

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GENERAL MOTORS LLC AND NISSAN NORTH AMERICA, INC.,
Petitioners,

v.

NEO WIRELESS LLC,
Patent Owner.

Case IPR2023-00962
Patent 10,447,450

PATENT OWNER'S PRELIMINARY RESPONSE

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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]

This Petition is a copycat petition seeking joinder to a case in which the decision whether to institute *inter partes* review is pending, IPR2023-00763.

As this and Petitioner's concurrent joinder petition against the '450 patent in IPR2023-00963 represent the fifth and **sixth** petitions for IPR filed in just **two years** against the '450 patent, the arguments against exercising the Director's discretion to institute this petition are accordingly different, and even stronger, than those arguments are with respect to the target IPR. Accordingly, for at least the reasons discussed in Section II *infra*, this petition should be discretionarily denied.

Patent Owner notes for the panel's convenience that the remaining non-institution arguments in this Preliminary Response essentially repeat the non-institution arguments raised in the target case, and are nonetheless being filed to protect Patent Owner's rights as to those arguments. *See* Sections III-IV *infra*.

I. INTRODUCTION

This and Petitioner's concurrent joinder petition against the same patent in IPR2023-00963, marks the fifth and sixth Petitions in two years challenging the claims of U.S. Pat. 10,447,450 (the "'450 Patent").

- A **first** IPR petition was filed by Dell Inc. ("Dell") on September 16, 2021, and was denied institution on the merits on March 16, 2022. IPR2021-01486.

- A ***second*** IPR petition was filed shortly thereafter by Volkswagen Group of America, Inc. (“Volkswagen”) on September 27, 2022, which was instituted and is currently pending before the Board. IPR2022-01567.
- A ***third*** IPR petition—the one Petitioner has moved in the present case to join—was filed by Ford Motor Company (“Ford”) on March 29, 2023, and is pending a decision whether to be instituted. IPR2023-00763,
- A ***fourth*** IPR petition, seeking joinder to Volkswagen’s instituted IPR2022-01567 petition above, was filed by American Honda Motor Co., Inc. (“Honda”) on March 30, 2023.
- A ***fifth*** IPR petition was filed, by the present Petitioner, concurrently with the present Petition, in which case Petitioner has filed a motion for joinder to Volkswagen’s instituted IPR2022-01567 petition above.
- Finally, Petitioner has filed the present Petition, the ***sixth*** IPR petition filed against the ’450 patent in less than two years, seeking to join Ford’s IPR2023-00763 petition above.

The Board should deny this sixth petition under 35 U.S.C. § 314(a).

In the co-pending infringement action brought by Patent Owner in federal district court, Petitioner is co-defendant with Volkswagen, the filing petitioner in the ***second*** petition that has been instituted, and Ford, the filing petitioner in the target case that Petitioner has moved in this case to join. See Section II.A, *infra*.

The judicial panel in district court has found that Petitioner and Volkswagen “share factual questions concerning such matters as the technology underlying the patents, prior art, claim construction, and/or issues of infringement involving the patents” because they are both accused of infringement by implementing the same standard. Ex. 1013 [Transfer Order] 1-2. The district court has ordered Petitioner, instituted petitioner Volkswagen, and target petitioner Ford to jointly present their invalidity contentions. Ex. 1010 [Opinion and Order] 3.

As far back as November 16, 2022, nearly ***seven months*** prior to the filing of the present Petition, Petitioner, Volkswagen, Ford, and other co-defendants ***jointly*** served invalidity contentions identifying the ***same*** combination of references that Petitioner now asserts in this Petition:

Park '274 and IEEE 802.16-2004:

¶ Park '274 and IEEE 802.16-2004: IEEE 802.16-2004 was published on October 1, 2004. It teaches and describes a wireless communication standard that specifies the air interface, including the medium access control layer and multiple physical layer specifications, of fixed broadband wireless access, BWA systems. IEEE802.16-2004 specifies a standard for a “base station (BS)” communicating with a “subscriber station (SS).” Title, 43 (definition 3.5), 47 (definition 3.56). The signaling structure consists of time domain “OFDMA symbol[s]” and frequency domain “subcarriers.” *Id.* at 530 (§§8.4.2.1, 8.4.2.2). Resource allocation in IEEE802.16-2004 is based on a “minimum possible data allocation unit” which consists of “one slot” in time (each slot consisting of multiple OFDMA symbols) and “one subchannel” in frequency (each subchannel being a “subset” of subcarriers). *Id.* at 532 (§8.4.3.1), 530 (§8.4.2.2). Based on this “minimum possible data allocation unit,” IEEE802.16-2004 specifies a “data region” as a “two-dimensional allocation of a group of contiguous subchannels, in a group of contiguous OFDMA symbols.” *Id.* at 532 (§8.4.3.1), Fig. 215. Park '274 teaches that its invention will apply using the 802.16-2004 standard. *E.g.*, Park '274 at [0007], [0013], [0014], [0017], [0018], [0036], [0037], [0073], [0075], [0076], [0077], [0078], [0079], [0085]. Therefore, a POSITA would have understood that the teachings of IEEE802.16-2004 were directly applicable to Park '274. Furthermore, a POSITA would have understood that incorporating

Ex. 2019 [Invalidity-Contentions] 666; *see also id.*, 1027 (Proof of service dated November 16, 2022).

Yet, when Volkswagen filed its since-instituted petition ***almost one year ago***, Petitioner did not join with Volkswagen in filing Volkswagen’s petition—even though in the district court it has been pursuing its invalidity case jointly with Volkswagen. Nor did Petitioner join Ford in filing Ford’s petition in March 2023—even though it has been pursuing its district court invalidity arguments jointly with Ford as well, and even though in November 2022 Petitioner, jointly

with Volkswagen and Ford, served invalidity contentions in district court raising as an invalidity theory the same combination of references raised in this Petition. Ex. 2019 [Invalidity-Contentions] 666.

After not joining Volkswagen’s IPR petition in September 2022, after raising the present alleged obviousness combination in the court case in November 2022, and after not joining Ford’s IPR petition raising the same combination in June 2023, as month after month ticked by, Petitioner made no move to file anything with this Board. Instead, Petitioner waited until **June** 2023 to file the present Petition, thereby allowing itself to maximize its harassing, roadmapping opportunities, including study of the Patent Owner’s Preliminary Response in Volkswagen’s IPR on February 8, 2023. *See* Ex. 2016 [Ford-POS] (service of complaint on Petitioner on March 29, 2022). And roadmapping is exactly what Petitioner did. Petitioner freely used the many roadmaps now at its disposal—everything from the Dell Petition, the Dell denial of institution decision, to even Patent Owner’s Preliminary Response in the Volkswagen IPR—to roadmap this Petition. *See* Section II.B.1, *infra*.

Under these facts, *General Plastic, Valve* and their progeny compel discretionary denial of institution under 314(a). *See* Section II.B, *infra*. There is no justification why this third Petition should be instituted when there is already an instituted trial challenging all claims of the ’450 Patent brought by Petitioner’s

district court co-defendant and Petitioner delayed so long in filing this Petition. This is especially the case since Petitioner was ordered in the district court to pursue joint invalidity contentions with instituted petitioner Volkswagen and target petitioner Ford. There is no reason why Petitioner should not and could not have filed this IPR petition a year ago.

Therefore, the Petition should be denied under 314(a). If the Board were to reach the merits of the Petition, the Petition still fails for failing to show a reasonable likelihood of success in connection with multiple limitations. See Sections III, IV, *infra*.

II. THIS SIXTH PETITION IN TWO YEARS CHALLENGING THE SAME PATENT AND CLAIMS, AFTER NEARLY A YEAR OF DELIBERATE DELAY, SHOULD BE DENIED UNDER § 314(a).

As explained above, this is the *sixth* Petition in the span of only two years challenging the same claims of the same Patent. The first petition was denied on the merits. The second petition, by Petitioner's district court co-defendant, was instituted and has oral arguments scheduled for February 1, 2024. The third and fourth petitions are pending institution decisions, and Petitioner filed a fifth petition, pending concurrently with this one, seeking to join IPR2022-01539 against this same patent. Finally, one of the two references in the combination in this Petition was already raised in an earlier petition that was carefully analyzed

and denied on the merits. The Board should deny this sixth, road-mapped, and overlapping petition under 35 U.S.C. § 314(a).

A. This Is The Sixth Petition In Two Years Challenging These Claims Of The '450 Patent, Including An Instituted Petition By Petitioner's District Court Co-Defendant, With Whom Petitioner Has For A Year Been Jointly Challenging The Patent In Court.

On September 16, 2021, Dell filed the first IPR petition challenging all claims of the '450 Patent. *Dell Inc. v. Neo Wireless LLC*, IPR2021-01486, Paper 2 (Sept. 16, 2021) (the “*Dell Petition*”). On March 16, 2022, the Board denied the *Dell Petition* on the merits. IPR2021-01486, Paper 10, 2 (Mar. 16, 2022). The *Dell Petition* challenged the claims based on a combination of Kim and IEEE 802.16-2004—the **same** IEEE 802.16-2004 reference that is one of the two references forming Petitioner’s alleged invalidity ground in this case. *Id.*, 9.

Shortly thereafter, on September 27, 2022, Petitioner’s district court co-defendant, Volkswagen, filed a second petition challenging all claims of the '450 Patent. *Volkswagen Group of America, Inc. v. Neo Wireless LLC*, IPR2022-01567, Paper 2 (Sept. 27, 2022) (the “*Volkswagen Petition*”). On May 4, 2023, the Board found the low institution threshold met and instituted trial on the *Volkswagen Petition*, which has oral argument scheduled for February 1, 2024. *Id.*, Paper 8, 2.

A third petition was filed by Ford, raising the same grounds as this Petition, in March 2023. *Ford Motor Co. v. Neo Wireless LLC*, IPR2023-00763, Paper 2 (Mar. 29, 2023) (the “*Ford Petition*” or target case).

A fourth petition was filed by Honda, seeking to join the *Volkswagen Petition*. IPR2023-00793.

And a fifth petition was filed by Petitioner in this case, also seeking to join the *Volkswagen Petition*. IPR2023-00962.

The instant Petition, filed on June 5, 2023, is the **sixth** Petition filed in close succession against the '450 Patent, copycatting and seeking to join the third petition, above. It challenges claims 7 and 11, claims that were denied institution in the *Dell Petition* and that are subject to a PTAB trial now in the *Volkswagen Petition*.

The same reasons which support denial of the third Petition, which the instant Petition seeks to join, apply here, and the reasons for denial of that third petition are stronger for this **sixth** petition. *General Plastic* and its precedential progeny set forth no exception for serial petitions, whether or not they are joinder petitions. Since the filing of the first petition on September 16, 2021, this is the sixth petition challenging these same claims, in the span of only two years.

B. *General Plastic* And Its Progeny Require Denial Of This Sixth, Delayed, Roadmapped Serial Petition, Especially In Light Of An Already Instituted Trial.

In exercising its discretion under 35 U.S.C. § 314(a), the Board analyzes factors set out in *General Plastic Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, 16–17 (Sept. 6, 2017) (precedential). These factors are “non-

exhaustive” (*id.*, 16), and “are not intended to represent all situations where it may be appropriate to deny a petition.” Consolidated Trial Practice Guide (Nov. 2019), 58. Furthermore, “not all the factors need to weigh against institution for [the Board] to exercise [its] discretion under § 314(a).” *Abiomed, Inc. v. Maquet Cardiovascular, LLC*, IPR2017–02150, Paper 11, 7 (Mar. 12, 2018).

As discussed in the following subsections, the express *General Plastic* factors strongly weigh against institution of this **sixth** Petition here. See Sections II.B.2-II.B.7, *infra*. These factors were found in the instituted *Volkswagen* case to not be sufficient to compel discretionary denial of institution. (They have yet to be considered with respect to the third petition, which this case seeks to join.) But the instituted *Volkswagen* case was only the **second** petition filed against these claims, and Volkswagen was not a co-defendant of the filer of the first petition; this is now the **sixth** petition against these claims, and Petitioner is a co-defendant who has been working jointly with Volkswagen. Furthermore, the additional pertinent factor of roadmapping also strongly weighs against institution. For these and other reasons, discretionary denial of institution is appropriate. See Section II.B.1, *infra*.

1. *Roadmapping Of This Sixth Serial Petition Is A Factor That Weighs Against Institution.*

The Office has long disfavored “roadmapping,” in which a petitioner uses the prior IPR petitions to develop its arguments. See, e.g., *Synaptics, Inc. v. Amkor Tech, Inc.*, IPR2017-00085, Paper 12, 10 (Apr. 18, 2017) (“We disfavor allowing

follow-on petitions that attempt to fix deficiencies in a previous petition that were explained in a previous decision on institution.”). And roadmapping is disfavored for good reason. As *General Plastic* noted:

Multiple, staggered petitions challenging the same patent and same claims raise the potential for abuse. The absence of any restrictions on follow-on petitions would allow petitioners the opportunity to strategically stage their prior art and arguments in multiple petitions, using our decisions as a roadmap, until a ground is found that results in the grant of review.

Gen. Plastic (precedential), Paper 19, 17. “[T]he filing of sequential attacks against the same claims, with the opportunity to morph positions along the way, imposes inequities on Patent Owner,” particularly when they are “based on the analysis articulated in [the] Decisions Denying Institution of” earlier challenges.

Id., 11 (internal quotation and alteration marks omitted); *see also id.*, 17

(explaining the “benefit from receiving and having the opportunity to study Patent Owner’s Preliminary Response, as well as our institution decisions on the first-filed petitions, prior to [the] filing of follow-on petitions,” can create “undue inequities and prejudices to Patent Owner”).

Petitioner’s arguments presented here, copied from Ford’s petition, take full, unfair advantage of roadmapping opportunities, using the *Dell Petition* and the *Volkswagen Petition* to present its challenge. This was facilitated by Ford’s delay

in filing its Petition; and Petitioner waited even longer, until June 2023. *Compare* Ex. 2016 [POS-Ford] (service of complaint on Petitioner on March 29, 2022).

One of the two references relied upon by the Petition here, the IEEE 802.16-2004, is the same reference that was the basis of the *Dell Petition* challenge. IPR2021-01486, Paper 10, 9. But instead of combining IEEE 802.16-2004 with Kim, as Dell did, Petitioner here combines it with Park. Pet., 14-15. Why? As Petitioner itself explains, precisely because the Petition’s arguments are roadmapped to address the hindsight gained from Board’s reasoned denial of institution in the *Dell Petition*, explaining that:

Dell pointed to two-dimensional starting time-frequency coordinates, such as a symbol (time) offset and a subchannel (frequency) offset, and contended that was sufficient to meet the claims. [citation]. But the Board agreed with Neo that Dell’s art taught only “independent time and frequency coordinates” rather than a single, unitary time-frequency coordinate. [citation].

Pet., 50. Thus, instead of combining it with Kim, as Dell did, the Petition combines IEEE 802.16-2004 with Park instead, because:

Park teaches this missing claim element, and explains why it would have been obvious to modify 802.16-2004 to encode the starting point as a single, one-dimensional time- frequency coordinate rather than separate time and frequency coordinates.

Pet., 51.

But the Petition's roadmapping does not stop there. In the *Volkswagen IPR*, the Patent Owner Preliminary Response argued that the references in that Petition do not disclose the claimed "time-frequency coordinate" because they rely on separate time and frequency coordinates:

much as with the -01486 IPR's asserted combination, neither of the primary references in this Petition, Vijayan089 (Grounds 1 and 3) and Vijayan475 (Grounds 2 and 4), disclose or render obvious "a starting time-frequency coordinate." Rather, Vijayan089 and Vijayan475 use both a starting time coordinate and a separate starting frequency coordinate. ***Because they use two separate starting coordinates rather than the single claimed "starting time- frequency coordinate," they do not offer the specific benefit of the innovative reduction in control overhead taught by the '450 patent.***

IPR2022-01567, Paper 7, 1. Using the additional hindsight gained from perusal of the Patent Owner Preliminary Response in the *Volkswagen IPR*, the Petition's arguments, like those of Ford's which it copies, are expressly drafted around that argument. In fact, the Petition expressly argues that its grounds are different from Volkswagen's grounds because:

Both of VW's grounds allege the claimed time-frequency coordinate is satisfied by two-parameter teachings.

Pet., 50-51.

And the roadmapping still is not done. The Petition further suggests that Park was chosen as a reference in light of hindsight knowledge about it gained from the *Volkswagen Petition*—which, the Petition explains, did not have Park in its obviousness combinations yet expressly cited it “as an exhibit” and discussed it:

VW’s petition lists Park as an exhibit, but never asserts it as prior art. Pet., 51 n. 22; see also IPR2022-01567, Paper 2, 9-10 (discussing -01567 Exhibit 1024, i.e., Park).

Thus, the Petition’s arguments, since Ford waited until the last day of its statutory bar to gain further roadmaps to read for directly relevant hindsight gained from both of the prior petitions, embodies the very roadmapping concerns that the Board seeks to address and eliminate.

This additional fact and factor of roadmapping weigh against institution in addition to the express *General Plastic* factors, all of which strongly weigh against institution, as discussed below. Indeed, this additional factor further strengthens the already great weight of those factors against institution.

2. *Factor 1: Petitioner’s Co-Defendant Has Already Challenged The Same Claims In A Currently Instituted IPR.*

The first *General Plastic* factor considers “whether the same petitioner previously filed a petition directed to the same claims of the same patent.” CTPG, 57. The application of this factor “is not limited solely to instances when multiple petitions are filed by the same petitioner”; rather, the Board “consider[s] **any**

relationship between” the petitioners. *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11, 2, 9 (Apr. 2, 2019) (precedential).

As will be discussed below, Petitioner, Volkswagen (who filed the second, instituted petition), and Ford, who filed the third, targeted petition, are all co-defendants in the district court, and have been ordered by the Court to all **jointly** present their invalidity contentions to the district court—and in fact they have done so, including with respect to the same combination of the IEEE 802.16 and Park references asserted in this Petition. Furthermore, the district court judicial panel has found that both Petitioner and Volkswagen will have similar issues relating to claim construction and infringement as both are accused of infringement based on implementing the same LTE and/or 5G standards. Further still, Petitioner has used the Volkswagen Petition and the Patent Owner Preliminary Response thereto to road-map its Petition. Under these facts, as discussed below, Board precedent mandates a finding of a relationship sufficient to deny institution.

Valve denied a second petition against a patent by a second petitioner, where the two petitioners were “co-defendants” in the same patent infringement litigation relating to the same products, finding that “[t]hus, there is a significant relationship between [the filers of the two petitions] with respect to [the] [p]atent [o]wner’s assertion of the [challenged] patent.” *Id.*, 11.

Here, the Petitioner is a district court co-defendant with Volkswagen, the petitioner of the second petition that was instituted and is currently pending before PTAB, and Ford, the petitioner of the third petition, which Petitioner seeks to join. Specifically, both Ford and Volkswagen are co-defendants in the multi-district litigation pending in the Eastern District of Michigan, case no. 2:22-MD-03034-TGB. Ex. 1013 [Transfer Order] 1; Ex. 1010 [Opinion and Order] 1. Furthermore, their cases have been consolidated in light of the close linkages between the cases' subject matter. Both defendants are accused of infringement by implementing the LTE and/or 4G/5G standards:

All accused infringers in these seven actions are automaker groups who are alleged to implement cellular communications technology into their vehicles, such as remote lock and unlock, remote start and remote start scheduling, parked vehicle location, remote fuel level checks, automatic collision notification, roadside assistance, and Wi-Fi hotspot. Neo alleges that, because the patents all relate to fundamental aspects of LTE/4G and 5G/NR networks, the patents read directly onto LTE or 4G/5G technical standards. As a result, by complying with these standards, each defendant allegedly infringes the asserted patents. All actions thus can be expected to share factual questions concerning such matters as the technology underlying the patents, prior art, claim construction, and/or issues of infringement involving the patents.

Ex. 1013 [Transfer Order] 1-2.

Further still, Defendants are ordered to jointly present their invalidity contentions in the district court, which makes it even more questionable as to why they should not do the same before PTAB:

Accordingly, for the same legal reasons stated in its Order Granting In Part and Denying In Part Defendants' Motion to Reduce Number of Asserted Claims (ECF No. 99), ***the Court ORDERS Defendants to limit their total asserted prior art references and/or products to an average of eight (8) per patent***, for a total of not more than forty-eight (48) references and/or products, on or before December 16, 2022. Defendants can determine how the limit is distributed across the asserted claims.

Ex. 1010 [Opinion and Order] 3.

And in fact, Petitioner, Volkswagen, and Ford ***are*** jointly presenting their invalidity contentions in the district court, including specifically relating to the same IEEE 802.16 and Park references that are the subject of this IPR. Ex. 2019 [Invalidity-Contentions] 2 n.1 (identifying both Ford and Volkswagen as Defendants that jointly submitted the contentions); 16 (identifying US Pat. App. No. 2006/0039274 [Park] against the '450 Patent); 27 (identifying various IEEE 802.16 publications against the '450 Patent). In fact, Volkswagen, Ford, and Petitioner jointly identified and mapped the combination of IEEE 802.16-2004 and Park, the same combination presented in the Petition, in their joint invalidity contentions in the district court, served on November 16, 2022:

Park '274 and IEEE 802.16-2004:

• **Park '274 and IEEE 802.16-2004:** IEEE 802.16-2004 was published on October 1, 2004. It teaches and describes a wireless communication standard that specifies the air interface, including the medium access control layer and multiple physical layer specifications, of fixed broadband wireless access, BWA systems. IEEE802.16-2004 specifies a standard for a “base station (BS)” communicating with a “subscriber station (SS).” Title, 43 (definition 3.5), 47 (definition 3.56). The signaling structure consists of time domain “OFDMA symbol[s]” and frequency domain “subcarriers.” *Id.* at 530 (§§8.4.2.1, 8.4.2.2). Resource allocation in IEEE802.16-2004 is based on a “minimum possible data allocation unit” which consists of “one slot” in time (each slot consisting of multiple OFDMA symbols) and “one subchannel” in frequency (each subchannel being a “subset” of subcarriers). *Id.* at 532 (§8.4.3.1), 530 (§8.4.2.2). Based on this “minimum possible data allocation unit,” IEEE802.16-2004 specifies a “data region” as a “two-dimensional allocation of a group of contiguous subchannels, in a group of contiguous OFDMA symbols.” *Id.* at 532 (§8.4.3.1), Fig. 215. Park '274 teaches that its invention will apply using the 802.16-2004 standard. *E.g.*, Park '274 at [0007], [0013], [0014], [0017], [0018], [0036], [0037], [0073], [0075], [0076], [0077], [0078], [0079], [0085]. Therefore, a POSITA would have understood that the teachings of IEEE802.16-2004 were directly applicable to Park '274. Furthermore, a POSITA would have understood that incorporating

Ex. 2019 [Invalidity-Contentions] 666; *see also id.*, 1027 (proof of service dated November 16, 2022).

Thus, Petitioner here has even a stronger relationship with both instituted petitioner Volkswagen and targeted petitioner Ford than what *Valve* found sufficient to deny institution.

Notably, the Board has found roadmapping, even absent a district-court co-defendant relationship, to be sufficient to deny institution. For example, in denying a second petition, the Board held in *Ericsson*:

Lastly, Petitioner asserts that it does not have a significant relationship with the other petitioners. Pet. 69. We agree that, absent this petition, no such relationship, on the record before us, existed. ***We determine, however, that Petitioner implicitly created such a relationship by using the prior petitioners' work as a menu and picking and choosing from their work product. The instant Petitioner's decision to use the prior petitions as a roadmap for its own petition ties the interests of all of the petitioners together. See General Plastic, Paper 19 at 11, 17 ("[m]ultiple, staggered petitions challenging the same patent and same claims raise the potential for abuse.")***.

Ericsson Inc. v. Uniloc 2017, LLC, IPR2019-01550, Paper 8, 12 (Mar. 17, 2020).

Like in *Ericsson*, the Petitioner's arguments here used the first and second prior petitions as roadmaps. See Section II.B.1, *supra*. Added to the fact that Petitioner is also a district-court co-defendant with Volkswagen and Ford, both of whom are accused of infringement by virtue of implementing the same standards, and their joint invalidity contentions in the district court, it is clear that, as in *Ericsson*, this factor weights strongly against institution.

Nor does Petitioner challenge any claims that were not previously challenged or that are not currently pending before the Board. The *Dell Petition* challenged all claims of the Patent. The Board denied institution on the merits. IPR2021-01486, Paper 10, 2. Similarly, the *Volkswagen Petition* also challenged all claims of the Patent. The Board instituted trial, and all claims of the Patent are

already before the Board for evaluation. IPR2022-01567, Paper 8, 2. The targeted Ford petition challenges the same claims. Therefore, as *Ericsson* above makes clear, the fact that Petitioner challenges only a subset of the claims already before the Board for evaluation, further weighs against institution. See *Ericsson*, IPR2019-01550, Paper 8, 11 (“we do not determine that challenging a subset of previously challenged claims is availing to Petitioner.”).

Petitioner presents no of arguments as to why there is no “significant relationship” between it and Volkswagen or Ford. Pet., 54.¹ Petitioner also does

¹ The Petition’s Table of Authorities falsely says that the Petition cites *Valve* on that page, but the Petition does not ever cite, discuss, or distinguish *Valve*. Pet., iv. Its Table of Authorities in fact contains many falsities. For example, it also falsely says that the Petition cites many other decisions, including precedential and non-precedential “*Code200*” decisions, and that it contains so many citations to *Facebook, Inc. v. Express Mobile Inc.*, IPR2021-01455, Paper 11 (Mar. 4, 2022) (an authority that Ford’s targeted petition cites in connection with the *General Plastic* analysis) that it (“*passim*”) cannot even list all the pages that cite it. Pet., iii-iv. All these decisions, it happens, were cited in Ford’s targeted 00763 petition. But in fact, the Petition contains **no** citations to **any** of these decisions at all. The Table of Authorities therefore creates a false, misleading impression of authority.

not address the fact that it has created an “implicit[]” relationship sufficient to deny institution by using the prior petitions as a road-map. *Ericsson*, IPR2019-01550, Paper 8, 12. It does not even mention *Ericsson*. That by itself is sufficient to reject all of Petitioner’s arguments. But there is more.

Where, as here, defendants are forced into a single multi-district litigation because of strong overlap of issues ranging from claim construction to infringement, and are expected to make joint submissions regarding the same, there is no reason why they cannot be expected to cooperate in their IPR challenges. Ex. 1013 [Transfer Order] 1-2. In fact, they are ordered to do exactly the same in the district court, where the Court ordered them to jointly select a limited number of validity challenges there. Ex. 1010 [Opinion and Order] 3. Petitioner even presented the **same combination** as here—IEEE 802.16-2004 and Park—to the district court **jointly** with both Volkswagen and Ford on November 16, 2022. Ex. 2019 [Invalidity-Contentions] 666. That they decided to submit staggered, road-mapped challenges before PTAB is **their** choice, and under *General Plastic*, disfavors institution.

For all of the foregoing reasons, the first *General Plastic* factor strongly weighs against institution.

3. *Factor 2: The Asserted Art Should Have Been Known At The Time Of The Second, Third, Fourth, And Fifth Petitions.*

The second *General Plastic* factor considers “whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it.” CTPG, 57. This factor strongly weighs against institution because at the time Volkswagen filed the second petition challenging the Patent in November, and certainly when Ford filed the third petition in March, Petitioner knew or should have known of the references it is now asserting in this sixth Petition.

Petitioner’s sole ground relies on two references: IEEE 802.16-2004 and Park. Pet., 14. IEEE 802.16-2004 was one of the two references that Dell relied upon in its petition filed on September 16, 2021. IPR2021-01486, Paper 2. Therefore, Petitioner was undisputedly aware of the IEEE 802.16-2004 at the time Volkswagen filed its petition on September 27, 2022—a year after the *Dell Petition*. IPR2022-01567, Paper 2.

Nor can it be seriously disputed that Petitioner was either aware, or should have been aware, of its Park reference at the time Volkswagen filed the second petition against the Patent. First, Petitioner jointly with Volkswagen identified Park as a reference in its invalidity contentions shortly after the filing of the *Volkswagen Petition*. Ex. 2019 [Invalidity-Contentions] 2 n.1 16 (identifying US Pat. App. No. 2006/0039274 [Park] against the ’450 Patent). Furthermore, the

Volkswagen Petition itself included the Park reference as an exhibit and discussed it. IPR2022-01567, Exhibit 1024. Given the district court order for the defendants to jointly limit and submit their invalidity challenges, it can hardly be doubted that Petitioner, working hand-in-hand with Volkswagen on their joint invalidity case as ordered by the court, was also apprised of Volkswagen's art. In any event, even if that were not so, it is enough that Park is a published U.S. Patent application. Therefore, if Volkswagen was able to locate Park with reasonable diligence, it follows that Ford should have reasonably been aware of it as well. *Apple Inc. v. Zomm, LLC*, IPR2019-1030, Paper 8, 12 (Nov. 14, 2019) ("We agree with Patent Owner that, as Tran is a U.S. Patent and it uses the same terms used in the '895 patent, in the absence of any explanation as to why a reasonably diligent search would not (or did not) uncover the reference, the second *General Plastic* factor weighs towards exercising our discretion to deny institution."); *Valve* (precedential), 11 ("Although Valve may not have known of the Maeda and Anderson references at the time HTC filed its petition in the 1031 IPR, the timing of Valve's petitions suggests that it could have found the Maeda and Anderson references through the exercise of reasonable diligence around the time of HTC's petition.").

Finally, of course, even if it did not know long before, Petitioner knew full well of these grounds at the time Ford filed the third petition, in March 2023, for

Petitioner has copied them from that Petition and seeks to join it. Yet Petitioner, despite literally jointly conducting an invalidity case with Ford throughout this time period, did not join with Ford in filing the 00763 petition. It only now, months later, seeks to join it.

Therefore, the second factor also strongly weighs against institution.

4. *Factor 3: Petitioner Had Received Patent Owner's Preliminary Response Prior To The Filing Of Its Petition.*

The third factor considers “whether at the time of filing of the second petition the petitioner already received the patent owner’s preliminary response to the first petition or received the Board’s decision on whether to institute review in the first petition.” CTPG, 57. This black-and-white, up-or-down factor also strongly weighs against institution.

At the time Ford filed its Petition on March 29, 2023, Ford, and Petitioner, had already received the Patent Owner Preliminary Response in the *Volkswagen Petition*. Specifically, in the Volkswagen IPR, the Petition was filed on September 27, 2022, and the Patent Owner Preliminary Response was filed on February 8, 2023. Both dates are substantially prior to the filing date of the Petition in this matter, on March 29, 2023. In fact, the evidence suggests that Ford waited until the **very last day** of its statutory bar grace period to file its Petition on March 29, 2023, making sure it had received Patent Owner’s Preliminary Response, and maximizing its road-mapping opportunity. See Ex. 2016 [Ford-POS] (service of

complaint on Petitioner on March 29, 2022). Petitioner here waited even longer, until June 2023. Furthermore, as discussed above, Ford did indeed expressly utilize the hindsight from the Patent Owner Preliminary Response in the Volkswagen IPR to roadmap its Petition, and Petitioner copied that roadmapping. *See* Section II.B.1, *supra*.

At the time it filed its Petition on March 29, 2023, Ford had also received Patent Owner's Preliminary Response (filed December 20, 2021) and the Board's decision denying institution (issued March 16, 2022) in the *Dell* IPR, and also used both those documents to road-map its Petition. *See* Section II.B.1, *supra*.

Therefore, the third factor strongly weighs against institution of this sixth petition.

5. *Factor 4: Substantial Time Elapsed Between The Filing Of Prior Petitions, Petitioner's Learning Of The Prior Art, And Petitioner's Petition.*

The fourth General Plastic factor considers "the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition." CTPG, 57. This factor indisputably and strongly weighs against institution.

Indisputably, Petitioner was aware of the very combination of IEEE 802.16-2004 and Park that is the basis of the Petition as early as November 16, 2022, when it, and Ford, served its invalidity contentions jointly with VW:

Park '274 and IEEE 802.16-2004:

• **Park '274 and IEEE 802.16-2004:** IEEE 802.16-2004 was published on October 1, 2004. It teaches and describes a wireless communication standard that specifies the air interface, including the medium access control layer and multiple physical layer specifications, of fixed broadband wireless access, BWA systems. IEEE802.16-2004 specifies a standard for a “base station (BS)” communicating with a “subscriber station (SS).” Title, 43 (definition 3.5), 47 (definition 3.56). The signaling structure consists of time domain “OFDMA symbol[s]” and frequency domain “subcarriers.” *Id.* at 530 (§§8.4.2.1, 8.4.2.2). Resource allocation in IEEE802.16-2004 is based on a “minimum possible data allocation unit” which consists of “one slot” in time (each slot consisting of multiple OFDMA symbols) and “one subchannel” in frequency (each subchannel being a “subset” of subcarriers). *Id.* at 532 (§8.4.3.1), 530 (§8.4.2.2). Based on this “minimum possible data allocation unit,” IEEE802.16-2004 specifies a “data region” as a “two-dimensional allocation of a group of contiguous subchannels, in a group of contiguous OFDMA symbols.” *Id.* at 532 (§8.4.3.1), Fig. 215. Park '274 teaches that its invention will apply using the 802.16-2004 standard. *E.g.*, Park '274 at [0007], [0013], [0014], [0017], [0018], [0036], [0037], [0073], [0075], [0076], [0077], [0078], [0079], [0085]. Therefore, a POSITA would have understood that the teachings of IEEE802.16-2004 were directly applicable to Park '274. Furthermore, a POSITA would have understood that incorporating

Ex. 2019 [Invalidity-Contentions] 666; *see also id.*, 1027 (proof of service dated November 16, 2022).

But Petitioner was, or should have been, aware of the references even ***before*** November 16, 2022. As explained in section II.B.2, *supra*, Petitioner should have known of the IEEE 802.16-2004 reference at least as of the time of the filing of the *Dell* Petition on September 16, 2021. As also explained in that section, Petitioner should have reasonably known of its Park reference at least as of the time Volkswagen filed its petition, since Volkswagen attached Park as an exhibit to its Petition, showing that it could have been located with a reasonable search. As also

explained in section II.B.2, *supra*, given the order for defendants to jointly present their district court invalidity challenges, it is highly likely that Petitioner was also already apprised of Volkswagen's art.

Yet, Petitioner did not file its Petition anytime around November 2022, when it identified the same combination of references in its invalidity contentions. It also did not file its Petition together with Volkswagen in September 2022, even though it either knew or should have known of its references then. And it did not file its Petition together with Ford in March 2023. Instead, it waited all the way until **June 2023**, maximizing Patent Owner's cost and harassment.

Therefore, this factor also weighs against institution.

6. *Factor 5: Petitioner Fails To Provide Adequate Explanation For Time Elapsed Between Filing Of Volkswagen's Petition And Its Own.*

The fifth *General Plastic* factor assesses "whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent." CTPG, 57. This factor also strongly weighs against institution.

The petition filed by Petitioner's co-defendant, Volkswagen, was filed on September 27, 2022. That was already approximately six months after the service of the complaint on Volkswagen and Ford in late March 2022. Exhibits 2016-2018 (proofs of service). Ford waited an additional six months, until the last day of its

one year statutory bar grace period, to file its Petition on March 29, 2023. *See* Ex. 2016 [Ford-POS] (service of complaint on Petitioner on March 29, 2022). Yet Petitioner waited until June 2023 to file a separate petition of its own. There is simply no reason why Petitioner could not have filed a petition together with Volkswagen, filed a petition together with Ford, or file a separate Petition in November 2022 when it indisputably knew of its combination of IEEE 802.16-2004 and Park.

Nor does Petitioner present an “adequate explanation” of the time lapse between the two petitions, just as it does not have an adequate explanation as to why there should be two instituted petitions against the same patent, which is strongly disfavored. *Valve* (precedential), 14 (even though change in law might have prompted the second petition, that still “does not excuse the five-month delay between the filing of HTC’s petition and Valve’s Petition.”).

Petitioner offers no serious explanation, not even an *ex post facto* rationale.

The fact that Petitioner did not file a joint Petition with Volkswagen, or with Ford, but instead chose to wait six months to file a separate Petition, has wasted, not preserved, the Board’s resources. This is precisely why the district court has ordered the defendants to jointly limit their validity challenges. Ex. 1010, 3.

The fifth General Plastic factor also strongly weighs against institution.

7. *Factors 6-7: Fairness, Timing And Efficiency Weigh Against Institution.*

“The sixth and seventh factors are efficiency considerations,” and consider “the finite resources of the Board.” *Valve* (precedential), 13. “In general, having multiple petitions challenging the same patent” is inefficient and tends to waste resources. *Id.* As the sixth petition challenging this Patent, especially in light of at least one already instituted trial, these factors also strongly weigh against intuition. Furthermore, the Petition’s roadmapping by use of hindsight knowledge, taking advantage of Ford’s deliberately waiting until the last day of its statutory bar to file its Petition and still further delay by Petitioner, raise additional “fairness” concerns. *See* Section II.B.1, *supra*.

8. *An Already Instituted Trial On The Second Petition Is An Additional Factor That Weighs Against Institution.*

The fact that the second petition challenging the claims was instituted is an additional factor that weighs against institution. As noted above, the Board has also instituted trial in the Volkswagen Petition, with oral argument for that matter scheduled for February 1, 2024. Instituting a second trial on the same claims of the same patent would present a double burden on both the Board and Patent Owner that would not have been present if Volkswagen’s petition were also denied. As the CTPG has observed in the context of parallel petitions, “one petition should be sufficient to challenge the claims of a patent in most situation.” CTPG, 59; *see*

also *id.* (“multiple petitions by a petitioner are not necessary in the vast majority of cases. To date, a substantial majority of patents have been challenged with a single petition.”). This additional factor also weighs against institution.

9. *The Patent Has Already Been, Or Will Be, Twice Evaluated On The Merits Without The Need For This Third Petition.*

This is not a case where denial of this sixth serial Petition would undermine the Board’s obligation to improve patent quality and patent system efficiency.

First, the Board already evaluated the Patent on the merits when denying the *Dell* Petition. If that were not enough, as noted above, the Board has also instituted trial in the *Volkswagen* Petition, finding a reasonable likelihood of success in that Petition. The Patent will be fully evaluated again on the merits based on the full record at the conclusion of at least the *Volkswagen* IPR. And the Board is still evaluating whether to institute the IPR filed by Ford. Thus, a sixth, successive and road-mapped petition shifts the balance of the scale from improving patent quality to harassment. This additional factor also weighs against institution.

For all of these reasons, institution of the Petition should be denied under § 314(a).

However, even if the Board were inclined to reach the merits of the Petition, it should still be denied because none of its grounds reach the threshold necessary for institution, as discussed in Sections III-IV.

III. PETITIONER FAILS TO SHOW THAT ITS GROUND DISCLOSES A “MOBILE DEVICE.”

Claim 7 recites a “mobile device configured to: receive an identifier from a base station in a cell in which the mobile device is operating”). Ex. 1001 [’450 Pat.] cl. 7.² Petitioner’s proposed ground of obviousness incorporates Park’s modified resource allocation scheme in the IEEE 802.16-2004 standard. 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.”). Yet, Petitioner’s expert (but not the Petition) admits that “Park and 802.16-2004 do not expressly state the ‘subscriber’ or ‘terminal’ is a mobile device.” Ex. 1003 [Cooklev-Decl.] ¶ 126. Faced with these fatal facts, Petitioner’s argument as to why its ground supposedly discloses “mobile devices” appears to follow the motto that “if you cannot convince them, confuse them” (attributed to Harry S. Truman).

As will be explained in the following sections, it is well-documented in the field, including in scholarship articles and Petitioner’s own exhibit, that the IEEE 802.16-2004 standard did not support mobile users. See Section III.A, *infra*. The first standard in the 802.16 family that supported mobile users was IEEE

² While a “mobile device” appears in both the preamble and the body of Claim 7, the parties agree that the preamble is limiting. Pet., 8.

802.16(e), published in December 2005 after the priority date of the Patent—not the IEEE 802.16-2004 that Petitioner is combining with Park. *Id.*

Nor does Park help Petitioner. *See* Section III.B, *infra*. As noted, Petitioner’s expert admits that Park does not “expressly state” that its subscribers are mobile. Ex. 1003 [Cooklev-Decl.] ¶ 126. As Petitioner further admits, the modifications that Park proposes to the IEEE 802.16-2004 standard only relate to a narrow aspect of resource allocation. *Id.* Therefore, they do not modify the portions of the standard that would need to be modified in order to make the standard mobile. Thus, Park does not do anything to change the fact that the IEEE 802.16-2004 standard, whether alone or in combination with Park, does not support mobile users.

These points are discussed in more detail below.

A. The IEEE 802.16-2004 Standard Did Not Support Mobile Users.

It is well-established in the field that the IEEE 802.16-2004 standard did not support mobile users. Instead, the first standard in the 802.16 family that supported mobile users was IEEE 802.16(e), published on December 7, 2005. (That is after the priority date of the Patent, but that does not help Petitioner, because Petitioner’s combination is with IEEE 802.16-2004, not IEEE 802.16(e).) Petitioner further provides no analysis as to what modifications would be necessary to IEEE 802.16-2004 to make it mobile, or whether the POSITA would have had a

motivation or a reasonable expectation of success to do so for the IEEE 802.16-2004 – Park combination.

As Mr. Alberth explains, “[i]t 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 users”:

The title of [the] 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. 2020 [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. 2020 [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. 2020 [Eklund-Article] 98 (Abstract). Eklund further explains the purpose of the IEEE 802.16 standard at the time, which did not require mobile users. The IEEE 802.16 standard provided network access to buildings through exterior antennas installed on the buildings as an alternative to cable access networks to provide the last-mile connection between the buildings and the larger metropolitan network infrastructure:

As currently defined through IEEE Standard 802.16, a wireless MAN provides network access to buildings through exterior antennas communicating with central radio base stations (BSs). The wireless MAN offers an alternative to cabled access networks, such as fiber optic links, coaxial systems using cable modems, and digital subscriber line (DSL) links.

Ex. 2020 [Eklund-Article] 98. WirelessMANTM referenced in Eklund refers to the air interface for the IEEE 802.16, and stands for Wireless Metropolitan Area Networks. *Accord*, Ex. 1006 [802.16-2004] 0001 (Local and Metropolitan Area Networks).

Once the building was connected to the larger metropolitan network through 802.16, the individual users inside the building could access the network through other standards such as WLAN 802.11, *i.e.*, the typical Wi-Fi network. *Id.* (“In this scenario, with WirelessMAN technology bringing the network to a building, users inside the building will connect to it with conventional in-building networks such as, for data, Ethernet (IEEE Standard 802.3) or wireless LANs (IEEE Standard 802.11).”).

Ex. 2001 [Alberth-Decl.] ¶¶ 36-40.

As Mr. Alberth further explains, it was not until December 2005—after the priority date of the Patent—that an amended IEEE 802.16(e) 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 users until version 802.16e, approved on December 7, 2005. *See* Ex. 1014 [802.16(e)] 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.*

A book authored by Dr. Eklund, Dr. Marks and others on the IEEE 802.16 standard, placed into evidence by Petitioner, also supports the above. Specifically, the book expressly confirms that IEEE 802.16-2004 was directed at fixed users, and it was the amendment in IEEE 802.16(e) 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] x³.

The length of the project to add mobility to IEEE 802.16 was, at least in part, due to the fact that both feasibility and desirability of adding mobility to the IEEE 802.16 standard were uncertain. As the “Call for Contributions” of the project noted, the working group had to “address enhancements to the IEEE 802.16a PHY/MAC to support mobile operation, including cell-to-cell and sector-to-sector handoff capability as well as other protocol and MIB support.” Ex. 2021 [Kiernan] 1. The first task of the working group was to determine if adding mobility to IEEE 802.16 was even feasible:

The initial output of the Study Group is expected to be a series of studies and analyses that would indicate ***whether such a capability can be provided*** within the basic confines of the 802.16a PHY/MAC, what level of mobility (pedestrian, vehicular) could be supported, and the extent of the PHY/MAC changes required to support it. It is NOT the current intent of the Study Group to develop a PAR. However, ***if the technical studies indicate that 802.16a enhancement for mobile operation is feasible***, development of a PAR can be expected at some future date.

³ Patent Owner cites native page numbers of Ex. 1025 [Eklund-Book] for the Board’s convenience.

Ex. 2021 [Kiernan] 1. Note that PAR is a Project Authorization Request.

Ex. 2001 [Alberth-Decl.] ¶¶ 41-43.

As Mr. Alberth further explains, even if the feasibility of adding mobility to IEEE 802.16-2004 were confirmed, there were substantial modifications required to the standard in order to allow it to support mobile users:

The Call for Contributions lists more than *a dozen* bullet points of “technical issues” that needed to be addressed to add mobility to IEEE 802.16. Ex. 2021 [Kiernan] 1-2. In fact, 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. 2022 [Marks] 74. In short, it was not until at least December 7, 2005 that the IEEE 802.16 family of standards could support mobile users, with many of the details being worked out even later than 2005.

Ex. 1025 [Eklund-Book] also confirms this:

As the working group’s attention turned to mobility, it decided that network management would be an increasingly critical issue. The Network Management (NetMan) Task Group, chaired by Phil Barber, was initiated to address such concerns. The NetMan group took on two projects: IEEE P802.16f and IEEE P802.16g. IEEE Std 802.16fTM, a management information base (MIB) for fixed systems, was approved in September 2005. IEEE P802.16g is a complex activity on

“management plane procedures and services.” Approval is not expected until 2007. In the meantime, the working group began planning in late 2005 to follow up IEEE Std 802.16f with a new MIB project for the mobile case. This was launched as IEEE P802.16i in December 2005.

Ex. 1025 [Eklund-Book] 26.

Ex. 2001 [Alberth-Decl.] ¶¶ 44-45.

As Petitioner’s own exhibit confirms, the substantial modifications necessary to make the IEEE 802.16-2004 mobile were, at least in part, due to the fundamental differences in the technical design requirement for fixed and mobile stations:

Apart from the regulatory requirements, fixed and mobile devices differ in technical design. Fixed networks may (in some cases) use high-power transmitters and involve high-gain, directional rooftop antennas with a clear LOS. This situation provides for a simple propagation channel. Although some fixed-system designs are based on more challenging links, to account for indoor antennas with minimal installation problems, the channel is relatively static. Mobile wireless networks, on the other hand, may involve a handheld subscriber unit with a small, omnidirectional antenna; therefore, the channel may be quite poor. Furthermore, since the device may be in rapid motion, the system must accommodate a rapidly varying channel. On the PHY level, the system must deal with changes in the radio frequency (RF) signal that are the result of the mobile device’s

movement, such as large-scale fading and Doppler. These phenomena will be discussed later in this chapter.

Effective mobile communication requires optimization at both MAC and PHY levels. An important additional requirement, with both PHY and MAC ramifications, is fast handover. For example, a mobile device communicating with a fixed BS must establish communication with a second BS, without disconnecting from the first, as it goes out of range of the first device. Handover usually involves support from components outside the MAC and PHY. However, the MAC must include basic support for handover, working in conjunction with other functions

Ex. 1025 [Eklund-Book] 33-34; *see also* Ex. 2001 [Alberth-Decl.] ¶ 46.

Faced with the irrefutable state of the art, Petitioner argues that:

Further, 802.16-based systems included mobile subscribers, as the '450 Patent admits, despite its title "Air Interface for Fixed Broadband Wireless Systems."

Pet., 18. Petitioner obscures the distinction between different 802.16 standards by inaccurately characterizing them as "802.16-based systems." *Id.* Specifically, "802.16-based systems" that were based on 802.16(e) could support mobile users as discussed above, but "802.16-based systems" that were based on Petitioner's 802.16-2004 reference could not.

The '450 Patent's reference to "WiMAX" (Ex. 1001 ['450 Patent] 1:42-45) also does not help Petitioner to show that IEEE 802.16-2006, rather than IEEE

802.16(e), supported mobile users. It was well-known based on Petitioner's own reference that the version of WiMAX that supported mobile users did not use IEEE 802.16-2004, but used IEEE 802.16(e):

*With the progress of the amendment project IEEE P802.16e, the WiMAX Forum developed an interest in this work also. The WiMAX Forum eventually came to the conclusion that it would strongly support the **evolution of the IEEE 802.16 standard from fixed to mobile applications** and would commit itself to the development of test specifications **for mobile systems defined in IEEE Std 802.16e.***

Ex. 1025 [Eklund-Book] 363.

Therefore, irrefutable evidence, including the IEEE 802.16-2004's own text and Petitioner's own reference book on the standard, demonstrate that IEEE 802.16-2004 did not support mobile users.

B. Park Does Not Disclose Applying Its Method To Mobile Users And Does Not Otherwise Modify IEEE 802.16-2004 To Make It Mobile.

As discussed in this section, the addition of Park to IEEE 802.16-2004 does not change the fact that Petitioner's combination does not disclose "mobile" devices. Specifically, as will be discussed, Park does not disclose mobile users. It only discloses "terminals." Furthermore, Petitioner admits that Park's disclosure does not modify any aspect of the IEEE 802.16-2004 standard that would need to be modified in order to make the standard mobile; rather, Park only modifies a

specific part of the resource allocation and DL-MAP message. Thus, the combination of Park and IEEE 802.16-2004 does not disclose or render obvious “mobile” users, and Petitioner’s arguments to the contrary are refuted by the record.

Petitioner first asserts that “Park also **discloses** the claimed mobile device in its wireless packet system, which it calls a ‘subscriber’ or ‘terminal.’” Pet., 17. Yet, this assertion is readily refuted by Petitioner’s own expert, who admits that Park does not “expressly state the ‘subscriber’ or ‘terminal’ is a mobile device.” Ex. 1003 [Cooklev-Decl.] ¶ 126. Petitioner’s expert is correct in this respect. Park only refers to its users as “terminals” or “subscribers,” and never characterizes them as “mobile.”

Petitioner next asserts that “Park discloses improvements to existing 802.16-based systems that enabled the ‘[n]ext generation mobile communication systems” Pet., 18, *citing* Ex. 1005 [Park] [0005]. Petitioner’s unsupported assertion is refuted by both Park and its own expert alike. The cited portion of Park states in full:

Next-generation mobile communication systems **will transmit data** with superior quality at a high transmission rate to provide subscribers with various improved multimedia services. **Recent studies are being conducted** on an Orthogonal Frequency Division Multiple Access

(OFDMA) scheme *to make it possible for the next-generation mobile communication systems* to meet the above expectations.

Ex. 1005 [Park] [0005]. Nothing in the above-quoted portion of Park even hints at Park “enable[ing]” IEEE 802.16-2004 to become “mobile” or to even “enable[]” the “[n]ext generation mobile communication systems.” Instead, Park is saying just the opposite. It explains that “[r]ecent studies are being conducted” in order “to make it possible” for the “next-generation mobile communication systems” to implement OFDMA and “meet the above expectations.” Ex. 1005 [Park] [0005]. But regardless, this disclosure has nothing to do with whether Park discloses “mobile” users, which it does not.

Instead, as Petitioner’s expert explains, “[t]he changes Park proposes are limited to altering the format of the DL-MAP” by adding a variable to the DL-MAP IE format. Ex. 1003 [Cooklev-Decl.] ¶ 91. The DL-MAP IE is merely an information element for transmitting the resource allocation information to the user. Ex. 1003 [Cooklev-Decl.] ¶ 51. It is not shown to have any correlation with making the IEEE 802.16-2004 mobile. In fact, as Petitioner’s expert further admits, Park’s “changes would work in a system based on the 802.16-2004 standard without affecting other aspects of the system.” Ex. 1003 [Cooklev-Decl.] ¶ 90; Ex. 2001 [Alberth-Decl.] ¶ 47.

But even if Park did disclose that its method could be applied to mobile users in some contexts—which it does not—it says nothing about applying it to a mobile station that implements IEEE. 802.16-2004. That is not surprising because, as explained in the last section, it was well known that the IEEE 802.16-2004 were not mobile. And there lies the heart of Petitioner’s problem: it seeks to combine Park with IEEE 802.16-2004.

Petitioner’s expert (but not the Petition) also argues that Park’s improvements could also be applied to a system called WiBro, which “was a South Korean mobile wireless service designed to provide wireless broadband access to devices moving up to 60-70 kilometers per hour.” Ex. 1003 [Cooklev-Decl.] ¶ 56. However, this assertion is besides the point because the combination proposed by Petitioner is the combination of Park with IEEE 802.16-2004, not with WiBro. 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.”). Even if WiBro did implement some modified version of IEEE 802.16, there is no evidence that the implementation was the same implementation as the IEEE

802.16-2004 that Petitioner seeks to combine with Park⁴, or that a POSITA could modify IEEE 802.16-2004 to implement WiBro with a reasonable expectation of success.

To the extent Petitioner’s arguments could be interpreted as an assertion that the combination of Park and IEEE 802.16-2004 can simply be implemented in a mobile system without the necessary modifications to make the IEEE 802.16-2004 standard mobile, that argument is contrary to the record evidence and should be disregarded. *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) (reversing the Board’s finding of motivation to combine where the expert testimony relied upon failed to identify any evidence that linked statements in the prior art to the expert’s conclusions).

⁴ Given the overwhelming evidence that IEEE 802.16-2004 did not support mobile users, even assuming, *arguendo*, that WiBro implemented any version of the IEEE 802.16 standard, it was necessarily a heavily modified version, not the version Petitioner seeks to combine with Park.

Failing on all else, Petitioner lastly argues that the Patent’s claimed “mobile” stations do not have to be mobile:

And even if the teachings in 802.16-2004 were limited to “fixed” devices “they are not), the ’450 Patent admits that the claimed “mobile devices” may be “fixed.” ’450 Patent at 3:40-42 (“mobile devices (not shown) may be fixed or may roam”).

Pet., 19. This argument is meritless on its face for numerous reasons. First, this portion of the Patent does not define “mobile devices” as devices that always need to be fixed; instead, properly read in context, it explains that a mobile device can at times be fixed and at times be moving—as clear from the phrase “mobile devices.” Ex. 1001 [’450 Patent] 3:40-42. More importantly, however, Petitioner has expressly applied “plain meaning” to all claim terms, except a few terms that do not relate to the construction of “mobile.” Pet., 8. Petitioner has not provided any analysis that the plain meaning of a “mobile” devices can be devices that, like IEEE 802.16-2004, must be stationary and cannot move. In contrast, Petitioner’s own exhibit explains that the plain meaning of “mobile” devices does not mean devices that must necessarily be stationary:

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***. For example, the ITU defines fixed service as a “radio communication service between specified fixed points.” In *fixed* wireless networks, wireless devices at

both ends are stationary during operation. In *mobile* wireless networks, at least one of the devices can move during operation. An example of the mobile wireless network is the cellular telephone network in which the cellular BSs are fixed and the phones or handsets are mobile. Other types of mobile networks offer a range of mobility and support a variety of device velocities.

Ex. 1025 [Eklund-Book] 33.

Finally, to the extent that there is any analysis by Petitioner's expert that is not meaningfully discussed in the Petition (and is therefore not addressed here), such an analysis should be disregarded. CTPG, 35-36 ("parties that incorporate expert testimony by reference in their petitions ... without providing explanation of such testimony risk having the testimony not considered by the Board."); *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12, 9-10 (Aug. 29, 2014) (informative) (citations to expert declaration to "support conclusory statements for which the Petition does not otherwise provide an argument or explanation" is improper incorporation by reference that will not be considered); 37 C.F.R. § 42.6(a)(3) ("Arguments **must** not be incorporated by reference from one document into another document.").

For all of the foregoing reasons, Petitioner fails to show that its combination discloses a "mobile device."

IV. PETITIONER FAILS TO SHOW THAT ITS GROUND TEACHES A SEGMENT COMPRISING N RESOURCE UNITS, WHERE “N=2, 4, OR 8.”

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,” the alleged “time-frequency resource 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 from 1-8, and therefore it may happen to also be “N=2, 4, or 8.” *Id.* Petitioner justifies this argument by stating that Park’s inclusion of the intervening integers of 3, 5, 6, and 7 does not matter in showing obviousness, because “the ’450 Patent does not describe any particular advantages from using N=2, 4, or 8.” Pet., 38. As will be discussed below, Petitioner’s arguments rest on a misapprehension of the invention (§ IV.A, *infra*), and Petitioner fails to show that its ground renders N = 2, 4 or 8 obvious (§ IV.B, *infra*).

A. By Limiting N=2, 4 Or 8, The Invention Achieves Multiple Benefits Not Disclosed By Prior Art Such As Parker.

As described below, by limiting N in the manner described in the invention, the invention achieves benefits beyond Park’s basic indexing of its “allocation units.” 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. These points are described below.

First, the invention 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

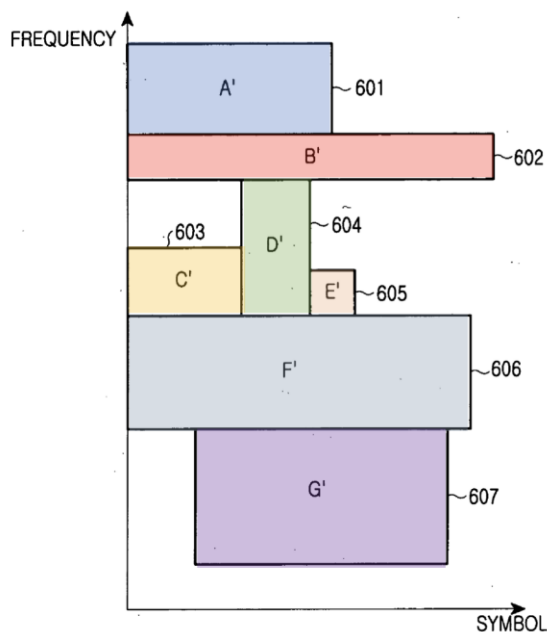
As shown in the table above, a Modulation and Coding Scheme Index (MCSI) of, for example, 1 conveys two pieces of information: that the modulation and coding scheme is 16QAM at $\frac{1}{2}$ rate, and also that the allocated segment contains one time-frequency resource unit. Similarly, an MCSI value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

Second, the invention 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.

As will be described below, the aspects of the invention described above confirm that Park does not disclose the claimed $N = 2, 4$ or 8 .

B. Petitioner Fails To Show That Its Ground Discloses “N=2, 4 Or 8.”

As noted above, claim 7 requires that the number N of the time-frequency resource units within a segment be “N = 2, 4 Or 8.” Petitioner relies on Park alone for the disclosure of this limitation simply because Park permits any and all values of N. Pet., 40. However, as explained below, both the plain meaning of the claim and the specification require that the size of the segment be selected among the numbers 2, 4 or 8, and excluding the intervening integers N = 3, 5, 6 or 7.

Therefore, Petitioner fails to show that its ground discloses “N = 2, 4 or 8.”

First, the plain meaning of the claim suggests that it excludes intervening integers 3, 5, 6 or 7.⁵ This is because the claim does not recite every integer N in the range of 2–8, but only N = 2, 4 or 8. *Insituform Techs., Inc. v. Cat Contr., Inc.*, 99 F.3d 1098, 1106 (Fed. Cir. 1996) (“the claim is specific as to the number of elements (one cup) and adding elements eliminates an inherent feature

⁵ The claim does not address the range of permissible N values outside of the 2 to 8 range. For example, as described in § IV.A, *supra*, the Patent’s Table 1 permits N = 1 for a segment with only a single time-frequency resource unit. Ex. 1001 [’450 Patent] 6:36-44. Furthermore, the insight of the invention as described in § IV.A, *supra* may permit, for example, the number 16, which also falls outside of the range of numbers (2-8) addressed and limited by the claim.

(discontinuous vacuum) 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).

If there were any doubt, the specification makes clear that the choice of N=2, 4 or 8 excludes intervening integers. As the Federal Circuit has made clear, “[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 (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))).

In re Abbott Diabetes Care Inc., 696 F.3d 1142 (Fed. Cir. 2012) is instructive. In *Abbott*, the Office erroneously held that “electrochemical sensor,” based on its plain meaning, did not exclude wired connections. *Id.*, 1146. The Federal Circuit reversed, even under the “broadest-reasonable-interpretation”

standard. The Court first observed that *Abbott*'s claims "suggest[ed]" connectivity without cables because they did not recite cables. *Id.*, 1149. The Court then held:

Even more to the point, every embodiment disclosed in the specification shows an electrochemical sensor without external cables or wires. Indeed, the only mention of a sensor with external cables or wires in *Abbott*'s patents is a single statement addressing the primary deficiency of the prior art. It is true that the specification does not contain an explicit statement disclaiming electrochemical sensors with external cables or wires.... We have held that "[e]ven when guidance is not provided in explicit definitional format, the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents." *Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004) (internal quotation marks omitted). Here, *Abbott*'s patents "repeatedly, consistently, and exclusively" depict an electrochemical sensor without external cables or wires while simultaneously disparaging sensors with external cables or wires. *Id.* at 1303.

Id., 1149-1150.

Here, similar to *Abbott*, 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 the inventors discovered had additional benefits. See Section IV.A, *supra*. Compare *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 and allowing the term 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”).

Further still, “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)); *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”). Here, as explained in Section IV.A, *supra*, 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 addressed above.

For all of the foregoing reasons, Petitioner fails to show that its ground discloses $N=2, 4$ or 8 as the claim recites.

V. CONCLUSION

For the foregoing reasons, the Petition should be denied.

Respectfully submitted,

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Date: September 8, 2023

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Preliminary Response (the “POPR”) consists of 11,732 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The POPR 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,

/ Robert Pistone /

Date: September 8, 2023

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served by electronic service, by consent between the parties (Pet. at 59), on the date signed below:

PATENT OWNER'S PRELIMINARY RESPONSE

EXHIBITS 2001-2005 & 2014-2022

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