

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

**PETITIONER'S REPLY TO
PATENT OWNER'S RESPONSE**

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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

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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
Ex.1022- Ex.1052	<i>Reserved</i>
Ex.1053	Statistics on District Court Timing (Mar. 31, 2025)
Ex.1054	WDTX 2024 Statistical Public Report, available at https://www.txwd.uscourts.gov/court-information/district-statistics/
Ex.1055	Amended Order Assigning the Business of the Court (Judge Moses, Jan. 31, 2025)
Ex.1056	LexMachina docket report
Ex.1057	LexMachina docket report
Ex.1058	"Albright Worried Multipatent Trials Ask Too Much Of Jurors," Law360 (Dec. 18, 2020), at https://www.law360.com/articles/1337976/albright-worriedmultipatent-trials-ask-too-much-of-jurors
Ex.1059	Bifurcation Order – Videolabs, Inc. v. Asustek Computer, Inc. 6:22-cv-00720-ADA (WDTX)
Ex.1060	Joint Claim Construction Statement, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA, ECF No. 37 (WDTX) (March 28,

	2025)
Ex.1061	“The economic contributions of Tesla to the California economy, 2018–2021,” IHS Markit (Oct. 2022), available at https://digitalassets.tesla.com/tesla-contents/image/upload/Tesla-California-Economic-Impact-Final-Report-October-2022
Ex.1062	“Tesla’s ‘American-made’ cars won’t get hit as hard by the auto tariffs,” CNN.com, https://www.cnn.com/2025/03/29/cars/american-made-cars-tesla-auto-tariffs/index.html , retrieved Apr. 14, 2025
Ex.1063	“An Assessment of the Impact of the Inter Partes Review Process under the Patent Trial and Appeal Board on the US Economy,” The Perryman Group, available at https://www.perrymangroup.com/publications/report/2021/9/23/an-assessment-of-the-potential-impact-of-expanding-inter-partes-review-ipr-under-the-america-invents-act-on-the-us-economy/
Ex.1064	<i>Reserved</i>
Ex.1065	“Tesla’s California Footprint,” https://www.tesla.com/blog/teslas-california-footprint (retrieved Apr. 25, 2025)
Ex.1066	“FAQs for Interim Processes for PTAB Workload Management,” available at https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management (retrieved May 13, 2025).
Ex.1067	Notice of <i>Sotera</i> Plus Stipulation for Defendant Tesla, Inc., <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA, ECF No. 59 (WDTX) (May 27, 2025)
Ex.1068	Order Granting Motion to Extend Time to File Infringement Contentions, <i>Intellectual Ventures II, LLC v. Tesla, Inc.</i> , 1:24-cv-884-ADA, ECF No. 60 (WDTX) (May 27, 2025)
Ex.1069	Judge Albright Patent FAQ, available at https://www.txwd.uscourts.gov/for-attorneys/judge-albright-courtroom-faq/ (retrieved June 2, 2025)

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Ex.1070 (NEW)	Deposition Transcript of Dr. Gary Lomp, February 3, 2026
Ex.1071 (NEW)	Second Declaration of Zhi Ding, Ph.D. under 37 C.F.R. § 1.68
Ex.1072 (NEW)	U.S. Patent No. 6,611,907

I. INTRODUCTION

The Petition, supported by Dr. Ding's testimony, establishes how the prior art renders obvious challenged claims 1-6 and 8-13 of the '138 patent. Intellectual Ventures II's ("IV") Patent Owner Response ("Response") does nothing to rebut this *prima facie* case of obviousness. IV makes two main arguments: (i) Eckert, or alternatively Eckert combined with Lohr-1, fails to render obvious "*a single allocation of uplink resources*" (in limitation [1.6] and [8.4]); (ii) the Petition fails to demonstrate a motivation to combine Eckert and Bucknell. As demonstrated below, IV's arguments fail on all fronts.

First, regarding the "*single allocation of uplink resources*" limitation, IV mischaracterizes the Petition's mapping, which points to Eckert's express disclosure of allocating a "defined time interval" on the E-DCH to mobile terminals for uplink transmission (i.e., a finite quantum of physical resources). This plainly satisfies the disputed claim language, whether considering Eckert alone or in combination with Lohr-1.

Second, IV's attack on Petitioner's motivation to combine Eckert and Bucknell also fails. IV ignores Petitioner's dispositive argument that Bucknell merely provides implementation details for Eckert's pre-existing priority-based data selection alternative. This alone establishes obviousness. IV's remaining arguments, asserting that the combination would render Eckert inoperable or

provide no benefit, focus entirely on embodiments of Eckert that are *not* part of Petitioner's combination and are thus irrelevant.

The challenged claims are unpatentable.

II. ECKERT, OR ALTERNATIVELY ECKERT AND LOHR-1, RENDER OBVIOUS THE DISPUTED CLAIM LIMITATIONS

IV alleges that Petitioner's prior art mapping is deficient because Eckert, or Eckert combined with Lohr-1, does not disclose or render obvious "*a single allocation of uplink resources,*" as recited in limitations [1.6] and [8.4] in claims 1 and 8, respectively. Response, 46-53. IV is wrong as shown below.

The Petition illustrates that this limitation is disclosed and rendered obvious by Eckert alone and by Eckert combined with Lohr-1. With respect to Eckert:

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].

Petition, 34. Importantly, the Petition explains that "[d]ata from buffer storages are transmitted in '**a defined time interval** via the E-dedicated channel (E-DCH).' Ex.1005, [0116]." Petition, 34 (emphasis added).¹ "The **allocated** E-DCH channel,

¹ All emphasis shown herein is in the original document, unless otherwise

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.” Petition, 34. Thus, Eckert discloses or renders obvious claim limitation [1.6]. Ex.1071, ¶¶14-15.

Eckert combined with Lohr-1 also renders obvious limitation [1.6]. “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].” Petition, 34. Eckert explains that scheduling of the E-DCH in a UE is controlled by a base station. Ex.1005, [0012] (“The fundamental characteristics of this new transport channel [E-DCH] 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; Petition 34. Further:

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.

specified.

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.

Petition, 35-36 (emphasis added); Ex.1071, ¶16.

A. Eckert alone discloses or renders obvious “*a single allocation of uplink resources.*”

IV ignores the above mapping in the Petition and instead attacks a different mapping of its own creation. Specifically, IV alleges that “the Petition’s mapping of Eckert’s E-DCH channel as a whole (e.g., including every possible time frame and spreading code) to the ‘a single allocation of uplink resources’ must be rejected.” Response, 48. The Petition, however, did not map “an infinite number of time slots” to the recited “*a single allocation of uplink resources,*” as alleged. *Id.* The Petition specifically pointed out that in Eckert a “**defined time interval**” on the E-DCH is allocated to the UE for the purpose of transmitting uplink data, where “**scheduling**” of the E-DCH in a UE is “controlled by a base station.” Petition, 34-36 (quoting Ex.1005, [0116], [0012]); Ex.1071, ¶17.

Further, Eckert’s disclosure matches IV’s understanding of “*a single allocation of uplink resources*” as “*a finite quantum of physical resources* that can be shared out, such as the resources defined by a combination of spreading codes and timeslots.” Response, 46 (citing Ex. 1001, 9:39-43 and 11:7-10; Ex. 2007,

¶101). Specifically, Eckert's transmissions are measured units of time called "transmission time intervals" or TTIs. See, e.g., Ex.1005 [0023], [0154]. A TTI is a fixed period of time, such as 2 ms in UMTS. *Id.*, [0020] ("In each transmission time interval (TTI) of 2 ms, it is possible to transmit a maximum of one MAC-hs PDU."); *see also id.*, [0085]. IV's expert agrees that a TTI is a "fixed interval of time" for transmission. Ex.1070, 40:11-24 (a "TTI" or "transmission time interval" is a "UMTS concept" and a "3GPP concept," and in UMTS "a transmission time interval is a fixed interval of time."); Ex.1071, ¶18.

Accordingly, Eckert's "defined time interval" (Ex.1005, [0116]) is both a finite length of time and would have included a finite number of TTIs (e.g., one TTI, two TTIs, etc.), as both experts agree. Ex.1071, ¶19; Ex.1070, 24:6-12 (referring Dr. Lomp to Eckert, [0116] and a "defined time interval" to have this exchange: "Q. And there is a term in UMTS called 'transmission time interval,' correct? A. Yes, that's correct. Q. **So a defined time interval could be one or more of those transmission time intervals or TTIs. Correct? A. It could be, yeah.**").

With respect to the "spreading codes" portion of IV's understanding of "*single allocation*," there are only a *finite* number of spreading codes employed on Eckert's E-DCH channel. Ex.1071, ¶20. IV's expert confirmed this during his deposition. Ex.1070, 11:1-10 ("Q. Would an E-DCH channel be expected to have

associated spreading codes? A. As part of the UMTS WCDMA specification it would, yes. **Q. Would an E-DCH be expected to have available a finite number of spreading codes? A. Yes, it would be expected.**"). Accordingly, even when considering Eckert's E-DCH channel as a whole, the spreading code resources allocated to a UE are finite. Ex.1071, ¶20.

Likewise, the '138 patent describes a "single CCTrCH" (a known transport channel in UMTS systems, Ex.1003, ¶88 (citing Ex.1011, [0021]) as including "a single physical allocation of uplink resources," Ex.1001, 9:36-43. The '138 patent disclosure parallels Eckert, with both the E-DCH and CCTrCH transport channels relating to a UMTS uplink, employing spreading codes in code division multiple access (CDMA), and employing fixed time slots called transmission time intervals (TTIs). *See* Ex.1005, [0003], [0008], [0015], [0023]; Ex.1071, ¶¶17-20 (regarding UMTS, CDMA, E-DCH, and TTIs); and Ex.1011, [0006], [00051] (regarding UMTS, CDMA, CCTrCH, and TTIs). Again, contrary to IV's arguments, Response, 47-48, Petitioner does not map "infinite time frames" to "*a single allocation of uplink resources.*"

Accordingly, Eckert's "defined time interval" of an "E-DCH channel" (which comprises a finite number of time slots (TTIs) and spreading codes) discloses and renders obvious "*a single allocation of uplink resources.*" Ex.1071, ¶21.

B. Eckert combined with Lohr-1 also renders obvious “*a single allocation of uplink resources.*”

The Petition relies on Lohr-1 simply to confirm that it was well known for Eckert's base station to allocate to a mobile terminal specific time intervals on the E-DCH, thus confirming the obviousness of Eckert's teachings. Petition, 35-36 (“Lohr-1 confirms that a base station (called a Node B in UMTS) specifies time intervals for transmission. Ex.1007, 7:6-9”). The Petition did not attempt to (or need to) import Lohr-1's scheduling modes into Eckert. Despite this, IV nevertheless asserts in the Response that Lohr cannot be bodily incorporated into Eckert and that **Lohr's** methods do not satisfy claim 1: “the Petition has failed to demonstrate that either of the two scheduling modes in Lohr-1 (i.e., (i) a rate controlled mode, and (ii) a time and rate controlled mode) satisfy the requirement in claim 1 that that the UE be provided with ‘*a single allocation of uplink resources*’ from the network.” Response, 52. The Petition does not assert that Lohr-1's scheduling modes independently meet claim 1. As a threshold issue, IV's arguments fail to address the combination in the Petition and can be ignored. *See In re Keller*, 642 F. 2d 413, 425 (CCPA 1981) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

For the sake of completeness only, Petitioner addresses IV's arguments regarding Lohr's two scheduling modes. IV first addresses the "rate controlled mode" in Lohr-1 (Response, 49-50), but since the Petition does not cite any disclosure from Lohr-1 associated with this mode, IV's arguments are irrelevant and should be given no weight.

IV next makes arguments regarding the "time and rate controlled scheduling mode" in Lohr-1. Response, 50-53. The parties agree that in Lohr-1's "time and rate controlled" mode, the base station controls the time during which a UE is allowed to transmit on the E-DCH channel. Response, 41; Ex.1007, 6:28-7:9 (Discussing "**Node B controlled time and rate scheduling**" as part of "E-DCH Signaling"). The scheduled time period is measured in transmission time intervals. Ex.1007, 15:9-11 (A "dedicated transport channel is the E-DCH. The data is transmitted within the transport channels during periodic intervals, commonly referred to as transmission time interval (TTI)."). Because (i) Eckert's base station also schedules the defined time interval during which the UE is to transmit, and (ii) Lohr-1's base station-scheduled time interval on the E-DCH channel includes a finite number of spreading codes and time slots (TTIs), Eckert combined with Lohr-1 plainly renders obvious "*a single allocation of uplink resources*"—even if Lohr-1's "time and rate controlled" scheduling is bodily incorporated into Eckert. Ex.1071, ¶¶22-24.

IV's arguments regarding Eckert's transport format combinations relate to how the "*single allocation of uplink resources*" (Eckert's time slots and spreading codes) are used, Response, 50-52, not whether the resources are allocated in the first place. Thus, IV's arguments are irrelevant to whether Eckert and Lohr-1 disclose "*a single allocation of uplink resources.*"

Moreover, to the extent Lohr-1's "time and rate controlled scheduling mode" is incorporated into Eckert (as posited by IV), such a combination would have achieved "more precise control of the interference" at the base station, as compared to the "rate-only controlled scheduling" mode. Ex.1007, 10:25-29. In the Response, IV focuses only on Lohr-1's explanation that when the base station also schedules transmission time (as opposed to rate-only scheduling), there is a "cost of more signaling overhead and scheduling delay." Response, 53 (quoting Ex. 1007, 10:25-29). This alleged drawback is not relevant to the combination. Specifically, if Lohr-1's "time and rate controlled scheduling mode" were added to Eckert, no additional overhead (due to time control) would result because Eckert's method ***already suggests time scheduling***. Ex.1071, ¶25. The combination would not add any overhead not already present in Eckert's system. *Id.* And, even if it did, the existence of known tradeoffs between Lohr-1's two scheduled modes does not obviate a motivation to combine that selects one mode based on its stated advantages. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir.

2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420-421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

The challenged claims are unpatentable.

III. ECKERT IS PROPERLY COMBINED WITH BUCKNELL.

IV’s arguments regarding the combination of Eckert and Bucknell fail because they are based on the incorrect notion that the Petition exclusively “proposes eliminating from Eckert, the weightings used in Eckert for proportionally mapping data from queues to the transport channels, and substituting in place thereof several of the priority-based allocation algorithms disclosed in Bucknell.” Response, 54. For example, IV asserts that “doing away with Eckert’s weightings would have rendered Eckert inoperable for its intended purpose.” Response, 54. In fact, the entire basis for IV’s arguments regarding the combination of Eckert and Bucknell is the notion that the Petition *only* suggests “doing away with Eckert’s weightings” . The Petition, however, recognizes that Eckert maps data to queues based on *either priority or weighting*—and in the case of priority, the Petition proposes merely implementing Eckert’s pre-existing priority scheme based on Bucknell’s technique. *See* Petition, 40. The Response fails to address this aspect of the combination, which establishes obviousness

alone. Even ignoring this failure, the arguments IV does present regarding the weightings aspect of Eckert are directed to embodiments in Eckert that are *not* part of Petitioner's combination and thus irrelevant.

A. IV ignores Petitioner's dispositive combination of Eckert's existing priority queues and Bucknell's priority techniques.

The Petition establishes, using substantial evidence, that Bucknell provides additional implementation detail regarding Eckert's priority-based data selection—thus rendering obvious limitations [1.7]-[1.9]. Petition, 36-56. The Petition explains that both Eckert and Bucknell address the problem of how to “select[] data from a plurality of MAC-d flows...to fill a single scheduled data unit in the form of a MAC-e PDU for transmission...over the E-DCH.” Petition, 40. The Petition also explains that “[b]oth 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.” Petition, 41 (emphasis added).

The Petition also recognizes that Eckert's “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 the priorities of the data.**” Ex.1005, [0228]; Petition, 50-51. Thus, as explicitly stated in the Petition: “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.” Petition, 50. The Petition (and Dr. Ding's original declaration)

provided ample technical explanation regarding Bucknell's implementation of Eckert's pre-existing priority-based scheme. For example, on pages 52-53, the Petition explained:

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.**

Petition, 52-53 (emphasis added). As shown in the Petition, Bucknell's method integrates with Eckert's system by using existing queue priorities to choose data from MAC-d queues for a MAC-e PDU, in line with Eckert's suggestion to use data priorities (Ex.1005, [0228]). This provides clear motivation to combine Eckert and Bucknell. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) (“[I]f there's a known technique to address a known problem using

'prior art elements according to their established functions,' then there is a motivation to combine.'").

Because IV completely fails to address this independent basis for obviousness in the Response, the Board can confirm the unpatentability of the claims without reaching IV's remaining arguments. For the sake of completeness, however, Petitioner nevertheless addresses IV's arguments regarding the combination. Ex.1071, ¶¶27-29.

B. Contrary to IV's arguments, replacing Eckert's queue weighting in certain embodiments with Bucknell's priority queue selection would not render Eckert inoperable.

IV contends that removing Eckert's weightings would make Eckert unable to serve its intended function, claiming that this change would take away the feature responsible for reducing signaling overhead. Response, 54-59. IV's arguments fail for reasons presented below.

1. Modifying Eckert using Bucknell is beneficial, and IV's arguments otherwise focus on embodiments of Eckert that are not part of Petitioner's combination.

As set forth in the Petition, Petitioner's combination is built on specific embodiments of Eckert in which MAC-d queue weighting values are explicitly signaled from a base station to a mobile terminal. Petition, 51-52 (citing Ex.1005, [0244], which recites that "the 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"); *see also* Ex.1005, [0244]-[0252], Figure 5.

IV does not dispute the existence of these embodiments, and, in fact, IV concedes the point. Response, 38 (“[I]n some embodiments, Eckert sends the weights from the mobile radio network to the mobile terminal...”); *see also* Ex.2007, ¶¶87-88; Ex.1070, 25:13-26:6 and 15:25-16:4. IV’s own expert likewise acknowledged that Eckert paragraph [0244] discloses “an example where the base station explicitly signals queue weighting values to a mobile terminal.” Ex.1070, 25:12-17; Ex.1071, ¶31.

Because these embodiments require the base station to transmit weighting values to the mobile terminal, the motivation to modify them is straightforward: replacing Eckert’s weight-based data selection method with Bucknell’s priority-based multiplexing scheme eliminates that signaling requirement, thereby reducing control signaling overhead. *See* Petition, 52. As explained in the Petition, Bucknell’s alternative methods “do not require sending weighting values from a base station to a UE, as is done in Eckert,” and further “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.” *Id.* These are concrete, articulable benefits that provide a clear reason to make the proposed modification. Ex.1071, ¶32.

IV’s arguments against this motivation fail because they are directed at the

wrong embodiments. IV focuses on other Eckert embodiments in which the weightings “are not explicitly signalled,” but are instead assigned *a priori* based on traffic classes. Response, 38. IV further argues that Eckert’s weighting scheme is linked to predefined transport format combinations, such that removing the weights would destroy Eckert’s mechanism for reducing signaling in the MAC-e PDU control header. Response, 54-59. But none of these arguments are directed to the embodiments that Petitioner actually relies upon. The Petition only addresses the embodiments in which queue weights are explicitly signaled from the base station—and in those embodiments, the signaling overhead associated with transmitting the weights is a real cost that Bucknell’s approach eliminates. IV’s contention that the modification would “render Eckert inoperable” (Response, 54) is thus a straw man, built entirely on embodiments outside the scope of the proposed combination. Ex.1071, ¶33.

Accordingly, Petitioner’s motivation to modify the explicitly signaled embodiments of Eckert using Bucknell’s teachings is supported by substantial evidence and provides a sound basis for the obviousness of the challenged claims.

2. Modifying Eckert using Bucknell is practical.

IV’s argument that applying Eckert’s transport formats to Bucknell’s teachings would be “impractical” (Response, 56–59) rests on a fundamental mischaracterization of the relationship between these two references. Properly

understood, Bucknell presents solutions to one of two problems identified in

Eckert, and Eckert has additional teachings related to a second problem that apply directly – and without conflict – to the solutions presented in Bucknell. Ex.1071, ¶35.

i. Eckert addresses two distinct problems.

Eckert addresses two separate problems in the context of transmitting data from multiple MAC-d flows in the E-DCH framework. First, Eckert addresses how to create a MAC-e PDU from a plurality of MAC-d flows in a mobile terminal – e.g., how many MAC-d PDUs should be selected from each MAC-d queue/flow. Ex.1070, 14:11-24; Petition, 41; Ex.1005, [0015]. Eckert's weighting values serve this function by specifying the proportion of the total available data transmission bandwidth allocated to each priority queue. Ex.1005, [0061], [0066], [0280]; Ex.2007, ¶¶83-86; Petition, 51. Second, Eckert addresses the distinct problem of how to signal the contents of a MAC-e PDU (e.g., how many MAC-d PDUs and from which MAC-d queues) from a mobile terminal to a base station. Ex.1005, [0027], [0235]-[0236]; Ex.1071, ¶36. Eckert solves this signaling problem through predefined transport formats and associated indexes: rather than adding individual control data headers to each MAC-e PDU (which would produce “an enormous volume of additional signalling data”), Eckert transmits only a single index to a row in a table of predefined transport format combinations stored at both the

terminal and the network. Ex.1005, [0024]–[0027], [0235]–[0236]; Ex.2007, ¶121; Ex.1071, ¶36. This single index conveys the complete makeup of the MAC-e PDU to the receiver with minimal overhead. Ex.1005, [0236] (“[J]ust one index for the respective table row needs to be written to the control range of the MAC-e protocol data unit 607, which additionally achieves significant savings in terms of bits required in the control data range 608, i.e. in the header field of the MAC-e protocol data unit 607.”); Ex.1071, ¶36.

ii. Bucknell addresses only the first problem.

Bucknell addresses only the first of the two problems addressed by Eckert – how to fill a MAC-e PDU from multiple MAC-d flows in a mobile terminal. Petition, 17-18, 41-44; Ex.1070, 31:13-17 (“Q. Okay. Does Bucknell address the problem of how to fill a MAC-e PDU from multiple MAC-d priority queues? A. He addresses the process of doing that, yes.”); Ex.1006, [0003], [0020], [0025]–[0028]. Bucknell’s apparatus for filling a MAC-e PDU is illustrated below, as annotated by Petitioner’s expert in the Petition. Ex.1071, ¶37.

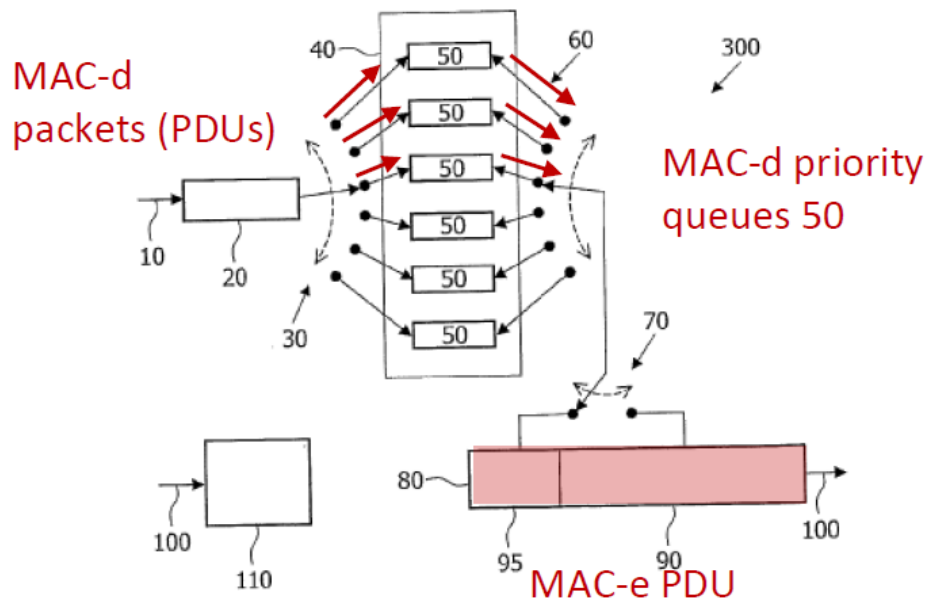


FIG. 2

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

Petition, 44

Indeed, Bucknell's entire disclosure is directed to providing “flexibility for appropriate handling of priorities, guaranteed bit-rates and starvation scenarios by dividing a data packet, such as a MAC-e PDU . . . into at least two portions and enabling different multiplexing rules to be used for the different portions.”

Ex.1006, [0006]. Critically, however, Bucknell is silent on the second problem that Eckert addresses—how to signal the contents of the assembled MAC-e PDU to the receiver. Ex.1070, 28:19-31:12; Ex.1071, ¶38.

iii. The combination of Eckert and Bucknell is complementary, not conflicting.

Contrary to IV's assertions, Response, 56-59, the Petition does not propose

eliminating Eckert's transport format signaling; it proposes substituting only the data selection methodology (Bucknell's priority-based selection from MAC-d flows for Eckert's MAC-e PDU, Petition, 50-53) while doing nothing to change Eckert's efficient transport format signaling mechanism. Because Eckert and Bucknell address different aspects of the MAC-e PDU transmission process, Eckert's transport format signaling mechanism applies directly and without modification to Bucknell's data selection methodology. Ex.1071, ¶39.

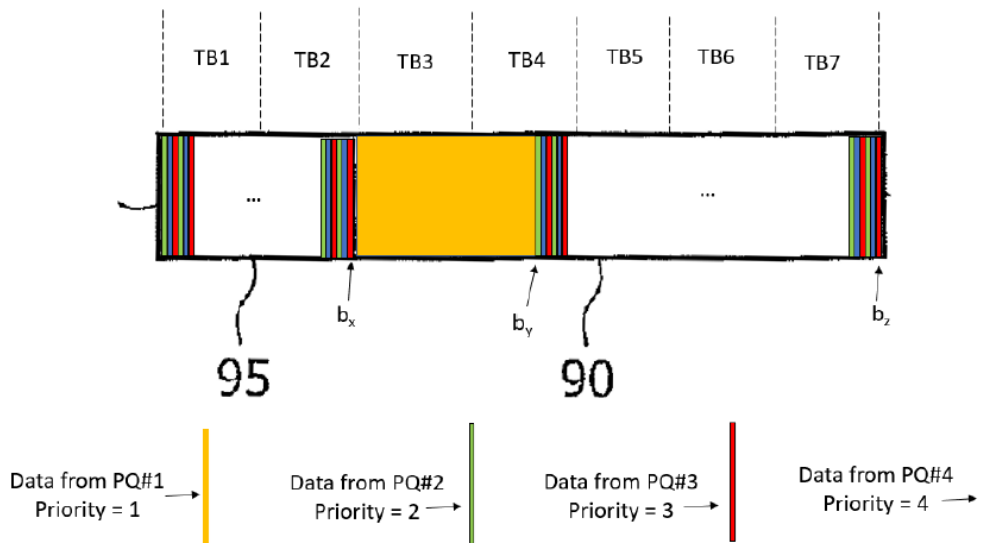
A POSITA would have recognized that regardless of *how* data is selected from the MAC-d queues to populate a MAC-e PDU—whether by Eckert's proportional weighting or by Bucknell's priority-based iterative selection—the *result* is the same: a MAC-e PDU containing a deterministic number of MAC-d PDUs from identified MAC-d queues. Once the MAC-e PDU is assembled according to Bucknell's data selection rules, Eckert's solution of using a single index to a row in a table of transport format combinations applies to signal the resulting PDU contents to the base station. Ex.1071, ¶39. Eckert's transport format table merely describes the *outcome* of the data selection process—how many MAC-d PDUs from each queue are included—not the *process* by which the data was selected. *Id.*

iv. **IV's "impracticality" argument relies on a strawman.**

In further attempts to demonstrate the combination is "impractical," IV

constructs a strawman argument purporting to show an example makeup of the portions 90 and 95 of Bucknell's output buffer 80, Response at 58, where the output buffer 80 represents a MAC-e PDU, *see* Ex.1003, ¶114 and Ex.1070, 28:14-18. The portions 90 and 95 are populated with PDUs from queue stores 50 associated with MAC-d flows. Ex.1006, ¶¶[0025]-[0030]; Ex.1070, 27:20-28:4; Ex.1003, ¶¶114-115. IV's example depicts MAC-d PDUs from different queues (PQ#1 through PQ#4) interleaved in fragmented fashion across transport blocks, and then assumes that an "enormous" volume of signaling information would be required because the data from each queue is scattered across multiple transport blocks in an irregular pattern. Response, 57-58.

IV's expert



Ex.2007, ¶119

IV's example fails because it assumes a POSITA would populate the MAC-e PDU in the most unfavorable arrangement possible and then stubbornly refuse to account for transport format constraints. A POSITA, however, is “a person of ordinary creativity, not an automaton.” *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420–21 (2007).

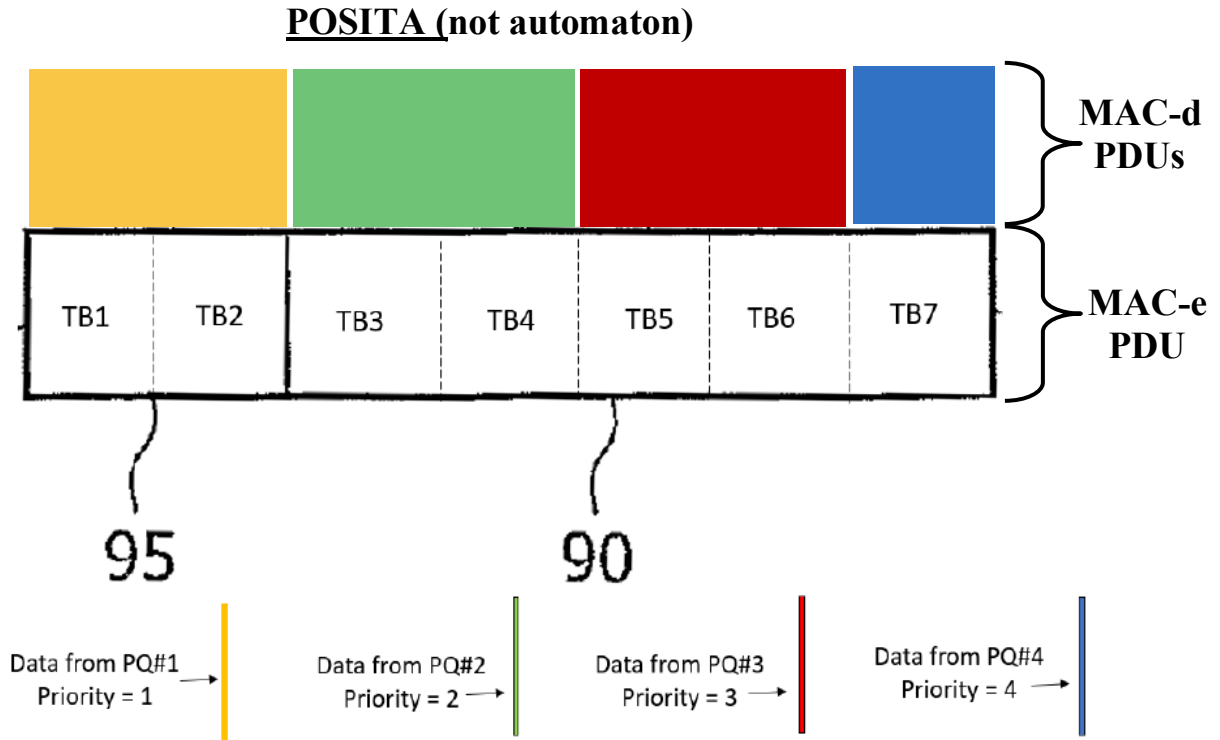
To the extent that a POSITA would have even populated Bucknell's buffer 80 (MAC-e PDU) in the manner illustrated by IV, it is well within the skill of a POSITA to simply rearrange the MAC-d PDUs in the buffer 80 so that data from each MAC-d queue are grouped together and arranged consecutively in a MAC-e PDU. Specifically, rather than scattering data from PQ#1, PQ#2, PQ#3, and PQ#4 across transport blocks in an interleaved fashion as IV depicts, a POSITA would group all MAC-d PDUs from each respective queue (e.g., all yellow-designated PDUs from PQ#1, all green-designated PDUs from PQ#2, all red-designated PDUs from PQ#3, and all blue-designated PDUs from PQ#4) into contiguous blocks aligned with transport block boundaries, such that Eckert's transport formats are directly applicable. Ex.1071, ¶¶40-41.

Moreover, a POSITA would have understood and applied standard memory management techniques—well-known in the art as “file segmentation” and the associated solutions—that allow fragmented/segmented data to be rearranged and reassembled to avoid issues with file fragmentation. Ex.1071, ¶42 (citing Ex.1072,

22:30-23:20). For example, it was well known that if a digital file is divided into a plurality of file sections and stored nonconsecutively in memory, this leads to different drawbacks depending on the type of memory. Ex.1072, 22:30-23:20. As was understood, rather than store fragments in non-consecutive memory locations, it was straightforward to simply rearrange the segments into consecutive memory locations. Ex.1071, ¶42 (citing Ex.1072, 22:39-46 and 22:13-15).

Moreover, data segmentation and reassembly techniques were a fundamental part of the UMTS protocol architecture – Eckert itself describes data being “split or assemble[d]” by the RLC protocol layer, Ex.1005, [0160]. A POSITA would have understood that the order in which MAC-d PDUs are selected from queues (per Bucknell) need not dictate the order in which they are arranged within the MAC-e PDU, and that applying well-known reassembly techniques to align the data with transport block boundaries was a straightforward exercise in ordinary engineering skill. Ex.1071, ¶43.

An example reassembly of MAC-d PDUs within the MAC-e PDU that fit neatly within transport blocks (TBs) is shown below, as would have been performed by a POSITA. Ex.1071, ¶44.



Ex.2007, ¶¶118-119 (modified); Ex.1071, ¶44

Once the MAC-d PDUs are grouped by queue and arranged to correspond with transport block boundaries, it is straightforward to use a single index to a table of transport format combinations to indicate the number of MAC-d PDUs from each of the MAC-d queues in the MAC-e PDU—precisely as Eckert teaches. Ex.1071, ¶45.

v. Summary

In sum, IV's “impracticality” argument collapses under the lightest scrutiny. Eckert's transport format signaling and Bucknell's data selection methodology address complementary aspects of the MAC-e PDU process, and a POSITA of

ordinary skill and creativity would have recognized that these teachings combine naturally, with transport formats serving to signal the outcome of Bucknell's data selection just as they signal the outcome of Eckert's weighting-based selection.

Ex.1071, ¶46.

C. IV's remaining arguments also disregard Eckert's embodiments that are addressed by Petitioner.

IV's remaining arguments rely on embodiments in Eckert in which weighting values are already not explicitly signaled, Response, 60-62, and IV again disregards the embodiments addressed by Petitioner where the weighting values are explicitly signaled. IV's argument fails for reasons presented previously – there is no dispute that there are embodiments in Eckert in which weighting values are explicitly signaled. *See supra* Section III.B.1.

IV also alleges that it would not be worth saving a “fraction of a clock cycle of processing required to multiple an available bandwidth quantity by an allocation percentage.” Response, 62. IV thus admits that using Bucknell's method of data selection from queues is simpler than Eckert's method in a sense because Bucknell avoids multiplication operations, consistent with the analysis in the Petition. *See* Petition, 52 (“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.”). Again, Bucknell and Eckert both address the problem of how to fill a MAC-e PDU from various MAC-d queues,

Petition, 16-18, 51-52; Ex.1070, 14:4-20 (Eckert) and 31:13-17 (Bucknell);

Ex.1071, ¶¶47-48, and Petitioner has demonstrated that Bucknell teaches a suitable option for addressing the same problem as in Eckert, which demonstrates obviousness. *Intel Corp. v. Qualcomm Inc.*, 21 F. 4th 784, 800 (Fed. Cir. 2021) (“It's not necessary to show that a combination is the best option, only that it be a suitable option.”) (internal quotations omitted).

IV. REMAINING GROUNDS

IV's arguments address only independent claims 1 and 8. The remaining challenged claims (2-6 and 9-13) are rendered obvious for the reasons presented in Ground 1 (claims 2-4 and 9-11), Ground 2 (claims 5 and 12), and Ground 3 (claims 6 and 13) presented in the Petition.

V. CONCLUSION

For the foregoing reasons, Petitioner requests that all challenged claims be found unpatentable.

Respectfully submitted,

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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 Opposition, that the number of words in this paper is 5,043. 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.

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CERTIFICATE OF SERVICE

The undersigned certifies, under 37 C.F.R. § 42.6, that service was made on the Patent Owner as detailed below.

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