

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

NEO WIRELESS LLC,
Patent Owner.

Case IPR2023-00763
Patent 10,447,450

PATENT OWNER'S RESPONSE

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EXHIBIT LIST	
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2002	William P. Alberth, Jr. Curriculum Vitae [Alberth-CV]
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2004	In re Neo Wireless, LLC Patent Litigation, 2:22-MD-03034-TGB, Exhibit A - Agreed Litigation Terms [Agreed-Lit.-Terms]
2005	In re Neo Wireless, LLC Patent Litigation, 2:22-MD-03034-TGB, Exhibit B - Disputed Litigation Terms [Disputed-Lit.-Terms]
2006-2013	Reserved
2014	Apr. 19, 2019 Letter from Sen. Tillis & Sen. Coons to USPTO Director [Tillis-Coons]
2015	'450 Patent Claim Comparison Table [Claims-Table]
2016	Neo Wireless, LLC v. Ford Motor Company, 4:22-cv-00210-GAF, Proof of Service of Summons [POS-Ford]
2017	Neo Wireless LLC v. Volkswagen et al, 1:22-CV-76, Return of Service of Summons and Complaint [POS-VW-Inc.]
2018	Neo Wireless LLC v. Volkswagen et al, 1:22-CV-76, Return of Service of Summons and Complaint [POS-VW-LLC]
2019	Defendants' Invalidity Contentions In In Re Neo Wireless LLC Patent Litigation, 2:22-MD-03034-TGB, served November 16, 2022 [Invalidity-Contentions]
2020	Carl Eklund, et al., <i>IEEE Standard 802.16: A Technical Overview of the WirelessMAN™ Air Interface for Broadband Wireless Access</i> , IEEE Communications Magazine, June 2002, at 98 [Eklund-Article]

2021	Brian Kiernan, <i>IEEE 802.16 Mobile Wireless MAN Study Group: Call for Contributions</i> , Aug. 23, 2002, https://www.ieee802.org/16/mobile/docs/80216sgm-02_08.pdf [Kiernan]
2022	Roger B. Marks, <i>The Evolution of WirelessMAN</i> , IEEE Microwave Magazine, Aug. 2008, at 72 [Marks]
2023	Second Declaration of William P. Alberth, Jr. [Alberth-2 nd -Decl.]
2024	Deposition Transcript of Dr. Todor Cooklev [Cooklev-1 st -Depo.]
2025	Todor Cooklev, <i>Wireless Communication Standards: A Study of IEEE 802.11, 802.15, and 802.16</i> , 2004 [Cooklev-Book]
2026	<i>Reserved.</i>
2027	Rami Lee et al., <i>Capacity Analysis Considering Channel Resource Overhead for Mobile Internet Access (WiBro)</i> , May 2005 [WiBro-Article]
2028	Chakchai So-In et al., “Resource Allocation in IEEE 802.16 Mobile WiMAX,” in <i>Orthogonal Frequency Division Multiple Access (OFDMA)</i> , April 2010
2029	Hua Wang & Lars Dittman, <i>Priority-Based Resource Allocation for Downlink OFDMA Systems Supporting RT and NRT Traffics</i> , May 2008
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2034	Flow Chart For 35 U.S.C. § 102(e) Dates, available at https://www.uspto.gov/sites/default/files/web/offices/dcom/olia/aipa/102eflowchart.pdf (last visited December 26, 2024) [102(e)-Dates-Flowchart]
2035	EE Times, <i>Cut through the confusion of mobile WiMAX</i> , June 2007
2036	<i>Reserved</i>
2037	<i>Translation of Unexamined Korean Patent No. 10-2004-0065099</i>
2038	Declaration of Translator Corey Colling

I. INTRODUCTION

Petitioner challenges claims 7 and 11 of U.S. Patent No. 10,447,450 (the “’450 Pat.”) under 35 U.S.C. § 103(a) based on the sole ground of Park in view of IEEE 802.16-2004. Petitioner’s challenge fails for two independently sufficient reasons. These reasons are strongly supported by the evidence, especially in view of the weak credibility of Petitioner’s proffered evidence and the strong documentary and other rebuttal evidence developed at trial.

First, claim 7 (the sole independent challenged claim) requires a “mobile device configured” to perform certain claimed limitations. Ex. 1001 [’450 Pat.] cl. 7; Section II, *infra*. It is not in dispute that, for several of the limitations that the claim requires that its “mobile device” be configured to perform, Petitioner relies entirely on Park’s embodiments that modify the resource allocation message for the band AMC region of a frame. Section II.A, *infra*. Park unambiguously teaches, however, that the band AMC region of the frame applies only to “fixed” subscribers, ***not*** mobile subscribers. Section II.B, *infra*. While Park indicates that these embodiments may be implemented in the context of a system that also supports “mobile subscribers,” such as WiBro, even in such systems, Park will divide its frame into mutually exclusive regions for fixed and mobile subscribers, and its relied-upon teachings would still apply only to fixed subscribers—not mobile as the required to meet the claims. *Id.*

Petitioner's combination of Park with IEEE 802.16-2004 fares no better. The combination does not purport to change Park's express teachings above. And the record is clear that IEEE 802.16-2004 only supported "fixed stations." Section II.C, *infra*. Indeed, Petitioner's own expert wrote in a technical publication that "IEEE 802.16's major weakness is that it does not support mobility." Ex. 2025 [Cooklev-Book] 332. Even if IEEE 802.16-2004 **could** support mobile devices, contrary to Petitioner's expert and the other evidence of record, the combination would still not meet the claims, because Park expressly discloses that even in the context of an 802.16 system that supports both fixed and mobile devices, Park's relied-on embodiments apply only to fixed subscribers.

Faced with these inconvenient facts, Petitioner resorts to misrepresentations and distractions. Section II.D, *infra*. Petitioner's positions and its expert's opinions are refuted by the record evidence, including Petitioner's expert's own published statements prior to this case, an example of which has just been described above.

Petitioner's sole ground fails for a second, independently sufficient reason. Section III, *infra*. Claim 7 recites a "segment having ... N time-frequency resource units ... where $N = 2, 4 \text{ or } 8$." The plain meaning of this language is that N, when plural, must equal 2, 4 or 8. Therefore, it cannot be other plural numbers not equal to 2, 4 or 8. Petitioner relies solely on Park for this limitation, but it is not

disclosed in Park, for, as Petitioner admits, Park does not limit N to 2, 4, 8, or any other number. Petitioner argues that because Park allows N to be *any* number, which necessarily includes 2, 4, or 8, the limitation is met. But merely disclosing that N can be *any* number does not disclose the limitation that N = 2, 4 or 8 unless that limitation were to be erroneously emptied of all meaning. In arguing otherwise, Petitioner asserts that the specification supports its interpretation because supposedly “the ’450 Patent does not describe any particular advantages from using N=2, 4 or 8.” Pet., 38. But that is not correct: the specification confirms the claims’ plain meaning, and discloses that when N equals 2, 4 or 8, the claimed invention achieves benefits absent from the prior art.

For the foregoing reasons, as discussed in more detail in this Response, Petitioner has failed to prove that its sole ground renders the claims unpatentable.

II. PETITIONER FAILS TO SHOW A “MOBILE DEVICE CONFIGURED TO” PERFORM THE RECITED LIMITATIONS.

Claim 7 recites that:

the mobile device configured to:

[1] receive an identifier from a base station in a cell in which the mobile device is operating; and

[2a] receive a signal containing information from the base station over a segment of time-frequency resource, [2b] ***the segment having a starting time-frequency coordinate and the segment comprising N time-frequency resource units within a time***

interval, [2c] each unit containing a set of frequency subcarriers in a group of OFDM symbols, [2d] *where N = 2, 4 or 8*; and [3] recover the information from the received signal *using the starting time-frequency coordinate and N* in conjunction with the received identifier.

Ex. 1001 [’450 Pat.] cl. 7.^{1,2}

Petitioner exclusively relies, as it must, on Park’s embodiments for the alleged disclosure of limitations [2a] and [2d], the “segment having a starting time-frequency coordinate and the segment comprising N time-frequency resource units within a time interval ... where N = 2, 4 or 8.” Pet., 31 (asserting that “Park teaches both of these limitations.”); Section II.A, *infra*. Petitioner also relies only on the Park embodiments for the part of limitation [3] reciting use of “the starting time-frequency coordinate and N” in recovering the information. Pet., 43-45.

¹ This POR uses the same claim element numbering as the Petition.

² The parties agree, both here and in court, that the preamble is limiting. Ex. 2004 [Agreed-Lit.-Terms] 3-4; Pet., 8 (“The parties agreed on the following constructions, which Ford also adopts in this Petition.”). The law agrees. *See In re Fought*, 941 F.3d 1175, 1178 (Fed. Cir. 2019) (“We have repeatedly held a preamble limiting when it serves as antecedent basis for a term appearing in the body of a claim.”).

However, Park does not teach a mobile device configured to perform these limitations. Park teaches that its relied-upon embodiments exclusively apply to “fixed subscribers,” even when those “fixed subscribers” are within a network (such as WiBro) that may *also* support mobile devices. Section II.B, *infra*. Implementing Park within the framework of IEEE 802.16-2004, as in the proposed Park-IEEE 802-16-2004 combination, does not change this teaching, because it was well known in the field that 802.16-2004 itself only supported “fixed stations.” Section II.C, *infra*. Therefore, Park and 802.16-2004, alone or in combination, fail to show or render obvious a “mobile device” configured to perform the recited claim limitations. Petitioner’s arguments to the contrary lack evidentiary or legal support. Section II.D, *infra*.

A. For Claim Limitations That Must Be Performed By A “Mobile Device,” Petitioner Relies Upon Park’s Embodiments For Resource Allocation Within The AMC Area Of The Frame.

For the limitations involving configuration of a mobile device—including limitations 2[b] and 2[d] and parts of limitation [3] of the independent claim 7—Petitioner relies upon Park’s teachings that certain of its embodiments modify the DL_MAP Information Element (IE) for the allocation of resources within the band AMC area of the frame. Pet., 31-40.

First, Limitation 2[b] recites “the segment having a starting time-frequency coordinate and the segment comprising N time-frequency resource units within a

time interval.” Ex. 1001 [’450 Pat.] cl. 7. Limitation 2[d] recites “where $N = 2, 4$ or 8.” Petitioner argues that “Park teaches both of these limitations.” Pet., 31. Petitioner relies wholly on the allocation mode 01 in Park’s embodiments that modify the DL_MAP IE for allocation of resources within the AMC area for the alleged disclosure of these limitations. Pet., 31-40. More specifically, as Mr. Alberth explains:

Park explains that its invention modifies the syntax definition for the DL_MAP IE that is used for indicating resource allocation information for the AMC area. Ex. 1005 [Park] [0013]; *see also id.*, [0043] (“According to the present invention, to indicate resource allocation information of an AMC area, allocation units having mutually difference sizes and shapes are defined ...”); *id.*, [0013]-[0029] (explaining that Park modifies the resource allocation mode definitions in the DL_MAP IE for allocation resources within the AMC region); *id.*, [0055] (“Table 2 shows DL(/UL)-MAP IE (Information Element), which indicates resource allocation information of the AMC area according to an embodiment of the present invention.”); *see also id.*, [0073]-[0074].

Park explains that in its invention, the entire AMC resource region is indexed per a pre-defined allocation unit. *Id.*, [0043]-[0046]. For example, Park Figure 3C, reproduced below, shows the region indexed with allocation units 1 to M-1.

INDEX 0	INDEX 1	INDEX 2	INDEX 3
INDEX 4	INDEX 5	INDEX 6	INDEX 7
⋮			
INDEX M-8	INDEX M-7	INDEX M-6	INDEX M-5
INDEX M-4	INDEX M-3	INDEX M-2	INDEX M-1

FIG.3C

Park then describes three allocation modes, 00, 01 and 10, for allocating the indexed allocation units to subscribers. *Id.*, [0064]-[0071]; Figs. 5A-5C. As relevant here, in allocation mode 01, the region assigned to a subscriber is defined by “the index value of the start allocation unit and the total number of allocation units.” *Id.*, [0067].

Park’s Figure 5B, reproduced below, provides an example for allocation mode 01, where the index number of the start allocation unit is j , and the number of allocation units is 3:

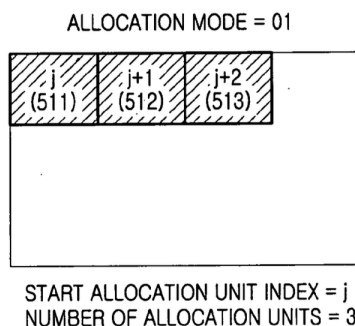


FIG.5B

Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 37-40.

In the Park embodiments just described, Petitioner relies upon allocation mode 01 for limitations 2[b] and 2[d]. Pet., 32-33. In particular, Petitioner maps Park’s “start allocation unit index” to the claims’ recited “starting time-frequency coordinate,” and Park’s “number of allocation units” to the claimed number N of time-frequency resource units. Petitioner’s argument is reproduced below:

Specifically, in Park’s “allocation mode ‘01’,” Park’s “allocation region” (i.e., segment) has: (1) an “index value of the start allocation unit” (i.e., a one- dimensional starting time-frequency coordinate) that identifies the start of the allocation region and; (2) the total number of allocation units (i.e., N time-frequency resource units). Park [0066] (“In the allocation mode ‘01’, the corresponding allocation region can be indicated by using the index value of the start allocation unit and the total number of allocation units.”) (emphases added); *see also id.* [0053], [0070], cl. 4 (“allocation region is indicated by using an index value of a start allocation unit and a total number of allocation units”); Cooklev Decl. ¶¶ 162-170 (explaining that this is part of Park’s improvement to 802.16-2004, which uses two- dimensional starting time-frequency coordinates (start symbol offset and start logical channel offset)).

Pet., 32-33; *see also* Pet., 33-34 (discussing Park Figure 5B).

Petitioner further relies upon these same Park embodiments for limitation 3, which recites “recover the information using the starting time-frequency

coordinate, N, and the identifier.” Petitioner argues that the sole ground meets this limitation because the DL_MAP IE disclosed in these Park embodiments transmits the “start allocation unit index” and the “number of allocation units.” Pet., 45.

Petitioner argues that

Park discloses using a DL-MAP IE message with revised syntax to communicate the parameters the mobile device will use to recover the information from the received signal.... Park discloses its modified DL-MAP IE includes “Start allocation unit index” (the claimed “starting time-frequency coordinate), “Number of allocation units” (the claimed “N time-frequency resource units”), and “RCID_ID” (the claimed “identifier”).

Id. Petitioner argues that the subscriber uses these values to recover the information contained in the frame. *Id.*; *see also* Ex. 2023 [Alberth-2nd-Decl.] ¶ 42.

In sum, for limitations 2[a], 2[b], and 3, Petitioner expressly (and necessarily) relies upon Park’s embodiments that modify the DL_MAP IE for allocating resources within the band AMC region of the frame. However, these embodiments cannot meet the limitations as to mobile devices, as discussed below.

B. Park’s Embodiments For Resource Allocation Within The Band AMC Area Of The Frame Are Only For “Fixed Subscribers.”

As will be discussed in this section, Park expressly teaches that, in a system (such as, for example, WiBro) that may support both mobile and fixed subscribers, Park’s teachings in its embodiments relied upon by Petitioner only apply to fixed

subscribers. Specifically, as just discussed, Petitioner relies, as it must, on Park's embodiments for allocating resources within the band AMC area of the frame. Park expressly teaches that the AMC area of the frame, and thus its embodiments, apply only to "fixed subscribers," even though the network may otherwise support mobile subscribers. Thus, Petitioner fails to show disclosure or obviousness in view of Park, whether alone or in combination, of a "mobile device" configured to perform the recited claim limitations.

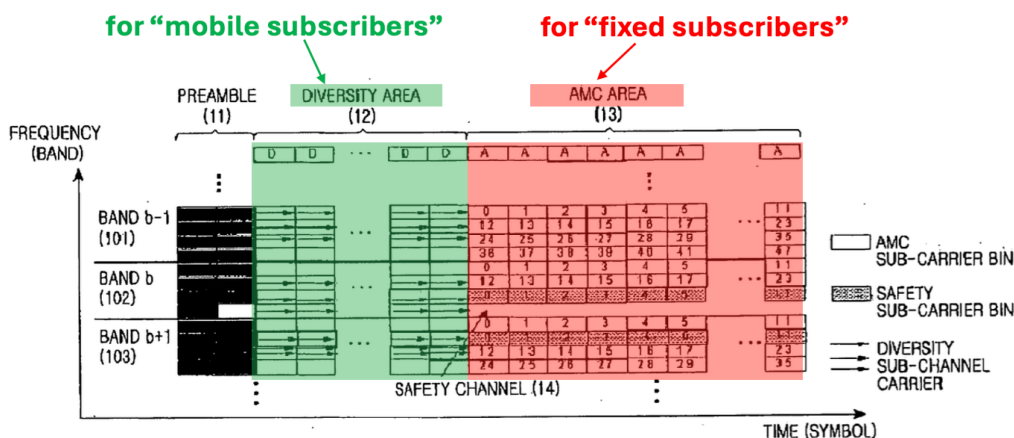
As Mr. Alberth explains:

Park discloses a frame structure in its Figure 1, which Park states illustrates the frame structure for a WiBro system "or an IEEE 802.16 system applied to an OFDMA system." *Id.*, [0007]. Park then explains that, in the frame structure of Figure 1, the frame area is divided into two mutually exclusive parts, one for "mobile subscribers" and one for "fixed subscribers:"

The *diversity area 12* is used for allocating resources *for mobile subscribers*, and *the AMC area 13* is used for increasing the transmission speed through a frequency-selective adaptive modulation *for fixed subscribers*.

Ex. 1005 [Park] [0011]; *see also id.*, [0010].

This is shown in the annotated version of Park's Figure 1, where the diversity area allocated to mobile subscribers is shown in green, and the AMC area allocated to fixed subscribers is shown in red:



Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 45-46.

Park discloses that its invention applies to the resource allocation message for subscribers within the AMC area, which, Park explains, is only for “fixed subscribers.” As Mr. Alberth further explains:

Park explains that its invention is for a modified resource allocation for the AMC area, which Park states is exclusively for “fixed subscribers.” Specifically, Park states that the DL_MAP IE “used for indicating resource allocation information of the AMC area in such a resource allocation structure is defined in Table 95 of the Institute of Electrical Engineers (IEEE) 802.16-2004 standard.” Ex. 1005 [Park] [0013]. The DL_MAP IE referenced by Park is an Information Element that informs the subscriber of the location within the band AMC region where the data for that specific subscriber is located. I also agree with Petitioner’s expert, Dr. Cooklev, that Park’s reference to Table 95 is intended to refer to Table 97 of IEEE 802.16-2004. Ex. 1003 [Cooklev-Decl.] ¶ 60; *see also* Ex. 1006 [802.15-2004] 110 (“The format of Compact DL-MAP IE for Band AMC Subchannel is presented in Table 97.”).

Park explains that the “Allocation Mode” variable in its prior art DL_MAP IE message for the AMC area defined three modes of allocation, 00, 01 and 10. Ex. 1005 [Park] [0016]-[0027]. Park’s invention then, in Park’s embodiments, re-defines the three allocation modes for the DL_MAP IE for the AMC area according to Park’s invention. *Id.*, [0064]-[0071]; [0055]; Table 2; Fig. 5.

Park is clear that its resource allocation scheme is for the band AMC area of the frame. First, as explained above, the Information Element that Park modifies is explicitly the DL_MAP IE for the band AMC area. Second, Park elsewhere states that its embodiments relate to the AMC area allocation. *See, e.g., id.*, [0043] (“According to the present invention, to indicate resource allocation information *of an AMC area*, allocation units having mutually different sizes and shapes are defined ...”); [0055] (“Table 2 shows DL(/UL)-MAP IE (Information Element), which indicates resource allocation information *of the AMC area* according to an embodiment of the present invention.”); [0073]-[0074] (discussing the benefits of Park invention for the AMC region).

Notably, Park never refers to the subscriber stations in its embodiments as “mobile.” The only place where Park ever refers to “mobile subscribers” is in the background of its invention, where it explains that the system overall may support mobile subscribers, and to do so, the frame area is divided between fixed and mobile subscribers. Ex. 1005 [Park] [0005], [0011]. But then Park proceeds to disclose its invention for the fixed subscribers within that system, as I explained above.

Therefore, Petitioner has not shown how Park discloses a “mobile device” configured to perform the recited claim limitations, where the

embodiments of Park, which Petitioner has relied upon, are exclusively for the AMC area of the frame, which Park states is for “fixed subscribers.”

Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 47-51. The fact that these Park embodiments are for the band AMC area of the frame is undisputed, including by Petitioner’s expert. *See, e.g.*, Ex. 1003 [Cooklev-Decl.] ¶ 113 (testifying that “[a]s described above, the DL-MAP is for resource allocation in an AMC area of the OFDMA frame.”); ¶ 115 (testifying that “[a]s Park indicates, its improvements to 802.16-2004 relate to the application of the DL-MAP IE (highlighted in blue) to the optional AMC zone (highlighted in orange).”); ¶ 139 (“Table 97, DL- MAP IE format for band AMC”) (citing Ex. 1006 [802.16-2004] 110); ¶ 159 (testifying that “[i]n Park, the indexed total resource region is the ‘AMC area’ for which the allocation information is provided via the DL-MAP, as described above.”); ¶ 189 (“Park (which, as described above relates to AMC)”); ¶ 206 (“Park teaches that DL-MAP IE is used to allocate resources resource information in the AMC area.”); ¶ 207 (“Park and 802.16-2004 apply the modulation and coding scheme to an AMC area”).

The fact that that the band AMC area modified by Park only supports fixed subscribers is also supported by the extrinsic evidence of record, specifically the descriptions of WiBro and IEEE 802.16(e). This support is found, for example, in a book by Petitioner’s own expert Dr. Cooklev published in 2004, prior to this litigation, titled “*Wireless Communication Standards, A Study Of IEEE 802.11*,

802.15 and **802.16**.” Ex. 2025 [Cooklev-Book]; *see also* Ex. 2024 [Cooklev-1st-Depo.] 38:2-12 (authenticating). In *Wireless Communication Standards*, Dr. Cooklev wrote that IEEE 802.16-2004 did not support mobile stations. Ex. 2025 [Cooklev-Book] 332 (“IEEE 802.16’s major weakness is that it does not support mobility.”); *see also* Section II.C, *infra*.³ Indeed, as Dr. Cooklev explained in his book, the reason that the 802.16(e) committee was established was to **add** mobility to IEEE 802.16-2004, and one of the “likely” changes needed to the 802.16-2004 standard in order to support mobility was to divide the frame into two regions, one for “fixed stations” and one for “mobile stations”:

Another initiative within IEEE 802.16 is to support mobility. Task Group 802.16e was established to support this technology [B30], [B97], [B99], [B131]. *The solution that will be developed by 802.16e will likely be devoting one part of the superframe for fixed stations and one part for mobile stations.*

Ex. 2025 [Cooklev-Book] 331.

Dr. Cooklev further testified that one of the changes made by the committee to IEEE 802.16-2004 in order to add mobility to the standard, as reflected in the

³ Dr. Cooklev’s book was published in 2004. As he confirmed under cross-examination, its discussion of the IEEE 802.16 standard applies to the 802.16-2004 version of the standard relied upon by Petitioner as prior art. Section II-C, *infra*.

subsequent IEEE 802.16(e) that supported mobility, was to divide the frame into two mutually exclusive regions, one for mobile devices and one for fixed devices. Ex. 2024 [Cooklev-1st-Depo.] 71:3-6 (“Q. To your knowledge, *is your proposed likely solution was the solution ultimately adopted by 802.16(e)? A. I think, yes.*”); 62:3-7 (“Q. Does 802.16-2004 divide a superframe between fixed and mobile stations? A. No, I—I don’t think the 2004 version of the standard has the superframe—this type of a superframe. It was brought by 16(e).”). This division of the frame into two mutually exclusive areas, one for mobile stations and one for fixed stations, as a later modification to 802.16-2004 to make it support mobile devices, is notably similar to the teaching in Park to divide the frame into two mutually exclusive areas, as shown for example in Park’s Figure 1 where the AMC area is exclusively for “fixed subscribers.” Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 53-56.

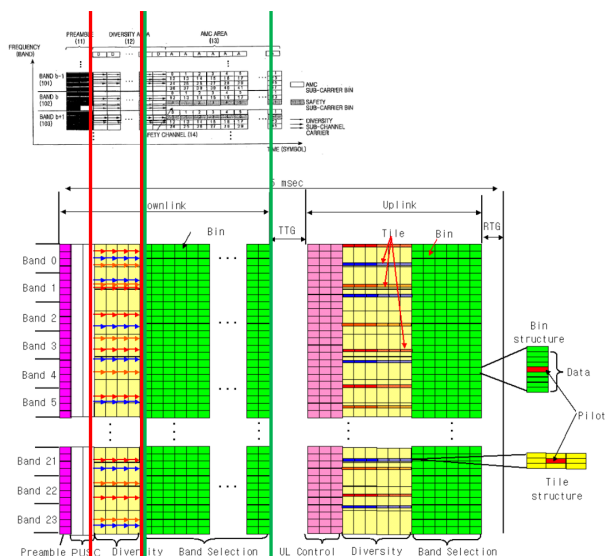
Similarly, WiBro-related documentation confirms the division of the frame into diversity (for mobile subscribers) and band AMC (for fixed subscribers) regions. Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 57-59. WiBro is based on IEEE 802.16(e). *Id.*; *see also* Ex. 2024 [Cooklev-1st-Depo.] 36:11-13 (“So WiBro, they said, well, we’ll take draft two of 802.16(e), and that will be the foundation of the WiBro technology.”); 2027 [WiBro-Article] 2 (“Specification of WiBro is somewhat similar to IEEE 802.16e ...”). In order to support mobility, WiBro would also, like IEEE 802.16e and Park, divide the frame into two mutually

exclusive areas, a diversity area for mobile subscribers, and a mutually exclusive AMC area for fixed subscribers:

Specification of WiBro is summarized in table 1. Fig.1 shows the frame structure... Sub-channels are flexible for band selection and diversity. ***Fixed wireless indoor service is supported with band selection mode*** to maximize multi-user scheduling gain by utilizing channel selectivity for stationary users. And ***mobile wireless outdoor service is supported with diversity mode*** to maximize wideband frequency diversity and temporal diversity gain for mobile users.

Ex. 2027 [WiBro-Article] 1-2. The article provides a figure showing the frame structure for WiBro as similar to Park’s Figure 1—having a diversity area for mobile stations, and a band AMC area for fixed stations—as seen in the comparison of the Park and WiBro figures below:

diversity area for mobile subscribers band AMC area for fixed subscribers



Ex. 1005 [Park] Figure 1

Ex. 2027 [WiBro-Article] Figure 1

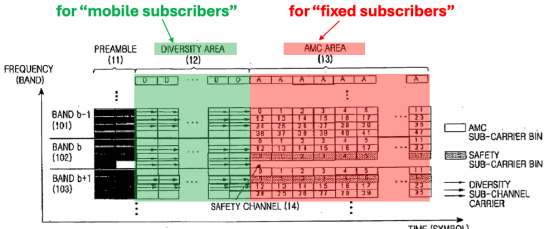
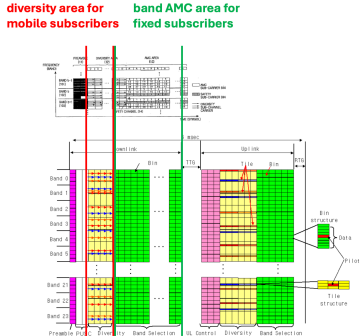
Ex. 2023 [Alberth-2nd-Decl.] ¶ 59.

As Dr. Cooklev admitted under cross-examination, the band selection zone in WiBro is similar to the band AMC region in Park, and is exclusively for fixed subscribers:

If you look at Figure 1 [of Ex. 2027], we see a figure. *This figure is consistent with Figure 1 of Park.* And we see there is a—and I think earlier we were—we were talking about different zones. So we see at the bottom—at the bottom we see a—so there is a diversity zone. This diversity zone is the zone dedicated to mobile users. *There is a zone that here it's referred to as band selection. This is the zone that is for fixed users.* So now this—so you were asking about that passage. And if we look, fixed wireless is supported with band selection mode. *So I think here band selection mode is that—is that part of the frame called “band selection.” That's for stationary users.* And you have diversity mode, again, that part of the frame which is directed to mobile users.

Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18.

Thus, IEEE 802.16(e), Dr. Cooklev's own book, WiBro and Park all uniformly confirm that in a system that may otherwise support mobile devices, the band AMC area (and thus Park's invention) only supports fixed subscribers. This relationship is summarized in the table below:

Park Frame divided into diversity (mobile) and AMC (fixed)	802.16(e)/Cooklev Book Frame divided into “fixed stations” and “mobile stations”	WiBro Frame divided into diversity (mobile) and band (fixed)
for “mobile subscribers” for “fixed subscribers”  Ex. 1005 [Park] Fig. 1 (annotations added) Ex. 1005 [Park] [0007] (“FIG.1 is a view illustrating <i>a frame structure of a WiBro</i> stands for Wireless Broadband (WiBro) system or an <i>IEEE802.16 system</i> applied to an OFDMA system.”) Ex. 1005 [Park] [0011] (“<i>The diversity area 12 is used for allocating resources for mobile subscribers</i>, and <i>the AMC area 13 is used</i> for increasing the transmission speed through a frequency-selective adaptive modulation <i>for fixed subscribers</i>.”)	Ex. 2025 [Cooklev-Book] 331 (“<i>The solution that will be developed by 802.16e will likely be devoting one part of the superframe for fixed stations and one part for mobile stations.</i>”) Ex. 2024 [Cooklev-1st-Depo.] 71:3-6 (“Q. <i>is your proposed likely solution was the solution ultimately adopted by 802.16(e)?</i> A. <i>I think, yes.</i>”)	diversity area for mobile subscribers band AMC area for fixed subscribers  Ex. 1005 [Park] Figure 1 Ex. 2027 [WiBro-Article] Figure 1 Ex. 2027 [WiBro-Article] 1-2. (“<i>Fixed wireless indoor service is supported with band selection mode</i> And <i>mobile wireless outdoor service is supported with diversity mode</i>”) Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18. (“<i>This figure is consistent with Figure 1 of Park. ... This diversity zone is the zone dedicated to mobile users. There is a zone that here it’s referred to as band selection. This is the zone that is for fixed users.</i>”)

Ex. 2023 [Alberth-2nd-Decl.] ¶ 61.

Therefore, Park, consistent with other extrinsic evidence, discloses that its embodiments only apply to fixed subscribers, even though the network may otherwise support mobile subscribers.

C. IEEE 802.16-2004 Does Not Modify Park's Disclosure Of Its Application To Only Fixed Subscribers Because IEEE 802.16-2004 Itself Only Disclosed Fixed Subscribers.

Petitioner's ground is based on implementing Park within an IEEE 802.16-2004 system. Pet., 14 ("A POSA would have been motivated to combine the teachings of Park and 802.16-2004 as proposed ..."); Ex. 1003 [Cooklev-Decl.] ¶ 77 ("A POSA would have considered it obvious to implement Park using 802.16-2004."). However, implementing Park within IEEE 802.16-2004 does not modify Park's disclosure that its embodiments are exclusively applied to fixed subscribers. This is because, as explained in this section, it was well-known that IEEE 802.16-2004 did not support mobile devices. Therefore, implementing Park in IEEE 802.16-2004 does not disclose or render obvious applying Park's method to mobile devices, especially since, as shown above, Park teaches that its method only applies to fixed subscribers even in systems such as WiBro that support mobile subscribers.

While Petitioner's expert, Dr. Cooklev, asserts in this litigation that "a POSA would understand that 802.16-2004 appl[ies] to mobile devices" (Ex.

1003 [Cooklev-Dec1.] ¶ 126), his publications outside of this litigation state the exact opposite. As discussed above, in 2004 Dr. Cooklev wrote a book titled *Wireless Communication Standards, A Study Of IEEE 802.11, 802.15 and 802.16*, Ex. 2025 [Cooklev-Book]. At deposition, Dr. Cooklev confirmed that the discussion of the IEEE 802.16 standard in his 2004 book applies to the 802.16-2004 version of the standard relied upon by Petitioner here. As Dr. Cooklev admitted under cross-examination:

Q. Is it fair to say that your *discussion of the 802.16 standard in your book applies to 802.16-2004* version standard, as well?

A. *I think so.*

Ex. 2024 [Cooklev-1st-Depo.] 39:5-8. In his book—which, unlike Dr. Cooklev’s declaration in this case, was not written in the context of litigation—Dr. Cooklev unambiguously explains that 802.16—including 802.16-2004, as just noted above—did not support mobile devices:

IEEE 802.16’s major weakness is that it does not support mobility.

While originally mobility was not required, recently demand has been increasing for mobile broadband wireless access. Within IEEE 802. there are two efforts to provide mobile BWA systems. First, *IEEE 802.16 has created a task group to explore how to modify IEEE 802.16 so that it supports mobility.*

Ex. 2025 [Cooklev-Book] 332; *see also id.*, 22 (“*IEEE 802. 16e, being developed at present to support mobile subscribers.*”); 331 (“Another initiative within IEEE

802.16 is to support mobility. Task Group 802.16e was established to support this technology.”); Ex. 2024 [Cooklev-1st-Depo.] 54:8-25 (“Q. [Page 226, Exhibit 2025] Second paragraph second sentence reads as follows, quote, ‘Fixed broadband wireless access systems typically include at least one base station and a number of subscriber stations (SS).’ Do you see that? A. Yes. Q. ... In this sentence by subscriber stations you mean stationary or fixed subscribers, correct? A. In this sentence, yes.”).

Dr. Cooklev’s book provides a table summary of the various versions of the standard, reproduced below with annotations added, that further confirms that it was the IEEE 802.16(e) version of the standard (highlighted in green), and not the earlier versions of the 802.16 standard such as 802.16-2004, that provided the “enhancement to support mobility”:

Table 1–4: 802.16 projects

Number	Description
802.16	Fixed broadband wireless systems between 10 and 66 GHz
802.16a	Amendment for operation between 2 and 11 GHz
802.16c	Enhancement including system profiles between 10 and 66 GHz
802.16.2	Coexistence between 10 and 66 GHz
802.16/Conf01 802.16/Conf02 802.16/Conf03	Test and conformance specifications (active)
802.16d	System profiles (active)
802.16e	Enhancement to support mobility (active)

Ex. 2025 [Cooklev-Book] 22 (color annotations added). In this table, 802.16d (highlighted in red) corresponds to IEEE 802.16-2004, the version of the standard relied upon by Petitioner here. That version, unlike the later 802.16(e), did not support mobile devices. Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 70-73. The IEEE 802.16(e) standard is not asserted in the Petition’s sole ground as prior art against the ’450 Patent.

The fact that IEEE 802.16-2004 did not support mobile devices is also supported by the teachings of the standard itself, and confirmed by publications from committee members involved with creation of the standard. As Mr. Alberth explains:

It was well-known in the field and to a POSITA that the IEEE 802.16-2004 standard were directed exclusively at stationary systems and did

not support mobile devices. The title of standard itself states that it is the “Standard Air Interface *for Fixed Broadband Wireless Access Systems*,” not for mobile systems:

**Part 16: Air Interface for Fixed
Broadband Wireless Access Systems**

Ex. 1006 [802.16-2004] 0001 (Title).

Its abstract states that “[t]his standard specifies the air interface of fixed broadband wireless access (BWA) systems supporting multimedia services.” Ex. 1006 [802.16-2004] 0004 (Abstract).

The word “mobile” does not appear in the standard even once.

This is also readily confirmed by various literature in the field, such as Ex. 200 [Eklund-Article], which was co-authored by Carl Eklund, chair of the MAC task group that developed the IEEE 802.16 medium access protocol, and Roger Marks, chair of the IEEE 802.16 working group on broadband wireless access. Ex. 200 [Eklund-Article] 107 (Biographies). Eklund provides a technical overview of the IEEE 802.16 standard. It explains that “[t]he broadband wireless access industry,” including the IEEE 802.16 standard, “provides high-rate network connections to *stationary sites*.” Ex. 200 [Eklund-Article] 98 (Abstract); *see also* Ex. 201 [Kiernan] 1-2 (Call for contributions to address feasibility of adding mobility to 802.16).

Ex. 203 [Alberth-2nd-Decl.] ¶¶ 64-67.

As Mr. Alberth further explains, it was not until December 2005—after the priority date of the Patent—that an amended IEEE 802.16e standard could support mobile terminals after years of research and analysis by experts in the field:

The IEEE 802.16 family of standards (including 802.16-2004) did not support mobile devices until version 802.16e, approved on December 7, 2005. *See* Ex. 1014 [802.16e] 3. This is confirmed by, for example, another article authored by Roger Marks. Dr. Marks explains that the 802.16 working group “began a new project” to “add support for mobile terminals” in 2002. Ex. 2022 [Marks] 74. While the project “brought in a large number of participants and new technology ideas,” it was not until 2005 when the details, including feasibility and desirability, were worked out and support for mobile terminals were supported through the IEEE 802.16e amendment. *Id.*; *see also* Ex. 2022 [Mark] 74 (explaining that even after approving the IEEE 802.16e amendment in 2005, the working group continued its work on other “critical issues” to support mobility, leading to IEEE 802.16f amendment in 2005 and IEEE 802.16g amendment in 2007); Ex. 1025 [Eklund-Book] 26 (explaining additional aspects of mobility not resolved until 2007).

A book authored by Dr. Eklund, Dr. Marks and others on the IEEE 802.16 standard also supports the above. Specifically, the book expressly confirms that IEEE 802.16-2004 was directed at fixed devices, and it was the amendment in IEEE 802.16e that allowed mobility:

The current version of its fixed wireless standard was most recently updated as IEEE Std 802.16-2004 [B20], and an

amendment adding mobility support (IEEE Std 802.16eTM-2005 [B24]) was published in late 2005.

Ex. 1025 [Eklund-Book] x. In fact, unlike the title of IEEE 802.16-2004 that “Standard Air Interface *for Fixed Broadband Wireless Access Systems*,” not for mobile systems (Ex. 1006 [802.16-2004] 0001 (Title)), the title for IEEE 802.16(e) expressly adds the word “Mobile”: “Air Interface for *Fixed and Mobile* Broadband Wireless Access Systems.” Ex. 1014, 1. This further confirms that IEEE 802.16-2004 did not support mobile stations.

Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 68-69.

Therefore, the documentary evidence in the record, including the text of the IEEE 802.16-2004’s standard itself, a reference book authored by Petitioner’s own expert, and another reference book authored by the committee members of the 802.16 working group, uniformly confirm that 802.16-2004 did not support mobile devices.

D. Petitioner’s Arguments That Park’s Relied-Upon Embodiments Apply To Mobile Devices Are Unsupported.

As Petitioner’s expert admits, “Park and 802.16-2004 do not expressly state the ‘subscriber’ or ‘terminal’ is a mobile device.” Ex. 1003 [Cooklev-Decl.] ¶ 126. And as shown at length above, Park expressly teaches that even in an 802.16(e)-type frame structure such as WiBro that may support mobile subscribers in addition to fixed subscribers, Park’s invention only applies to fixed subscribers

within that system. As also shown at length above, implementing Park’s invention in IEEE 802.16-2004 does not change that fact because 802.16-2004 did not support mobile subscribers either. Notwithstanding the above, Petitioner argues that a POSITA would understand that “Park’s changes to 802.16-2004 will apply to mobile devices, including mobile devices moving at vehicular speeds.” Ex. 1003 [Cooklev-Decl.] ¶ 101; *see also id.*, ¶ 126. However, that conclusion is unsupported, and the bases relied upon by Petitioner’s expert for reaching that conclusion fail to do so and, indeed, are demonstrably false. *See Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1378 (Fed. Cir. 2017) (reversing a finding of obviousness by the Board because “we must disregard the testimony of an expert that is plainly inconsistent with the record”) (internal citations and quotations omitted); *see also TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1362 (Fed. Cir. 2019).

First, Petitioner’s expert asserts that “802.16e was underway at the time of the invention.” Ex. 1003 [Cooklev-Decl.] ¶ 101. Neither he nor Petitioner explain or show, however, how this fact could change Park’s teaching that its embodiments apply only to fixed subscribers even within an 802.16(e)-type system that supports both fixed and mobile subscribers, as shown above. And it is clear that this fact cannot change Park’s teaching. As Mr. Alberth explains:

The fact that the drafts of IEEE 802.16(e) were under way at the time of the invention does not affect my analysis above. Park already recognized the existence of IEEE 802.16(e), as evidenced by the fact that its Figure 1 is a frame structure for an 802.16(e)-type frame, not a 802.16-2004 frame. Park also notes that its Figure 1 also represents the WiBro frame structure which, again, was based on 802.16(e). Thus, Park was fully aware of the expected frame structure for the versions of the standard after 802.16-2004 that supported mobility. Within such a system, Park explains that its embodiments only apply to the band AMC area within those systems, which Park and other extrinsic evidence I reference above teach only applies to fixed subscribers. Thus, the existence of 802.16(e) drafts at the time does not show that Park's invention "will apply to mobile devices." Rather, Park already discloses its invention in the context of an 802.16(e)-type system such as WiBro that supports both mobile and stationary subscribers, but explains that its invention applies only to fixed subscribers within those systems.

Ex. 2023 [Alberth-2nd-Decl.] ¶ 77.

Next, Petitioner cites Park's reference to WiBro. Ex. 1003 [Cooklev-Decl.]

¶ 101. But that also does not help Petitioner. As Mr. Alberth explains:

Similarly, the fact that "Park explicitly references WiBro" does not mean that "Park's changes to 802.16-2004 will apply to mobile devices." Ex. 1003 [Cooklev-Decl.] ¶ 101. WiBro was a system based on IEEE 802.16(e), and, as Park and Ex. 2027 [WiBro-Article] both explain, divided the frame into an area dedicated to mobile subscribers,

and an area dedicated to fixed subscribers. Just as I explained in connection with 802.16(e) above, Park teaches that even in a system like WiBro that supports both mobile and fixed subscribers, Park's invention applies to the AMC area, which Park states supports only fixed subscribers. Thus, the POSITA's knowledge that WiBro existed at the time does not affect Park's express disclosure.

Ex. 2023 [Alberth-2nd-Decl.] ¶ 78.

Next, Petitioner and its expert argue that the specific DL_MAP IE modified by Park's invention did not change between the 802.16-2004 version of the standard that did not support mobility, and the 802.16(e) version of the standard that supported mobility. Ex. 1003 [Cooklev-Decl.] ¶ 101. But this fact does not help Petitioner's theory; rather, as Mr. Alberth explains, it provides further confirmation of Park's teaching that its invention does not apply to mobile devices:

I agree with Dr. Cooklev that the specific DL_MAP IE modified by Park's invention did not materially change between 802.16-2004 (which did not support mobility) and 802.16(e) (which did support mobility). Ex. 1003 [Cooklev-Decl.] ¶ 100. However, this fact is consistent with, and supports, the view that Park's invention does not apply to mobile devices. This is because the DL_MAP IE that Park modifies is, as Park teaches, only for fixed subscribers. Therefore, there is no surprise that this message did not change from IEEE 802.16-2004, because it did not need to support mobility and therefore did not need to change.

Ex. 2023 [Alberth-2nd-Decl.] ¶ 79.

Moreover, a reference book cited by Petitioner explains that the DL MAP messages for the region of the frame that supported mobility in the later 802.16(e) version of the standard were different from the DL MAP messages in the 802.16-2004 version that did not support mobility:

One of the four major changes introduced in WirelessMAN-OFDM by the IEEE 802.16e amendment is the capability for provisioning subchannelization in the DL (the other three changes are *the additions of private MAPs*, private initial ranging opportunities, and open-loop power control). This DL subchannelization is provided as a separate zone, similar to the zone concept of the OFDMA PHY (see Chapter 12), *with its own* subchannelized preamble, FCH, and *MAPs so that it is completely independent of the remainder of the frame*. The DL subchannelization is restricted to the use of quadruple subchannel allocations (see Figure 11-3). *The DL MAP in this construct provides allocations only for future frames*, not for the current one, as it is assumed that mobile devices do not have the computational power necessary to decode this MAP quickly enough to efficiently avoid receiving data not intended for the station itself; this would unnecessarily drain the battery.

Ex. 1025 [Eklund] 270. This again provides further confirmation of Park's teaching that its invention, that utilizes the DL_MAP IE unchanged from 802.16-2004, only applies to *fixed* subscribers.

Petitioner relies on the drafts of IEEE 802.16(e) as discussed above as supposed background knowledge of the POSITA. Ex. 1003 [Cooklev-Decl.]

¶ 101. But Petitioner does not show that the draft standards for 802.16(e) were common knowledge of the POSITA at the time of the invention, which claims priority to a provisional application filed in September 2005. Indeed, Petitioner does not show that the draft standards were even publicly available, and without such public availability they could hardly have been general, universal knowledge common to any ordinary artisan at the time.

As Petitioner's expert testified under cross-examination, the drafts of IEEE 802.16(e) were not freely available, but were instead only available to voting members of the 802.16(e) working group. Ex. 2024 [Cooklev-1st-Depo.] 21:10-19. The copy of the draft on the IEEE website was password protected. *Id.* There were only about 300 voting members for 802.16(e) working group, and, therefore, until at least December 2005, the draft was made available only to at most about 300 members. *Id.*, 28:8-14. Even after December 2005, when the 802.16(e) amendment was ratified by the 802.16(e) working group, the draft standard still was only made available to an additional approximately 30-50 people, by invitation only. *Id.*, 30:1-21. In fact, Petitioner's own expert, who was a voting member of another IEEE working group at the time, admitted at deposition that he was not provided with, and had not seen, a copy of the 802.16(e) draft until *after* it was ratified by the 802.16(e) working group in December 2005. Thus, Petitioner has not met its burden to show that IEEE 802.16(e) drafts were common

knowledge of the POSITA or even publicly available by the Patent’s September 2005 priority.⁴

Faced with these inconvenient facts, Petitioner attempts to distract the Board with mischaracterizations of the record that are unsupported by the evidence. For example, whether inadvertently or otherwise, Petitioner relies on a misquotation of Park as supposed support for its position that IEEE 802.16-2004 supported mobility. In the Petition, Petitioner’s misquotation of Park falsely modifies “802.16” to instead read “802.16-2004”:

Petitioner	Actual Park Disclosure
“In particular, Park depicts ‘a frame structure of ... an IEEE 802.16-2004 system applied to an OFDMA system.’ Park [0007], [0036].” Pet., 20.	“FIG. 1 is a view illustrating a frame structure of a WiBro stands for Wireless Broadband (WiBro) system for an IEEE 802.16 system applied to an OFDMA system.” Ex. 1005 [Park] [0007].

Since the Petition’s lone ground relies on IEEE 802.16-2004, this misquotation is clearly materially misleading, since it falsely suggests to the reader that Park’s discussion—indeed, including its discussion of WiBro in particular—is

⁴ Similarly, Petitioner does not show that the standard underlying WiBro was publicly available either. *See, e.g.*, Ex. 2024 [Cooklev-1st-Depo.] 113:19-21 (Petitioner’s expert testifying that to this date, he has not seen any draft of the WiBro standard).

specifically referring to exactly the same 802.16 version that is used as a reference in Petitioner’s combination. But that suggestion is false. As explained above, Park’s Figure 1 is an IEEE 802.16(e)-type frame, not a frame format from IEEE 802.16-2004. Section II.D, *supra* (citing, *e.g.*, Ex. 2023 [Alberth-2nd-Decl.] ¶ 77). This is confirmed by the fact that Park’s Figure 1 frame is divided into a region for mobile subscribers and a region for fixed subscribers. *See id.* In contrast, IEEE 802.16-2004 did **not** subdivide its frame between fixed and mobile stations, as Dr. Cooklev admitted under cross-examination. Ex. 1005 [Park] [0011]; Ex. 2024 [Cooklev-1st-Depo.] 62:3-7 (“Q. Does 802.16-2004 divide a superframe between fixed and mobile stations? A. No, I—I don’t think the 2004 version of the standard has the superframe—this type of a superframe. It was brought by 16(e).”); Ex. 2023 [Alberth-2nd-Decl.] ¶ 81.

Next, to argue that IEEE 802.16-2004 supported mobility, Petitioner’s expert suggests in his declaration that WiBro, which supported mobility, was based on IEEE 802.16-2004. Ex. 1003 [Cooklev-Decl.] ¶ 97. But that is not true either. As Petitioner’s expert admitted under cross-examination at deposition, WiBro was actually based on IEEE 802.16(e), not IEEE 802.16-2004:

Petitioner's Expert Declaration	Truth
“While the title of 802.16-2004 refers to “Fixed Broadband Wireless Access Systems,” <i>the application of 802.16-2004 is not so limited</i>. As explained above, <i>WiBro, which touted its ability to cover mobile subscriber stations, adopted the 802.16 standard back in July 2004.</i>” Ex. 1003 [Cooklev-Decl.] ¶ 97	Ex. 2024 [Cooklev-1st-Depo.] 36:11-13 (“So WiBro, they said, well, <i>we’ll take draft two of 802.16(e), and that will be the foundation of the WiBro technology.</i>”). 2027 [WiBro-Article] 2 (“Specification of <i>WiBro is somewhat similar to IEEE 802.16e</i> ...”).

See also Ex. 2023 [Alberth-2nd-Decl.] ¶ 82.

Next, Petitioner’s expert cites Park’s Korean patent application as supposed support for the assertion—contrary to Park’s express disclosure—that Park’s invention was not limited to fixed subscribers. Referencing Park’s description of its AMC region as being for “fixed subscribers,” Dr. Cooklev argued that “[w]hile the U.S. Park application refers to ‘fixed subscribers,’ Park [0011], the original Korean application refers to ‘mainly for stationary users.’” Ex. 1003 [Cooklev-Decl.], ¶ 128 (citing Ex. 1008, 22). Dr. Cooklev argued that the Korean application, and therefore this statement in that Korean application, would have been a “part of the POSA’s background knowledge at the time.” *Id.* Dr. Cooklev’s reliance on Park’s Korean application fails both procedurally and substantively.

Procedurally, Petitioner’s expert is incorrect that Park’s Korean application would have been a part of POSITA’s background knowledge in September 2005.

Park's Korean application was not published until 2006, after the September 2005 priority date of the '450 Patent. *See* Ex. 1008, 20 (showing a publication date of February 22, 2006 for Park's Korean application); *accord* Ex. 2037, 1. A reference that was not publicly available until after the priority date of the Patent can hardly have been a part of the background knowledge of every POSITA as of that time. Notably, even though Park's Korean application was filed in Korea prior to the 450 Patent's priority date, it is not prior art to the '450 patent, for it was not filed as an international application under the treaty defined in 35 U.S.C. § 351. *See* 35 U.S.C. § 102(e) (pre-AIA); *see also* Ex. 2034 [102(e)-Dates-Flowchart].

Substantively, Petitioner's expert's statement regarding Park's Korean application is based on an errant translation and is not supported by the Korean language application's text. Petitioner translates the relevant disclosure in Park's Korean application as "mainly for stationary users." Ex. 1003 [Cooklev-Decl.], ¶ 128. But this text in the Korean language application is more accurately translated as "for mostly stationary users." Ex. 2037 [Translation] 3; Ex. 2038 [Translation-Declaration] ¶¶ 8-12. What Park's Korean application explains is that the degree of mobility of the subscriber is limited—in other words, the subscriber is stationary. *Id.* This is readily confirmed by Park's own U.S. patent application, which refers to those users as "fixed subscribers." Ex. 1005 [Park] [0011]. This is also in accord with the other extrinsic evidence, as discussed above, explaining that

the band-AMC region is for fixed subscribers. Ex. 2025 [Cooklev-Book] 331; Ex. 2027 [WiBro-Article] 1-2; Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18; Ex. 2023 [Alberth-2nd-Decl.] ¶ 84.

But, even if Park had permitted limited movement of the device, that does not make the device a “mobile device,” under the plain and ordinary meaning in this field. As Petitioner’s expert, Dr. Cooklev, explained in his 2004 book *Wireless Communications*, “fixed or slowly moving stations” were not considered to be “mobile” stations by persons in this field. Ex. 2025 [Cooklev-Book] 71. Dr. Cooklev confirmed this at deposition. As he explained under cross-examination, even a device moving at “pedestrian speed” of approximately 5 km/hr was (and is) not considered a “mobile device” in this field. Ex. 2024 [Cooklev-1st-Depo.] 50:5-8, 153:8-14; Ex. 2023 [Alberth-2nd-Decl.] ¶ 85. Thus, Park’s relied-upon teachings do not apply to mobile devices as that term is used in the art.

Finally, Petitioner argues that “even if the teachings in 802.16-2004 were limited to ‘fixed’ devices,” “the ’450 Patent admits that the claimed ‘mobile devices’ may be ‘fixed.’” Pet., 19 (citing Ex. 1001 [’450 Patent] 3:40-42). This argument is nonsensical and fails for multiple reasons. First, what the ’450 patent actually states is the non-controversial observation that a mobile device may be stationary at some times, and mobile at other times. In the field of the Patent, a “mobile device” configured to perform the claimed limitations is capable of

performing the claimed limitations while the device is in motion. Ex. 2025 [Cooklev-Book] 71 (“Mobile stations can participate in a network while in motion.”); Ex. 1025 [Eklund-Book] 33 (“Wireless devices may be classified based on whether the communicating devices are physically fixed at one location or allowed to move during a communication session.”). If a “mobile device” as claimed were simply a “fixed device,” that would render the word “mobile” superfluous. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 810 (Fed. Cir. 2021) (quoting *Wasica Finance GmbH v. Continental Automotive Systems, Inc.*, 853 F.3d 1272, 1288 n.10 (Fed. Cir. 2017)) (“It is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous.”); *see also Dell Inc. v. Accelaron, LLC*, 818 F.3d 1293, 1300 (Fed. Cir. 2016); Ex. 2023 [Alberth-2nd-Decl.] ¶ 86.

For all of the foregoing reasons, Petitioner fails to show that its combination discloses a “mobile device” that is configured to perform the recited limitations.

III. PETITIONER FAILS TO SHOW A SEGMENT COMPRISING N TIME-FREQUENCY RESOURCE UNITS, “WHERE N=2, 4, OR 8.”

The Petition’s sole ground fails for a second, independently sufficient reason. Claim 7 recites that the mobile device is configured to “receive a signal” “over a segment of time-frequency resource,” “and the segment comprising N time-frequency resource units,” “where N=2, 4 or 8.” Ex. 1001 [’450 Patent] cl. 7. Petitioner relies on Park for the disclosure of this limitation, but admits that Park

does not limit the number (“N”) of its “allocation units” to 2, 4, or 8—or to any other number. Pet., 38-39. Instead, Petitioner argues that Park discloses that N can be **any** number, and therefore it may happen to also be “N=2, 4, or 8.” *Id.*

Similarly, Petitioner’s expert says that Park allegedly discloses Claim 7 because, in Park, N can be literally anything:

The possibilities for combinations of a starting time-frequency coordinate and N are practically endless. As Park explains, the total resource (AMC area) can be divided into allocation units of “various sizes and shapes’ and the resource allocation regions can vary in size and shape, as well as location in the total resource (AMC area). Park [0046], [0081]-[0083]. **“N” can therefore be any number of allocation units** needed for a particular allocation region, expressed as a positive integer value from 1 up through the number needed to express the entire resource. Park [0070].

Ex. 1003 [Cooklev-Decl.] ¶ 180.

Petitioner and its expert are incorrect. Park’s teachings that the value of N can be anything does not disclose or render obvious the limitation that N must equal 2, 4 or 8. Instead, the plain meaning of the claims confirms that N must be selected from N = 2, 4 or 8, excluding other plural numbers. *See* Section III.A, *infra*. The specification readily confirms this plain meaning. It explains that by limiting N in the manner described, the invention achieves benefits beyond the benefits achievable by a reference such as Park that permits N to be anything

without attaching any significance to $N = 2, 4$ or 8 . *See* Section III.B, *infra*. Thus, for reasons discussed in this section, Park, which permits N to be anything, does not disclose or render obvious the claim limitation requiring “ $N = 2, 4$ or 8 .”

A. The Plain Meaning Of The Claims Confirms That It Excludes Plural N Other Than $N = 2, 4$ Or 8 .

Claim 7 recites:

... the segment comprising N time-frequency resource units within a time interval, ..., where $N = 2, 4$ or 8 .

Ex. 1001 [450 Pat.] cl. 7.

As Mr. Alberth explains:

The plain meaning of the claim requires that N , when plural, must “equal” $2, 4$ or 8 . Of course, if N equals another number, such as 7 , it does not “equal” $2, 4$ or 8 . Thus, based on the plain meaning, N , when plural, must be selected from one of $2, 4$ or 8 , to the exclusion of any plural N other than $N = 2, 4$ or 8 .⁵ This is because the claim expressly recites “ $N = 2, 4$ or 8 .” It does not recite, for example, that “ N *can* equal *at least* $2, 4$ or 8 .”

Ex. 2023 [Alberth-2nd-Decl.] ¶ 89; *see also Insituform Techs., Inc. v. Cat Contr., Inc.*, 99 F.3d 1098, 1106 (Fed. Cir. 1996) (“the claim is specific as to the number

⁵ The claim requires a plural number of “resource units,” and, thus, is agnostic to the case of $N=1$.

of elements (one cup) and adding elements eliminates an inherent feature ... of the claim.”); *Free Motion Fitness, Inc. v. Cybex Int’l*, 423 F.3d 1343, 1350 (Fed. Cir. 2005) (when “a or an in patent parlance carries the meaning of one or more in open-ended claims containing the transitional phrase comprising. This convention is overcome only when the claim is specific as to the number of elements or when the patentee evinces a clear intent to ... limit the article.”) (internal quotations and citations omitted).

The Institution Decision preliminarily found that $N = 2, 4$ or 8 does not exclude other values of N because of the presence of the term “comprising” in a preceding limitation:

We do not agree that the plain language of claim 7 excludes integers $N=3, 5, 6$, or 7 . Claim 7 utilizes the open-ended term “comprising” in the recitation “the segment comprising N time-frequency resource units within a time interval.” Due to the use of the term “comprising” in the recitation, the full scope of claim 7 may include additional N time-frequency resource units, such as $N=3, 5, 6, 7$, in addition to the claimed “ N time-frequency resource units within a time interval, . . . where $N=2, 4$, or 8 .”

Paper 30 [Institution-Decision] 33-34.

Respectfully, this preliminary conclusion is incorrect. As discussed below, “comprising” is a non-limiting legal term of art only when used as a transitional phrase after the preamble, but where, as here, it is used in the body of the claim, it

does not have the non-limiting legal effect that the Institution Decision ascribes to it. Both the Federal Circuit and the Board have rejected reliance on the word “comprising” in the body of the claim to expand the specific number of elements that follow.

For example, in *Moleculon Research*, the Federal Circuit held that the plain meaning of a limitation reciting a first set “comprising four cubes” means exactly four cubes, not “at least” four cubes:

... *Moleculon argued* that the word “comprising” in step (b) (“rotating a first set of cube pieces *comprising four cubes about a first axis*”) *means that the step covers four cubes or more*. “Comprising” is not used here as a transitional phrase and has no special legal effect as such. Hence, it should be interpreted according to the normal rules of claim interpretation. No analogous word precedes the structural recitation of the number of cube pieces in steps (a) and (c). *“Comprising” in step (c) reasonably interpreted means “having” but not “having at least.”*

Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 1272 n.8 (Fed. Cir. 1986).

The Board, applying *Moleculon*, has similarly rejected a petitioner’s argument to expand what follows “comprising” in the body of the claim:

We further note that Petitioner’s arguments are based on case law giving “comprising” legal effect as a transitional phrase between the preamble and the body of a claim. In contrast, *the word “comprising” here is in the body of the claim, so it has “no special legal effect”* and “should be interpreted according to the normal rules of claim

interpretation.” *Moleculon Rsch. Corp. v. CBS, Inc.*, 793 F.2d 1261, 1272 n.8 (Fed. Cir. 1986). ***Therefore, consistent with Moleculon, we interpret “comprising” here as “‘having’ but not ‘having at least.’” Id.***

Apple Inc. v. LBT IP I LLC, IPR2020-01189, Paper 48, 20 (Dec. 5, 2023); *see also In re Varma v. IBM Corp.*, 816 F.3d 1352, 1362 (Fed. Cir. 2016) (even where “comprising” is an open ended transitional phrase, “the term does not render each limitation or phrase within the claim open-ended.”).

Thus, the plain meaning of “N = 2, 4 or 8” requires that N, when plural, be only those values, not “at least” 2, 4 or 8. *Moleculon*, 793 F.2d at 1272 n.8.

B. The Specification Confirms The Plain Meaning Because By Limiting N=2, 4 Or 8, The Invention Achieves Multiple Benefits Not Disclosed By Prior Art Such As Park.

The specification confirms that the value of N, when plural, is limited to 2, 4 or 8. As described below, by limiting N when plural in the manner described, the invention achieves benefits beyond Park’s basic indexing of its “allocation units” in at least two ways. First, limiting N may further reduce overhead by linking the segment size to the modulation scheme. Second, limiting N may remedy the prior art’s “irregular” arrangement of segments. Petitioner misapprehends the specification, incorrectly asserting that “the ’450 Patent does not describe any particular advantages from using N=2, 4 or 8.” Pet., 38. These facts are shown in detail below.

First, as Mr. Alberth explains:

the inventors recognized that by limiting N, the control overhead may be reduced beyond what would be permitted through simple indexing of segments (as in Park). Specifically, the inventors recognized that if the claimed “time-frequency resource unit” did not have any arbitrary size, but, for example, the size of the “highest available MCS [Modulation and Coding Scheme],” then “the resource utilized by other MCS is simply an integer multiple of the basic unit.” Ex. 1001 [’450 Patent] 6:46-52. The invention then explains that, as a result, the MCS can be linked to the size of the segment, and both can be transmitted through a single parameter:

The MCS [Modulation and Coding Scheme] index (MCSI) conveys the information about modulation and coding scheme. For a known vocoder, ***MCSI also implies the number of AMC resource units*** [the claimed “time-frequency resource unit”] required for a voice packet.

Ex. 1001 [’450 Patent] 6:55-68; *see also id.*, 2:54-57 (“In some embodiments, modular coding schemes associated with the packet streams may be selected that further reduce the amount of necessary control information.”); Ex. 1001 [’450 Patent] 2:3-4 (explaining as an example of the large control overhead of the prior art that the MCS index would be a 4 bit transmission separate from the resource allocation).

The Patent describes this insight in connection with its Table 1, reproduced below with annotations added:

MCSI	Modulation	Coding rate	Information bits	Raw symbols	Units
1	16QAM	$\frac{1}{2}$	160	80	1
2	QPSK	$\frac{1}{2}$	160	160	2
3	QPSK	$\frac{1}{4}$	160	320	4
4	QPSK	$\frac{1}{8}$	160	640	8

As shown in the table above, a Modulation and Coding Scheme Index (MCSI) of, for example, 1 conveys two pieces of information: that the modulation and coding scheme is 16QAM at $\frac{1}{2}$ rate, and also that the allocated segment contains one time-frequency resource unit. Similarly, an MCSI value of 4 conveys two pieces of information: that the modulation and coding scheme is QPSK at $\frac{1}{8}$ rate, and also that the allocated segment contains eight time-frequency resource units.

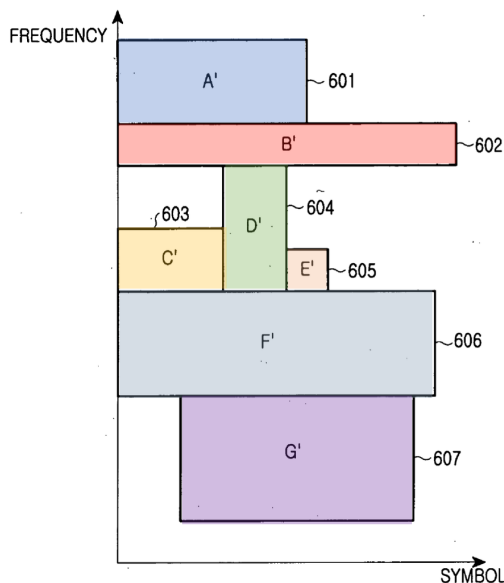
The Patent then explains that a single 2 bit MCSI index (*id.*, 10:16) can convey both the modulation and coding scheme, and the number of time-frequency resource units for a given segment. In contrast, Petitioner's Park reference does not disclose such an insight. Instead, its index merely conveys the resource allocation, which means that the modulation and coding scheme must be separately transmitted to the user through additional overhead. Ex. 1005 [Park] [0055]; *see also* Ex. 1001 ['450 Patent] 2:3-4 (explaining as an example of the large control overhead of the prior art that the MCS index would be a 4 bit transmission separate from the resource allocation).

Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 93-96.

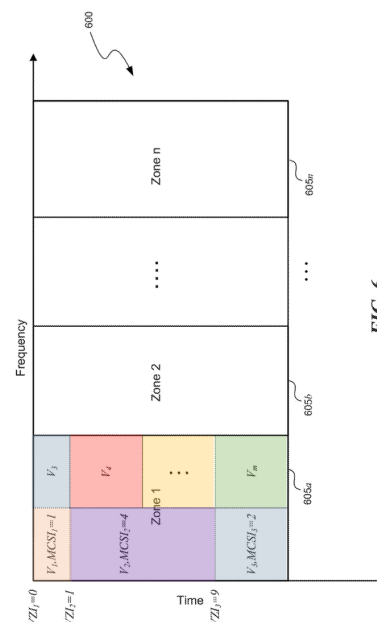
Next, as Mr. Alberth explains, by limiting N as described the inventors also achieved a second benefit:

Second, the inventors further recognized that by limiting the number N as explained above, it can resolve another disadvantage of the prior art. Specifically, the Patent explains that in the prior art, “the allocated resources region is irregular from connection to connection.” Ex. 1001 [’450 Patent] 2:1-2. Addressing this and other issues, the inventors conceived “an alternative way of managing multiple packet streams” to “overcome the inefficiencies associated with maintaining” mappings under the prior art. Ex. 1001 [’450 Patent] 5:41-43. Instead of spreading the various applications carried in packet streams throughout the available resource region, per the prior art, the inventors took a different approach: they “group[ed] like applications together.” Ex. 1001 [’450 Patent] 5:43-53.

Because of this grouping, a “basic resource unit” could be defined with level of granularity that is high enough to accommodate the needs of the similar applications, but low enough such that the basic resource unit is large and can be identified with a single time-frequency coordinate. Thus, this insight permitted inventors to define the granularity of the claimed “segment of time-frequency resources” using values of N as described in Table 1 (*id.*, 6:35-44). Defining the permitted sizes of the segment with a limited value of N as described in the invention permits the segment to have a regular size, unlike the “irregular” forms of the prior art segments. Ex. 1001 [’450 Patent] 2:1-2. This is shown through a side-by-side comparison of the segments in Park and the ’450 Patent, with color coding added:



Ex. 1005 [Park] Fig. 6B



Ex. 1001 ['450 Patent] Fig. 6

As can be seen above, Park, through its arbitrary segment sizes, does not address the “irregular” allocation problem that the invention addresses in part by limiting N in the manner described by the invention.

Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 97-99.

As the Federal Circuit has held, “[w]here the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.” *Chi. Bd. Options Exch., Inc. v. Int’l Sec. Exch., LLC*, 677 F.3d 1361, 1372 (Fed. Cir. 2012) (citing *Honeywell Int’l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1319 (Fed. Cir. 2006) (quoting *SciMed Life Sys.*

v. Advanced Cardiovascular Sys., 242 F.3d 1337, 1341 (Fed. Cir. 2001)). That is the case here. The choice of $N = 2, 4$ or 8 is not arbitrary; rather, it was a deliberate selection that followed from the specific choice of time-frequency unit granularity that, as shown above, the inventors discovered had additional benefits. See, e.g., *Kinetic Concepts, Inc. v. Blue Sky Med. Grp., Inc.*, 554 F.3d 1010, 1018-19 (Fed. Cir. 2009) (limiting “wound” to “skin wounds” where “[a]ll of the examples described in the specification involve skin wounds”); *Wisconsin Alumni Res. Found. v. Apple Inc.*, 905 F.3d 1341, 1351-52 (Fed. Cir. 2018) (limiting “prediction” to dynamic prediction where all embodiments describe dynamic prediction, as allowing the claimed “prediction” to cover static prediction “would ‘expand the scope of the claims far beyond anything described in the specification’”); *Choon’s Design, LLC v. IdeaVillage Prods. Corp.*, 776 Fed App’x 691, 695-96 (Fed. Cir. 2019) (construing “at least one pin bar” to extend only to detachable pin bars, where “the specification discloses only loom kits having detachable bases and pin bars”).

Here, as explained above, the Patent expressly explained that the prior art created “irregular” resource allocations. Ex. 1001 [’450 Patent] 2:1-2. The Patent further observed that the prior art had a large control overhead, in part because of the separate transmission of the resource allocation and MSC codes. *Id.*, 2:3-4 (“As a still further example [of the large control overhead], the modulation and

coding scheme for each connection [in the prior art] is identified by a 4-bit MCS code...”). Limiting N offers solutions to both of these problems, in part by allowing the use of “[t]he resource utilized by [the] highest MCS” as its basic time-frequency resource unit in its embodiments, which meant that the MCS index “also implies the number of AMC resource units” *Id.*, 6:45-62. Utilizing such a structure also meant that the segment sizes are “integer multiple[s]” of each other, addressing the irregular resource allocation. *Id.*, 6:49-50. To read the claim so broadly as to undo all the improvement over the prior art is contrary to the established standards of claim construction, and “the claims should not be read so broadly as to encompass the distinguished prior art structure.” *SciMed*, 242 F.3d at 1343 (citing *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998)); see *Ekchian v. Home Depot, Inc.*, 104 F.3d 1299, 1304 (Fed. Cir. 1997) (“since, by distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover, he is by implication surrendering such protection”).

In reaching a contrary conclusion, the Institution Decision preliminarily found as follows:

We also do not agree with Patent Owner’s argument that the ’450 Patent Specification requires the exclusion of intervening integers N=3, 5, 6 or 7. The ’450 Patent does not disclose the exclusive use of N=2, 4, or 8, nor does it disclose the exclusion of other integers such as N=3, 5, 6, 7. See Ex. 1001, 6:22–7:6. In contrast to Patent Owner’s argument, the

'450 Patent Specification discloses Table 1 in exemplary and optional terms.

Paper 30 [Institution-Decision] 34.

Patent Owner respectfully submits that this conclusion is not consistent with the principles of claim construction cited herein. The Patent expressly discloses an embodiment where $N = 2, 4$ or 8 , and no other plural value, because $N = 2, 4$ or 8 has the specific advantages described above. Ex. 1001 ['450 Patent] 6:35-62. The claims then expressly recite " $N = 2, 4$ or 8 ." *Id.*, cl. 7. This is not a situation where the specification is used to limit an otherwise broader plain meaning. Rather, the specification here merely confirms the plain meaning of the claim language, because it expressly discloses an identical embodiment corresponding to what is claimed.

The Institution Decision is correct that for other modulation schemes or for other types of data different values of N may be beneficial. But that is not the embodiment claimed in claim 7. "The mere fact that there is an alternative embodiment disclosed in the [patent] that is not encompassed by [our] claim construction does not outweigh the language of the claim, especially when the court's construction is supported by the intrinsic evidence." *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1285 (Fed. Cir. 2011) (quoting *TIP Sys., LLC v.*

Phillips & Brooks/Gladwin, Inc., 529 F.3d 1364, 1373 (Fed. Cir. 2008)); Ex. 2023 [Alberth-2nd-Decl.] ¶ 101.

Therefore, the specification amply supports the plain meaning of the claim as excluding plural N other than N = 2, 4 or 8. Under that correct construction, it is undisputed that the Petition's sole ground does not meet this limitation.

For the reasons discussed above, Petitioner fails to show disclosure or obviousness of N = 2, 4 or 8 as claimed.

IV. CONCLUSION

For the foregoing reasons, Petitioner fails to show that any of the challenged claims are unpatentable.

Respectfully submitted,

/ Parham Hendifar /

Parham Hendifar, Reg. No. 71,470
Kenneth J. Weatherwax, Reg. No. 54,528
LOWENSTEIN & WEATHERWAX LLP

Date: December 30, 2024

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Response (the “POR”) consists of 10,733 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The POR complies with the type-volume limitation of 14,000 words as mandated 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).

Respectfully submitted,

/ Parham Hendifar /

Date: December 30, 2024

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served by electronic service, by consent between the parties, on the date signed below:

PATENT OWNER'S RESPONSE

EXHIBITS 2023-2025; 2027-2029; 2033-2035; 2037-2038

The addresses of the parties being served are as follows:

FPGP0138IPR@brookskushman.com

Respectfully submitted,

/ Abigael Neufeld/

Date: December 30, 2024