

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC. and CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS,
Petitioners,

v.

PROCOMM INTERNATIONAL PTE. LTD.,
Patent Owner.

Case No. IPR2024-01452

U.S. Patent No. 8,583,100

PATENT OWNER PRELIMINARY RESPONSE

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. THE '100 PATENT	2
A. Claims of the '100 Patent.....	7
III. AARFLOT DOES NOT TEACH OR SUGGEST, ALONE OR IN COMBINATION WITH LAROIA OR WEIDMAN, ANY OF THE INDEPENDENT CLAIMS.....	8
A. Aarflot.....	8
B. Aarflot Does Not Teach Or Suggest Remote Base Stations	10
C. Petitioners' Own Arguments Demonstrate The Flaws In Petitioners' Logic.....	13
IV. CONCLUSION	19

EXHIBIT LIST	
2001	Docket Control Order in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.)
2002	Opening Claim Construction Brief in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.)
2003	Plaintiff's Opposition to Defendants' Motion to Stay in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24cv-009-RWS-RSP (E.D. Tex.)
2004	United States District Courts—National Judicial Caseload Profile for 12-month period ending June 30, 2024; available at https://www.uscourts.gov/statistics-reports/analysis-reports/federalcourtmanagement-statistics
2005	LegalMetric District Report for Texas Eastern District Court in Patent Cases (January 2019-April 2024)
2006	April 6, 2025 Order denying Defendants' Motion To Stay in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24cv-009-RWS-RSP, Dkt. No. 62 (E.D. Tex.)
2007	Plaintiff's infringement contentions in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.) dtd March 20, 2024
2008	Defendant's P.R. 3-3 and 3-4 Disclosures (invalidity contentions) dated June 12, 2024 in <i>Procomm International Ptd. Ltd. v. Verizon Communications, Inc. et al.</i> , No. 2:24-cv-009-RWS-RSP (E.D. Tex.)
2009	Comparison of Petition to Ex. 1003 (Houh Declaration)
2010	Transcript of January 30, 2025 Deposition of Dr. Henry Houh in IPR2024-00710
2011	Transcript of January 31, 2025 Deposition of Dr. Henry Houh in IPR2024-00723

I. INTRODUCTION

The grounds in the Petition do not anticipate or render obvious the challenged claims. The single ground in the Petition relies on Aarflot as the primary reference. Aarflot is directed to a distributed base station that is distributed between “a main baseband processing unit coupled to one or more remote radio units where RF processing occurs” EX1004 [Aarflot], 1:24-29. This is a concept that the ’100 Patent specifically distinguishes over and improves upon. EX1001 [’494 Patent], 1:16-32. As a result, many of the features claimed in the ’100 Patent are completely missing from Aarflot.

This POPR deals with one such feature that is missing from every independent claim—Aarflot does not disclose both a host and a base station that is located remotely from the host. Each independent claim requires a host unit. EX1001 [’100 Patent], cls. 1, 8, 15, 19. Each independent claim also requires a separate “base station” or “baseband unit” that is “co-located” with a remote unit. *Id.* That is, the claimed host and base station are, by definition, two separate entities located at two separate (“remote”) locations.

Petitioners rely on Aarflot’s REC—a single element—as both the claimed host and the claimed “remote base station” that is remote from the host. But the REC cannot be both. Each distributed base station in Aarflot has a single REC. The REC does not simultaneously exist in one location as the claimed host and at the

same time in a remote location as the claimed remote base station. The claims require the host is *remote* from the *remote* base station; otherwise the remote base station would not be remote as required by the claims.

Indeed, as discussed below, one of the goals of the '100 Patent was specifically to improve upon distributed base stations like Aarflot that rely on centralized control and processing by duplicating the base station and router functionality at remote antennas. Accordingly, the Petition cannot demonstrate a reasonable likelihood of success as to any challenged claims and must be denied.

II. THE '100 PATENT

The '100 Patent is directed to a distributed remote base station system. EX1001 ['100 Patent], Title. The '100 Patent proposes a “modular platform is made up of a reconfigurable host unit and a reconfigurable remote unit designed for use in a system with a central node and a plurality of distributed antennas.” *Id.*, 2:30-33. The '100 Patent explains that “[t]raditional wireless communication systems may have distributed antennas to expand the range of a centralized base station. Any signals received by the distributed antennas must be sent back to the centralized base station for processing regardless of where the ultimate destination of the signal is located.” EX1001 ['100 Patent], 1:16-21. “This causes unneeded

transmission of signals and results in increased latencies for users of the system.”

EX1001 [’100 Patent], 1:21-22.

So, for example, one mobile phone might call a second mobile phone that happened to be served by the same distributed antenna. In a traditional wireless communication system, the distributed antenna would have to transmit the call back to the centralized base station at a different location for processing and then the centralized base station would route the call right back to the same distributed antenna to connect the second mobile phone. Situations like this cause unnecessary traffic and latency problems discussed above.

The ’100 Patent solves this problem by, among other things, providing for a distributed base station system with a plurality of remote antennas. EX1001 [’100 Patent] 1:42-46. Each remote antenna has a router and may have a base station functionality at the distributed antennas. EX1001 [’100 Patent], 1:36-46; 2:56-62. By co-locating additional routers and base stations with the distributed antennas (i.e., in addition to the base station at the host), the ’100 Patent provides for independent processing at remote antennas and avoids unnecessary transmissions and the extra time and capacity needed for the transmissions. This speeds up the network (i.e., reduces latency) and increases reliability (i.e., by reducing the load).

Figures 8 and 9 of the '100 Patent illustrate embodiments of the distributed base station systems described in the '100 Patent. EX1001 ['100 Patent], Figs. 8, 9. It is important to note that, by “distributed base station system,” the '100 Patent does not mean simply *distributing* the functionality of a single base station throughout several remote antennas as in the prior art. Instead, the '100 Patent is *duplicating* base station functionality at remote antennas, creating *independent base stations* at remote units in the distributed base station system rather than a single base station whose functionality is distributed among several remote antennas.

This is shown, for example, at Figure 8, below:

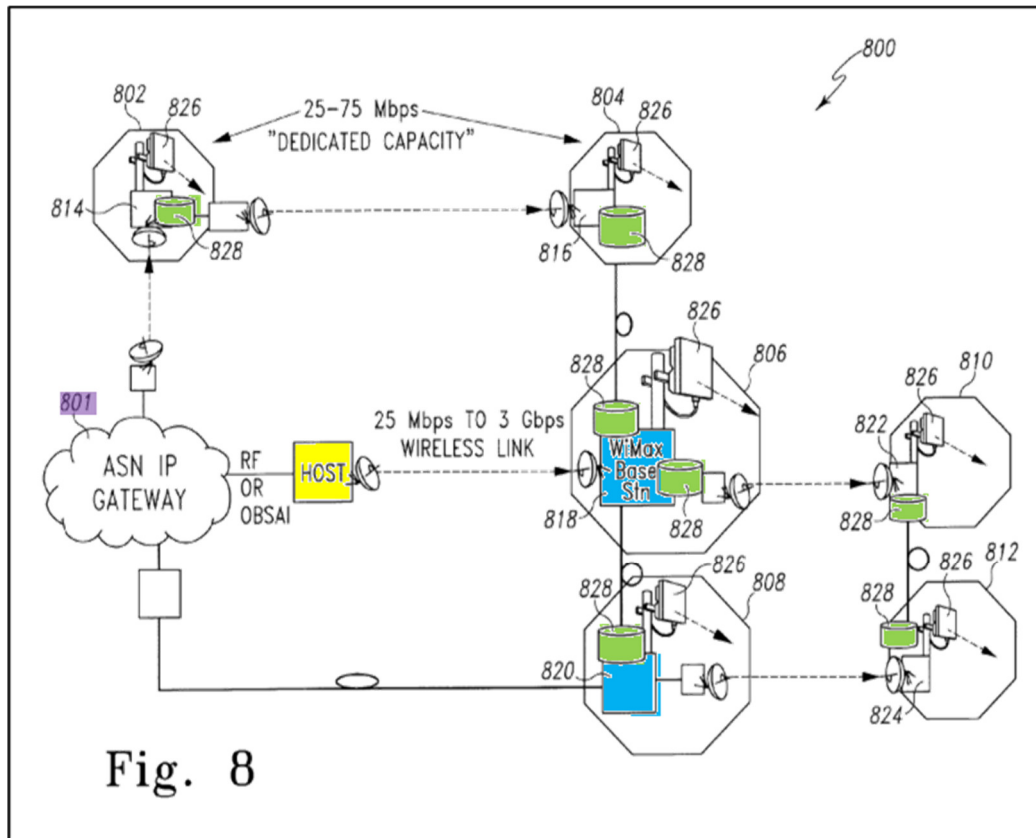


Figure 8 shows distributed base station system 800. *Id.*, 9:2-3. Central node 801 (in **purple**) is connected to an IP gateway. *Id.*, 9:3-4. This gateway connects the '100 Patent's distributed base station system to the wired internet. The IP Gateway also performs traditional base station processing. *Id.*, 9:20-22; Fig. 1 (showing base station 103 between the host 102 and internet gateway 101).

Figure 8 also shows a host (in **yellow**). "The host unit is located near the central node and facilitates transmission/reception of information to/from the remote units which are located remotely with an accompanying antenna." *Id.*, 2:33-36. 802, 804, 806, 808, 810 and 812 are examples of remote stations containing

remote units 814, 816, 818, 820, 822 and 824. *Id.*, 9:5-8. “The remote units function to transmit/receive transmissions from the host unit and transmit/receive wireless signals over accompanying antenna to mobile customers.” *Id.*, 2:36-39.

Each remote station in Figure 8 also contain a router 828 (in green). In addition, some remote units (818 and 820 in Figure 8, corresponding to remote stations 806 and 808) are independently configured as base stations (in blue).

The '100 Patent explains that “remote stations 806, [808] which are equipped with a base station do not need to transmit signals back to central node 801 for base station processing.” *Id.*, 9:20-23. “Instead, when an RF signal is received via antenna 826 at remote station 806, for example, remote station 806 processes the RF signal with remote unit 818, which is configured as a base station. *Id.*, 9:23-26. Thus, instead of a network with multiple remote antennas where all base station processing is performed at a central location, the '100 Patent provides for a network with independent base station processing at multiple locations.

The '100 Patent explains that “distributed base station system 800 has many advantages over traditional centralized base station systems.” *Id.*, 9:19-20. These advantages include simplifying and speeding up the processing of wireless signals, improved routing capability, decreased latency, reducing unnecessary network

traffic, and providing dedicated capacity to each remote station. EX1001 [’100 Patent], 9:19-57. “The flexibility to modify the functionality of each remote unit allows the wireless platform to support centralized base stations and distributed base stations, either separately or concurrently.” *Id.*, 2:59-62.

A. Claims of the ’100 Patent

The claims of the ’100 Patent reflect a similar arrangement. Independent claim 1 is directed to a distributed base station system (comparable to Figure 8), independent claim 19 is directed to a remote wireless communication station such as remote stations 802, 804, 806, 808, 810 and 812 in Figure 8, and independent claims 8 and 15 are directed toward methods of transmitting wireless signals in distributed base station systems similar to Figure 8.

Like Figure 8, each independent claim requires host units and remote units / remote stations. *See, e.g.*, EX1001, cl. 1 (“wherein the plurality of remote antenna units are configured to send uplink RF sampled data to the host unit”); cl. 8 (“a first remote wireless communication station ... a second remote wireless communication station ... sending a second transport signal to a host unit”); cl. 15 (“a first remote wireless communication station ... a second remote wireless communication station ... sending a second transport signal to a host unit”); cl. 19 (“wherein the remote unit is configured to send uplink RF sampled data to a host

unit ... “). Each independent claim also requires these remote units or stations to be co-located with a router, and that at least one remote units/ remotes station is co-located with a remote base station or baseband unit. *Id.*, cls. 1, 8, 15, 19.

III. AARFLOT DOES NOT TEACH OR SUGGEST, ALONE OR IN COMBINATION WITH LAROA OR WEIDMAN, ANY OF THE INDEPENDENT CLAIMS

As discussed below, Aarflot discloses a distributed base station that distributes the functionality of a single base station among several remote nodes, with the central node retaining the processing and control functionality. This is precisely the type of centralized base station functionality that the ’100 Patent distinguishes and improves upon. For example, Aarflot does not have the concept of remote base stations co-located at different remote nodes that is discussed and claimed in the ’100 Patent. As a result, Petitioners’ attempted mapping of Aarflot to the claims of the ’100 Patent fails.

A. Aarflot

Aarflot (U.S. Pat. No. 8,908,650) is directed to communication between a radio equipment control node and one or more remote radio equipment nodes.

EX1004 [Aarflot], Title.

Aarflot discloses the type of distributed base station that the ’100 Patent specifically distinguishes over and improves upon. Aarflot discloses a distributed

radio base station that includes a central radio equipment controller (“REC”) and distributed radio equipment (“RE”). EX1004 [Aarflot], 1:61-63. The REC performs the base station functionality of baseband signal processing. EX1004 [Aarflot], 1:67-2:1. The REC also houses “the radio base station control and management.” EX1004 [Aarflot], 6:51-53. Thus, the REC performs the base station control functionality and baseband processing from a centralized location.

Aarflot Figure 8A shows an example of Aarflot’s distributed base station, with REC node 12 and RE nodes 14a and 14b:

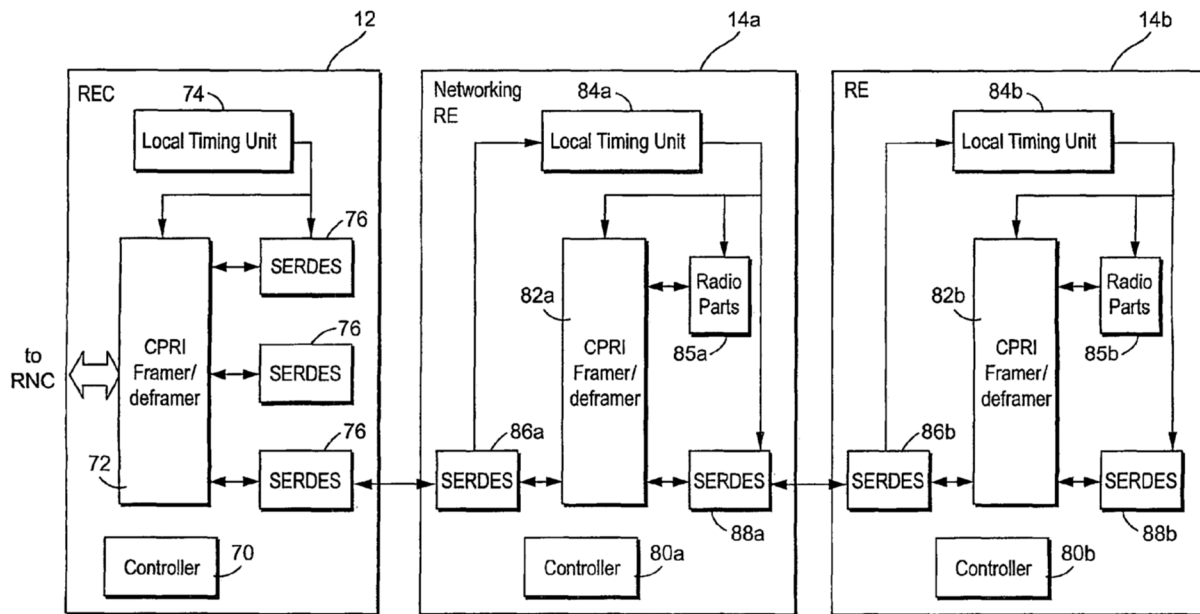


Fig. 8A

There may be multiple REs in Aarflot's distributed base station. EX1004 [Aarflot], 2:5-7 ("each of the plural remote radio equipment."). Each RE converts the signals received from the REC to radio frequencies and transmits and receives signals over antennas. EX1004 [Aarflot], 2:1-3. REs may be remote from the REC—similar to the '100 Patent's distributed antennas and remote units—but the RE ultimately sends any signals received back to the centralized REC for base station processing, causing the issues with increased latency, lack of capacity, and disruption of service discussed in the '100 Patent. EX1001 ['100 Patent], 1:16-26.

B. Aarflot Does Not Teach Or Suggest Remote Base Stations

Each independent claim requires a host unit. EX1001 ['100 Patent], cls. 1, 8, 15, 19. Each independent claim also requires a base station or baseband unit that is co-located with a remote unit. *Id.* Specifically, limitation 1.5 requires "a first of the plurality of remote antenna units is coupled to a co-located remote base station." EX1001 ['100 Patent], cl. 1. Limitation 8.4 requires "processing the first transport signal by a base station at the second remote wireless communication station." EX1001 ['100 Patent], cl. 8. Limitation 15.2 requires "processing the first RF signal by a base station at the first remote wireless communication station." EX1001 ['100 Patent], cl. 15. Limitation 19.3 requires "a baseband unit co-located

with and coupled to the remote unit.” EX1001 [’100 Patent], cl. 19. In each claim, the base station or baseband unit is remote from the host unit.

The Petition alleges that Aarflot’s Radio Equipment Controller (REC) serves as the claimed host unit. Pet., 30-31 (cl. 1), 62-63 (cl. 8), 81-82 (cl. 15), 87-88 (cl. 19). But Petitioners then allege that Aarflot’s REC is not only the host unit, but also the separate “*remote* base station.” Pet., 35, 38-39 (cl. 1); 60-61 (cl. 8), 74-75 (cl. 15), 84-85 (cl. 19). By “remote”, the claims mean remote from the host.

Petitioners fundamentally misstate the claims and Aarflot. The REC cannot be both the host unit and the remote base station because the claims require the host unit and remote base station to be *remote* from one another. The remote base station is “co-located” with a *remote* antenna unit. By “remote,” the claims expressly require that the “remote base station” and “remote antenna unit” are at a physically separate location than the host unit. Thus, they are not “co-located” with the host unit.

Moreover, nothing in Aarflot discloses multiple RECs in a single distributed radio base station or RECs that are distributed between two locations. *See* EX1004 [Aarflot], Figs. 2-6, 8A, 8B, 18, 20, 21 (each disclosing a single REC). This is because Aarflot is directed to a distributed radio base station *singular*, not a system of multiple base stations. EX1004 [Aarflot], 1:24-29. . *See also* EX1001 [’100

Patent], 2:59-62 (The flexibility to modify the functionality of each remote unit allows the wireless platform to support centralized base stations and distributed base stations, either separately or concurrently.”).

That is, Aarflot is directed to a single distributed base station where an REC serves several REs with remote antennas at different locations. *See, e.g., id.*, 2:5-7 (“Separate, dedicated optical and/or electrical links connect the radio equipment control (REC) to each of the plural remote radio equipment (RE).”); 2:41-43 (“The REC node is separate from and coupled to the RE node by a transmission link.”). Aarflot does not disclose the modular functionality and reconfigurable remote units central to the ’100 Patent. EX1001 [’100 Patent], 2:30-33 (“This modular platform is made up of a reconfigurable host unit and a reconfigurable remote unit designed for use in a system with a central node and a plurality of distributed antennas.”). Thus, Aarflot does not teach or suggest the challenged claims.

Since the Petition’s single ground relies exclusively on Aarflot as allegedly disclosing the remote base station, the Petition does not present a reasonable likelihood of success on any ground.

**C. Petitioners' Own Arguments Demonstrate The Flaws In
Petitioners' Logic**

Petitioners' argument that an REC can simultaneously exist in two separate locations at the same time is based on a section of Aarflot that Petitioners either misunderstand or mischaracterize. Petitioners cite Aarflot at column 1 lines 58-67 to argue that the REC and RE can be co-located. Pet., 38-39 (cl. 1), 59-61 (cl. 8), 75 (cl. 15), 84-85 (cl. 19). The full paragraph from Aarflot is quoted below:

A conventional radio base station in a cellular communications system is generally located in a single location, and the distance between the baseband circuitry and the radio circuitry is relatively short, e.g., on the order of one meter. A distributed radio base station includes the radio equipment control (REC) and the radio equipment (RE). Both parts may be physically separated, (i.e., the RE may be close to the antenna, whereas the REC is located in a conveniently accessible site), or both may be co-located as in a conventional radio base station design. The radio equipment control (REC) performs baseband signal processing, and each radio equipment (RE) converts between baseband and radio frequencies and transmits and receives signals over one or more antennas. Each RE serves a certain geographic area, sector, or cell. Separate, dedicated optical and/or electrical links connect the radio equipment control (REC) to each of the plural remote radio equipment (RE). However, the term link as used hereafter refers to a logical link and is not limited to any particular physical medium. Each link carries digital information downlink from the REC to the RE and digital information uplink from the RE to the REC.

EX1004 [Aarflot], 1:58-2:11.

This paragraph of Aarflot explains the difference between a “conventional radio base station” that is “generally located in a single location” and a “distributed radio base station” where the REC and RE “may be physically separated.” *Id.*, 1:58-67. While the paragraph states that the REC can be co-located with the RE

“as in a conventional radio base station design,” an REC co-located with an RE would not be a “*distributed* radio base station”; it would, as Aarflot explains, be a “*conventional* radio base station.”

In other words, what Aarflot is explaining is that a “distributed radio base station” has an REC that is connected to *remote* REs that are *remote* because they are not co-located with the REC. *Id.*, 1:58-2:11. Aarflot is purportedly improving on conventional radio base stations where the base station functionality is present in a single location by proposing a distributed base station where the REs are distributed at different locations.

Applying Petitioners’ logic to the claims illustrates its circular nature. The host (allegedly the REC) cannot be co-located with the claimed *remote* antenna because then the antenna would not be *remote*. Thus, Petitioners mapping fails.

Petitioners’ other arguments are similarly flawed. Petitioners argue that “Aarflot discloses that base station functionality is distributed to both the REC and the networking RE 14a.” Pet., 38. The claims require the *entire* remote base station to be co-located with the remote antenna unit. EX1001 [’100 Patent], cl. 1 (“a first of the plurality of remote antenna units is coupled to a co-located remote base station.”) Indeed “base station functionality [that] is distributed to both the REC and the networking RE 14a” is the precisely the type of “centralized base station”

with “distributed antennas” that the ’100 Patent distinguishes over and improves upon by allowing for remote units to be co-located with additional base stations. The claims are duplicating the base station functionality present at the host (i.e., creating two separate base stations, one at the host and the other at the remote antenna unit), not distributing a single base station’s functionality between several nodes as in Aarflot.

Petitioners state “Aarflot also discloses that the REC and the networking RE 14a may be co-located, meaning the remote base station is within the networking RE 14a, within the co-located REC, or formed by the networking RE 14a and the co-located REC.” Pet., 38. Petitioners’ logic misstates the claims. The claimed “remote base station” is remote precisely because it is not co-located with the host. If, as Petitioners argue, the REC is the host, the claims do not allow for the REC to be co-located with the *remote* antenna unit that is *remote* precisely because it is *remote* from the host.

Moreover, Aarflot is clear that the REC “performs the radio function of the digital baseband domain” and “the radio base station control and management.” EX1004 [Aarflot], 6:47-53. The REs—which Petitioners allege are the claimed “plurality of remote antenna units” (Pet., 32) are not by themselves base stations. EX1004 [Aarflot], 1:58-63 (explaining that a base station must include both an

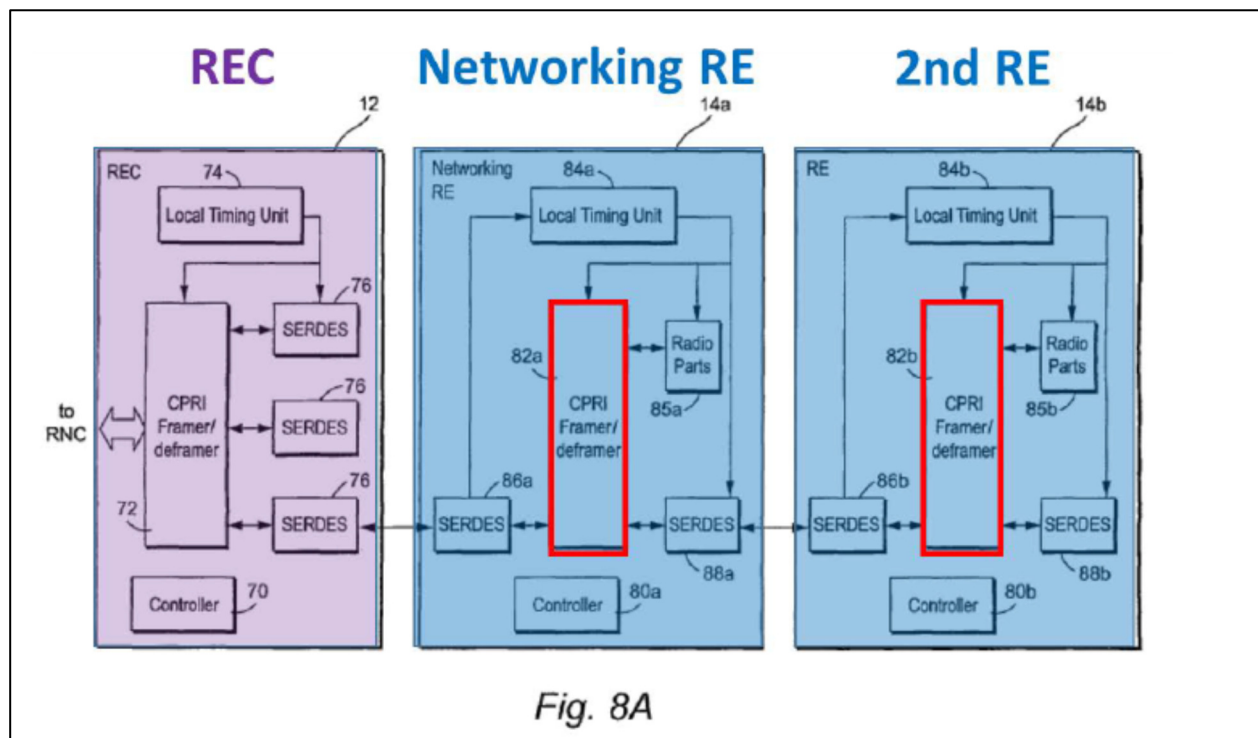
REC and an RE). Instead, the REs simply convert the baseband signals received from the REC to “radio frequencies and transmits and receives signals over one or more antennas.” EX1004 [Aarflot], 2:1-3.

The ’100 Patent distinguishes over similar functionality. The ’100 Patent’s remote units “convert[] the received signal back into an RF signal and transmit the signal over antennas.” EX1001 [’100 Patent], 3:32-34. To improve on this functionality, the ’100 Patent discloses, among other things, equipping remote stations with base stations so that they “do not need to transmit signals back to central node 801 for base station processing.” EX1001 [’100 Patent], 9:20-23. When the ’100 Patent claims a remote base station, it is not simply referring to an RE that converts signals to RF as in Aarflot. It is referring to the additional “base station processing” including baseband processing and control functionality. *Id.*

Petitioners cite to ’100 Patent Figs. 6-8 without explanation of their relevance. Pet., 39. The ’100 Patent claims are directed to various aspects of a “distributed base station system,” each with a host and a remote unit/station co-located with a remote base station. *See* EX1001 [’100 Patent], cls. 1, 8, 15, 19. Only Figure 8 is directed to a distributed base station system. *Id.*, 1:66-2:4. As explained above, Figure 8 discloses not only a base station at the IP Gateway 801, but also a base station at remote units 818 and 820. *Supra*, §II.A. Thus, Figure 8 is

consistent with the claims, which require the host and *remote* base station to be *remote* from one another. Aarflot's REC cannot be a remote base station because Petitioners allege it is the host. Petitioners' logic would require the REC to simultaneously be co-located with the remote antenna unit (as the remote base station) and remote from the remote antenna unit (as the host).

Finally, Petitioners cite, without explanation, to an annotated version of Aarflot Fig. 8A. Pet., 39. The annotations reinforce the fact that Aarflot discloses a single REC that controls multiple remote REs:



Pet., 39 (annotating EX1004 [Aarflot], Fig. 8A).

As shown in Fig. 8A, REC 12 is separate from Networking RE 14a and second RE 14b. Aarflot describes Fig. 8A as illustrating “the REC and RE nodes in further detail in multi-hop configuration.” EX1004 [Aarflot], 10:1-3. As Aarflot describes, the REC 12, RE 14a and RE 14b are different *nodes*, further emphasizing that the REC and REs are in different locations and not co-located. Aarflot, in introducing the “multi-hop configuration,” further confirms the REC and REs are not co-located, stating “[t]he REC node is separate from and coupled to the first RE node by a first transmission link” and “[t]he first RE node is separate from and coupled to the second RE node by a second transmission link.” EX1004 [Aarflot], 4:5-8. Thus, the evidence Petitioners cite confirms that the REC is separate from the REs and thus not co-located with a remote antenna unit as required by the claims.

Aarflot discloses a distributed radio base station consisting of an REC and a plurality of remote REs. The REC cannot be both the claimed host and the claimed remote base station because the two are by definition *remote* from one another. Accordingly, the Board should deny institution on all claims.

IV. CONCLUSION

For the foregoing reasons, the Board should deny institution.

Dated: April 29, 2025

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Preliminary Response consists of 3,415 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The Response complies with the type-volume limitation of 14,000 words as set forth in 37 C.F.R. § 42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

Dated: April 29, 2025

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that, pursuant to 37 CFR § 42.6(e), a true and correct copy of the foregoing **PATENT OWNER PRELIMINARY RESPONSE** has been served electronically via email on counsel of record for Petitioners:

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