

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner,

v.

INTELLECTUAL VENTURES II LLC

Patent Owner.

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

PATENT OWNER'S PRELIMINARY RESPONSE

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PATENT OWNER'S EXHIBIT LIST

Ex. 2001	Petitioner's Answer to Complaint and Counterclaim, dated June 20, 2024, in <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
Ex. 2002	Docket from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
Ex. 2003	Scheduling Order from District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
Ex. 2004	Defendant's Second Supplemental Preliminary Invalidity Contentions, dated January 9, 2025, in District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)
Ex. 2005	Webpage for Judge Albright http://www.txwd.uscourts.gov/for-attorneys/judge-albright-courtroom-faq/
Ex. 2006	Defendant's Final Invalidity Contentions, dated May 22, 2025, in District Court Litigation, <i>Intellectual Ventures II LLC v. Tesla, Inc.</i> , C.A. 1:24-cv-00884-ADA (W.D. Tex.)

I. INTRODUCTION

The Petition challenges claims 1-6 and 8-13 (“Challenged Claims”) of U.S. Patent No. 10,292,138 (“‘138 Patent,” Ex. 1001) under three grounds of unpatentability. The Board should deny institution for at least the following reasons.

The Challenged Claims are directed to user equipment (UE) that receives parameters *(plural)* associated with a plurality of radio bearers. The claims recite a process for selecting data from the radio bearers for transmission in which the selection process includes a “first iteration” and a “second iteration.” The claimed “first iteration” requires the selection of data “from a subset of the plurality of radio bearers based on the received parameters” *(plural)*. Data selection based on only one received parameter *(singular)* fails to satisfy the requirements of the claimed “first iteration.” The “second iteration” requires the selection of data “based on buffered data for respective radio bearers” *(plural)*. Data selection based on buffered data of only one radio bearer *(singular)* fails to satisfy the requirements of the claimed “second iteration.”

In all three Grounds, the Petition relies on Bucknell (Ex. 1006) for the “first iteration” and “second iteration” recited in the Challenged Claims. As described more fully below, the Petition advances three alternative mappings (all purportedly based on Bucknell) for the claimed combination of the “first iteration” and “second iteration.” Each of these mappings is deficient at least because (i) the aspect of

Bucknell relied on for the “first iteration” is based on only one received parameter rather than a plurality of received parameters as required by the claim language, and/or (ii) the aspect of Bucknell relied on for the “second iteration” is based on buffered data from only one data bearer rather than a plurality of respective data bearers as required by the claim language.

For at least these reasons, as well as additional reasons set forth below, institution should be denied.

II. THE SPECIFICATION AND CLAIMS OF THE ‘138 PATENT

The ‘138 Patent is directed to a system and method for allocating uplink transmission resources among multiple data flows in a wireless communication environment, where each data flow is mapped to a respective radio bearer. These radio bearers are associated with queues (or buffers) at the User Equipment (UE) that store data awaiting transmission. In the disclosed allocation algorithm, each of the data flows has a Quality of Service (QoS) profile (referred to as an S_{tier} parameter) and is associated with a radio bearer instance. The disclosed allocation process is iterative, and distributes a finite set of physical resource units—referred to as Resource Allocation Assignment Units (RAAUs)—across a subset of queues in a manner that is responsive to buffer occupancy and fair over time across bearers with similar characteristics. The allocation algorithm limits the distribution of resources to only a subset of queues in order to address signaling problems that may occur

when a queue (or radio bearer) is allocated a very small proportion of the overall resources.

In the disclosed system, the S_{tier} parameters, which reflect the relative QoS priorities of the radio bearers, are communicated from the network to the UE. In each transmission cycle, the allocation algorithm determines different weights (referred to as W'_q and W''_q) for each queue based on both the S_{tier} values and current fill level of the queues. In each transmission cycle, these weights are used to determine a series resources allocations (referred to a $RAAU_q$, $RAAU'_q$ and $RAAU''_q$) for the queues. The algorithm tracks the underallocation or overallocation of resources to each queue over time with a parameter termed $running_RAAU_delta_q$, which reflects, *inter alia*, the difference between the amount of resources that would have been allocated to the queue had transmission not been limited to only a subset of the queues, and the actual resource allocation for each queue when transmission is limited to only a subset of the queues. The $running_RAAU_delta_q$ parameter allows the algorithm to achieve fairness over time across radio bearers with similar characteristics.

The following sections explain this allocation process in detail, beginning with an overview of the high-level architecture and progressing through each step of the algorithm as shown in Figure 6 of the '138 Patent. A working example involving

four queues is used throughout to illustrate the iterative calculations and resource adjustments that take place.

A. Overview Of Allocation Process Disclosed In The ‘138 Patent

In the disclosed embodiment, buffers hold data until physical resources (each of which is referred to as a “RAAU”) become available to transmit the data. Ex. 1001, 11:7-8 (“RAAU represents a quantum of physical resources.”). The allocation algorithm allocates a total amount of resources (referred to as “FreeRAAU”) among the data flows using an iterative process. *Id.*, 11:9-10 (“FreeRAAU is the number of free RAAU that the resource allocator (RA) can share out”) and 11:32-33 (“[n]ote that this algorithm is iterative”). The disclosed allocation process services the queues in a statistically fair fashion. In simple terms, the algorithm keeps track of whether each queue has been overallocated or underallocated resources in the past by defining a quantity termed “*running_RAAU_delta*,” which serves as a numerical measure of service excess or deficiency previously provided to each queue. *Id.*, 10:43-45 and 11:32-38. The algorithm uses the *running_RAAU_delta* parameter to manage the allocation process among the queues in a fair manner. *Id.* For example, the process allocates a share of available resources in each transmission interval in a manner that, for example, maintains equality of performance (over time) across users having the same QoS profile. *Id.*, 8:44-46, 9:4-11 and 9:39-42.

B. Tier-Based Weighted Fair Queueing

The allocation process disclosed in the '138 Patent provides "QoS prioritization" across radio bearers by associating a queue weight (referred to as an S_{tier} value) with each radio bearer (or RB). As explained in the '138 Patent:

The structure of this architecture means that it is possible to provide QoS prioritization across multiple users. Hence, for example, in a scenario where there are two users, one may have hyper-text transfer protocol (HTTP) traffic and this may be mapped to RB1, and a second user may employ file transfer protocol (FTP) traffic, which may be mapped to RB2. The S_{tier} associated with RB 1 ($S_{tier\ 1}$) is higher than that for RB2 ($S_{tier\ 2}$). ...

It is noteworthy that there is no restriction on the values associated with each queue weight value (S_{tier}). Therefore, in accordance with embodiments of the present invention, it may be possible to, say, set the relative weight for service 1 for SLA-2 to be higher than a number of services on SLA-1, which may nominally be a higher-priority SLA.

In accordance with one embodiment of the present invention, a mechanism to provide prioritization of services across multiple users in an uplink direction is described. In this regard, weight values are signaled to the UE. If there are multiple QoS requirements within a single 3GPP PDP context, a single physical allocation of radio resources may be made to the UE. ... This single physical allocation of radio resources provided to a UE is shared amongst a number of services, in proportion to their respective QoS requirements, for example in proportion to the signaled weight values (S_{tier}). Id., 9:4-43 (emphasis added).

Thus, as discussed more fully below, in one embodiment of the allocation process disclosed in the '138 Patent, queue weight values associated with the QoS requirements of each of the queues are transmitted to a UE (user equipment) from a

Universal Mobile Telecommunication System Radio Access Network (UTRAN) in the form of S_{tier} values, and a single physical allocation of resources provided to the UE is shared amongst the queues based on these weight values.

C. System Disclosed for Implementing the Allocation Process

FIG. 5 of the '138 Patent, reproduced below, illustrates a communication system for implementing the disclosed allocation process in the context of uplink scheduling. *Id.*, 5:48-50. The system includes User Equipment (UE) 505 and a Universal Mobile Telecommunication System Radio Access Network (UTRAN) 540. UE 505 receives a single PDP context 510 (packet-data connection) and “splits the single PDP context 510 into separate services on individual radio bearers in divider logic 515.” *Id.*, 10:5-8. The UE then transmits “a message 535 indicating separate buffer occupancy for each of the radio bearers to a UTRAN scheduler 545.” *Id.*, 10:8-10.

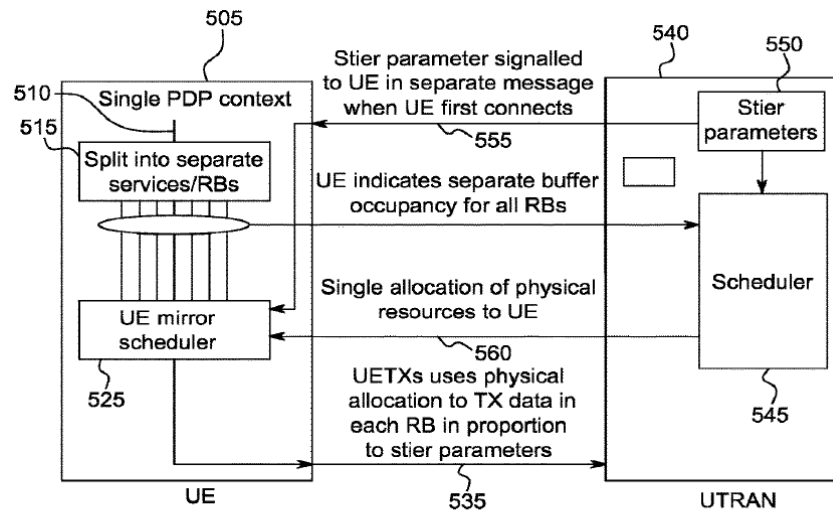


FIG. 5

“The separate services on individual radio bearers are input to a UE mirror scheduler 525.” *Id.*, 10:11-12. The UE mirror scheduler 525 receives the S_{tier} parameters 550 (discussed above) from the UTRAN 540, which are also input to the UTRAN scheduler 545. *Id.*, 10:13-16. The UTRAN scheduler 545 provides “a single allocation of a physical resource to the UE mirror scheduler 525 within message 560.” *Id.*, 10:17-18. “The UE mirror scheduler 525 then informs the UTRAN 540 on its use of the physical allocation, “in order to transmit data in each radio bearer in proportion to the informed S_{tier} parameters 550.” *Id.*, 10:19-22. “Thus, within the UE 505, the S_{tier} values are known, together with the total allocation of resources for the UE 505. ... [T]he overall resources allocated by the network are now split up” based on the relative weighting values. *Id.*, 10:23-28.

D. Limiting The Total Number of Queues Served

An important aspect of the allocation process disclosed in the '138 Patent involves limiting the total number of queues serviced to a subset of all queues. This aspect was intended to address signaling problems that may occur when a queue (or radio bearer) is allocated a very small proportion of the overall resources. As explained in the '138 Patent:

... it may be the case that very small proportions of the overall resources are allocated to each RB. This may create signalling problems, as the mechanism may result in a large number of individual users being allocated some resource at any one time and each user will require a separate allocation message. Therefore, in an enhanced embodiment of the present invention, a mechanism to implement additional functionality to limit a total number of queues served, e.g. to be allocated resource allocation units, is described. Thus, this algorithm limits a number queues that can be allocated resource at any one instance, for example to an operator specified value. The algorithm may also ensure that the ratio of allocated resource is maintained, over the long term, to the ratios specified by the Stier values. *Id.*, 10:32-45 (emphasis added).

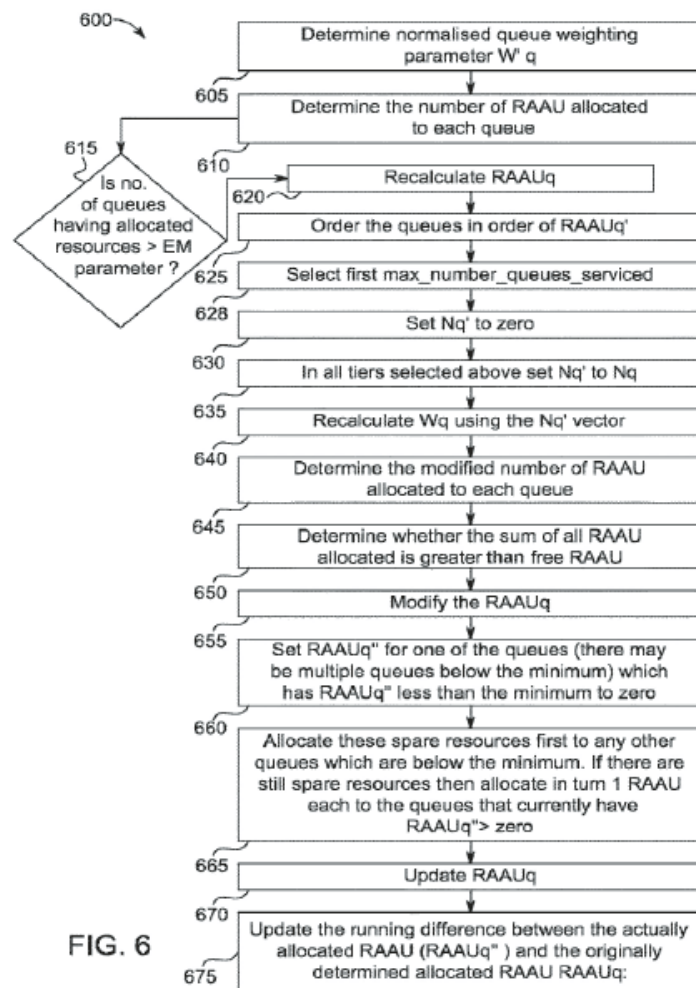
In the disclosed embodiment, “max_number_queues_served” is the parameter used to limit the total number of queues serviced at any time to a subset of all queues:

Referring now to FIG. 6, an algorithm 600 employing embodiments of the present invention is illustrated. The algorithm describes one mechanism to limit a number of queues served at a single instant of time. The algorithm may be run when a number of active users (i.e. those users known to have a buffer occupancy greater than zero in any queue) is greater than a known fixed parameter, for example 'max_number_queues_served' ... *Id.*, 10:48-54 (emphasis added).

The 'max_number_queues_served' value corresponds to a subset of all queues, because it is used when the number of active users "is greater than" the 'max_number_queues_served' value.

E. Iterative Allocation Process

The iterative allocation process of '138 Patent is depicted in Fig. 6 (below):



Set forth below is a step-by-step explanation of the allocation process shown in Figure 6. In order to better illustrate how the allocation process operates, an

exemplary illustration involving the allocation of resources among four queues (q1, q2, q3, and q4) is discussed and carried forward for each step in the allocation process. For illustration purposes only, the following starting parameters are used for the exemplary illustration:

$$\text{FreeRAAU} = 40$$

$$\text{max_num_queues_serviced} = 3$$

$$\text{cell edge minimum} = 7$$

Queue Number	q1	q2	q3	q4
S_{tier} value for queue (S_q)	0.3	0.3	0.2	0.2
running_RAAU_delta for queue	0	0	0	0
Initial fill level for each queue (N_q)	110	100	55	50

1. Step 605 - Determine Normalized Queue Weightings (W'_q)

The process begins at step 605 by determining a normalized weighting (W'_q) of the allocated resources” for each of the queues based on Equation [6] set forth below. *Id.*, 10:57-67.

$$W'_q = \frac{S_q N_q}{\sum_q S_q N_q}$$

In Equation [6], S_q corresponds to the S_{tier} parameter for the queue denoted by the subscript “ q ” in S_q . As noted above, the S_{tier} parameter for each queue (S_q) is provided

to the UE from the UTRAN. *Id.*, 10:13-16. Also in Equation [6], N_q is the number of entries in the queue denoted by the subscript “ q ” in N_q . In the illustrated example, the N_q values for the four queues (q_1 , q_2 , q_3 and q_4) correspond to N_1 , N_2 , N_3 and N_4 and were chosen as 110, 100, 55 and 50, respectively.

As is evident from Equation [6] and the illustration of the implementation of Equation [6] below, the normalized weighting (W'_q) for each queue is based on the S_{tier} values of all queues, which have been provided to the UE from the UTRAN, as well as the fill levels (N_q) of all queues. *Id.*, 10:13-16.

Applying the exemplary starting values set forth above to Equation [6] results in the following normalized weightings (W'_q) for the queues. The denominator sum is:

$$\begin{aligned}\sum_q S_q N_q &= (0.3 * 110) + (0.3 * 100) + (0.2 * 55) + (0.2 * 50) \\ &= 33 + 30 + 11 + 10 \\ &= 84\end{aligned}$$

Applying this value for the denominator results in the following normalized weightings (W'_q) for each of the four queues:

$$W'_1 = \frac{33}{84} = 0.39286$$

$$W'_2 = \frac{30}{84} = 0.35714$$

$$W'_3 = \frac{11}{84} = 0.13095$$

$$W'_4 = \frac{10}{84} = 0.11905$$

2. Step 610 - Determine Queue Allocations ($RAAU_q$)

Next, in step 610, the process determines a number of resource allocation units (RAAU) allocated to each queue using Equation [7] set forth below. *Id.*, 11:1-10.

$$RAAU_q = (FreeRAAU) * W'_q$$

In Equation [7], $RAAU_q$ corresponds to a number of resource allocation units (or RAAU) allocated the queue denoted by the subscript “ q ” in $RAAU_q$. Continuing with the illustration, application to Equation [7] of the normalized weightings (W'_q) for the queues determined in Step 605 above and the starting value of FreeRAAU=40 chosen for the illustration, results in the following $RAAU_q$ values for queues q1, q2, q3 and q4:

$$\begin{aligned} RAAU_1 &= (40)(0.39286) \\ &= 15.714 \end{aligned}$$

$$\begin{aligned} RAAU_3 &= (40)(0.13095) \\ &= 5.2380 \end{aligned}$$

$$\begin{aligned} RAAU_2 &= (40)(0.35714) \\ &= 14.286 \end{aligned}$$

$$\begin{aligned} RAAU_4 &= (40)(0.11905) \\ &= 4.7620 \end{aligned}$$

3. Step 615 - Determine If Max Number Of Queues Is Exceeded

Next, in step 615, the allocation process determines whether “the number of queues that have resources allocated is greater than” the `max_number_queues_served` threshold. *Id.*, 11:11-17. Continuing with the illustrative example, each of the four queues (q1, q2, q3 and q4) had resources allocated to it, e.g., each of the four queues had a positive value of $RAAU_q$ as determined in Step 610. In the illustrative example, the value for `max_num_queues_served` = 3 was chosen. As a result, the number of queues having resources allocated (4 queues) exceeds the `max_num_queues_served` value (which is 3) in the example.

4. Step 620 - Determine New Queue Allocations ($RAAU_q$)

“If the number of queues that have resources allocated is greater than” the “parameter `max_number_queues_served`, the process moves to step 620,” where the algorithm “re-calculates $RAAU_q$ as follows” using Equation [8] set forth below. *Id.*, 11:17-25:

$$RAAU'_q = RAAU_q + running_RAAU_delta_q$$

In Equation [8], *running_RAAU_delta_q* corresponds to “the running difference between the number of RAAU” allocated in Step 610 to the queue denoted by the subscript “*q*” in *running_RAAU_delta_q* “without the limitation of the number of queues serviced” and the number of RAAU allocated to such queue “with the limitation” of the number of queues serviced. *Id.*, 11:27-31. As explained in the ‘138 Patent, “this algorithm is iterative and *running_RAAU_delta* is determined from the previous iteration of the algorithm.” *Id.*, 11:32-34. Hence, while *running_RAAU_delta_q* may be zero “in the first iteration, on the second iteration the limitation of the number of queues in the previous iteration” will result in non-zero values of *running_RAAU_delta_q* because there are some queues that do not receive the number of RAAU that were originally determined in Step 610. *Id.*, 11:34-38.

Consistent with the embodiment disclosed in the ‘138 Patent, in the illustrative example, each of the four queues (q1, q2, q3 and q4) begins with its value of *running_RAAU_delta_q* set to zero. Thus, in the illustrative example. the first application of Equation [8] results in the following *RAAU_q*’ values:

$$\begin{aligned} RAAU'_1 &= RAAU_1 + 0 \\ &= 15.714 \end{aligned}$$

$$\begin{aligned} RAAU'_3 &= RAAU_3 + 0 \\ &= 5.238 \end{aligned}$$

$$\begin{aligned} RAAU'_2 &= RAAU_2 + 0 \\ &= 14.286 \end{aligned}$$

$$\begin{aligned} RAAU'_4 &= RAAU_4 + 0 \\ &= 4.762 \end{aligned}$$

While in the illustrative example, each of the four queues (q1, q2, q3 and q4) begins with its value of $running_RAAU_delta_q$ equal to zero, as demonstrated below, the limitation of the number of queues serviced results in non-zero values of $running_RAAU_delta_q$ going forward. As explained more fully below in connection with Step 675, as a result of the limitation on the number of queues serviced, some queues receive a greater number of RAAU than were originally determined in Step 610 and other queues receive a lesser number of RAAU than were originally determined in Step 610. These differences result in non-zero values of $running_RAAU_delta_q$ going forward. *See*, Section II(E)(12), *infra*.

5. Step 625 - Order Queues Based On $RAAU_q$ ' Values

“In step 625, the queues are then ordered in order of $RAAU_q$ ’, beginning with the highest queue.” *Id.*, 11:39-40. Continuing with the illustrative example, each of the four queues (q1, q2, q3 and q4), the four queues are ranked as follows based on their respective $RAAU_q$ ’ values from highest to lowest:

<u>Rank</u>	<u>Queue</u>	<u>$RAAU_q$'</u>
1	q1	15.714
2	q2	14.286
3	q3	5.238
4	q4	4.762

6. Step 628 - Select Max Queues From Ordered List

In step 628, “[t]he first max_number queues_serviced queues are then selected.” *Id.*, 11:40-42. In the illustrative example, the value for max_num_queues_serviced = 3 was chosen. Therefore, the top three ranked queues (i.e., q1, q2 and q3) are chosen, as represented by the red box below:

Rank	Queue	$RAAU_q'$
1	q1	15.714
2	q2	14.286
3	q3	5.238
4	q4	4.762

In step 628, a subset of all queues (equal to the max_number_queues_serviced) is selected from the top of the ordering.

7. Steps 630 and 635 - Determine N_q' Values

Next, the allocation process determines a new N_q value (N_q') for each queue. As noted above in connection with Step 605, N_q represented the number of entries in each queue. *Id.*, 10:65-66. “In all queues not selected in step 628, the N_q' value is set to zero as shown in step 630. In all of the tiers that were selected in step 628, N_q' is set to N_q , as shown in step 635.” *Id.*, 11:43-45. Continuing with the illustrative example, the N_q and N_q' value for each queue is set forth in the table below:

<u>Queue</u>	<u>N_q (from Step 605)</u>	<u>Queue Selected in Step 628?</u>	<u>N_q ' Set In Steps 630 and 635</u>
q1	1100	YES	110
q2	1000	YES	100
q3	1000	YES	55
q4	1000	NO	0

8. Step 640 - Determine New Normalized Queue Weightings (W''_q)

In step 640, the normalized queue weighting for each queue is “recalculated using the N_q ' vector determined in step 635” based on Equation [10] reproduced below. The '138 Patent refers to the recalculated normalized weighting for each queue as W''_q . *Id.*, 11:46-55.

$$W''_q = \frac{S_q N'_q}{\sum_q S_q N'_q}$$

As is evident from Equation [10] and the illustration of the implementation of Equation [10] below, the normalized weighting (W''_q) for each selected queue is based on the S_{tier} values of all selected queues, which have been provided to the UE from the UTRAN, as well as the fill levels represented by the N_q ' values of all selected queues. *Id.*, 10:13-16.

Applying the exemplary starting S_{tier} values and the recalculated N_q ' values for the selected queues to Equation [10] results in the following recalculated normalized weightings (W''_q) for the queues. The denominator sum is:

$$\begin{aligned}\sum_q S_q N'_q &= (0.3 * 110) + (0.3 * 100) + (0.2 * 55) + (0.2 * 0) \\ &= 33 + 30 + 11 \\ &= 74\end{aligned}$$

Applying this value for the denominator results in the following recalculated normalized weightings (W''_q) for each of the four queues:

$$\begin{aligned}W''_1 &= \frac{33}{74} = 0.4459 & W''_3 &= \frac{11}{74} = .1486 \\ W''_2 &= \frac{30}{74} = 0.4054 & W''_4 &= \frac{0}{74} = 0.000\end{aligned}$$

9. Step 645 - Determine Recalculated Queue Allocations ($RAAU''_q$)

Next, the recalculated normalized weightings (W'_q) for each queue determined in Step 640 are used to recalculate the allocation for each queue based on Equation 11 reproduced below. The '138 Patent refers to this recalculated allocation for each queue as $RAAU_q''$. *Id.*, 11:56-60.

$$RAAU''_q = \text{round}[(FreeRAAU)W''_q]$$

In Equation [11], the round (...) function “rounds to the nearest integer.” *Id.*, 11:61. Continuing with the illustrative example, application of the FreeRAAU value (chosen to be equal to 200) and the recalculated normalized weightings (W'_q) (from Step 640) to Equation [11] results in the following recalculated allocation ($RAAU''_q$) for each queue rounded to the nearest integer:

$$\begin{aligned} RAAU_1'' &= (40)(0.4459) \\ &= 17.84 \\ &\rightarrow 18 \end{aligned}$$

$$\begin{aligned} RAAU_3'' &= (40)(0.1486) \\ &= 5.944 \\ &\rightarrow 6 \end{aligned}$$

$$\begin{aligned} RAAU_2'' &= (40)(0.4054) \\ &= 16.22 \\ &\rightarrow 16 \end{aligned}$$

$$\begin{aligned} RAAU_4'' &= (40)(0.0000) \\ &= 0 \\ &\rightarrow 0 \end{aligned}$$

10. Steps 650-655: Adjust Recalculated Queue Allocations ($RAAU''_q$) If They Sum To More Than FreeRAAU

In Step 650, the sum of all RAAU allocated in Step 645 (i.e., the sum of all $RAAU''_q$) is determined. If the sum allocated “is greater than freeRAAU (which is possible following the rounding operation in step 645) then the $RAAU_q''$ may be modified in Step 655. *Id.*, 11:62-66. In the illustrative example, the sum of all RAAU allocated in Step 645 equals the sum of $18 + 16 + 6$, or 40 -- which is no greater than freeRAAU (which equals 40). Accordingly, no adjustment is needed in Step 655.

11. Steps 660-670: Determine If Resource Allocated To A Queue Is Less Than That Required For A Cell Edge State And Adjust If Necessary

As explained in the ‘138 Patent, “[i]t is possible that the volume of resource allocated to the queue may be less than that required given the cell edge state that the UE is in. For example, if the UE is in cell edge ‘2’ then four RAAU will be needed as a minimum.” *Id.*, 12:1-4. If the amount of RAAU allocated “is less than the minimum required RAAU, given the cell edge state for any q , then $RAAU_q''$ may be set for one of the queues that has $RAAU_q''$ less than the minimum to zero, as

shown in step 660. .. In this scenario, any spare resources are allocated first to any other queues that are below the minimum, as shown in step 665. If there are still spare resources, then any spare resources are allocated ... to the queues that currently have $RAAU_q''$ greater than zero.” *Id.*, 12:5-16. In a case where such spare resources are reallocated, the $RAAU_q''$ values are updated in step 670. *Id.*, 12:17.

In the illustrative example, the volume of resources allocated to q3 (in Step 645) is 6, which is less than the cell edge state minimum of 7 in the illustrative example. Thus, in Step 665, $RAAU_q''$ for q3 is set to zero, and the volume of resources previously allocated to q3 (which was 6) is reallocated to the queues that currently have $RAAU_q''$ greater than zero (which are q1 and q2 in the illustrative example.) Accordingly, in Step 665, half of the 6 RAAU from q3 (or 3 RAAU) are reallocated to q1 and the other half of the 6 RAAU from q3 (or 3 RAAU) are reallocated to q2. The $RAAU_q''$ values are then updated in Step 670 to be as follows:

$$\begin{aligned} RAAU_1'' &= 18 + 3 \\ &= 21 \end{aligned}$$

$$RAAU_3'' = 0$$

$$\begin{aligned} RAAU_2'' &= 16 + 3 \\ &= 19 \end{aligned}$$

$$RAAU_4'' = 0$$

12. Step 675: Update *Running_RAAU_Delta_q* Values For Queues

In Step 675, for each of the queues, the running difference between the actually allocated RAAU ($RAAU_q''$) from Step 645 above and the originally allocated RAAU ($RAAU_q$) from Step 610 above (rounded to the nearest integer) is then updated using Equation [12] reproduced below (with colored annotations). *Id.*, 12:18-24.

$$\text{running_RAAU_delta}_q = \text{running_RAAU_delta}_q + (RAAU_q - RAAU_q'')$$

In the annotated version of Equation [12] above, the **value in red font** corresponds to the previous value of $\text{running_RAAU_delta}_q$ (immediately before the current update in Step 675), and the **value in blue font** corresponds to the updated value of $\text{running_RAAU_delta}_q$ determined in Step 675.

Continuing with the illustrative example, as explained in connection with Step 620 above, the value of $\text{running_RAAU_delta}_q$ may be zero in the first iteration. *Id.*, 11:34-38. Applying a previous value of $\text{running_RAAU_delta}_q$ equal to zero for each queue to the formula of Equation [12] yields the following updated values of $\text{running_RAAU_delta}_q$.

$$\begin{aligned} \text{running_RAAU_delta}_1 &= \text{running_RAAU_delta}_1 + (\text{RAAU}_1 - \text{RAAU}_1'') \\ &= 0 + (16 - 21) \\ &= -5 \end{aligned}$$

$$\begin{aligned} \text{running_RAAU_delta}_2 &= \text{running_RAAU_delta}_2 + (\text{RAAU}_2 - \text{RAAU}_2'') \\ &= 0 + (14 - 19) \\ &= -5 \end{aligned}$$

$$\begin{aligned} \text{running_RAAU_delta}_3 &= \text{running_RAAU_delta}_3 + (\text{RAAU}_3 - \text{RAAU}_3'') \\ &= 0 + (5 - 0) \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{running_RAAU_delta}_4 &= \text{running_RAAU_delta}_4 + (\text{RAAU}_4 - \text{RAAU}_4'') \\ &= 0 + (5 - 0) \\ &= 5 \end{aligned}$$

As reflected in the results of Step 675, the limitation on the number of queues serviced results in q1 and q2 receiving a greater number of RAAU in Step 645 than were originally determined in Step 610 (q1 and q2 were “overallocated”), and q3 and q4 receiving a lesser number of RAAU in Step 645 than were originally determined in Step 610 (q3 and q4 were “underallocated.”) These differences result in q1 and q2 having negative values of *running_RAAU_delta_q* the next time Step 620 is performed, and q3 and q4 having positive values of *running_RAAU_delta_q* the next time Step 620 is performed. The value of *running_RAAU_delta_q* for each queue thus tracks whether each queue has been overallocated or underallocated resources in the past, and serves as a numerical measure of service excess or deficiency previously provided to each queue. *Id.*, 10:43-45 and 11:32-38. By applying the

current $running_RAAU_delta_q$ value each time the allocation algorithm determines $RAAU'_q$ in Step 620, and then updating each $running_RAAU_delta_q$ each time Step 675 is performed, the allocation process disclosed in the '138 Patent achieves a fair allocation amongst the queues in a manner that, for example, maintains equality of performance over time across queues having the same QoS profile. *Id.*, 8:44-46, 9:4-11 and 9:39-42.

In summary, the allocation algorithm uses queue weightings (S_{tier} or S_q) values and the fill levels of the queue (N_q) to compute normalized queue weightings (W'_q and W''_q), that are used to determine a series resources allocations ($RAAU_q$, $RAAU'_q$ and $RAAU''_q$) for the queues, each of which reflects an amount of the available resource ($FreeRAAU$) each queue should receive. The algorithm uses the $running_RAAU_delta_q$ to track whether resources have been overallocated or underallocated to each queue over time based on the running difference between the amount of resources that would have been allocated to each queue had transmission not been limited to only a subset of the queues ($RAAU_q$), and the actual resource allocation for each queue ($RAAU''_q$).

As discussed more fully below, the prior art relied on the Petition (particularly, Bucknell) bears no resemblance to the allocation algorithm disclosed in the '138 Patent.

III. THE PROSECUTION HISTORY OF THE ‘138 PATENT

The ‘138 Patent matured from U.S. Patent Appl. 15/618,669, filed June 9, 2017. Ex. 1002. As originally filed, the application included claims 1-8. *Id.*, 327-329. In the First Office Action, the Examiner rejected claims 1-8 based on obviousness-type double patenting. *Id.*, 224-233.

In response to the First Office Action, the Applicant cancelled original claims 1-8 in favor of new claims 9-22. *Id.*, 205-208. The Examiner performed a search in connection with the new claims, which resulted in the identification and citation of two references by the Examiner, namely, U.S. Patent Publ. 2007/0297360 and U.S. Patent Publ. 2008/0254804, both authored by Lohr. *Id.*, 199-202, 194. The Examiner found that all of the limitations of the pending independent claims (i.e., claims 9 and 16) were not met by the prior art, and issued a Notice of Allowance. In the reasons for allowance, the Examiner stated in part:

The prior art ... being relied upon and made of record, in single or in combination, does not disclose explicitly the limitations of:

“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” as disclosed in Claim 9. *Id.*, 75-76 (emphasis added).

Thus, *inter alia*, the Examiner found that the specific requirements of the “first iteration” and “second iteration” for selecting data for transmission set forth in the claim language was absent from the prior art. As explained more fully below, the references relied on in the Petition also fail to satisfy the limitations associated with the “first iteration” and “second iteration” set forth in the claims.

IV. THE CHALLENGED CLAIMS

The Challenged Claims include independent claims 1 and 8, which correspond to independent claims 9 and 16, respectively, in the application that matured into the ‘138 Patent. Claim 1 is exemplary and recites:

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 associated 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,
 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.

Several aspects of independent claim 1 are particularly noteworthy.¹

Firstly, the claim requires that the UE receive parameters (plural) associated with a plurality of radio bearers. The S_{tier} parameters (or S_q) provided to the UE from the UTRAN (one such parameter for each of the queues) and discussed in connection with Step 605 above correspond to parameters (plural) that are received by the UE and associated with a plurality of radio bearers, as recited in the claim. Ex. 1001, 10:13-16; *see*, Section II(E)(1), *supra*.

Secondly, “the first iteration” requires the selection of data “from a subset of the plurality of radio bearers based on the received parameters” (*plural*). In the disclosed embodiment, the queues chosen in Step 628 correspond to “a subset of the plurality of radio bearers,” and the recalculated normalized queue weightings (W''_q) for the queues in the subset (determined in Step 640) result in subsequent data selection based on a plurality of the S_{tier} (or S_q) parameters (“received parameters”). *See*, Sections II(E)(6)-(8), *supra*. This aspect of the disclosed embodiment is illustrated by Equation [10], reproduced again below:

¹ Independent claim 8 (also challenged in the Petition) contains substantially the same limitations as claim 1.

$$W_q'' = \frac{S_q N_q'}{\sum_q S_q N_q'}$$

As is evident from this equation, the W_q'' value for each selected queue is based on a plurality of S_{tier} values (a plurality of “received parameters”). Ex. 1001, 10:13-16. Since each of recalculated normalized queue weightings (W_q'') is based on a plurality of “received parameters,” the recalculated queue allocations ($RAAU_q''$) determined in Step 645 using W_q'' are similarly “based on the received parameters” (plural), as required by the claimed “first iteration.” See, Section II(E)(9), *supra*. By contrast, data selection based on only one received parameter (singular) fails to satisfy the requirements of the “first iteration” recited in the claims.

Thirdly, “the second iteration” requires the selection of data “based on buffered data for respective radio bearers” (plural). An example of “the second iteration” is illustrated in the specification where, after the $RAAU_q''$ values are determined in Step 645, the algorithm performs a further reallocation (a “second iteration”) in Steps 655-670 when the volume of resources allocated to queue(s) is less than that required for a given cell edge state. Ex. 1001, 12:1-4; *see also*, Section II(E)(11), *supra*. More specifically, in Step 660, $RAAU_q''$ is set to zero for queues below the minimum required given the cell edge state, and resources are reallocated to other queues having a $RAAU_q''$ value greater than zero. Ex. 1001, 12:5-16; *see also*, Section II(E)(11), *supra*. This reallocation to queues with $RAAU_q''$ greater than

zero is “based on buffered data for respective radio bearers” (plural), because $RAAU_q$ is based on W'_q (which was calculated using Equation [10]) and therefore based on, *inter alia*, the respective levels of buffered data in each selected queue as represented by the N_q values of the selected queues.) Ex. 1001, 10:13-16; *see*, Section II(E)(8), *supra*. Since the $RAAU'_q$ allocations themselves are “based on buffered data for respective radio bearers,” the use of the $RAAU'_q$ values in Step 660 to reallocate resources to queues having $RAAU_q$ greater than zero (an example of “the second iteration”) is also “based on buffered data for respective radio bearers” (plural). By contrast, data selection based on buffered data of only one radio bearer (singular) fails to satisfy the requirements of the “second iteration” recited in the claims.

As noted in Section III, *supra*, the Examiner premised the reasons for allowance on the limitations emphasized above reciting the “first iteration” (based on received parameters (plural)) and the “second iteration” (based on buffered data for respective radio bearers), which the Examiner found were absent from the prior art. The language of independent claim 1 makes clear that both iterations must consider plural inputs—plural received parameters in the first iteration and buffered data for plural bearers in the second iteration. By contrast, as explained more fully below, the mappings to the prior art (specifically, Bucknell) relied on in the Petition are deficient at least because (i) the aspect of Bucknell relied on for the “first

iteration” is based on only one received parameter rather than a plurality of received parameters as required by the claim language, and/or (ii) the aspect of Bucknell relied on for the “second iteration” is based on buffered data from only one data bearer rather than a plurality of respective data bearers as required by the claim language.

V. MATERIALS RELIED ON IN THE PETITION

Ground 1 alleges that claims 1-4 and 8-11 are obvious over Eckert (Ex. 1005) in view of Bucknell (Ex. 1006) and Lohr-1 (Ex. 1007). Ground 2 alleges that dependent claims 5 and 12 are obvious over Eckert in view of Bucknell, Lohr-1, and Hans (Ex. 1008). Ground 3 alleges that dependent claims 6 and 13 are obvious over Eckert in view of Bicknell, Lohr-1 and Lohr-2 (Ex. 1009).

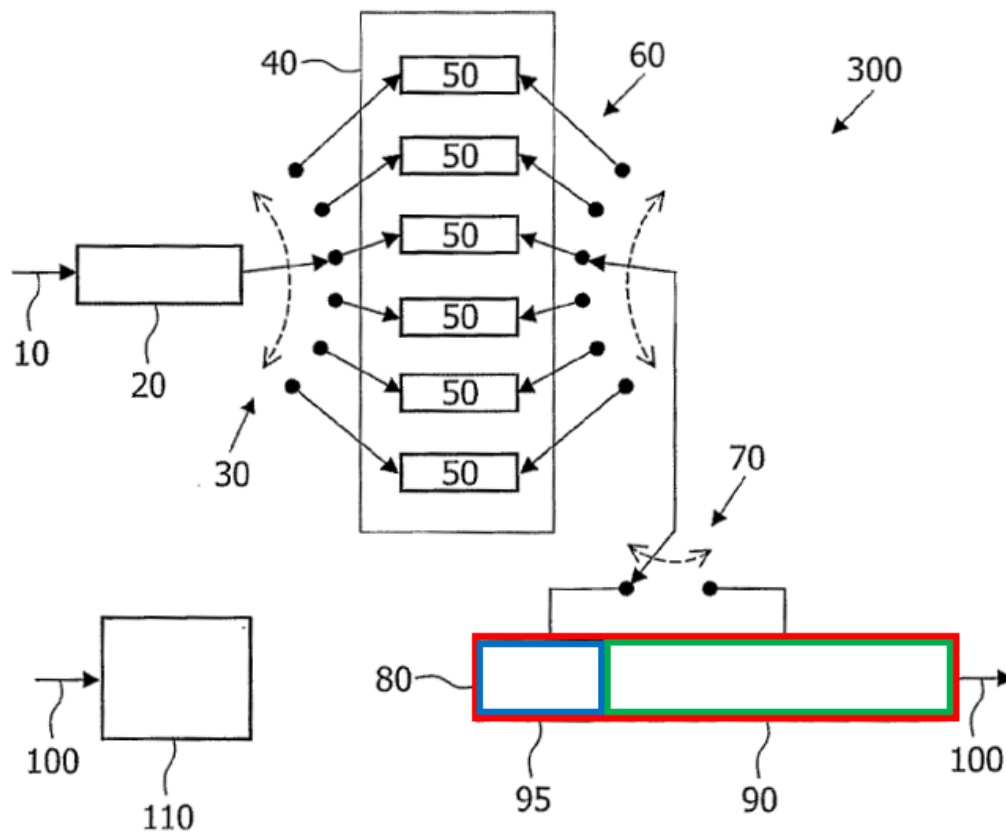
A. Bucknell

In all of the Grounds, the Petition relies solely on Bucknell (Ex. 1006) for the claim limitations reciting that “the first iteration” performs selection of data “from a subset of the plurality of radio bearers based on the received parameters” (plural), and reciting that “the second iteration” perform selection of data “based on buffered data for respective radio bearers” (plural.)² Bucknell bears little resemblance to the resource allocation process disclosed and claimed in the ‘138 Patent.

² See, e.g., Pet., 44 (“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],

Figure 2 of Bucknell (reproduced below with annotations) illustrates “an apparatus for multiplexing” that includes an input buffer 20 for storing received data packets,” a bank 40 that includes “a plurality of queue stores 50,” and a switch that routes each data packet to one of the queue stores 50 according to a priority assigned to each data packet. An output buffer 80 stores the data packets prior to transmission on an output 100. The output buffer 80 [red box] “comprises a first portion 90 [green box] and a second portion 95 [blue box].” Ex. 1006, [0020].

[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” ... “; at 45 (“Bucknell describes that its data selection process iterates over the MAC-d queues 50 multiple times ... 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*)”) and 54 (“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*).”



In Figure 2, “[d]ata packets are selected for transfer from the queue stores 50 to the output buffer 80 by means of a second routing means 60.” *Id.*

Bucknell explains that the first portion 90 [green box] and the second portion 95 [blue box] can be populated using different *rules*.³ *Id.*, [0005] (“According to a first aspect of the invention there is provided a method of multiplexing data packets having different assigned priorities, comprising: ... assembling a group of the data

³ The Petition erroneously equates a *rule* in Bucknell with an *iteration* as recited in the Challenged Claims, but provides no explanation whatsoever how a *rule* meets the plain and ordinary meaning of an *iteration* in the content of the ‘138 Patent. The Petition cites no dictionary or any other evidence that a “rule” is an iteration. The Patent Owner reserves the right to contest Petitioner’s position that a rule constitutes an iteration in the context of the ‘138 Patent should this matter be instituted.

packets wherein a first portion of the group is populated with data packets selected ... according to a first rule and a second portion of the group is populated with data packets selected ... according to a second rule”) and [0007]-[0008] (“Preferably, according to the first rule, data packets are selected from the queue containing the highest priority of the data packets. ... Preferably, according to the second rule, data packets are selected from one or more of the queues containing data packets having a lower priority than the highest priority.”)

Bucknell provides some examples how data packets are assembled according to these rules. The Petition attempts to map several combinations of examples 1, 2, 3, 4 and 9 in Bucknell to the claimed “first iteration” that selects data “from a subset of the plurality of radio bearers based on the received parameters,” and the claimed “second iteration” that selects data “based on buffered data for respective radio bearers.” Examples 1, 2, 3, 4 and 9 from Bucknell are set forth below:

Some examples are given below of how the data packets may be selected from the queues in the queue stores 50 to populate the group of data packets assembled in the first portion 90 and second portion 95 of the output buffer 80. ...

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. Suitable selection of the subset can enable

the multiplexing apparatus 300 to avoid starvation of particular queues, for example to enable a delay criterion to be met.

2) Fair selection for the second portion: In this case 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. To maximize fairness, especially when a large number of queues are present, the last selected queue may be remembered for use in subsequent multiplexing operations.

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.

4) As a further variation on 2), the second portion 95 can be populated before the first portion 90. This may allow some flexibility in regard to which queues make use of which of the portions. ...

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, [0025]-[0028].

As explained in detail below, not one of the combinations of examples from Bucknell conjured in the Petition meets all of the requirements of the “first iteration” and “second iteration” recited in the Challenged Claims.

B. Eckert

Eckert relates to a “UMTS (Universal Mobile Telecommunications System)” mobile radio system. Pet., 14, citing, Ex.1005, [0003]. Eckert describes the operation of the protocol layer arrangement described in technical standards promulgated by 3GPP. Pet. 15. Eckert is substantially duplicative of the numerous 3GPP

Specifications considered by the Examiner and identified on the first several pages of the ‘138 Patent. Ex. 1001, 2-4.

C. Lohr-1

The Petition relies on the disclosure in Lohr-1 (Ex. 1007) of a “radio bearer control message” sent from the network to a mobile terminal that includes a “set of parameters indicating the priorities of a logical channel of the radio bearer.” Pet., 20. Lohr-1 is largely cumulative of the two Lohr references (U.S. Patent Publ. 2007/0297360 and U.S. Patent Publ. 2008/0254804) that the Examiner identified and considered just prior to allowance of the application. Ex. 1002, 194.

D. Hans

“Hans is directed to a conventional set of protocol layers in a UMTS system.” Pet., 63, citing, Ex. 1008. Hans is substantially duplicative of the numerous 3GPP Specifications considered by the Examiner and identified on the first several pages of the ‘138 Patent. Ex. 1001, 2-4.

E. Lohr-2

“Lohr-2 relates to a UMTS system that employs data transmitted in the E-DCH channel.” Pet., 73, citing Ex. 1009. Lohr-2 is largely cumulative of the two Lohr references (U.S. Patent Publ. 2007/0297360 and U.S. Patent Publ. 2008/0254804) that the Examiner identified and considered just prior to allowance of the application, both of which described an E-DCH channel. Ex. 1002, 194.

F. Declaration of Zhi Ding

The expert declaration from Zhi Ding submitted with the Petition (Ex. 1003) is not prior art, but is being used by the Petition to fill gaps in the prior art. The expert declaration should be afforded little, if any, evidentiary weight.

As an initial matter, large portions of the declaration simply mirror the Petition with only minimal, insubstantial differences. For example, paragraphs 29-35, 40, 44-60, 63, 65, 67-110, 112-114, 116-131, 133-143, 145 and 147-190 of the declaration essentially parrot the Petition word-for-word.⁴ The few variations between the Petition and the expert declaration are largely superficial—for example, in instances where the Petition provides a citation to a reference, the declaration merely includes by way of parenthetical a direct quotation from the reference corresponding to the citation. Such rote repetition is entitled to little evidentiary weight. As explained in *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15–17 (PTAB Aug. 24, 2022) (precedential), expert testimony that merely restates the Petition’s conclusory assertions without offering additional substantive explanation is entitled to “little weight.” *See also, Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1340–41 (Fed. Cir. 2020) (affirming the Board’s finding that expert testimony was

⁴ The portions of the expert declaration that do not parrot the Petition include information such as the expert’s background, the materials he considered, and boilerplate describing application legal standards. (Ex. 1003, ¶¶ 1-18 (background of expert and materials considered) and ¶¶ 19, 22-28 (legal standards)).

unpersuasive where it “merely repeated Petitioner’s argument, nearly verbatim, without citation to the basis for his testimony”).

Here, the Petition’s heavy reliance on an expert declaration that mostly parrots the Petition’s arguments underscores the weakness of the arguments advanced in the Petition and supports affording the declaration little weight.

VI. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS WITH RESPECT TO CLAIM 1

The language of claim 1 of the ‘138 Patent and, in particular, the recitation of the claimed “first iteration” and “second iteration,” claim 1 provides in pertinent part as follows:

... the processor is configured to: ...

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* ...

As is evident from the claim language itself, and as explained in detail in Section IV above, the “first iteration” must be based on received parameters (plural) – if the first iteration is based on only one received parameter, the claim language is not met. In addition, the “second iteration” must be based on buffered data for

respective radio bearers (plural) – if the second iteration is based on buffered data for only one radio bearer, the claim language is not met.

The Petition advances three alternative mappings (referred to below as “Mapping #1,” “Mapping #2” and “Mapping #3” below) for the combination of the claimed “first iteration” and “second iteration.” A detailed analysis explaining why each of these mappings fails to meet the claim language is set forth below. In all three mappings, the Petition maps the “received parameters” to priority values of logical channels associated with the data flows.⁵

A. Mapping #1 Fails To Satisfy All Of The Requirements Of The First Iteration And Second Iteration Recited In The Challenged Claims

In Mapping #1, the Petition relies on examples 2-4 of Bucknell, and attempts to equate the claimed “first iteration” with populating Bucknell’s second portion 95 by taking one data packet in turn from each queue other than the highest priority queue, and the claimed “second iteration” with populating Bucknell’s first portion with data from the highest priority queue. From the Petition:

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 populated using a “subset of queues, excluding the highest priority

⁵ Pet., 45-46 (“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.”)

queue” (first iteration, data selected from subset of queues), and, next, the first portion 90 is populated using the highest priority queue (second iteration). ... Pet., 47-48 (emphasis added).

Starting with the purported mapping of the claimed “first iteration” above, the Petition fails to explain how taking one data packet in turn from each of the queues other than the highest priority queue constitutes the “first iteration” wherein “the selection of the data is selected from a subset of the plurality of radio bearers based on the received parameters” (plural). As noted above, the Petition maps the “received parameters” to priority values of logical channels associated with the data flows. *See*, note 4, *supra*. However, when Bucknell takes one data packet in turn from each of the queues other than the highest priority queue (the purported “first iteration”), only one received parameter matters – namely the identity of the highest priority queue. The priorities of all of the other queues (other than the highest priority queue) are completely irrelevant in this process – as one packet is taken in turn from each of these other queues regardless of the relative priority of each of the other queues to one another. Since only one received parameter (the identity of the highest priority queue) matters when Bucknell takes one data packet in turn from each of the queues other than the highest priority queue, the Petition has failed to demonstrate that this process can be the claimed first iteration which must be based on a plurality of received parameters – not just one.

Turning next to the purported mapping of the claimed “second iteration” above, the Petition fails to explain how populating the first portion using the highest priority queue constitutes the “second iteration” wherein “the selection of the data is based on buffered data for respective radio bearers” (plural). The Petition fails to explain how populating the first portion based on data from only one queue -- namely, the highest priority queue -- constitutes selection of data based on buffered data for “respective radio bearers” (plural) as required by the “second iteration” recited in the claim. The Petition offers only the following conclusory analysis of this aspect of the claim language:

... 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]. Pet., 54.

Nothing in the above conclusory analysis explains how populating Bucknell’s first portion based on data in only one queue -- namely, the highest priority queue constitutes selection of data based on buffered data for “respective radio bearers” (plural) as required by the claimed “second iteration.”

For the above reasons, Mapping #1 fails to present a reasonable likelihood of success.

B. Mapping #2 Fails To Satisfy All Of The Requirements Of The First Iteration And Second Iteration Recited In The Challenged Claims

In Mapping #2, the Petition relies on examples 2, 4, and 9 of Bucknell. From the Petition:

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]. Pet., 54-55 (emphasis added).

While example (9) in Bucknell refers to selection from queues exceeding a certain length, nothing in example (9) (or examples (2) or (4)) discloses or even suggests ordering queues based on priority.⁶ Conspicuously absent from the above

⁶ Example (2) describes “Fair selection for the second portion: In this case 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”; Example (4) provides “As a further variation on 2), the second portion 95 can be populated before the first portion 90. This may allow some flexibility in regard to which queues make use of which of the portions”; and Example (9) states: 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

passage in the Petition is any citation to the relied on examples from Bucknell for the proposition that those examples disclose or suggest ordering queues based on priority. Rather than disclosing “ordering” the queues according to priority, example (2) of Bucknell puts the highest priority queue in the first portion, and for the second portion treats all other queues equally regardless of their relative priorities to each other. Ex. 1005, [0027] (“In this case 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”).

Even if the ordering of queues based on priority was disclosed in examples (2), (4) or (9) of Bucknell (it is not), Mapping #2 would still fail to meet the claim language. In Mapping #2, the Petition asserts that Bucknell teaches a system where “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.” Pet., 54 (emphasis added). As alleged earlier in the Petition, the combination of examples (2) and (4) corresponds to a case where “the second portion 95 is populated by taking one data packet in turn from each of the subset of queues” (the alleged “first iteration”) after which “the first portion 90 is populated using the highest priority queue (second iteration).” Pet., 47-48 (emphasis added). Presuming

by preferentially selecting from queues exceeding a certain length.” Ex. 1005, [0027]-[0028].

a motivation to do so was present (none has even been alleged, let alone shown), criteria relating to queue length (from Example 9) and priority ordering of queues (as alleged in the Petition) could arguably be applied to the first step (mapped to the “first iteration”) in the alleged combination of examples (2) and (4) set forth in the sentence above where the second portion 95 is populated by taking packets from the subset of queues excluding the highest priority queue. However, regardless of whether queue length and priority ordering of queues were applied in the “first iteration,” the second step in the alleged combination of examples (2) and (4) above is still limited to “the first portion 90 [being] populated using the highest priority queue (second iteration).” Pet., 47-48 (emphasis added). The Petition again fails to explain how this mapping satisfies the requirement of the claimed “second iteration” because the Petition fails to explain how populating the first portion based on data from only one queue -- namely, the highest priority queue -- constitutes data selection based on buffered data for “respective data bearers” (plural) as required by the claimed “second iteration.”

For the above reasons, Mapping #2 fails to present a reasonable likelihood of success.

C. Mapping #3 Fails To Satisfy All Of The Requirements Of The First Iteration And Second Iteration Recited In The Challenged Claims

In Mapping #3, the Petition relies on examples 2, 3, and 4 of Bucknell. From the Petition:

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. Pet., 55 (emphasis added).

As an initial matter, Bucknell does not combine example 3 and 4 as alleged in the Petition. Rather, Bucknell combines examples 2 and 3, and separately combines examples 2 and 4. In this regard, Bucknell describes example 3 as “a variation on 2)” and example 4 as “a further variation on 2).” Ex. 1005, [0027] (emphasis added).

Thus, Bucknell describes examples 3 and 4 as different *alternatives*. Bucknell never discloses or suggests combining examples 3 and 4 together as alleged in the Petition. Moreover, the Petition has provided *no explanation whatsoever* why a POSITA would have been motivated to combine examples 3 and 4 as alleged in the Petition.

Was there a problem that existed that would have motivated a POSITA to combine these different examples from Bucknell in the manner described in the Petition? On this issue, the Petition is *silent*. In short, the Petition's proposed combination of different aspects of Bucknell in a manner not set forth in the reference lacks any rationale underpinning and reeks of hindsight.

Moreover, even if Bucknell disclosed a system that combined examples 2-4 as set forth in the Petition (Bucknell does not), Mapping #3 would still fail to meet the claim language. In Mapping #3, the Petition equates filling “the second portion 95 using a subset of the queues” as set forth in example 2 with the claimed “*first iteration*.” See, Pet., 55 (step “a” identifying “first iteration”). However, as noted earlier in the Petition, “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.’*” Pet., 47 (emphasis added). Again, the Petition fails to explain how taking one data packet in turn from each of the queues *other than the highest priority queue* constitutes the “*first iteration*” where data selection must occur “*based on the received parameters*” (*plural*). As noted above, the

Petition maps the “received parameters” to priority values of logical channels associated with the data flows. *See*, note 4, *supra*. However, when Bucknell takes one data packet in turn from each of the queues other than the highest priority queue (the purported “first iteration”), only one received parameter matters – namely the identity of the highest priority queue. The priorities of all of the other queues (other than the highest priority queue) are completely irrelevant in this process – as one packet is taken in turn from each of these other queues regardless of the relative priority of each of the other queues to one another. Since only one received parameter (the identity of the highest priority queue) matters when Bucknell takes one data packet in turn from each of the queues other than the highest priority queue, the Petition has failed to demonstrate that this process can be the claimed first iteration which must be based on a plurality of received parameters – not just one.

For the above reasons, Mapping #3 fails to present a reasonable likelihood of success.

D. None of Petitioner’s Mappings Satisfy the Claimed Process

As demonstrated above, none of the mappings presented in the Petition satisfy the requirements of the “first iteration” and “second iteration” recited in claim 1 of the ‘138 Patent. Each mapping relies on a flawed interpretation of Bucknell that either (i) treats as sufficient the use of a single received parameter rather than a plurality, as expressly required by the “first iteration,” or (ii) attempts to satisfy the

“second iteration” through a process that uses only buffered data of a single bearer, as opposed to being based on buffered data for respective radio bearers (plural). Since the Petition fails to demonstrate that any of the proposed mappings satisfy all of the limitations of the “first iteration” and the “second iteration” recited in claim 1, the Petition fails to establish a reasonable likelihood of success with respect to claim 1 in Ground 1.

VII. GROUND 1 FAILS TO DEMONSTRATE A LIKELIHOOD OF SUCCESS WITH RESPECT TO CLAIMS 2-4 AND 8-11

For the reasons set forth in Section VI, *supra*, the Petition has failed to demonstrate a likelihood of success with respect to independent claim 1. Independent claim 8 uses language identical to claim 1 for describing the claimed “first iteration” and “second iteration.” Thus, the Petition has failed to demonstrate a likelihood of success with respect to claim 8 under Ground 1 for the same reasons that the Petition failed to demonstrate a likelihood of success with respect to independent claim 1 in Ground 1.

In addition to independent claims 1 and 8, Ground 1 also challenges dependent claims 2-4 and 9-11. With respect to these dependent claims, Ground 1 relies on the same deficient mappings for the “first iteration” and “second iteration” discussed above. Accordingly, the Petition has failed to demonstrate a likelihood of success with respect to dependent claims 2-4 and 9-11 in Ground 1.

VIII. GROUND 2 FAILS TO DEMONSTRATE A LIKELIHOOD OF SUCCESS WITH RESPECT TO DEPENDENT CLAIMS 5 AND 12

With respect to dependent claims 5 and 12, Ground 2 relies on the same deficient mappings for the “first iteration” and “second iteration” discussed above in connection with Ground 1. Accordingly, the Petition has failed to demonstrate a likelihood of success with respect to dependent claims 5 and 12 in Ground 2.

IX. GROUND 3 FAILS TO DEMONSTRATE A LIKELIHOOD OF SUCCESS WITH RESPECT TO DEPENDENT CLAIMS 6 AND 13

With respect to dependent claims 6 and 13, Ground 3 relies on the same deficient mappings for the “first iteration” and “second iteration” discussed above in connection with Ground 1. Accordingly, the Petition has failed to demonstrate a likelihood of success with respect to dependent claims 6 and 13 in Ground 3.

X. CONCLUSION

Patent Owner respectfully requests that institution be denied. For the reasons set forth above, the Petition has failed to demonstrate a reasonable likelihood that it would prevail with respect to any of the Challenged Claims.

Respectfully submitted,

Dated: May 26, 2025

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 10,234 words, excluding the parts of this Patent Owner's Preliminary Response that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Preliminary Response.

Respectfully submitted,

Dated: May 26, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** was served via email (as consented to by counsel) on May 26, 2025 to lead and backup counsel of record for Petitioners as follows:

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