

21. Taking these factors into consideration, in my opinion, on or before September 28, 2007, a POSITA would have been someone knowledgeable and familiar with design or development of telecommunication and/or wireless communications systems that are pertinent to the '838 Patent. That person would have a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field and at least two years of practical experience with design

or development of telecommunication and/or wireless communications systems, or the equivalent. Lack of work experience can be remedied by additional education, and vice versa. I have been asked to consider whether the level of ordinary skill in the art would be different if the alleged priority date were September 26, 2008. In my opinion, the level of ordinary skill in the art would be the same in September 2008.

22. As of September 28, 2007, I met, and in fact exceeded, the qualifications of a person of ordinary skill in the art.

23. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my experience and the understanding of a POSITA generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the field as of the earliest proper priority date of the '838 Patent (i.e., September 28, 2007). Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of a POSITA prior to the earliest alleged priority date of the '838 Patent.

IV. RELEVANT LEGAL STANDARDS

24. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '838 Patent, I am relying on certain basic legal principles that counsel have explained to me. These principles are discussed below.

25. I understand that for an invention claimed in a patent to be found

patentable, it must be, among other things, new and not obvious in view of what was known before the invention was made.

26. I understand the information that is used to evaluate whether an invention is new and not obvious is generally referred to as “prior art” and generally includes patents and printed publications (e.g., books, journal publications, articles on websites, product manuals, etc.).

27. I understand that in this proceeding the Petitioner has the burden of proving that the claims of the ’838 Patent are anticipated by or obvious in view of the prior art by a preponderance of the evidence. I understand that “a preponderance of the evidence” is evidence sufficient to show that a fact is more likely true than it is not.

28. I understand that prior art to the ’838 Patent in this proceeding includes patents and printed publications in the relevant art that predate the proper priority date of the alleged invention recited in the ’838 Patent.

29. I understand that terms appearing in the patent claims are to be interpreted according to their “ordinary and customary meaning” in an IPR proceeding. In determining the ordinary and customary meaning, the words of a claim are first given their plain meaning as they would have been understood by a POSITA at the time of the alleged invention, in light of the specification and file history. I understand that treatises and dictionaries may be consulted, albeit under

limited circumstances, to determine the meaning attributed by a POSITA at the time of the alleged invention. I have followed this approach in my analysis and have applied the ordinary and customary meaning of those terms throughout my analysis in this Declaration.

30. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can be shown to “anticipate” the claim. Second, the prior art can be shown to have made the claim “obvious” to a person of ordinary skill in the art. In this declaration I focus on “obviousness.” My understanding of the legal standard for “obviousness” is set forth below.

31. I have been informed that a claimed invention is unpatentable as obvious if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

32. Specifically, I understand that the obviousness question requires consideration of four factors (although not necessarily in the following order):

- The scope and content of the prior art;

- The differences between the prior art and the claims at issue;
- The knowledge of a person of ordinary skill in the pertinent art; and
- Whatever objective factors indicating obviousness or non-obviousness may be present in any particular case.

33. I have been informed by counsel that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include the following: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to obtain predictable results; (c) use of a known technique to improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. I also understand that, at least in IPR proceedings, admissions in the patent or in the prosecution file history of the patent (referred to as Applicant Admitted Prior Art or “AAPA”) can be used to establish background knowledge possessed by a POSITA, to furnish a motivation to combine, to assess whether a patent’s claims would have

been obvious, and/or to supply a missing limitation.

34. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

35. I am not aware of any allegations by the named inventor of the '838 Patent or any assignee of the '838 Patent that any secondary considerations are relevant to the obviousness analysis of any Challenged Claim of the '838 Patent.

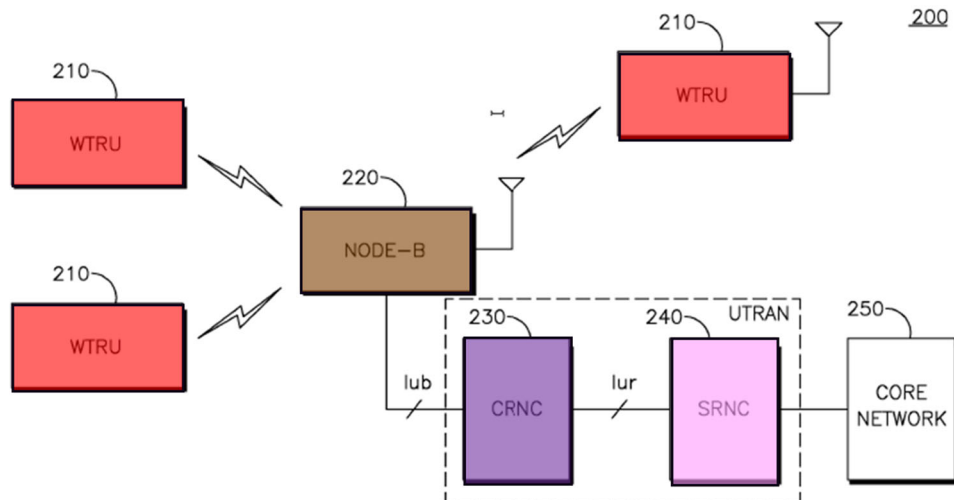
36. I understand that for a claim to be valid, its scope must be definite, and that improperly introducing a term can lead to an unascertainable scope of a term, rendering it indefinite. I understand that any claim element first addressed in the claims by the antecedent basis, “a” may then be identified later in the claims by the antecedent basis, “the.” I understand that failing to follow this convention may lead

to ambiguity in the identification of the particular claim element in question, leading to an indefinite scope of the claim's term. For purposes of this proceeding, I identified and provided my best understanding of any such terms despite such ascertainable scope.

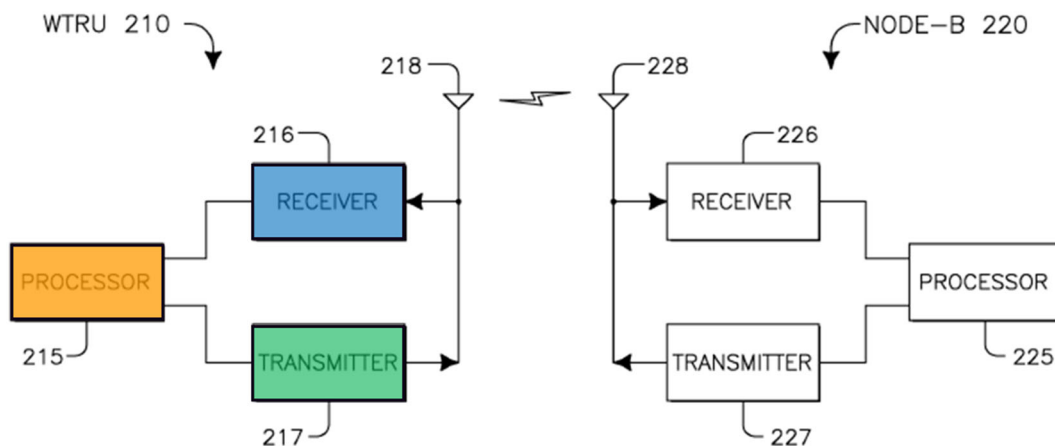
V. SUMMARY OF THE '838 PATENT

A. Specification

37. The '838 patent addresses an alleged problem stemming from use of a contentious channel known as the random access channel (RACH) for transmission of "data messages associated with the new non real-time data services such as internet browsing, e-mail, etc." in a Third Generation Partnership Project (3GPP) network. '838 patent, 1:41-62. The '838 Patent provides an example system (which I have annotated in Figure 2 below) that comprises a plurality of wireless transmit receive units (WTRUs) 210 (red), a base station 220 (brown), a CRNC 230 (purple), and an SRNC 240 (pink). '838 patent, 3:38-40, Fig. 2.

**FIG. 2**

In turn, Figure 3, which I have also annotated, depicts the WTRU which comprises a receiver 216 (blue), transmitter 217 (green), and a processor 215 (orange). '838 patent, 3:54-60, Fig. 3.

**FIG. 3**

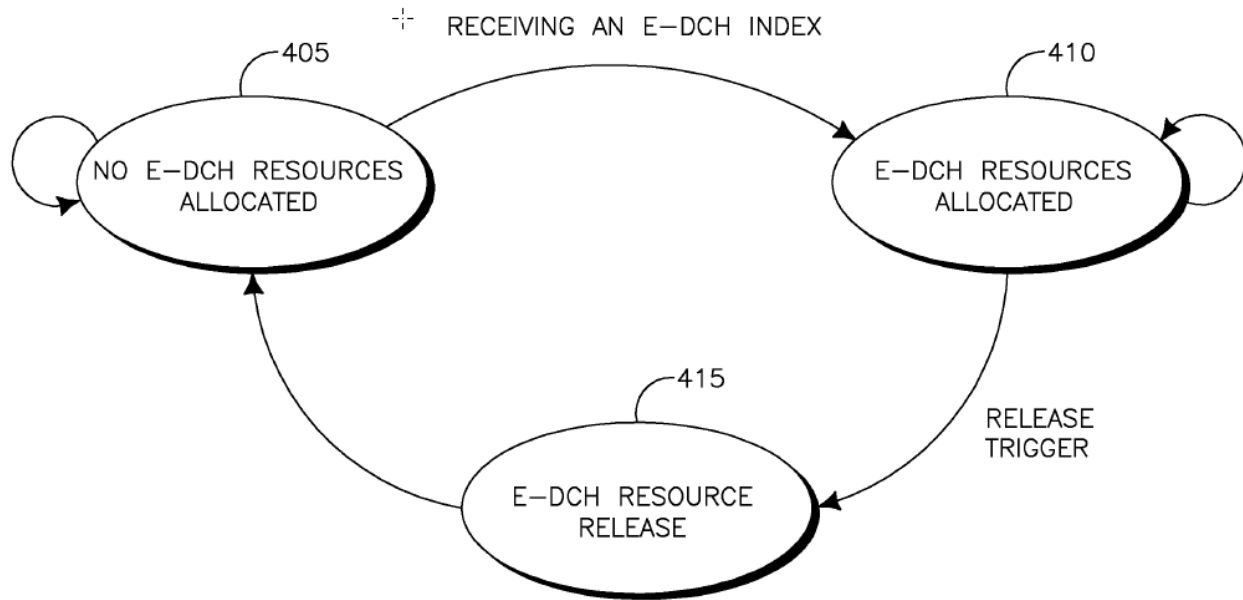
38. The '838 patent explains that “the RACH is a shared channel, [so] in order to avoid WTRUs holding the shared radio resource for a long time, only relatively short message payloads are transmitted on the RACH; this leads to a

relatively small data rate.” *Id.*, 1:50-54.

39. The ’838 patent states that “[t]o overcome these difficulties, it was proposed to use the enhanced dedicated channel (E-DCH) in the CELL_FACH¹ state to increase the data rate of the shared channel.” *Id.*, 2:2-6. The ’838 patent further states that “in the current standard, there are no methods to terminate the E-RACH [enhanced RACH] message phase,” *id.*, 2:21-22, and purports to provide “[a] method and an apparatus [] for terminating an E-RACH message in an E-RACH transmission...in order to release the shared E-DCH resources while in the CELL_FACH state,” *id.*, 2:29-35.

40. Relevant here, the ’838 patent teaches “E-DCH resource allocation 400 and de-allocation using triggering for a WTRU.” *Id.*, 4:5-28, Fig. 4. A WTRU “requests E-DCH resources from the network by transmitting a preamble and waiting for a response...After receiving the E-DCH resource assignment, the WTRU...may use these E-DCH resources until it receives a trigger, at which point the WTRU 210 will release the resources.” *Id.*, 4:18-24. “[T]he trigger may be timer based.” *Id.*, 4:25-26.

¹ The ’838 patent does not define the acronym CELL_FACH, but a POSITA would have understood it to refer to the **F**orward Access **C**hannel in 3GPP.

**FIG. 4**

'838 patent, Fig. 4.

41. One such timer “may start as soon as the radio resource control (RRC) provides the MAC with the timer values, and after receiving the E-DCH resource index.” *Id.*, 5:9-11. Notably, the '838 patent also uses the term “duration” to describe the timer limiting the E-DCH. E.g., '838 patent 4:45-47 (“this embodiment would allow the flexibility to configure smaller transmission time duration for a logical channel such as the CCCH”), 4:61-63 (Alternatively, the network may configure the transmission duration timer based on the presence or absence of an E-RNTI), 5:30-41 (“Alternatively, E-RACH message duration may be fixed...For example, the E-RACH message duration IE may be transmitted with the initial resource assignment....”).

42. While the detailed description of the '838 patent describes various

procedures including resource allocation and de-allocation, releasing resources based on the status of WTRU's buffer, and EDCH resource release when transitioning from a CELL_FACH state to a CELL_DCH state (see, e.g., Figures 4, 6, 8, and 9 and associated description), the claims of the '838 patent are directed to basic operations performed at a WTRU related to only activation and deactivation of a media access control (MAC) timer. *Id.*, 11:4-12:28. In my opinion, these claims were already known and described in the prior art.

B. Prosecution History

43. I have reviewed the prosecution history of the '838 patent, which issued from U.S. Application 16/421,019 ("'019 Application"). The examiner rejected the '019 Application twice as obvious in view of U.S. 2008/0117891 ("Damnjanovic") and U.S. 2007/0081492 (Petrovic). The examiner's rejections were ultimately overcome by amending independent claims 1 and 6 to recite that the receiver and the processor are configured to receive "at least one radio resource control (RRC) message indicating an uplink resource for WTRU and medium access control (MAC) timer information" and that the MAC timer "is being configured based on the MAC timer information indicated by the received RRC message." '838FH, 471, 473 (emphasis original). The applicant distinguished the prior art by arguing that Damnjanovic does not receive timer information via an RRC message and that Petrovic receives activation time, rather than timer information,

from a Node B. *Id.*, 475-479. The claims were then allowed. *Id.*, 275, 12. As discussed below, each of the limitations added during prosecution was known in the prior art.

VI. TECHNOLOGY BACKGROUND

A. Wireless Technology

44. Wireless technology enables information transmission over distances without physical connections, using electromagnetic waves such as radio waves, infrared, or microwaves to facilitate device communication. One of the most prevalent wireless technologies entail cellular radio systems which typically include mobile devices (e.g., cell phones, cellular modems, smartphones, etc.), base stations, and core networks with connections to external networks.

45. Base stations typically provide wireless radio access through different air interface standards, enabling mobile stations served by the base stations to connect to external networks such as the public switched telephone network (PSTN), the internet, and other cellular provider networks. A mobile device is also identified by the term User Equipment (UE) primarily in the context of 3GPP (3rd Generation Partnership Project), and the term "mobile station" commonly used in the early days of cellular networks, particularly in the context of GSM (Global System for Mobile Communications) and other 2G/3G technologies. Another term for a mobile device, albeit less commonly used, is Wireless Transmit/Receive Unit (WTRU), which can

apply to a wider range of wireless communication devices.

46. 2G mobile wireless technologies consisting of GSM and Code-Division Multiple Access (CDMA) provided voice and basic data services such as short message service (SMS) and (multimedia messaging service) MMS and limited web browsing in the late 1990s to the early 2000s. With the increasing demand for mobile data services, 3G mobile networks such as Universal Mobile Telecommunication Systems (UMTS) including wideband-CDMA (W-CDMA) technology and CDMA-based Evolution Data Optimized (EVDO) networks were introduced in the early to mid 2000s that supported higher data rate services (e.g., up to 2.4 Mbps for EVDO rev 0 and up to 2 Mbps for UMTS). EX1010; EX1011. Eventually, High-Speed Downlink Packet Access (HSDPA), High-Speed Uplink Packet Access (HSUPA), and High-Speed Packet Access (HSPA+) were integrated into UMTS networks to provide even higher data speeds to support the continuously growing number of smartphones and mobile data applications.

47. With the ever growing need to support even higher data speeds (e.g. 100 Mbps in downlink /50 Mbps in uplink) and more mobile data applications, the need for the next generation of wireless technologies (4G) became evident. EX1012. There were initially three 4G standards efforts. One was Ultra Mobile Broadband (UMB) started by 3GPP2 and another was WiMAX (IEEE 802.16e). However, these are now largely abandoned in favor of the third 4G standard called Long Term

Evolution (LTE) led by 3GPP. EX1013. LTE is the most prevalent 4G mobile wireless technology in the world and was first commercially available in late 2009. EX1014. Because LTE was under development in the relevant time frame and exemplifies wireless technology advancement built on the principles discussed herein, I have provided various examples from LTE throughout this Technology Background section. It is to note that a standardized technology like LTE or UMTS establishes a common language and framework, ensuring that stakeholders, including those with ordinary skill in the art (POSITAs) across various subfields related to 3GPP standards, share a unified understanding of the underlying technology. This consistency extends beyond mere terminology to encompass the underlying concepts, functionalities, and implementation details associated with specific technical entities. As a result, when encountering a technical term or concept, POSITAs can reliably assume a shared understanding of not only the entity itself but also its functional implications, performance expectations, and integration requirements. LTE provides wireless high-speed data transmission in cellular networks. A cellular network that employs LTE technology is typically referred to as the Evolved Packet System (EPS).

B. Evolved Packet System (EPS)

48. EPS encompasses the entire system architecture, including both the Evolved Universal Terrestrial Radio Access Network (E-UTRAN or simply RAN),

Evolved Packet Core (EPC), along with base stations (eNodeB or simply eNB) and mobile devices or User Equipment (UE). EPS is an end-to-end all-IP (Internet Protocol) network that supports data communication between UEs and external networks like the internet. EX1016, § 4.3.3.1, p. 13.

49. The RAN manages the air interface, providing radio access to the UEs and the connectivity to the EPS. eNBs are typically interconnected via the S1 interface to the RAN, but some eNBs are directly interconnected using the X2 interface if favorable physical conditions exist, such as suitable backhaul, site topology, low latency connection, and synchronization. The S1 interface supports functions including authentication, mobility management, and bearer management, while the X2 interface supports functions such as handover, load balancing, and interference coordination. EX1007, § 4, pp. 11-15.

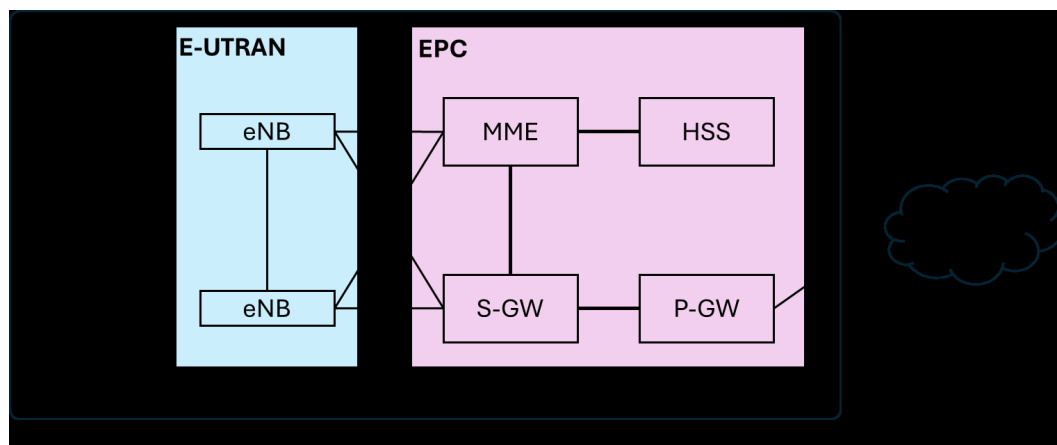


Fig. #1 (based on EX1016)

50. The EPC manages and controls the flow of data between the RAN and

external packet data networks. The EPC consists of:

- Mobility Management Entity (MME)
- Serving Gateway (S-GW)
- Packet Data Network Gateway (P-GW)
- Home Subscriber Server (HSS)

C. Base Station [based on EX1008]

51. An eNB serves as the main communication point for one or more UEs, connecting them to the EPS and beyond. It typically consists of the following key components:

- An antenna system: Includes one or multiple antennas that transmit and receive radio signals. These antennas are strategically positioned to cover designated areas and ensure optimal signal quality.
- A transceiver: Combines both transmitter and receiver functions, handling the conversion of radio signals to digital signals and vice versa.
- A baseband unit (BBU): Processes the baseband signal, managing encoding, decoding, and other digital signal processing tasks.
- A radio frequency (RF) power amplifier: Boosts the strength of outgoing signals to ensure they can travel long distances and reach UEs within the coverage area.
- A backhaul connection: Links the eNB to the EPC, facilitating data

transfer and communication with other network components.

52. The eNB (base station) performs the following primary functions:

- Signal Transmission and Reception: Enables communication services like voice calls, text messaging, and data by transmitting and receiving radio signals.
- Network Connection: Connects UEs to the EPC and external networks such as the internet, for seamless communication.
- Handover Management: Manages transitions between cells to ensure continuous connectivity as UEs move.
- Resource Management: Coordinates with other base stations to manage resources, balance loads, and optimize network performance.

53. Base stations vary in coverage size, with traditional ones, known as macro base stations or macro cells, having a coverage radius of several miles. The terms “base station” and “cell” are often used interchangeably when referring to their functionality.

54. In contrast, small base stations, which include microcells, picocells, and femtocells, offer limited coverage, typically ranging from a few meters to a few hundred meters. Despite their smaller scale, small base stations contain the same key components as macro base stations and perform similar primary functions, albeit with reduced capability. They usually have their own backhaul connection to the core network and they may use different (usually higher) carrier frequencies. Small

base stations are used to enhance network performance in densely populated areas or where macro cell coverage is weak. For example, LTE Small Cell Enhancements are particularly useful in providing dual connectivity, where a user equipment (UE) connects to both a macro base station and a small base station simultaneously. This setup allows for even higher data speeds and improved network efficiency. In the context of dual connectivity, the macro base station is called the master eNB (MeNB), whereas the small base station the secondary eNB (SeNB). EX1008. In the context of small indoor cell enhancement, it is known as LTE hotspot indoor cell (LTE-Hi) technology. EX1015.

D. User Equipment (UE) [based on EX1009 and EX1019]

55. A UE is an electronic device that connects wirelessly to eNBs to access network services. It consists of several key components to support its functionalities. EX1009.

- Cellular Radio: Includes an antenna, transceiver, and circuitry for communication with base stations.
- Baseband Processor: Handles signal processing tasks like modulation, demodulation, encoding, decoding, multiplexing, and error correction to ensure reliable data transmission.
- Processors: Executes the operating system and applications, managing communication protocols and software.

- **Memory and Storage:** Provides capacity for data storage and application execution.

56. The primary functions of a UE, with respect to the EPS, include:

- **Signal Transmission and Reception:** Enables voice calls, text messaging, and data by transmitting and receiving radio signals.

- **Network Registration:** Registers with the RAN by sending identification information to the base station for service authorization.

- **Handover Management:** Collaborates with base stations to manage transitions between cells, maintaining continuous connectivity.

- **Data Processing:** Processes received data to ensure correct interpretation and presentation to the user.

57. It is important to point out that the term UE as defined by 3GPP standards refers to any device that connects to a cellular network, such as smartphones, tablets, IoT modules, or wireless modems. These devices are not merely passive transceivers; rather, they are complex systems that must interpret, process, and respond to a wide variety of signaling and data protocols (e.g., RRC, PDCP, RLC, MAC and PHY). This level of functionality is only possible with the presence of a processor, which serves as the central unit for executing the device's operating system, protocol stacks, application software, and security algorithms. Even the most basic UEs must be able to execute protocol stacks that require logical

decision-making, timer management, error correction, and adaptive responses to changing network conditions. All these operations inherently demand computational capability, which is provided by a processor, which could be a general-purpose CPU, a digital signal processor (DSP), or a system-on-chip (SoC) integrating multiple processing elements. EX1019, §4.3, p. 8.

58. The evolution of UEs has further increased the reliance on processors. Modern UEs not only handle traditional voice and data communications but also support advanced features such as multimedia processing, encryption, application hosting, and interaction with sensors and user interfaces. These capabilities require significant processing power and sophisticated software management, reinforcing the necessity of a processor at the heart of every UE. EX1019, §4.3, p. 8. In essence, the very definition and expected functionality of a UE presuppose the existence of a processor. Without a processor, a device would be incapable of fulfilling the essential roles required for network connectivity, protocol compliance, and user interaction. Therefore, whenever the term "UE" is used, it is always with the implicit understanding, at least to a POSITA, that the device includes a processor as an indispensable component. EX1019.

E. Radio Protocol

59. Effective communication between base stations and UEs requires a set of rules and standards known as radio protocols. These protocols govern aspects of

data formatting, transmission timing, and error correction, ensuring device interoperability and standardized communication. The LTE radio protocol architecture is divided into two main components: the user plane and the control plane, as shown in Fig. #2. EX1007, §§ 4.3.1-4.3.2, pp. 13-14.

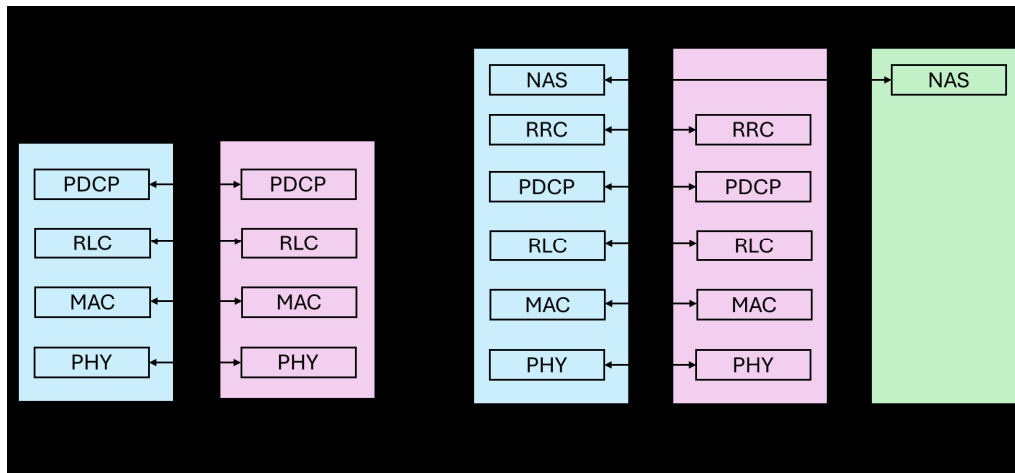


Fig. #2 based on EX1007, Figs 4.1 and 4.3.2, pp. 13-14.

60. The user plane is responsible for transmitting user data, such as voice, video, and internet traffic, between the UE and the RAN. Its protocol stack includes multiple layers (EX1007, § 4.3 pp. 13-14):

- PDCP (Packet Data Convergence Protocol): Ensures in-sequence delivery of upper layer Protocol Data Units (PDUs), handles encryption/decryption (*i.e.*, ciphering/deciphering), header compression/decompression (robust header compression) ROHC only, duplicate detection of lower layer Service Data Units (SDUs), retransmission of PDCP SDUs at handover, and reordering. It acts as an interface between the IP layer and lower layers, facilitating the convergence of data

from different sources. EX1007, § 6.3, pp. 33-34.

- RLC (Radio Link Control): Ensures reliable data transfer over the radio link through segmentation, concatenation, reordering, duplicate detection, and retransmissions, operating in different modes, including Acknowledged Mode (AM), Unacknowledged Mode (UM), and Transparent Mode (TM). EX1007, § 6.2, pp. 32-33.

- MAC (Medium Access Control): Manages access to the radio channel, schedules data transmission and reception, multiplexes/demultiplexes MAC SDUs belonging to one or different logical channels into/from transport blocks (TB) delivered to/from the physical layer on transport channels, and performs error correction using Hybrid Automatic Repeat Request (HARQ). EX1007, § 6.1, pp. 30-32.

- PHY (Physical Layer): Defines the physical means (e.g., modulation/demodulation and coding/decoding) of transmitting/receiving data over the radio interface using techniques like OFDMA for downlink and SC-FDMA (single carrier frequency division multiple access) for uplink. EX1007, § 5, pp. 15-28.

61. The control plane handles signaling and control messages necessary for network access, mobility management, and resource allocation. Its protocol stack also includes the PDCP, RLC, MAC, and PHY layers for supporting the control

plane functions, with two additional protocols or layers on top of RLC:

- RRC (Radio Resource Control): Manages radio resource configuration, mobility, and connection setup. EX1007, § 7, pp. 34-36.
- NAS (Non-Access Stratum): Handles higher-level signaling between the UE and the core network for tasks like authentication and session management. For instance, PDCCP also handles ciphering and integrity protection for the control plane. EX1007, § 6.3.1, p.33.

62. Both the user and control plane protocol stacks are implemented in eNBs and UEs. Each layer communicates with its peer layer on the counterpart device, ensuring reliable and efficient data delivery across the network.

F. Interface Between Layers

63. In transmission from the eNB, data flows from the PDCCP layer down through each protocol layer, with each layer adding its own headers and control information. This process continues until the data reaches the physical layer, where it is transmitted over the medium. In reception by the UE, data flows in reverse, starting at the physical layer and moving up through each layer, with each layer removing its corresponding headers and control information until the data reaches the PDCCP layer, depending on if the data is being received or sent, respectively.

64. Each layer interacts with its adjacent layers using Service Data Units (SDUs) and Protocol Data Units (PDUs). When data is passed between layers, the

sending layer refers to it as an SDU, while the receiving layer treats it as a PDU. Each layer processes the PDU according to its specific functionality and then sends the processed data unit as an SDU to the next adjacent layer. This process continues until the data reaches either the uppermost or lowest layer.

65. For example, in the case of a UE receiving data shown in Fig. #3:

- The PHY layer receives data and sends data as a SDU (aka. Transport block) to the MAC.
- The MAC layer receives this SDU from the PHY layer, which now becomes the PDU, removes the MAC header and padding from the PDU, and then passes the resulting data unit as a SDU to the RLC layer.
- The RLC layer receives this SDU from the MAC layer, which now becomes a PDU, processes the PDU by removing its RLC header, and then sends the resulting data unit as a SDU to the PDCP layer.
- Finally, the PDCP layer receives this SDU from the RLC layer, which now becomes a PDU, removes the headers from the PDU, and then passes the processed data unit as a SDU to the network.

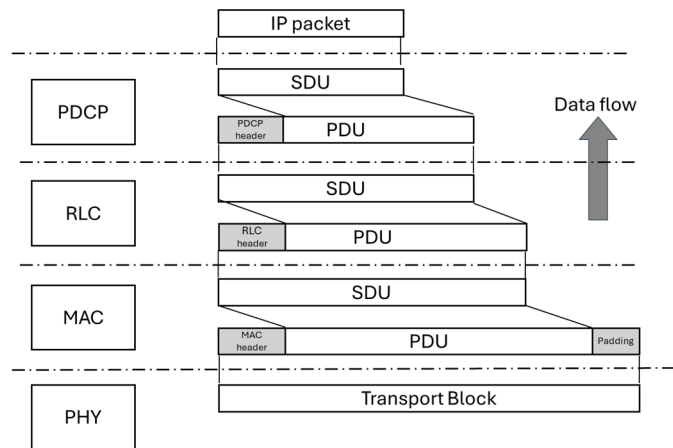


Fig. #3 based on EX1007, § 6, pp. 28-34.

66. This protocol layering approach ensures that data is transmitted and received efficiently while maintaining proper formatting and functionality at each stage of communication. It provides modularity and flexibility in implementation. Each layer can be modified or updated independently without affecting other layers. This means that new technologies can be introduced, or issues can be fixed in one layer without disrupting the entire system, making it easier to adapt to changing network requirements or technological advancements. It promotes compatibility by ensuring that changes in one layer do not affect others, allowing for backward compatibility.

G. Radio Bearer

67. A radio bearer (RB) is a logical or abstract communication channel that carries a specific type of data between a UE and the RAN over a radio frequency (RF) signal. It is a virtual concept that specifies how data or signaling is treated as it

travels across the network, including quality of service (QoS) characteristics like priority, latency, and throughput. An RB is not a physical entity, but rather a software-defined channel that's managed by the RAN. EX1016, § 4.6.1.2, p. 20.

68. There are two types of radio bearers:

- Signaling Radio Bearer (SRB): SRBs are used for transmitting control plane traffic, including RRC (Radio Resource Control) and NAS (Non-Access Stratum) messages. These messages are essential for network setup, configuration, and management. Several types of SRBs are defined in LTE for different types of control signaling. EX1007, § 7.1, p. 34.

- Data Radio Bearer (DRB): DRBs are used for transmitting user plane traffic, such as internet data, video streaming, and voice calls. They carry IP packets and are essential for providing services to users. DRBs can be classified into default bearers and dedicated bearers, each with different QoS characteristics tailored to specific applications. In the early stage of the LTE development, it was broadly referred to as the SAE radio bearer. EX1007, § 13.1, pp. 53-54.

69. Radio bearers are configured using radio protocols, specifically through RRC (Radio Resource Control) messages. These messages establish and modify radio bearers, defining their QoS characteristics and parameters. The configuration of radio bearers involves layers such as RRC, PDCP, RLC, MAC, and PHY, each contributing to the setup and management of bearers. For example, a PDCP bearer

is a logical connection between two PDCP entities (e.g., at a UE and an eNB, respectively), which is configured by the PDCP configuration information element in a RRC message. EX1007, § 6, pp. 28-34 and § 7.1, pp. 34-35.

H. RRC Protocol

70. The Radio Resource Control (RRC) protocol plays a crucial role in the control plane by managing radio resource configurations, mobility, and connection setup between User Equipment (UEs) and the radio access network. It handles signaling and control messages, including connection requests, configurations, measurements, and reports. RRC messages contain comprehensive configuration details organized into information elements (IEs) that facilitate independent management of different parameters. EX1007, § 7, pp. 34-36.

71. The RRC protocol plays a central role in dynamically configuring various types of uplink and downlink physical channels—such as common, shared, and dedicated channels—that carry both control information and user data between the UE and the network. Through its physical channel configuration messages, RRC communicates the necessary information for assigning, reconfiguring, or releasing these channels, utilizing a range of configuration parameters tailored to the underlying technology. In LTE, for instance, RRC messages may specify parameters such as the modulation and coding scheme (MCS), transmission mode (TM), resource allocation type (localized or distributed), and the size and positioning of

resource block groups, as well as time and frequency allocation. In contrast, UMTS RRC transport channel configuration involves parameters like spreading factor, code allocation, scrambling code, and transmission power. It is important to note that in UMTS, transport channels describe the essential characteristics that determine how data is transmitted over the air interface. EX1007, § 11.1, pp. 51-52; EX1018, § 10.3.5, pp. 625-645.

72. Beyond basic channel parameters, RRC physical channel configuration also includes settings for timers that govern aspects of physical channel operation, such as measurement reporting intervals or activation and deactivation timing. By incorporating these timer settings into physical channel reconfiguration, RRC enables flexible and efficient management of radio resources, ensuring that both the UE and the network remain synchronized in their operations. EX1007, § 12, p. 53; Annex B, p. 68; and Annex C1.5, p. 71. EX1018, § 10.3.5.1a, p. 626.

73. Furthermore, the RRC protocol closely coordinates with the MAC layer to facilitate resource allocation for both uplink and downlink transmissions. While RRC provides the configuration framework and resource allocation parameters, the MAC layer is responsible for the actual scheduling of data transmissions and the allocation of radio resources, taking into account the RRC-configured parameters as well as Quality of Service (QoS) requirements. This layered approach ensures both policy-driven control and real-time responsiveness in managing radio resources.

EX1007, Annex B, p. 68; EX1018, § 10.3.6.4, p. 646.

I. MAC Protocol

74. The MAC protocol is fundamental to managing access to the shared radio medium and ensuring efficient, reliable data transmission in wireless systems. It works in close coordination with the RRC layer to handle dynamic resource allocation, including the scheduling of uplink and downlink grants, the operation of Hybrid Automatic Repeat Request (HARQ) for error correction, and the mapping between logical and transport channels. The MAC layer also prioritizes traffic according to Quality of Service (QoS) requirements, which is essential for delivering low latency for voice services and high throughput for data-intensive applications like video streaming. Additionally, the MAC layer manages semi-persistent scheduling for periodic data flows, oversees buffer management to efficiently handle data queues, and enforces power control mechanisms to optimize both UE battery life and overall network capacity. EX1007, § 6.1, p. 30; EX1021, §6.1, pp. 32-33.

75. A key aspect of the MAC layer's operation is its control over the fundamental transmission time units that structure wireless communication. In LTE, these units are called subframes, while in UMTS they are known as Transmission Time Intervals (TTIs). These basic time units are crucial for organizing data transmission, enabling efficient resource allocation, scheduling, and HARQ management. The division of transmission time into subframes or TTIs also supports

adaptive modulation and coding schemes, allowing the network to dynamically respond to changing radio conditions. This adaptability, combined with effective scheduling and resource management, helps maximize system throughput and minimize latency. EX1007, § 11.1, p. 51; EX1021, § 11.9.1.1, pp. 111-113.

76. To support its various functions—such as scheduling, HARQ management, and buffer handling—the MAC layer relies on timers. These timers are designed to operate in alignment with subframes or TTIs, expiring at intervals that match these basic time units. For example, a MAC timer might be set to expire every subframe or every few TTIs, enabling precise control over when resources are allocated or released. By synchronizing timers with subframes or TTIs, the MAC layer ensures that data transmission remains efficient and reliable, even as network conditions fluctuate. EX1007, § 10.1.6, pp. 47-48; EX1021, § 11.9.1.4, pp. 113-114.

77. While the RRC layer is responsible for high-level configuration and signaling—including the setting of parameters and timers that influence lower-layer behavior—the actual enforcement and operation of such timers, especially those tied to subframes or TTIs, are handled by the MAC layer. The RRC configures these timers and passes the relevant parameters to the MAC layer, which then uses them to manage the timing of resource grants and releases. This division of responsibilities allows the RRC to concentrate on overall connection management and policy, while the MAC layer executes real-time resource allocation in accordance with RRC

directives. EX1007, Annex B, p. 68; EX1021, §6.1, pp. 32-33.

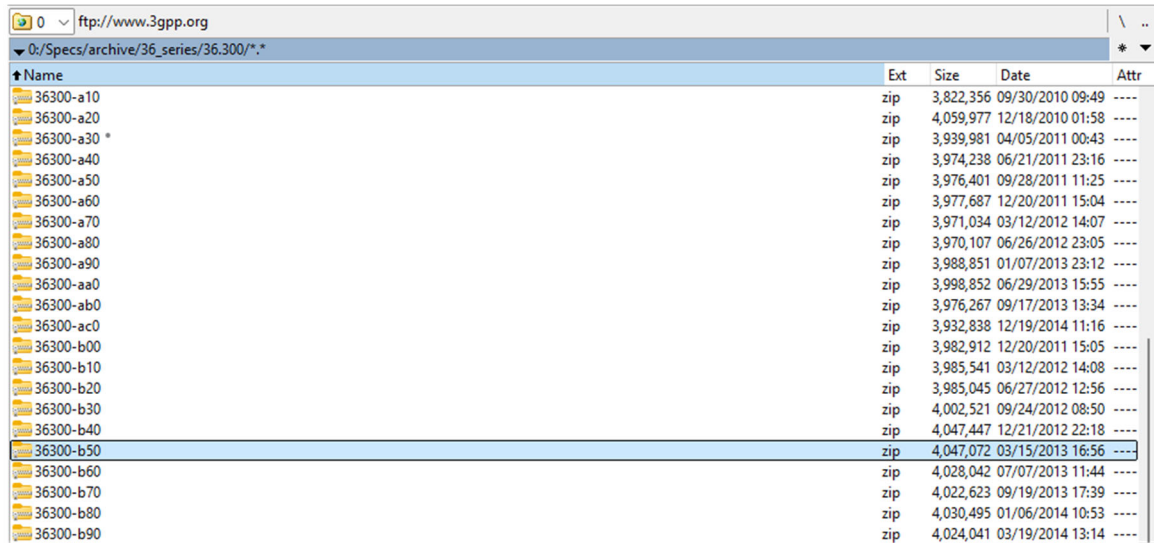
78. In essence, when a timer is used for resource allocation based on the Transmission Time Interval (TTI) and is configured by the RRC, it is implemented at the MAC layer. This ensures that resource allocation decisions are made in real time, closely aligned with the transmission structure of the network, and in accordance with the high-level policies set by the RRC. EX1007; EX1021.

VII. PUBLIC AVAILABILITY OF 3RD GENERATION PARTNERSHIP PROJECT (3GPP) TECHNICAL SPECIFICATIONS AND OTHER DOCUMENTS

79. In the above paragraphs and throughout this Declaration, I have referred to various 3rd Generation Partnership Project (3GPP) documents to corroborate my explanations, and confirm the understanding of POSITAs, about the basic aspects of wireless systems, radio protocols and signals that are sent or received by various components of those wireless systems, including LTE systems. These documents were readily accessible, and could be downloaded from 3GPP servers by POSITAs at the time of the alleged invention in 2007. Based on my years of experience, I am familiar with the regular business practices of 3GPP relating to technical documents including specifications, draft standards and proposals, and standards-related technical contributions—including the business practices through which 3GPP makes these documents public.

80. A primary goal of 3GPP is to provide an environment to produce

technical specifications and technical reports that define and standardize technologies covering cellular telecommunications networks, including User Equipment or Mobile Device (UE) technologies, Radio Access Network (RAN) technologies, Core Network (CN) technologies, and service and system capabilities—including work on codecs, security, and quality of service. The specifications also provide hooks for interworking with non-3GPP networks including but not limited to Wi-Fi networks. As I have done, interested POSITAs have been tracking the developments of 3GPP specifications and other submissions to ensure that the standards reflected their employers' technology visions, included their technological solutions and features, and that products and services developed by their companies were consistent with the standards being developed. It is my opinion that a POSITA in cellular communications would need to be familiar with 3GPP and the specification-related documents produced as part of the 3GPP process in order to properly perform his or her job. I have been using the 3GPP official FTP server <ftp://www.3gpp.org/> to access 3GPP specifications for my work or for interest for more than 15 years. This FTP server allows anyone to log in anonymously to download documents. For example, if I needed to learn about a specific version of a 3GPP specification, say 3GPP TS 36.300 V11.5.0 (2013-03), I could navigate to subfolder `/Spec/archive/36_series/36.300/`, where all the versions of 36.300 specifications are located from 07/05/2006 to present.



Name	Ext	Size	Date	Attr
36300-a10	zip	3,822,356	09/30/2010 09:49	----
36300-a20	zip	4,059,977	12/18/2010 01:58	----
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36300-a50	zip	3,976,401	09/28/2011 11:25	----
36300-a60	zip	3,977,687	12/20/2011 15:04	----
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36300-a80	zip	3,970,107	06/26/2012 23:05	----
36300-a90	zip	3,988,851	01/07/2013 23:12	----
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36300-ab0	zip	3,976,267	09/17/2013 13:34	----
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36300-b10	zip	3,985,541	03/12/2012 14:08	----
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36300-b90	zip	4,024,041	03/19/2014 13:14	----

If I believed that a 3GPP document might potentially contain some specific information of interest, I relied on the 3GPP official advanced search engine <http://isearch.3gpp.org/isysadvsearch.html>. I have been using this search engine for many years as well until it was discontinued in 2023. A powerful feature of this search engine was that one could specify a logical combination of keywords or phrases of interest, the time span of interest, technology task group, file format, etc.

A. 3GPP's Policy and Practice of Making Documents Public

81. 3GPP's policy was to make 3GPP documents available to the public, including to interested POSITAs. The free availability of 3GPP documents to any interested member of the public was widely recognized in the industry. For example, textbooks and other sources directed readers to the 3GPP website for information

about relevant standards.² Making the documents available to the public was intended to enhance collaboration among 3GPP Working Group members and other interested POSITAs. Because the purpose of 3GPP was worldwide adoption of a common standard, no restrictions on distribution or discussion were placed on 3GPP documents.

82. The technical specifications and reports developed by 3GPP were, and are, driven by the technical contributions of 3GPP member companies. As part of that development process, various types of documents have been produced. As relevant to this proceeding, the 3GPP process involved the consideration of temporary documents (“TDocs,” also referred to as “technical contributions,” or “member contributions,” and in some cases referred to as “change requests”), resulting in the production of technical specifications. All TDocs, technical reports, and technical specifications were and are freely available to interested POSITAs (and to any interested member of the public) through the public file repository on the 3GPP website. In my opinion, an interested POSITA could have located relevant documents of interest on the 3GPP website using reasonable diligence based on the website’s indexing scheme. For example, the documents on the 3GPP website were (and remain) organized according to the relevant Working Groups within 3GPP

² <https://web.archive.org/web/20070219081417/http://tools.ietf.org/html/rfc3314>.

(each of which focused on particular subject matter) and then further organized based on the meetings of those groups. POSITAs would have known which Working Groups focused on particular subject matter.

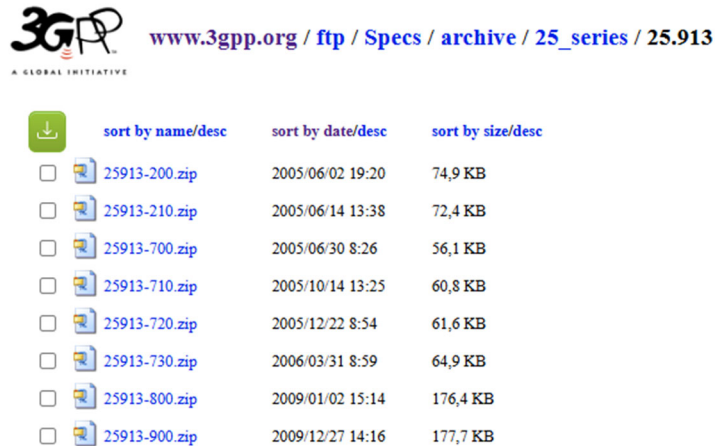
B. The 3GPP Public File Repository

83. There are several sites from which a POSITA could access the 3GPP public file repository to locate documents of interest. For example, a POSITA could have used 3GPP FTP server <ftp://www.3gpp.org/>. A POSITA could, using a file explorer, navigate through the folders and files to look for documents of interest since the folder and files names tended to be self-explanatory. If the specifics of a document of interest are known, such as its document number, its file name, its series, and release version, one could go to a folder or subfolder in the FTP server to find the document. The FTP server contains archives of 3GPP documents, including: 3GPP specifications, including from 00_series to 55_series of all releases; 3GPP meeting information and documents; Email discussions by 3GPP member companies; Technical contributions (TDocs) by 3GPP member companies; and Workshop materials. The FTP server has been accessible to the public for at least twenty years and is still currently accessible. I have reproduced a screenshot of the FTP server below.

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36300-090	zip	1,505,714	03/04/2007 12:24	----
36300-100	zip	1,418,165	03/19/2007 15:46	----
36300-800	zip	1,406,738	04/06/2007 13:35	----
36300-810	zip	1,626,575	07/03/2007 08:30	----
36300-820	zip	1,328,126	10/05/2007 12:57	----
36300-830	zip	1,512,555	01/03/2008 13:26	----
36300-840	zip	1,549,661	03/17/2008 09:49	----
36300-850	zip	1,672,467	06/25/2008 14:03	----
36300-860	zip	1,700,179	09/18/2008 13:08	----
36300-870	zip	2,303,685	01/05/2009 08:52	----
36300-880	zip	2,525,820	04/03/2009 13:13	----
36300-890	zip	2,551,000	06/18/2009 06:13	----
36300-900	zip	2,646,978	06/18/2009 06:13	----
36300-8a0	zip	2,420,507	09/22/2009 12:08	----
36300-910	zip	2,648,232	09/28/2009 09:11	----
36300-8b0	zip	2,407,501	01/05/2010 23:04	----
36300-920	zip	2,721,836	01/06/2010 23:36	----
36300-8c0	zip	2,434,125	04/20/2010 09:05	----
36300-930	zip	2,737,889	04/27/2010 10:21	----
36300-a00	zip	3,650,134	06/17/2010 14:37	----
36300-940	zip	2,766,978	06/17/2010 14:50	----
36300-950	zip	2,779,556	09/30/2010 09:48	----

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84. A POSITA could have also used the 3GPP FTP directory available at <https://www.3gpp.org/ftp/>. This is an alternative way to access the 3GPP FTP server using a web browser. A quick way to find a document is to search by entering “file_name, 3GPP.org/ftp” if the file name is known. The link to the location of the document usually will show up if it exists. The FTP directory has been accessible to the public for at least twenty years and is still currently accessible. I have reproduced a screenshot of the FTP directory below.

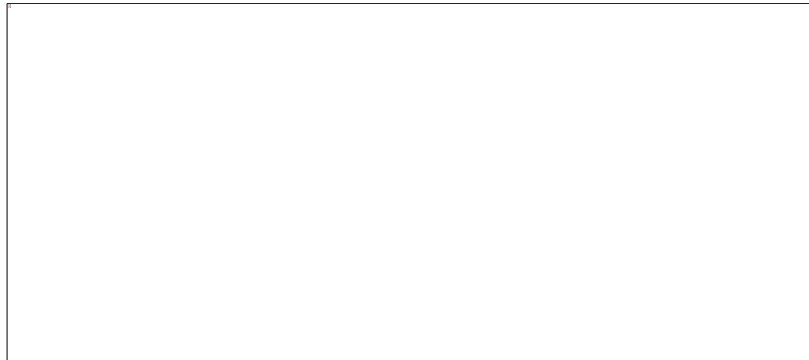


The indexed navigation of the files follows a clear pattern—the top two levels of indexing within the file repository are based wholly on subject matter, as reflected by the division of subject matter among the various TSGs and Working Groups.

85. A POSITA could have also used the 3GPP official advanced search engine <http://isearch.3gpp.org/isysadvsearch.html>. If a POSITA desired to look for files that might potentially contain the information of interest, the POSITA could have used the search engine to locate and extract the files. The search engine allowed the public to search for and extract, without restriction, 3GPP documents, including technical contributions and specifications. Using the search engine, anyone could search for any available file on the 3GPP website and file servers by logical combinations of keywords and by time periods. Unfortunately, as mentioned above, the search engine was discontinued in 2023.

86. Most TDocs were uploaded to the public file server for public viewing prior to the relevant meeting (although some TDocs were submitted during or after

meetings in which they were created). 3GPP's public file repository provides a reliable mechanism for identifying the date a document was uploaded to the website for public viewing. When a document is uploaded, the file server automatically assigns the document a time stamp, an accurate and automatically computer-generated electronic record of when the document was uploaded, as part of the regular business practices of 3GPP. "[T]he time stamp of the Zip file can be relied upon to indicate when the upload occurred." <https://www.3gpp.org/about-us/3gpp-faqs>. Thus, the documents are listed with the date of upload. 3GPP technical specifications or reports were published and uploaded to the public file server with the time, date, and version of the documents. For example, I have reproduced a screenshot of a partial list of 3GPP TS 25.321 files in the FTP directory below.



87. This has always been the practice regarding uploading documents to the 3GPP file repository, and my personal experience further confirms that the time stamps have always been a reliable way to indicate when a file was uploaded to the 3GPP website. Accordingly, Exhibits EX1007-1009, 1011-1012, 1015-1016, 1018-

1019, and 1021 were all publicly accessible and available before September 28, 2007.

VIII. CLAIM CONSTRUCTION

88. It is my understanding that in order to properly evaluate the Challenged Patents, the terms of the claims must first be interpreted. It is my understanding that for the purposes of this inter partes review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would have been understood by one of ordinary skill in the art in light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term. For the purposes of this declaration, I have given all the claim terms of the Challenged Claims their plain and ordinary meaning, as would have been understood by a person of ordinary skill in the art, at the time of the alleged invention, which I have been asked to assume is September 28, 2007, for all claims.

89. I have been asked to also consider whether the prior art discloses or suggests the challenged claims if the term “uplink resources” is construed as “resources that include at least an indication of a spreading code.” As I explain below, in my opinion the prior art discloses or suggests the Challenged Claims in either case.

IX. CLAIMS 1-10 ARE UNPATENTABLE

90. I have been asked to provide my opinion as to whether the Challenged Claims of the '838 Patent would have been obvious in view of the prior art. The

discussion below provides a detailed analysis of how the prior art references identified below teach the limitations of the Challenged Claims of the '838 Patent.

91. As part of my analysis, I have considered the scope and content of the prior art and any differences between the alleged invention and the prior art. I describe in detail below the scope and content of the prior art, as well as any differences between the alleged invention and the prior art, on an element-by-element basis for each Challenged Claims of the '838 Patent. As described in detail below, the alleged invention of the Challenged Claims would have been obvious in view of the teachings of the identified prior art references as well as the knowledge of a POSITA.

Grounds	Claim(s)	Basis
1	1-10	Zeira
2	1-10	Zeira and Yi

A. Ground 1: Obvious Over Zeira

1. Zeira

92. Zeira, titled “Packet Switched Connections Using Dedicated Channels” teaches using a temporary dedicated channel assigned to a user for a set duration to support communications; “[a]fter the duration expires, the channel is automatically released to the user.” Zeira, Abstract. I have annotated Zeira’s Figure 1, which depicts a WTRU comprising a receiver 516 (blue), transmitter 514 (green), a radio link controller (RLC) 510, and a medium access controller (MAC) 512 (orange).

Zeira, ¶ 29, Fig. 1. The WTRU communicates with a Node-B 502 (brown) that comprises a transmitter and receiver, which in turn communicates with a cell radio network controller (C-RNC) 506 (purple), which in turn communicates with a servicing radio network controller (S-RNC) 508 (pink).

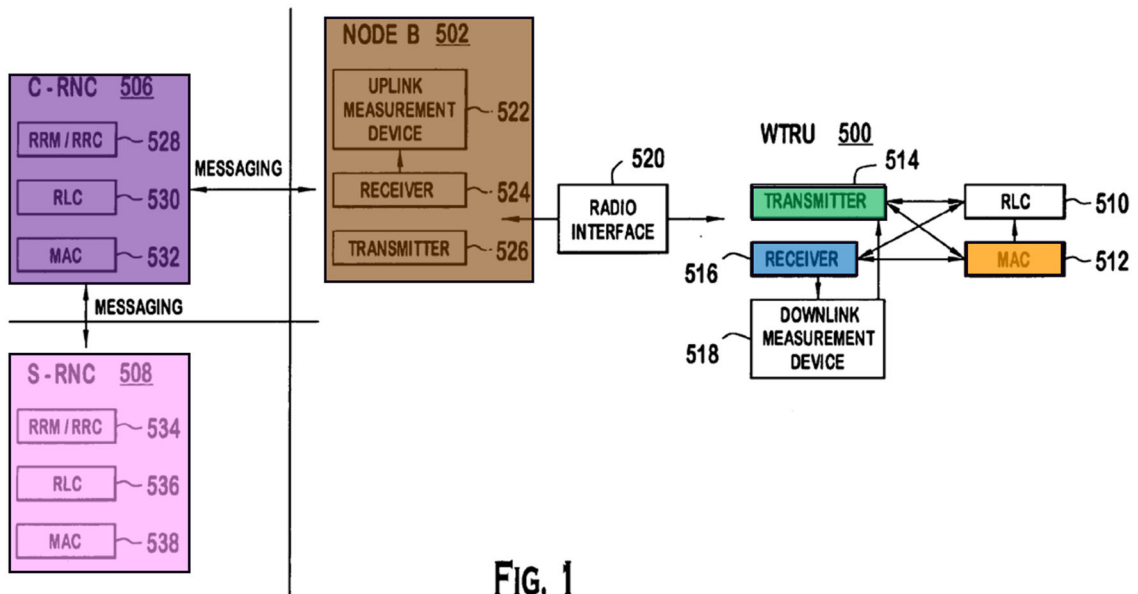


FIG. 1

93. The WTRU operates as part of a 3GPP system. *Id.*, ¶ 27. Like the '838 patent, Zeira explains that for “non-real time (NRT) applications, frequent periods of no transmission or reception activity exist” which leads to DCH resources not being utilized well during these periods. *Id.*, ¶ 33. Zeira also explains that “dedicated channels [DCHs] provide [the] required quality of service while maintaining efficient use of radio resources” *Id.*, ¶ 32.

94. Having identified the problem and the advantages of DCHs, Zeira provides a solution by allocating a temporary (temp) DCH, for a predetermined

duration, to the WTRU. Zeira, ¶ 34. “After that duration, the DCH is automatically released and the connection is returned to common channels.” *Id.* A servicing radio network controller (S-RNC) 508 “determines the duration of the temp-DCH.” *Id.*, 395. The S-RNC then configures the WTRU by sending either a “Physical Channel Reconfiguration (RRC) message”³ or a “Transport Channel Reconfiguration (RRC) message” to the WTRU that contains, *inter alia*, “timeslot information” and “frame allocation (continuous).” *Id.*, ¶¶ 401-412. When a WTRU receives an RRC message, it “[c]onfigure[s] the MAC layer with the new transport channel information...and the new radio bearer mapping information received in the message.” *Id.*, ¶¶ 421, 423. This solution both utilizes DCH resources more efficiently by releasing them after a set duration and maintains the QoS provided by DCHs.

2. Independent Claim 1

a. 1[pre]: “A wireless transmit/receive unit (WTRU) comprising:”

95. In my opinion, Zeira discloses this limitation. Zeira discloses *a wireless transmit/receive unit (WTRU)*⁴ 500 (red). E.g., Zeira, ¶¶ 28-29, Fig. 1.

³ Physical Channel Reconfiguration message and Transport Channel

Reconfiguration message are two types of RRC messages that are sent to WTRU.

⁴ Unless noted otherwise, I use *italics* to indicate claim language.

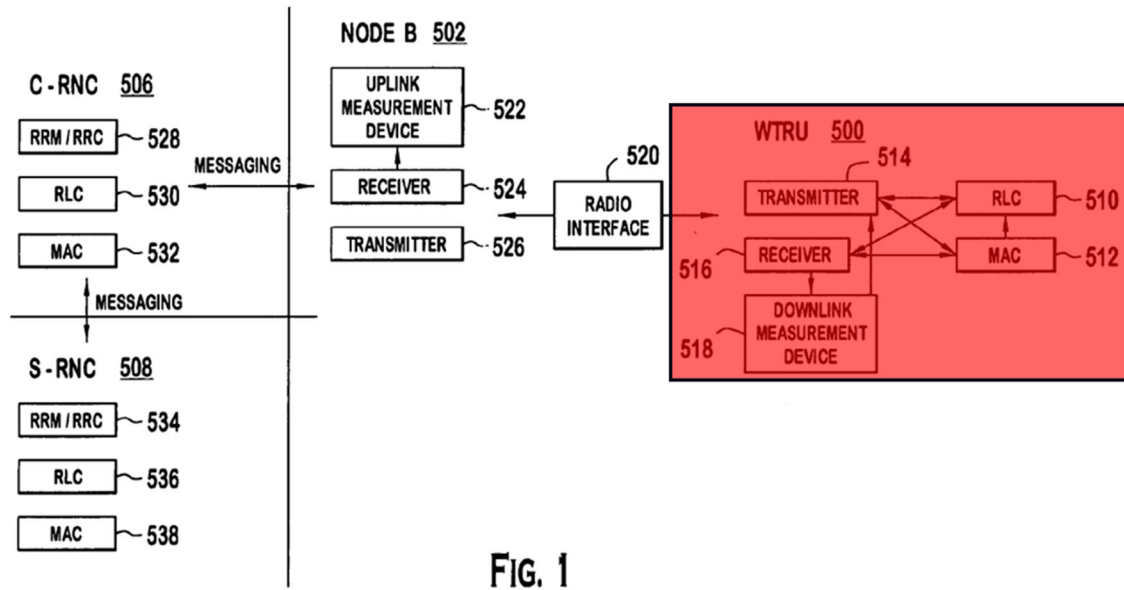


FIG. 1

b. 1[a]: “a receiver;”

96. In my opinion, Zeira discloses this limitation. Zeira discloses that WTRU 500 comprises “a receiver 516 [blue] for...receiving transmissions over [a] radio interface 520.” Zeira, ¶ 29, Fig. 1.

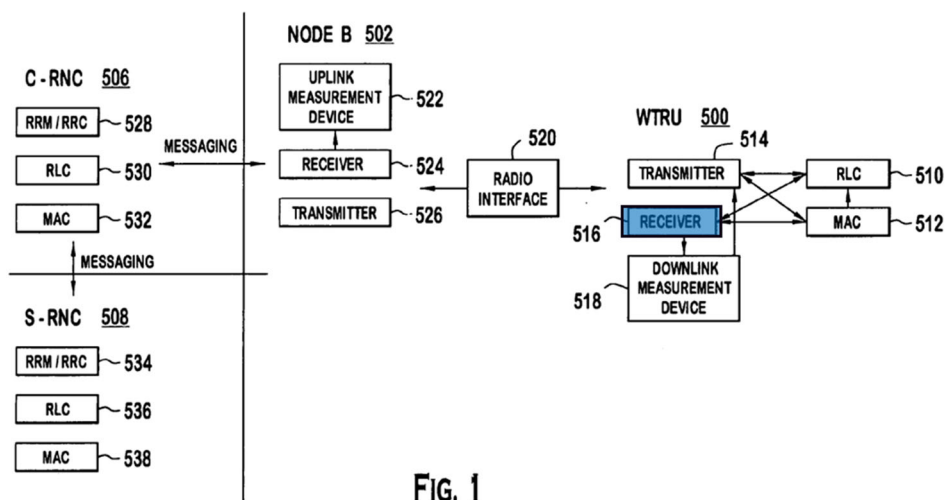
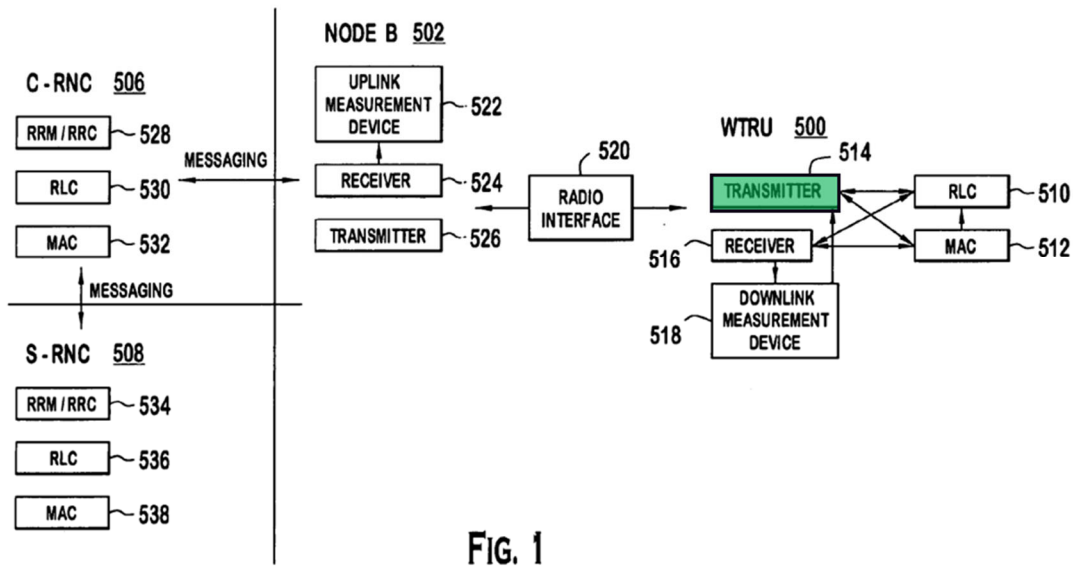


FIG. 1

c. 1[b]: “a transmitter; and”

97. In my opinion, Zeira discloses this limitation. Zeira discloses that WTRU 500 comprises “a transmitter 514 [green]...for sending...transmissions over [a] radio interface 520.” Zeira, ¶ 29, Fig. 1.

**FIG. 1****d. 1[c]: “a processor;”**

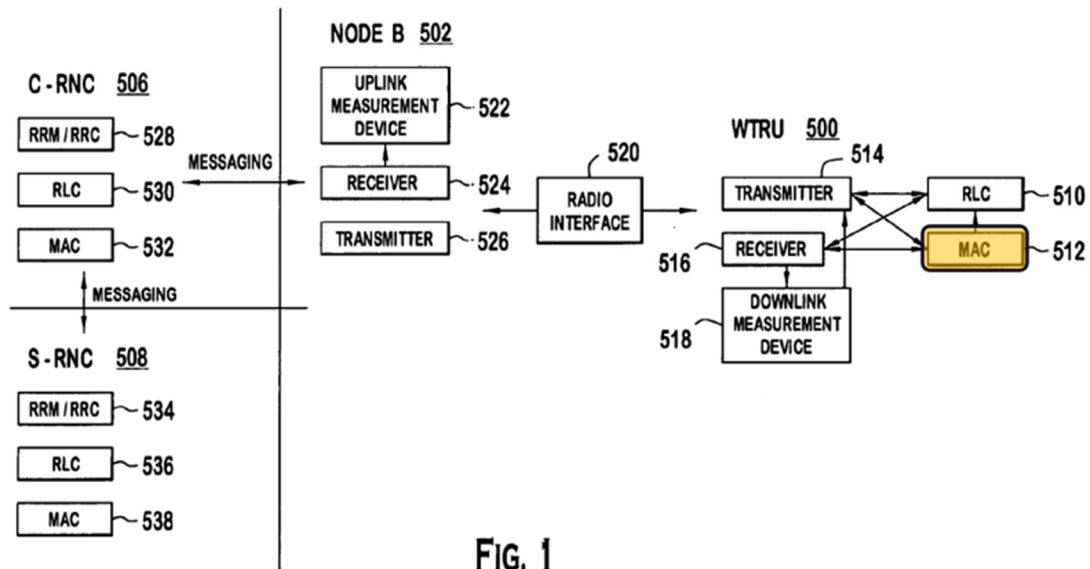
98. In my opinion, Zeira discloses or suggests this limitation. As I explain in Section VI.D, a POSITA would have known that Zeira’s WTRU includes a processor because a processor or controller would be required to perform the signal processing operations of a WTRU operating under 3GPP, such as the WTRU described by Zeira. Further, Zeira explains that “[i]t is desirable to maintain the WTRU connection on common channels whenever possible, since WTRU power

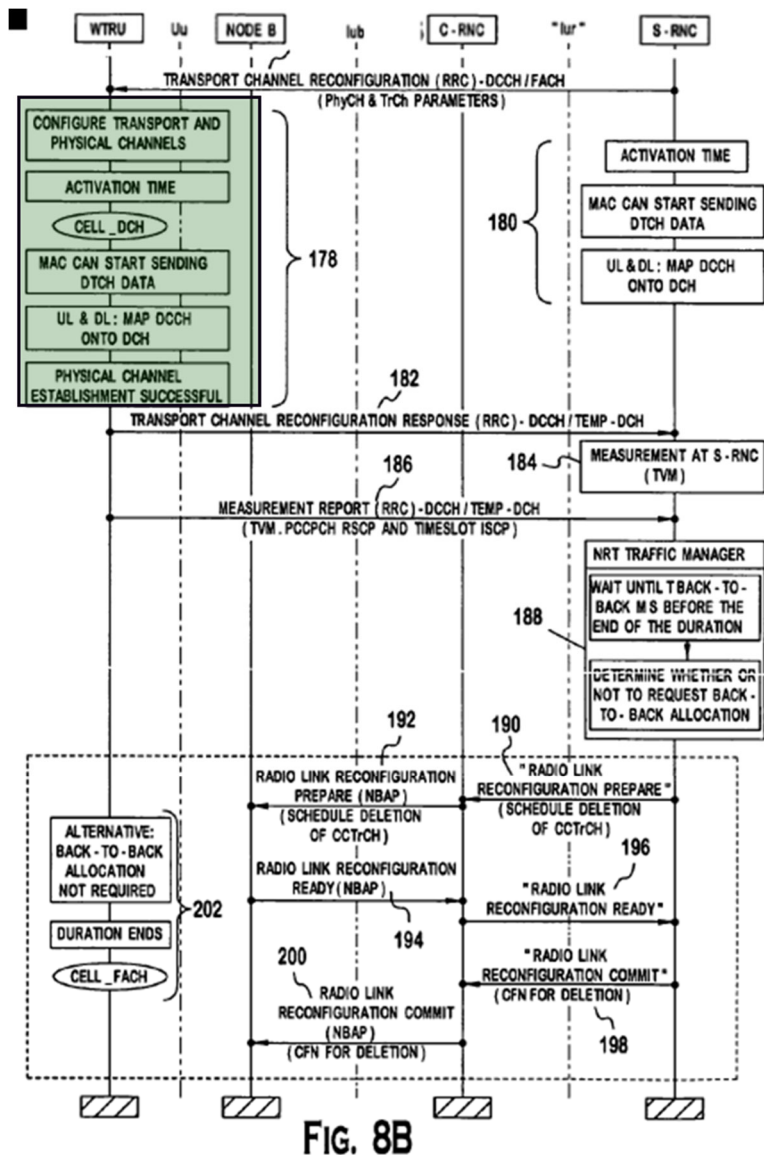
and **processing requirements**⁵ are greatly reduced.” Zeira, ¶ 32. Therefore, a POSITA would have found it obvious that such processing requirements relate to operations that are performed by a processor. Indeed, even the ’838 patent describes a WTRU that can be “a cellular telephone, a personal digital assistant (PDA), [or] a computer” (’838 patent, 3:15-16), which are known to include a processor.

99. I have been asked to assume that Patent Owner may argue that a Zeira nonetheless does not disclose a processor. Such an argument would be incorrect for the reasons I explained above, but even setting those aside, Zeira discloses a processor because its WTRU 500 comprises “a medium access controller (MAC) 512” (orange). Zeira, ¶ 29 (emphasis added), Fig. 1. A POSITA would have understood that the Zeira’s MAC is a “*processor*” because the MAC performs computational operations that require a processor implementation. Further, Zeira’s MAC is a “*processor*” as described in the ’838 patent because it is “used to implement a radio frequency transceiver for use in a wireless transmit receive unit (WTRU)” as described below. ’838 patent, 10:55-57, For example, Zeira discloses that when the WTRU 500 receives a reconfiguration message, “the WTRU RRC...[c]onfigure[s] the MAC layer with [a] new transport channel information (in case of changes in transport channel information) and the new radio bearer mapping

⁵ Unless otherwise noted, all emphasis is added by Petitioner.

information received in the message.” Zeira, ¶¶ 421-423, Figs. 1 and 8B. A POSITA would have recognized and understood that the function of implementing configuration changes would require a processor.

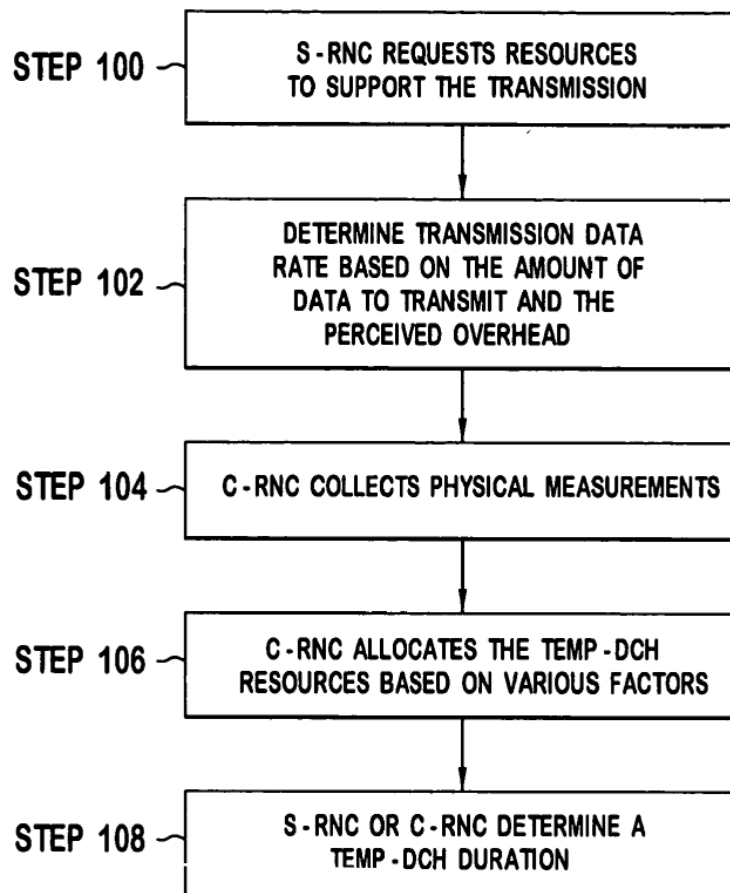




e. 1[d]: “wherein the receiver and the processor are configured to receive at least one radio resource control (RRC) message indicating uplink resources for WTRU and medium access control (MAC) timer information,”

100. In my opinion, Zeira discloses or suggests this limitation. Zeira discloses a process by which a temp-DCH (temporary dedicated channel) is assigned to a WTRU in its system. E.g., Zeira, ¶ 36 (“the general procedure for a temp-DCH allocation”), Fig. 2, ¶ 326, Fig. 15 (“procedure to allocate ‘Normal’ temp-DCH).

Below, I often rely on the disclosure in Zeira's Figure 8, which depicts a messaging diagram of a call admission procedure that uses WTRU measurements. Zeira, ¶ 14. Zeira notes that "[t]he implementation of [temp-DCH allocation] may be similar to th[at] for call admission for real time services," so Figure 8 is relevant to, and indeed, as the discussion below makes clear, depicts the messaging between components in Zeira's system when forming a temp-DCH. Zeira, ¶¶ 53, 107 (Fig. 8 is a messaging diagram for call admission control procedure), Fig. 8.

**FIG. 2**

Zeira, Fig. 2.

101. At a high level, Zeira discloses that the S-RNC requests resources to support a transmission over a temp-DCH. *Id.*, ¶ 36, Fig. 2. A transmission data rate is calculated, *id.*, ¶¶ 36-38, Fig. 2; *see also id.*, ¶¶ 40-50 (describing procedure for determining data rate), and a duration the temp-DCH is obtained, *id.*, Abstract, ¶ 6 (“[e]mbodiments of the invention relate to establishing the temp-DCH channel, determining the data rate and duration of the channel.”). The C-RNC allocates the temp-DCH resources based on various factors including the data rate, *id.*, ¶¶ 52, 99, Fig. 2, and the S-RNC calculates the duration and transmits the channel configuration and temp-DCH duration to the WTRU, *id.*, ¶¶ 74, 401-403.

102. **Radio Resource Control (RRC) Message Indicating Uplink Resources:** According to Zeira, the C-RNC performs resource allocation for the temp-DCH. *Id.*, ¶ 99, Fig. 2. Zeira describes the procedure for allocating resources, as part of its call admission control procedure, in its Figures 8A-8B. *Id.*, ¶ 107, Figs. 8A-8B; *see also id.*, ¶ 326, Fig. 15. Figure 8A indicates that one of the steps for allocating resources comprises “determine[ing] required codes and their spreading factors” [cyan]. *Id.*, Fig. 8A; *see also id.*, ¶¶ 326 (“The procedure to allocate ‘normal’ temp-DCH is as follows”), 329 (“[d]etermine the required number of codes and their spreading factors”), 338 (“[d]etermine the required number of codes and their spreading factors, 452”).

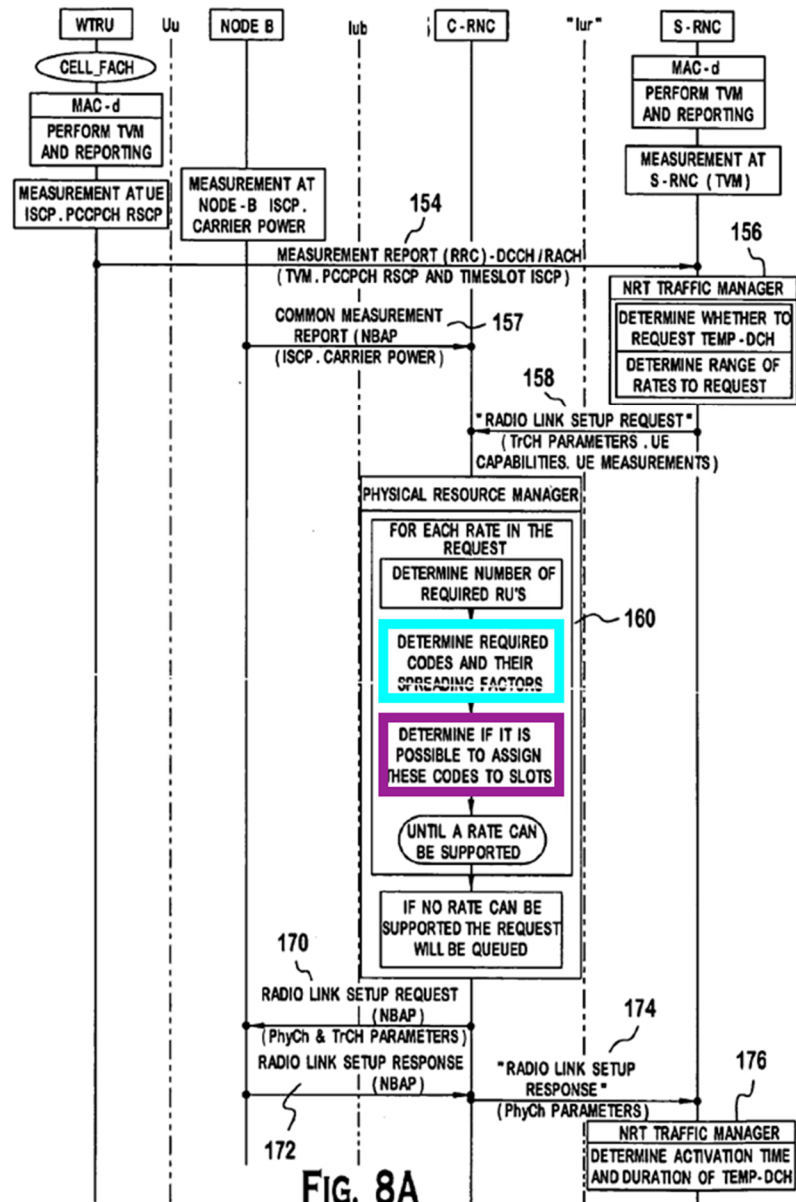


FIG. 8A

Zeira, Fig. 8A.

103. After the required codes and their spreading factors are determined, the C-RNC determines if it is possible to assign these codes (dark purple). *Id.* If resources are successfully assigned by the C-RNC, it sends a message to the Node-B to “reserve the necessary resources and configure the new radio link.” *Id.*, ¶ 347.

If successful, the Node-B sends a “Radio Link Setup Response” to the C-RNC, which then “informs the S-RNC 508 of the assigned physical resources and the allocated rate...by sending a ‘Radio Link Setup Response’ (RNSAP).” *Id.*, ¶¶ 367-368. This message comprises information about the channelization codes assigned to the temp-DCH. In my opinion, a POSITA would have understood that the message would also include at least an indication of the spreading factors that the C-RNC determined and assigned. *Id.*, ¶¶ 368, 371. Upon receipt of the RNSAP, the S-RNC determines the duration of the temp-DCH. Zeira, ¶¶ 384, 393-400 (providing details on how to determine duration).

104. Next, the S-RNC configures the WTRU by sending either a “Physical Channel Reconfiguration (RRC) message” or a “Transport Channel Reconfiguration (RRC) message.” *Id.*, ¶¶ 401-403. These messages contain details regarding various uplink resources, including the channelization codes for the temp-DCH. Zeira, ¶¶ 404-420, 411 (“channelization codes”). A POSITA would have understood that because the C-RNC determines the channelization codes and their spreading factors and then communicates that information to the S-RNC, which then sends the information to the WTRU, the spreading factors are also sent in the RRC message to the WTRU because, as I explained in Section VI.H, spreading factors are communicated in RRC transport channel configuration (which Zeira carries out). In other words, a POSITA would have understood that the RRC message sent to the

WTRU *indicat[es] uplink resources* that include “at least an indication of a spreading code.”

105. Because a construction of *uplink resources* that requires “at least an indication of a spreading code” is narrower than the plain and ordinary meaning of the term, Zeira discloses or suggests this limitation under both constructions.

106. **WTRU Receiving the RRC Message:** Zeira discloses that the WTRU receives the reconfiguration message, Zeira, ¶ 421. A POSITA would have understood and found it obvious that, specifically, the receiver 516 receives the message, and the processor of WTRU processes the received message to implement the reconfiguration based on the message contents, as I explained in Section VI.D. *Id.*, ¶ 29. Notably, upon receipt, the WTRU “[c]onfigure[s] the MAC layer with the new transport channel information (in the case of changes in transport channel information) and the new radio bearer mapping information received in the message.” *Id.*, ¶¶ 421, 423. Because the MAC layer is configured based on information in the RRC message, a POSITA would have understood that the WTRU’s processor and/or the medium access controller (*processor*) receives the RRC message. In other words, *the receiver and the processor are configured to receive at least one radio resource control message indicating uplink resources for the WTRU.*

107. **Timer Information:** Zeira explains that the S-RNC determines the activation time and duration for the temp-DCH, and then notifies the WTRU of its

determinations:

(1) “After the S-RNC 508 receives the "Radio Link Setup Response" message, *it determines the activation time and duration of the Temp-DCH*, 176.”

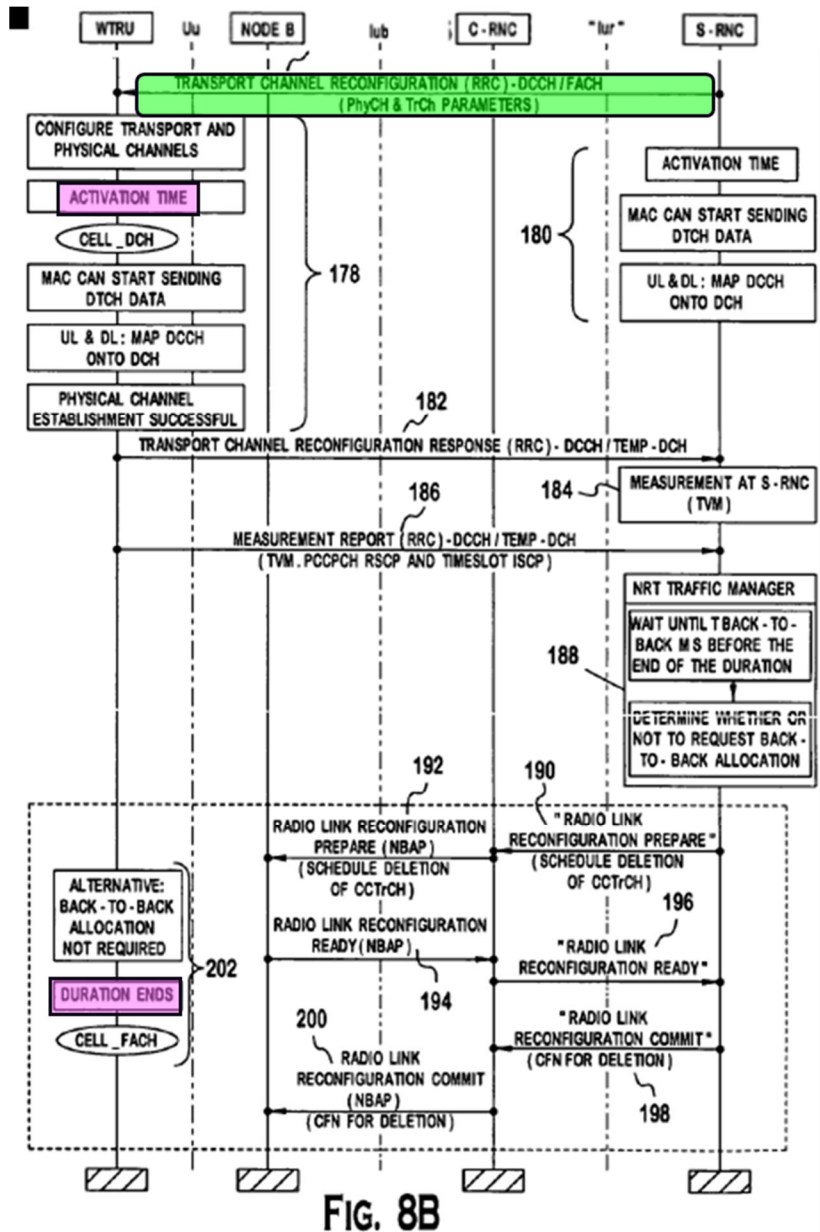
Zeira, ¶ 384; see also, *id.*, ¶¶ 393-400 (explaining details of timer duration determination).

(2) “The S-RNC 508 *notifies the WTRU 500 of any changes in transport channel information and the new physical channel configuration*, 177.”

Zeira, ¶ 401⁶. The S-RNC notifies the WTRU via an RRC message. *Id.*, ¶¶ 402-403.

⁶ Zeira’s ¶ 401 begins with “For low-rate temp-DCH, the duration is preferably always fixed, T_{st} ,” but also explains that the duration of low-rate temp-DCH is a design parameter determined based on various considerations, including the time needed to receive uplink measurements, processing requests and reconfiguration requests. *Id.*, ¶ 63. Then, “[t]he S-RNC 508 notifies the WTRU 500 of any changes in transport channel information and new physical channel configuration, 177.” *Id.* ¶ 401. Accordingly, a POSITA would have understood that Zeira’s disclosure of sending RRC messages to the WTRU in ¶¶ 402-403 applies to both low-rate temp-DCHs and normal-rate temp-DCHs because the WTRU was notified with the new channel configuration in either scenario.

108. Notably, among the channel information, Zeira's S-RNC notifies the WTRU about the temp-DCH channel duration. Zeira, ¶ 74 ("S-RNC 508 computes a duration (transmission period time)...If duration is computed, this information may be transmitted to the WTRU 500."). A POSITA would have found it obvious that the S-RNC communicates the duration information to the WTRU via an RRC message it sends because it was well known to a POSITA that RRC messages were used for sending information related to configuration of various parameters to the WTRU. I explained these aspects of the RRC messages in Section VI.H of this Declaration (specifically ¶¶ 76-80) which were well known to a POSITA, and explained in detail in various 3GPP documents available to a POSITA. In addition, Figure 8B shows an RRC message that is sent from the S-RNC to the WTRU after the S-RNC computes the duration. This is illustrated by operation 177 (green) in Zeira, Figure 8A:



109. After receipt of the RRC message 177, which includes an indication of the uplink resources and the duration computed by the S-RNC as discussed above, the transport and physical channels are configured at the WTRU, and after the temp-DCH is activated the WTRU begins tracking its duration (pink). Zeira, ¶¶ 421-423, Fig 8B. Even if Patent Owner argues that transmission of the timer duration is not

spelled out in Figure 8's operation 177, nonetheless, Zeira explicitly describes that the duration information "may be transmitted to WTRU." Zeira, ¶ 74. This means that the timer information is sent either in the same message as the remaining configuration information, or in a different RRC message. But to a POSITA it would have been obvious to transmit the timing information with the same RRC message

110. **MAC Timer:** A POSITA would have further understood and found it obvious that the duration sent by the S-RNC to the WTRU indicates *MAC timer* information because the WTRU MAC layer is configured with this information. Zeira, ¶ 423. For example, Zeira describes "...the C-RNC 506 or S-RNC 508 can **calculate the time that MAC-d will need to transmit the current buffered data** and set the duration accordingly." Zeira, ¶ 76. A POSITA would have been guided by the teachings of Zeira and found it obvious that the duration information pertained to or indicated MAC timer information.

111. Further, as I explained in Section VI.I (specifically, ¶¶ 74-78), a POSITA would have found it obvious to implement a timer controlling a temporary channel duration in the MAC layer. As I explained earlier, it was well known to a POSITA, and described in various 3GPP standard documents, that MAC layer handles the timing aspect related to subframes or TTIs. Indeed, Zeira discloses that the duration of the temp-DCH is calculated as a "multiple of the longest TTI length in the TFCS of the CCTrCH." Zeira, ¶ 79, see also, ¶¶ 77-78, 397. And a POSITA

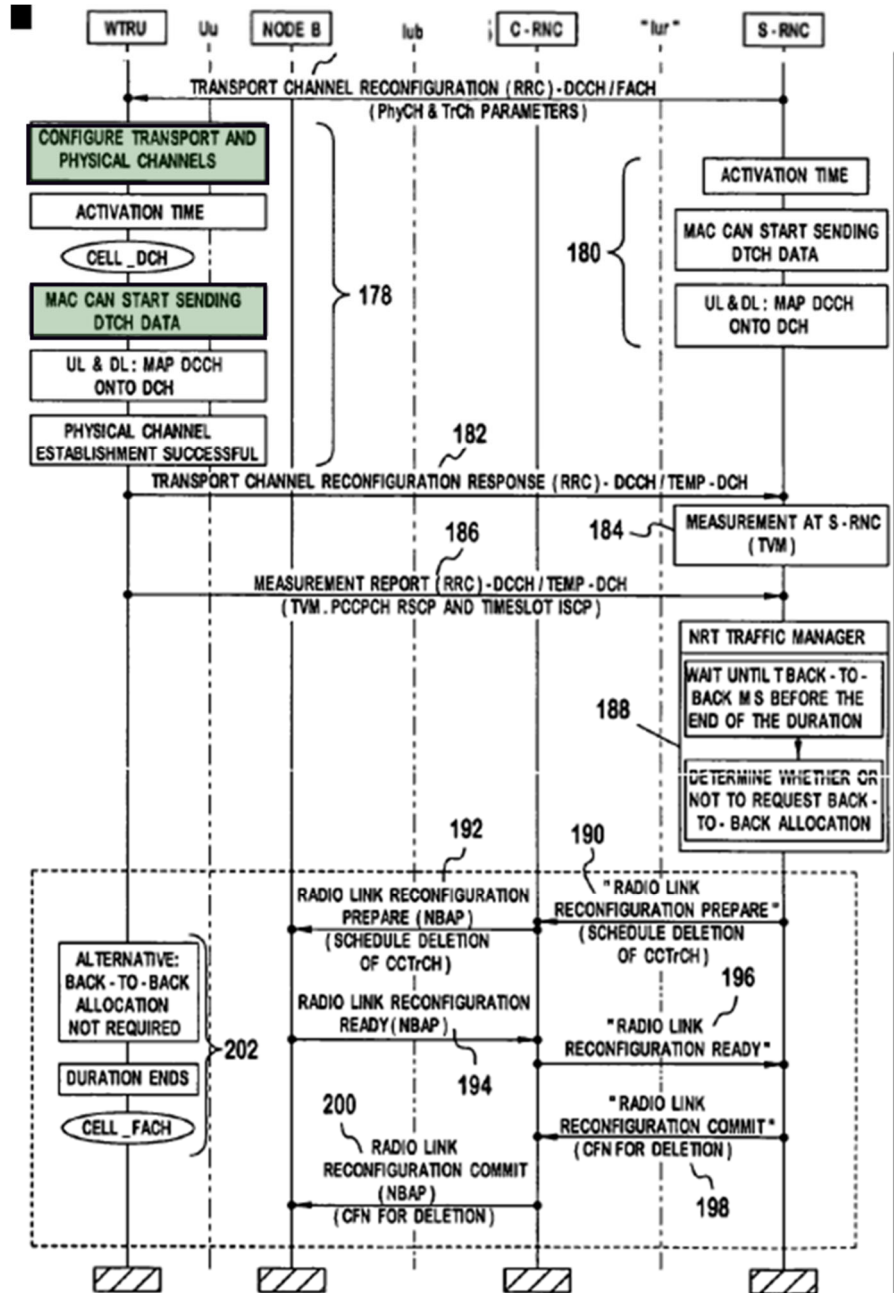
would have understood that TTIs (transmission time intervals) are how the MAC in 3GPP controls access the physical transmission medium. Therefore, Zeira's explanation about how temp-DCH duration is calculated as a multiple of TTIs, would have further confirmed and made it obvious that the duration communicated to and tracked by the WTRU would be implemented as a MAC timer.

112. While the above explanations in Zeira would have been a clear indication that the timer can be implemented at the MAC layer, a POSITA would have found this obvious to begin with, because a POSITA would have known that the MAC fundamentally controls access to the transmission medium. To re-iterate, I have provided these explanations in Section VI.I of this Declaration. The MAC layer would thus be the most obvious place for controlling the duration of the temp-DCH – i.e., the channel through which the WTRU accesses the transmission medium.

113. Accordingly, Zeira discloses or suggests that the WTRU receiver and processor, e.g., medium access controller (*wherein the receiver and the processor*) receive an RRC message from the S-RNC (*are configured to receive at least one radio resource control (RRC) message*) that comprises channel information for the temp-DCH, including at least an indication of the spreading factors (*indicating uplink resources for WTRU*) and the duration for the temp-DCH, which is configured within the MAC layer (*and medium access control (MAC) timer information*).

f. 1[e]: “the transmitter and the processor are configured to transmit uplink data based on the indicated uplink resources,”

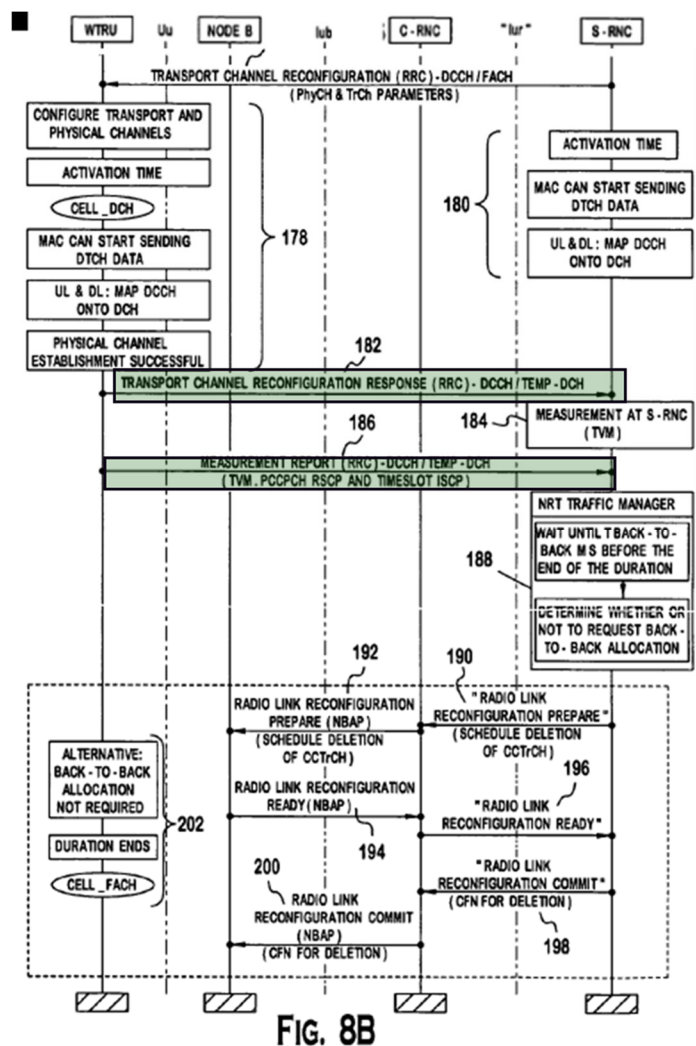
114. In my opinion, Zeira discloses or suggests this limitation. As I explained in 1[b] in Section IX.A.2.c, Zeira discloses that the WTRU 500 has a transmitter 514 “for sending ...transmissions over the radio interface 520.” Zeira, ¶ 29, Fig. 1. Indeed, Zeira is clear that its procedure for establishing a temp-DCH (and subsequently transmitting data via the temp-DCH) applies to both uplink and downlink transmissions because a temp-DCH is established “[a]fter sufficient data has been collected for either an uplink or downlink transmission.” Zeira, ¶ 36, *see also*, ¶ 50. Subsequent references to transmissions in Zeira do not limit this disclosure, so a POSITA would have understood that such references to transmissions contemplate both uplink and downlink transmissions. E.g., *id.*, ¶¶ 76, 84-86. For example, Zeira teaches or suggests transmitting uplink data based on the indicated resources because, as I have annotated Figure 8B below to highlight, Zeira discloses that the WTRU performs operations that include “CONFIGURE TRANSPORT AND PHYSICAL CHANNELS” and “MAC CAN START SENDING DTCH DATA.” Zeira, Fig. 8B.



115. A POSITA would have found it obvious that the configuration of channels in the first highlighted operation would be based on the resources that were indicated in the received RRC message (*see* element 1[d], Section IX.A.2.e, which is followed by the use of DTCH (dedicated traffic channel) for uplink transmission

of user data. Also, given that the highlighted operations are identified at the WTRU, it would have been obvious to a POSITA that the WTRU is configured to transmit data in the uplink.

116. Additionally, or alternatively, Zeira describes WTRU transmitting uplink data including measurement reports over Temp_DCH to the S-RNC as described in, for example, in operation 186 of Figure 8 (annotated below).



117. Notably, Zeira describes upon “receiving [a] reconfiguration message,

the WTRU RRC...[c]onfigure[s] the physical layer with the physical channel information and [a] new transport channel information [is] received in the message.” Zeira, ¶¶ 421-422. The WTRU’s processor then “[c]onfigure[s] the MAC layer with the new transport channel information,” and “[a]fter receiving a confirmation from the physical layer that the DPCCH was successfully established...[s]end[s] a ‘Complete’ message to the S-RNC 508 over the DCCH/Temp-DCH, 182.” Zeira, ¶¶ 423-425, Fig. 8B. Traffic Volume Measurements are also “collected at the S-RNC 508, 188 and **measurement reports are sent from the WTRU 500 to the SRNC 508, 186.**” Zeira, ¶ 426, Fig. 8B.

118. Given that Figure 8B shows transmissions 182, 186 that originate from the WTRU, a POSITA would have found it obvious that such transmissions would be carried out by the processor and transmitter that resided in Zeira’s WTRU that were responsible for processing and transmission of data. Zeira, ¶ 29; *see also*, Sections VI.D and VI.I.

119. In other words, the WTRU *processor* via the *transmitter* transmits the DTCH data, a “Complete” message and/or “Measurement Reports” via the newly established temp-DCH (*are configured to transmit uplink data based on the indicated uplink resources*).

g. 1[f]: “the processor is configured to deactivate the indicated uplink resources in response to a MAC timer expiring, and”

120. In my opinion, Zeira discloses or suggests this limitation. Zeira discloses that a “temp-DCH channel is a channel that is assigned to a user having a set duration” and “[a]fter the duration expires, the channel is automatically released by both the user and the network.” Zeira, ¶ 6, *see also id.* ¶ 34 (“instead of a traditional allocation of a DCH to a WTRU, a temporary (temp) allocation of the DCH is made. The temp allocation is an assignment of a DCH with a predetermined duration. After the duration, the DCH is automatically released and the connection is returned to common channels”). For instance, before “the end of the temp-DCH duration, the S-RNC 508 decides if an extension of the duration is required, 188.” Zeira, ¶ 428. If no extension is requested by the WTRU 500, or if the duration ends, the WTRU’s processor “releases the temporary dedicated physical channels.” Zeira, ¶ 440, Fig. 8B. As explained in connection with Element 1[d], Section IX.A.2.e, the duration information had been “transmitted to the WTRU 500,” Zeira, ¶ 74, enabling the WTRU 500 to activate and monitor a MAC timer and to release (*deactivate*) the temporary dedicated uplink resources “at the end of the duration,” Zeira, ¶ 440; *see also* annotated Fig. 8B below, illustrating activation time and duration ends operations at the WTRU.

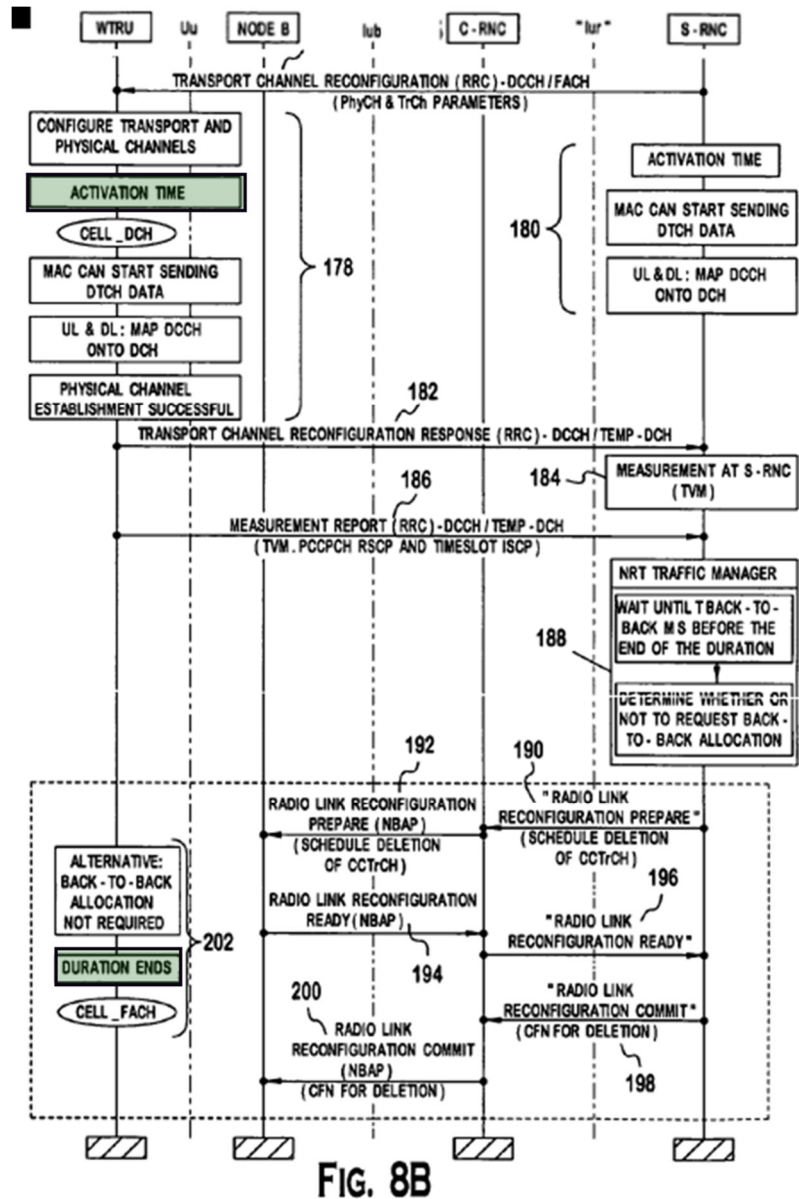


Fig. 8B

121. Moreover, a POSITA would have found it obvious that the timer implemented at Zeira's WTRU would be a MAC timer because, as explained in connection with Element 1[d], Section IX.A.2.e, the timer information provided to the WTRU pertained to MAC timer information.

h. 1[g]: “the MAC timer is configured based on the MAC timer information indicated by the [at least one]⁷ received RRC message.”

122. In my opinion, Zeira discloses or suggests this limitation. *See also* Element 1[d] in Section IX.A.2.e above explaining that it would have been obvious that the at least one RRC message would include the MAC timer information. Element 1[g] appears to additionally require that the MAC timer is *configured* based on the received MAC timer information.

123. As explained in Section IX.A.2.e, Zeira discloses that at least one RRC message is sent to the WTRU’s MAC where it is used to “[c]onfigure the MAC layer with the new transport channel information...and the new radio bearer mapping information received in the message.” Zeira, ¶ 423. As further explained in Section IX.A.2.e, a POSITA would have found it obvious that the duration for Zeira’s temp-DCH is provided as a MAC timer via the RRC message. Furthermore, as also explained in connection with Elements 1[d] and 1[e] in Sections IX.A.2.e, and

⁷ The “*received message*” in 1[g] lacks proper antecedent basis. It is assumed that Element 1[g] recites “... indicated by the at least one received RRC message,” which finds antecedent basis in Element 1[d]. As explained in Element 1[d], it would have been obvious that the timer information and configuration information are received in either a single RRC message or two RRC messages.

IX.A.2.f, the timer information is implemented at the WTRU because Figure 8B illustrates the activation and deactivation of the timer at the WTRU. Therefore, it would have been obvious to a POSITA that Zeira describes configuring the WTRU's MAC timer based on the MAC timer information indicated by the [at least one] received RRC message.

124. In other words, the duration for the temp-DCH (*the MAC timer*) is configured by the MAC layer based on the duration information received in the RRC message (*is configured based on the MAC timer information indicated by the received RRC message*).

3. Claim 2: “The WTRU of claim 1 wherein the receiver and the processor are configured to receive an uplink grant associated with the indicated uplink resources and the transmitter and the processor are configured to transmit using the indicated uplink resources based on the grant.”

125. In my opinion, Zeira discloses or suggests the additional limitations of this claim. As I explained in element 1[e], Section IX.A.2.f, Zeira's transmitter and the processor are configured to transmit uplink data based on the indicated uplink resources. As I explained in Section VI.I, it would have been obvious to a POSITA that, based on normal procedures of cellular wireless systems, such uplink transmissions would have been made in response to receiving an uplink grant for making such uplink transmissions.

126. Further, as explained in Section IX.A.2.e, Zeira's WTRU *receiver* and

processor are configured to receive at least one RRC message comprising the uplink resources and MAC timer information. A POSITA would have found it obvious for the RRC message to be, or include, an *uplink grant associated with the indicated uplink resources* because after the WTRU's MAC layer is configured, the WTRU in fact sends uplink data to the S-RNC, including a "Complete" message to the S-RNC over the newly established temp-DCH. Subsequent uplink data (i.e., at least the measurement report) is also transmitted in the uplink. Zeira, ¶¶ 424-425.

127. Additionally, or alternatively, Zeira describes its WTRU receiving an uplink grant and transmitting based on the uplink grant when discussing back-to-back allocations. Notably, Zeira describes granting additional time to continue the use of Temp-DCH. Zeira, ¶ 428 ("The extension of the duration is a new allocation at the UE side: the duration of the previously allocated temp-DCH will expire, and a new temp-DCH will be configured. This procedure is called a 'back-to-back allocation'") *see also, id.*, ¶ 87. In case of back-to-back allocations, the new configurations are sent to WTRU. *Id.*, ¶¶ 513-517; *see also id.*, ¶¶ 85-91. Therefore, a POSITA would have understood that Zeira teaches or suggests providing additional uplink grants for transmission of additional information using the indicated uplink resources for back-to-back allocations. In the back-to-back allocation scenario, the mapping to Zeira to claim 1 is augmented to include the RRC messaging associated with the back-to-back configuration information as part of the

“at least one” RRC message.

128. Therefore, Zeira discloses or renders obvious the WTRU receiving an uplink grant or permission (e.g., via the RRC message⁸) to use the Temp-DCH for the particular duration (*configured to receive an uplink grant associated with the indicated uplink resources*), and to, e.g., send uplink data (*the transmitter and the processor are configured to transmit using the indicated uplink resources based on the grant.*”).

4. Claim 3: “The WTRU of claim 2 wherein based on the receipt of the uplink grant, the WTRU does not deactivate the indicated uplink resources.”

129. In my opinion, Zeira discloses or suggests the additional limitations of this claim. Zeira discloses that the RRC message containing the *uplink grant* discussed in Sections IX.A.3; IX.A.2.e “is sent on the DCCH/FACH.” Zeira, ¶ 404. The WTRU receives the RRC message and configures the MAC layer. Zeira, ¶¶ 421-423. “After [the WTRU receives] confirmation from the physical layer that the DPCH was successfully established...[it] send[s] a ‘Complete’ message to the S-RNC 508 over the DCCH/Temp-DCH 182.” Zeira, ¶¶ 424-425. Because the WTRU sends a “Complete” message over the DCCH/Temp-DCH, i.e., the channel

⁸ Notably, claim 2 does not require receiving an uplink grant via a separate message.

established by the *uplink grant*, a POSITA would have understood that Zeira teaches *not deactivat[ing] the indicated uplink resources*.

130. Additionally or alternatively, as explained in connection with claim 2, Section IX.A.3, Zeira describes granting back-to-back allocations, which allows additional data to be sent over the temp-DCH. Zeira, ¶¶ 513-517; see also, *id.*, Abstract, ¶¶ 85-91, Figs. 5-6, ¶ 100 (“For the WTRU 500, the back-to-back allocation is a new temp-DCH allocation with an activation time equal to the end of the duration of the previous temp-DCH.”). Accordingly, upon an indication that a back-to-back allocation is granted, it would have been obvious to a POSITA that uplink resources would not be deactivated in order to allow transmission of additional uplink data by WTRU.

5. Claim 4: “The WTRU of claim 1 wherein the receiver and the processor are configured to receive a deactivation message and the processor is configured to deactivate the uplink resources based on the received deactivation message.”

131. In my opinion, Zeira discloses or suggests the additional limitations of this claim. Zeira discloses an embodiment that “relates to adding a start/stop function to the medium access controller which can be used in conjunction with temp-DCH as well as other applications.” Zeira, ¶ 6. Therefore, Zeira already contemplated combining the start/stop function with the temp-DCH function and a POSITA would have been guided by the teachings of Zeira to additionally implement the start/stop functionality. Zeira describes the start/stop functionality as beneficial because during

reconfiguration, the channel may become unstable and therefore it “may be desirable that the RRC 472 configures the lower layer to stop the data transmission over the air.” Zeira, ¶ 558. In connection with Figure 20, Zeira explains that its WTRU 500 architecture includes a start/stop function “performed by a start/stop device 476 (tan), in the MAC layer 474 (gray) [that] allows the RRC 472 (gold) in the WTRU 500 and RNC 504 to request the MAC 474 to start or stop requesting data for specific logical channel in a specific radio frame.” Zeira, ¶ 561; *see also id.*, ¶ 564.

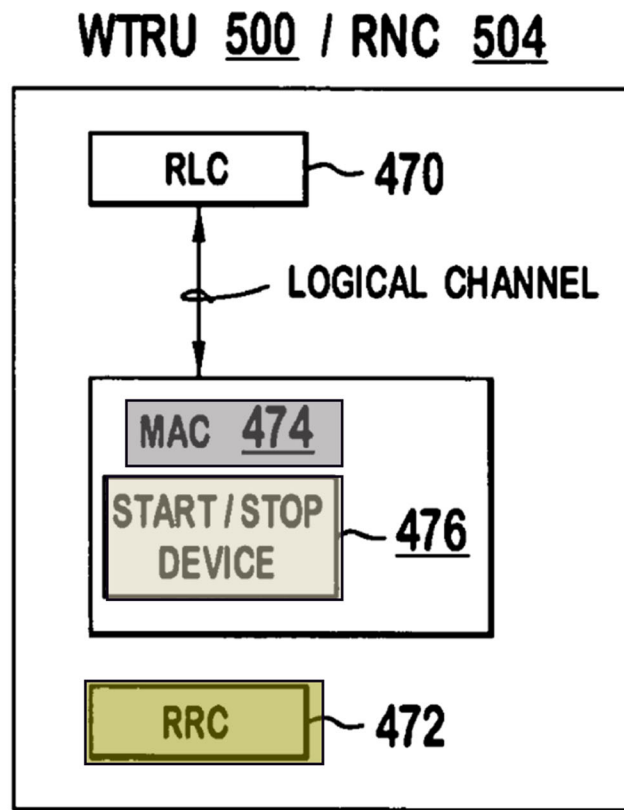


FIG. 20

132. Zeira further discloses that when the MAC 474 is instructed to “stop

the transmission of a logical channel in a specific radio frame, the channel becomes ‘inactive’ at that radio frame.” Zeira, ¶ 561; *see also* Zeira, ¶ 562 (“When a stop command is received, the channel becomes inactive in the specified radio frame.”).

133. A POSITA would have understood and found it obvious Zeira describes using these logical channels for “scheduling of data transmission in the uplink” and further states that “the RLC 470 builds and delivers PDUs (Protocol Data Units) to the MAC 474, using the logical channels.” Zeira, ¶ 554.

134. Moreover, a POSITA would have understood and found it obvious that when the start/stop functionality of Zeira is implemented, the reconfiguration message sent by the RNC (e.g., RRC message in Figure 8B) would result in the “stop” command being effectuated. Notably, Zeira explains that “during a reconfiguration, even a synchronized reconfiguration, there is a period of time where the channel is unstable. Because of that, there are situations where it may be desirable that the RRC 472 configures the lower layer to stop the data transmission.” *Id.*, ¶ 558. Therefore, a POSITA would have found it obvious that the reconfiguration message included and/or operated as a “deactivation message” that would be received by the WTRU’s receiver and processor as claim 4 recites, and would result in the channel becoming “inactive.” *Id.*, ¶¶ 561-562.

6. Claim 5: “The WTRU of claim 1 wherein the MAC timer is based on a number of frames.”

135. In my opinion, Zeira discloses or suggests the additional limitations of

this claim. As explained in Section IX.A.2.e, the S-RNC sends an RRC message to the WTRU indicating the duration of the temp-DCH. The RRC message also comprises a continuous frame allocation. Zeira, ¶¶ 404, 412. The MAC layer is configured with this information, such that a POSITA would understand it to be a *MAC timer*. Section IX.A.2.e; Zeira, ¶¶ 404, 412, 423.

136. As discussed in connection with claim 2 in Section IX.A.3, Zeira additionally explains that its consideration for determining back-to-back allocation takes into account the frame numbers or CFNs (connection frame numbers) for its determination of the activation duration:

After receiving the response from the C-RNC 506, if the allocation is successful, the S-RNC NRT-TM **calculates the activation time and duration. If the CFN for the activation time is greater than the CFN where the duration of the previous Temp-DCH ends, then back-to-back allocation cannot be supported...** [in contrast] If the activation time is valid, the UTRAN RRC configures the MAC layer with the new transport channel information (in case of changes in transport channel information). The sending of the new configuration to the WTRU 500 is the same as previously described, except that the messages is sent on the DCCH/Temp-DCH.

Zeira, ¶¶ 513-514.

137. Accordingly, based at least on Zeira's description in the above paragraphs, a POSITA would have found it obvious that the timer duration

calculations in Zeira would be based on the number of frames in order to compare the activation time to the CFN where the duration of the previous temp-DCH ends. In the back-to-back allocation scenario, the mapping to Zeira to claim 1 is augmented to include the RRC messaging associated with the back-to-back configuration information as part of the “at least one” RRC message.

7. Independent Claim 6

a. 6[pre]: “A method comprising:

138. Zeira discloses or suggests a *method* for establishing a temporary dedicated channel. E.g., Zeira, claims 1-8.

b. 6[a]: “receiving, by a wireless transmit/receive unit (WTRU), at least one radio resource control (RRC) message indicating uplink resources for WTRU and medium access control (MAC) timer information;”

139. In my opinion, Zeira discloses or suggests 6[a] for the reasons discussed in Sections IX.A.2.a (*WTRU*), IX.A.2.e (*receiving...at least one radio resource control (RRC) message indicating uplink resources for the WTRU and medium access control (MAC) timer information*).

c. 6[b]: “transmitting, by the WTRU, uplink data based on the indicated uplink resources; and”

140. In my opinion, Zeira discloses or suggests 6[b] for the reasons discussed in Section IX.A.2.f.

d. 6[c]: “deactivating, by the WTRU, the indicated uplink resources in response to a MAC timer expiring, wherein the MAC timer is configured based on the MAC timer information indicated by the received RRC message.”

141. In my opinion, Zeira discloses or suggests 6[c] for the reasons discussed in Sections IX.A.2.g, IX.A.2.h.

8. Claim 7: “The method of claim 6 further comprising receiving, by the WTRU, an uplink grant associated with the indicated uplink resources and transmitting, by the WTRU, using the indicated uplink resources based on the grant.”

142. In my opinion, Zeira discloses or suggests claim 7 for the reasons discussed in Section IX.A.3.

9. Claim 8: “The method of claim 7 wherein based on the receipt of the uplink grant, the WTRU does not deactivate the indicated uplink resources.”

143. In my opinion, Zeira discloses or suggests claim 8 for the reasons discussed in Section IX.A.4.

10. Claim 9: “The method of claim 7 further comprising receiving, by the WTRU, a deactivation message and deactivating, by the WTRU, the uplink resources based on the received deactivation message.”

144. In my opinion, Zeira discloses or suggests claim 9 for the reasons discussed in Section IX.A.5.

11. Claim 10: “The method of claim 7 wherein the MAC timer is based on a number of frames.”

145. In my opinion, Zeira discloses or suggests claim 10 for the reasons

discussed in Section IX.A.6.

B. Ground 2: Obvious Over Zeira and Yi

146. As I explained in Ground 1, it would have been obvious that Zeira’s WTRU comprises a *processor*, Section IX.A.2.d, that the time duration information sent to Zeira’s WTRU is *MAC timer information*, Section IX.A.2.e, and that a *MAC timer is configured based on the MAC timer information*, Section IX.A.2.h. I have been asked to assume that the Patent Owner will argue that Zeira alone does not disclose or suggest those specific features of Elements 1[c], 1[d], or 1[g] (and the corresponding limitations of claim 6). Such an argument would be incorrect for the reasons I explained above. In addition, these limitations would have been obvious based on Zeira in view of Yi’s teachings regarding those features, as further explained below.

1. Yi

147. Yi, titled “Apparatus and Method of Releasing a Point-to-Multipoint Radio Bearer” generally teaches two ways in which a radio bearer (RB) between a UTRAN comprising radio network subsystems such as a Node-B, and user equipment (UE), can be terminated. Yi, ¶ 4. First, the RB can be explicitly released via explicit instruction to do so from the network to the UE. Yi, Abstract, ¶ 58. Second, an implicit release mechanism “allows the mobile terminal itself to release the RB without receiving any explicit instructions from the network.” Yi, Abstract.

148. Yi discusses its teachings in the context of a multimedia broadcast/multicast system (MBMS), which is a downlink transmission service. Yi, ¶ 15. Relevant here, Yi teaches that its “UTRAN uses a radio bearer (RB) to provide a MBMS bearer service to a terminal,” *id.*, ¶ 18, and that the RB comprises a dedicated channel for transport, *id.* Specifically, “[i]f a point-to-point radio bearer is to be set, the UTRAN allocates a dedicated logical channel to each terminal (UE) and sends the data of the corresponding service.” *Id.*, ¶ 25. This data is sent via an RRC message. *Id.*, ¶¶ 19-20.

149. In order to implicitly release RB resource, Yi teaches that timer can be operated located at the second layer of the radio protocol, such as at a MAC entity. Yi, ¶ 39. When the UE receives a data unit, it triggers the timer, and the UE releases the RB if another data unit is not received by the time the timer expires. *Id.*, ¶ 37.

2. Motivation to Combine

150. As I explained above, Zeira alone discloses or suggests the Challenged Claims. I have been asked to assume that the Patent Owner will argue that (1) inclusion of a processor in a WTRU, and (2) implementation of a timer in the MAC layer are not disclosed or suggested by Zeira alone. I provide additional analysis based on the teachings of Yi in combination with Zeira to explain how these items would have been obvious to a POSITA even if they are not so based on Zeira alone.

151. More specifically, assuming for the sake of argument that Zeira does

not explicitly describe a *processor*, Yi explains that its mobile terminal includes a processor. A POSITA would have been guided by the teachings of Yi and found it obvious to include a processor in Zeira's WTRU because the WTRU's processor would perform various processing operations on the data that the WTRU generated before transmitting the data to the RNC; the processor would also be needed to process the information, such as configuration messages, the WTRU received over the air interface.

152. Furthermore, assuming for the sake of argument that Zeira does not alone disclose or suggest that the duration information sent from Zeira's S-RNC to the WTRU is *MAC timer information* and a *MAC timer is configured based on the MAC timer* information, a POSITA would find the MAC layer implementation obvious based on Yi's teachings that the timer can be implemented in the L2 layer, including at the MAC layer:

Preferably, a particular entity provided in the mobile terminal can operate a timer for the data unit of a particular MBMS service. This entity can be located in the second layer (L2) of the radio protocol, and may be a MAC entity, a RLC entity, or a PDCP entity. If this entity in the mobile terminal operates a timer for a single data unit of the broadcast or multicast service, and then does not receive another data of the broadcast or multicast service before the timer expires, the entity in the mobile terminal reports the timer expiration to the RRC in the mobile terminal. The RRC in the mobile terminal, upon

receiving the timer expiration report, performs the release of the point-to-multipoint RB established for the broadcast or multicast service.

Yi, ¶ 39. Implementation at the MAC layer would have been no more than use of a known technique (including temp-DCH duration information in the MAC layer of a WTRU, as taught by Yi). *See also*, Section VI.I regarding MAC timers.

153. Moreover, a POSITA would have had a reasonable expectation of success in applying Yi's teachings to Zeira's temp-DCH formation. Zeira already describes sending activation time and duration information to the WTRU, which implements a timer functionality based on the timer information. Zeira, ¶¶ 384, 423. Zeira further explains that its WTRU configures the MAC layer based on the received RRC messages, *id.*, ¶ 427, and describes implementing a MAC start/stop functionality, *id.*, ¶¶ 554-555. Given that Zeira already describes configuring the MAC layer based on information received at the WTRU and implementing stop/stop transmission control at the MAC layer, a POSITA would have found it straightforward, and well within its skills, to implement Zeira's timer at the MAC layer, in view of Yi's explicit teachings, Yi, ¶ 39, with a reasonable expectation of success.

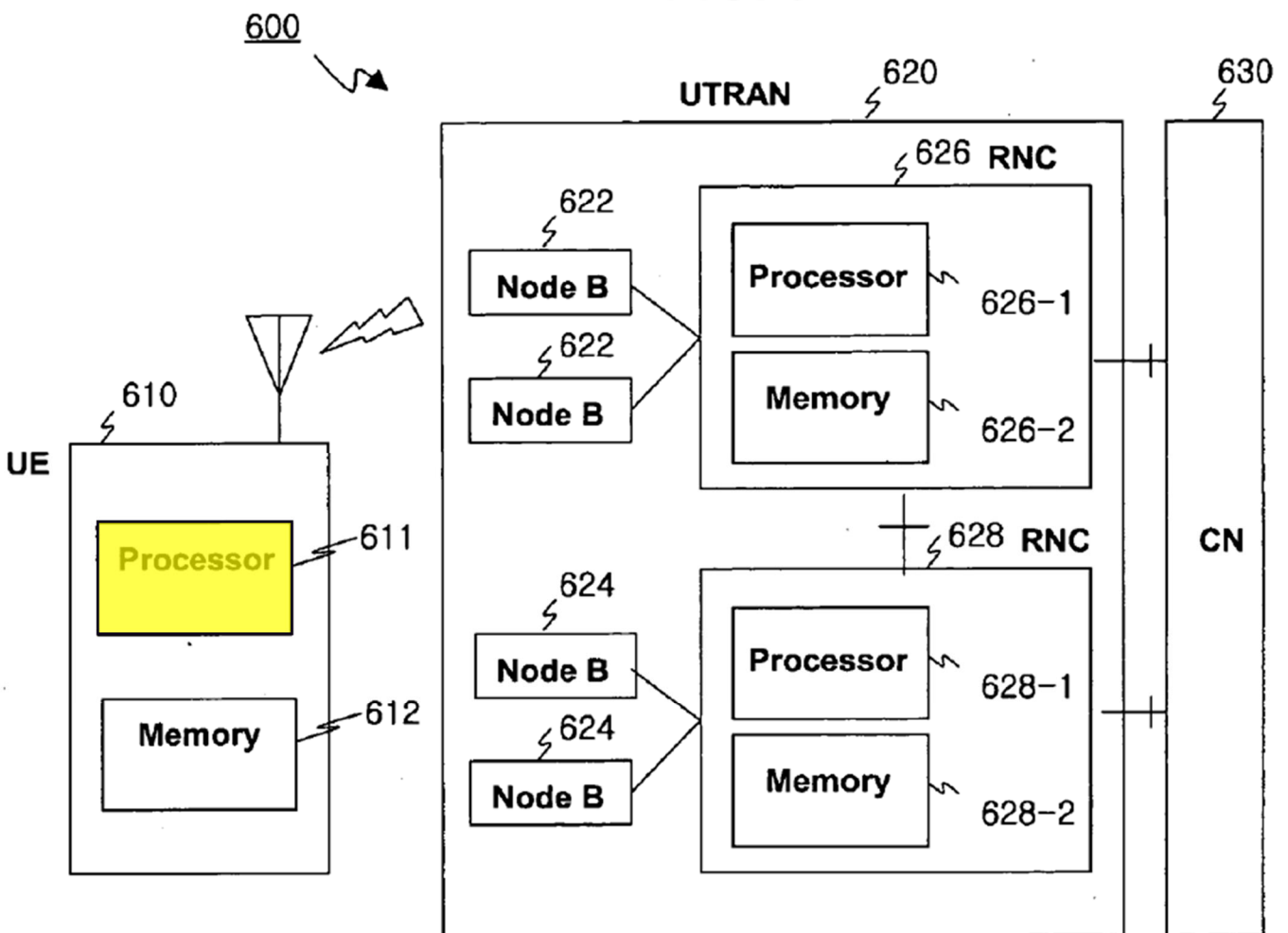
3. Independent Claim 1

a. 1[pre]-1[b]

154. Zeira discloses or suggests 1[pre]-1[b] for the reasons discussed in Sections IX.A.2.a-IX.A.2.c, respectively.

b. 1[c]: “a processor;”

155. Assuming for the sake of argument that Zeira does not alone disclose or suggest a processor in its WTRU, a POSITA would have found it obvious to include a processor in Zeira’s WTRU based on Yi’s explicit teachings that a WTRU comprises a processor (yellow). *See* Yi, Figure 6 (annotated below) and ¶ 72 (“mobile terminal...comprising...a processor connected with the antenna and the memory, the processor executing software codes for, establishing [a temp-DCH].”);

FIG. 6

156. A POSITA would have found it obvious to include a processor in Zeira's WTRU because it would have enabled the WTRU to process the signals that the WTRU received, to generate and process data the WTRU generated (such as measurement reports) and to provide the processed information to WTRU's transmitter for transmission over the air.

c. 1[d]: “wherein the receiver and the processor are configured to receive at least one radio resource control (RRC) message indicating uplink resources for WTRU and medium access control (MAC) timer information,”

157. Assuming, for the sake of argument, that Zeira alone does not describe 1[d]'s “*MAC timer*” information, the combination of Zeira and Yi discloses or suggests this feature of 1[d].

158. As I explain in element 1[d] in Section IX.A.2.e, Zeira discloses that the WTRU receives an RRC message that contains the duration information for the temp-DCH. A POSITA would have found it obvious, based on the explicit teachings of Yi, to implement the timer at the MAC layer, and was thus a *MAC timer*. Yi, ¶ 39 (“Preferably, a particular entity provided in the mobile terminal can operate a timer for the data unit of a particular MBMS service. This entity can be located in the second layer (L2) of the radio protocol, and **may be a MAC entity**, a RLC entity, or a PDCP entity.”). Notably, Yi makes it clear, and a POSITA would have understood, that implementation of the timer in the MAC layer would have been one of a limited number of entities for implementing a timer, and would have been no

more than use of a known technique already suggested by Zeira, and made explicit in Yi.

d. 1[e]-1[f]

159. Zeira discloses or suggests 1[e]-1[f] for the reasons discussed in Sections IX.A.2.f-IX.A.2.g, respectively.

e. 1[g]: “the MAC timer is configured based on the MAC timer information indicated by the [at least one] received RRC message.”

160. Assuming, for the sake of argument, that Zeira alone does not disclose or suggest 1[g]’s *MAC timer*, the combination of Zeira and Yi discloses or suggests 1[g] for the reasons discussed in Sections IX.B.3.c (*MAC timer information*) and IX.A.2.h (remaining elements of 1[g]).

4. Claim 2-10.

161. Zeira and Yi disclose or suggest claims 2-10 for substantially the same reasons as discussed in Sections IX.A.3-IX.A.11, respectively.

X. CONCLUSION

162. Based on the foregoing analysis, it is my opinion that the challenged claims of the ’838 Patent are invalid.

163. This declaration and my opinions herein are made to the best of my knowledge and understanding, and based on the material available to me, at the time of signing this declaration. I declare that all statements made herein on my own

knowledge are true and that all statements made on information and belief are believed to be true, and further, 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 or Title 18 of the United States Code.

Date: May 14, 2025



Dr. Titus Lo