

HAYNES BOONE

***TESLA, INC. V. INTELLECTUAL
VENTURES II LLC***

IPR2025-00343 (10,292,138)

Scott T. Jarratt, Clint Wilkins
Counsel for Petitioner



The '138 Patent

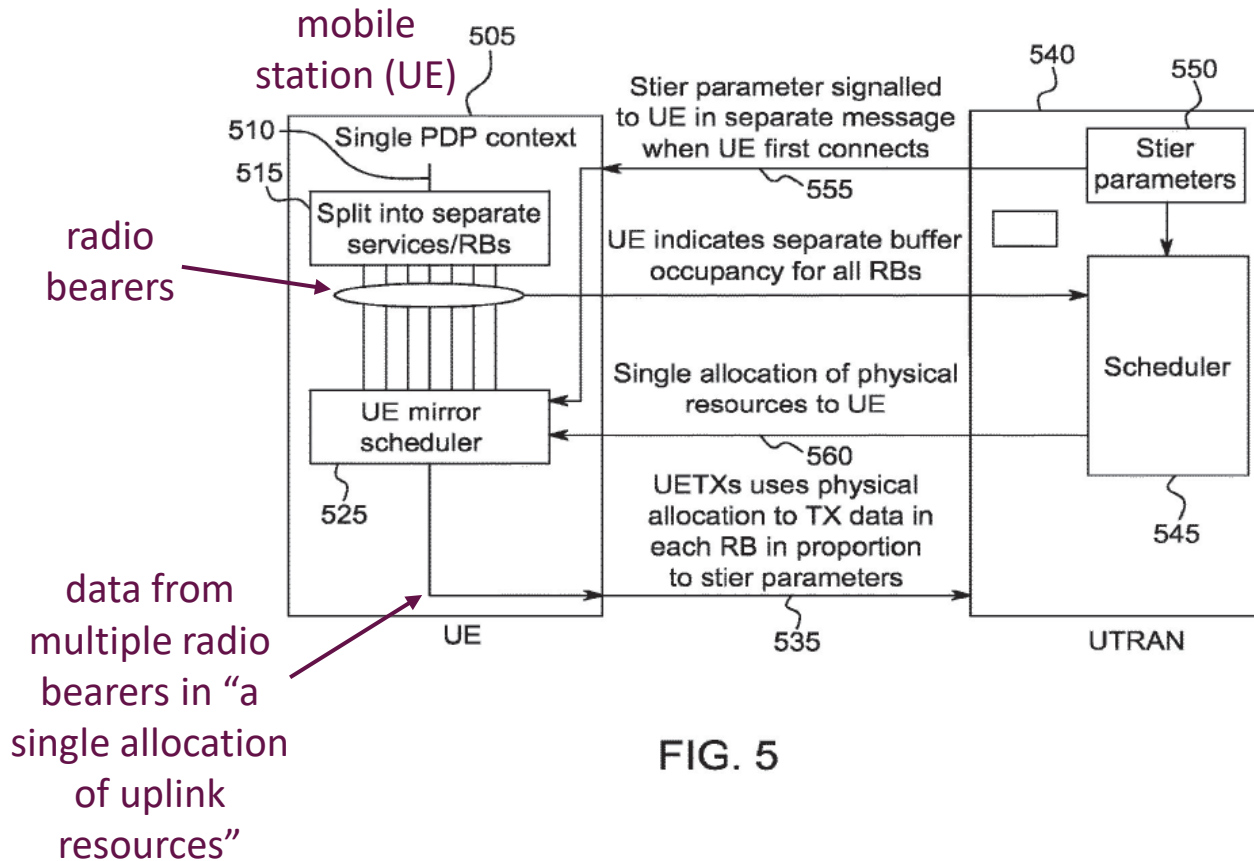


FIG. 5

Ex.1001, Figure 5; Petition, 7-8

Claim 1 - Disputes

1. A user equipment (UE) comprising:
a processor communicatively coupled to a transmitter and
circuitry configured to receive; and
the processor is configured to:
- cause the circuitry to receive parameters associated
with a plurality of radio bearers,
 - determine a plurality of buffer occupancies, wherein
each of the plurality of buffer occupancies is asso-
ciated with one or more radio bearers of the plurality
of radio bearers,
 - cause the transmitter to transmit a message including
the plurality of buffer occupancies to a network,
 - [1.6] cause the circuitry to receive a single allocation of
uplink resources,
 - [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,
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.

[1.6] Eckert alone;
Eckert+Lohr-1
[1.7] Eckert+Bucknell
(motivation to combine)

Independent claim 8 has identical claim language and issues.

Overview

1. Eckert alone and also Eckert combined with Lohr-1 renders obvious “*a single allocation of uplink resources*” in limitation [1.6].
 - A. Eckert alone: Contrary to Patent Owner’s arguments, Petitioner did not map “an infinite number of time slots” to “*a single allocation of uplink resources.*”
 - B. Eckert combined with Lohr-1: Patent Owner’s bodily incorporation arguments have no merit.
2. Petitioner demonstrated a motivation to combine Eckert and Bucknell for limitation [1.7].
 - A. (i) Eckert describes selecting radio bearer data in the context of MAC-d flows and buffers based on priorities or weights;
(ii) Bucknell provides implementation detail for data selection based on priority.

1.A Eckert alone renders obvious “*a single allocation of uplink resources*” in limitation [1.6]

[1.6] “a single allocation of uplink resources” (Eckert alone)

Eckert

[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-storaged in the respective data buffer storages, in line with the signalled weighting (the signalled weighting values and the respective data buffer storages’ associated data transmission bandwidths which are linked thereto).

Ex.1005, [0116];
Petition, 34; Reply, 4-6

Petition does not map infinite time frames/every possible time frame to “*single allocation of uplink resources*”

POR

the ‘138 Patent which the Petition uses to erroneously contend that the *entirety* of a transport channel (e.g., including *infinite time frames and spreading codes*) is the same as a “a *single allocation of uplink resources*.” The other reference relied on

POR, 1

POR

Simply put, 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 because it is based on the erroneous proposition that the specification of the ‘138 Patent equates an entire transport channel to “a single allocation of uplink resources,” and because allowing it would

POR, 48

Petition does not map infinite time frames to a “*single allocation of uplink resources*”

Petition

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.

Petition, 34

Eckert matches Patent Owner's understanding of "*a single allocation*" also regarding spreading codes

POR

Claim 1 requires that the UE receive "*a single allocation of uplink resources*" from the network. In the '138 Patent, the "single allocation" corresponds to *a finite quantum of physical resources* that can be shared out, such as the resources defined by a combination of spreading codes and timeslots. Ex. 1001, 9:39-43 and 11:7-10;

POR, 46

Deposition of Patent Owner's expert

Q. Would an E-DCH be expected to have available a finite number of spreading codes?

A. Yes, it would be expected.

Ex.1070, 11:10-12;
Reply, 5-6

[1.6] “a single allocation of uplink resources” (Eckert alone)

Petitioner’s expert

21. 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;
Reply, 6

Conclusion: Eckert alone renders
obvious “*a single allocation of
uplink resources.*”

1.B Eckert combined with Lohr-1 also renders obvious “*a single allocation of uplink resources*” in limitation [1.6]

[1.6] “a single allocation of uplink resources” (Eckert+Lohr-1)

Eckert

existing dedicated transport channel DCH, 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 the application of a Hybrid Automatic Repeat Request method (HARQ method) based on the N-channel stop&wait method, scheduling controlled by the base station, also called NodeB in UMTS, and also frame lengths of less than

Ex.1005, [0012];
Petition, 35-36

Lohr-1

information a Node B can estimate the noise rise and schedule the UE. With a grant message sent in the downlink from the Node B to the UE, the Node B assigns the UE the TFCS with maximum data rate and the time interval, the UE is allowed to send. The grant message is in the following referred to as Scheduling Assignment (SA).

Ex.1007, 7:6-9;
Petition, 36

[1.6] “a single allocation of uplink resources” (Eckert+Lohr-1)

POR

Thus, for the above reasons, 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. Ex. 2007, ¶111.

POR, 52

- Patent Owner argues bodily incorporation of Lohr-1 and fails to address combination in the Petition.

Reply, 7

2.A Petitioner demonstrated a motivation to combine Eckert and Bucknell for limitation [1.7].

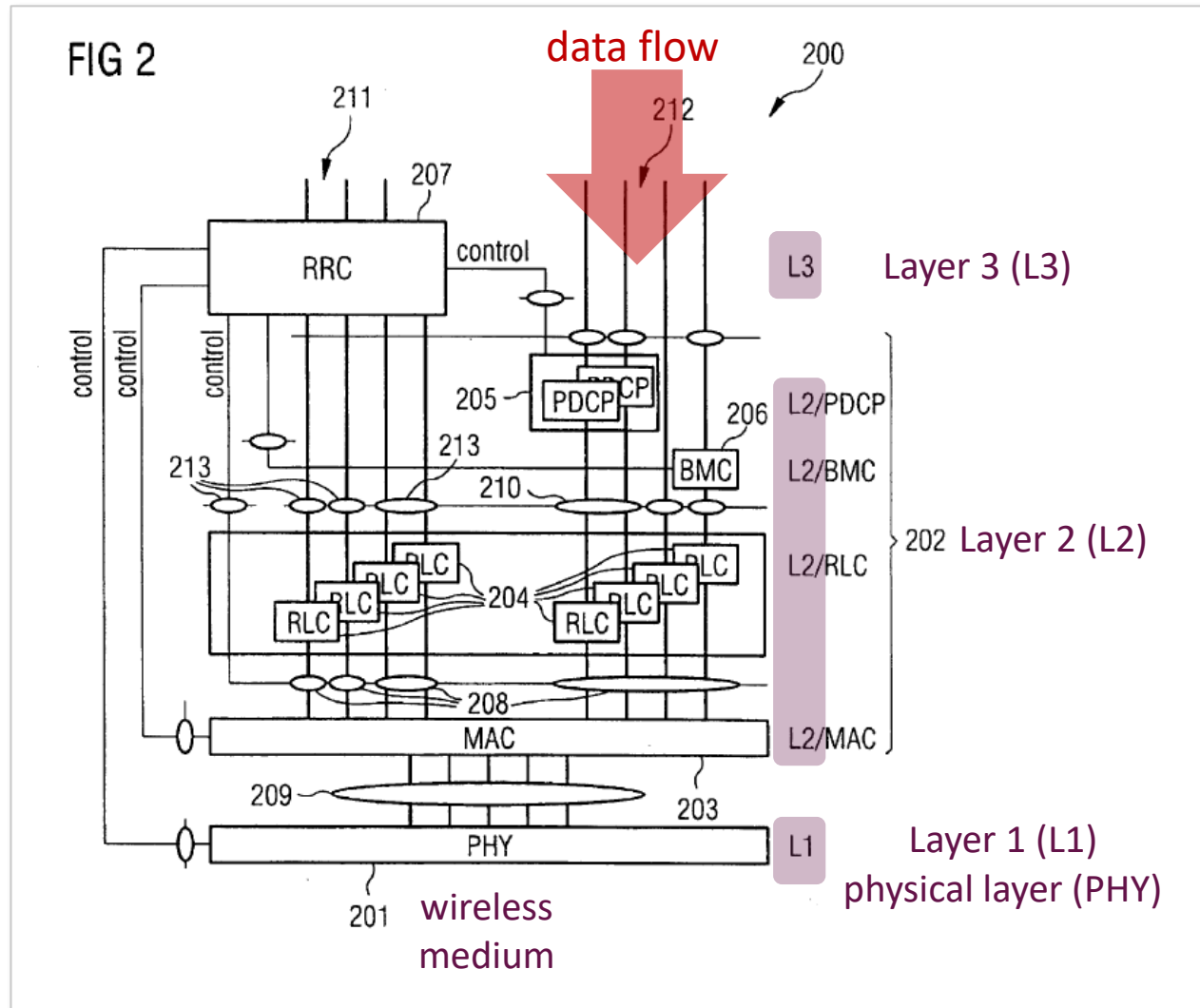
- (i) Eckert describes selecting radio bearer data in the context of MAC-d flows and buffers based on priorities or weights;
- (ii) Bucknell provides implementation detail for data selection based on priority.

Claim 1

1. A user equipment (UE) comprising:
a processor communicatively coupled to a transmitter and
circuitry configured to receive; and
the processor is configured to:
cause the circuitry to receive parameters associated
with a plurality of radio bearers,
determine a plurality of buffer occupancies, wherein
each of the plurality of buffer occupancies is asso-
ciated with one or more radio bearers of the plurality
of radio bearers,
cause the transmitter to transmit a message including
the plurality of buffer occupancies to a network,
cause the circuitry to receive a single allocation of
uplink resources,
[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,
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.

[1.7] Eckert+Bucknell
(motivation to combine)

Eckert – protocol layers



Ex.1005, Fig. 2, [0143]-[0147], [0160];
Petition, 15-16, 37-43

Eckert – radio bearers and MAC-d flows

FIG 2

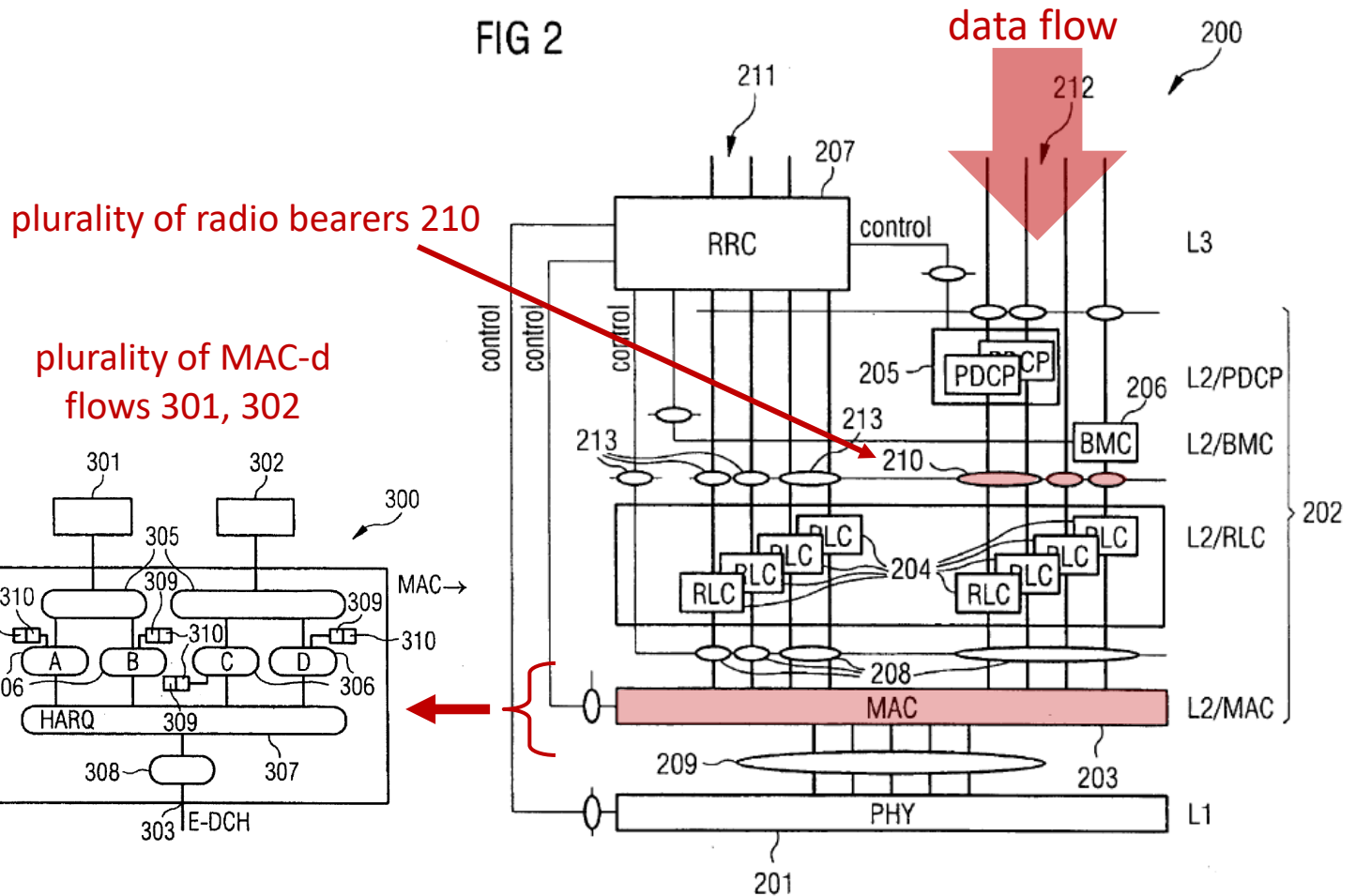
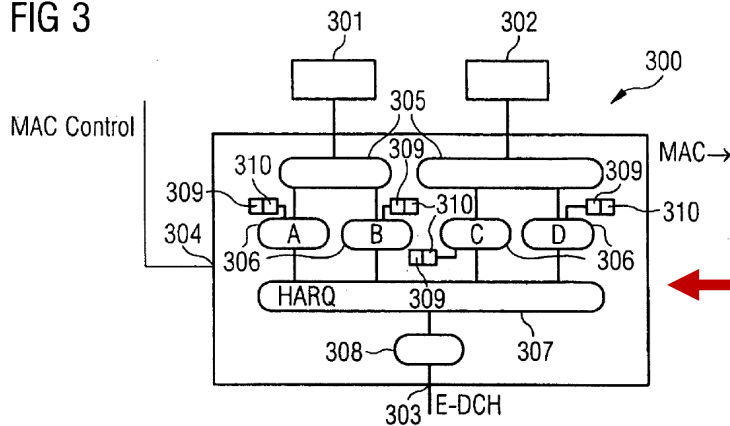


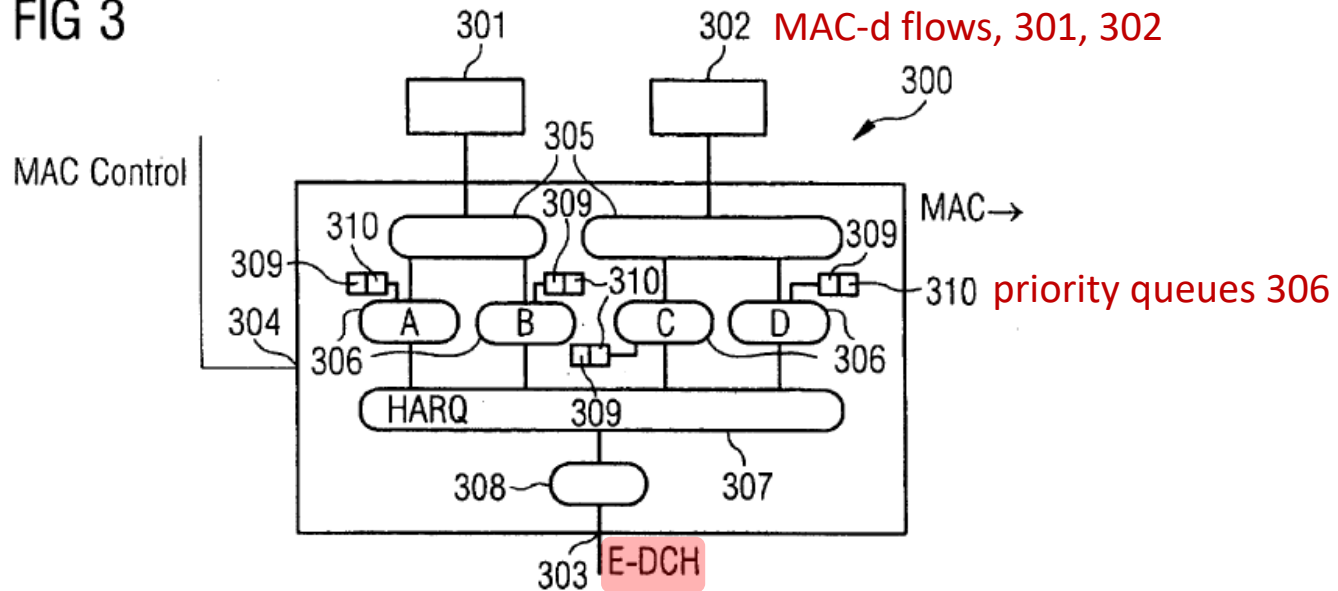
FIG 3



Ex.1005, Figs. 2-3, [0143]-[0147],
[0160], [0168]; Petition, 15-16, 37-43

Eckert selects radio bearer data from the queues for transmission

FIG 3



MAC-e protocol data unit

Eckert describes selecting data based on either priority or weighting

Eckert

[0228] To set up the MAC-e protocol data unit 607, the HARQ unit 307 retrieves, i.e. reads, the data from the various priority queues 306 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];
Petition, 50

- Petition addresses both options in Eckert using Bucknell – selecting data based on either “priorities” or “weightings.”

Petition 48-53;
Reply, 10-25

2.A Petitioner demonstrated a motivation to combine Eckert and Bucknell for limitation [1.7].

- (i) Eckert describes selecting radio bearer data in the context of MAC-d flows and buffers based on priorities or weights;
- (ii) Bucknell provides implementation detail for data selection based on priority.

Bucknell provides implementation detail for selection based on priorities

Bucknell

[0006] The invention provides flexibility for appropriate handling of priorities, guaranteed bit-rates and starvation scenarios by dividing a data packet, such as a MAC-e PDU, that is large enough to accommodate a plurality of smaller data packets, such as MAC-d PDUs, into at least two portions and enabling different multiplexing rules to be used for the different portions. In this way, a combination of data packets having different priorities may be transmitted.

Ex.1006, [0006];
Petition, 44, 46, 51

Petition

Motivation to Combine Eckert with Bucknell

...

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,

Petition,
48-51

Patent Owner addressed only Eckert's weighting techniques

POR

1. The Petition's Proposed Modification Of Eckert Based On Bucknell Would Render Eckert Inoperable For Its Primary Purpose Of Reducing Signaling Overhead

The Petition 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. Petition, 51-52. However, doing away with Eckert's

POR, 54

Motivation to combine based on Eckert's priority queue data selection is dispositive

Reply

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.

Reply, 10-13

Sur-reply strawman: Eckert's "priority queues 306" not the same as Eckert's "radio bearers 210"

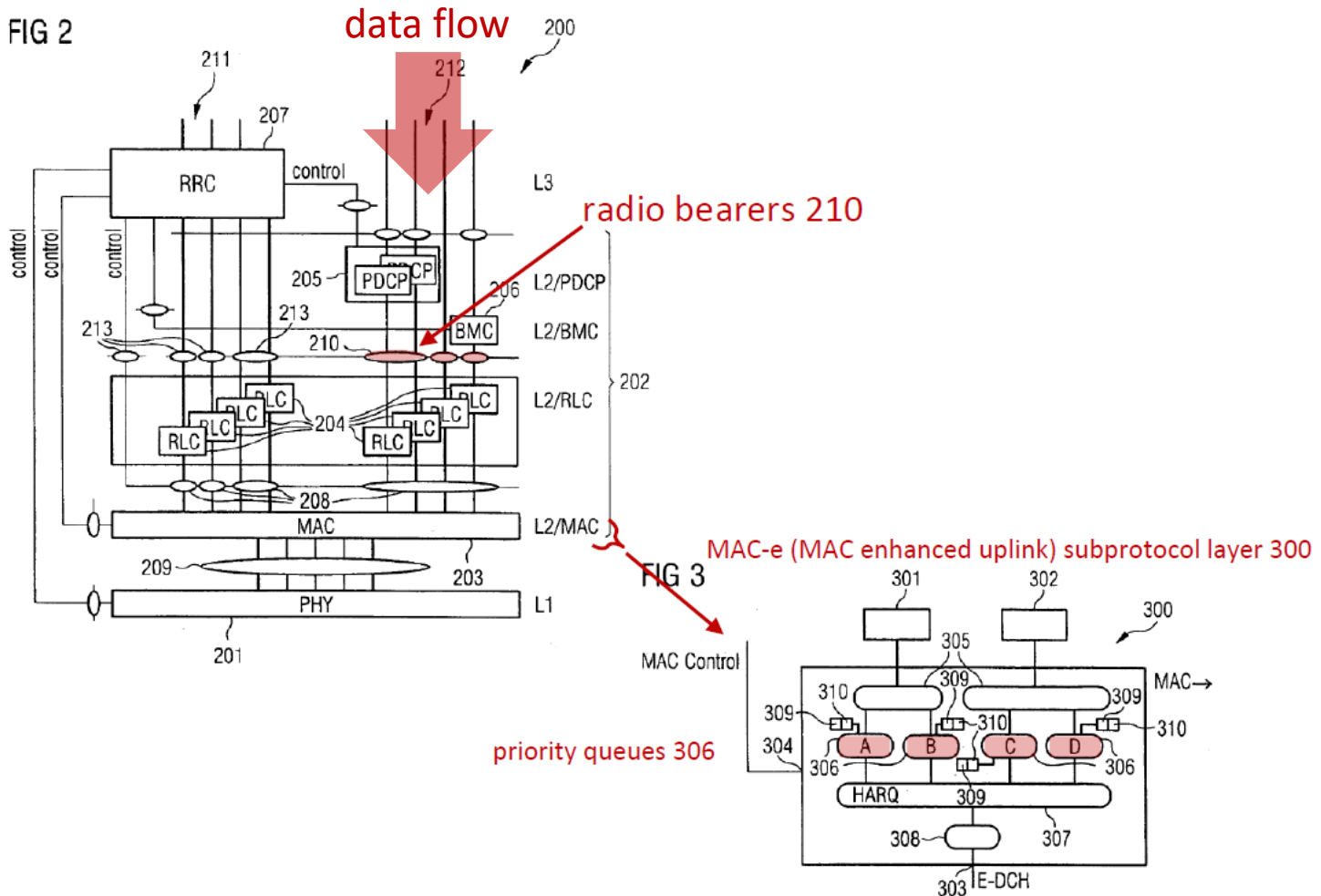
Sur-reply

As is evident from the above, Eckert's priority queues 306 are not one and the same as Eckert's radio bearers 210, which the Petition mapped to the claimed radio bearers in Elements [1.4]-[1.5]. In fact, they are many steps removed from each other as shown in Figures 2 and 3 of Eckert. The arguments in the Reply (at 10-13)

Sur-reply, 14

Eckert's Figures 2 and 3

FIG 2



Ex.1005, Figures 2
and 3; Petition, 50

Claim limitation [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,

Conclusion: The motivation to combine Eckert and Bucknell based on implementing Eckert's priority queue data selection using Bucknell's priority queue techniques is dispositive.

Another way to implement the combination – replacing Eckert's method that uses signaled weights

- Eckert – UE selects packets from MAC-d queues in proportion to percentage weight values.

Eckert

[0280] This also means that during the existing mobile radio communication link for transmitting the useful data per unit time TTI the 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.1005, [0280];
Petition, 51

- Eckert – weight values are transmitted to a UE from a base station.

Eckert

[0244] As FIG. 3 and FIG. 4 show, 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 (explicit PQ weighting)

Ex.1005, [0244];
Petition, 51

Bucknell's methods reduce processing/complexity compared to Eckert's use of weights

Petitioner's expert

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 exact proportion to weighting values. Eckert, [0280].

Ex.1003, ¶123;
Petition, 52

Patent Owner's expert

the base station to the UE. *See*, Eckert at [0204]. **Second**, the fraction of a clock cycle of processing required to multiply an available bandwidth quantity by an allocation percentage is so trivial that it would not motivate a POSITA to do away with the benefits of Eckert's weighting methodology, i.e., the ability to reduce

Conclusion: The reduction in Eckert's processing demonstrates a motivation to replace Eckert's method of using signaled weights for data selection with Bucknell's techniques.

Petition, 48-53;
Reply, 24-25

A second benefit: Bucknell's methods also do not require sending weighting values from a base station to a UE, reducing control signaling

Eckert – message is used to send the weighting values

[0244] As FIG. 3 and FIG. 4 show, 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 (explicit PQ weighting)

Ex.1005, [0244];
Petition, 51-52

A second benefit: Bucknell's methods also do not require sending weighting values from a base station to a UE, reducing control signaling

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]

Petition, 52

Conclusions

1. Eckert alone and also Eckert combined with Lohr-1 renders obvious “*a single allocation of uplink resources*” in limitation [1.6].
2. Petitioner demonstrated a motivation to combine Eckert and Bucknell for limitation [1.7].

Backup slides

[1.6] “a single allocation of uplink resources” (Eckert alone)

- E-DCH channel of Eckert parallels “CCTrCH” transport channel of ’138 specification that includes “a single physical allocation of uplink resources.”

Reply

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.”

Reply, 6

[1.6] “a single allocation of uplink resources” (Eckert+Lohr-1)

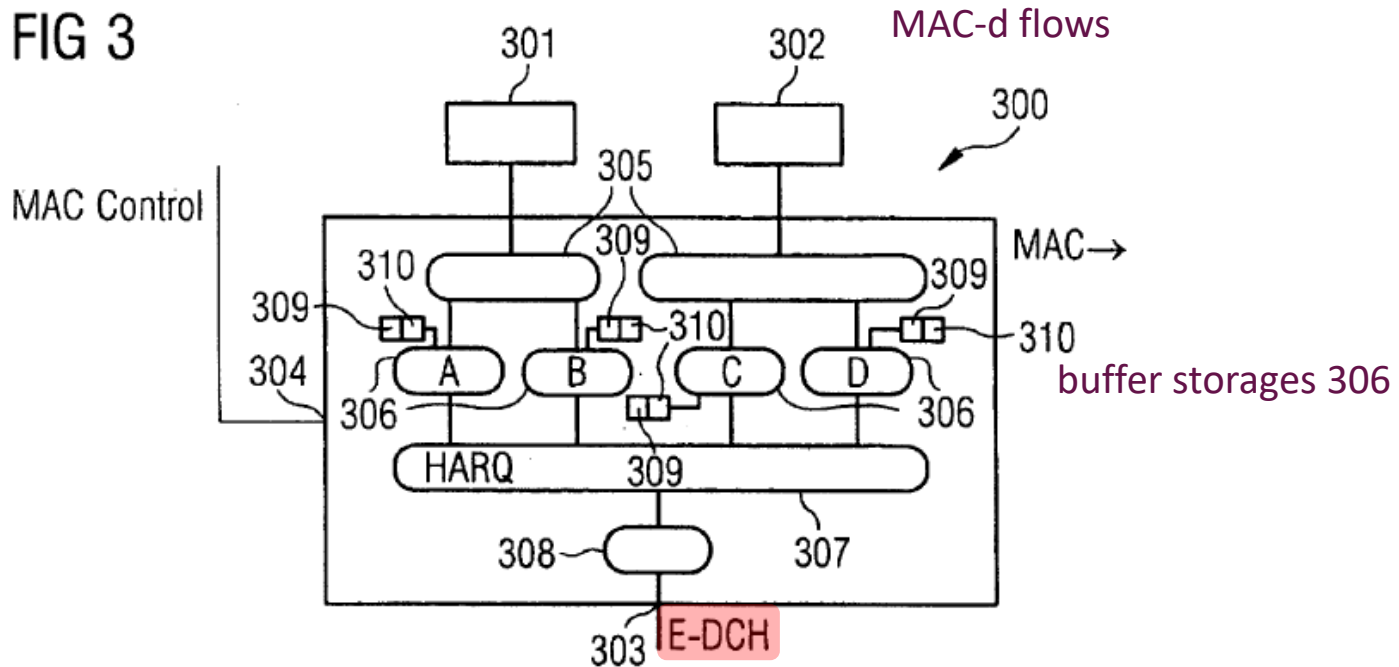
Lohr-1

Node B controlled time and rate scheduling provides a more precise RoT control compared to the rate-only controlled scheduling as already mentioned before. However this more precise control of the interference at this Node B is obtained at the cost of more signaling overhead and scheduling delay (scheduling request and scheduling assignment messages) compared to rate control scheduling.

Ex.1007, 10:25-29;
Reply, 9

Eckert

FIG 3



MAC-e protocol data unit

[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-storaged in the respective data buffer storages, in line with the signalled weighting (the signalled weighting values and the respective data buffer storages' associated data transmission bandwidths which are linked thereto).

Ex.1005, Fig. 3, [0116], [0085]; Petition, 34, 39, 41-42

Bucknell describes iterative data selection based on priority

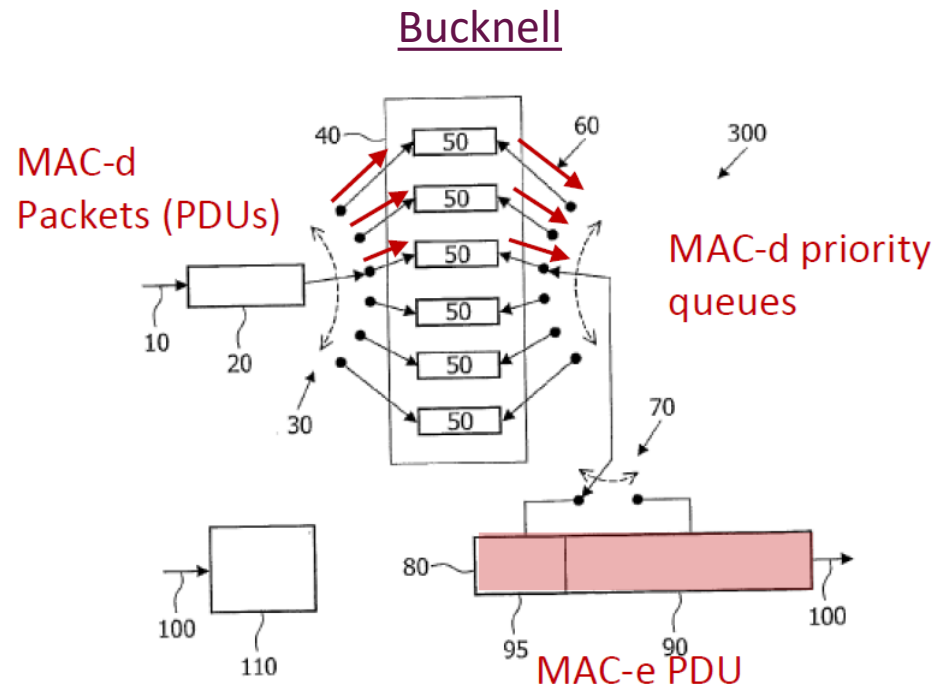


FIG. 2

[0026] 1) Strict priority based selection: In this case each MAC-d flow is assigned a priority. Then for the first selection, data packets are taken from the queue having the highest priority until the resource available for the first portion 90 is filled. If this queue becomes empty, data packets are taken from the queue with the next highest priority and so on. For the second portion 95 the same procedure is carried out, but for a subset of the queues.

Ex.1005, Fig. 2,
[0026]; Petition, 47

Sur-reply alleges (incorrectly) - “scheduling” is different than “*allocation*”

Sur-reply

permitted to share out during that period. In this respect, the Reply conflates user “scheduling” with “allocation.” “Scheduling” is the process of deciding which user(s) have access to the channel in a given time slot or transmission time interval (TTI), while “allocation” involves assigning specific physical-layer resources—such as bandwidth, specific subcarriers (resource blocks), and transmission power—to each scheduled user. For example, scheduling involves determining which user or

Sur-reply, 4

'138 patent

'138 patent

In HSDPA, transmission code resources are shared amongst users according to their traffic needs. The base station or “Node-B” is responsible for allocating and distributing the resources to the users, within a so-called scheduling task. Hence, for HSDPA, some scheduling is

Ex.1001, 2:57-61

Sur-reply alleges (incorrectly) – “scheduling” is different than “*allocation*”

Petition

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.

Petition, 36

Eckert and Bucknell both address the problem of how to create a MAC-e PDU from a plurality of MAC-d flows in a mobile terminal

Deposition of Patent Owner's expert re: Eckert

Does Eckert address the problem of how to fill a MAC-e PDU from multiple MAC-d priority queues?

A. He addresses the multiplexing of MAC-d flows into the MAC-e protocol layer, and I guess you could say that is addressing the problem.

Ex.1070, 14:11-24;
Reply, 16

Deposition of Patent Owner's expert re: Bucknell

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.1070, 31:13-17;
Reply, 17

Eckert's transport formats (TFs) address a different problem – how to signal the contents of MAC-e PDU

Eckert

TF	PQ #1		PQ #2		PQ #3	
	# of TBs	TB size (bit)	# of TBs	TB size (bit)	# of TBs	TB size (bit)
#1	0	100	0	100	0	100
#2	1	100	0	100	0	100
#3	0	100	1	100	0	100
#4	0	100	0	100	1	100
...	...	...	...	...	...	...
#10	2	200	2	100	0	100
#11	3	200	2	100	1	100
#12	2	300	1	200	2	100
...	...	...	...	...	...	...
# n	5	300	3	300	1	300

[0235] In one alternative embodiment of the invention, the full identifiers are not specified and transmitted in the MAC-e protocol data unit 607 to the mobile radio base station 109, but rather only an index for a row in a table or a pointer to a row in a table which explicitly stores the order and the number of data packets in a respective priority queue 306 and the size thereof.

Ex.1005, [0204],
[0235]; Reply, 16-17

Sur-reply alleges (incorrectly) - “*using*” modifies “*selects data*” in limitation [1.7]

Sur-reply

Claim 1 recites that the UE “*receiv[es] a single allocation* of uplink resources” corresponding to a quantum of resource units that can be shared out, and then the UE “*selects data* from the plurality of radio bearers for transmission *using the single allocation of uplink resources.*” Thus, the claim requires that the UE *use* the “single allocation” in data selection. See also, Ex. 1001, 9:53-57 (the UE “*takes the single*

Sur-reply, 8

Claim limitation [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,

Patent Owner allegations about linkage between weighting values and transport formats have no merit

POR

formats available for the mobile terminal to select. The linkage between the weighting values and the available transport formats is what allows Eckert to *reduce* signaling overhead by using a *single* index value (corresponding to the selected

POR, 55

Eckert's weights address one problem

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];

Reply, 16

Patent Owner arguments about linkage between weighting values and transport formats have no merit

Eckert's transport formats address a different problem

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

Reply, 16

Bucknell addresses a problem complementary to Eckert's transport formats

Petitioner's Expert

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

39. 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. A

...

contents to the base station. The 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. Thus, contrary to

Ex.1071, ¶39

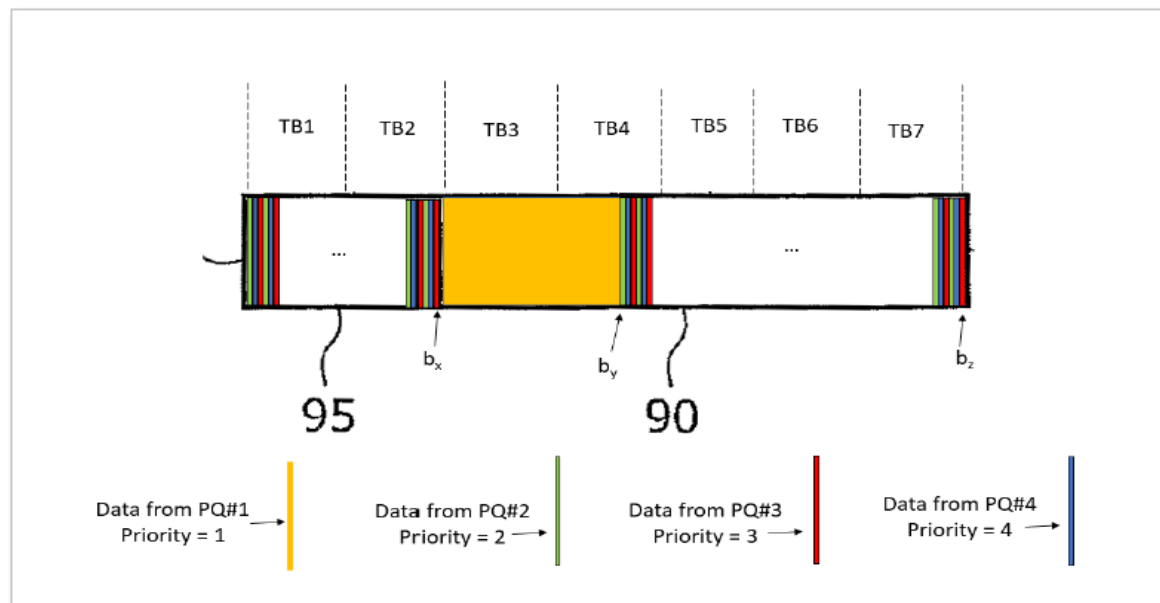
Patent Owner alleges (incorrectly) that Bucknell and Eckert combination would be “impractical”

POR

UE. The Petition does not allege that a network could set up predefined transport format combinations linked to any of the priority-based allocation algorithms disclosed in Bucknell, because doing so would be impractical. Ex. 2007, ¶118. For

POR

POR, 56

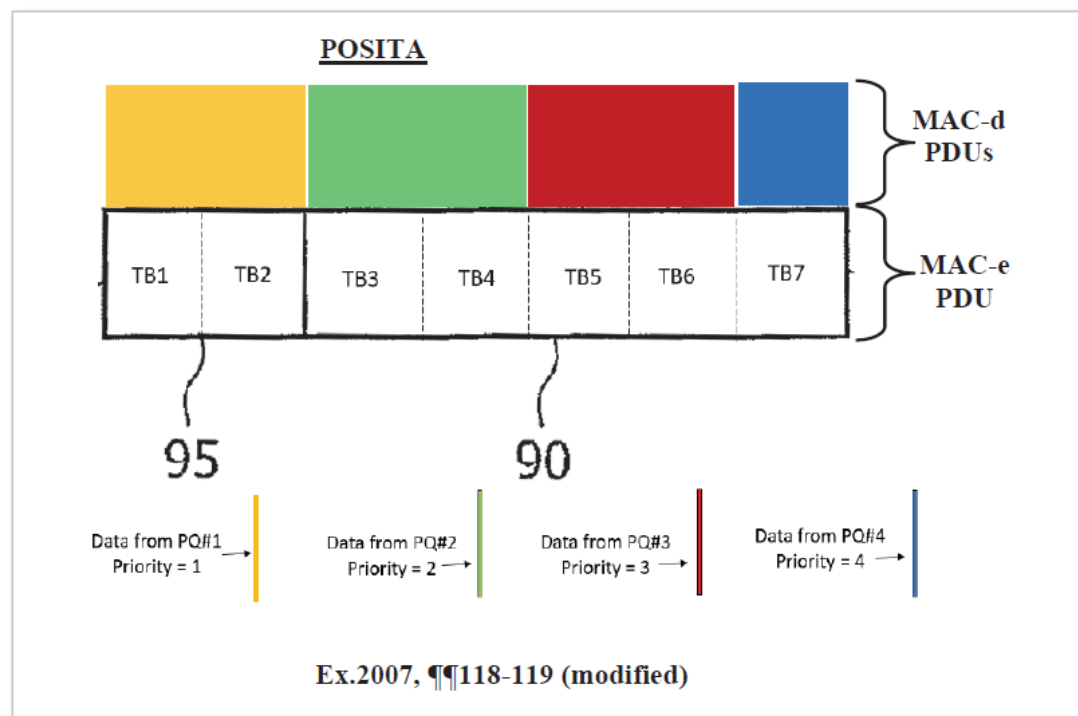


POR, 57

POSITA is a person of ordinary creativity

Petitioner's expert

42. Moreover, a POSITA would have understood and applied standard memory management techniques to the problem known in the art as “file fragmentation” and the associated solutions—that allow fragmented/segmented data (or data segments) to be rearranged and reassembled. For example, it was well



Ex.1071, ¶42;
Reply, 21-23