

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2025-00343
U.S. Patent No. 10,292,138

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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PETITIONER’S EXHIBIT LIST

Ex.1001	U.S. Patent No. 10,292,138 to T. Speight (“’138 patent”)
Ex.1002	Prosecution File History of U.S. Patent Application No. 15/618,669 issued as the ’138 Patent (“’138 File History”)
Ex.1003	Declaration of Zhi Ding, Ph.D. under 37 C.F.R. § 1.68
Ex.1004	Curriculum Vitae of Zhi Ding, Ph.D.
Ex.1005	U.S. Patent Application Publication No. 2006/0088058 by M. Eckert et al. (“Eckert”)
Ex.1006	U.S. Patent Application Publication No. 2007/0297435 to P. Bucknell et al. (“Bucknell”)
Ex.1007	WIPO Publication WO 2005/125252 to J. Lohr et al. (“Lohr-1”)
Ex.1008	U.S. Patent No. 7,245,636 to M. Hans et al. (“Hans”)
Ex.1009	U.S. Patent Application Publication No. 2008/0254804 to J. Lohr et al. (“Lohr-2”)
Ex.1010	U.S. Patent Pub. No. 2005/0238051 to S. Yi et al. (“Yi-1”)
Ex.1011	U.S. Patent Pub. No. 2003/0076799 to Y. Kwak et al. (“Kwak”)
Ex.1012	U.S. Patent Pub. No. 2003/0123485 to S. Yi et al (“Yi-2”)
Ex.1013	IPR2022-01127, Ex. 2001, Declaration of Dr. Gary Lomp in Support of Patent Owner’s Preliminary Response
Ex.1014	IV’s Complaint, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , No. 6:24-cv-188-ADA (WDTX)
Ex.1015	Proposed Scheduling Order, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , No. 6:24-cv-188-ADA (WDTX)
Ex.1016	Statistics on District Court Timing, Sept. 30, 2024
Ex.1017	Interim Procedure for Discretionary Denials in AIA Parallel

	District Court Litigation, June 21, 2022
Ex.1018	File History of Supplemental Examination 96/000,323
Ex.1019	IPR2022-01127, Decision Denying Institution, January 3, 2023
Ex.1020	IV's Preliminary Infringement Contentions Cover Pleading, Intellectual Ventures II, LLC v. Tesla, Inc., No. 6:24-cv-188-ADA (WDTX)
Ex.1021	IPR2023-00020, Petition, October 6, 2022

I. INTRODUCTION

U.S. Patent No. 10,292,138 (“the ’138 patent,” Ex.1001) relates to and claims the transmission of data for communication services (“radio bearers”) from a user device in a wireless communication system. Throughout prosecution and a previous IPR, Patent Owner has alleged that the ’138 patent’s claims are patentable because the transmitted data is selected from “*a subset of the plurality of radio bearers.*” As shown herein, however, data selection from a subset of radio bearers was not novel. *See, e.g.,* Bucknell (Ex.1006), [0027] (selecting data for transmission by “taking one data packet in turn from each of the **subset**” of radio bearers).

Accordingly, pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, Tesla, Inc. (“Petitioner”) respectfully requests that the Board review and cancel as unpatentable under (pre-AIA) 35 U.S.C. §103(a) claims 1-6 and 8-13 (the “Challenged Claims”).

II. GROUNDS FOR STANDING

Petitioner certifies that the ’138 patent is eligible for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims. 37 C.F.R. § 42.104(a).

III. NOTE

Petitioner cites to exhibits’ original page numbers, unless noted otherwise.

Emphasis in quoted material has been added. Claim terms are presented in *italics*.

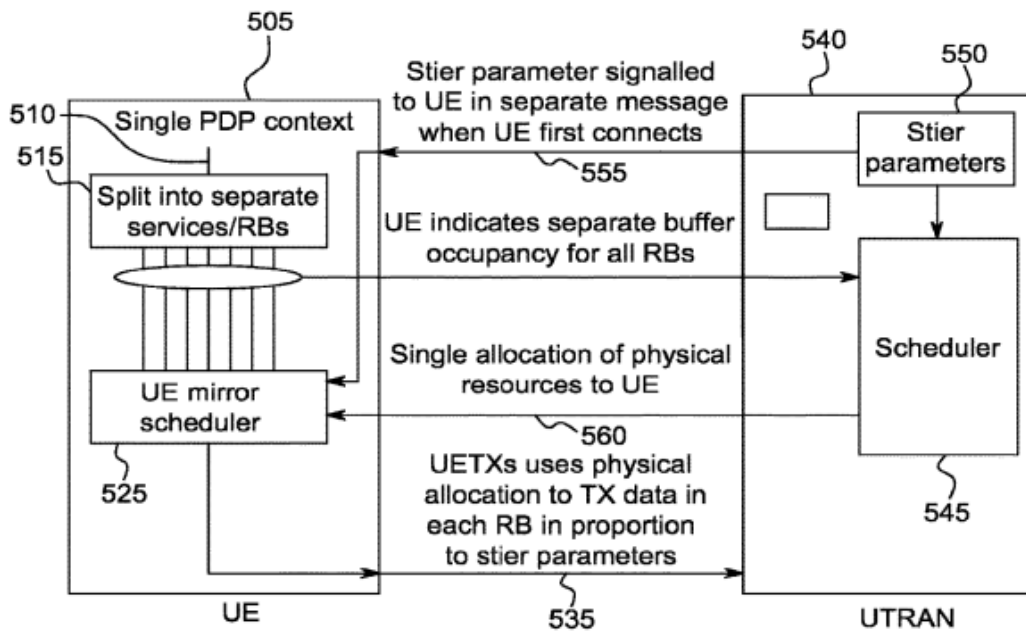
IV. THE '138 PATENT

A. Overview

The '138 patent relates to the use of “radio bearers” in a wireless communications system. Ex.1001, Abstract. The '138 specification describes a service as an example radio bearer provided by the network to the user equipment (UE), where radio bearers are associated with queues, or buffers, that hold associated data. Ex.1001, 4:4-5 (discussing “buffer occupancy for individual **radio bearers (or services)**”); 4:24-27 (“**radio bearers (e.g., services)**”); 5:66-6:2; Figure 2 (“Functionality identifies a particular service and filters all data associated with this service onto a particular RB [radio bearer]”); 9:32-35 (“UE is able to signal to the network separate buffer occupancy for each queue associated with the various RBs.”).

The '138 patent attempts to prioritize the provision of uplink resources to services/radio bearers based on “buffer occupancy.” Ex.1001, 4:4-7, 4:24-27 (discussing “prioritization” of “particular radio bearers (e.g. services)”). As illustrated in Figure 5, UE 505 transmits message 535 to UTRAN 540 indicating buffer occupancy for each of the radio bearers. *Id.* at 10:8-18. The UTRAN provides a single allocation of physical (communication) resources to UE with message 560, and the UE allocates the resources to the /services radio bearers

based on the buffer prioritization scheme. *Id.* at 10:18-22.

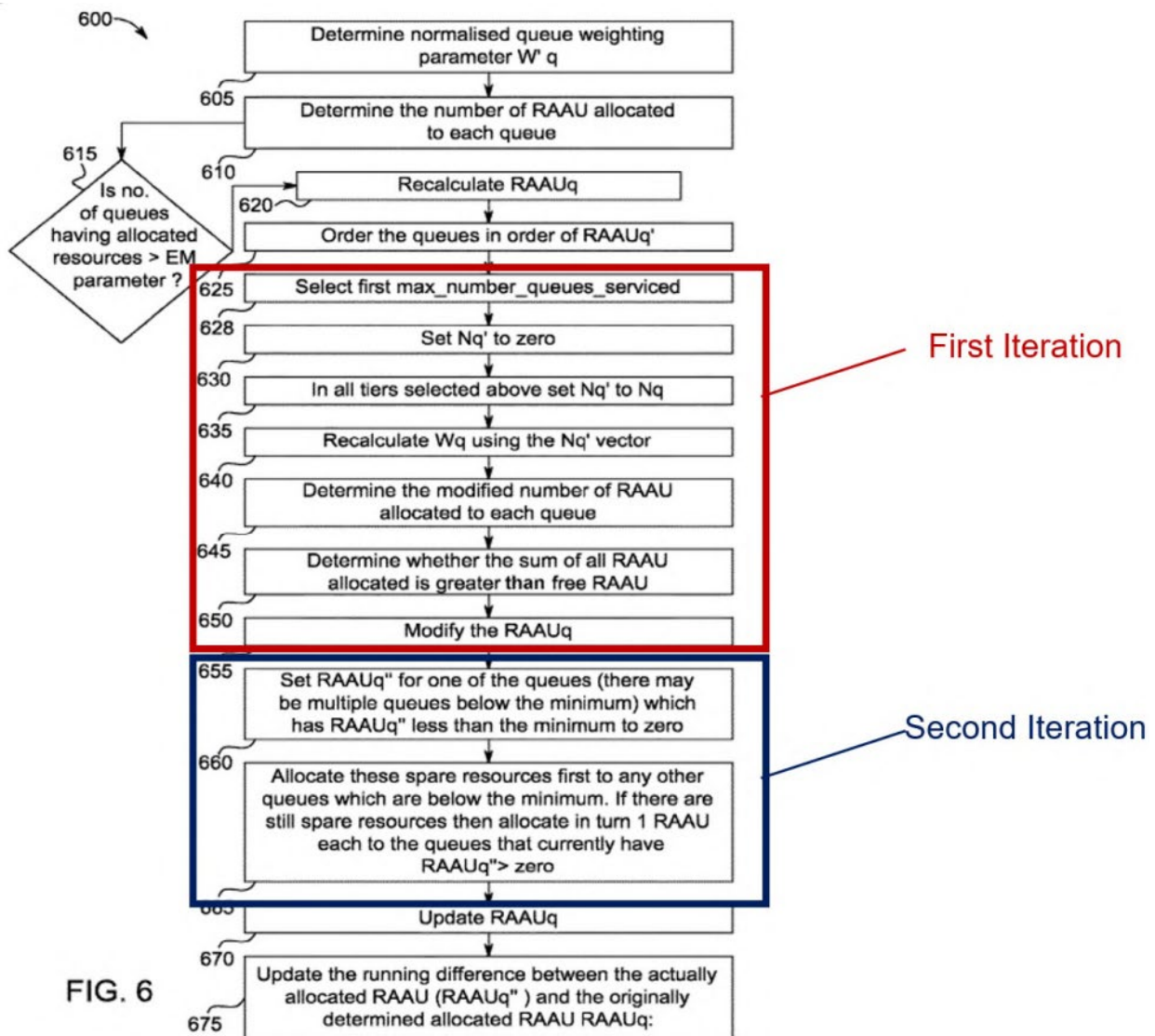


Ex.1001, Fig. 5

The resource allocation process is illustrated in Figure 6 (below). Ex.1001, 10:48-51 (“algorithm describes one mechanism to limit a number of queues served at a single instant in time”). The algorithm initially takes the number of free resources (denoted by FreeRAAU) and divides them among the different queues, with the number of resources for the q^{th} queue denoted by RAAU $_q$ and a normalized queue weighting parameter W'_q defining a percentage. Ex.1001, 10:56-11:10. If the number of queues exceeds a threshold, the resources allocated to each queue is recalculated. *Id.*, 11:11-17.

The Challenged Claims require selecting data from the plurality of radio bearers “using a first iteration and a second iteration.” The ’138 specification

does not indicate which, if any, steps in Fig. 6 correspond to an iteration, but Patent Owner's expert in IPR2022-01127 provided the following alleged designations.



Ex.1013, ¶34.

Patent Owner's expert provided no guidance as to how he arrived at this seemingly arbitrary grouping of steps into the recited "iterations." Ex.1013, ¶¶34-44. Notwithstanding this delineation, the claims themselves recite the

requirements of each iteration, as follows:

wherein in the first iteration, the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters,

wherein in the second iteration, the selection of the data is based on buffered data for respective radio bearers

These requirements are disclosed in the prior art, as discussed below. Ex.1003, ¶¶29-33.

B. Prosecution History

During prosecution of Application No. 15/618,669 (“the ’669 application”) that led to the ’138 patent, there were no rejections based on prior art. In the first office action, the only rejections were obviousness-type double patenting rejections. Ex.1002, 226-233. In response, Applicant filed new claims 9-22. Ex.1002, 204-213. The Notice of Allowance indicated that the prior art of record does not disclose *wherein the selection of the data occurs using a first iteration and a second iteration*, as well as limitations specifying details of the *first iteration* and *second iteration* (limitations numbered [1.8] and [1.9] *infra* herein). Ex.1002, 191.

C. Supplemental Examination

Patent Owner filed a request for supplemental examination of the ’138 patent based on DE102004044956A1 (“Choi”). Ex.1018, 40, 156-157. The request

included the following analysis (referring to the last elements of claim 1, with limitation numbering added by Petitioner):¹

[1.7]	a distribution component configured to, wherein the selection of the data occurs using a first iteration and a second iteration,	Choi does not appear to disclose this feature.
[1.8]	wherein in the first iteration, the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters, wherein in the second iteration, the selection of the data is based on buffered data for respective radio bearers, and cause the transmitter to transmit a signal including the selected data.	
[1.9]		

Ex.1018, 48; *see also* 53-54. The Request was denied as lacking a substantial new question of patentability for the same reasons given by the Requester: Choi does not teach the “*first iteration*” and “*second iteration*” limitations. Ex.1018, 22-25.

D. Previous IPRs Involving the ’138 Patent

Two petitioners unrelated to Tesla previously challenged the ’138 patent in two IPRs that are discussed in Section X.A in the context of § 325(d).

V. PRIORITY DATE

The earliest possible priority date of the ’138 patent is May 8, 2006, and all the relied-upon prior art predates May 8, 2006. Petitioner does not waive any right

¹ “*A distribution component configured to*” does not appear in claim 1.

or opportunity to dispute the priority date of the '138 patent in this or another forum.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) in May 2006 would have been someone knowledgeable and familiar with the wireless communications systems that are pertinent to the '138 Patent. A POSITA would have had a bachelor’s degree from an accredited program in electrical engineering, computer engineering, computer science, or equivalent training, and at least two years of professional experience relating to wireless communication technology. Lack of professional experience can be remedied by additional education, and vice versa. Ex.1003, ¶¶19-21.

VII. CLAIM CONSTRUCTION

In IPR2022-01127, the Board preliminarily determined that *a subset of the plurality of radio bearers*” means “*less than all of the plurality of radio bearers.*” Ex.1019, 18-19. Petitioner applies the prior art in accordance with that construction; however, in view of the asserted grounds, no claim term requires express construction to find the Challenged Claims unpatentable. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Ex.1003, ¶40.

VIII. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF

Petitioner asks that the Board institute an IPR trial and cancel the Challenged Claims in view of the analysis below.

IX. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

A. Challenged claims

Petitioner challenges claims 1-6 and 8-13 (“the Challenged Claims”).

B. Statutory grounds for challenges

Grounds	Claims	Basis (pre-AIA)
#1	1-4, 8-11	35 U.S.C. §103 over Eckert in view of Bucknell and Lohr-1
#2	5, 12	§103 over Eckert in view of Bucknell, Lohr-1, and Hans
#3	6, 13	§103 over Eckert in view of Bucknell, Lohr-1, and Lohr-2

U.S. Patent Pub. No. 2006/0088058 (“Eckert,” Ex.1005) was filed on September 28, 2005 and published on April 27, 2006. Eckert is prior art under §§102(a) and 102(e).

U.S. Patent Pub. No. 2007/0297435 to P. Bucknell et al. (“Bucknell,” Ex.1006) is a U.S. publication of a PCT application PCT/IB2005/053618, which was filed on November 4, 2005, published as WO2006/051465 on May 18, 2006 in English and designates the U.S. Therefore, Bucknell is prior art under §102(e) as

of November 4, 2005.

WIPO Publication WO 2005/125252 to J. Lohr (“Lohr-1,” Ex.1007) is a PCT publication that published on December 29, 2005. Thus, Lohr-1 is prior art under §102(a). Lohr-1 also has an international filing date of June 14, 2005, was published in English, and designates the U.S, so Lohr-1 is also prior art under §102(e).

U.S. Patent No. 7,245,636 to M. Hans et al. (“Hans,” Ex.1008) has an international filing date of September 19, 2000, and Hans fulfilled the requirements of 35 U.S.C. 371(c)(1), (2) and (4) on September 17, 2002. Therefore, Hans is prior art as of September 17, 2002 under §102(e). *See* MPEP 2136, Example 6.

U.S. Patent Pub. No. 2008/0254804 to J. Lohr et al. (“Lohr-2,” Ex.1009) is a U.S. publication of a PCT application that was filed on Feb. 7, 2006, published in English as WO2006/102949 on October 5, 2006 and designates the U.S. Therefore, Lohr-2 is prior art under §102(e) as of the international filing date of Feb. 7, 2006.

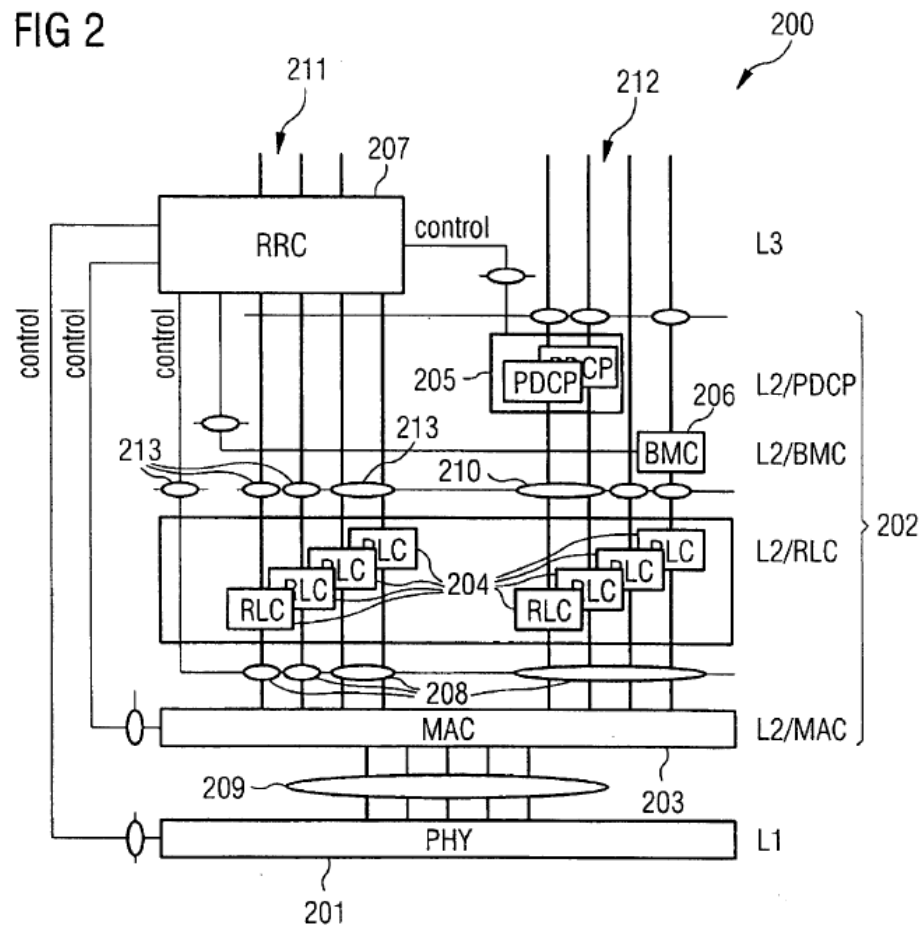
C. Ground 1: Claims 1-4 and 8-11 are obvious over Eckert in view of Bucknell and Lohr-1

1. Summary of Eckert

Eckert relates to a “UMTS (Universal Mobile Telecommunications System)” mobile radio system. Ex.1005, [0003]. This area of technology is described in terms of numerous, but standard, acronyms that are assumed familiar

to a POSITA, with technical standards related to the technology being referred to throughout Eckert. *See, e.g.*, Ex.1005, [0005]-[0007], [0009], [0020]-[0021], [0152] (each referring to a standards document promulgated by 3GPP). Ex.1003, ¶44.

Eckert presents its teachings in the context of a “UMTS air interface...logically divided into three protocol layers,” where the “protocol layers...are implemented both in the mobile radio terminal 118 and in the UMTS base station 108, 109, 110, 111 or in the respective mobile radio network control unit 106, 107.” Ex.1005, *Id.*, [0143]. Referring to Figure 2, below, there is “layer 1” (L1), “layer 2” (L2), and “layer 3” (L3), corresponding to the “physical,” “data link,” and “network” layers, respectively. Ex.1006, [0143]-[0147]. Layer 2 includes “a plurality of subprotocol layers,” including “the Medium Access Control protocol Layer (MAC protocol layer) 203” and “the Radio Link Control protocol layer 204 (RLC protocol layer).” *Id.*, [0146]. “The RLC protocol layer 204 is modelled such that there is an independent RLC entity for each radio bearer.” *Id.*, [0160]. The details regarding the “protocol layer arrangement 200” are further described in technical standards promulgated by 3GPP. Ex.1006, [0152]; Ex.1003, ¶45.

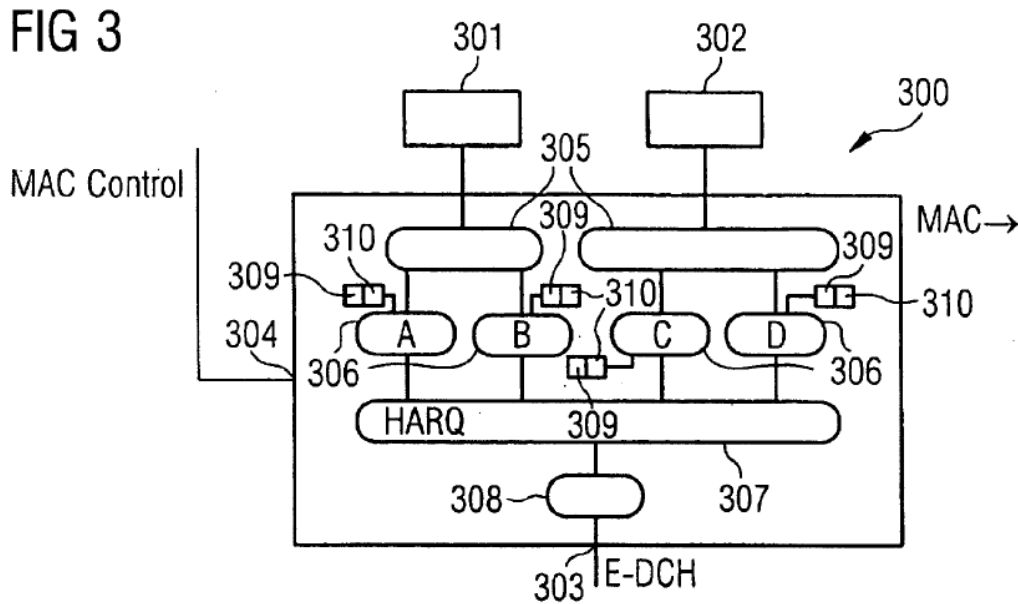


Ex.1005, Figure 2

The “MAC-e (MAC enhanced uplink) subprotocol layer 300...receives its data from the MAC-d subprotocol layer via ‘MAC-d flows’ 301, 302 and in turn transmits its data via the E-DCH transport channel 303 to the physical layer 201.” Ex.1005, [0168]. The E-DCH (Enhanced Dedicated Channel) is a “new dedicated transport channel.” *Id.*, [0012]. “[E]ach MAC-d flow 301, 302 in the MAC-d subprotocol layer [is] assigned a priority, said priority being used by the function priority queue distribution.” *Id.*, [0170]. “The data buffer storage in the priority

queues 306 then buffer-stores the data until they are retrieved for transmission.”

Id., [0171]; Ex.1003, ¶46.



Ex.1005, Figure 3

2. Summary of Bucknell

Bucknell focuses on activities in the MAC-e subprotocol layer including the E-DCH transport channel. Ex.1006, [0002] (For the E-DCH, “MAC-d Protocol Data Units or MAC-d PDUs, are grouped together for transmission to form larger, enhanced PDUs termed MAC-e PDUs.”). An output buffer 80 forming a MAC-e PDU is divided into “a first portion 90 and a second portion 95,” *id.*, [0020], as shown in Figure 2 below.

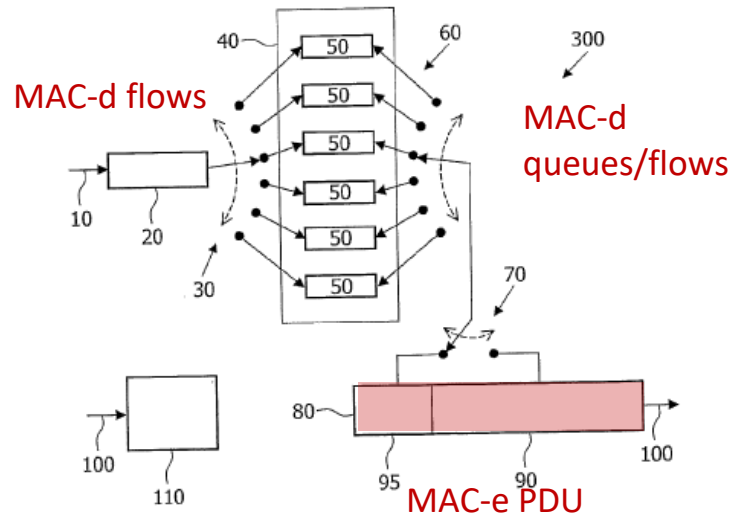


FIG. 2

Ex.1006, Figure 2 (annotated); Ex.1003, ¶47

Bucknell presents numerous examples of rules for selecting data from a “subset” of MAC-d queues 50 and sequentially populating the portions 90 and 95 of a MAC-e PDU. Ex.1006, [0025]-[0030]. These examples are discussed further in the analysis of various claim limitations. Ex.1003, ¶48.

3. Eckert and Bucknell Are Analogous Art to the '138 Patent

Eckert and Bucknell are each analogous art to the '138 patent at least because Eckert and Bucknell both pertain to the same field of endeavor as the '138 patent, namely, wireless, cellular communication systems, such a Universal Mobile Telecommunication System (UMTS). Ex.1001, 1:23-28 (“The invention is applicable...for use in the universal mobile telecommunication standard” [UMTS])), 2:5-67; Ex.1005, [0112] (“The mobile radio devices and also the

mobile radio network control unit are...preferably for communication on the basis of the cellular mobile radio system UMTS.”); Ex.1006, [0001] (“The invention has application in... the Universal Mobile Telecommunication System (UMTS).”); Ex.1003, ¶49.

Eckert and Bucknell are also analogous art to the ’138 patent because Eckert and Bucknell are reasonably pertinent to a same problem faced by the inventor of the ’138 patent of how “to provide an improved mechanism to differentiate between IP data flows.” Ex.1001, 3:17-18. Eckert is related to this problem because Eckert is concerned with how data of different priorities are to be transmitted. Ex.1005, [0015] (“One possible solution is to split the data according to their priorities over various data buffer storages... which are then processed and hence transmitted ... according to ... their priority.”). Bucknell is also related to this problem because Bucknell is concerned with “a method of multiplexing data packets” for transmission in UMTS, Ex.1006, [0001], such as “multiplex[ing] data packets having different priorities,” *id.*, [0002]; Ex.1003, ¶50.

Motivations to combine Eckert and Bucknell are presented in the analysis of relevant limitations where teachings of Eckert and Bucknell are combined.

4. Summary of Lohr-1

Lohr-1 also relates to the E-DCH implemented in a UMTS network protocol layer architecture compliant with wireless standards. Ex.1007, 4:19-26, 1:16-20.

Consistent with Eckert and Bucknell, Lohr-1 describes the MAC-d subprotocol layer as having data flows and corresponding priority queues. *Id.*, 5:26-6:1. Lohr-1 explains that a “radio bearer control message” sent from the network to a mobile terminal includes a “set of parameters indicating the priorities of a logical channel of the radio bearer” and that a radio bearer may be established according to these parameters. *Id.*, 20:14-24; Ex.1003, ¶52.

5. Lohr-1 is Analogous Art to the ’138 Patent

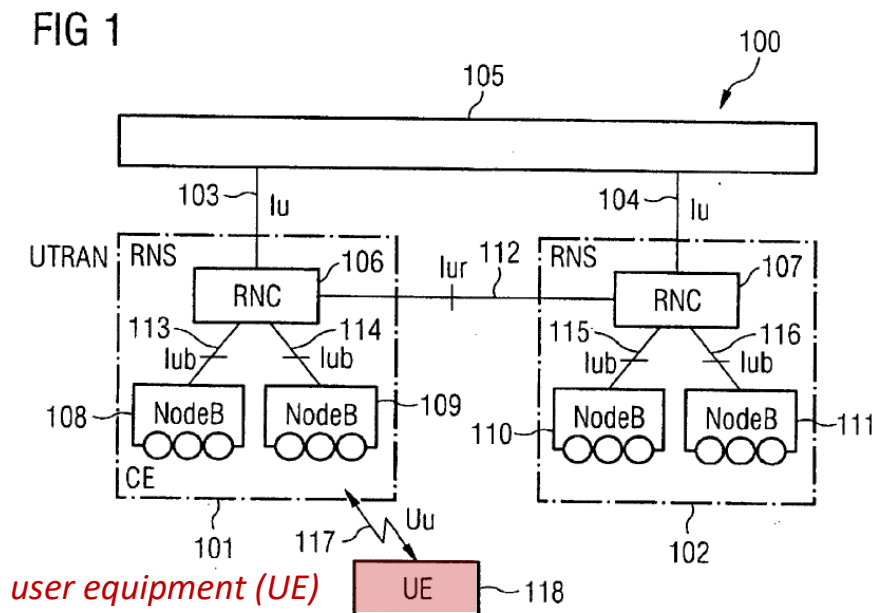
Lohr-1 is analogous prior art to the ’138 patent at least because Lohr-1 pertains to the same field of endeavor as the ’138 patent, namely, wireless, cellular communication systems, such UMTS systems. Ex.1001, 1:23-28, 2:5-67; Ex.1007, 24:25-25:4. Ex.1003, ¶53.

Lohr-1 is also analogous art to the ’138 patent because Lohr-1 is reasonably pertinent to a same problem faced by the inventor of the ’138 patent of how “to provide an improved mechanism to differentiate between IP data flows.” Ex.1001, 3:17-18. Lohr-1 is directed to differentiating between different data flows according to priority. Ex.1007, 25:15-19 (“According to one aspect of an embodiment of the invention a different priority handling of uplink transmissions depending on the scheduling mode is introduced.”). Ex.1003, ¶54.

6. Claim 1

[1.0] A user equipment (UE) comprising:

Eckert discloses a UE, thereby disclosing limitation [1.0]. For example, Figure 1 in Eckert illustrates a communication system in which base stations 108, 109, 110, 111 communicate with a “user equipment, UE” 118. Ex.1005, [0138]; Ex.1003, ¶¶55-56.



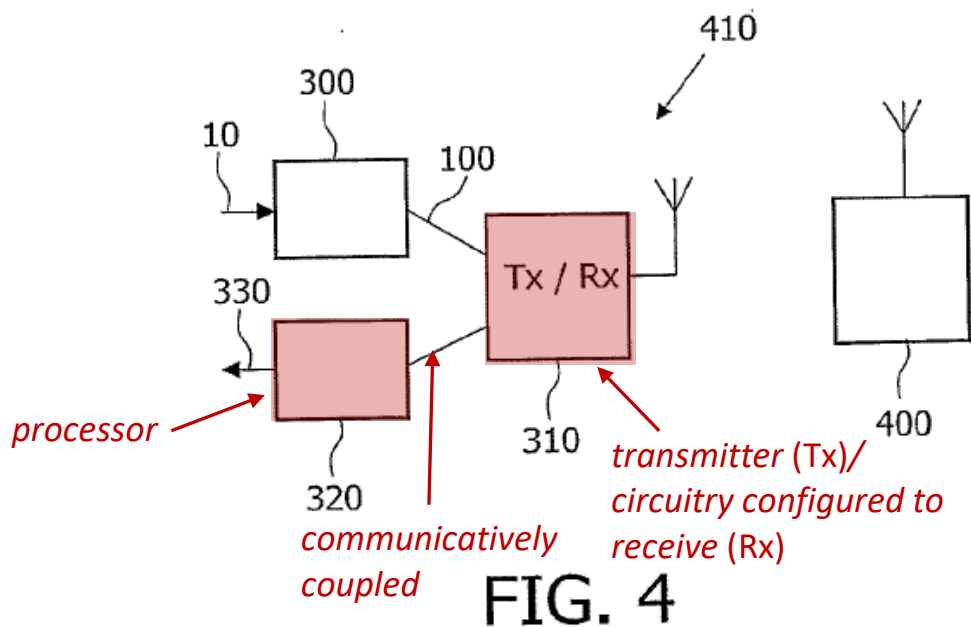
Ex.1005, Figure 1 (annotated); Ex.1003, ¶56

[1.1] a processor communicatively coupled to a transmitter and circuitry configured to receive; and

Eckert in view of Bucknell renders obvious limitation [1.1]. Ex.1003, ¶57.

Eckert teaches user equipment (used synonymously with the term “mobile radio terminal”) communicating with a base station (Ex.1005, [0138]), and

Bucknell similarly discloses a mobile communication terminal 310 having a transceiver 310 (*a transmitter and circuitry configured to receive*) and a processor 320 (*processor*). Ex.1006, [0032] (“The **communication terminal 410** ... comprises ... a **transceiver 310** for transmitting data and receiving acknowledgements, and a **processor 320**...”); [0001] (“[T]he invention has application in...**mobile** communication systems such as ...UMTS”). As shown in Figure 4, the processor is “*communicatively coupled*” to the transceiver 310.



Ex.1006, Figure 4 (annotated); Ex.1003, ¶58

Thus, Bucknell discloses or renders obvious *a processor* (Bucknell’s processor 320) *communicatively coupled to a transmitter and circuitry configured to receive* (connected to Bucknell’s transceiver 310). Ex.1003, ¶59.

Motivation to Combine Eckert with Bucknell

Eckert discloses UMTS user equipment and various functions implemented on the user equipment, but Eckert provides insufficient details regarding the internal architecture of such user equipment. Thus, a POSITA would have been motivated to look to Bucknell, which provides details about the internal architecture of a UMTS-compatible mobile radio terminal as including a processor and a transceiver. Ex.1003, ¶60.

In more detail, Figure 1 in Eckert illustrates a communication system in which base stations communicate with a **“user equipment, UE”** which is **“also called [a] mobile radio terminal.”** Ex.1005, [0138]. Eckert describes the E-DCH and associated MAC-e subprotocol layer being implemented on the mobile radio terminal 118 (user equipment). *Id.*, [0168]. (A **“MAC-e (MAC enhanced uplink) subprotocol layer 300”** is implemented **“in the mobile radio terminal 118...”** The MAC-e subprotocol layer 300 ... in turn **transmits its data via the E-DCH transport channel 303** to the physical layer 201.”). Ex.1003, ¶¶61-62.

While Eckert describes the E-DCH transport channel being implemented in a mobile terminal/UE, Eckert provides insufficient details regarding the internal architecture of such a mobile terminal/UE. Bucknell provides such details on the internal architecture of a mobile terminal for implementing an E-DCH, such as in Eckert, including a “transceiver” and a “processor.” Ex.1006, [0032], [0002]

(discussing different priorities of packets “in UMTS for an Enhanced Uplink Data Channel (E-DCH)”); *id.*, [0020]; Ex.1003, ¶62.

Implementing Eckert’s user equipment (UE) using Bucknell’s processor and transceiver would have involved combining prior art elements (Eckert’s UE having an architecture with Bucknell’s processor and transceiver) according to known methods (having a processor control a transceiver) to yield the predictable and beneficial result of a UE architecture for implementing the teachings of Eckert and Bucknell. In other words, it would have been naturally beneficial to implement Bucknell’s standard UMTS-compatible mobile radio terminal architecture in Eckert so that Eckert’s device is also UMTS compatible. A POSITA would have also found it advantageous to implement Eckert’s transmission/reception functionality in a transceiver that is controlled by a processor (e.g., via software modules) to achieve (1) simplicity of implementation via programming or configuration of a single processor and a single transceiver and (2) speed of implementation as a result of a simple architecture. Ex.1003, ¶¶63-64.

A POSITA would have had a reasonable expectation of success in implementing Bucknell’s mobile terminal hardware architecture in Eckert’s UE because both Bucknell and Eckert describe the same MAC protocol layer having the same E-DCH channel. Ex.1005, [0168]; Ex.1006, [0002]. Thus, a POSITA would have expected that using Bucknell’s processor and transceiver to provide the

hardware platform for Eckert's UE would be successful. Ex.1003, ¶65.

[1.2] *the processor is configured to:*

As explained in the analysis of limitation [1.1], Eckert's UE includes Bucknell's processor. It was obvious or understood that a processor in a mobile terminal, such as Bucknell's processor, can be programmed or configured to perform various functions, such as the functions in the remaining limitations, which are obvious in view of the teachings of Eckert, Bucknell, and Lohr-1, thereby rendering obvious claim element [1.2]. Ex.1003, ¶66 (citing Lohr-1, 34:11-12 ("Further, the various embodiments of the present invention may also be implemented by means of software modules which are executed by a processor...")) and Ex.1010, Figure 11 and related discussion in [0006]-[0011] and [0074]-[0076]; Ex.1003, ¶66.

[1.3] *cause the circuitry to receive parameters associated with a plurality of radio bearers,*

Eckert in view of Lohr-1 renders obvious limitation [1.3]. Ex.1003, ¶67.

Eckert presents a protocol stack for communication between a base station and a UE. Ex.1005, [0005]. The protocol stack includes a Radio Resource Control (RRC) protocol layer, which is responsible for configuring and reconfiguring radio bearers. *Id.*, [0006]. ("The RRC protocol or the RRC protocol layer is responsible for setting up and clearing down and also for (re)configuring ...

radio bearers...”). Ex.1003, ¶68.

Furthermore, as was understood generally in the art, a radio bearer provides a corresponding service over the wireless medium. Ex.1005, [0156] (providing “services by means of radio bearers (RB)”), [0161]; Ex.1003, ¶69 (citing Ex.1010, [0014] (“[A] radio bearer (RB) [is] established, respectively, for providing services having an appropriate QoS.”), and Ex.1012, [0011]). Eckert’s usage of the term of art “radio bearer” is consistent with that of the ’138 patent, which describes a service as an example radio bearer. Ex.1001, 4:4-5 (“radio bearers (or services)”), 4:24-27 (“radio bearers (e.g., services)”).

Eckert’s UE may maintain a plurality of services, provided by a plurality of radio bearers (*plurality of radio bearers*), simultaneously. For example, in one embodiment of Eckert, three packet services are provided on the uplink in parallel:

For the exemplary embodiments shown, a transmission scenario is assumed in which **a user of the mobile radio terminal 118 uses three packet services in the uplink at parallel times**, for example one service for interactive gaming on the internet, one service for downloading text files and one service for streaming video data.

Ex.1005, [0197]. Other prior art confirms that a UE can have multiple radio bearers, each providing a service. Ex.1003, ¶70 (citing Ex.1012, [0118]

(Describing Figure 7, which is identical to Eckert’s Figure 2, that “**one UE may**

have several RBs and, in general, one RLC entity and **one PDCP entity are used for one RB.**") and [0121]). Thus, Eckert describes the use of a radio bearer to provide a service and describes a UE providing a plurality of services at the same time, thereby disclosing or rendering obvious *a plurality of radio bearers*.

Ex.1003, ¶70.

Eckert explains that the RRC protocol layer is responsible for “negotiating all parameters of the protocol layers of layer 1 and layer 2 on the basis of UMTS.” Ex.1005, [0006]. Protocol layer 2 (L2) includes radio bearers – for example, “the data link layer 202, protocol layer 2,” Ex.1005, [0146], is shown in Figure 2 as including “radio bearers 210,” *id.*, [0163]. Layer 2 202 also includes the MAC layer. *See* Ex.1005, Figure 2. Eckert explains that “**the UMTS mobile radio core network 105 provides this requested service** in a prescribed, defined quality of service (QoS) which corresponds to the Quality of Service requirements of the service in question.” Ex.1005, [0177]. The core network provides these services via other infrastructure network elements, such as NodeB. *See* Eckert, Figure 1 (illustrating core network 105 and NodeBs 108,109). Because the UMTS mobile radio core network provides the services, it would have been obvious that the RRC protocol layer at the infrastructure side is responsible for providing the parameters of the radio bearers (in layer 2), including the priority levels of the logical channels of the radio bearers. Ex.1003, ¶71.

Lohr-1 confirms that the network communicates parameters, such as priorities of a logical channel of the radio bearer, in a “radio bearer control message” to a “mobile terminal.” Ex.1007, 20:14-24. The message provides “the set of parameters indicating the priorities of a logical channel of a radio bearer” and the radio bearer is established in accordance with these parameters. *Id.* Eckert’s logical channels are associated with MAC-d flows, and MAC-d flows have corresponding priorities used in the data buffer storages in the MAC-e subprotocol layer. Ex.1005, [0170]; Ex.1003, ¶72.

Therefore, Eckert in view of Lohr-1 renders obvious *cause the circuitry to receive parameters* (Lohr-1’s disclosure that priorities of logical channels of radio bearers are communicated from the radio network to a UE in a control message) *associated with a plurality of radio bearers* (Eckert’s UE that maintains multiple services (radio bearers) simultaneously, with each radio bearer being associated with one or more logical channels and MAC-d buffer storages). Ex.1003, ¶73.

Motivation to Combine Eckert and Lohr-1

A POSITA seeking to implement Eckert’s teachings in a UMTS network would have been motivated to specify implementation detail missing from Eckert regarding how a UE establishes priorities for its logical channels and associated queues in the UMTS MAC-d layer (priorities used by Bucknell for multiplexing data), and Lohr-1 provides implementation detail for establishing a radio bearer

and associated logical channel and priorities in UE in a UMTS network. Ex.1003, ¶74. Applying these UMTS teachings is nothing more than “the predictable use of prior art elements according to their established functions.” *KSR Int’l v. Teleflex Inc.*, 550 U.S. 398, 417 (2007); *see also Samsung Electronics Co., Ltd. et al. v. Netlist Inc.*, IPR2023-00455, Paper 30, 33 (July 30, 2024) (finding obviousness of implementing according to known standards).

Eckert explains that “the Radio Resource Control (RRC) protocol layer... is responsible for negotiating **all parameters of the protocol layers of layer 1 and layer 2 on the basis of UMTS.**” Ex.1005, [0006]. Protocol layer 2 (L2) includes radio bearers – for example, “the data link layer 202, protocol layer 2,” Ex.1005, [0146], is shown in Figure 2 as including “radio bearers 210,” *id.*, [0163]. Layer 2 202 also includes the MAC layer. *See* Ex.1005, Figure 2. Eckert explains that “**the UMTS mobile radio core network 105 provides this requested service** in a prescribed, defined quality of service (QoS) which corresponds to the Quality of Service requirements of the service in question.” Ex.1005, [0177]. The core network provides these services via other infrastructure network elements, such as NodeB. *See* Ex.1005, Figure 1 (core network 105 and NodeB 108, 109). Because the UMTS mobile radio core network provides the services, it would have been obvious that the RRC protocol layer at the network side is responsible for providing the parameters of the radio bearers (in layer 2), including the priority

levels of the logical channels of the radio bearers, as described in Lohr-1. Ex.1003, ¶75.

Lohr-1 confirms that the network communicates parameters, such as priorities of a logical channel of the radio bearer, in a “radio bearer control message” to a “mobile terminal.” Ex.1007, 20:14-24. The message provides “the set of parameters indicating the priorities of a logical channel of a radio bearer” and the radio bearer is established in accordance with these parameters. *Id.*; Ex.1003, ¶76.

Eckert’s logical channels are associated with MAC-d flows, and MAC-d flows also have a priority. Ex.1005, [0170] (“In the MAC-d subprotocol layer, one or more logical channels are multiplexed onto an MAC-d flow 301, 302, with each MAC-d flow 301, 302 in the MAC-d subprotocol layer being assigned a priority, said priority being used by the function priority queue distribution, implemented ... to split the data over the data buffer storages 306 with the different priorities.”). Thus, it would have been obvious that the priorities of the priority queues in Eckert are communicated from the network to a mobile terminal. Ex.1003, ¶77.

Using a control message, as in Lohr-1, to indicate priorities associated with logical channels and associated queues in Eckert would have involved the combination of prior art elements (Lohr-1’s control message in a UMTS system that has radio bearers used in Eckert’s UMTS system that also has radio bearers

and other similar protocol elements) according to known methods (sending Lohr-1's control message from the network) to yield the predictable and beneficial result of describing how priorities associated with logical channels are established. Ex.1003, ¶78.

A POSITA would have had a reasonable expectation of success in using Lohr-1's control message in Eckert's UMTS system because Lohr-1 is described in the context of a "UMTS system" in which "data is transmitted via an E-DCH," Ex.1007, 22:17-18, which is the same context as Eckert. Ex.1005, [0112]-[0113] ("[T]he invention is used within the context of UMTS."); [0167] ("Enhanced-DCH (E-DCH) is provided," and "scheduling is controlled by a UMTS base station."). Ex.1003, ¶79.

[1.4] determine a plurality of buffer occupancies, wherein each of the plurality of buffer occupancies is associated with one or more radio bearers of the plurality of radio bearers,

Eckert discloses or renders obvious limitation [1.4]. Ex.1003, ¶80.

Eckert describes determining and indicating data buffer storage filling levels "for each radio bearer," thereby disclosing or rendering obvious limitation [1.4]. For example, Eckert discloses that a "measurement result list shown in Table 1 is thus transmitted from ... the mobile radio terminal ... and **the respective RRC [sic RLC] data buffer storage filling level is indicated for each radio bearer (RB).**" Ex.1005, [0011]. Table 1 presents example information elements of a message that

conveys radio bearer (RB) identity and “RLC Buffer Payload” information for the radio bearer.

TABLE 1

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Traffic volume measurement results	OP	1 to <maxRB>		
>RB Identity	MP		RB Identity 10.3.4.1 6	
>RLC Buffer Payload	OP		Enumerated (0, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, 1024K)	In bytes And N Kbytes = N*1024 bytes. Twelve spare values are needed.
>Average of RLC Buffer Payload	OP		Enumerated (0, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, 1024K)	In bytes And N Kbytes = N*1024 bytes. Twelve spare values are needed.
>Variance of RLC Buffer	OP		Enumerated (0, 4,	In bytes And N

Ex.1005, Table 1 (annotated); Ex.1003, ¶81

See also Ex.1005, [0164] (describing “provid[ing] [] an indication of the RLC data buffer filling levels of the transport channel in question, i.e. it is indicated how many data items there are currently in the respective RLC data buffer storages of the mobile radio terminal 118”), [0244]; Ex.1003, ¶81.

Thus, Eckert discloses *determine a plurality of buffer occupancies, wherein each of the plurality of buffer occupancies is associated with one or more radio bearers of the plurality of radio bearers* (mobile radio terminal determines the RLC data buffer filling level for each radio bearer and transmits a message including this information). Ex.1003, ¶82.

[1.5] *cause the transmitter to transmit a message including the plurality of buffer occupancies to a network,*

Eckert combined with Bucknell renders obvious limitation [1.5]. Ex.1003, ¶83.

As discussed in [1.4], Eckert discloses transmitting a “measurement result list” that indicates “data buffer storage filling level for each radio bearer” (*transmit a message including the plurality of buffer occupancies to a network*). Ex.1005, [0011] (“The **measurement result list ... is thus transmitted from ...the mobile radio terminal ... and the respective RRC data buffer storage filling level is indicated for each radio bearer (RB).**”); *see also* [0164]; Ex.1003, ¶84. As explained in the analysis of limitation [1.1], Bucknell’s transceiver implemented in Eckert’s UE transmits data, such as the buffer storage level information.

Thus, Eckert in view of Bucknell discloses *cause the transmitter* (Bucknell’s transceiver in Eckert’s UE) *to transmit a message including the plurality of buffer occupancies to a network* (Eckert discloses transmitting a “measurement result

list” that indicates “data buffer storage filling level for each radio bearer”).

Ex.1003, ¶85.

[1.6] *cause the circuitry to receive a single allocation of uplink resources,*

Eckert discloses or renders obvious limitation [1.6] (with the understanding that Eckert’s UE has Bucknell’s receive *circuitry* controlled by a *processor*, per analysis of [1.1] and [1.2]). Eckert combined with Lohr-1 also renders obvious limitation [1.6] (with the same understanding of Bucknell’s teachings). Ex.1003, ¶86.

First, Eckert discloses or renders obvious limitation [1.6]. Eckert explains that mobile radio terminals (UEs) are allocated “resources” by the network and “the protocols of the protocol layers 1 and 2 are configured.” Ex.1005, [0189]. Eckert relates to the issue of “how the data about **the new transport channel E-DCH** are to be transmitted via the UMTS air interface.” Ex.1005, [0015]. Data from buffer storages are transmitted in “a defined time interval via the E-dedicated channel (E-DCH).” Ex.1005, [0116] (“The data which are transmitted within a defined time interval via the E-dedicated channel (E-DCH) are in this case made up proportionally from the data which are buffer-stored in the respective data buffer storages...”). The allocated E-DCH channel, which is a transport channel and also an uplink channel, Ex.1005, [0012], is an example of *a single allocation of uplink resources*. Ex.1003, ¶87.

The '138 patent confirms that a transport channel is an example of “*a single allocation of [] radio resources.*” Ex.1001, 9:36-43 (“In this manner, **a single PDP context implies a single CCTrCh. This single physical allocation of radio resources** provided to a UE...”). The abbreviation CCTrCh was understood in the art to refer to a transport channel known as the Coded Composite Transport Channel. Ex.1003, ¶88 (citing Ex.1011, [0021]).

Second, Eckert combined with Lohr-1 also renders obvious claim element [1.6], disclosing or rendering obvious *a single allocation of uplink resources* at an even more granular level than a transport channel. Ex.1003, ¶89.

Eckert focuses on a unit of time in UMTS called a “transmission time interval” and also a MAC-e protocol data unit within the transmission time interval. Ex.1005, [0023]. Eckert teaches how data from various priority queues in a UE are selected for uplink transmission in this allocation. Ex.1005, [0023] (“In line with the UMTS Enhanced Uplink method, on the other hand, the data having various priorities, i.e. the data from various priority queues, are **transmitted in an MAC-e protocol data unit within a data transmission time interval.**”). Eckert explains that scheduling of the E-DCH in a UE is controlled by a base station. Ex.1005, [0012] (“[A] new dedicated transport channel called Enhanced Dedicated Channel (E-DCH) has been introduced for this purpose. The fundamental characteristics of this new transport channel include ... **scheduling controlled by**

the base station, also called NodeB in UMTS...). Based on Eckert, it would have been obvious that network elements (such as base station) schedule times for a UE to transmit and communicate those times to the UE, e.g., indicate to the UE a transmission time interval to the UE for transmission. Ex.1003, ¶90.

Like Eckert, Lohr-1 also relates to the E-DCH of UMTS, including different MAC-d data flows. Ex.1007, 5-6 (section entitled “E-DCH MAC Architecture at the user equipment”). Lohr-1 confirms that a base station (called a Node B in UMTS) specifies time intervals for transmission. Ex.1007, 7:6-9 (“With a grant message sent in the downlink from the Node B to the UE, the Node B assigns the UE ... the time interval, the UE is allowed to send.”); Ex.1003, ¶91.

Thus, Eckert in view of Lohr-1 discloses a UE receiving “maximum data rate and the time interval” (*receive a single allocation of uplink resources*) for an E-DCH channel, thereby also rendering obvious limitation [1.6]. Ex.1003, ¶92.

[1.7] *select data from the plurality of radio bearers for transmission using the single allocation of uplink resources, wherein the selection of the data occurs using a first iteration and a second iteration,*

Eckert combined with Bucknell renders obvious limitation [1.7]. Ex.1003, ¶93.

First, Bucknell describes a selection of data from each of the MAC-d flows for transmission in a MAC-e PDU over E-DCH (*select data ... for transmission using the single allocation of uplink resources*), where, in view of Eckert, it would

have been obvious that the MAC-d flows correspond to *a plurality of radio bearers*, thereby rendering obvious *select data from the plurality of radio bearers for transmission using the single allocation of uplink resources*. Ex.1003, ¶94.

As explained in the analysis of limitation [1.3], Eckert describes the use of a radio bearer to provide a service and describes a UE providing a plurality of services at the same time, thereby disclosing or rendering obvious *a plurality of radio bearers*. Ex.1003, ¶95.

Radio bearers correspond to MAC-d flows and corresponding buffers

As explained in the analysis of limitation [1.3], Eckert’s UE maintains a plurality of services simultaneously, provided by a plurality of radio bearers (*plurality of radio bearers*). As explained below, packets of a radio bearer are provided via one or more logical channels to the MAC protocol layer, which includes the MAC-e subprotocol layer; and the logical channels are multiplexed onto MAC-d flows. Thus, Eckert discloses or renders obvious that a plurality of MAC-d flows corresponds to a *plurality of radio bearers*. Ex.1003, ¶¶96-97.

Each radio bearer forms a data pipe² or flow that are created and flow down

² Patent Owner’s expert in IPR2022-01127 explains that “[a] Radio Bearer may be thought of as a ‘pipe’ through which data can be transferred.” Ex.1013, ¶27, FN 3.

through each layer of the protocol stack (RLC layer to MAC layer to physical layer). Ex.1003, ¶98. Each radio bearer is associated with an “RLC entity.” Ex.1005, [0160] (“The RLC protocol layer 204 is modelled such that there is an independent RLC entity for each radio bearer...”). The RLC entity “split[s] or assemble[s] the useful data and ...from radio bearers ... into data packets,” which are then transferred “the MAC protocol layer 203 for further transport or for further processing.” Ex.1005, [0160]. Further, “[t]he MAC protocol layer 203 ... provides ... the RLC protocol layer 204 with its or their services using logical channels 208 as service access points and these are used to characterize what type of file the transported data involve.” Ex.1005, [0154]; Ex.1003, ¶¶98-99.

The MAC protocol layer 203 includes a “sublayer” known as “MAC-e (MAC enhanced uplink) subprotocol layer 300, which is likewise implemented both on the terminal, i.e. in the mobile radio terminal 118, and on the network.... The MAC-e subprotocol layer 300 receives its data from the MAC-d subprotocol layer via ‘MAC-d flows’ 301, 302 and in turn transmits its data via the E-DCH transport channel 303 to the physical layer 201.” Ex.1005, [0168]. “In the MAC-d subprotocol layer, one or more logical channels are multiplexed onto an MAC-d flow 301, 302...” Ex.1005, [0170]; Ex.1003, ¶100.

In summary, in Eckert, there is one RLC entity per radio bearer; an RLC entity creates packets of a corresponding radio bearer that are provided via one or

more logical channels to the MAC protocol layer, which includes the MAC-e subprotocol layer; and the logical channels are multiplexed onto MAC-d flows. Ex.1003, ¶101.

Further, there are priority queues in Eckert for the various priorities of the logical channels in the MAC-d flows, illustrated in Figure 3 as A, B, C, and D (each numbered 306). Ex.1005, [0170]. (“[E]ach MAC- d flow 301, 302 in the MAC-d subprotocol layer being assigned a priority, said priority being used by the function priority queue distribution, implemented in a priority queue distribution unit 305 in the MAC-e subprotocol layer 300, to split the data over the data buffer storages 306 with the different priorities, i.e. for processing using data of different priorities in a respective data buffer storage, with a data buffer storage respectively buffer-storing data of one priority.”). Eckert’s Figure 2 and 3 are presented below to illustrate the general relationship between protocol layers, radio bearers 210, logical channels 208, MAC-d flows 301, 302, and corresponding data buffer storages 306 for different priorities. Ex.1003, ¶102.

A, B, C, D in FIG. 3 may serve a different traffic class, which corresponds to a radio bearer. Ex.1003, ¶103.

Data Selection from MAC-d flows and queue/buffer storages

Both Eckert and Bucknell describe selecting data from a plurality of MAC-d flows (*select data from the plurality of radio bearers*) to fill a single scheduled data unit in the form of a MAC-e PDU for transmission (*for transmission*) over the E-DCH (*using the single allocation of uplink resources*, per the analysis of limitation [1.6]). For example, Eckert discloses that “[t]he MAC-e subprotocol layer 300 receives its data from the MAC-d subprotocol layer via ‘MAC-d flows’ 301, 302 and in turn transmits its data via the E-DCH transport channel 303.” Ex.1005, [0168]; *see also* [0228]. Bucknell likewise discloses that:

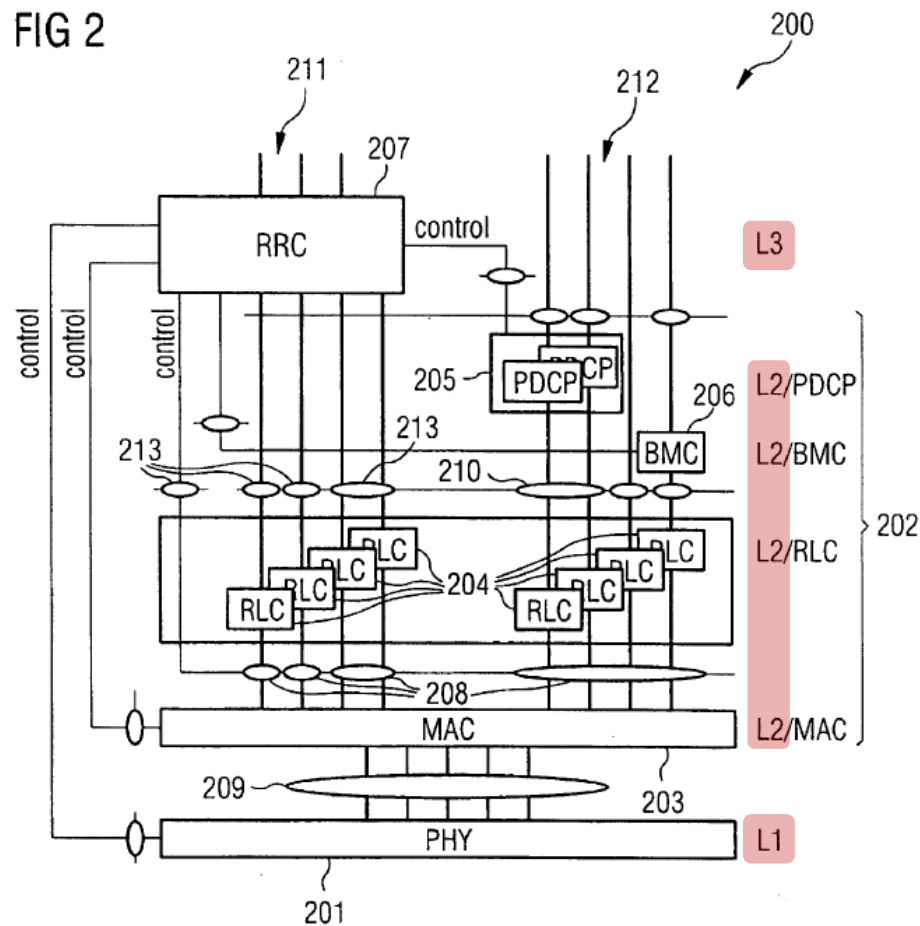
[I]n ... an **Enhanced Uplink Data Channel (E-DCH)** ...
... **MAC-d Protocol Data Units** ... are grouped
together for transmission to form larger, enhanced
PDUs termed **MAC-e PDU**s.

Ex.1006, [0002]; Ex.1003, ¶104.

Both Eckert and Bucknell describe the use of MAC-d queues/flows having different assigned priorities, and forming a MAC-e PDU with MAC-d PDUs. *See* Ex.1005, [0085] (“[T]he **MAC-e SDUs from various MAC-d flows (MAC-d data streams) and various priorities**, that is to say data from various priority

queues, [] form a protocol data unit...”); *see also* [0170]; Ex.1006, [0002] (“There is a requirement in communication systems to **multiplex data packets having different priorities**. For example, in UMTS for an Enhanced Uplink Data Channel (E-DCH), at the ... **MAC-d Protocol Data Units or MAC-d PDUs, are grouped together for transmission to form larger, enhanced PDUs termed MAC-e PDUs.**”); Ex.1003, ¶105.

Bucknell focuses only on the MAC layer in a UMTS system and does not provide details on the layers above and below the MAC layer. Eckert is an exemplary reference that provides details on these protocol layers – Layer 1, Layer 2 (which includes the MAC layer) in a UMTS system, and Layer 3. *See, e.g.*, Ex.1005, Figure 2, below, and associated description (Layer 1, 2, and 3, labeled as L1, L2, L3, respectively). Ex.1003, ¶106.



Ex.1005, Figure 2 (annotated); Ex.1003, ¶106

Bucknell describes selecting data packets from MAC-d queues to fill a MAC-e PDU. Ex.1006, [0003] and Figure 1. Referring to Figure 2 (below), Bucknell describes that “packets may be routed to the queue stores 50 according to their respective MAC-d flows, with each flow having an associated priority.” Ex.1006, [0020]. Bucknell further describes selecting data packets from the MAC-d queues 50 to populate an output buffer, which would have been

understood to represent an example MAC-e PDU based on the description and illustration of Figure 1. See Ex.1006, [0002]-[0003].

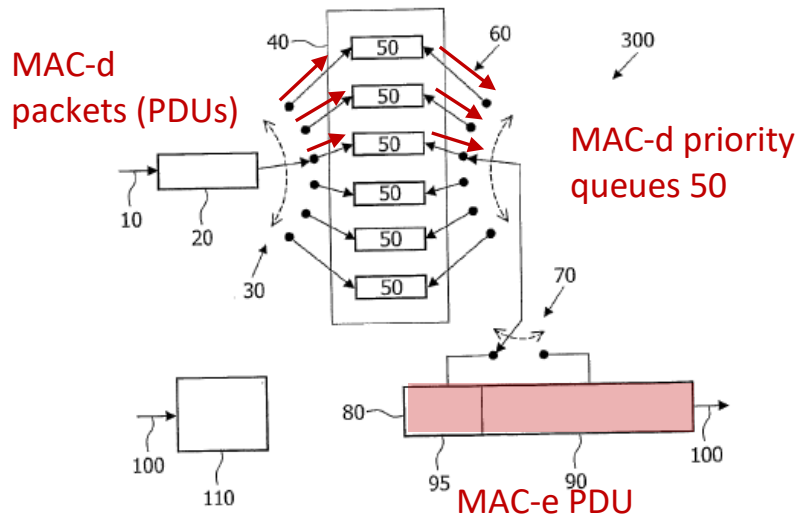


FIG. 2

Ex.1006, Figure 2 (annotated); Ex.1003, ¶107

Bucknell describes that its data selection process iterates over the MAC-d queues 50 multiple times to populate a MAC-e PDU. Ex.1006, [0006], [0025]-[0028]. For example, during a *first iteration*, data is selected from a “subset” of MAC-d queues 50 and during a *second iteration*, data is selected from the queues 50 based on “the amount of data in the respective queues,” as described in more detail in limitations [1.8] and [1.9]. *Id*; Ex.1003, ¶107.

Thus, Eckert in view of Bucknell renders obvious *select data from the plurality of radio bearers* (select data from a plurality of MAC-d flows and corresponding priority queues) *for transmission using the single allocation of*

uplink resources (for transmission on E-DCH) using an iterative data selection process (*wherein the selection of the data occurs using a first iteration and a second iteration*). Ex.1003, ¶¶108.

Second, the data selected from the MAC-d flows in Bucknell (*a plurality of radio bearers*) is transmitted in a single E-DCH (*a single allocation of uplink resources*, per the analysis of [1.6]) and, more granularly, a transmission time interval (TTI) (another, alternative, example of *a single allocation of uplink resources*, per the analysis of [1.6]), per Eckert, thereby also disclosing or rendering obvious *select data from the plurality of radio bearers for transmission using the single allocation of uplink resources*. For example, Eckert explains that a MAC-e protocol data unit is transmitted within a “data transmission time interval” (*single allocation of uplink resources*). Ex.1005, [0023] (“[T]he data from various priority queues, are transmitted in an MAC-e protocol data unit within a data transmission time interval.”); *see also* [0085]; Ex.1003, ¶¶109-111.

[1.8] *wherein in the first iteration, the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters,*

Eckert in view of Bucknell renders obvious limitation [1.8]. Ex.1003, ¶112.

As explained in the analysis of limitations [1.3] and [1.7], in view of the teachings of Eckert, the MAC-d flows in Bucknell correspond to *radio bearers*, and examples of the “*received parameters*” are the priority values of logical

channels associated with the MAC-d flows. As also explained in [1.7], Bucknell describes that its data selection process iterates over the MAC-d queues 50 multiple times to populate the MAC-e PDU. Ex.1006, [0006], [0025]-[0028]. During a first iteration, data is selected from a “subset” of MAC-d flows (*a subset of the plurality of radio bearers*) based on priority values (*received parameters*). *Id.*; Ex.1003, ¶113.

In more detail, Bucknell describes selecting data packets from MAC-d queues to populate a MAC-e PDU. The MAC-e PDU is divided into “a first portion 90 and a second portion 95,” *id.*, [0020], as shown in Figure 2 below. The “MAC-e PDU” is divided “into at least two portions” thus “enabling different multiplexing rules to be used for the different portions” to provide “flexibility for appropriate handling of priorities, guaranteed bit-rates and starvation scenarios.” Ex.1006, [0006]; Ex.1003, ¶114.

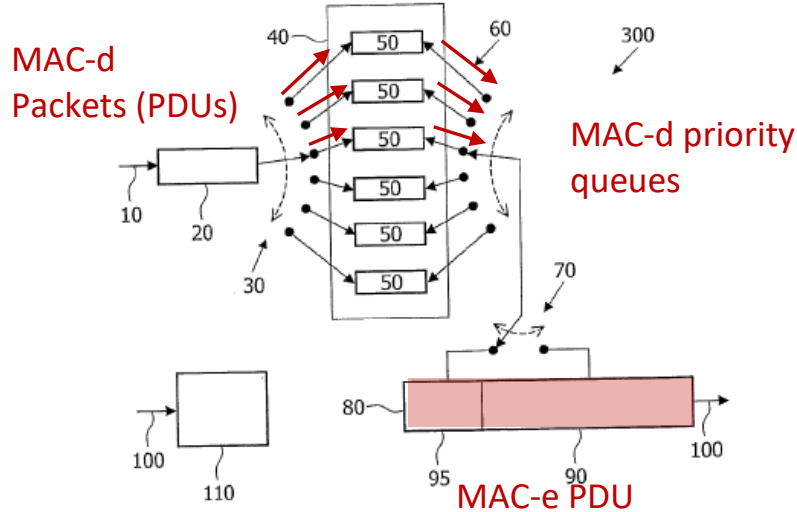


FIG. 2

Ex.1006, Figure 2 (annotated); Ex.1003, ¶114

Each pass through the MAC-d queues 50 to populate a portion of a MAC-e PDU is an *iteration*, as claimed. Bucknell’s data selection process is iterative because multiple passes through the MAC-d queues 50 are required to populate the different portions 90 and 95 of the MAC-e PDU—i.e., data selection from the queues 50 happens multiple times. Ex.1006, [0006], [0025]-[0028]; Ex.1003, ¶116. And, during each pass (*iteration*), Bucknell may apply different data selection “rules,” as illustrated in Bucknell’s different examples (1) through (13). Ex.1006, [0006], [0025]-[0030]; Ex.1003, ¶115.

For example, in Bucknell’s example (2), “the second portion 95 is populated by **taking one data packet in turn from each of the subset of queues**, excluding the highest priority queue,” and in example (4), as a “variation on 2), the second

portion 95 can be populated before the first portion 90.” Ex.1006, [0027]. These examples teach that the second portion 95 of a MAC-e PDU is first populated using a “subset of queues, excluding the highest priority queue” (*first iteration*, data selected from *subset* of queues), and, next, the first portion 90 is populated using the highest priority queue (*second iteration*). Example (5) reinforces that the different portions 90, 95 can be populated using “subsets of the queues” (*a subset of the plurality of radio bearers*). Ex.1006, [0027]. These teachings in Bucknell meet the Board’s preliminary construction in IPR2022-01127 of “*a subset of the plurality of radio bearers*” construed to mean “*less than all of the plurality of radio bearers.*” (See Section VII.). Ex.1003, ¶117.

Thus, in Bucknell, data may first be selected from a subset of MAC-d packet queues (*a subset of the plurality of radio bearers*, per Eckert) based on the priorities (*based on the received parameters*), e.g., data may be selected for the second portion 95 of a MAC-e PDU from all queues except the highest priority queue (i.e., less than all of the queues), which correspond to *radio bearers* according to Eckert, in a first iteration, thereby rendering obvious *wherein in the first iteration, the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters*, as claimed. Ex.1003, ¶118.

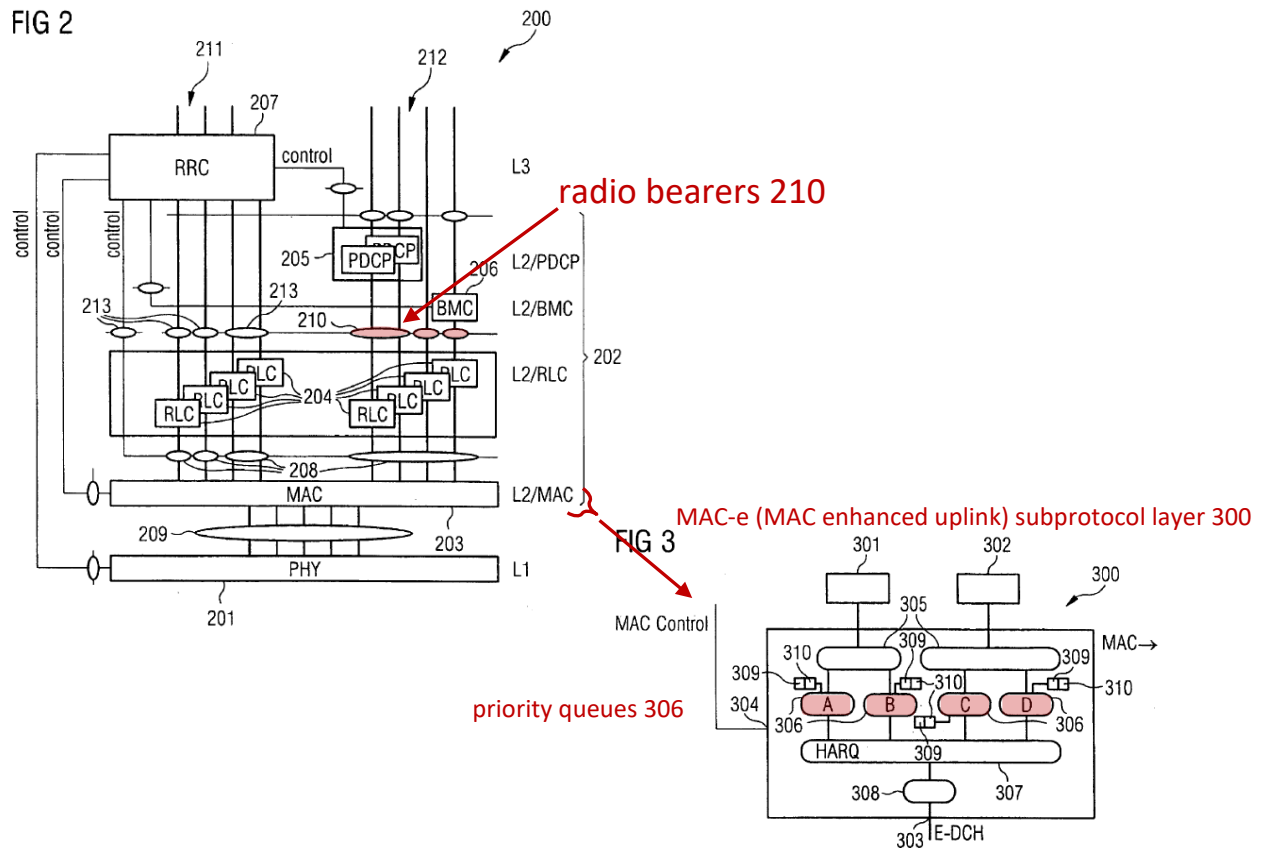
Motivation to Combine Eckert with Bucknell

A POSITA would have been motivated to modify Eckert’s method of

selecting data from MAC-d priority queues for transmission with Bucknell's method of selecting data from MAC-d priority queues for two reasons: (1) to reduce control signaling overhead and (2) to reduce complexity compared to Eckert's method. Ex.1003, ¶119.

Referring to Figure 2, Eckert presents a MAC protocol layer 203 within the larger context of a set of UMTS protocol layers (labeled as L1 (Layer 1), L2 (Layer 2), L3 (Layer 3)). Ex.1005, [0143], [0146] (“[P]rotocol layer 2 ... includes the Medium Access Control protocol Layer (MAC protocol layer) 203.”). There is a radio link control (RLC) entity for each radio bearer, and the RLC layer transfers packets to the MAC layer for transport or processing. Ex.1005, [0160]. Consistent with the teachings in Bucknell, Eckert's MAC layer, as in Bucknell, includes MAC-e and MAC-d subprotocol layers, and data is split therein over various priority queues and processed in accordance with priorities. Ex.1005, [0167]-[0170]; Ex.1006, [0002]; Ex.1003, ¶120. Eckert further explains that “[i]n one advantageous variant, **a priority queue buffer storage is provided in the MAC-e subprotocol layer for each data traffic class.**” Ex.1005, [0117]. The combined teachings of Eckert's Figures 2 and 3 are below.

FIG 2



Ex.1005, Figures 2 and 3 (annotated); Ex.1003, ¶120

Eckert recognizes that a “MAC-e protocol data unit” may be created by “retriev[ing], i.e., read[ing], the data from the various priority queues” according to a number of alternatives, such as “**according to particular criteria, such as the priorities of the data or the weightings or weighting value ranges transmitted using an RRC message.**” Ex.1005, [0228]. Bucknell specifies implementation detail for how to select data for a MAC-e PDU according to “priorities of the data,” which fits seamlessly in Eckert’s framework to address this issue. Ex.1003,

¶121.

Although Eckert acknowledges that a MAC-e PDU can be created based on priorities of data, Eckert primarily focuses on a technique for selecting packets from MAC-d priority queues based on percentage weight values that have been sent to the UE from a base station. Ex.1005, [0244] (“[T]he UTRAN uses an RRC message 500, as shown by way of example in FIG. 5, to signal to the mobile radio terminal 118 the weighting of the individual priority queues 306.”). The UE selects packets from MAC-d queues in proportion to the percentage weight values. *See, e.g.*, Ex.1005, [0131] or [0280] (“[T]he data packets buffer-stored in the priority queue buffer storages are transmitted proportionally via the E-DCH transport channel 303 from the various priority queues 306 in line with their explicit weighting (i.e. the weighting values) and the selected transport format.”); Ex.1003, ¶122.

Bucknell presents alternatives for reading data from priority queues that involve dividing “a data packet, such as a MAC-e PDU” into at least two different portions with “different multiplexing rules to be used for the different portions” to beneficially avoid “starvation” of “low priority” queues, thus enabling “**flexible and efficient multiplexing of data packets**,” Ex.1006, [0003]-[0006]. As explained in the analysis of limitation [1.8], Bucknell discloses a number of ways to fill two portions of a MAC-e PDU, *see* Ex.1006, [0025]-[0031], as alternatives

to Eckert's queue weighting for selecting packets from queues, that a POSITA would have found advantageous and looked to for the following reasons. **First**, Bucknell's alternatives do not require sending weighting values from a base station to a UE, as is done in Eckert, *see* Ex.1005, [0244] (“[A]n RRC message...signal[s] to the mobile radio terminal 118 the weighting of the individual priority queues...and additionally the weighting bands within which the weighting of the priority queues 306 can be lowered and raised dynamically...”), thus beneficially achieving reducing control signaling overhead compared to Eckert's techniques. **Second**, Bucknell's methods reduce complexity compared to Eckert's use of queue weights by avoiding the use of calculations that involve selecting data from queues in proportion to weighting values. Ex.1005, [0280]; Ex.1003, ¶123.

Using Bucknell's multiplexing scheme for the MAC-e subprotocol layer within the more complete set of protocol layers of Eckert's system would have involved the combination of prior art elements (multiplexing MAC-d flows into a MAC-e PDU according to Bucknell's teachings, in the UMTS protocol architecture of Eckert, which has a MAC-e protocol layer) according to known methods (applying the rules of Bucknell in Eckert, which likewise already has priority queues) to yield the predictable and beneficial result of using the information already existing in Eckert's user equipment to form protocol data units with data from multiple queues, while avoiding starvation of lower priority queues.

In addition, it would have been obvious to try using Bucknell's multiplexing and packet formation techniques in Eckert's system because Eckert describes a system that has the information (e.g., priorities associated with queues) needed for applying Bucknell's rules. Finally, use of Bucknell's multiplexing and packet formation techniques in place of Eckert's queue weighting represents simple substitution of one known element (Eckert's queue weighting) with another (Bucknell's multiplexing according to priority) to yield the predictable result of the implementation of Bucknell's MAC-e sublayer. Ex.1003, ¶124.

A POSITA would have had a reasonable expectation of success in implementing Bucknell's teachings regarding selecting packets from priority queues in a MAC layer within Eckert's MAC layer and overall protocol stack because both Eckert and Bucknell address a same issue of how to multiplex data packets from queues having different priorities for transmission in the Enhanced Uplink Data Channel (E-DCH). Ex.1005, [0015]; Ex.1006, [0002]-[0004]. Thus, a POSITA would have expected for Bucknell's techniques for transmission in the E-DCH to work for the same E-DCH in Eckert. Ex.1003, ¶125.

[1.9] *wherein in the second iteration, the selection of the data is based on buffered data for respective radio bearers, and*

Bucknell discloses or renders obvious limitation [1.9] in several ways.
Ex.1003, ¶126.

As discussed in [1.7] and [1.8], each data selection pass through the relevant set or subset of MAC-d queues 50 to populate MAC-e PDU portions 90 or 95 is an example *iteration*, as recited in claim 1. As also discussed, during a first data selection *iteration*, the second portion 95 of a MAC-e PDU may be populated using data from a “subset of queues.” Ex.1006, [0025]-[0027]. Bucknell further teaches that during a *second iteration* the first portion 90 of the MAC-e PDU may be populated “**based on the amount of data in the respective queues**, for example assigning highest priority to the queue with most data” (*based on buffered data for respective radio bearers*). Ex.1006, [0028]. In other words, the selection of data for the first portion 90 is based on priority, which in turn is based on the amount of buffered data, thereby making the selection of data for portion 90 based on the amount of buffered data (*based on buffered data for respective radio bearers*), thereby also disclosing or rendering obvious limitation [1.9]. Ex.1003, ¶127.

In addition, in example (9), “**one or both selections for the first and second portions 90, 95 can be modified to take into account the length of queue**, for example by preferentially selecting from queues exceeding a certain length.” Ex.1006, [0028]. In more detail, all queues exceeding a certain length may be identified and then ordered according to priority, with Bucknell’s examples (2) and (4) (as examples) applied to read data from those queues. Thus, in each

iteration of selecting data from queues, the queues may be serviced in an order according to both priority (data selection *based on the received parameters*, per [1.8]) and the queue length exceeding a certain length (data selection based on *buffered data*), thereby disclosing or rendering obvious limitation [1.9]. Ex.1003, ¶128.

Bucknell describes additional ways that limitation [1.9] is disclosed, based on the teachings of examples 2 and 4 (discussed previously) in view of example 3, which recites:

- 3) As a variation on 2), if the resource available for the first portion 90 is not fully used, then the unused resource can be made available for the second portion 95.

Ex.1006, [0027]. Combining example (3) with example (4) (linked via example (2)) to reverse the order of serving first portion 90 and second portion 95 yields the following procedure:

- a. Fill second portion 95 using a subset of the queues; (*first iteration*)
- b. Attempt to fill first portion 90 but first portion 90 not fully used;
- c. Fill remaining unused portion of first portion 90 using the same subset of queues from step (a),

where steps (b) and (c) together are an example of the *second iteration* and step (c) alone is also an example of the *second iteration*, which are other ways that

Bucknell discloses or renders obvious limitation [1.9] (including if both priority and queue length are factored into determining which queues to service as discussed above). Note that in this example, the *first iteration* and the *second iteration* of selecting data are sequentially performed using the same subset of queues, per steps (a) and (c) (the same *subset of the plurality of radio bearers* of limitation [1.8]). Ex.1003, ¶129. *See supra* analysis of limitation [1.8] for the motivation to combine Eckert and Bucknell.

[1.10] *cause the transmitter to transmit a signal including the selected data.*

Bucknell discloses or renders obvious limitation [1.10]. Ex.1003, ¶130.

The MAC-e PDU (*a signal including the selected data*), assembled by multiplexing data from MAC-d queues in apparatus 300, is transmitted using Bucknell's transceiver 310 (*cause the transmitter to transmit*). Ex.1006, [0032] (“[T]he apparatus for multiplexing 300” of Figure 2 is “coupled to a transceiver 310 for transmitting data...”); Ex.1003, ¶¶131-132.

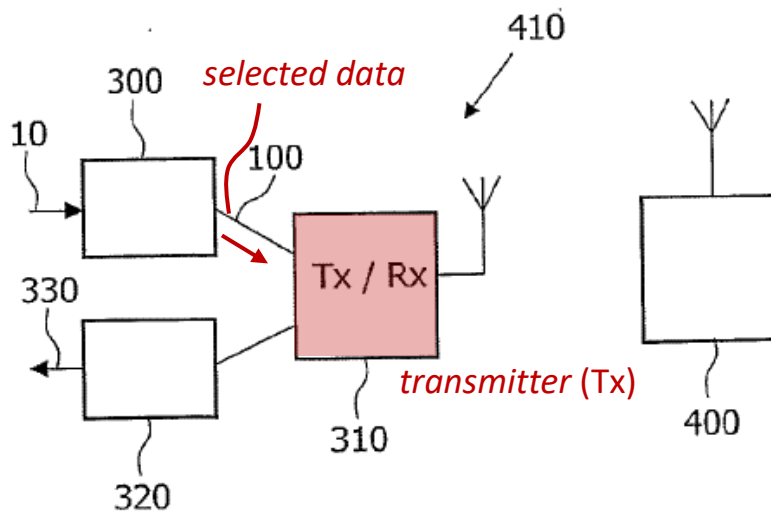


FIG. 4

Ex.1006, Figure 4 (annotated); Ex.1003, ¶131

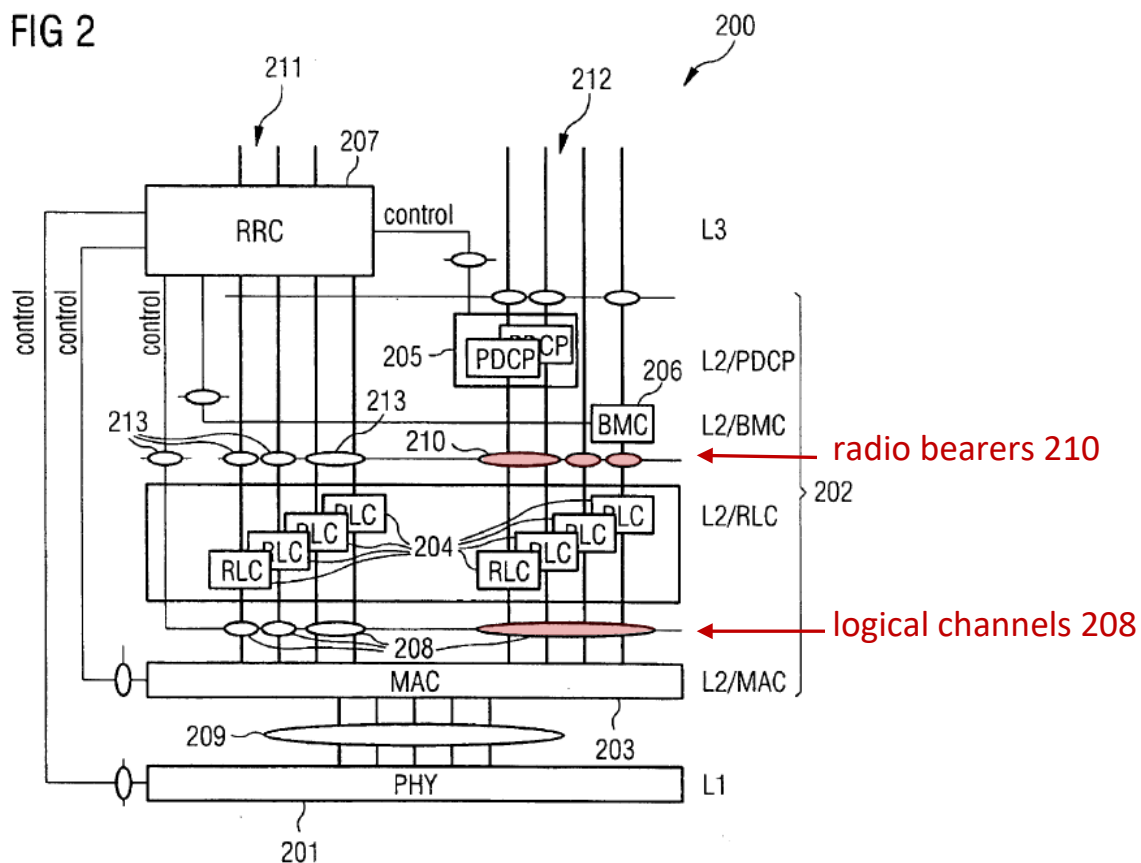
7. Claim 2

The UE of claim 1, [2.1] wherein the plurality of radio bearers are associated with a plurality of channels.

Eckert discloses or renders obvious limitation [2.1]. Ex.1003, ¶133.

As explained in the analysis of limitation [1.3], Eckert describes the use of radio bearers to provide services and describes a UE providing a plurality of services at the same time, thereby disclosing or rendering obvious *a plurality of radio bearers*. As also explained in the analysis of [1.3], referring to Figure 2, Eckert discloses that each radio bearer is associated with an “RLC entity.” Ex.1005, [0160]. The RLC entity “split[s] or assemble[s] the useful data ... from radio bearers ... into data packets,” which are then transferred “the MAC protocol

layer 203 for further transport or for further processing.” Ex.1005, [0160]. “**The MAC protocol layer 203 ... provides ... the RLC protocol layer 204 with its or their services using logical channels 208 as service access points and these are used to characterize what type of file the transported data involve.**” Ex.1005, [0154]. Figure 2 is reproduced below, noting the radio bearers are labeled as 210, *id.*, [0156] (“...radio bearers (RB) 210...”) and logical channels 208. Ex.1003, ¶¶134-135.



Ex.1005, Figure 2 (annotated); Ex.1003, ¶135

Thus, Eckert discloses or renders obvious *the plurality of radio bearers (a plurality of services provided by a plurality of radio bearers) are associated with a plurality of channels* (services are provided using logical channels, each associated with a priority). Ex.1003, ¶136.

8. Claim 3

The UE of claim 1, [3.1] wherein each radio bearer of the plurality of radio bearers is associated with at least one data flow or IP flow.

Eckert discloses or renders obvious limitation [3.1] in multiple ways.
Ex.1003, ¶137.

First, as explained in the analysis of limitation [1.7], each radio bearer is also associated with a “MAC-d flow,” which is also called a “MAC-d data stream[,]” Ex.1006, [0085], thereby also disclosing that *each radio bearer of the plurality of radio bearers is associated with at least one data flow*. Ex.1003, ¶138.

Second, as discussed in the analysis of limitation [1.3], referring to Figure 2, Eckert discloses that “**the PDCP [packet data convergence protocol] protocol layer 205 and the BMC [broadcast/multicast control] protocol layer 206 are provided with their services by means of radio bearers (RB) 210 as service access points.**” Ex.1005, [0156]. Furthermore, also referring to Figure 2, there is one RLC entity per radio bearer, and the RLC layer transfers packets to the MAC layer. Ex.1005, [0160]. Figure 2 illustrates the “**protocol layers...implemented**

both in the mobile radio terminal 118 and in the UMTS base station 108, 109, 110, 111.” Ex.1005, [0143]. As shown in Figure 2, and discussed above, there are multiple radio bearers and corresponding RLC entities and PDCP entities. Other prior art confirms this teaching. Ex.1003, ¶¶139-140 (citing Ex.1012, [0118] (“[O]ne UE may have several RBs and, in general, one RLC entity and one PDCP entity are used for one RB.”)).

Thus, Eckert describes and illustrates multiple PDCP entities (*at least one* [packet] *data flow*) associated with multiple radio bearers, such that *each radio bearer of the plurality of radio bearers is associated with at least one data flow* (PDCP entity and its associated data service). Ex.1003, ¶141.

9. Claim 4

The UE of claim 2, [4.1] wherein the selected data is selected based on a priority or a Quality of Service (QoS).

Bucknell discloses or renders obvious limitation [4.1]. Ex.1003, ¶142.

As discussed in the analysis of limitation [1.8], during Bucknell’s *first iteration* of data selection, the MAC-e PDU is first populated using data from queues based on “priority.” Ex.1006, [0025]-[0027] (“the second portion 95 is populated by taking one data packet in turn from each of the subset of queues, excluding the highest priority queue”), thereby disclosing *the selected data is selected based on a priority*. Bucknell also discloses selecting data based on *QoS*.

Ex.1006, [0028] (“The selection can be based on the QoS...”). Ex.1003, ¶¶143-144.

10. Claim 8

[8.0] *A method performed by a user equipment (UE), the method comprising:*

Claim 8 is a substantially similar method version of claim 1. Limitation [8.0] is substantively similar to [1.0]. Therefore, the prior art renders obvious limitation [8.0] for the same reasons. Ex.1003, ¶145.

[8.1] *receiving, by the UE, parameters associated with a plurality of radio bearers;*

See below for the analysis of [8.1], [8.3], and [8.4].

[8.2] *determining, by a processor of the UE, a plurality of buffer occupancies, wherein each of the plurality of buffer occupancies is associated with one or more radio bearers of the plurality of radio bearers;*

Limitation [8.2] is substantively the same as limitation [1.4], except that limitation [8.2] adds “*by a processor of the UE.*” As explained in the analysis of limitation [1.1] and [1.2], Bucknell discloses *a processor*, and it would have been obvious that Bucknell’s processor can be programmed or configured to perform various functions. Thus, Eckert discloses or renders obvious limitation [8.2] (in view of Bucknell’s teachings regarding *a processor*) for the same reasons as [1.4]. Ex.1003, ¶147.

[8.3] *transmitting, by a transmitter of the UE, a message including the plurality of buffer occupancies to a network;*

[8.4] *receiving, by the UE, a single allocation of uplink resources;*

[8.5] *selecting, by the processor, data from the plurality of radio bearers for transmission using the single allocation of uplink resources, wherein the selection of the data occurs using a first iteration and a second iteration;*

Limitation [8.5] is substantively similar to limitation [1.7]. Limitation [8.5] adds “*by the processor,*” whereas in [1.7] a “*processor*” is configured to perform this *selecting*. Thus, the prior art discloses or renders obvious limitation [8.5] for the same reasons as [1.7]. Ex.1003, ¶150.

[8.6] *wherein in the first iteration, the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters;*

[8.7] *wherein in the second iteration, the selection of the data is based on buffered data for respective radio bearers; and*

[8.8] *transmitting, by the transmitter, a signal including the selected data.*

Limitations [8.1], [8.3], [8.4], [8.6], [8.7], and [8.8] are substantively similar to limitations [1.3], [1.5], [1.6], [1.8], [1.9], and [1.10], respectively. Therefore, the prior art renders obvious these claim 8 limitations for the same reasons as the corresponding claim 1 limitations. Ex.1003, ¶¶146-149, 151-153.

11. Claim 9

The method of claim 8, [9.1] wherein the plurality of radio bearers are associated with a plurality of channels.

Limitation [9.1] is substantively similar to limitation [2.1]. Therefore, the prior art renders obvious limitation [9.1] for the same reasons. Ex.1003, ¶154.

12. Claim 10

The method of claim 8, [10.1] wherein each radio bearer of the plurality of radio bearers is associated with at least one data flow or IP flow.

Limitation [10.1] is substantively similar to limitation [3.1]. Therefore, the prior art renders obvious limitation [10.1] for the same reasons. Ex.1003, ¶155.

13. Claim 11

The method of claim 8, [11.1] wherein the selected data is selected based on a priority or a Quality of Service (QoS).

Limitation [11.1] is substantively similar to [4.1]. Therefore, the prior art renders obvious limitation [11.1] for the same reasons. Ex.1003, ¶156.

D. Ground 2: Claims 5 and 12 are obvious over Eckert in view of Bucknell, Lohr-1, and Hans

1. Summary of Hans

Hans is directed to a conventional set of protocol layers in a UMTS system. Ex.1008, 3:6-14 (“The functionalities of the UMTS mobile wireless system may be divided into layers.”). Hans explains that “UMTS-specific protocols may lie underneath network layer.” Ex.1008, 3:58-59. Hans presents details about its network layer and that parameters about the quality of service are “referred to as a PDP [packet data protocol] context.” Ex.1008, 3:51-67. A PDP context is important for informing layers below the network layer how to handle data as part of a service. Ex.1008, 4:19-23; Ex.1003, ¶157.

2. Reasons to combine Eckert and Hans

For the reasons set forth below, a POSITA would have been motivated to combine the teachings of Eckert and Hans. Ex.1003, ¶158.

a) Analogous art

Hans is analogous art to the '138 patent at least because Hans pertains to the same field of endeavor as the '138 patent, namely, wireless, cellular communication systems, such UMTS systems. Ex.1001, 1:23-28, 2:5-67; Ex.1008, 2:66-3:8; Ex.1003, ¶159.

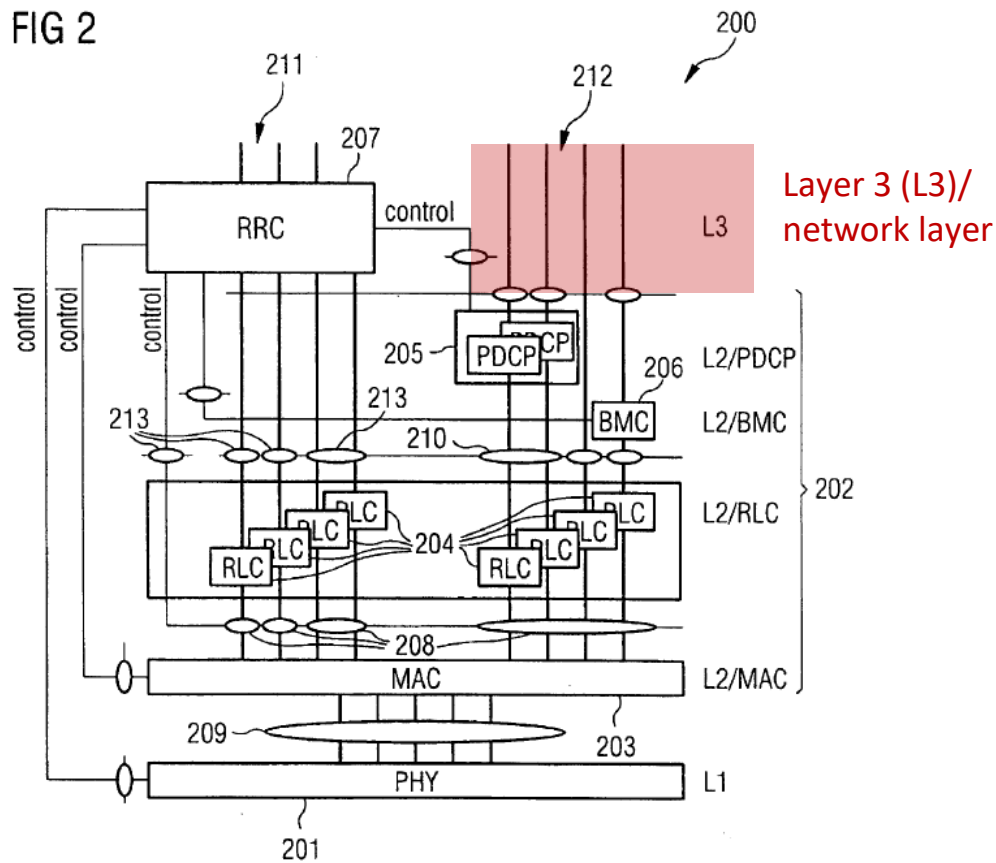
Hans is also analogous art to the '138 patent because Hans is reasonably pertinent to the same problem faced by the inventor of the '138 patent of how “to provide an improved mechanism to differentiate between IP data flows.” Ex.1001, 3:17-18. Hans explains that the Packet Data Convergence Protocol (PDCP) within UMTS, Ex.1008, 2:66-3:11, “tailors the user data which comes from the PDP context for transmission via an air interface,” *id.*, 4:19-28, where a “PDP context” refers to data reflecting “parameters about quality of service QoS” for packet data services, *id.*, 3:59-65. Thus, Hans is also concerned with differentiating packet data flows in UMTS systems. Ex.1003, ¶160.

b) Motivation to combine Eckert with Hans

A POSITA seeking to implement Eckert’s teachings in a UMTS network would have been motivated to implement a complete set of protocol layers for

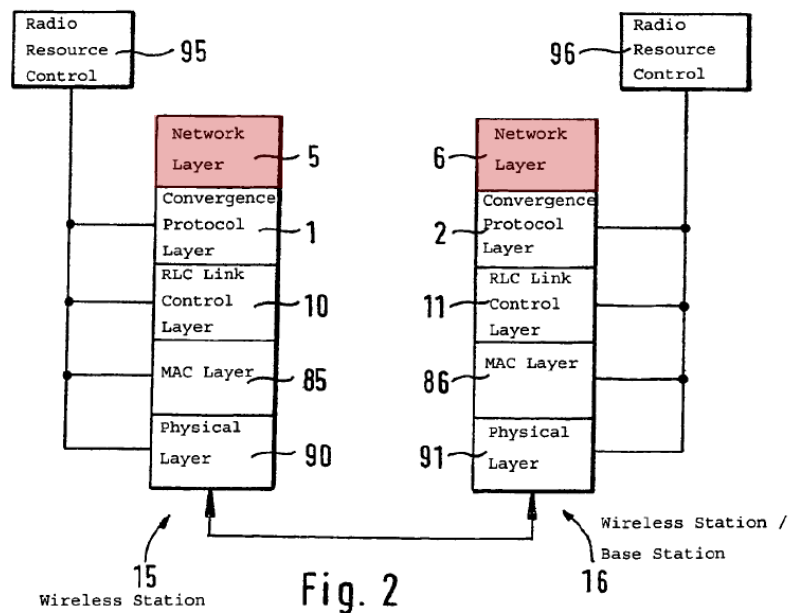
providing applications in Eckert's UE, and Hans provides implementation detail for a UMTS-compatible network layer that is missing from Eckert. Applying the standard UMTS network stack in Eckert's UMTS system is nothing more than "the predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417; *see also* IPR2023-00455, Paper 30, 33 (finding obviousness of implementing according to known standards). Ex.1003, ¶161.

In more detail, Eckert describes the various protocol layers, explaining that (referring to Figure 2), "[t]he topmost layer of the UMTS air interface Uu is the mobile radio network layer" also known as "protocol layer 3." Ex.1005, [0147]. "Layer 3" is denoted in Figure 2 below, focusing on the "user plane" 212 responsible for data transmission. Ex.1005, [0150]-[0151]; Ex.1003, ¶162.



Ex.1005, Figure 2 (annotated); Ex.1003, ¶161

Hans illustrates the same protocol stack at both a “mobile station” and a “base station” as in Eckert’s Figure 2, but at a higher level of abstraction. Ex.1008, 3:12-55; Ex.1003, ¶162.



Ex.1008, Figure 2 (annotated); Ex.1003, ¶162

Hans explains that “UMTS-specific protocols may lie underneath network layer 5, 6,” Ex.1008, 3:58-59, where the “[t]he convergence protocol used according to the UMTS standard is referred to in this case as PDCP (Packet Data Convergence Protocol),” *id.*, 3:9-11, which is also presented in Eckert (*see, e.g.*, layer labeled “L2/PDCP” in Eckert’s Figure 2 above). The “network protocols” of “network layer 5,6” are “referred to as PDP (Packet Data Protocol),” and data about each PDP, such as “parameters about quality of service QOS [] is referred to as **PDP context**.” Ex.1008, 3:51-67; Ex.1003, ¶163.

Hans explains that “[a] data carrier,” also known as “a radio bearer or RB...provides RLC link control layer 10, 11 lying underneath convergence

protocol layer 1, 2, [and] is [] used for the transmission of any of the multiplexed packet data streams from various PDP contexts 21, 22.” Ex.1008, 4:42-46. Figure 3 of Hans illustrates various protocol layers and entities within those layers, such as a PDP context within the network layer 5, a PDCP protocol entity within the convergence protocol layer, a radio bearer, and the RLC layer:

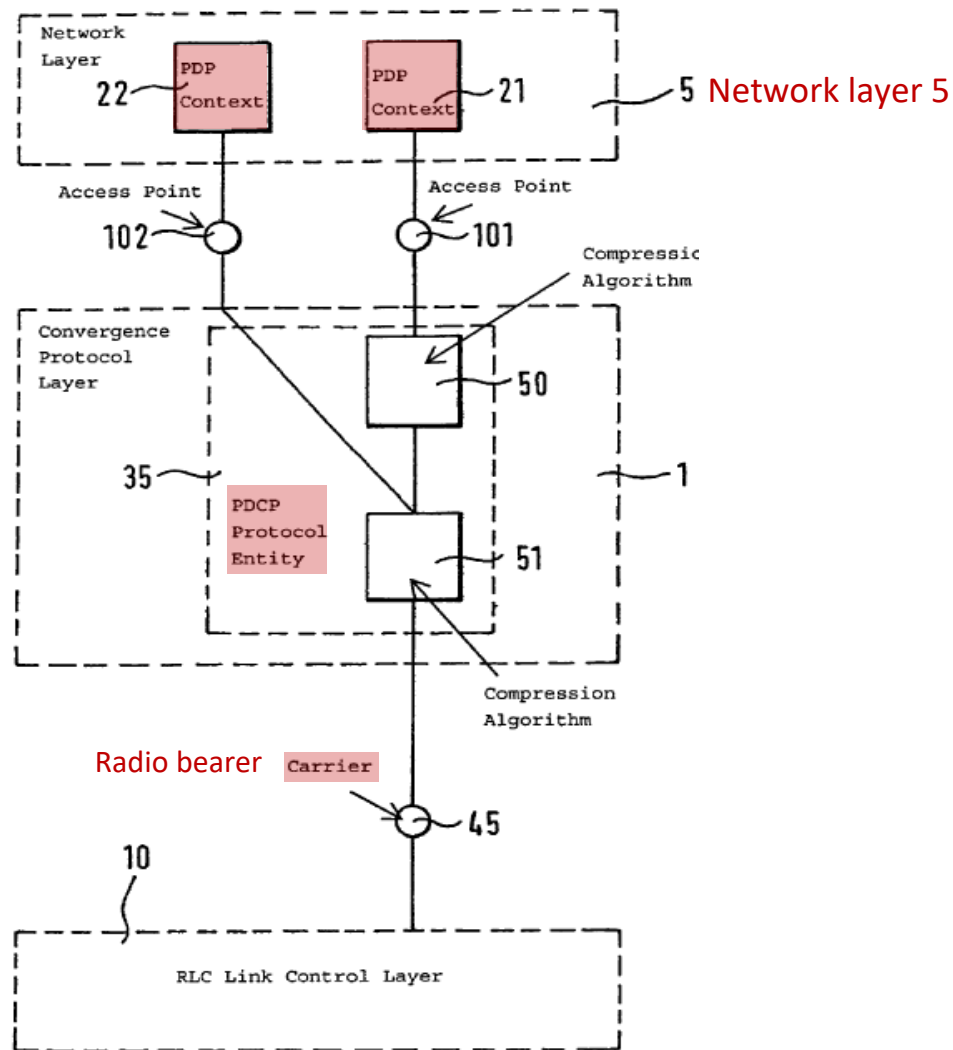


Fig. 3

Ex.1008, Figure 3 (annotated); Ex.1003, ¶164

Thus, Hans beneficially provides further detail about how the network layer (Layer 3 or L3) in Eckert would have been implemented and connected to the PDCP entities in the convergence protocol layer of Layer 2. Ex.1003, ¶165.

Providing further detail about the network layer in the Eckert-Bucknell-Lohr-1 system would have involved combining prior art elements (a conventional network layer 3 residing above UMTS layers 1 and 2) according to known methods (using a network layer to help provide data services) to yield the predictable result of a UE that is configured to provide or support data services. It would also have been obvious to try implementing Hans' teachings regarding PDP contexts to provide a quality of service to a convergence protocol layer having PDCP entities because the Eckert-Bucknell-Lohr-1 protocol stack (illustrated in Figure 2 of Eckert) already uses PDCP entities and is connected to a network layer (Layer 3). Ex.1003, ¶166.

c) Reasonable expectation of success

A POSITA would have had a reasonable expectation of success in using Hans' teachings regarding its network layer provided as a layer on top of Eckert's UMTS protocol layers because Eckert indicates use of a network layer (layer 3) above the same UMTS layers as shown in Hans, albeit with less detail about the network layer than Hans. Hans describes a PDP context in the network layer as important for informing the PDCP, as disclosed in both Hans and Eckert, about

how to handle data as part of a service. Ex.1008, 4:19-23; Ex.1003, ¶167.

3. Claim 5

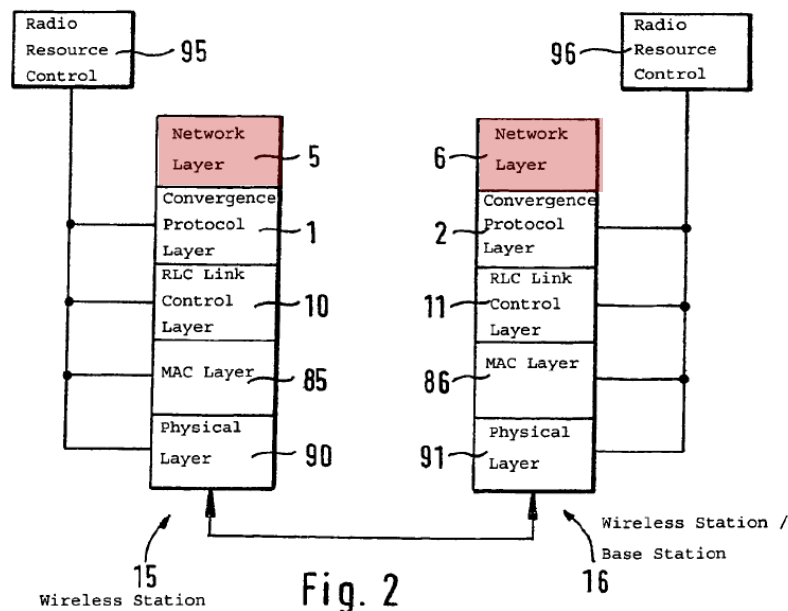
The UE of claim 1, [5.1] wherein the plurality of radio bearers are associated with at least one packet data protocol (PDP) context.

Eckert in view of Hans renders obvious limitation [5.1]. Ex.1003, ¶168.

As explained in the analysis of limitation [1.3], Eckert's UE maintains a plurality of services simultaneously, provided by a plurality of radio bearers (*plurality of radio bearers*). Ex.1003, ¶169.

Eckert describes the various protocol layers, explaining that (referring to Figure 2) "[t]he topmost layer of the UMTS air interface" is the "network layer" or "protocol layer 3." Ex.1005, [0147]. Hans provides implementation detail for the network layer, and reasons to combine Eckert and Hans are provided *supra*. Ex.1003, ¶170.

Hans' Figure 2 illustrates a network layer in a protocol stack at both a "mobile station" (network layer 5) and a "base station" (network layer 6). Ex.1008, 3:12-55.



Ex.1008, Figure 2; Ex.1003, ¶171

“The convergence protocol used according to the UMTS standard is referred to in this case as PDCP (Packet Data Convergence Protocol).” Ex.1008, 3:9-11.

The network protocols are associated with a “**PDP context**,” which may “contain parameters about quality of service QOS” of a “data link.” Ex.1008, 3:51-67. A PDP context is important for informing the PDCP layer how to handle data as part of a service. Ex.1008, 4:19-23 (“The PDCP... tailors the user data which comes from a PDP context for transmission via an air interface...”). Ex.1003, ¶172.

Hans provides further information on the relationship between a “carrier”/radio bearer, PDCP entities (part of the described “convergence protocol layer 1, 2”), and a PDP context of the network layer 5, Ex.1008, 4:42-46,

illustrating the relationships in Figure 3:

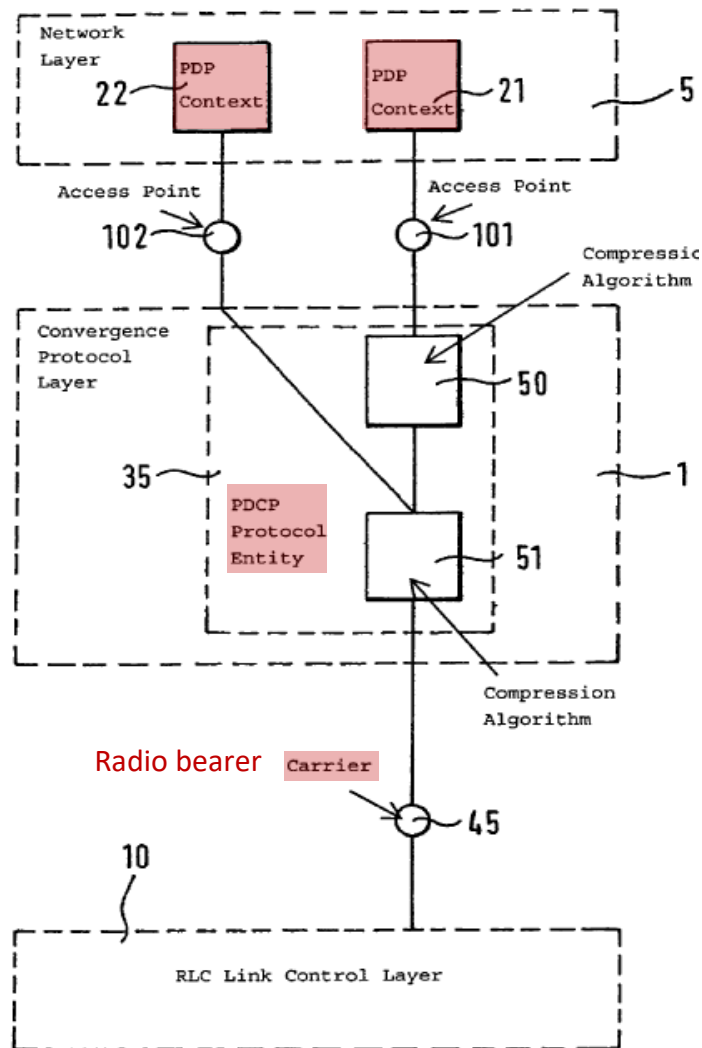


Fig. 3

Ex.1008, Figure 3 (annotated); Ex.1003, ¶173

The network has the flexibility to use one PDP context per PDCP protocol entity or multiple PDP contexts per PDCP protocol entity, and one PDCP protocol entity per radio bearer, such that each PDP context is associated with a radio bearer (via a PDCP protocol entity):

Multiple PDP contexts 21, 22 may be connected to one PDCP protocol entity 35; however, one PDP context 21, 22 may only be connected to one PDCP protocol entity 35. Each PDCP protocol entity 35 uses ... a radio bearer.

Ex.1008, 4:49-58.

Thus, Eckert in view of Hans renders obvious *the plurality of radio bearers* (Eckert's plurality of radio bearers) *are associated with at least one packet data protocol (PDP) context* (per Hans' teachings, each PDP context is associated with at least one radio bearer via a PDCP entity). Ex.1003, ¶¶174-175.

4. Claim 12

The method of claim 8, [12.1] wherein the plurality of radio bearers are associated with at least one packet data protocol (PDP) context.

Limitation [12.1] is substantially similar to limitation [5.1]. Therefore, the prior discloses or renders obvious limitation [12.1] for the same reasons. Ex.1003, ¶176.

b. Ground 3: Claims 6 and 13 are obvious over Eckert in view of Bucknell, Lohr-1, and Lohr-2

1. Summary of Lohr-2

Lohr-2 relates to a UMTS system that employs data transmitted in the E-DCH channel. Ex.1009, [0157]. In this context, Lohr-2 describes a channel, known as an "Enhanced Absolute Grant Channel" E-AGCH, as a physical channel,

Ex.1009, [0038], and a “shared” channel, *id.*, [0110], that provides scheduling information for the E-DCH from a “scheduler” in the network, *id.*, [0041]; Ex.1003, ¶177.

2. Reasons to combine Eckert, Bucknell, Lohr-1, and Lohr-2

a) Analogous art

Lohr-2 is analogous prior art to the ’138 patent at least because Lohr-2 pertains to the same field of endeavor as the ’138 patent, namely, wireless, cellular communication systems, such UMTS systems. Ex.1001, 1:23-28, 2:5-67; Ex.1009, [0154] (“most of the embodiments are outlined in relation to a UMTS communication system and the terminology used in the subsequent sections mainly relates to the UMTS terminology.”); Ex.1003, ¶¶178-179.

Lohr-2 is also analogous art to the ’138 patent because Lohr-2 is reasonably pertinent to a same problem faced by the inventor of the ’138 patent of how “to provide an improved mechanism to differentiate between IP data flows.” Ex.1001, 3:17-18. Lohr-2 relates to this problem because Lohr-2 is concerned with adapting how uplink data transmissions and associated resources are scheduled and granted (e.g., on “the absolute grant channel” (E-AGCH)) to prevent an “overload situation in neighboring cells” during handover. Ex.1009, [0156]-[0160]; [0089] (“[S]cheduling decisions” are “reflected in the...absolute grant.”). Scheduling data transmissions and allocated resources to those transmissions provides for data

flows, such as those in the '138 patent. Ex.1003, ¶180.

b) Motivation to combine Eckert-Bucknell-Lohr-1 with Lohr-2

A POSITA seeking to implement the combined teachings of Eckert-Bucknell-Lohr-1 in a UMTS network would have been motivated to specify implementation detail missing from Eckert, Bucknell, and Lohr-1 regarding how a UE knows when or how much E-DCH resources to use. Lohr-2 provides details regarding how E-DCH resources are scheduled, and Lohr-2 is in the same context as Eckert and Bucknell – a UMTS communication system that employ an E-DCH. Ex.1009, [0154], [0157]. Applying these UMTS teachings is nothing more than “the predictable use of prior art elements according to their established functions.” *KSR*, 550 U.S. at 417; *see also* IPR2023-00455, Paper 30, 33 (finding obviousness of implementing according to known standards). Ex.1003, ¶181.

Lohr-2 explains that the “MAC-e/es handles the E-DCH specific functions,” and “[t]he MAC-e/es entity receives scheduling information from Node B (network side) via Layer 1 signaling as shown in FIG. 6,” such as “[a]bsolute grants [] received on E-AGCH (Enhanced Absolute Grant Channel).” Ex.1009, [0038]. Implementing Lohr-2’s E-AGCH for UMTS in the UMTS network of Eckert-Bucknell-Lohr-1 is nothing more than combining prior art elements (Lohr-1’s E-AGCH) according to known methods (use of a channel in

UMTS) to yield the predicable result of implementing the E-AGCH in a UMTS system as it was intended. Ex.1003, ¶182.

c) Reasonable expectation of success

A POSITA would have had a reasonable expectation of success in using Lohr-2's E-AGCH in the UMTS system of Eckert, Bucknell, and Lohr-1 because Lohr-2's E-AGCH is described as used in a UMTS system, Ex.1009, [0154] ("most of the embodiments are outlined in relation to a UMTS communication system"); which is the same context as Eckert, Ex.1005, [0112]-[0113], [0167], Bucknell, Ex.1006, [0001], and Lohr-1, 4:19-26, 1:16-20; Ex.1003, ¶183.

3. Claim 6

The UE of claim 1, [6.1] wherein the single allocation of uplink resources is received on a physical shared channel from a scheduler in the network.

Lohr-2 discloses or renders obvious limitation [6.1]. Ex.1003, ¶184.

As explained in the analysis of limitation [1.6], an allocated E-DCH channel is an example of *a single allocation of uplink resources*. As explained below, Lohr-2 describes an "Enhanced Absolute Grant Channel" E-AGCH as a physical channel and a shared channel that provides scheduling information for the E-DCH from a scheduler in the network. Ex.1003, ¶185.

Lohr-2 explains that the "MAC-e/es handles the E-DCH specific functions," and "[t]he MAC-e/es entity receives **scheduling information** from Node B

(network side) via Layer 1 signaling as shown in FIG. 6,” such as “[a]bsolute grants [] received on E-AGCH (Enhanced Absolute Grant Channel).”

Ex.1009, [0038]. “Layer 1” is a reference to the physical layer, *see* Ex.1005, [0145] (“the physical layer PHY 201, which represents the protocol layer 1...”), so E-AGCH, which provides “Layer 1” signaling, is a physical layer channel (illustrated in Figure 6 below), thereby disclosing a *physical* [] *channel*. Ex.1003, ¶186.

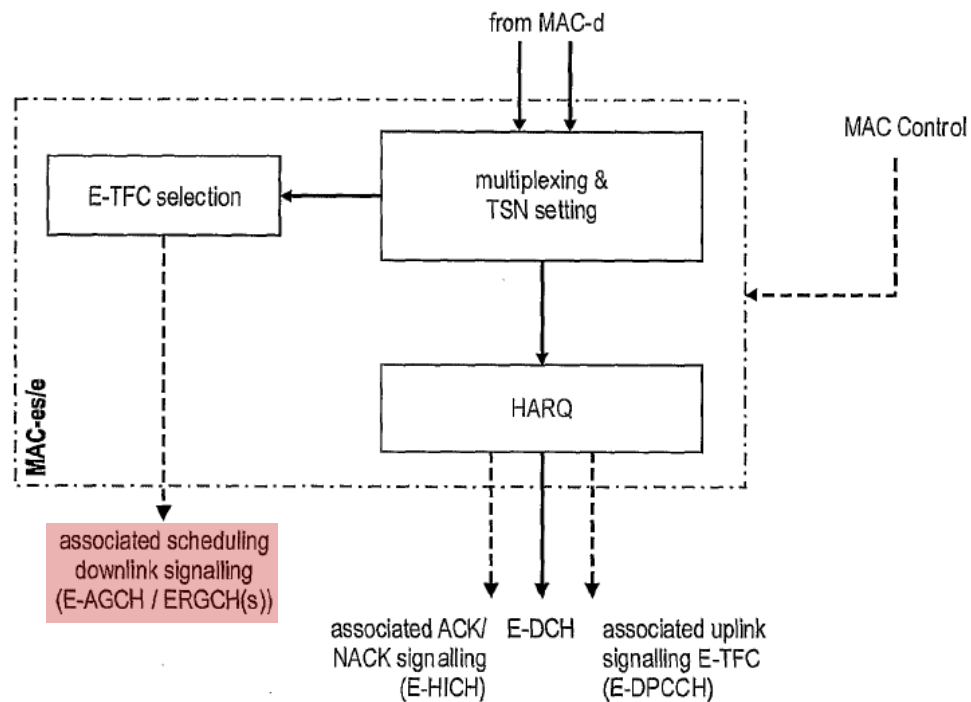


Fig. 6

Ex.1009, Figure 6 (annotated); Ex.1003, ¶186

Lohr-2 also describes the E-AGCH (enhanced absolute grant channel) as a

shared channel. Ex.1009, [0110] (referring to the “absolute grant channel” as “shared”). Thus, the E-AGCH is a *physical shared channel*. Ex.1003, ¶187.

As explained in the analysis of limitation [1.6], an allocated E-DCH channel (that combines multiple MAC-d flows) is an example of *a single allocation of uplink resources*. The E-DCH scheduler (*scheduler*) manages E-DCH cell resources, and the E-DCH scheduler is in a Node B, or base station (*in the network*): “There is ... **one E-DCH scheduler function in the Node-B for all UEs. ...**” Ex.1009, [0041]; [0028] (“Node Bs” and “base stations” are synonymous). Thus, a NodeB, which includes a E-DCH scheduler, provides “absolute grants.” Ex.1009, [0051]-[0052]; Ex.1003, ¶188.

Thus, Lohr-2 discloses *the single allocation of uplink resources* (E-DCH resources) *is received on a physical shared channel* (E-AGCH (Enhanced Absolute Grant Channel), which is a physical channel that is shared) *from a scheduler in the network* (from an “E-DCH scheduler” in a base station). Ex.1003, ¶189.

4. Claim 13

The method of claim 8, [13.1] wherein the single allocation of uplink resources is received on a physical shared channel from a scheduler in the network.

Limitation [13.1] is substantively similar to limitation [6.1]. Therefore, the prior art renders obvious limitation [13.1] for the same reasons. Ex.1003, ¶190.

X. DISCRETIONARY DENIAL IS INAPPROPRIATE

A. No basis for § 325(d) denial

The Grounds presented herein have not previously been presented to the Office with respect to the Challenged Claims. Eckert was not presented or considered during prosecution of the '669 application or in either of the two previous IPRs filed against the '138 patent (IPR2022-01127 and IPR2023-00020). A patent publication related to Lohr-1 is listed on the face of the '138 patent, but there were no prior art rejections during prosecution of the '669 application. To the extent the Examiner considered the disclosures of Lohr-1 with respect to the Challenged Claims during prosecution of the '669 application, it was material error for the Examiner to have allowed the Challenged Claims for the reasons presented in the Grounds above. *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (Feb. 13, 2020) (precedential) (“*Advanced Bionics*”).

None of the references applied herein were previously presented in IPR2022-01127, the first of two IPRs against the '138 patent. The petitioner in the second IPR, IPR2023-00020, applied the same primary reference as used in IPR2022-01127 (Piesa), which Petitioner has not relied on here, and combined Piesa with patent publications related to Bucknell and Lohr-1. While analysis was presented regarding the “*first iteration*” and “*second iteration*” of claim 1, there

appears to be no analysis that Bucknell applies to “*a subset of the plurality of radio bearers*,” instead apparently relying on Piesa. Ex.1021, 51-54. Regardless, IPR2023-00020 terminated prior to any filings by Patent Owner or decision by the Board; thus neither Bucknell nor Lohr-1 were previously considered by the Office.

B. No basis for *Fintiv* denial

The Board balances six factors in considering denial under § 314. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential). These factors strongly favor institution. The district court case is in its very early stages. Patent Owner filed its complaint on April 12, 2024 (Ex.1014) and trial is not scheduled to start until May 14, 2026. Ex.1015 (proposed scheduling order). Petitioner has worked diligently to prepare this Petition, which is being filed well within the one-year timeframe allowed by Congress.

1. No evidence regarding a stay

No motion to stay has been filed, so the Board should not infer the outcome of such a motion. *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (June 16, 2020) (informative). Thus, this factor is neutral on discretionary denial.

2. Parallel proceeding trial date

This factor weighs against discretionary denial because the projected trial date—based on median time-to-trial statistics—is in January of 2027³, which is well after the projected date for the Board to issue a Final Written Decision in May or June 2026. While trial is currently proposed⁴ for May 14, 2026 (Ex.1015, 4), the Board recognizes “that scheduled trial dates are unreliable and often change.” *See* Director’s Memorandum on Discretionary Denials. Ex.1017, 8. Moreover, Petitioner notes that “a court’s general ability to set a fast-paced schedule is not particularly relevant...where, like here, the forum itself has not historically resolved cases so quickly.” *In re Apple Inc.*, 979 F.3d 1332, 1344 (Fed. Cir. 2020). Because the projected trial date is approximately seven months *after* the Board’s expected date for issuing a Final Written Decision, this factor weighs against discretionary denial.

³ The current average time-to-trial for the district court hearing the co-pending litigation is 33.1 months. *See* Ex.1016, 5.

⁴ The district court has not entered an order scheduling a trial date.

3. Investment in the parallel proceeding

The investment in the co-pending litigation has been minimal. A claim construction hearing has not yet occurred, fact discovery is not proposed to open until April 11, 2025, and expert discovery is not proposed to open until November 20, 2025. Ex.1015, 2-3; *see PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8 at 17 (Jan. 6, 2021). This lack of investment favors institution.

Moreover, Petitioner only learned which claims were being asserted in August 2024. *See* Ex.1020 (infringement contentions cover pleading). Since then, Petitioner has worked expeditiously to file this petition within four months. And, as of this filing, Patent Owner has not yet served its final infringement contentions. Under *Fintiv*, Petitioner’s prompt filing “weigh[s] against exercising the authority to deny institution.” *Fintiv*, Paper 11 at 11.

4. Overlapping issues with the parallel proceeding

Petitioner served its preliminary invalidity contentions on October 24, 2024 and supplemental invalidity contentions on November 27, 2024. However, Petitioner will not be serving its final invalidity contentions until May 22, 2025, around the time the Board would issue an institution decision in this case. Ex.1015, 3. The extent of overlap is thus speculative at this point in time.

5. Petitioner is a defendant

Petitioner is a defendant in the co-pending litigation. That is true of most Petitioners in IPR proceedings, making this factor neutral. *See HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13 at 9 (Jan. 14, 2021).

6. Other circumstances

“[T]he PTAB will not deny institution of an IPR or PGR under *Fintiv* (i) when a petition presents compelling evidence of unpatentability.” Ex.1017, 9. Here, the petition—along with Dr. Ding’s expert testimony—plainly shows that the ’138 patent claims no more than well-known subject matter.

Because the *Fintiv* factors are either neutral or weigh against discretionary denial, institution should not be denied on discretionary factors.

C. No Basis for *General Plastic* Denial Under § 314(a)

The *General Plastic* factors weigh heavily in favor of institution. *Gen. Plastic*, IPR2016-01357, Paper 19, at 16 (PTAB Sept. 6, 2017) (precedential at § II.B.4.i). Toyota Motor Corp. (“Toyota”) filed IPR2022-01127 in June 2022. American Honda Motor Co., Inc. (“Honda”) filed IPR2023-00020 in October 2022.

Tesla was sued over two years after the lawsuits involving Toyota and Honda were filed, and Tesla does not have a “significant relationship” with Toyota or Honda. Because Petitioner and prior petitioners Honda and Toyota do not

possesses a significant relationship, the first *General Plastic* factor – “whether the same petitioner previously filed a petition directed to the same claims of the same patent,” *General Plastic* at 16 – is dispositive and weighs strongly against denial as this is Petitioner’s only IPR challenging the ’138 patent. *Videndum Prod. Sols. Inc v. Rotolight Ltd*, IPR2023-01218, Paper 12 (Director Vidal) (April 19, 2024) (“*General Plastic* factor one necessarily outweighs the other *General Plastic* factors.”). To the extent the other factors apply, the timing of this Petition relative to the others is entirely due to Patent Owner’s staggered litigation strategy.

XI. CONCLUSION

Petitioner has established a reasonable likelihood that the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: December 31, 2024
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XII. MANDATORY NOTICES

A. Real party-in-interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that the real party-in-interest is Tesla, Inc.

B. Related matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of the Petitioner, the '138 Patent is or was involved in the following cases:

Case Heading	Number/Status	Court	Filed
<i>Intellectual Ventures I LLC et al v. Volvo Car Corporation et al</i>	DNJ-3-24-cv-09298 (pending)	DNJ	Sept. 19, 2024
<i>Intellectual Ventures II LLC v. Tesla, Inc</i>	WDTX-1-24-cv-00390 (terminated)	WDTX	Apr. 11, 2024
<i>Intellectual Ventures II LLC v. Tesla, Inc.</i>	WDTX-6-24-cv-00188 (pending)	WDTX	Apr. 12, 2024
<i>Intellectual Ventures II LLC v. Tesla, Inc.</i>	WDTX-1-24-cv-00884 (transferred)	WDTX	Apr. 12, 2024
<i>Intellectual Ventures I LLC et al v. Volvo Car Corporation et al</i>	WDTX-6-23-cv-00429 (transferred)	WDTX	June 8, 2023

<i>Intellectual Ventures I LLC et al v. Honda Motor Company, Ltd. et al</i>	NDTX-3-22-cv-00761 (dismissed)	NDTX	Apr. 4, 2022
<i>Intellectual Ventures I LLC et al v. Toyota Motor Corp. et al</i>	EDTX-2-21-cv-00389 (dismissed)	EDTX	Oct. 19, 2021
<i>Intellectual Ventures I LLC et al v. Honda Motor Company, Ltd. et al</i>	EDTX-2-21-cv-00390 (dismissed)	EDTX	Oct. 19, 2021
<i>Intellectual Ventures I LLC et al v. General Motors Company et al</i>	WDTX-6-21-cv-01088 (dismissed)	WDTX	Oct. 19, 2021

The '138 patent was also involved in the following IPRs. Institution was denied in IPR2022-01127, and IPR2023-00020 settled prior to institution.

Case Heading	Number	Filed
<i>American Honda Motor Co., Inc. v. Intellectual Ventures II LLC</i>	IPR2023-00020	October 6, 2022
<i>Toyota Motor Corporation et al v. Intellectual Ventures II LLC</i>	IPR2022-01127	June 10, 2022

C. Lead and back-up counsel and service information

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Please address all correspondence in this proceeding to lead and back-up counsel. Petitioner consents to service in this proceeding by email at the addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,943. Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: December 31, 2024

/Scott T. Jarratt/
Scott T. Jarratt
Lead Counsel for Petitioner
Registration No. 70,297

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner as detailed below.

Date of service December 31, 2024

Manner of service FEDERAL EXPRESS

Documents served Petition for *Inter Partes* Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 of U.S. 10,292,138;
Petitioner's Power of Attorney;
Petitioner's Exhibit List; and
Exhibits 1001-1021.

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