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Paper 49
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CONTINENTAL AUTOMOTIVE SYSTEMS, INC.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2022-00972
Patent 9,681,466 B2

Before KRISTEN L. DROESCH, DAVID C. MCKONE, and AMBER L. HAGY, *Administrative Patent Judges*.

MCKONE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying and Dismissing as Moot Petitioner's Motion to Exclude
35 U.S.C. § 318(a); 37 C.F.R. § 42.64(c)

I. INTRODUCTION

Continental Automotive Systems, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–10 of U.S. Patent No. 9,681,466 B2 (Ex. 1001, "the '466 patent").[1] Intellectual Ventures II LLC ("Patent Owner") filed a Preliminary Response to the Petition. Paper 7 ("Prelim. Resp."). Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 12) and Patent Owner filed a Preliminary Sur-reply to the Preliminary Reply (Paper 14).

The Board instituted an *inter partes* review of the challenged claims pursuant to 35 U.S.C. § 314. Paper 16 ("Dec.").

After institution, Patent Owner filed a Patent Owner Response (Paper 27, "PO Resp."); Petitioner filed a Reply (Paper 33, "Reply"); and Patent Owner filed a Sur-reply (Paper 40, "Sur-reply"). The parties then presented oral arguments via a (video) Hearing (Sept. 7, 2023), and the Board entered a Hearing transcript into the record (Paper 48, "Tr.").

Petitioner filed a Motion to Exclude Evidence (Paper 42, "Mot. to Exclude"); Patent Owner filed a response (Paper 44, "Opp. Mot. to Exclude"); and Petitioner filed a reply (Paper 45, "Reply Mot. to Exclude").

For the reasons set forth in this Final Written Decision pursuant to 35 U.S.C. § 318(a), we determine that Petitioner demonstrates by a preponderance of the evidence that claims 1–10 are unpatentable.

[1] The Petition was filed by Toyota Motor Corp. and Continental Automotive Systems, Inc. We later terminated the proceeding as to Toyota Motor Corp. due to settlement after institution of trial, leaving Continental Automotive Systems, Inc., as the sole Petitioner. Paper 26.

II. BACKGROUND

A. Related Proceedings

The parties identify several district court and *inter partes* review proceedings in which the '466 patent is or has been involved. Pet. 72–74; Paper 4, 2.

B. The '466 Patent

The '466 patent relates to queuing algorithms for packet data transmission, for example, for use in the universal mobile telecommunication standard (UMTS). Ex. 1001, 1:23–26. Such algorithms can be used in a system such as illustrated in Figure 1, reproduced below:

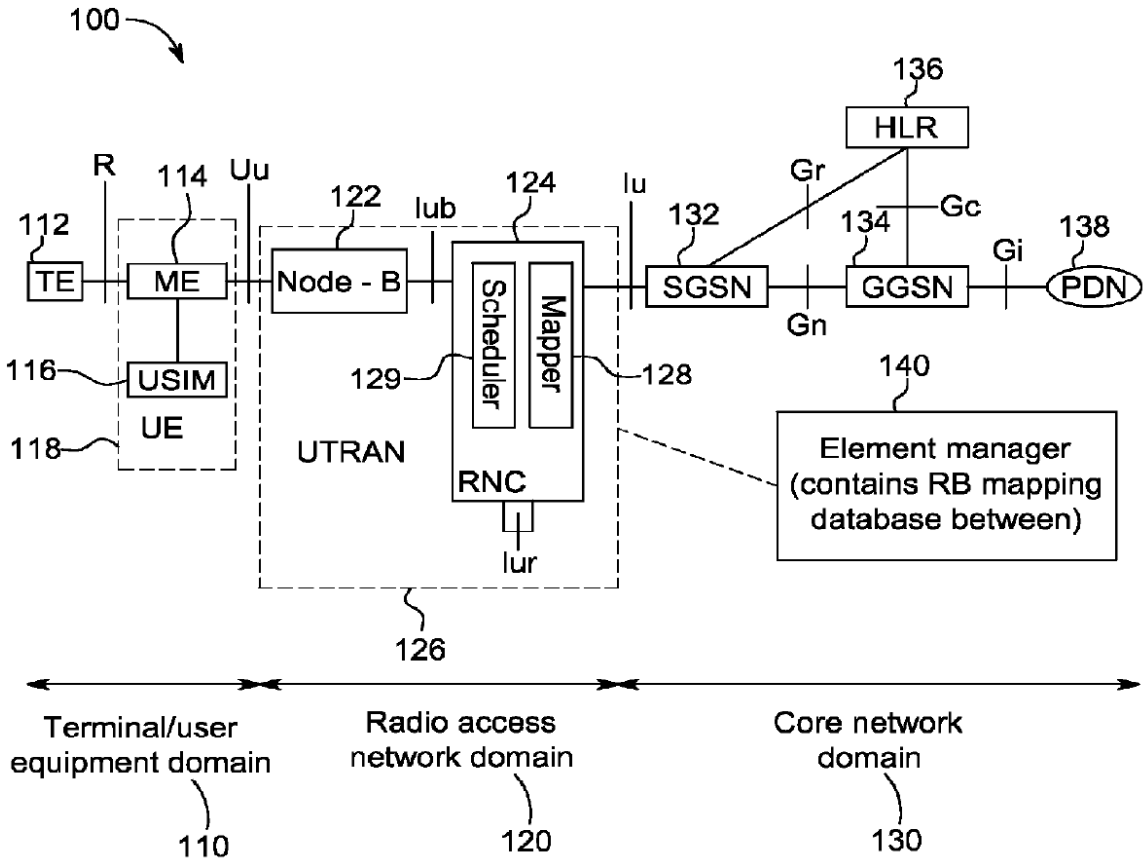


FIG. 1

Figure 1 is a block diagram of a 3rd Generation Partnership Project (3GPP) cellular communication system, e.g., UMTS Radio Access Network (UTRAN) system 100. *Id.* at 5:33–34, 6:8–10. UTRAN 100 includes terminal equipment (TE) 112 connected to mobile equipment (ME) 114, which, along with user service identity module (USIM) 116, constitutes user equipment (UE) 118. *Id.* at 6:13–18. UE 118 can be, for example, a mobile station, a personal digital assistant, or a laptop computer communicating over an air interface using a cellular communication system. *Id.* at 6:18–23.

UE 118 communicates with base station (Node-B) 122 via wireless interface Uu. *Id.* at 6:24–26. Node-B 122 communicates with radio network controller (RNC) 124. *Id.* at 6:26–28. Mapper 128 of RNC 124 maps internet protocol (IP) packets to separate radio bearers (RBs). *Id.* at 7:40–44. Scheduler 129 allocates a certain proportion of a radio resource to each of the RBs. *Id.* at 7:45–47. Node-B 122 and RNC 124 together form UTRAN 126. *Id.* at 6:31–32. RNC 124 communicates with serving general packet radio service (GPRS) service node (SGSN) 132, which communicates with gateway GPRS support node (GGSN) 134, which, in turn, communicates with public data network (PDN) 138. *Id.* at 6:34–40.

The ’466 patent describes a mechanism to provide prioritization of services across multiple users in an uplink (from UE 118 to Node-B 122) direction. *Id.* at 9:19–21. A single physical allocation of resources can be made to UE 118. *Id.* at 9:29–31. “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 signalled weight values (S_{tier}).” *Id.* at 9:32–36. Scheduler logic in the

network and UE "takes the single physical allocation and splits it between different RBs using the weight, S_{tier}, values." *Id.* at 9:46–50.

Figure 6, reproduced below, illustrates an example queuing algorithm:

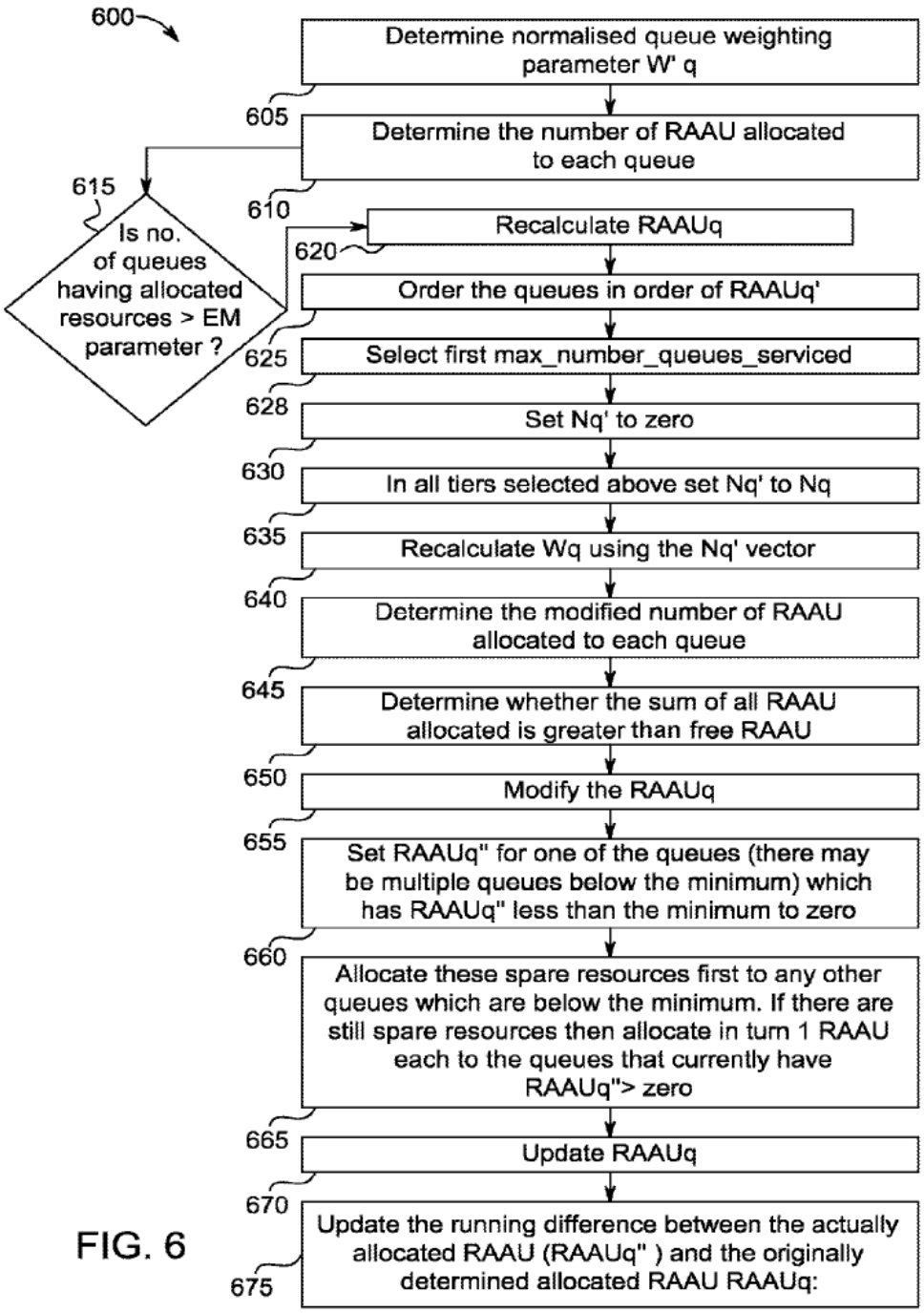


FIG. 6

Figure 6 is a flow chart of a method to limit a number of services/queues to be allocated RBs at a particular instant in time. *Id.* at 5:47–49. "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', as defined by the Element Manager (EM)." *Id.* at 10:48–53.

Algorithm 600 starts by determining a normalized queue weighting parameter W'q[2] of the allocated resources. *Id.* at 10:54–67 (step 605). Algorithm 600 then determines the number of RAAU allocated to each queue, RAAUq, where RAAU represents a quantum of physical resource (codes and timeslots), and is calculated by multiplying the total number of free RAAU resources by normalized queue weighting parameter W'q (equation 7). *Id.* at 11:1–10 (step 610). If the number of queues that have resources allocated is greater than a threshold (step 615), the algorithm re-calculates RAAUq to produce the value RAAUq' (step 620). *Id.* at 11:11–37. The queues are then ordered, beginning with the highest RAAUq' value, and a number of the top queues equal to a maximum number of queues value are selected. *Id.* at 11:38–41 (steps 625, 628). For all queues not selected in step 628, an Nq' value (number of entries in the queue, a value used in calculating normalized queue weighting parameter W'q) is set to zero (step 630); for all queues selected, Nq' is set to Nq (step 635). *Id.* at 11:42–44. The normalized queue weighting parameter for each queue is recalculated as Wq", and a modified number of RAAU allocated to each

[2] The equation for W'q includes a S_{tier} weighting value, Sq, which Petitioner contends (and Patent Owner does not contest), is a "first parameter," as recited in claim 1. Ex. 1001, 10:57–63 (equation 6); Pet. 42.

queue, RAAUq", is determined. *Id.* at 11:45–60 (steps 640, 645). If the sum of all RAAUq" is greater than the number of free RAAU resources, RAAUq" may be modified in step 566. *Id.* at 11:62–67. Spare resources may be allocated to other queues in step 665. *Id.* at 12:11–15. A running difference between resources actually allocated to a queue (RAAUq") and the originally determined RAAUq is updated in step 675. *Id.* at 12:16–24.

Claim 1, reproduced below, is illustrative of the subject matter at issue:

> 1. A user equipment (UE) comprising:
>
> circuitry configured to receive, from a network device, a first transmission including a first parameter corresponding to each of a plurality of channels and a second transmission including an allocation message for an uplink resource from the network device;
>
> a processor configured to allocate resources in response to the allocation message, wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero; and
>
> wherein the second parameter is derived from a first channel's first parameter and the third parameter is derived from a second channel's first parameter.

C. Evidence

Petitioner relies on the references listed below.

Reference(s)		Date	Exhibit No.
Speight	US 2007/0258433 A1[3]	pub. Nov. 8, 2007	1006
Peisa	US 6,850,540 B1	iss. Feb. 1, 2005	1010
Heo	US 2005/0047416 A1	pub. Mar. 3, 2005	1011

Petitioner also relies on the Declaration and Supplemental Declaration of Robert Akl, D.Sc. (Exs. 1004, 1040).

Patent Owner relies on the Declaration of Gary Lomp, Ph.D. (Ex. 2003[4]).

D. The Asserted Grounds of Unpatentability

Petitioner contends that claims 1–10 are unpatentable under the following grounds. Pet. 19.

Claims Challenged	35 U.S.C. §	References
1–10	102(a)(1)[5]	Speight
1–3, 6–8	102(a)(1)	Peisa
2, 7	103	Peisa, Heo

[3] The '466 patent issued from a chain of continuations of U.S. Application No. 11/430,421 (Ex. 1005, "the '421 application"), which published as Speight. Ex. 1001, code (63); Ex. 1006, code (21). Petitioner contends that Speight and the '421 application have the same specification as the '466 patent in all material respects, which Patent Owner does not contest. Pet. 6.
[4] Patent Owner submitted a Declaration of Dr. Lomp, Exhibit 2001, with the Preliminary Response, but no longer relies on that Declaration. In this Decision, we refer to the Declaration of Exhibit 2003 unless otherwise stated.
[5] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the '466 patent was filed after March 16, 2013, we apply the AIA version of §§ 102 and 103.

III. ANALYSIS

A. Level of Skill in the Art

Petitioner, relying on the testimony of Dr. Akl, contends that a person of ordinary skill in the art "would have had a Bachelor of Science in electrical engineering, computer engineering, or an equivalent field, as well as three years of experience in wireless communication technology, or a master's degree in electrical engineering, or other equivalent degree," and that "[a]dditional education could substitute for professional experience and vice versa." Pet. 14 (citing Ex. 1004 ¶¶ 47–49). Patent Owner does not contest Petitioner's contention or propose a level of skill. Petitioner's proposal is consistent with the technology described in the Specification and the cited prior art. On the complete record, we adopt this level of skill.

B. Claim Construction

For petitions filed after November 13, 2018, we construe claims "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b) (2019); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

1. *"wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero"*

Claim 1 recites "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero." Independent claims 4, 6, and 9 include similar recitations.

Petitioner contends that this claim term recites "two alternatives with respect to the claimed 'third parameter,'" specifically,

> [Alternative A] allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than . . . zero.
>
> [Alternative B] allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter . . . equal to zero.

Pet. 2 (color emphasis omitted).

In the Preliminary Response, Patent Owner agreed, arguing that claim 1's "processor's programming causes it to apply the claimed allocation process when either of two mutually-exclusive, alternative conditions are satisfied." Prelim. Resp. 17. According to Patent Owner,

> the processor must include: (i) programming that allocates resources "for data of each channel having a *second parameter above zero* prior to another channel's data for transmission having a *third parameter less than . . . zero*," and (ii) it must include programming that allocates resources "for data of each channel having a *second parameter above zero* prior to another channel's data for transmission having a *third parameter . . . equal to zero*."

Id.

In the Institution Decision, we accepted the parties' apparent agreement that this claim term should be read as reciting two mutually-exclusive alternatives with respect to the "third parameter." Dec. 11. The parties do not challenge this construction in the Patent Owner Response, Reply, or Sur-reply. On the complete record, we construe "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero" as reciting two mutually-exclusive alternatives with respect to the "third parameter."

2. "second parameter" and "third parameter"

Claim 1 recites "wherein resources are allocated for data of each channel having a *second parameter* above zero prior to another channel's data for transmission having a *third parameter* less than or equal to zero." (emphases added). Claims 4, 6, and 9 include similar recitations. In the Institution Decision, we preliminarily determined that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels. Dec. 11–14.

Petitioner contends that the second parameter disclosed in the Specification and Speight (which Petitioner contends essentially has an identical specification) is RAAUq' and the third parameter is RAAUq", two different values within algorithm 600 depicted in Figure 6 (reproduced above for the '466 patent). Pet. 17, 41–43.

Patent Owner had contended in the Preliminary Response that two instances of the same parameter for different channels can be the second and third parameters, arguing that RAAUq' can be positive, zero, or negative

and that, in some instances, a negative RAAUq' value for one channel will result in a resource being allocated for another channel having a RAAUq' value above zero. Prelim. Resp. 7–12. Patent Owner no longer contests our preliminary construction, stating that

> Without waiver of the positions set forth in Patent Owner's Preliminary Response (Paper 7) and Sur-Reply (Paper 14), and for purposes of this proceeding only, Patent Owner relies on the Board's construction "that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels."

PO Resp. 9. On the complete record, and for the reasons given in our Institution Decision (Dec. 11–14), we maintain this construction.

Applying this construction in arguing that Speight provides written description support for the challenged claims, Patent Owner maps RAAUq" to the "second parameter" and RAAUq' to the "third parameter." PO Resp. 29 ("By mapping the claimed 'second parameter' to RAAUq" and the 'third parameter' to RAAUq', the illustrative example demonstrates that the claim language in question is met."). By the literal language of our construction, for which Petitioner advocated, RAAUq" and RAAUq' are separate and different parameters, and, thus, could be second and third parameters, respectively, if they satisfy other claim language such as "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero."[6] As Patent Owner argues, "[t]here is no dispute that the parameters used by Patent Owner for its

[6] We explain below why the evidence does not show that RAAUq" and RAAUq' behave in the manner claimed for the second and third parameters, respectively.

mapping (i.e., RAAUq' and RAAUq") are different parameters and therefore meet the claim construction position staked out in the Petition and adopted by the Board in the Institution Decision." Sur-reply 20.

Petitioner purports to continue to advance this construction, Reply 2, but instead asks us to construe "second parameter" exclusively as RAAUq' and the "third parameter" exclusively as RAAUq", *id.* at 20. Petitioner argues that "ordinary artisans would not consider that every one of the parameters disclosed in the Parent Application's specification, e.g., W'q, Nq', RAAU, RAAUq', and RAAUq", could interchangeably be mapped to every one of the enumerated claim terms in the Challenged Claims." *Id.* at 21–22. In support, Petitioner cites new testimony of Dr. Akl not supplied with the Petition. *Id.* (citing Ex. 1040 ¶ 21). Petitioner argues that "[o]rdinary artisans would consider there to be only one correct mapping." *Id.* at 25 (citing Dec. 17–18; Ex. 1040 ¶ 21).

Petitioner argues that the intrinsic evidence supports its new construction. *Id.* at 22–23. Specifically, Petitioner argues that the algorithm of Figure 6 can be divided into three stages, and that "[o]rdinary artisans would understand that each of these stages of the algorithm sequentially uses different parameters, which correspond to the claimed parameters in sequence." *Id.* at 22 (citing Ex. 1005 ¶¶ 84–95[7]; Ex. 1040 ¶ 22). As to the alleged first stage, Petitioner argues that Patent Owner does not dispute that Sq is the only parameter described as satisfying the claimed "first parameter

[7] Petitioner cites to the '421 application which, we note above, the parties appear to agree has the same disclosure as the '466 patent.

corresponding to each of a plurality of channels," as recited in claim 1.[8] *Id.* at 23 (citing Ex. 1005 ¶¶ 84–86; Ex. 1004 ¶¶ 105–106; Ex. 1040 ¶ 23). Similarly, regarding the alleged second and third stages, Petitioner argues that "ordinary artisans would understand that only the RAAUq' parameter corresponds to the claimed 'second parameter,'" and "ordinary artisans would understand that only the RAAUq" parameter corresponds to the claimed 'third parameter." *Id.* at 23–25 (citing Ex. 1005 ¶¶ 87–95; Ex. 1004 ¶¶ 109–124, 127–128; Ex. 1040 ¶¶ 24, 26).

Petitioner also contends that the prosecution history of a continuation application of the '466 patent (not the prosecution history of the '466 patent itself) shows that the applicant understood the "second parameter" to correspond to RAAUq' alone, where the applicant "heavily amended" the claims to recite that a "second value" is one that is compared to a threshold to determine whether to schedule a buffer's data for transmission. Reply 23 (citing Ex. 1038[9]; Ex. 1040 ¶ 25).

Patent Owner contends that we should exclude Petitioner's new claim construction as exceeding the proper scope of a reply, arguing:

> Where, as here, the Petitioner stakes out a claim construction position, and Patent Owner expressly relies on that claim construction in its Patent Owner Response, it would be unfairly prejudicial to allow Petitioner to change its claim construction

[8] Patent Owner would not be expected to dispute this, as Petitioner never argued, and we never found, that Sq is the only parameter described in the Specification as the "first parameter." Pet. 17–18 (listing Sq as an example "first parameter," but not arguing that it is the exclusive "first parameter"); Dec. 20 (finding disclosure of Sq to be sufficient to show a "first parameter"), 22 (same).

[9] This evidence was submitted with the Reply, but not the Petition.

> position in its Reply – at a time when Patent Owner is procedurally precluded from submitting further evidence.

Sur-reply 21.

We agree with Patent Owner. The Petition is required to identify "[h]ow the challenged claim is to be construed." 37 C.F.R. § 42.104(b)(3). Petitioner argued in the Petition that "as properly construed, the claimed 'first parameter,' 'second parameter,' 'third parameter,' and 'fourth parameter' are four different parameters." Pet. 17–18. In the Institution Decision, Petitioner prevailed on that point and "we agree[d] with Petitioner that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels." Dec. 14. Patent Owner "relie[d] on the Board's construction 'that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels,'" and proposed distinct parameters in the Specification that it alleges are examples of second and third parameters, albeit not the same two parameters proposed by Petitioner. PO Resp. 9, 29.

Petitioner now proposes new constructions for the second and third parameters that would limit those parameters to the two examples it advanced in the Petition and improperly supports these new constructions with new expert testimony and an exhibit from the prosecution of a later patent. Reply 20–25; Ex. 1040 ¶¶ 20–29; Ex. 1038. *See also* Consolidated Trial Practice Guide ("TPG")[10] 73 ("Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability."). As Patent Owner observes (Sur-reply

[10] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

21), it has no opportunity to introduce rebuttal evidence contesting the new constructions. *See* TPG 73–74 (Nov. 2019) ("The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness. Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony."). We agree with Patent Owner that it would be unfair to consider Petitioner's new construction. *See* 37 C.F.R. § 42.23(b) ("A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution."). Thus, Petitioner has forfeited its new claim construction arguments and they will not be considered. *See* TPG 74 ("While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered.").

Moreover, these arguments would be unpersuasive even if considered. Petitioner has, at most, cited description in the Specification to show that its identified second and third parameters are examples corresponding to the recited second and third parameters. Ex. 1005 ¶¶ 84–95. This description does not define the second and third parameters nor purport to exclude from the claims any parameter that would otherwise meet the language of the claims. The prosecution history to which Petitioner cites, that of a child application, took place after the prosecution of the '466 patent and thus, does not constitute a definition or disclaimer of subject matter for claims of the '466 patent. In any case, the brief argument in the cited response to office action, that "[i]n the algorithm, the first value is provided by the wireless network for each of a plurality of buffers where the buffer having the second

value above a threshold transmits data first," does not define the second and third parameters, disavow any values from those parameters, or even discuss the third parameter. Ex. 1038, 12. Petitioner's extrinsic evidence, Dr. Akl's testimony, does little more than repeat the arguments in the Reply and, thus, is of little value. Ex. 1040 ¶¶ 20–29.

In sum, we maintain our construction that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels. Under this construction, RAAUq" and RAAUq', respectively, could potentially be second and third parameters, as could RAAUq' and RAAUq", respectively, as long as they satisfy the rest of the pertinent language of the challenged claims.

3. Remaining Terms

Based on the record before us, we do not find it necessary to provide express claim constructions for any other terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. Priority Date of the '466 Patent; Prior Art Status of Speight

As noted above, the '466 patent issued from a chain of continuation applications that includes the '421 application that published as Speight. Ex. 1001, code (63); Ex. 1006, code (21). Petitioner contends (and Patent Owner does not contest) that the '421 application and Speight have

disclosures identical, in material respects, to the Specification of the '466 patent. Pet. 4–6. According to Petitioner,

> the Challenged Claims are only entitled to the April 18, 2016, filing date of the application leading to the '466 patent because the intervening '843 and '666 applications have identical disclosure in relevant respects to the Parent Application and thus also do not fully describe the subject matter of the Challenged Claims. Because Speight was published more than one year prior to their effective filing date, Speight is prior art to and anticipates the Challenged Claims under AIA 35 U.S.C. § 102(a)(1).

Id. at 6.

As explained above, we construe "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero" as reciting two mutually-exclusive alternatives with respect to the "third parameter." Petitioner refers to these alternatives as:

> Alternative A: "allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than . . . zero"; and
>
> Alternative B: "allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter . . . equal to zero."

Pet. 8. Petitioner contends that, to provide written description support for, and thus be an application eligible for the '466 patent to claim priority to, the '421 application must, but does not, disclose both Alternative A and Alternative B. *Id.* at 6–14. Patent Owner does not contest that the '421 application must disclose both alternatives. However, Patent Owner

presents argument and evidence to show that the ’421 application discloses both alternatives. PO Resp. 19–38.

For the reasons given below, the ’421 application does not disclose Alternative A. Thus, Speight is prior art to the ’466 patent.

1. Legal background

a) Burdens of production and persuasion

“In an *inter partes* review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.” *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). According to the Federal Circuit, “a patent challenger has the burden of producing evidence to support a conclusion of unpatentability under § 102 or § 103, but a patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375–75 (Fed. Cir. 2016) (citing *Dynamic Drinkware*, 800 F.3d at 1379). Here, Petitioner has met its burden of producing evidence to support a conclusion of unpatentability under § 102 by introducing Speight and explaining how it discloses each limitation of the challenged claims. *Cf. Dynamic Drinkware*, 800 F.3d at 1379 (“Dynamic . . . had the initial burden of production, and it satisfied that burden by arguing that Raymond anticipated the asserted claims of the ’196 patent under § 102(e)(2).”).

The burden then shifts to Patent Owner to “argue or produce evidence” that the challenged claims are “entitled to the benefit of a filing date (constructive or otherwise) prior to the filing date” of Speight.

Dynamic Drinkware, 800 F.3d at 1380. "We understand, and we shall use here, the phrase 'going forward with evidence' to mean both producing additional evidence and presenting persuasive argument based on new evidence or evidence already of record, as the case may require." *Tech. Licensing Corp. v. Videotek, Inc..*, 545 F.3d 1316, 1327 (Fed. Cir. 2008). "This requires [Patent Owner] to show not only the existence of the earlier application, but why the written description in the earlier application supports the claim[s of the '466 patent]." *Id.*

Once Patent Owner presents its evidence and argument in support of the earlier filing date, here the filing date of the '421 application, "the burden of going forward again shifts to the proponent of the invalidity defense, [Petitioner], to convince the court that [Patent Owner] is not entitled to the benefit of the earlier filing date." *Id.* at 1328.

b) What the priority application must show

As explained in more detail below, neither party cites express disclosure in the '421 application of allocating resources for a channel having a second parameter above zero prior to another channel's data for transmission having a third parameter (e.g., RAAUq') less than zero (Alternative A). Patent Owner offers evidence and argument that, when the described algorithm (e.g., shown in Figure 6) is executed in practice, an alleged third parameter, RAAUq', takes values less than zero. PO Resp. 19–38. Patent Owner purports to show this through hand calculations and

computer simulations of the algorithm of Figure 6 performed by Dr. Lomp. *Id.*; Ex. 2003 ¶¶ 38–53.

35 U.S.C. § 120 provides:

> An application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States . . . , which is filed by an inventor or inventors named in the previously filed application shall have the same effect, as to such invention, as though filed on the date of the prior application, if filed before the patenting or abandonment of or termination of proceedings on the first application or on an application similarly entitled to the benefit of the filing date of the first application and if it contains or is amended to contain a specific reference to the earlier filed application.

According to 35 U.S.C. § 112 ¶ 1[11],

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.

"[T]he test for sufficiency [of written description under § 112 ¶ 1] is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). "And while the description requirement does not demand any particular form of disclosure, or that the specification recite the claimed invention *in haec verba*, a description that

[11] Here, we refer to the pre-AIA versions of §§ 112 and 120, as the parties dispute whether an application filed before the effective date of the relevant provisions of the AIA provides written description support for claims of the '466 patent.

merely renders the invention obvious does not satisfy the requirement." *Id.* at 1352 (internal citations omitted). "Put another way, one skilled in the art, reading the original disclosure, must immediately discern the limitation at issue in the claims." *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000). "[A] recitation of how to make and use the invention across the full breadth of the claim is ordinarily sufficient to demonstrate that the inventor possesses the full scope of the invention, and vice versa." *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005). That said, "[a] claim will not be invalidated on section 112 grounds simply because the embodiments of the specification do not contain examples explicitly covering the full scope of the claim language." *Id.* (citing *Union Oil Co. v. Atl. Richfield Co.*, 208 F.3d 989, 997 (Fed. Cir. 2000)).

In *Union Oil*, the Federal Circuit affirmed a jury verdict of sufficient written description when the challenged patent "claims its inventive products in terms of ranges of chemical properties, which work in combination with ranges of other chemical properties to produce a gasoline that reduces emissions." 208 F.3d at 997. The challenger asserted that the specification did not describe the exact chemical component of each combination that falls within the range of those claims; however, the Federal Circuit stated that "neither the Patent Act nor the case law of this court requires such detailed disclosure." *Id.* It was sufficient that the specification described the properties of the components and the effects on the end product of varying the amounts of the components. *Id.* at 998. According to the Federal Circuit, "[t]he patent unmistakably informs skilled refiners to increase or decrease the various components to arrive at preferred combinations. In

fact, the written description usually labels both preferred and most preferred levels within each range." *Id.* at 999. The *Union Oil* court, citing *Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575 (Fed. Cir. 1985), stated

> In *Ralston*, a case in which this court applied the less deferential clear error standard appropriate for this court's review of bench verdicts, this court noted that the ranges in applicant's claims need not correspond exactly to those disclosed in the parent application. Rather, this court clarified that the issue is whether one of skill in the art could derive the claimed ranges from the parent's disclosure.

208 F.3d at 1001. Important in the Federal Circuit's analysis was that "[a]rtisans skilled in petroleum refining . . . are aware of the properties of raw petroleum sources and know how to mix streams of such sources to achieve a final product with desired characteristics." *Id.* at 1000–01.

In contrast, in *Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center v. Eli Lilly and Co.*, 849 F.3d 1049 (Fed. Cir. 2017), a provisional application did not explicitly disclose a claimed dosage of a drug for humans, but the patent owner argued that the dosage level was disclosed for rats in a study described in the provisional application, and that a corresponding human dosage could be calculated using a conversion method described in a scientific article. 849 F.3d at 1057. The Federal Circuit affirmed the Board's conclusion that the patent owner's evidence was insufficient to establish priority, and agreed with the Board's findings that the patent owner's calculations were based on assumptions and variables not knowable from the disclosure in the provisional application; that the patent challenger showed that the patent owner's expert's calculations were incorrect when using the assumptions given in the

provisional application; and that the patent owner presented no evidence as to why a skilled artisan would have used the conversion method described in the scientific article. *Id.* at 1058.

In another example, *New Railhead Manufacturing, L.L.C. v. Vermeer Manufacturing Co.*, 298 F.3d 1290 (Fed. Cir. 2002), the Federal Circuit noted that "nowhere in the provisional application is the bit body expressly described as being 'angled with respect to the sonde housing' as recited in claim 1" of the challenged patent; however, the patent owner introduced evidence that "one of ordinary skill could actually construct the tool itself from these drawings [in the provisional application] *and if that were done, the heel and toe portions would be present*." 298 F.3d at 1293, 1295. The Federal Circuit found the patent owner's arguments insufficient, reasoning that

> the disclosure must show [the inventor] had invented each feature that is included as a claim limitation. The adequacy of the written description (i.e., the disclosure) is measured from the face of the application; the requirement is not satisfied if one of ordinary skill in the art must first make the patented invention before he can ascertain the claimed features of that invention.

Id. at 1295.

As explained above, the claim language of claim 1, "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero," encompasses two alternatives, Alternative A and Alternative B. According to Petitioner, "[w]here a claim recites alternative limitations, the disclosure must provide written description support for each of the alternative limitations." Pet. 8 (citing

Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc., No. 2020-2066, 2021 WL 6137375, at *2–*3 (Fed. Cir. Dec. 29, 2021) (unpublished) (affirming PTAB Final Written Decision in IPR2018-01680 denying priority claim where patent claim recited "a piston rod comprising either an internal or an external fourth thread," but foreign priority application only disclosed externally-threaded piston rods)).

In the Institution Decision, we agreed with Petitioner and determined that, to provide written description support for the full scope of claim 1, an application must describe both Alternative A and Alternative B. Dec. 17. We ruled preliminarily that a "third parameter" equal to zero is the terminal end of an unbounded range "less than or equal to zero." By showing only Alternative B, an application cannot be said to describe the "full breadth" or "full scope" of claim 1. *See LizardTech*, 424 F.3d at 1345. Patent Owner does not contest Petitioner's statement of the legal background, and does not argue that it would be sufficient to show only Alternative B to establish written description support for claim 1. We maintain our conclusion that to provide written description support for the full scope of claim 1, and the similar independent claims 4, 6, and 9, an application must describe both Alternative A and Alternative B.

2. The '421 application does not provide written description support for the challenged claims because it does not disclose both Alternative A and Alternative B

Whether the challenged claims are entitled to the benefit of the '421 application's filing date turns on whether the '421 application provides written description support for the full scope of "wherein resources are allocated for data of each channel having a second parameter above zero

prior to another channel's data for transmission having a third parameter less than or equal to zero," as recited in independent claims 1 and 6 and the substantially similar recitations of independent claims 4 and 9. As explained above, to provide written description support for the full scope of claims 1, 4, 6, and 9, an application must describe both Alternative A and Alternative B, i.e., the '421 application must describe "allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than . . . zero" and "allocating resources for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter . . . equal to zero."

The parties offer competing proposals for the identifications of the second and third parameters. Petitioner argues that RAAUq' is the second parameter and RAAUq" is the third parameter. Pet. 9–10, 41–42. Patent Owner contends that RAAUq" is the second parameter and RAAUq' is the third parameter. PO Resp. 29. We address each in turn.

As to Petitioner's mapping, Petitioner, relying on Dr. Akl's testimony and the description in the '421 application of Figure 6, argues that the algorithm of Figure 6 calculates a nominal resource allocation, RAAUq', for each channel, and that "[b]ecause RAAUq' represents a nominal number of physical resources (codes and timeslots) to be allocated to each selected channel, it is a positive number." Pet. 9–10 (citing Ex. 1005 ¶¶ 86–90, Fig. 6 (steps 610, 615, 620, 625, 628); Ex. 1004 ¶¶ 80–82). Petitioner further argues that the algorithm of Figure 6 then calculates a physical resource allocation, RAAUq", for each selected channel. *Id.* at 10 (citing Ex. 1005 ¶ 92 (equation 11); Ex. 1004 ¶ 81). According to Petitioner, when

the algorithm elects not to allocate resources to a channel (what Petitioner alleges is the "another channel . . . having a third parameter . . . equal to zero") in the current iteration, it sets RAAUq" for that channel to zero. *Id.* at 11–12 (citing Ex. 1005 ¶¶ 94, 96; Ex. 1004 ¶¶ 85–87). According to Petitioner, the '421 application describes Alternative B because "the algorithm allocates resources *in the current iteration* for data of each channel having RAAUq' (the claimed 'second parameter') above zero before allocating resources *in the next iteration* to the channel for which RAAUq" (the claimed 'third parameter') was set to zero." *Id.* at 12–13 (citing Ex. 1005 ¶¶ 94–95; Ex. 1004 ¶¶ 86–87). Patent Owner does not dispute that the '421 application describes Alternative B under Petitioner's mapping, and we find that it does.

Petitioner, however, argues that the '421 application fails to disclose RAAUq" taking values less than zero and, instead, "because the RAAU values (RAAUq, RAAUq', RAAUq", and FreeRAAU) described in the ['421] Application refer to the number of physical resources (codes and timeslots) to be allocated to a channel, nominal or actual, they must always be non-negative numbers." *Id.* at 13 (citing Ex. 1005 ¶¶ 86, 94; Ex. 1004 ¶¶ 87–88). Thus, Petitioner argues, "the first filed Parent Application to the '466 [patent] only discloses Alternative B, and not also Alternative A, which the Challenged Claims encompass." *Id.*

Patent Owner does not challenge Petitioner's conclusion under Petitioner's mapping of the second and third parameters. In the Institution Decision, we preliminarily credited Dr. Akl's testimony showing that the '421 application does not describe Alternative A under Petitioner's mapping of the second and third parameters. Dec. 18–19 (citing Ex. 1004 ¶¶ 87–88).

We continue to credit that testimony and find that, under Petitioner's mapping of the second and third parameters, the '421 application does not describe Alternative A.

Patent Owner takes issue with Petitioner's statement that RAAUq' must always be non-negative, alleging that Dr. Akl's opinion on that issue is based insufficiently on his experience, his review of the '421 application, and a textbook on computer networks (Ex. 1007, "Tanenbaum"). PO Resp. 10–12 (citing Ex. 1004 ¶¶ 86–87; Ex. 2004, 29:22–30:4). Patent Owner argues that Dr. Akl should have used MATLAB simulation software to confirm his understanding of the algorithm of Figure 6. *Id.* at 15–17 (citing Ex. 2004, 41:11–42:9, 42:25–43:18).

Patent Owner's arguments here do not undermine Petitioner's conclusion that the '421 application does not describe Alternative A under Petitioner's mapping of the second and third parameters. Indeed, whether RAAUq' could take negative values is of little relevance under Petitioner's mapping, as the claimed second parameter is recited as having a value above zero. Rather, Patent Owner makes these arguments to support its new mapping of the second and third parameters, presented with the Patent Owner Response (which we address in detail below). Patent Owner argues that Petitioner and Dr. Akl did not consider different mappings of the second and third parameters. PO Resp. 12–15. This argument is not persuasive, however, because Petitioner was not required to rebut in advance Patent Owner's argument and evidence alleging priority to the '421 application. As explained above, Petitioner satisfied its initial burden of production by showing how Speight anticipates the challenged claims, and the burden of production shifted to Patent Owner to go forward with evidence and

argument that the '466 patent is entitled to the benefit of the '421 application's filing date. *See Tech. Licensing*, 545 F.3d at 1327.[12] We now evaluate whether Patent Owner has met that burden of production.

As noted above, in its Response, Patent Owner offers a different mapping of parameters from the algorithm of Figure 6 to the claimed second and third parameters than it did in the Preliminary Response. Specifically, Patent Owner now contends that "[b]y mapping the claimed 'second parameter' to RAAUq" and the 'third parameter' to RAAUq', the illustrative example demonstrates that the claim language in question is met." PO Resp. 29. Neither Patent Owner nor Dr. Lomp identify in the '421 application any express disclosure of RAAUq' taking a value below zero. As noted above, Petitioner contends, and Dr. Akl testifies, that RAAUq' does not take negative values. Pet. 13 (citing Ex. 1004 ¶¶ 87–88; Ex. 1005 ¶ 86).

Petitioner argues that there is no disclosure, in the four corners of the '421 application, that RAAUq' turns negative. Reply 18–20. Petitioner

[12] As explained in the Institution Decision, in the Preliminary Response, Patent Owner offered MATLAB simulations performed by Dr. Lomp to show that RAAUq' sometimes took negative values. Dec. 19 (citing Ex. 2001). Patent Owner faults Dr. Akl for not offering opinions on Dr. Lomp's simulations that accompanied the Preliminary Response. PO Resp. 17–19. However, Patent Owner offered these simulations to support a different mapping of the second and third parameters, a mapping we rejected preliminarily, Dec. 11–14, and Patent Owner no longer pursues. Dr. Akl's failure to opine on Dr. Lomp's Preliminary Response simulations is of little relevance, as Patent Owner no longer relies upon those simulations and, instead, offers new and different simulations performed by Dr. Lomp in support of Patent Owner's new mapping of the second and third parameters in the Patent Owner Response. Dr. Akl offers opinions on Dr. Lomp's new simulations in testimony submitted with the Reply, which we address below.

argues that, in the algorithm of Figure 6, RAAUq is always positive or zero and that "[i]n order for RAAUq' to theoretically turn negative, the running_RAAU_delta in equation [8] . . . would need to simultaneously be both (a) negative and (b) greater in magnitude than RAAUq." *Id.* at 18–19 (citing Ex. 1005 ¶¶ 85–86, 88; Ex. 1040 ¶¶ 32, 36). Petitioner further argues that the '421 application only expressly discloses positive numbers for running_RAAU_delta and, accordingly, the '421 application "does not reasonably contemplate operating the algorithm of Fig. 6 under conditions that would yield negative RAAUq' values." *Id.* at 19–20 (citing Ex. 1005 ¶¶ 89, 96; Ex. 1040 ¶¶ 33–36). Patent Owner argues that Dr. Akl admitted on cross-examination that running_RAAU_delta can be negative. Sur-reply 18–19 (citing Ex. 2005, 37:7–10). Patent Owner does not contest, however, Petitioner's main point, i.e., that the '421 patent does not expressly disclose that running_RAAU_delta or RAAUq' can take negative values. Patent Owner identifies no such disclosure, and we see none.

Instead of express disclosure in the '421 application, Patent Owner offers a "small-scale" calculation and a MATLAB computer simulation of the algorithm of Figure 6, both performed by Dr. Lomp, to show that RAAUq' will, in some circumstances, take negative values. First, as its "illustrative example," "Patent Owner, through the Declaration of its expert, Dr. Gary Lomp (Ex. 2003), sets forth below for purposes of illustration a step-by-step example showing how the resource allocation method disclosed in the Parent Application would be understood to function by a person of ordinary skill." PO Resp. 20. Specifically, Patent Owner repeats in its Response what appears to be hand calculations performed by Dr. Lomp in his Declaration as "a small-scale example to illustrate that the RAAUq' can

be positive, negative, or zero." *Id.* at 20–30 (essentially copying Dr. Lomp's testimony at Ex. 2003 ¶¶ 38–45).

For starting values of his calculations, Dr. Lomp states that the "small-scale example involves four queues (q1, q2, q3 and q4), and a max_number_queues_serviced value which equals two." Ex. 2003 ¶¶ 41, 42 (step 3). Additionally, Dr. Lomp's "illustration examines the operation of the allocation process after one of the queues (q2) has accrued a positive '*running_RAAU_delta*' value (q2 has a *running_RAAU_delta* = 10), while the other queues (q1, q3 and q4) each have a '*running_RAAU_delta*' value equal to zero." *Id.* He then assumes a FreeRAAU value of 200 for his first iteration of the algorithm. *Id.* ¶ 42 (step 2). Dr. Lomp does not explain in his Declaration why he chose these values or how these choices correspond to description in the '421 application.

Dr. Lomp then calculates running_RAAU_delta, RAAUq, RAAUq', and RAAUq" values using these starting values. *Id.* (steps 4–13). Dr. Lomp then calculates a second iteration, starting with the running_RAAU_delta, RAAUq', and RAAUq" values from the first iteration, and changing the value of FreeRAAU to 100. *Id.* (steps 14–15). Dr. Lomp does not explain in his Declaration why he changed the FreeRAAU value. With these values, including the new value for FreeRAAU, Dr. Lomp calculates new running_RAAU_delta, RAAUq, RAAUq', and RAAUq" values, concluding that RAAUq' can sometimes be negative (e.g., step 17). *Id.* ¶¶ 42 (steps 16–26), 43 ("Here, q3 and q4 (both of which had second and third parameters above zero) were allocated resources prior to q2 (which had second and third parameters equal to zero) and prior to q1 (which had a second parameter equal to zero and a third parameter that was negative).").

Petitioner responds by arguing that Dr. Lomp's starting conditions are contradicted by the '421 application. Reply 8. For example, Dr. Lomp sets running_RAAU_delta for queue q2 to 10 in the "first repetition" of his small-scale example. Ex. 2003 ¶ 42. The '421 application, however, states that

> this algorithm is iterative and running_RAAU_delta is determined from the previous iteration of the algorithm. Hence, although no limitation has been applied in the first iteration, on the second iteration the limitation of the number of queues in the previous iteration has meant that there are some queues that did not receive the number of RAAU that were originally determined.

Ex. 1005 ¶ 89. From this, Petitioner argues that "[o]rdinary artisans would understand that any limitation on the number of queues results in non-zero running_RAAU_delta values, and, conversely, in the absence of any such limitation, the running_RAAU_delta values are all zero." Reply 8–9 (citing Ex. 1040 ¶ 38). Thus, Petitioner concludes, the '421 application "expressly discloses that the running_RAAU_delta values were zero for the first iteration." *Id.* at 9. Petitioner argues that Dr. Lomp begins his analysis at an arbitrary iteration of the algorithm and assumes values without explaining how those values could have been reached. *Id.* Petitioner further argues that assigning a positive running_RAAU_delta for just one of queues q1 and q2 is inconsistent with also assigning those queues equal queue weights (Sq) of 0.3. *Id.* at 10 (citing Ex. 2003 ¶ 41; Ex. 1040 ¶ 40).

As a second example of an alleged error in Dr. Lomp's small-scale example, Petitioner argues that changing the FreeRAAU value from 200 to 100 in his second repetition is contradicted by the '421 patent's statement that "when the volume indication reaches the head of the queue **a fixed**

volume of resource is allocated to the user." Reply 12 (quoting Ex. 1005 ¶ 66 (emphasis Petitioner's)). According to Petitioner, this fixed volume of resource corresponds to FreeRAAU, and nothing in the '421 application suggests that FreeRAAU can change between iterations of the algorithm of Figure 6. *Id.* at 12–13 (citing Ex. 1040 ¶ 44).

Although Patent Owner challenges these alleged errors with respect to Dr. Lomp's MATLAB simulation (which we discuss below), Patent Owner does not challenge Petitioner's allegations of error as to Dr. Lomp's small-scale example. Sur-reply 28–33. We agree with Petitioner that Dr. Lomp's small-scale example, in particular his starting values and his unexplained change to the FreeRAAU value, appears inconsistent with the description in the '421 application. As such, Dr. Lomp's testimony regarding his small-scale example (Ex. 2003 ¶¶ 39–45) lacks credibility and is entitled to little weight. Moreover, Dr. Lomp does not identify the bases for his choices of starting parameters or explain how those choices align with the description of the '421 application. This is an additional reason why Dr. Lomp's testimony is entitled to little weight. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). Because of these inconsistencies between the small-scale calculations and the '421 application and because Dr. Lomp's testimony on this point lacks credibility, we find that Patent Owner's small-scale calculations evidence is insufficient to meet Patent Owner's burden of going forward with evidence that the challenged claims are entitled to the benefit of a filing date prior to Speight.

As noted above, Patent Owner also offers a computer simulation, performed by Dr. Lomp using MATLAB, to show that "the value of

RAAUq' always takes on positive, negative and zero values." Ex. 2003 ¶ 47; *see also* PO Resp. 30–36; Ex. 2003 ¶¶ 46–53. According to Dr. Lomp, "[t]o extend the example to a larger number of queues, I created a higher order computer model that exercises the algorithm with a larger number of queues and over a randomly varying range of conditions that is more representative of an actual system." Ex. 2003 ¶ 40.

> [Dr. Lomp's] simulation included the following elements:
>
> - 40 users;
> - max_number_queues_serviced = 20;
> - a selection of QoS profiles available to each user;
> - a selection of Service Level Agreement (SLA) profiles permitting the users to be divided into classes wherein each user in a given class has the same SLA profile;
> - an ability to display the behavior of the parameters used in the process, including RAAUq' and RAAUq".

Id. ¶ 46; *see also id.* ¶ 48 ("The simulation modelled a basic system that supported 3 QoS levels, 2 SLA levels and 40 users."). Dr. Lomp does not explain in his declaration why he chose these "elements" or how they correspond to disclosure in the '421 application. Rather, he states, generally, that "[t]he simulation provides a basis for illustrating the basic operation of the Parent Application's allocation model over a range of conditions which basic operation is not altered in its general behavior by variation of configuration or parameters." *Id.* ¶ 47. Dr. Lomp's Declaration does not explain whether these "elements" are starting parameters, or if not, provide such starting parameters, and he does not provide any meaningful explanation of how he performed the simulation.

Dr. Lomp testifies that he attaches to his Declaration the graphs of Appendix A to "show the instantaneous queue history for the ensemble of users . . . in graphical form showing the instantaneous occupancy as a function of time." *Id.* ¶ 48. Further, Dr. Lomp attaches the spreadsheets of Appendix B to "show further examples of the claimed features." *Id.* ¶¶ 50, 52. Neither the graphs of Appendix A nor the spreadsheets of Appendix B explain how Dr. Lomp conducted the simulation or what he used as inputs to the simulation. Rather, they purport to show values of RAAUq' and RAAUq" for various "users," including instances when RAAUq' instances take on negative values. *Id.* ¶¶ 50–53, Appendix A, Appendix B. Dr. Lomp also did not attach to his Declaration any source code for his simulation. For these reasons, Dr. Lomp's Declaration testimony is entitled to little weight. *See* 37 C.F.R. § 42.65(a).

Asked on cross-examination about the methodology he used for his simulation, Dr. Lomp testified as follows: "Q. So the computer simulation uses the same underlying methodology as the illustrative example? A. I believe that's a correct statement, yes." Ex. 1039, 12:13–17; *see also id.* at 22:14–15 ("But it's the same model as was in the hand model."). From this, Petitioner concludes that "[Dr. Lomp's] computer simulation applies the same erroneous assumptions and/or operating conditions that contradict or are inconsistent with the Parent Application's description as his illustrative example of iterative allocation method." Reply 13.

Petitioner then discusses an exhibit reproducing the source code for Dr. Lomp's simulation (which Petitioner introduced at Dr. Lomp's deposition and cross-examined Dr. Lomp extensively on). *Id.* at 13–14

(citing Ex. 1039, 19:11–23:12).[13] Here, Dr. Lomp testified that he made choices as to several "environmental variables . . . and attributes, parameters, that would be needed to describe a system such as a wireless system that is allocating resources to a collection of users," and that the algorithm cannot be executed "without having a context or without having data for it to operate on." Ex. 1039, 20:10–21:4. He testified that "there was quite a bit of thought that went into this." *Id.* at 21:9–13. His choices of context appear to be based on his own "familiarity with cellular systems in general and the problems and techniques that are addressed by cellular systems that allocate resources to users in an air interface," and his "own personal experience as to what a system like that would . . . entail." *Id.* at 22:22–23:6. He testified that he "drew on that experience as well in creating both the small model and the large model." *Id.* at 23:6–8.

Petitioner argues that the '421 application's "description does not provide support for the numerous environmental variables, parameters, attributes, and context that Dr. Lomp testified are necessary for his computer simulation to execute." Reply 14 (citing Ex. 1040 ¶ 55). Petitioner also argues that Dr. Lomp's assumptions represent cellular systems in use today (or at the earliest 2007), and not at the time of the May 8, 2006, filing of the '421 application. *Id.* at 14–15 (citing Ex. 1039, 21:5–23:12, 40:14–19).

Patent Owner responds that the particular errors Petitioner alleges with respect to the small-scale example do not apply to Dr. Lomp's

[13] Petitioner did not enter this exhibit into the record or attach it to the transcript of Dr. Lomp's deposition (Ex. 1039). Patent Owner attached this exhibit as Exhibit 2 to the transcript of Dr. Akl's second deposition (Ex. 2005). This exhibit is a subject of Petitioner's Motion to Exclude, which we address below.

MATLAB simulation. Sur-reply 28–33. Patent Owner argues that the initial values of running_RAAU_delta in Dr. Lomp's simulation were all zero, and the results shown in his Declaration are values reported after 20,000 iterations of the algorithm had been performed. *Id.* at 28–31 (citing Ex. 2005, 10:12–11:4, 16:15–22, Exhibit 2[14] to Ex. 2005). Dr. Lomp's Declaration does not provide support for these arguments. Ex. 2003 ¶¶ 46–53. Nor does Patent Owner argue that an explanation can be found in Dr. Lomp's cross-examination testimony. Sur-reply 28–31. Instead, Patent Owner argues that Dr. Akl made admissions when cross-examined on Dr. Lomp's source code that support these arguments. *Id.* (citing Ex. 2005, 10:12–11:4, 16:15–22). We find no such admissions. At most, Dr. Akl admitted that a "zeros" function in MATLAB creates a vector filled with zeros. Ex. 2005, 10:12–11:4. We find no admissions or other evidence that Dr. Lomp's computer simulation started with all queues and running_RAAU_delta values set to zero. This is not shown clearly in the short reproduction of source code at page 30 of the Sur-reply and Patent Owner points to no testimony of Dr. Lomp explaining his starting assumptions.

As to whether the FreeRAAU parameter changes in Dr. Lomp's simulation, Patent Owner argues that "in Dr. Lomp's MATLAB simulation, the variable corresponding to FreeRAAU is ***fixed*** before the first iteration begins and is ***constant*** throughout all 20,100 iterations." Sur-reply 31.

[14] Petitioner moves to exclude Exhibit 2 to Exhibit 2005. Mot. to Exclude 6. For the reasons given below, we deny Petitioner's motion as to Exhibit 2. However, Exhibit 2 is of limited, if any, persuasive value because Patent Owner does not point to any testimony of Dr. Lomp to explain the relevance of what purports to be complex computer source code.

However, Patent Owner identifies no evidence in support of this contention. In light of Dr. Lomp's testimony that the MATLAB simulation uses "the same model as was in the hand model," Ex. 1039, 22:14–15, and in the absence of credible evidence to the contrary, we find that Dr. Lomp's MATLAB simulation uses the same assumptions, and suffers from the same defects, as his small-scale example.

For these reasons, we find that Patent Owner's MATLAB computer simulation evidence is insufficient to meet Patent Owner's burden of going forward with evidence that the challenged claims are entitled to the benefit of a filing date prior to Speight.

However, even if we were to accept Patent Owner's arguments that Dr. Lomp's MATLAB simulation started with initial values of running_RAAU_delta set to zero and held FreeRAAU constant, Patent Owner does not introduce evidence or explain persuasively why all the necessary "context" Dr. Lomp needed to supply to run the algorithm had a connection to the disclosure in the '421 application. As explained above, Dr. Lomp's Declaration is virtually silent on this point and his deposition testimony establishes little more than that he chose his starting assumptions based on his own personal experience and familiarity with cellular systems. Ex. 2003 ¶¶ 46–53; Ex. 1039, 19:11–23:12.

In response to Petitioner's argument that the '421 application does not provide support for Dr. Lomp's chosen environmental variables, parameters, and attributes, Patent Owner argues that "Dr. Lomp had testified that when he varied all of these parameters, he got the same result, namely that *the value of RAAUq' always takes on positive, negative and zero values*." Sur-reply 32 (citing Ex. 2003 ¶ 47). Patent Owner further argues that "[u]sing

different environmental parameters to test an allocation method under different conditions is the exact same approach that Dr. Akl uses in his scientific work." *Id.* These arguments, however, do not address why Dr. Lomp chose the values that he did or where in the '421 application such values are disclosed. Because Dr. Lomp does not explain the basis for his MATLAB simulation and the conclusions he draws from that simulation, Dr. Lomp's testimony (Ex. 2003 ¶¶ 46–53) is entitled to little weight. *See* 37 C.F.R. § 42.65(a).

We note that Petitioner's expert witness, Dr. Akl, offers his own calculation of Dr. Lomp's small-scale example, where he purports to "replicate[] Dr. Lomp's illustrative example of iterative allocation method after correcting his errors discussed above." Reply 15 (citing Ex. 1004 ¶¶ 45–52). According to Petitioner, when starting values of zero are applied for the running_RAAU_delta of all four queues and FreeRAAU is kept constant at 200 for both iterations, "Dr. Lomp's example no longer shows RAAUq' taking negative values once his unsupported assumptions are removed." *Id.* at 15–16 (citing Ex. 1040 ¶¶ 45–46). Dr. Lomp testifies that he also reached the same result (RAAUq' not taking negative values) when making calculations (1) keeping FreeRAAU constant at 100 with starting values of zero for all running_RAAU_delta values; (2) keeping FreeRAAU constant at 200 and using Dr. Lomp's starting values of running_RAAU_delta; and (3) keeping FreeRAAU constant at 100 and using Dr. Lomp's starting values of running_RAAU_delta. *Id.* at 16–17 (citing Ex. 1040 ¶¶ 47–52).

Patent Owner responds by providing attorney modifications to Dr. Akl's calculations, concluding that "[b]y changing just one of the queue

fill levels at the beginning of Dr. Akl's illustration to *2000* – instead of *1000* as used by Dr. Akl, and *keeping everything else from Dr. Akl's illustration the same*, it can easily be seen that *RAAUq' takes on a negative value on the third iteration of step 620 of the allocation process*." Sur-reply 1–16. In addition to consisting of attorney argument rather than evidence, Patent Owner's new calculations suffer from the same problem as Dr. Lomp's, namely, that Patent Owner provides no argument or evidence showing that the values it chose are disclosed in, or even have any connection to, the '421 application.

Patent Owner also argues that Dr. Akl's calculations are deficient because he "hard-coded his Excel spreadsheet with a single set of beginning parameters where all queues had exactly equal fill levels, ran it for 20 iterations, (not many thousands) and then stopped." Sur-reply 23 (citing Ex. 1040, Appendix 1–4). According to Patent Owner, "[h]e performed no other empirical research to see how the allocation process disclosed in the ['421 application] works." *Id.* at 23–24 (citing Ex. 2005, 53:22–54:19). Patent Owner argues that "Dr. Akl's Excel spreadsheets prove only that, in the single, specific instance that he hard-coded, RAAUq' does not turn negative. His spreadsheets do not speak to whether, under the *thousands of other possible operating scenarios*, RAAUq' is commonly negative." *Id.* at 24. Patent Owner characterizes Dr. Akl's calculations as "unreliable" and his reasoning as "not scientifically sound." *Id.* at 24–27 (citing Ex. 2005, 48:7–50:12).

Patent Owner's criticisms are misplaced. First, Patent Owner, not Petitioner, bears the burden of producing evidence and persuasive argument to show that the challenged claims are entitled to the benefit of the '421

patent's filing date. *See Tech. Licensing*, 545 F.3d at 1327. Thus, even if Dr. Akl's calculations are unreliable, it is Patent Owner's evidence that we evaluate in the first instance to determine whether the challenged claims are entitled to the benefit of an earlier filing date. As explained above, Patent Owner's evidence, i.e., Dr. Lomp's calculations and simulation, lack credibility, are entitled to little weight, and do not support a finding that the challenged claims are entitled to the benefit of the '421 application's filing date. Second, Dr. Akl's calculations at least show that choices of input parameters to the algorithm of Figure 6 are important, and highlight that Patent Owner has not shown any disclosure in the '421 application to support Dr. Lomp's choices, to the extent that Dr. Lomp has identified those choices.

Moreover, even if we were to find that Patent Owner met its burden of production, we still would find that a skilled artisan would not have been able to ascertain from the disclosure in the '421 application that RAAUq' could take values less than zero. Instead, even if we were to credit Dr. Lomp's testimony, to conclude that RAAUq' can take negative values, a skilled artisan would need to program computer software to simulate the '421 application's algorithm and correctly choose starting parameters and other context variables without guidance from the description in the '421 application. This case is similar to that in *New Railhead*, where the written description was insufficient because "one of ordinary skill in the art must first make the patented invention before he can ascertain the claimed features of that invention." 298 F.3d at 1295. This case also is similar to *Los Angeles Biomedical Research Institute*, in which an application's written description was insufficient because assumptions and starting variables were

not knowable from the disclosure in the application. 849 F.3d at 1058. Thus, even if we were to conclude that Patent Owner has met its burden of production, a preponderance of the evidence shows that the '421 application does not provide written description support for Alternative A.

In sum, we conclude that the '421 application does not provide written description support for the challenged claims and that, therefore, Speight is prior art to the challenged claims.

D. Anticipation by Speight

Petitioner contends that claims 1–10 are anticipated by Speight. Pet. 31–51. "[A] prior art reference will anticipate if it 'disclose[s] each and every element of the claimed invention . . . arranged or combined in the same way as in the claim.'" *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2016) (quoting *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (alteration by Federal Circuit)). "However, a reference can anticipate a claim even if it 'd[oes] not expressly spell out' all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would 'at once envisage' the claimed arrangement or combination." *Id.* (quoting *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (alteration by Federal Circuit); *In re Petering*, 301 F.2d 676, 681 (CCPA 1962)).

As noted above, Petitioner contends that Speight has substantially the same disclosure as the Specification of the '466 patent, which we summarize above. Pet. 6. Patent Owner does not dispute this or point us to any divergence between Speight and the Specification. Rather, Patent Owner directs its arguments to whether the claims of the '466 patent are entitled to

the benefit of the '421 application, which would disqualify Speight as prior art. PO Resp. 19–38. For the reasons given above, the claims of the '466 patent are not entitled to the benefit of the '421 application and, thus, Speight is prior art.

Regarding the preamble of claim 1, Petitioner argues that Speight discloses user equipment, e.g., UE 118 or UE 505, that performs a resource allocation method. Pet. 31 (citing Ex. 1006 ¶¶ 2, 43, 47, 79, 85–103). As to "circuitry configured to receive, from a network device, a first transmission including a first parameter corresponding to each of a plurality of channels and a second transmission including an allocation message for an uplink resource from the network device," as recited in claim 1, Petitioner points to mobile equipment (ME) 114 of UE 118, which is configured to receive data from Node-B 122. *Id.* at 32–33 (citing Ex. 1006 ¶¶ 2, 47, 48, 53). Petitioner alleges that a first transmission received from Node-B 122 includes queue weighting parameters S_{tier} 550, which Petitioner contends corresponds to the recited "first parameter," and that a second transmission from Node-B 122 includes allocation message 560. *Id.* at 33–34 (citing Ex. 1006 ¶¶ 60, 71–73, 77, 80). Based on this evidence, we find that Speight's weighting parameter S_{tier} 550 is a "first parameter . . . corresponding to each of a plurality of channels" included in a "first transmission" received from Node-B 122 ("a network device") by circuitry at UE 118 ("circuitry configured to receive"). We further find that the circuitry at UE 118 receives from Node-B 122 allocation message 560 ("a second transmission including an allocation message for an uplink resource from the network device").

As to "a processor configured to allocate resources in response to the allocation message, wherein resources are allocated for data of each channel

having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero," as recited in claim 1, Petitioner contends that UE mirror scheduler 525 is configured to allocate resources in response to allocation message 560, and that UE 118 includes a processor to implement the mirror scheduler. Pet. 34–45 (citing Ex. 1006 ¶¶ 47, 77, 80). Pointing to the algorithm of Figure 6 (described above with respect to similar disclosure in the Specification), Petitioner argues that RAAUq' for one channel is a "second parameter" and RAAUq" for another channel is a "third parameter." *Id.* at 36–38.[15] Petitioner argues that Speight describes "an iterative resource allocation algorithm 600 that ordinarily allocates resources in a current iteration to channels having RAAUq' above zero prior to allocating resources in a next iteration to a channel having RAAUq" equal to zero." *Id.* (citing Ex. 1006 ¶¶ 44, 86–103; Ex. 1004 ¶¶ 111, 112). Petitioner, citing to Dr. Akl's testimony, then analyzes algorithm 600 of Figure 6 and how it allocates resources. *Id.* at 38–41 (citing Ex. 1004 ¶¶ 83, 85, 113–119; Ex. 1006 ¶¶ 89–94, 96, 98, 100, 101). We have analyzed Speight and find that Petitioner's exposition of algorithm 600 accurately characterizes Speight's description. Specifically, we find that Speight discloses allocating resources to channels having

[15] As explained above, Patent Owner contends that RAAUq' can be a third parameter and RAAUq" can be a second parameter. PO Resp. 29. However, Patent Owner does not contend that this is an exclusive mapping of parameters and, instead, "relies on the Board's construction 'that the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels.'" *Id.* at 9. Specifically, Patent Owner does not dispute that Petitioner's mapping of RAAUq' and RAAUq" to the second and third parameters, respectively, is appropriate.

RAAUq' above zero prior to allocating resources to a channel having RAAUq" equal to zero. Ex. 1006 ¶¶ 44, 86–103, Fig. 6 (steps 610, 620, 645–660); Ex. 1004 ¶¶ 111, 112.

In essence, Petitioner asserts that Speight discloses what Petitioner identifies as Alternative B, namely, that Speight's processor is configured to allocate resources, "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter . . . equal to zero." Petitioner does not contend that Speight discloses Alternative A, namely "wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than . . . zero." In the Institution Decision, we concluded that "it is sufficient for Petitioner to show that the prior art discloses Alternative B to show that this claim limitation is met, and Petitioner need not show that the prior art discloses both Alternatives A and B." Dec. 24–25 (citing *Brown v. 3M*, 265 F.3d 1349, 1351–53 (Fed. Cir. 2001); *Hytera Commc'ns Co. v. Motorola Solutions, Inc.*, 841 F. App'x 210, 215–16, 2021 WL 164508 (Fed. Cir. 2021) (not selected for publication), and *Lincoln Nat'l Life Ins. Co. v. Transamerica Life Ins. Co.*, 609 F.3d 1364, 1366–67 (Fed. Cir. 2010)). The parties do not argue in the Patent Owner Response, Petitioner Reply, or Patent Owner Sur-reply that this conclusion is incorrect. For the reasons stated in the Institution Decision (Dec. 23–25), we maintain our conclusion that it is sufficient for Petitioner to show that the prior art discloses Alternative B to show that this claim limitation is met, and Petitioner need not show that the prior art discloses both Alternatives A and B. Accordingly, we find that Speight discloses "a processor configured to

allocate resources in response to the allocation message, wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero," as recited in claim 1.

As to "wherein the second parameter is derived from a first channel's first parameter and the third parameter is derived from a second channel's first parameter," as recited in claim 1, we find that both RAAUq' and RAAUq", Petitioner's alleged second and third parameters, respectively, are derived using equations that include S_{tier} 550, the first parameter, which is represented in Speight's equations as Sq. Specifically, RAAUq' is derived from RAAUq (Equation 8), which is derived from W'q (Equation 7), which is derived from Sq (Equation 6). Ex. 1006 ¶¶ 86–94. RAAUq" is derived from W"q (Equation 11), which is derived from Sq (Equation 10). *Id.* ¶ 98; *see also* Pet. 41–43 (citing Ex. 1006 ¶¶ 80, 85–88, 97, 98; Ex. 1004 ¶¶ 121, 123).

Independent claim 6 is directed to a "method performed by a user equipment (UE)" comprising steps substantially the same as the functions the circuitry of claim 1 is recited to perform. Independent claim 4 is directed to a "network device" that is configured to transmit substantially the same communications that the user equipment of claim 1 is configured to receive. Independent claim 9 is directed to a "method performed by a network device" comprising steps substantially the same as the functions the circuitry of claim 4 is recited to perform. Petitioner argues claims 1 and 6 together, offering the same evidence for each. Pet. 31–43. Petitioner argues claims 4 and 9 together, relying on substantially the same disclosures in Speight as it does for claims 1 and 6, and incorporating its claim 1 and 6 arguments by

reference. *Id.* at 45–50. For the same reasons as given for claim 1, we find that Speight discloses each limitation of claims 4, 6, and 9.

Claim 2 depends from claim 1 and adds "a transmitter further configured to transmit a third transmission including a plurality of indications of buffer occupancies associated with the plurality of channels." Claims 5, 7, and 10 depend from claims 4, 6, and 9, respectively, and add substantially the same limitation. We find that Speight's Node-B 122 transmits, and UE 118 receives, a transmission including message 530 ("a plurality of indications of buffer occupancies associated with the plurality of channels"). Ex. 1006 ¶¶ 47, 48, 53, 79, Fig. 5; Ex. 1004 ¶¶ 125–126, 142–143; Pet. 44–45, 51. Accordingly, we find that Speight discloses each limitation of claims 2, 5, 7, and 10.

Claim 3 depends from claim 1 and adds "wherein the second parameter is derived by multiplying the first channel's first parameter with a fourth parameter and the third parameter is derived by multiplying the second channel's first parameter with the fourth parameter." Claim 8 depends from claim 6 and adds substantially the same limitation. We find that Speight's FreeRAAU value is a "fourth parameter" and that RAAUq' is derived by multiplying Sq (the first parameter) with FreeRAAU. Ex. 1006 ¶¶ 89–93 (Equations 7, 8). We further find that RAAUq" is derived by multiplying Sq with FreeRAAU. *Id.* ¶ 98 (Equation 11). Accordingly, we find that Speight discloses each limitation of claims 3 and 8.

Patent Owner does not provide separate arguments for claims 2–10.

In sum, we find that Speight discloses each limitation of claims 1–10. For the reasons explained above, Speight is prior art to the '466 patent.

Accordingly, Petitioner has proved, by a preponderance of the evidence, that Speight anticipates claims 1–10 of the '466 patent.

E. Anticipation by Peisa

Petitioner contends that claims 1–3 and 6–8 are anticipated by Peisa. Pet. 51–66. For the reasons given below, Petitioner has not proved, by a preponderance of the evidence, that claims 1–3 and 6–8 are anticipated by Peisa.

1. Overview of Peisa

Peisa relates to scheduling packets of data/informational flows having differing priority levels in a communications system. Ex. 1010, 1:28–31. Peisa describes its scheduling techniques in the context of a UMTS network with multiple UEs, for example mobile stations, mobile terminals, laptop computers, and personal digital assistants with wireless links. *Id.* at 1:64–2:16, 4:20–67, Figs. 1, 2. Figure 8 is reproduced below:

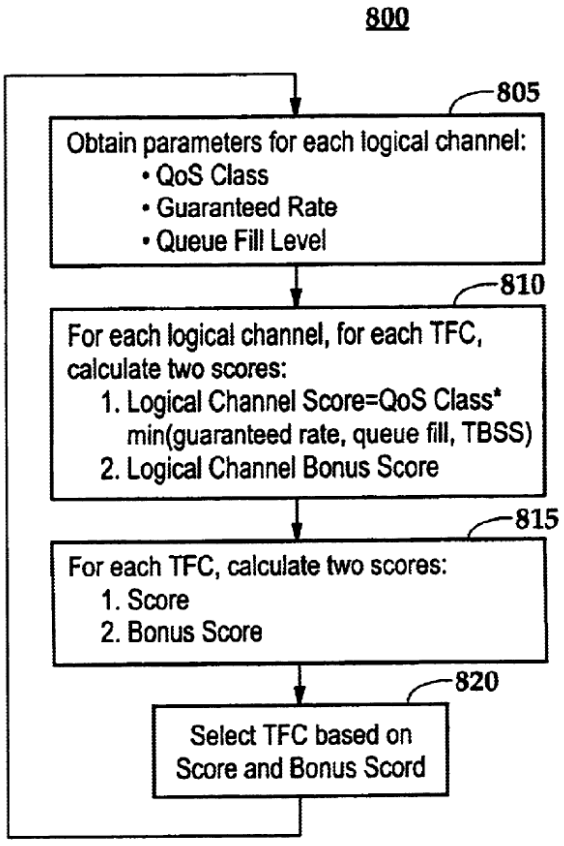


Fig.8

Figure 8 is a flow chart of a method of scheduling data flows, for example a scheduling process in the media access control (MAC) layer for the selection of a Transport Format Combination (TFC) from a TFC set (TFCS). *Id.* at 3:61–63, 18:29–34.

Initially several parameters are obtained for each logical channel, including the QoS Class and a Guaranteed Rate Radio Access Bearer (RAB) parameter. *Id.* at 18:35–44 (step 805). "If the 'Guaranteed Rate' RAB parameter is not applicable or is otherwise unsatisfactory, a zero (0) value may optionally be assigned to this parameter." *Id.* at 18:53–55. For each logical channel for each TFC in the TFCS, two scores are calculated, Score_lch and Bonus_score_lch. *Id.* at 18:60–67 (step 810). From these

two scores, Score and Bonus_score values are calculated. *Id.* at 19:1–6 (step 815). "The TFC that has the greatest [] Score is selected to determine the bandwidth distribution. If two or more TFCs have equal Scores, the TFC with the highest Bonus score is selected therefrom." *Id.* at 19:7–10 (step 820).

2. Claims 1–3 and 6–8

Petitioner contends that claims 1–3 and 6–8 are anticipated by Peisa. Pet. 51–66.

As to "a processor configured to allocate resources in response to the allocation message, wherein resources are allocated for data of each channel having a second parameter above zero prior to another channel's data for transmission having a third parameter less than or equal to zero," as recited in claim 1, Petitioner maps Peisa's "Score_lch" value of one channel to a "second parameter" and the "Score_lch" value of another channel to a "third parameter." Pet. 59–63. According to Petitioner, the Score_lch value for a channel can be set to zero when the Guaranteed Rate value for that channel is zero, i.e., when that channel has no guaranteed rate. *Id.* at 61–62 (citing Ex. 1010, 18:60–67). Under Petitioner's reasoning, when that channel's Score_lch value (the alleged third parameter) is zero, channels with a positive Score_lch (the alleged second parameter) will be allocated resources first, and the channel with no Guaranteed Rate will only be allocated resources afterward based on its Bonus_score. *Id.* at 62–63 (citing Ex. 1010, 14:52–59, 19:8–10). Petitioner, thus, argues that Peisa discloses this claim limitation's Alternative B. Petitioner does not contend that the Score_lch for

any channel drops below zero; thus, Petitioner does not contend that Peisa discloses Alternative A.

Patent Owner argues that "the Petition maps the second and third parameter to different instances of the *same* parameter (Logical Channel Score) for separate channels, rather than to 'separate and different parameters' as required by the Board's construction." PO Resp. 40. As explained in the Claim Construction section above, the second and third parameters are separate and different parameters, and not different instances of the same parameter for separate channels. As Patent Owner points out (PO Resp. 41), Dr. Akl conceded on cross-examination that Peisa does not anticipate the challenged claims under this construction. Ex. 2004, 10:13–19 ("Q. If the board does adopt your definition for the first, second, and third parameters as being different parameters, do you agree that the mapping in Ground 2 fails to meet the limits of the claims of the '466 patent? A. Yes. And that's why Ground 1 would disclose those limitations."). Petitioner confirmed at the oral argument that Peisa does not anticipate the challenged claims under this construction. Tr. 5:21–25 ("JUDGE MCKONE: . . . To be clear, grounds two and three, as long as we agree with you on claim constructions, we should find that you have not proved grounds two and three by a preponderance of the evidence. Is that correct? MR. KUMAR: Yes, Your Honor.").

Thus, Petitioner has not proved, by a preponderance of the evidence, that claims 1–3 and 6–8 are anticipated by Peisa.

F. Obviousness over Peisa and Heo

Petitioner contends that the subject matter of claims 2 and 7 would have been obvious over Peisa and Heo. Pet. 66–71. Claim 2 depends from claim 1 and claim 7 depends from independent claim 6. As noted above, Petitioner does not show sufficiently that Peisa anticipates claims 1 and 6. Petitioner does not allege that Heo remedies the deficiency we find above for its anticipation challenge based on Peisa. Thus, for the same reasons, Petitioner has not proved, by a preponderance of the evidence, that the subject matter of claims 2 and 7 would have been obvious over Peisa and Heo.

IV. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude Exhibit 2005, the transcript of Patent Owner's second deposition of Dr. Akl that Patent Owner submitted with the Sur-reply. Mot. to Exclude 1. Exhibit 2005 includes the transcript of Dr. Akl's deposition along with Exhibits 1–7 to that deposition.

According to the Trial Practice Guide, "[t]he sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness." TPG 73. Nevertheless, Board cases have held that exhibits introduced during such a deposition may also be submitted with a sur-reply if used for the purpose of testing the witness's testimony. *See, e.g., Edwards Lifesciences Corporation et al., v. Cardiovalve Ltd.*, IPR2021-00383, Paper 60 at 85–88 (PTAB July 18, 2022).

As an initial matter, Petitioner provides no persuasive basis to exclude the transcript of Dr. Akl's testimony, which is otherwise proper to include with a sur-reply. TPG 73.

As to the exhibits attached to the transcript, Patent Owner states that it "did not cite Deposition Exhibits 3–7, or any of the deposition testimony directed to those exhibits, in Patent Owner's Sur-Reply, and has not relied on those exhibits in any of Patent Owner's filings in this case." Opp. Mot. to Exclude 14. Petitioner argues that Patent Owner relies on page 62, lines 6–9, of Exhibit 2005, which, Patent Owner argues, discusses the contents of Exhibit 3. Reply Mot. to Exclude 5 (citing Sur-reply 23). We agree that the Sur-reply discusses deposition testimony discussing Exhibit 3. Sur-reply 23. However, Dr. Akl confirmed that Exhibit 3 is a formula version of the spreadsheet that he used to generate Appendix 1 to his Declaration, and Patent Owner used Exhibit 3 in the deposition to test Dr. Akl's testimony. Ex. 2005, 33:15–34:16, 59:21–24, 62:1–9. Thus, we are not persuaded that Exhibit 3 should be excluded.

As to Exhibits 4–7, it appears that Patent Owner does not rely on these exhibits. Moreover, we do not rely on these exhibits. Thus, Petitioner's Motion to Exclude is moot as to Exhibits 4–7.

Patent Owner uses Exhibit 1 only to show the approach that Dr. Akl typically uses in his work, in an attempt to draw a contrast to his approach in this proceeding. Opp. Mot. to Exclude 5; Sur-reply 23, 32; Ex. 2005, 7:8–8:15, 42:9–13, 62:6–9. Patent Owner does not rely on the substance of Exhibit 1. In other words, Patent Owner uses Exhibit 1 to test Dr. Akl's testimony. Thus, we are not persuaded that Exhibit 1 should be excluded.

Exhibit 2 to Dr. Akl's deposition is a copy of the computer program that Dr. Lomp wrote in MATLAB this is a simulation of the algorithm described in the '466 patent. Ex. 1039, 13:22–14:3. Petitioner cross-examined Dr. Lomp extensively on Exhibit 2. Ex. 1039, 13:22–38:13;

Opp. Mot. to Exclude 6. Indeed, Exhibit 2 (labeled Exhibit 1 to Dr. Lomp's deposition transcript) was the subject of the vast majority of Petitioner's cross-examination of Dr. Lomp. Petitioner relies on this testimony and, by extension, the exhibit that testimony discusses, in the Reply. Reply 13–14 (citing Ex. 1039, 12:8–17, 19:11–23:12). Dr. Akl also relied on Dr. Lomp's testimony and Exhibit 2. Ex. 1040 ¶¶ 53–56. Petitioner relies on this testimony of Dr. Akl in the Reply. Reply 13–14 (citing Ex. 1040 ¶¶ 55–56). Nevertheless, Petitioner did not include that deposition exhibit with the transcript it submitted (Ex. 1039) or enter it as an exhibit in this proceeding. Introduction of this exhibit into the record of this proceeding is necessary to understand both Dr. Lomp's testimony and Dr. Akl's testimony on which Petitioner relies in its briefing and, in fairness, should be included in the record for this reason alone. *See* Fed. R. Evid. 106 ("If a party introduces all or part of a writing or recorded statement, an adverse party may require the introduction, at that time, of any other part — or any other writing or recorded statement — that in fairness ought to be considered at the same time.").

Patent Owner argues that it relies on Exhibit 2 to test Dr. Akl's testimony in his Supplemental Declaration (Ex. 1040). Opp. Mot. to Exclude 6–8 (citing Ex. 1040 ¶¶ 43, 53; Ex. 2005, 10:12–11:24, 16:15–22, 20:5–25:8). Petitioner argues that Patent Owner seeks to use Exhibit 2 to affirmatively establish starting values for Dr. Lomp's MATLAB simulation. Reply Mot. to Exclude 2–5 (citing Sur-reply 30). Patent Owner, however, sought through Dr. Akl's deposition to test Dr. Akl's opinion, relied upon by Petitioner in the Reply, that Dr. Lomp's starting conditions for his illustrative example contradict the Parent Application. Sur-reply 29–31

(citing Ex. 2005, 10:12–11:4, Exhibit 2; Reply 8 (citing Ex. 1040 ¶¶ 38–40)). We discuss above whether Exhibit 2 and Dr. Akl's testimony in fact show what Patent Owner alleges they show and, therefore, the weight we should give to Exhibit 2 and this testimony. However, Petitioner has not persuaded us that this is a basis to exclude Exhibit 2.

Petitioner objects to Exhibit 2 under Federal Rule of Evidence 901, arguing that "Exhibit 2 within Exhibit 2005 has not been authenticated as the code relied upon by Dr. Lomp for his supplemental declaration, despite Patent Owner characterizing it as such in its sur-reply." Mot. to Exclude 6 (citing Sur-reply 30). Petitioner, however, sufficiently authenticated this exhibit through its own cross-examination of Dr. Lomp, who testified that "[i]t is a copy of the computer program that [he] wrote in a programming language—platform called MATLAB that is a simulation of—a model of the algorithm described in the '466 patent." Ex. 1039, 13:22–14:3; *see also* Fed. R. Evid. 901(b)(1) ("The following are examples only — not a complete list — of evidence that satisfies the requirement: (1) Testimony of a Witness with Knowledge. Testimony that an item is what it is claimed to be."). Thus, Petitioner's objection is overruled.

Petitioner argues that it could not understand fully the code in Exhibit 2, that the code is incomplete because of redactions in the document, and that Dr. Akl could not get the code to work. Mot. to Exclude 6; Reply Mot. to Exclude 3. We find that these concerns bear on the weight we should give this exhibit, not its admissibility.

In sum, Petitioner has not persuaded us that the deposition transcript of Exhibit 2005 or Exhibits 1–3 to Exhibit 2005 should be excluded. We deny Petitioner's Motion to Exclude as to the transcript of Exhibit 2005 and

Exhibits 1–3 to that transcript. We dismiss as moot Petitioner's Motion to Exclude as to Exhibits 4–7 of Exhibit 2005.

V. CONCLUSION[16]

Petitioner has proved by a preponderance of the evidence that Speight anticipates claims 1–10. We deny Petitioner's Motion to Exclude as to the transcript of Exhibit 2005 and Exhibits 1–3 to that transcript. We dismiss as moot Petitioner's Motion to Exclude as to Exhibits 4–7 of Exhibit 2005. The outcome for the challenged claims of this Final Written Decision follows. In summary:

Claims	35 U.S.C. §	References/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–10	102	Speight	1–10	
1–3, 6–8	102	Peisa		1–3, 6–8
2, 7	103	Peisa, Heo		2, 7
Overall Outcome			**1–10**	

[16] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–10 of the '466 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 42) is denied as to the transcript of Exhibit 2005 and Exhibits 1–3 to that transcript;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 42) is dismissed as moot as to Exhibits 4–7 to Exhibit 2005; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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