

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY, GENERAL MOTORS LLC, and
NISSAN NORTH AMERICA, INC.,¹
Petitioners,

v.

NEO WIRELESS LLC,
Patent Owner.

Case IPR2023-00763
Patent 10,447,450

PATENT OWNER'S SUR-REPLY

¹ General Motors LLC and Nissan North America, Inc. were joined as a petitioner to this proceeding based on a petition and motion for joinder filed in IPR2023-00962, which were granted.

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EXHIBIT LIST	
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2003	In re Neo Wireless, LLC Patent Litigation, 2:22-MD-03034-TGB, Joint Claim Construction Statement [Joint-CC-Statement]
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
2030	Declaration of Xu Zhou in Support of Motion for <i>Pro Hac Vice</i> Admission
2031	<i>Reserved.</i>
2032	<i>Reserved.</i>
2033	Defendants’ Motion For Summary Judgment, <i>In re Neo Wireless, LLC Patent Litig.</i> , No. 2:22-md-03034 (E.D. Mich. Jun. 20, 2024) ECF No. 242-1 (“Defendants’ Motion For Summary Judgment”)

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
2039	Second Deposition Transcript of Dr. Todor Cooklev [Cooklev-2 nd -Depo.]

Emphases herein are added unless otherwise stated.

Petitioner's Reply is rooted in unsupported arguments. Even where it does cite the opinions of its expert, Dr. Cooklev, those opinions contradict his own publications and deposition testimony, thereby undermining their credibility. The Reply ultimately reinforces Petitioner's failure to meet its burden of proof.

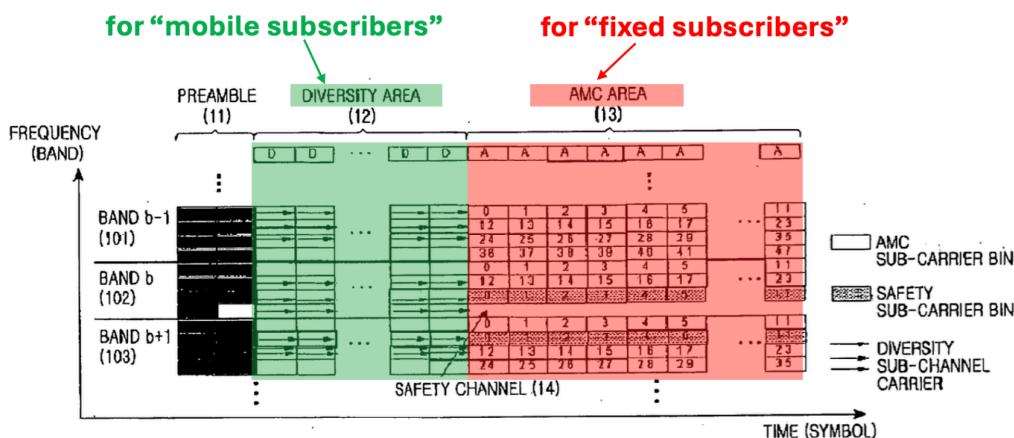
I. PETITIONER'S REPLY CONFIRMS PETITIONER'S FAILURE TO SHOW A "MOBILE DEVICE" CONFIGURED TO PERFORM THE RECITED LIMITATIONS.

A. Patent Owner's Refutation Of The Petition Remains Unrebutted.

Claim 7 requires a "mobile device" configured to perform the claimed limitations. POR, 2-3. It is undisputed that Petitioner relies exclusively on Park's embodiments for resource allocation within the band AMC area of a frame for multiple claim limitations, including limitations [2b], [2d] and parts of limitation [3]. POR, 5-9, 13.

As the POR (at 9-13) demonstrated, however, Park is expressly clear that the band AMC area of the frame supported fixed devices, but not mobile devices. Ex. 1005 [Park] [0011] ("... the AMC area ... is used for fixed subscribers."); *see also id.*, [0010]. Resource allocations for mobile devices are in a different area of Park's frame—called the diversity area—that Park's relied-upon embodiments do not and cannot use. *Id.*

This division of the frame into an AMC area (for fixed devices) and a diversity area (for mobile devices) is shown in Park's annotated Figure 1:



Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 45-46.²

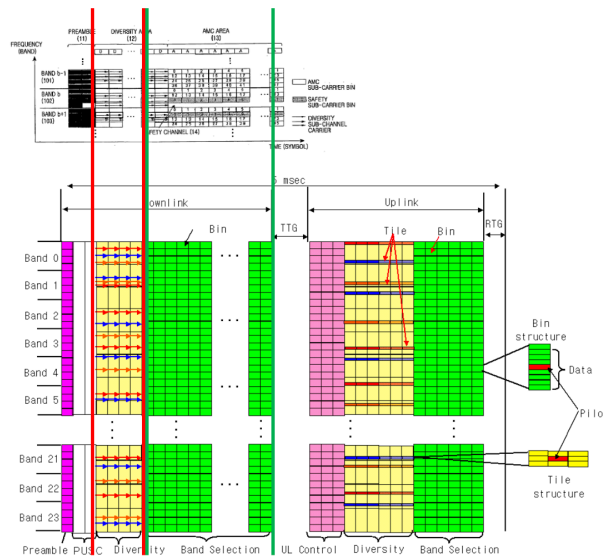
As detailed in the POR (at 13-19), extrinsic evidence overwhelmingly supports Park’s express teaching that the AMC area was for fixed devices. Petitioner’s own expert, Dr. Cooklev, wrote in a reference book he authored that, to introduce mobility into IEEE 802.16, the solution would “likely be *devoting* one part of the superframe for fixed stations and one part for mobile stations.” Ex. 2025 [Cooklev-Book] 331; POR, 14. Dr. Cooklev reaffirmed this understanding during his deposition in this case—testifying that IEEE 802.16 indeed proceeded to

² The Reply asserts that Park’s Figure 1 is its “prior art.” Reply at 5. This is a red herring. Park does not alter the “prior art’s” fundamental frame division between the AMC area (for fixed devices) and the diversity area (for mobile devices). Instead, Park’s embodiments modify the resource allocation control message for the AMC area. POR, 5–9.

divide the frame into two mutually exclusive regions, one for mobile devices and one for fixed devices—consistent with Park’s disclosure. Ex. 2024 [Cooklev-1st-Depo.] 70:17-71:6; *see also* POR, 14-15. Critically, Dr. Cooklev’s Reply declaration addresses neither his own published statements nor his deposition testimony on this point.

As the POR further explained (at 15-17), WiBro—based on IEEE 802.16(e) and now heavily relied upon in the Reply—similarly divided the frame into two mutually exclusive areas—one for fixed devices, and one for mobile devices:

**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. Petitioner’s expert expressly confirmed under cross-examination that the band AMC area of the WiBro frame was for “fixed” users just as in Park. Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18; *see* POR, 17.

Again, Dr. Cooklev's Reply declaration does not address his unambiguous deposition testimony.

The Reply fails to rebut these points. Petitioner's expert addresses neither his own book, nor his deposition testimony concerning both IEEE 802.16 and WiBro, all of which support Patent Owner's position. Instead, the Reply effectively retreats from and abandons arguments advanced in the Petition. Instead, it now contends that the claimed "mobile device" configured to perform the recited limitations is satisfied by a device that can do so only when "stationary or slowly moving." *See* Section I.B, *infra*. However, the record evidence uniformly shows that, in this field, the ordinary meaning of a "mobile device" configured to practice the invention does not encompass a device that can practice the invention only when "stationary or slowly moving." *Id.*

B. Petitioner's Reply Rests On A Claim Interpretation That Is Contradicted By The Plain Meaning And Both Experts.

Petitioner relies on the plain meaning of "mobile device." Ex. 2039 [Cooklev-2nd-Depo.] 12:19-13:1. As discussed below, Petitioner fails to show that its sole ground discloses or renders obvious a "mobile device" configured to practice the invention under its plain or ordinary meaning in this field.

1. *Petitioner's Reply Rests On The Position That A Device That Can Practice The Invention Only When "Stationary Or Slowly Moving" Is A "Mobile Device."*

Petitioner's Reply now rests entirely on the position that the claimed "mobile device" configured to practice the invention is disclosed by a device that can perform the invention only when "stationary or slowly moving." In adopting this position, Petitioner effectively abandons much of its argument in the Petition.

For example, the Institution Decision found that Petitioner preliminarily demonstrated a likelihood of disclosure of the claimed "mobile device" based, in part, on Petitioner's expert's declaration that Park referenced WiBro—"a South Korean mobile wireless service designed to provide broadband access to devices moving at speeds of up to 60–70 kilometers per hour." Paper 30 [Institution-Decision] 27 (*quoting* Ex. 1003 ¶ 56); *see also* Pet., 10; Ex. 1003 ¶ 96 ("A POSA would also understand that all of these changes would work equally well in ... WiBro mobile stations moving at 60–70 km/h.").

Yet, Petitioner in its Reply has now (rightfully) abandoned relying on devices that move at "60-70 kilometers per hour." Petitioner now tacitly concedes that Park's relied-upon embodiments may at most be implemented in devices that are "stationary or moving slowly." *See infra*. Nonetheless, Petitioner argues that a device that practices Park's relied-upon embodiments only when "stationary or

moving slowly” discloses the claimed “mobile device” because the device might be mobile at *other* times when *not* practicing Park’s relied-upon embodiments:

When a mobile device is stationary or moving slowly, it would have communicated using band AMC for increasing the transmission speed as Park teaches.

Reply, 6 (internal quotation and citation omitted); *see also id.*, 10-11 (“nothing in Park suggests those improvements are not leveraged *when the mobile device is stationary.*”); Ex. 1031 [Cooklev-2nd-Decl.] ¶ 7 (“A person of skill in the art would have understood, based on the teachings of Park, the software that would have performed Park’s invention would have been executed on *a mobile device that is stationary or slowly moving.*”); *id.* (“Therefore, Park’s improvements to band AMC would have been used by a mobile device *while the device was stationary or slowly moving*”); ¶ 10 (“The ‘mobile subscribers’ in Park are not perpetually mobile. Sometimes, in fact *often, they are stationary and then will use the AMC area* of the superframe.”); ¶ 11 (“Park’s mobile device is configured to *use band AMC when the device is stationary or slowly moving.*”).

As discussed below, Petitioner’s claim interpretation that the claimed “mobile device” is disclosed by a device that practices the invention only when “stationary or slowly moving” is incorrect and unsupported.

2. *The Plain Meaning Of A “Mobile Device” Configured To Perform The Claimed Limitations Requires That The Device Be Configured To Be “Mobile” When Performing Them.*

The record evidence uniformly confirms that, in this field, the plain meaning of a “mobile device” configured to practice the invention does not encompass a device that can only practice the invention when “stationary or slowly moving.” Petitioner fails to present any contrary evidence.

A reference book authored by Petitioner’s own expert, Dr. Cooklev, explains that in this field, “there are *two types* of stations to *distinguish* between: *portable* and *mobile* stations.” Ex. 2025 [Cooklev-Book] 71. Devices that participate in the network when “fixed or slowly moving” may be considered “portable,” but are not “mobile”:

Wireless communication protocols are affected by the mobility of stations. *There are two types of stations to distinguish between-portable and mobile stations. A portable station is one that can be moved from one place to another place, but *normally participates in a wireless network when it is in a fixed location. Fixed or slowly moving stations can be considered portable. Mobile stations can participate in a network while in motion.**

Ex. 2025 [Cooklev-Book] 71. At deposition, Petitioner’s expert explained that “slowly moving” devices in this context means devices moving at the “pedestrian speed” of 5 km/h. Ex. 2024 [Cooklev-1st-Depo.] 50:5-8, 153:8-14; *see also* 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.*”). Patent Owner’s expert agrees with Dr. Cooklev on these points. Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 85-86. They are therefore undisputed.

The statements of both experts—that a “stationary or slowly moving” device is not a “mobile device”—conforms with common sense. Interpreting the claims otherwise would render the term “mobile” superfluous. POR, 36. Taken to its logical conclusion, Petitioner’s position would suggest that even the earliest version of IEEE 802.16, which was expressly designed for fixed subscribers, supported “mobile devices” merely because the device could be stationary while communicating under the standard, yet be “mobile” at other times. But this is not how a POSITA would understand mobility in this context. Rather, the term “mobile” refers to a device’s ability to be mobile while performing the relevant functions. For example, Petitioner’s expert, as Dr. Cooklev explained in his book, in 2004, “IEEE 802.16’s major weakness [was] that it [did] not support mobility.” Ex. 2025 [Cooklev-Book] 332. As Dr. Cooklev’s book further explained, IEEE 802.16(e) was being developed “to support mobile subscribers.” Ex. 2025 [Cooklev-Book] 54. To achieve that goal, Dr. Cooklev wrote, “[t]he solution that will be developed by 802.16(e) will likely be devoting one part of the superframe for fixed stations and one part for mobile stations.” *Id.*, 331. As the record makes

clear, references to “mobile stations” in this field unambiguously refer to devices capable of performing their functions while mobile—not merely to devices that can be mobile only when not engaged in the relevant activity.

Petitioner offers no meaningful response to these points. Petitioner’s expert relies on the plain meaning of “mobile device” (Ex. 2039 [Cooklev 2nd Depo.] 12:19–13:1), but provides no analysis or discussion of its plain meaning in this field—and for good reason.³ His support of the Petition is not reconciled with his own statements in his published book and deposition testimony. Nor does Petitioner offer any other evidence to support its position, such as reference books, dictionaries, or articles. In fact, for the assertion that Park’s embodiments could be implemented in “slowly moving” devices, Petitioner fails to define what “slowly moving” means in this technical context, to identify the level of movement required for a device to qualify as “mobile,” or to demonstrate that Park’s embodiments could operate under such conditions. This complete failure of proof on the plain meaning of “mobile device” in this field is fatal to Petitioner’s case.

³ The only statement by Petitioner’s expert in his Reply declaration relevant to this issue is “I am not aware of any ‘in motion’ limitation in claim 7.” Ex. 1031 [Cooklev-2nd-Decl.] ¶ 25. This carefully drafted statement does not provide any analysis on the plain meaning of “mobile device.”

Google LLC v. Neonode Smartphone LLC, IPR2021-01041, Paper 52, 25 (Jan. 11, 2023) (“Because Google has the burden of persuasion, Neonode has no obligation to precisely define the term *gliding . . . away* or explain how the term differs from the term *flick* in Robertson.”); 37 C.F.R. § 42.104(b)(3). Petitioner’s failure is especially untenable since the Institution Decision expressly invited the parties to address this question. Paper 30 [Institution-Decision] 28 (“we invite the parties in further briefing to offer respective proposed claim constructions for the term ‘mobile device.’”).

Lacking in evidence, Petitioner’s Reply resorts to attorney arguments, but attorney arguments do not substitute for evidence. *Intuitive Surgical, Inc. v. Ethicon LLC*, IPR2018-01248, Paper 34, 41 (Feb. 6, 2020) (“Mere attorney arguments and conclusory statements that are unsupported by factual evidence have little probative value.”); *Samsung Elecs. Co., Ltd. v. Elm 3DS Innovations, LLC*, IPR2016-00393, Paper 62, 37 (Jun. 23, 2017) (“Petitioner contests Petitioner’s [sic] position, which is based on ... well-reasoned and supported testimony, with attorney-argument consisting of conclusory statements Such untethered references to conclusory attorney-argument are insufficient [to show obviousness]”).

Petitioner complains that Patent Owner only cites “extrinsic evidence.” Reply, 10. However, the parties both agree that the plain meaning of “mobile

device” applies. *See* Ex. 2039 [Cooklev-2nd-Depo.] 12:19-13:1. Thus, reliance on extrinsic evidence, especially where such evidence includes a contemporaneous reference book on the same subject authored by Petitioner’s own expert, is proper to establish the plain/ordinary meaning of “mobile device” in the field.

Next, Petitioner cites the Patent’s statement that a mobile device “may be fixed or may roam within a geographic region covered by the network.” Reply, 10 (*citing* Ex. 1001, 3:40-42). As the POR (at 35-36) explained, that a device may be at times fixed and at times mobile does not mean that a device that can practice the invention only when “stationary or slowly moving” is a “mobile device” in this field. If anything, this portion of the specification highlights that “mobile devices” must be able to practice the invention *when* they “roam within a geographic region.” Ex. 1001, 3:40-42. And again, Petitioner has relied on the “plain meaning” of “mobile device.” Petitioner provides no support for the proposition that the specification of this patent can somehow broaden the “plain meaning” of the term. Nor does not Petitioner present any expert opinion or analysis on the impact, if any, of the cited portion of the specification on the plain meaning of “mobile device.”

For the foregoing reasons, the Reply’s argument that the claimed “mobile device” configured to practice the invention is disclosed by a device that can only

practice Park’s relied-upon embodiments when “stationary or slowly moving” fails.

3. *Petitioner Fails To Show That Park’s Relied-Upon Embodiments Could Be Practiced Even In A “Slowly Moving” Device.*

Petitioner contends that Park’s relied-upon embodiments may be implemented in “stationary or slowly moving devices.” However, as also discussed above, such devices do not disclose the claimed “mobile device.” Notably, Petitioner fails to even define what constitutes a “slowly moving” device—let alone explain how such a device could disclose a “mobile device” in this field contrary to the evidence above. For completeness, Patent Owner explains in this section that even if the ambiguous and undefined term “slowly moving” could somehow be interpreted to disclose a “mobile device” under its plain and ordinary meaning in this field, Petitioner has still failed to meet its burden to demonstrate that Park’s relied-upon embodiments could actually be implemented in a “slowly moving” device.

To claim that Park’s relied-upon embodiments could be practiced by “slowly moving” devices, Petitioner asserts that (i) Park can be implemented within WiBro, and (ii) WiBro could allocate the band AMC area of the frame to “slowly moving” devices. Reply, 1, 6–7. The sole evidence Petitioner cites for this proposition is

Exhibit 1023. *Id.*⁴ Exhibit 1023 is neither a scholarly nor a peer-reviewed source—it is merely a PowerPoint presentation authored by a Samsung employee. And its alleged support for Petitioner’s position consists of a single bullet point on one slide, which states that in WiBro, “[f]or slowly moving users: allocate band selection AMC subchannels” Ex. 1023, 17 (*quoted* in Reply, 7). This isolated assertion cannot overcome the substantial body of contrary record evidence consistently indicating that the band AMC region was reserved exclusively for fixed subscribers.

Petitioner’s own expert at deposition unambiguously stated that, in WiBro, the band AMC region of the frame is for “fixed” users. Ex. 2024 [Cooklev-1st-Depo.] 107:24-108:18. Scholarly sources reinforce this statement. Exhibit 2027, an IEEE publication, similarly states that, in WiBro, the band AMC region is for “fixed” users. Ex. 2027 [WiBro-Article] 1-2; Ex. 2023 [Alberth-2nd-Decl.] ¶ 59; POR, 16-17. An academic source explains that “[t]he distributed subcarrier

⁴ While Dr. Cooklev’s first declaration relied upon Park’s Korean application to argue that Park’s embodiments could be applied to moving devices, the POR (at 33-35) demonstrated that this reliance is both procedurally improper, and substantively incorrect as it relies on an errant translation. The Reply and Dr. Cooklev’s second declaration no longer rely on Park’s Korean application.

permutation is suitable for mobile users while adjacent permutation [band AMC] is for fixed (stationary) users.” Ex. 2028 [WiMax-Article] 34; *see also* Ex. 2023 [Alberth-2nd-Decl.] ¶ 61.

Moreover, while a Samsung employee may have delivered the PowerPoint presentation in Exhibit 1023 in 2004 as part of an aspirational vision for WiBro (Ex. 1031, ¶ 14), Petitioner’s expert testified that even a year later, as of the Patent’s priority date, Samsung had still not succeeded in developing a mobile device that could implement WiBro. Ex. 2024 [Cooklev-1st-Depo.] 37:2-11.

Even more fundamentally, there is no evidence in the record that even if Park was implemented in WiBro, such a system would disclose the claims. Petitioner’s expert, despite relying on what was allegedly theoretically possible in a WiBro system, has never reviewed *any* draft of the WiBro standard. Ex. 2024 [Cooklev 1st Depo.] 113:19–21. Even after the POR was filed, he made no effort to examine the WiBro standard. Ex. 2039 [Cooklev 2nd Depo.] 18:10–13. He admitted to still possessing no knowledge of how WiBro may have differed from the IEEE 802.16 standard that Park modifies. Ex. 2039 [Cooklev 2nd Depo.] 17:2–15 (testifying that he does not “know” how WiBro may have modified the IEEE 802.16 standard); *id.* at 23:3–9 (similar testimony).

Petitioner falls far short of its burden to show that the band AMC area of the frame in WiBro could even be utilized by a “slowly moving” device—even if that somehow disclosed a “mobile device” as claimed.

C. Petitioner’s Remaining Incidental Arguments Fail.

In connection with the arguments above, Petitioner’s Reply makes several incidental assertions. For completeness, they are addressed below.

Petitioner contends that Patent Owner admits WiBro is a “mobile wireless service,” that Exhibit 2027 [WiBro Article] is “directed to ‘mobile’ devices,” and that Patent Owner “ignores” Park’s reference to “next-generation mobile communication systems.” Reply, 3, 4, 9. These assertions, however, conflate two distinct concepts: a mobile communication system that supports both mobile and stationary devices, and a mobile device that practices the claimed invention. As explained above, both Park and the WiBro references make clear that the AMC area of the frame—*the only portion upon which Petitioner relies*—supports only stationary devices, even within a mobile wireless system. This is precisely why Park states that its invention can be applied to IEEE 802.16-2004, a standard that supported only fixed stations and included only the AMC area of the frame. POR, 28; *see also* Reply, 14–15. Park refers to “mobile” communication systems because its enhancements to resource allocation for stationary devices remain relevant in the context of mobile wireless systems, because as such systems evolve

to support *both* mobile *and* stationary devices, the overall number of supported devices increases. Consequently, efficient resource allocation becomes even more critical to maintaining system performance. Ex. 1005 [Park] ¶ [0005]. None of this even slightly suggests fixed or slowly moving devices are “mobile.”

Petitioner also relies on Exhibit 2027’s statement that “[t]he proportion of diversity to band selection can be changed every frame” to argue that mobile subscribers “both received and leveraged band selection AMC.” Reply, 9 (*citing* Ex. 2027, 2). This conclusion does not logically follow. The cited statement merely indicates that relative allocation of the diversity and AMC areas within a frame may vary over time—reflecting changes in the proportion of network resources required by stationary devices (which use the AMC area) versus mobile devices (which use the diversity area). It does not suggest that mobile devices utilize or operate within the AMC area of the frame, as Petitioner insinuates.

Petitioner also argues IEEE 802.16-2004 supposedly supported mobile devices because “the ’450 Patent admits that messages such as ‘DL-MAP’ in 802.16 ‘are utilized to broadcast the scheduling decisions to the mobile stations.’” Reply, 12 (*quoting* Ex. 1001, 1:48-50). Petitioner argues that the statement in the Patent’s background “are binding admissions about the applicability of 802.16 to support mobile devices at the time of the purported invention.” Reply, 12. Petitioner’s arguments are misplaced. There is no showing that the DL-MAP

message modified by the '450 Patent for mobile devices is the same DL-MAP message that is modified by Park (and relied upon by Petitioner) for stationary devices. Ex. 1003 [Cooklev-Decl.] ¶ 60 (explaining that Park modifies the DL-MAP message in Table 97 of IEEE 802.16-2004); Ex. 2023 [Alberth-2nd-Decl.] ¶ 47 (similar); Ex. 2024 [Cooklev-1st-Depo.] 148:23-149:25 (“Q. Are you able based on the information provided in the background section of the '450 Patent point me in the 802.16 standard which map scheduling message is the background discussing on this standard? A. ...I would say Table 16 [at Ex. 1004, 46]”); *id.*, 151:24-152:6 (Dr. Cooklev testifying it is “possible” to “identify a specific DL-MAP information element” in the 802.16 standard the '450 Patent modifies); *see also* Ex. 1006 [802.16-2004] 500 (“No DL-MAP or UL-MAP allocations can span over multiple zones.”).

Finally, Petitioner insists WiBro was based on IEEE 802.16-2004, apparently attempting to support the Petition’s assertion that IEEE 802.16-2004 supported mobile devices. Reply, 13. But as the POR (at 32-33) demonstrated, this contradicts the unambiguous testimony of Petitioner’s expert, confirmed in his Reply declaration. Ex. 1031 [Cooklev-2nd-Decl.] 17 n.5.

For all of the foregoing reasons, Petitioner fails to show disclosure or obviousness of a “mobile device” configured to practice the invention.

II. THE REPLY’S ARGUMENTS CONFIRM THAT THE CLAIM REQUIRES “N = 2, 4, 8,” EXCLUDING OTHER PLURAL VALUES.

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 argues that Park discloses this limitation because Park discloses that N can be “any” number, and therefore may happen to also be “N=2, 4, or 8.” Ex. 1003 [Cooklev-Decl.] ¶ 180; Pet., 38-39. As the POR (at 38-41) explained, however, the plain meaning of the claim requires that N, when plural, must equal 2, 4 or 8, to the exclusion of other plural values. As the POR (at 41-49) further explained, the specification readily confirms the plain meaning of the claim, because, *e.g.*, it explains that limiting N as claimed achieves benefits beyond what Park’s unbounded possibilities for N would. As discussed in the following subsections, Petitioner’s Reply fails to refute any of this.

A. Petitioner’s Argument That N Values, When Plural, Are “Open-Ended” Is Rejected By Binding Authority And Plain Meaning.

Petitioner’s lead argument for the proposition that N, when plural, is not limited to 2, 4 or 8 is that “[t]he relevant limitation of claim 7 uses the open-ended ‘comprising’ language indicating that, while N=2, 4 or 8 must be a supported configuration, a system that additionally supports unclaimed values of N are not

excluded from the claim.” Reply, 17. Petitioner’s argument fails under both binding authority and plain meaning.

Petitioner’s only analysis of claim language is premised on use of the phrase “comprising” in the body of the claim, arguing that it renders the values of N “open ended.” Reply, 17. However, as the POR (at 40) explained, binding authority explains that “comprising” is a legal term of art only when used as a transitional phrase; instead, when it is used in the body of the claim, it has no special meaning and is given its plain and ordinary meaning. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1272 n.8 (Fed. Cir. 1986) (“‘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. ...

‘Comprising’ in step (c) reasonably interpreted means ‘having’ but not ‘having at least.’”). Both the Board and District Courts have followed this binding authority, holding that “comprising” in the body of the claim does not create an “open ended” limitation. *E.g., Apple Inc. v. LBT IP I LLC*, IPR2020-01189, Paper 48, 20 (Dec. 5, 2023) (“consistent with *Moleculon*, we interpret ‘comprising’ here as ‘having’ but not ‘having at least.’”); *Araujo v. E. Mishan & Sons, Inc.*, 2022 U.S. Dist. LEXIS 115290, *25 (“Accordingly, consistent with *Moleculon Research*, the Court construes ‘comprises’ in the context used in Claim 1 as meaning ‘have’ (but not ‘have at least’).”); *Med. Res. Inst. v. Bio-Engineered Supplements & Nutrition*,

Inc., 2007 U.S. Dist. LEXIS 3576, *12 (“while ‘comprising’ is always construed as an open term when used in a claim preamble, it has no such automatic meaning when used within the body of a claim.”); *Orion IP, LLC v. Xerox Corp.*, 2008 U.S. Dist. LEXIS 64348, *19 (“Here, ‘comprising’ is not used as a transitional phrase. Thus, the open-ended meaning does not apply.”).

Petitioner’s Reply ignores the general rule that “comprising” does not create an “open ended” limitation when used in the body of the claim. It cites no authority that contradicts the authority above.⁵ All Petitioner does is argue that the balance of claim language in the cases cited by Patent Owner is not exactly the same as the claim language here. Reply, 21-22. Petitioner attacks a strawman. Petitioner’s arguments do not change the general rule that “comprising” does not create an open-ended limitation when recited in the body of the claim. In fact, courts have rejected Petitioner’s argument even in cases where the claim language closely mirrored the claim language here. For example, in *Barnes & Noble, Inc. v. LSI Corp.*, the limitation-at-issue recited “performing an Inverse Fast Fourier

⁵ In the cases cited by the Reply, “comprising” appears as a transitional phrase and not in the body of the claim, as here. *See, e.g., Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1369 (Fed. Cir. 2005) (“A safety razor blade unit comprising ...”) (cited by Reply, 17-18).

Transformation on said K signals to generate a signal ***comprising K different frequencies.***” 2014 U.S. Dist. LEXIS 48524, *77. Just as here, LSI there argued that “because the claim states that the IFFT on ‘said K signals’ creates a signal ‘*comprising K different frequencies*’—comprising being an inherently open-ended term—the claim requires only that ‘at least’ K frequencies are created.” *Id.*, 83.

Rejecting this argument, the court held:

“comprising” is contained in the body of the claim. ***Courts have held that when used in the body of a claim, and not as a transition, the term “comprising” should be interpreted according to the normal rules of claim interpretation.*** [citations]. The claim language includes a numerical limitation “K” for both the signals upon which the IFFT is performed and the frequencies which would result. ***It would be highly unusual for a writer to use the term “comprise” as open-ended in this context given this express numerical limitation.***

Id., 83-84.

Petitioner presents no claim language analysis under the plain and ordinary meaning of “comprising,” which, as explained above, does not create an open-ended limitation here. And for good reason. The plain meaning of the claim is that N must “equal” 2, 4 or 8. Ex. 2023 [Alberth-2nd-Dec1.] ¶ 89. It does not recite, for example, that “N *can equal at least* 2, 4 or 8.” *Id.*; see also POR, 38. Thus, the plain meaning of the claim excludes other plural values of N. Just as in *Barnes & Noble*, “it would be highly unusual” for the drafters of the claim to

intend an open-ended list of plural N values “given this express numerical limitation.” 2014 U.S. Dist. LEXIS 48524, *83-84; *see also supra* (cases holding that “comprising” means “having,” but not “at least having”).

Therefore, the plain meaning of the claim is that N, when plural, is limited to 2, 4 or 8.

B. The Specification Confirms Patent Owner’s Position.

As the POR (at 41-49) explained, the specification confirms that N, when plural, is limited to 2, 4 or 8. Specifically, the POR explained, by limiting N in the manner described, the invention achieves benefits beyond those offered by Park’s unbounded indexing. In response, the Reply advances two primary arguments. First, it contends that the value of N is not limited to 2, 4 or 8 because the Patent’s embodiments also disclose $N = 1$. Reply, 17-18. Second, it argues that systems employing different modulation schemes might be constructed in which a different set of N values could achieve benefits similar to those described in the patent. As discussed below, both arguments only reinforce Patent Owner’s position. Moreover, neither overcomes the plain claim language, which—as already shown—limits plural values of N to 2, 4, or 8.

The Reply (at 17-18) argues that the claims do not limit the value of N to 2, 4 or 8 because the specification “contemplate[s]” the use of other N values. As support, Petitioner relies on the Patent’s Table 1, where N may also be equal to 1,

in addition to 2, 4 or 8. Reply, 18 (*citing* Ex. 1001 [’450 Pat.] 6:35-45). Petitioner cites to no other N values in the specification. *Id.* But Petitioner ignores that the plain language of Claim 7 only addresses **plural** values of N by reciting N “resource units;” it is, thus, agnostic to the case of N=1. Ex. 1001 [’450 Pat.] cl. 7; *see also TRW Auto. U.S. LLC v. Magna Elecs. Inc.*, IPR2014-00256, Paper 36, 12 (June 25, 2015) (“[T]he plain meaning of ‘objects’ is more than one object ...”). The only plural N values in the specification are 2, 4 and 8. Ex. 1001 [’450 Pat.] 6:35-45. Petitioner and its expert chose to ignore the fact that the claim only address plural N values, even though Patent Owner explained it in its POR. POR, 38 n.5; Ex. 2023 [Alberth-2nd-Decl.] ¶ 89. This is also the most logical reading of the claim in light of the specification, which discloses N = 1, 2, 4 or 8. But even if the specification disclosed unclaimed embodiments, that would not “outweigh the language of the claim.” *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; POR, 48-49.

The Reply (at 19) next addresses the benefits the invention achieves by limiting N, when plural, to 2, 4 or 8. It first argues that these benefits are not “recited in claims 7 or 11,” and “Patent Owner’s focus on them is irrelevant.” Reply, 19. But for the Board to consider the benefits of the invention in its

obviousness analysis, these benefits do not have to be discussed in the specification, let alone in the claims. *In re Chu*, 66 F.3d 292, 298 (Fed. Cir. 1995) (“the Board erred in apparently requiring Chu’s evidence and arguments responsive to the obviousness rejection to be within his specification in order to be considered. To require Chu to include evidence and arguments in the specification regarding whether placement of the SCR catalyst in the bag retainer was a matter of ‘design choice’ would be to require patent applicants to divine the rejections the PTO will proffer when patent applications are filed.”). Nonetheless, the Patent’s specification here *did* explain how limiting N, when plural, to 2, 4 and 8 would achieve certain benefits, and then proceeded to claim those values of N precisely *because* they achieve those benefits. Ex. 2023 [Alberth-2nd-Decl.] ¶¶ 93-97.

Next, the Reply (at 20) argues that other groupings of N may yield the same benefits as N = 2, 4 or 8. Petitioner’s expert “construc[s]” a hypothetical example using coding rate of 1/3, which differs from the coding rate used in the Patent’s embodiment, and based on that coding rate and a QPSK modulation scheme, asserts that N values that are powers of 3 could achieve similar benefits to the Patent. Ex. 1031 [Cooklev-2nd-Decl.] ¶ 35, 38; *compare* Ex. 1001 [’450 Pat.] 6:36-44 (utilizing a specific arrangement of coding rates $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$).

Rather than undermining Patent Owner’s argument, Petitioner’s example confirms the inventive insight absent from the prior art. The inventors recognized

that by linking the value of N to modulation and coding parameters, it is possible to reduce overhead and avoid irregular resource allocation. Ex. 2023 [Alberth 2nd Decl.] ¶¶ 93–97. The Patent determined a set of modulation and coding parameters that it deemed suitable, constructed the collection of N values based on its insight, and then claimed that collection of N values. Petitioner’s expert, in effect, follows that inventive roadmap—deriving a new set of N values by applying the Patent’s insight to a different coding rate and modulation scheme. That only *underscores* the contribution of the invention, and confirms that the claimed N values are not insignificant or arbitrary.⁶

For the foregoing reasons, Petitioner has failed to show disclosure or obviousness of “N=2, 4 or 8” as claimed.

III. CONCLUSION

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

⁶ Petitioner’s expert also states that the benefits of N = 2, 4 or 8 “appear to be made up.” Ex. 1031 [Cooklev-2nd-Decl.] ¶ 34. This statement lacks any credibility. Dr. Cooklev declares he was able to “construct” other examples of N “that achieve the same benefits,” and his technical analysis only lends support to their existence. *Id.*, ¶ 35.

Respectfully submitted,

 / Parham Hendifar /

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

Date: May 1, 2025

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Sur-Reply (the “Sur-Reply”) consists of 5,504 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The Sur-Reply complies with the type-volume limitation of 5,600 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: May 1, 2025

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 SUR-REPLY

EXHIBIT 2039

The addresses of the parties being served are as follows:

John S. LeRoy	FPGP0138IPR@brookskushman.com
Christopher Smith	
Kyle G. Konz	
Timothy Riffe	IPR18768-0206IP2@fr.com
Usman Khan	PTABInbound@fr.com
Reginald J. Hill	rhill@jenner.com
Nicole A Keenan	nkeenan@jenner.com

Respectfully submitted,

/ Parham Hendifar/

Date: May 1, 2025