

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORP. AND
CONTINENTAL AUTOMOTIVE SYSTEMS, INC.

Petitioners,

v.

INTELLECTUAL VENTURES II LLC

Patent Owner.

Case IPR2022-01127
U.S. Patent No. 10,292,138

**DECLARATION OF DR. GARY LOMP IN SUPPORT OF
PATENT OWNER'S PRELIMINARY RESPONSE**

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I, Dr. Gary Lomp, do hereby declare:

I. INTRODUCTION

1. I am making this Declaration at the request of Intellectual Ventures II LLC (“Intellectual Ventures”) in the matter of the *Inter Partes* Review (“IPR”) proceeding before the United States Patent and Trademark Office (“USPTO”) of U.S. Patent No. 10,292,138 (“the '138 Patent”) to provide expert technical opinions with respect to the '138 Patent.
2. I am being compensated for my work in this matter at my standard hourly rate of \$450 for such consulting services. My compensation in no way depends on the outcome of this case, and I have no financial interest in the outcome.
3. In preparing this Declaration, I considered the following materials, the subject matter of which are all within the scope of my education and professional experience:
 - The '138 Patent, Ex. 1001;
 - The Petition for *Inter Partes* Review of U.S. Patent No. 10,292,138 (“Pet.”);
 - Declaration of Dr. Robert Akl, Ex. 1003;
 - U.S. Patent No. 6,850,540 (“Peisa”), Ex. 1004.
 - U.S. Patent Application Publ. No. 2005/0047416 to Heo (“Heo”), Ex. 1029.
 - TS 24.008 (Ex. 1005).

II. PROFESSIONAL BACKGROUND

4. Based on my qualifications, education, knowledge, expertise, experience, and work background, I believe I am qualified to offer opinions relating to the technology described in the '138 Patent. Exhibit 2002 is a copy of my current *curriculum vitae* (“CV”), detailing my education and experience. Additionally, the following overview of my background pertains to my qualifications for providing expert testimony in this matter.
5. I am currently an Adjunct Professor in Wireless Communications at the NYU Tandon School of Engineering and President of TekTaktiks, a research and expert consulting company. My job duties include directing and performing research in, and technical evaluation of, advanced communication system design, especially new cellular technologies. I have over 43 years of experience in the field of wireless telecommunications, including advanced military communications systems, commercial satellite, WiFi and cellular systems research and development. I have over 15 years of experience in providing expert services in the field of wireless telecommunications. I hold Ph.D., Master’s and Bachelor’s degrees in Electrical Engineering, all from the Polytechnic Institute of New York (now part of NYU Tandon School of Engineering).
6. I am a named inventor on over 100 issued U.S. Patents in the field of wireless telecommunications. Most of these patents pertain to wireless communication,

including communication system architecture, communication system signal processing and communication system protocols.

7. In addition to my technical experience in the field of wireless communications systems, I have been a principal and executive in multiple wireless technology corporations. In the late 1980s and early 1990s, I was Vice President and Chief Scientist at SCS Mobilecom, a wireless company that developed new technology based on spread spectrum technologies and advanced signal processing (DSP) techniques. Following the acquisition of SCS Mobilecom by InterDigital Communications, Corporation in 1992, I held various leadership roles at InterDigital, including General Manager of the Wireless Products Business Unit and Executive Vice President and Chief Technology Officer, where I helped develop 2G and 3G technologies. After InterDigital, I served in leadership positions at several wireless startups, including Symbol Technologies (where I led the Wide Area Wireless technology division), LayerOne Wireless Technologies Inc. (where I served as CEO) and incNetworks (where I served as CTO). I am also the Founder and President of The TekTacktics Group, Inc. a private company that has provided expert services and telecommunications consulting in the Telecommunications industry for the past 15 years.
8. In terms of commercial research and development (R&D) experience, I have worked extensively on the design and optimization of radio frequency (RF)

communications systems for enhanced capacity and service coverage. A further object of my work has been to realize systems that are “converged” or are ingredients in a converged network concept. Convergence means the technical integration of heterogeneous services (such as voice, data, and multimedia) and heterogeneous radio technologies (macrocellular, microcellular, WiFi, cordless phone) into a seamless operating unit. This work requires cross functional design in which the respective heterogeneous technologies are made to interoperate.

9. During this career activity, I have had first-hand knowledge and exposure to numerous discussions, and debates in support of the advancement of new wireless technologies and paradigms. These new technologies addressed various air interface methods, including orthogonal frequency division multiplexing (OFDM) and Orthogonal Frequency Division Multiple Access (OFDMA), a closely related method of utilizing the OFDM format to provide shared access. My current research includes the presently evolving 5G cellular concept, which incorporates, among other things, MIMO-OFDM/OFDMA processing. As outlined above, my involvement in wireless R&D has also drawn me to fundamental system architecture issues and philosophies including the functional portioning of the overall wireless network. I have had the benefit of collaboration and debate with numerous top tier innovators, from many industry-leading organizations in the field. In particular, I have detailed knowledge and recollection of the atmosphere

surrounding the ongoing wireless technology revolution that began in the late 1980s and continues to the present day, including the period surrounding the present invention, and also including attempts by interested parties across the globe to promulgate and protect preferred ideas and intellectual property.

10. With respect to the technologies relevant to the '138 Patent, my experience includes research, design and/or development of optimized communication systems comprising operating systems and protocols that control the use of radio resources.

11. My CV contains further details on my education, experience, publications, and other qualifications to render an expert opinion in this case. Ex. 2002.

III. RELEVANT LEGAL STANDARDS

12. I have been asked to provide my opinion as to whether certain claims limitations of the '138 Patent are anticipated or rendered obvious by Peisa.

13. The opinions I am expressing in this report involve the application of my knowledge and experience to the evaluation of certain references with respect to the '138 patent. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Volpe Koenig, who represent Intellectual Ventures, to provide me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply current principles related to patent validity to my analysis.

- 14.I understand that an IPR is a proceeding before the USPTO for evaluating the patentability of an issued patent's claims based on prior-art patents and printed publications.
- 15.I understand that the claims of a patent are reviewed from the point of view of a hypothetical person of ordinary skill in the art ("POSITA") at the time of the filing of the patent. The "art" is the field of technology to which a patent relates.
16. I understand that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to construe the claim.
- 17.I understand that, in this proceeding, Petitioners have the burden of proving that the challenged claims of the '138 Patent are unpatentable by a preponderance of the evidence. I understand that "preponderance of the evidence" means that a fact or conclusion is more likely true than not true.
- 18.I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can "anticipate" the claim. Second, the prior art can render the claim "obvious" to a POSITA. I understand that for an invention claimed in a patent to be patentable, it must not be anticipated and must not be obvious based on what was known before the invention was made. For purposes of this Declaration only, I have applied the definition of a POSITA proposed in the Petition.

19. I understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each and every limitation of the claim as construed by the court is found, either expressly or inherently, in a single prior art reference, such as a publication or patent, that predates the claimed subject matter. I also understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of non-obviousness (i.e., “secondary considerations”).

20. I also understand that, when a party alleges obviousness based on a combination of references, that party should identify a reason why a POSITA would have been motivated to combine the asserted references in the manner recited in the claims and to explain why a POSITA would have had a reasonable expectation of success in making such combinations.

21. I understand that an obviousness analysis permits the application of “common sense” in examining whether a claimed invention would have been obvious to a POSITA. For example, I understand that combining familiar elements according

to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. And I understand a party asserting obviousness should still provide a specific motivation to combine the references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

22.I understand that one indicator of nonobviousness is when a prior art reference leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent's result, or otherwise indicates that a seemingly inoperative device would be produced.

IV. RESOURCE MANAGEMENT IN WIRELESS NETWORKS

23.The domain of the '138 Patent includes the management of radio resource allocations wherein "resources" are units of transmission capacity in a wireless network. Such resources can take many forms depending on the technology utilized in the wireless network. Examples are frequency subcarriers (e.g., in an OFDM(A) System), time slots (e.g., intervals of transmission set aside for a particular user in a TDMA system), spreading or orthogonal codes (e.g. PN codes or Walsh codes in a CDMA system).

24.In most cases, in a wireless cellular communications system the allocated resources are activated (by a mobile terminal, designated in many systems as User Equipment, or UE, or a Radio Base Station, or BS), with a prescribed transmission

power level, as well as other physical parameters of the radio signal needed to effect reliable detection and synchronization of the signal. The aggregate of physical parameters that enable a quantum of communication using the allocated resources is characteristic of the system.

25. Notwithstanding the particular system architecture, a fundamental principle of operation of a multiple access (MA) system in use today is the fair and efficient sharing of the radio channel by a plurality of users. In systems in use today, users are allocated resources temporarily via a moderated¹ contention-based demand-assignment process. Users (also referred as subscribers or mobile terminals) must accept a limitation of the total data throughput available to them. Access procedures limit the number of users accessing the system to limits that permit the “active users” to enjoy reasonable throughput. Even with such procedures, it is necessary to manage the active user resource allocations to ensure that users receive timely resource allocations (without excessive delay) in a fair manner (so

¹ There are many forms of contention protocols. I use the adjective “moderated” here in reference to the fact that cellular telephone systems are organized and managed according to System Configuration and Status information that is disseminated among the system components, including the terminals that are in its service domain. Thus, terminals are able to discern certain information before attempting to access the system. This information allows the contention process to be “moderated”, as opposed to “blind”. In a blind contention process, access may be attempted without any foreknowledge of the probability of success. In a moderated system, availability information may be shared (broadcast), advising users of system availability before access is attempted. In any case, this aspect of system management is separate from the subject of the patent at issue.

that no user receives an allocation fraction greater than that user's service profile prescribes).

26. In current systems, users may subscribe, in principle at least, to wireless network services under Service Level Agreements (SLA's) that provide for differentiated Quality of Service (QoS) characteristics as a function of subscription and traffic carrying fee schedules. Quality of Service parameters include, among other things, throughput (cumulative information transfer per unit time), latency (delay), error rate (information symbols or packets received incorrectly) and allowable jitter (the random departure of the arrival time of information symbols or packets from the expected arrival time). The importance of the respective QoS parameters varies according to the nature of the user "traffic", or data payload, intended for transmission over the radio access interface. For example, voice and video traffic is sensitive to delay and jitter but tolerates some errors. File transfers are not sensitive to moderate delay but are very sensitive to errors.

V. THE '138 PATENT

A. Overview of Allocation Process in the '138 Patent

27. The '138 Patent addresses aspects of the following functions in a Radio Access Protocol:

- Organizing user data packets² according to their QoS Parameters.
- Buffering user data packets in a transmission buffer for temporary storage until resources are activated for transmission of the packets.
- Prioritizing the transmission of the respective buffers' contents.
- Allocation of quanta of transmission resources in a manner that provides a means of withdrawing waiting (buffered) data and transmitting said data over the radio link.
- Management of the total number of separate radio bearers³ operating on the radio interfaces.

28. Specifically, the patent contemplates a plurality of data flows each having a QoS profile and associated with a radio bearer instance. Radio bearers are associated with queues (buffers) that serve to hold data while transmission is pending. Buffers also allow for the orderly sharing of radio resources by providing time for resources to become available. A method is disclosed that provides for a division of the overall available radio resource pool into Resource Allocation Units. The

² I use the term packet generically herein to refer to an aggregate of data symbols belonging to a service data stream. For example, a voice service breaks the information from a voice encoding process into blocks that are transmitted discretely (separately). Packets are also universal units of data (indeed, they are called Datagrams) in the internet protocol (IP) that carries information across the Internet.

³ A Radio Bearer may be thought of as a “pipe” through which data can be transferred. Systems manage the pipes, and there is an overhead cost in such management, which increases with the number of pipes.

total amount of resources is therefore made available to a plurality of flows by allocating partial resources to respective users.

29. The allocation process disclosed in the patent services users in a statistically fair fashion. In simple terms, the system keeps track of user “satisfaction” and ensures that satisfaction is uniform. The patent defines a quantity termed “*Running_RAAU_delta*,” that serves as a numerical measure of accumulated service excess or deficiency provided to each user. Using *Running_RAAU_delta*, the allocation process manages allocation priority in a fair manner.

30. As explained in the '138 Patent, an aspect of the allocation of resources is to determine the number of resources to be allocated to service each queue. In situations where the system loading is sufficiently light, sufficient resources may be available to empty every queue entirely in each transmission interval. Under more general and more typical operating conditions, the method described in the patent allocates a share of available resources in each transmission interval in a manner that, for example, maintains equality of performance across users having the same QoS and SLA profile.

B. System Disclosed for Implementing the Allocation Process

31. FIG. 5 of the '138 Patent illustrates a communication system for implementing the allocation process in the context of uplink scheduling. Ex. 1001 ('138

Patent), Col. 5, Ll. 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., Col. 10, Ll. 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., Col. 10, Ll. 8-10.

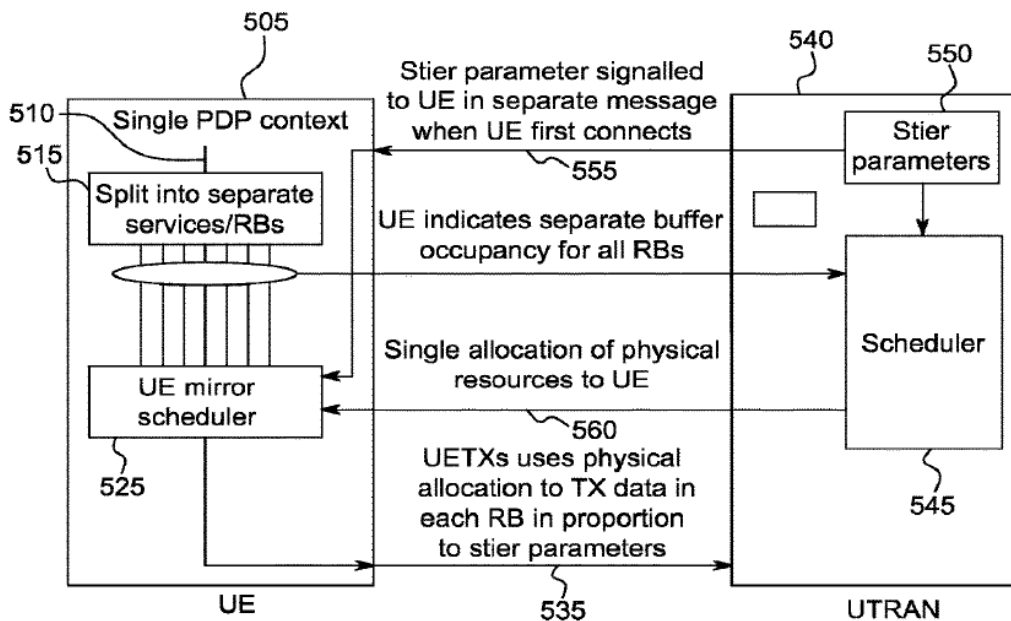


FIG. 5

“The separate services on individual radio bearers are input to a UE mirror scheduler 525.” Id., Col. 10, Ll. 11-12. The UE mirror scheduler 525 receives Service Tier (*Stier*) parameters 550 from the UTRAN 540, which are also input to

the UTRAN scheduler 545. Id., Col. 10, Ll. 13-16. The UTRAN scheduler 545 provides “a single allocation of a physical resource to the UE mirror scheduler 525 within message 560.” Id., Col. 10, Ll. 17-18 (emphasis added). “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 *Stier* parameters 550.” Id., Col. 10, Ll. 19-22. “Thus, within the UE 505, the *Stier* 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., Col. 10, Ll. 23-28.

C. Limiting The Total Number of Queues Served

32. 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., Col. 10, Ll. 32-45 (emphasis added).

33. In the disclosed embodiment, “max_number_queues_serviced” 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_serviced' ...* Id., Col. 10, Ll. 48-54 (emphasis added).

It is clear that the ‘max_number_queues_serviced’ 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_serviced’ value.

D. First and Second Iterations of Allocation Process

34. The '138 Patent describes its iterative allocation process in connection with Fig. 6 (reproduced below in annotated form). The process includes a “first iteration” (steps 628-655) and a “second iteration” (steps 660-665).

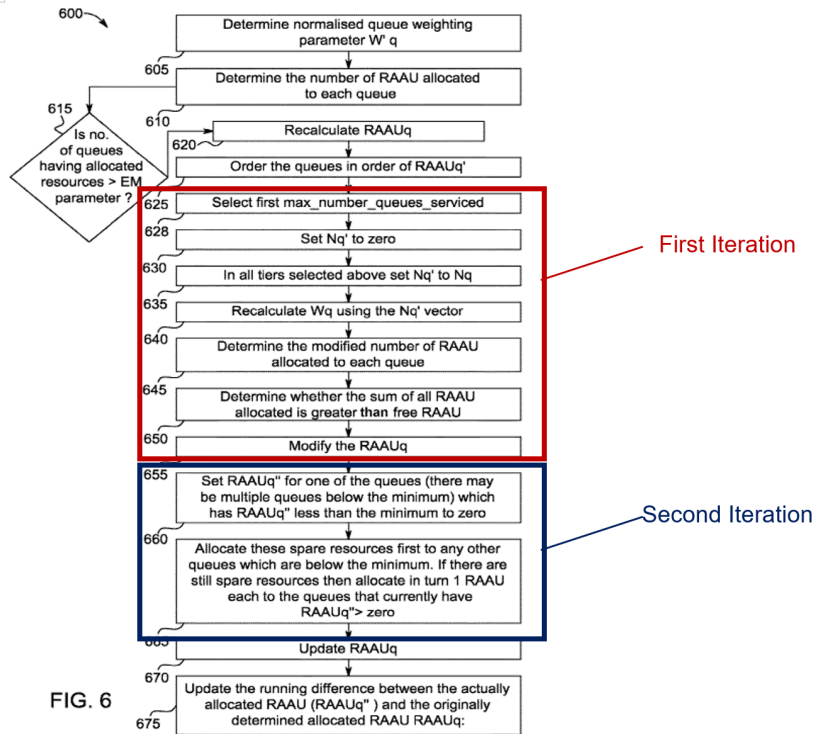


FIG. 6

35. The process begins at step 605 by determining a normalized weighting ($W'q$) of the allocated resources.” Id., Col. 10, Ll. 57-58. Next, in step 610, the process determines a number of resource allocation units (RAAU) allocated to each queue using the following equation:

$$RAAUq = FreeRAAU * W'q$$

“Where:

RAAU represents a quantum of physical resource (codes and timeslots);

and

FreeRAAU is a number of free RAAU that the resource allocator (RA) can share out.”

Id., Col. 11, Ll. 1-10.

36. Next, in step 615, the process determines whether “the number of queues that have resources allocated is greater than” the max_number_queues_served threshold. If so, RAAUq is recalculated in step 620 as follows:

$$RAAUq' = RAAUq + \text{running_RAAU_delta}$$

“Where:

RAAUq is calculated in step 610, and

running_RAAU_delta is the running difference between the number of RAAU that would be allocated without the limitation of the number of queues serviced and the number of RAAU allocated with the limitation.”

Id., Col. 11, Ll. 11-31.

37. In step 625, “the queues are then ordered in order of RAAUq', beginning with the highest queue.” Id., Col. 11, Ll. 39-40.

38. First Iteration (Steps 628-655)

The first iteration begins with the queues ordered in order of RAAUq' beginning with the highest queue (from step 625). From that ordering, “[t]he first max_number_queues_served queues are then selected, as shown in step 628.” Id., Col. 11, Ll. 39-42. In this step, a subset of all queues (corresponding to the max_number_queues_served) is selected from the top of the ordering.

39. Next, the process adjusts the N_q values, where N_q “is the number of entries in a queue Q .” Id., Col. 10, Ll. 65-66. Specifically, “[i]n 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., Col. 11, Ll. 43-45.

40. Next, in step 640, the normalized weighting of allocated resources “(now known as W''_q) may be recalculated using the N_q' vector determined in step 635. [and the] modified number of RAAU, allocated to each queue, may then be determined in step 645” as follows:

$$RAAU_{q''} = \text{round}(\text{FreeRAAU} * W''_q)$$

“where round (...) rounds to the nearest integer.”

Id., Col. 11, Ll. 46-61.

In step 650, “the sum of all RAAU allocated may then be determined.” Id., Col. 11, Ll. 61-62.

41. In step 655, if the sum of all RAAU 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, as also described in the PCT publication WO 03/049320.” Id., Col. 11, Ll. 62-67.

42. Second Iteration (Steps 660-665)

In the second iteration, the allocation algorithm addresses situations where the volume of resources allocated to a given queue is less than that required, by setting such queue's RAAUq" to zero, and then reallocating the resources from such queue to other queues. As the '138 Patent explains:

It 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. Therefore, if the amount of RAAU allocated by RAAU tier" is less than the minimum required RAAU, given the cell edge state for any q, then RAAUq" may be set for one of the queues that has RAAUq" less than the minimum to zero, as shown in step 660. Here, it is noteworthy that there may be multiple queues below the minimum. Id., Col. 12, Ll. 1-11.

43. In Step 665, the spare resources (resulting from setting the RAAUq" to zero for one or more queues in step 660) "are allocated first to any other queues that are below the minimum. ... If there are still spare resources, then any spare resources are allocated in turn; one RAAU each to the queues that currently have RAAUq" greater than zero. Id., Col. 12, Ll. 12-16.

44. Following the "Second Iteration" (Steps 660-665), "[t]he RAAUq" value is then updated, as shown in step 670. The running difference, between the actually allocated RAAU (RAAUq") and the originally determined allocated RAAU RAAUq, is then updated, as shown in step 675" as follows:

$$\text{running_RAAU_delta} := \text{running_RAAU_delta} + (\text{RAAUq} - \text{RAAUq})"$$

Id., Col. 12, Ll. 12-2.

E. The Challenged Claims

45. The challenged claims of the '138 Patent include independent claims 1 and 8.

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.

46. Two aspects of claim 1 are noteworthy.

First, in the first iteration, “data is selected from a subset of the
plurality of radio bearers.” This subset corresponds to the

‘max_number_queues_served’ parameter discussed above in connection with, e.g., Step 628.

Second, the language of Claim 1 (as well as the Specification) make clear that both the first and second iterations are applied to select data, and only after both iterations are performed is the selected data transmitted. The final limitation of the claim recites transmission of “the selected data,” where the antecedent for “the selected data” is the earlier limitation in the claim that recites: “select data from the plurality of radio bearers ... wherein the selection of the data occurs using a first iteration and a second iteration.” Fig. 6 of the Specification illustrates just such a sequence where, the “first iteration” (steps 628-655) is performed first, and the “second iteration” (steps 660-665) is applied to adjust the results of the ‘first iteration’ – all of which happens prior to data transmission.

VI. Claim Construction

47. The “subset of the plurality of radio bearers” referred to in Claim 1 (and Claim 8) corresponds to the ‘max_number_queues_served’ parameter discussed above in connection with, e.g., Step 628. The ‘max_number_queues_served’ value corresponds to less than all queues, because it is used when the number of active users “is greater than” the ‘max_number_queues_served’ value. Id., Col. 10, Ll. 52-54 (“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'); *see also*, Col. 10, Ll. 40-43 (“this algorithm limits a number queues that can be allocated resource at any one instance.”) A POSITA, reading the claim in light of the specification, would understand the “subset of the plurality of radio bearers” referred to in Claim 1 to mean “less than all of the plurality of radio bears.”

VII. The Petition’s Mapping of Peisa to the Challenged Claims

48. The Petition relies on Peisa (Ex. 1004) alone or as a primary reference in combination with secondary references in its mappings. As discussed below, those mappings fail to demonstrate that at least two aspects of independent claims 1 and 8 are shown or suggested by Peisa.

A. Peisa Fails to Disclose the Claimed ‘First Iteration’

49. Independent claims 1 and 8 both recite that “in the first iteration ... data is selected from a subset of the plurality of radio bearers based on the received parameters.” For the reasons discussed above, the first iteration is limited to selecting data from some – but less than all – of the radio bearers.

50. The Petition maps the claimed “first iteration” to steps 415-445 in Fig. 4 of Peisa. Peisa’s description of these steps is as follows:

With reference now to FIG. 4, an exemplary method in flowchart form for allocating bandwidth resources to data flow streams between entities in the exemplary second layer architecture of FIG. 3 is illustrated generally at 400. The flowchart 400 is a flow diagram of a method of allocating bandwidth resources to, for example, the input flow Streams of a MAC entity of the layer 2 of FIG. 3. Generally, an exemplary method in accordance with the flowchart 400 may follow the following steps. First, input flows are received at RLCs and the data is buffered (step 405). Information on buffer fill levels is passed to the MAC entity (step 410). After *the information on buffer fill levels is passed, the fair MAC bandwidth share for each input flow is computed (step 415)*. The computed fair share of each is then adjusted by *adding the contents of an associated backlog counter* to the respective computed fair share (step 420). Once the computed fair shares have been adjusted, a TFC is selected from the TFC set to most closely match the adjusted fair shares (step 425). The RLC is next instructed to deliver packets to the MAC entity according to the selected TFC (step 430). The MAC entity may also schedule packets in accordance with the selected TFC (step 435). After packet scheduling, the traffic channels may be transported on the physical channel(s) (step 440). Once packet traffic has been transported, the backlog counters should be updated (Step 445). ... Ex. 1004, Col. 10, Ll. 29-55 (emphasis added).

51. Peisa's discussion of Fig. 4 discloses a scheduling algorithm that computes a

"fair MAC bandwidth share" for each input flow of data, after which the contents of a backlog counter are added "to the respective computed fair share."

Peisa does not disclose that this fair share is zero for any of the radio bearers.

52. The aspects of Peisa mapped to the claimed "first iteration" (Peisa, Steps 415-445; Pet., 47-50) fail to meet the requirement that data be selected from a subset of radio bearers, because step 415 of Peisa allocates a fair share to every radio bearer and then adds the contents of a backlog counter thereto. Peisa contains

no disclosure that steps 415-445 are applied to only a subset (i.e., less than all) of the radio bearers, as required by the Challenged Claims.

B. Peisa Fails to Disclose Performance of Both the ‘First Iteration’ and the ‘Second Iteration’ Before the Selected Data is Transmitted

53. Independent claims 1 and 8 also require that both the first and second iterations are applied to “select data,” and only after both iterations are complete (resulting in “the selected data”) is the selected data transmitted. As mentioned above, the final limitation of Claim 1 recites transmission of “the selected data,” where the antecedent for “the selected data” is the earlier limitation in the claim that recites: “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.”

Claim 8 includes the same limitation, but in method format.

54. The claimed ordering is illustrated in the Specification where, the “first iteration” (steps 628-655) is performed, and then the “second iteration” (steps 660-665) is applied to adjust the results of the “first iteration” – all of which happens prior to data transmission.

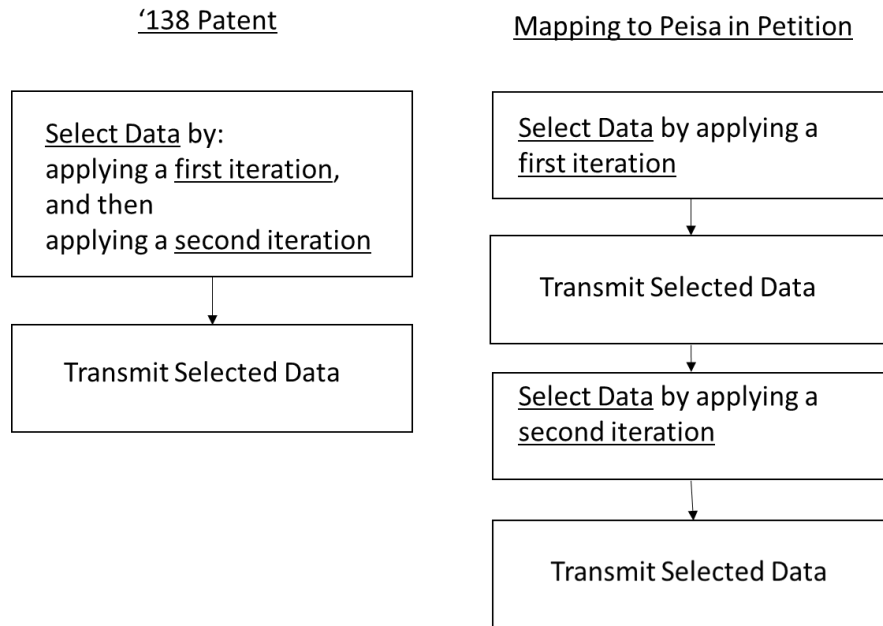
55. By contrast, the mappings in the Petition are to a system where data is transmitted immediately after the “first iteration”, i.e., before any ‘second iteration’ is performed. In attempting to map the claimed “first iteration” to Peisa, the Petition states:

As explained in claim 1[f]/8[e], the scheduling algorithm in Figure 4 is iterative. In the first iteration, the scheduling algorithm computes a “fair MAC bandwidth share” for each input flow of data in step 415. *Peisa* discloses that this computation of shares is based on the “weights” for each input flow as defined by the RNC. ...

In step 420, each “computed fair share is then adjusted by adding the contents of an associated backlog counter to the respective computed fair share[.]” ... Then, in step 430, the RLC is “instructed to deliver packets to the MAC entity according to the selected TFC.

When the scheduling algorithm *does* reach step 445 in the first iteration, it will “update” the “backlog counters” for each input flow that did not get to transmit all of its data during the first iteration. Pet., at 47-49 (emphasis added, citations omitted).

56. The Petition then goes on to map the claimed “second iteration” to the next cycle of Fig. 4 (steps 405-445) of *Peisa*. Pet., at 50-52. Thus, the mappings in the Petition show a first transmission of data selected based on the result of the “first iteration,” and a second transmission of data selected based on the result of the “second iteration”. A high-level diagram comparing the claimed process to the mappings in the Petition is set forth below:



57. In summary, it is my opinion that Peisa fails to disclose an allocation algorithm where both the first and second iterations are applied to select data, and only after both iterations are performed is the selected data transmitted.

DECLARATION

I, Dr. Gary Lomp, declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: 6 Oct 2022 By: 

Dr. Gary Lomp