UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO. LTD.,
Petitioner,

v.

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC,
Patent Owner.

Case IPR2025-01069
Patent 10,313,077

PATENT OWNER'S RESPONSE

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PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	Order, *Wilus Institute of Standards and Technology Inc., v. HP Inc.*, Case No. 2:24-cv-00752-JRG-RSP, Dkt. No. 146 (E.D. Tex., August 14, 2025) ("Docket Control Order")
2002	Intentionally Omitted
2003	Excerpts of Defendants' P.R. 3-3 and 3-4 Invalidity Contentions and Subject Matter Eligibility Contentions in the consolidated case, *Wilus Institute of Standards and Technology Inc., v. HP Inc.*, Case No. 2:24-cv-00752-JRG-RSP (E.D. Tex.), dated February 13, 2025.
2004	Docket Navigator Stay Statistics
2005	Excerpt from U.S. District Court – National Judicial Caseload Profile for the Eastern District of Texas, March 31, 2025, https://www.uscourts.gov/sites/default/files/document/fcms_na_distprofile0331.2025.pdf
2006	Judge Rodney Gilstrap's median time to trial from August 25, 2024 until August 25, 2025, retrieved from www.docketnavigator.com
2007	D. Crouch, *Estoppel Gutted: A Pelican's Guide to Patent Litigation*, Patently-O, https://patentlyo.com/patent/2025/05/estoppel-pelicans-litigation.html (May 7, 2025)
2008	Declaration of Jin Sam Kwak
2009	List of Licensees to Wifi 6 from Sisvel, https://www.sisvel.com/licensing-programmes/Wi-Fi/wifi-6/#tab-list-of-licensees
2010	Letter re "Notice of Wi-Fi 6 License offer" from Sisvel to Samsung Electronics Co., Ltd. with Attachments 1-2, April 8, 2022
2011	Examiner's Notice of References Cited in Samsung application number 15/933,770, dated November 11, 2018
2012	U.S. Patent No. 10,397,877

2013	Email from Petitioner's Counsel to Patent Owner's Counsel dated August 27, 2025 regarding Petitioner's Patent Rule 4-1 Disclosures in the District Court
2014	Excerpts of IEEE Std 802.11ax™-2021
2015	Excerpts of HE PHY Padding and Packet Extension, IEEE Document 802.11-15/0810, dated July 10, 2015
2016	Excerpts of HE PHY Padding and Packet Extension, IEEE Document 802.11-15/0810, dated September 12, 2015
2017	Excerpts of TGax September 2015 Meeting Agenda, IEEE Document 802.11-15/0987r6, dated August 4, 2015.
2018	*Wilus Institute of Standards and Technology Inc. v. HP Inc.*, No. 2:24-cv-00752-JRG-RSP (consolidated lead case) (E.D. Tex.), Joint Claim Construction and Prehearing Statement
2019	*Wilus Institute of Standards and Technology Inc. v. HP Inc.*, No. 2:24-cv-00752-JRG-RSP (consolidated lead case) (E.D. Tex.), Wilus's Opening Claim Construction Brief
2020	November 11, 2025 email from Petitioner's litigation counsel to Patent Owner's litigation counsel withdrawing contentions of indefiniteness for the '077 patent
2021	Declaration of Todor V. Cooklev, Ph.D., in support of Patent Owner's Response
2022	HE PHY Padding and Packet Extension, IEEE Document 802.11-15/0810, dated July 10, 2015, uploaded July 13, 2015, *available for download at* https://mentor.ieee.org/802.11/documents?is_dcn=HE%20PHY%20Padding%20and%20Packet%20Extension (download page reproduced at Exhibit 2021)
2023	HE PHY Padding and Packet Extension, IEEE Document 802.11-15/0810, dated September 12, 2015, uploaded September 13, 2015 *available for download at* https://mentor.ieee.org/802.11/documents?is_dcn=HE%20PHY%20Paddin

	g%20and%20Packet%20Extension (download page reproduced at Exhibit 2021)
2024	IEEE Mentor: 802.11, search for "HE PHY Padding and Packet Extension," https://mentor.ieee.org/802.11/documents?is_dcn=HE%20PHY%20Padding%20and%20Packet%20Extension, *last visited* Mar. 25, 2026
2025	Efficient Padding for Last OFDM Symbol, IEEE Document 802.11-15/0887r3, dated July 13, 2015, uploaded to IEEE Mentor on July 14, 2015, *available for download at* https://mentor.ieee.org/802.11/documents?is_dcn=Heejung%20Yu&is_group=00ax (download page reproduced at Exhibit 2024)
2026	Support of 1x/2x/4x OFDM Symbol in HE SU PPDU, IEEE document 802.11-15/1092r0, dated September 14, 2015, uploaded September 13, 2015, *available for download at* https://mentor.ieee.org/802.11/documents?is_dcn=Heejung%20Yu&is_group=00ax (download page reproduced at Exhibit 2024)
2027	IEEE Mentor: 802.11, search for "Heejung Yu" filtered by TGax working group, https://mentor.ieee.org/802.11/documents?is_dcn=Heejung%20Yu&is_group=00ax, *last visited* Mar. 24, 2026
2028	TGax September 2015 Meeting Agenda, dated August 4, 2015, uploaded September 17, 2025, *available for download at* https://mentor.ieee.org/802.11/documents?is_dcn=tgax%20september%202015%20meeting%20agenda (download page reproduced at Exhibit 2026)
2029	IEEE Mentor: 802.11, search for "TGax September 2015 Meeting Agenda," https://mentor.ieee.org/802.11/documents?is_dcn=tgax%20september%202015%20meeting%20agenda, *last visited* Mar. 24, 2026
2030	LinkedIn page for Hongyuan Zhang
2031	LinkedIn page for Li-Hsiang Sun
2032	LinkedIn page for Hanqing Lou

2033	Webpage for IEEEComSoc, Wireless Communications Technical Committee
2034	LinkedIn page for Oghenekomo Oteri
2035	LinkedIn page for Joseph Levy
2036	LinkedIn page for Frank LaSita
2037	LinkedIn page for Arjun Bharadwaj
2038	IEEE 802.11ax: An Overview of High-Efficiency Wi-Fi(Wi-Fi 6) Medium Access Control Layer, retrieved from https://iln.ieee.org/public/contentdetails.aspx?id=D83376AA22D944BDADE59B3BE57D1440, *last visited* Mar. 7, 2026
2039	Seongjin Kim & Heejung Yu, *Energy-Efficient Resource Allocation in Multi-User AF Two-Way Relay Channels*, Journal of Communications and Networks, Vol. 18, No. 4, August 2016
2040	Korean Patent Application No. 10-2015-0117434, filed on August 20, 2015
2041	Certified English Translation of Korean Patent Application No. 10-2015-0117434, filed on August 20, 2015
2042	Deposition Transcript of Zhi Ding, Ph.D. dated February 27, 2026

I. Introduction

The Petition challenges the independent claims of the ‘077 patent under two grounds, Ground 1A (involving a combination of Bharadwaj with Yu), and Ground 2A (involving Bharadwaj alone). Under both of these grounds, the Petition fails to establish obviousness, because the Petition fails to show that a POSITA would have recognized the problem that would have allegedly motivated the solution claimed in the ’077 patent.

More specifically, as explained in detail herein, over 100 authors (including those of extraordinary skill in the art far higher than the level of ordinary skill in the art[1]) were listed as authors of a formula for calculating L_LENGTH in the 802.11ax standard. *See* Ex. 2022 at 23. This is the same formula that was adopted during the working group’s September 2015 meeting. *See* Ex. 2028 at 66–67. It is also the same formula that Bharadwaj-Prov059 (the priority support for the Petition’s primary reference) teaches.

In contrast to the standardization process which enthusiastically accepted this formula, the inventors of the ’077 patent recognized an inefficiency caused by this

[1] The Petition concedes that a POSITA would have had a “Bachelor’s degree” in a relevant field “and at least 3 years of” industry experience. Pet. 10. In contrast, a typical contributor to IEEE 802.11ax standard working group had a Ph.D. or a Master’s degree plus approximately a decade of experience, as described throughout.

generally accepted L_LENGTH formula no later than August 20, 2015. *See* Ex. 2041 at <85> & FIG. 10 (noting that this formula "causes legacy terminals to defer longer than the actual packet length"); *see also id.* at FIG. 12 & <85> (proposing a solution to this problem).

No one else solved this problem in the generally accepted L_LENGTH formula until approximately November 8, 2015, precisely because no one else recognized the problem. And the individuals who did recognize and solve this problem in approximately November 8, 2015 were a team of seven engineers having extraordinary skill in the art (of the six of these seven for whom credentials are available, four had Ph.Ds, one had a master's degree, and all had *at least* a decade of experience). Accordingly, the objective evidence makes clear that not only were the inventors of the '077 patent the first to recognize and solve this problem, but when another group finally did so, that group had far greater than ordinary skill in the art.

The Petition's obviousness theory relies on the allegation that a POSITA would have supposedly been motivated to solve the problem with the prior art's L_LENGTH formula expressed in Bharadwaj-Prov059. But all of the evidence of record shows that no POSITA would have ***recognized*** that problem in the first place, such that there would have been no motivation to solve the problem. *See Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1356–57 (Fed. Cir. 2013) ("Indeed ordinary

artisans would not have thought to try at all because they would not have recognized the problem.").

Accordingly, because the overwhelming evidence shows that a POSITA would ***not*** have recognized the problem the Petition contends would have been obvious to solve, the solution reflected in the claims of the '077 patent would not have been obvious, and all challenged claims should be found not unpatentable.

II. Overview of the Alleged Prior Art

A. Bharadwaj

Bharadwaj is a patent application publication with a filing date of May 19, 2016 (after the critical date of the '077 patent). Although Bharadwaj claims priority to Bharadwaj-Prov059, the most relevant disclosures of Bharadwaj itself are absent from Bharadwaj-Prov059. Specifically, the formula that the Petition contends would be obvious (where an "m" value is subtracted instead of added) is absent from Bharadwaj-Prov059's disclosure, and was only included in the Bharadwaj publication ***after*** the Bharadwaj inventors had already been exposed to the concepts underlying the invention claimed in the '077 patent (as explained in more detail in Section III, below).

Importantly, "to claim priority to the provisional filing date, the portion of the application relied on… as prior art must be supported by the provisional application." *In re Riggs*, 131 F.4th 1377, 1384 (Fed. Cir. 2025). Accordingly, to the extent

Bharadwaj is deemed prior art, it is *at most* prior art only to the extent its teachings are included in Bharadwaj-Prov059.

Bharadwaj-Prov059 discloses an L_{LENGTH} formula as follows:

$$L_{LENGTH} = \left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 + m \text{ where } m = 1, 2$$

Ex. 1007, [0051] (Equation 2); Ex. 2021 at ¶ 34. Contrary to Petitioner's contention, Bharadwaj-Prov059 does not teach that "m" is added in 802.11ax "***merely***" to "ensure that LLENGTH is not exactly a multiple of 3" so that legacy transmissions can be differentiated from non-legacy transmissions as the Petition contends. *See generally* Ex. 1007 at [0051]-[0052]; Ex. 2021 at ¶ 35. Furthermore Bharadwaj does not itself disclose any other importance to the "m" value. *Id*; Ex. 2021 at ¶ 35. For example, Bharadwaj-Prov059 does not contemplate that the "m" values of 1 or 2 in Bharadwaj-Prov059's disclosure would have any detrimental downstream impacts on calculations of legacy receivers. Ex. 2021 at ¶ 35.

As acknowledged by the Petition, Bharadwaj-Prov059's formula provides a solution to a "need" to "distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions" by having LLENGTH not be exactly a multiple of 3. *See* Pet. 18; Ex. 1007 at [0051] ("The value *m* shown above has been added in IEEE 802.11ax to ensure that L_{LENGTH} is not exactly a multiple of 3 and is therefore used to distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions (e.g., autodetections)."); Ex. 2021 at ¶ 34.

B. Yu

To the extent Yu is prior art at all, it is only prior art to the extent its teachings are included in a provisional application having a filing date earlier than the August 20, 2015 critical date of the '077 patent. *See In re Riggs*, 131 F.4th 1377, 1384 (Fed. Cir. 2025). The Petition relies on Yu-Prov428 (Ex. 1020) as providing support for Yu's teachings. *See generally* Pet.

Yu-Prov428 is concerned with a different problem than Bharadwaj-Prov059. Ex. 2021 at ¶ 37. Specifically, Yu-Prov428 is ***not*** concerned with ensuring that LLENGTH is not exactly a multiple of 3 (such that it can be used to 'distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions'), because Yu-Prov428's "Length" formula explicitly allows Length to be a multiple of 3. Ex. 2021 at ¶ 37. Yu-Prov428's Length formula is reproduced below.

$$\text{Length} = \frac{\text{TXTIME-20}}{4} \times 3 - 3 - M, \ 0 \le M \le 2$$

Ex. 1020 at 16.

As can be seen above, Yu-Prov428 allows Length to be a multiple of 3, because the "M" offset can be 0 (which would not allow differentiation between legacy and non-legacy devices). Id.; Ex. 2021 at ¶ 38. Thus, rather than solving (or attempting to solve) the problem of ensuring that a length value is not a multiple of 3, Yu-Prov428 attempts to solve the problem of signaling three different frame

structures to 802.11ax devices using a length offset modifier, and having a legacy receiver be agnostic to which of these three values was selected. *See* Ex. 1020 at 16 ("The L-LENGTH can imply three different states with the value of M without changing the operation of the legacy receiver. The cases 2, 3, and 4 can be information with the following example: M= 0 : case 4 M= 1 : case 3 M = 2 : case 2"); *see also id.* at 12 (visually depicting the OFDM frame structures associated with each of cases 2, 3, and 4); Ex. 2021 at ¶ 38.

Yu-Prov428 also ensures that regardless of ***which*** of the three "M" values is chosen (between 0, 1, or 2), legacy receivers will calculate "the same packet duration" between any of these M values. Ex. 2021 at ¶ 39. For instance, the packet duration calculated by a legacy receiver will be identical regardless of whether 0, 1, or 2 is chosen for "M" in Yu-Prov428's equation. Ex. 2021 at ¶ 39. Yu-Prov428 teaches that this "same packet duration" will be recognized by legacy receivers regardless of which of the three possible "M" values are chosen, specifically "because one OFDM symbol with the lowest rate includes 3 bytes data." Ex. 1020, 16 ("Though 3 different values are possible with M = 0, 1, and 2, the legacy receiver [will] identify the same length (the same packet duration) because one OFDM symbol with the lowest rate includes 3 bytes data."); Ex. 2021 at ¶ 39.

Thus, in contrast to Bharadwaj-Prov059's formula ensuring that the transmitted L_{LENGTH} value is not a multiple of 3, Yu-Prov428 seeks to accomplish a

different goal by ***allowing*** the transmitted Length to be a multiple of 3, but allowing for three different frame structures to be indicated wherein a legacy receiver will calculate a consistent packet duration regardless of which frame structure is indicated. Ex. 2021 at ¶ 40.

A POSITA would not understand Yu-Prov428 to suggest any motivation regarding the operation of legacy receivers beyond ensuring that such receivers will operate consistently regardless of which M value is chosen. Ex. 2021 at ¶ 41. Instead, Yu-Prov428 was concerned with solving a different problem—allowing "M" to represent three different frame structures, such that the same packet duration will be calculated by legacy receivers regardless of which "M" value is selected (such that, e.g., a legacy receiver will not calculate inconsistent results depending on whether M=1 or M=2 is selected). Ex. 2021 at ¶ 41.

III. Overview of L_LENGTH formula development in 802.11ax

Around July 13, 2015, a group of over 100 highly qualified authors from numerous leading companies including Marvell, Qualcomm, Broadcom, MediaTek, Apple, Huawei, LG, ZTE, Cisco, and Samsung proposed a means for "HE PHY Padding and Packet Extension," such that in 802.11ax, the L_LENGTH formula would be as follows:

$$L\_LENGTH = \left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 + m,\ m = 1 \text{ or } 2$$

Ex. 2022 at 23[2]; Ex. 2021 at ¶ 42. As shown in the equation above, L_LENGTH is calculated with a positive offset of "m" at the end, where "m" is equal to either 1 or 2.

Among the 100+ authors of this proposal were Arjun Bharadwaj and Bin Tian, listed inventors of Bharadwaj-Prov059 and Bharadwaj. *See* Ex. 2022 at 2; *see also* Ex. 1006 & 1007 (listing both Arjun Bharadwaj and Bin Tian as inventors). Both Mr. Bharadwaj and Dr. Tian had greater than ordinary skill in the art, with Dr. Tian having far greater than ordinary skill in the art. *See* Ex. 2037 (describing Arjun Bharadwaj as having a Master's degree in telecommunication plus several years of industry experience by September 2015); Ex. 2038 at 2 (describing Bin Tian as having a "Ph.D. degree in Electrical Engineering" and noting that "[s]ince 2012, he has contributed significantly to different generations of 802.11 standards including 802.11ah (Sub 1-Ghz)[and] 802.11ax (Wi-Fi6)"); Ex. 2021 at ¶ 43. This same group of 100+ highly qualified authors submitted a different version of this proposal with the same proposed L_LENGTH formula on September 13, 2015. *See* Ex. 2023 at 23.[3]

[2] Ex. 2022 is dated July 10, 2015, but as shown by Exhibit 2024, it was uploaded to the IEEE Mentor website for distribution to participants in the IEEE 802.11ax working group on July 13, 2015.
[3] As shown in Ex. 2024, Ex. 2023 was uploaded to the IEEE Mentor website on September 13, 2015.

During the week of September 17 (i.e., after the August 20, 2025 Critical Date of the '077 patent as discussed in Section IV below), a vote was held proposing the above L_LENGTH formula as "PHY Motion #61." *See* Ex. 2028 at 66–67. This proposal was "Accepted with no objection." *Id.* at 67.

On approximately July 13, 2015, a different group of authors from Yeungnam University (all but one of these authors overlapping with the named inventors of the Yu and Yu-Prov428 references) made a proposal regarding a means for "Efficient padding for last OFDM Symbol." *See* Ex. 2025.[4] This proposal described some of the material described in Yu-Prov428, including "Case 2," "Case 3," and "Case 4" that Yu-Prov428 proposes would have been signaled by an M value of M=2, M=1, and M=0 respectively in Yu-Prov428's Length formula. *Compare* Ex. 2025 at 6, *with* Ex. 2023 at 12; Ex. 2021 at ¶ 45.

The same authors submitted a proposal regarding "Support of 1x/2x/4x OFDM Symbol in HE SU PPDU" dated September 14, 2015, which provided the same proposed frame structures. *See* Ex. 2026 at 4.[5] The authors of this proposal

[4] These authors include lead author (and lead inventor of Yu) Heejung Yu, who received a Master's Degree in Electrical Engineering in 2001 and a Ph.D. in Electrical Engineering in 2011. *See* Ex. 2039 at 10. He additionally had significant industry experience by 2015, given that he "has participated in the IEEE 802.11 standardization, where he has made technical contributions since 2003." *Id.*

[5] Although Exhibit 2026 is dated September 14, 2015, the document was uploaded on September 13, 2015. *See* Ex. 2027 (providing an uploaded date of "13-Sep-2015" for DCN 1092 revision 0.

made clear that they had considered a proposal regarding "PHY Padding and packet extension" submitted to the IEEE 802.11ax working group. *See* Ex. 2026 at 2 ("Furthermore, we analy[ze] relationship between our proposed method and PHY padding and packet extension method that was proposed in [2]."); *id.* at 6 ("Relationship with PHY Padding Proposal in [2] • PHY Padding proposal in [2] addressed a different aspect of the decoding process."); *id.* at 7 (The two proposal[s] actually have distinct use cases. —The PHY padding in [2] is useful when data rate is high and data bandwidth is large (in both OFDM and OFDMA transmissions)."); Ex. 2021 at ¶ 46.

Although Ex. 2026 does not provide the full title of the reference "[2]" that it discusses, it does describe this reference as a "PHY Padding and packet extension" proposal (Ex. 2026 at 2), such that it appears Ex. 2026 was referring to the proposal in either Ex. 2022 or 2023 detailing the same L_LENGTH formula provided in Bharadwaj-Prov059. Ex. 2021 at ¶ 47. Even if Ex. 2026 were not referring to the PHY padding and extension method involving the L_LENGTH formula with a positive "m" offset of 1 or 2, the authors of Ex. 2026 were clearly aware of proposals made in the 802.11ax working group relating to PHY padding and packet extensions by the time they submitted Ex. 2026. Despite this knowledge by extraordinarily skilled artisans such as Heejung Yu (*see* Ex. 2039 at 10), and despite having been aware of their own Length formula in Yu-Prov428 involving a negative "M" offset

where "M" is 0, 1, or 2, the authors of Ex. 2026 raised no concern over a L_LENGTH formula with the positive "m" offset of 1 or 2 even though their own work regarding OFDM symbol structure used a different approach to Length offset (a negative M offset of either 0, 1, or 2). Ex. 2021 at ¶ 47.

Instead, after the Critical Date of the '077 Patent, the next recognition of any problem caused by L_LENGTH formula in Bharadwaj-Prov059, outside of the inventors of the '077 Patent came about in November 2015 from a team of seven contributors from Marvell and Interdigital, which collectively had an extraordinary amount of skill in the art. *See* Ex. 1016 (listing Hongyuan Zhang, Lei Wang, Li Hsiang Sun, Hanqing Lou, Frank La Sita, Oghenekome Oteri, and Joseph Levy as authors); Ex. 2021 at ¶ 48; *see also* Exs. 2022, 2023.

And of the six of the authors of Exhibit 1016 for whom publicly available profile information was available, four had doctoral degrees, one had a master's degree, and all had *at least* a decade of experience. Ex. 2021 at ¶ 49. For instance, Hongyuan Zhang received a Ph.D. in Electrical Engineering from North Carolina State University, and had been working on wireless standards from May 2005, first as a "Research Intern" from May 2005 to August 2006, then as a "Principal Engineer" starting in August 2006, and then as a "Director of Engineering" of "PHY Systems" and "Wireless Connectivity" starting in January 2015. *See* Ex. 2030. In other words, by the time Ex. 1016 was submitted, Mr. Zhang had a Ph.D.

(significantly more education than a POSITA) ***and*** over a decade of relevant experience (significantly more professional experience than a POSITA). Li-Hsiang Sun also had a Ph.D. in Electrical Engineering and over a decade of relevant work experience (Ex. 2031), and Hanqin Lou had a Ph.D. in Electrical Engineering and nearly a decade of relevant work experience (Ex. 2032). Oghenekome Oteri appears to have gone by "Kome Oteri" (*see* Ex. 2033) and also had a Ph.D. in Electrical Engineering as well as over a decade of relevant experience (Ex. 2034). Joseph Levy had a Master's degree plus approximately 35 years of industry experience. Ex. 2035. And while Frank La Sita's level of education is unknown, he appears to have had at least 15 years of relevant experience. Ex. 2036.

This team of engineers having ***far greater*** than ordinary skill in the art—at least four of whom had Ph.Ds in Electrical Engineering one with a Master's degree in Electrical Engineering (and all six of the individuals for who credentials were able to be located having had at least a decade, and in some cases as much as 35 years, of industry experience)—were able to collectively recognize an inefficiency in Bharadwaj-Prov059's formula such that when legacy devices calculate "NSYM" using Bharadwaj-Prov059's formula, the calculated NSYM is one greater than the "desired NSYM" value. *See* Ex. 1016 at 3:

- According to Clause 18, it is desirable to make legacy devices assuming the number data symbols in non-HT PPDU as:

$$N_{SYM,Non-HT} = \left\lceil \frac{8.L\_LENGTH + 16 + 6}{24} \right\rceil = \left\lceil \frac{TXTIME - 20}{4} \right\rceil$$

- With current 11ax L-LENGTH equation, we get

(desired NSYM)

$$N_{SYM,Non-HT} = \left\lceil \frac{8.\left(\left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 + m \right) + 16 + 6}{24} \right\rceil$$

$$= \left\lceil \left\lceil \frac{TXTIME - 20}{4} \right\rceil + \frac{m}{3} - 0.08 \right\rceil = \left\lceil \frac{TXTIME - 20}{4} \right\rceil + 1, \text{ for } m = 1 \text{ or } 2$$

See also Ex. 2021 at ¶ 50.

Only after the named inventors of Bharadwaj (Ex. 1006) were exposed to this solution by virtue of their participation in 802.11ax did they adjust their formula to include a negative m offset rather than a positive m offset. *See* Ex. 1006 (filing date of May 19, 2016); Ex. 2021 at ¶ 51.

IV. Overview of the '077 Patent

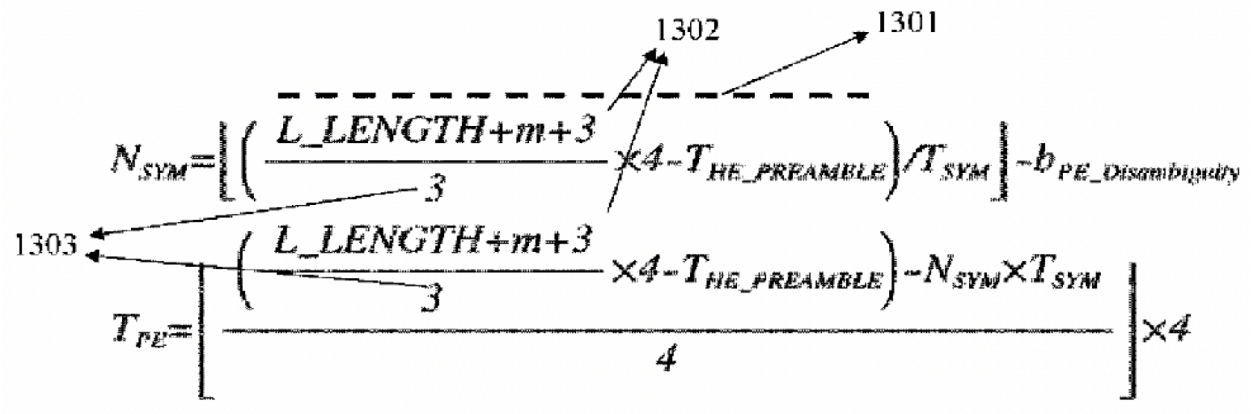
As noted in Section III above, the authors of Ex. 1016 may appear to be the first individuals to author any document recognizing the problem (and the corresponding solution) caused by the previous 802.11ax L_LENGTH formula, wherein the L_LENGTH formula would cause the calculated NSYM to be greater than the desired NSYM. However, the authors of Ex. 1016 were not actually the first to recognize the problem. Ex. 2021 at ¶ 52. Instead, the inventors of the '077 patent

did so in their Korean Application 10-2015-0117434 ("the KR-434 application") from August 20, 2015. Ex. 2021 at ¶ 52; Ex. 2041. Specifically, the inventors of the '077 patent recognized that using a formula with a ***negative*** m offset (as opposed to a positive m offset) was "fairer to legacy terminals compared to the L_LENGTH setting method [discussed in prior 802.11ax proposals and Bharadwaj-Prov059], which causes legacy terminals to defer longer than the actual packet length. *See* Ex. 2021 at ¶ 52; Ex. 2041 at <85> & FIG. 12. FIG. 12 of the KR-434 application, showing the use of a negative "m" offset for calculating L_LENGTH, is reproduced below.

$$L\_LENGTH_{formula} = \left\lceil \frac{TXTIME - T_{L\_PREAMBLE}}{aSymbolLength} \right\rceil \times N_{OPS} - \left\lceil \frac{aPLCPServiceLength + aPLCPTailLength}{8} \right\rceil - m$$
$$= \left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 - m \ , m = 1 \text{ or } 2$$

Ex. 2041 at FIG. 12; *see also id.* at FIG. 10 (showing prior art method of calculating L_LENGTH, which the KR-434 application contrasts with the negative-m offset technique disclosed in FIG. 12).

The KR-434 application goes on to disclose a method of calculating NSYM based on the disclosed L_LENGTH formula which solved the inefficiency of the prior art formula. Ex. 2021 at ¶ 53. The corresponding NSYM formula is shown in FIG. 13 and reproduced below.



Ex. 2041, FIG. 13.

Again, this recognition of using a negative "m" offset of 1 or 2 in the 802.11ax L_LENGTH calculation was made by August 20, 2015, despite over 100 highly skilled artisans proposing a different (positive "m" offset) formula in July 2015 and the 802.11ax working group officially adopting that positive "m" offset proposal in September 2015. Ex. 2021 at ¶ 54.

The recognition of the inventors of the '077 patent that its negative "m" offset as used in the context of 802.11ax solved a problem caused by the prior art positive "m" offset's formula is reflected in the claims of the '077 patent. Ex. 2021 at ¶ 55. For example, claim 1 of the '077 patent recites the solutions disclosed in Figures 12 and 13 and associated text of the KR-434 application:

1[pre]. A wireless communication terminal that communicates wirelessly, the terminal comprising:
1[1]. a transceiver; and a processor, wherein the processor is configured to
1[a]. receive a non-legacy physical layer frame by using the transceiver,
1[b]. obtain a legacy signaling field including information decodable by a legacy wireless communication terminal from the non-legacy physical layer frame,

1[c]. obtain length information indicating information on a duration of the non-legacy physical layer frame, from the legacy signaling field,
1[d]. obtain information other than information on the duration of the non-legacy physical layer frame through a remaining value obtained by dividing the length information by a data size transmittable by a symbol of a legacy physical layer frame, wherein the data size transmittable by a symbol of the legacy physical layer frame is 3 octets when a data rate of the legacy physical layer frame is 6 Mbps, and
1[e]. determine the number of symbols of data of the non-legacy physical layer frame according to a following equation, $N_{SYM} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{HE\_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE\_Disambiguity}$ where $\lfloor x \rfloor$ denotes a largest integer less than or equal to x, L_LENGTH denotes the length information, m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame, $b_{PE\_Disambiguity}$ denotes a value of PE Disambiguity field, $T_{HE\_PREAMBLE}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame, T_{SYM} denotes a duration of a symbol of the data of the non-legacy physical layer frame, wherein the PE Disambiguity field is set based on the duration of a symbol of the data of the non-legacy physical layer frame and an increment of duration to set a value of the length information based on a duration of a symbol of the legacy physical layer frame.

V. The Petition fails to show the obviousness of its proposed modification to Bharadwaj-Prov059 in view of the teachings of Yu-Prov428

The Petition fails to show that a POSITA would have been motivated to modify Bharadwaj-Prov059's LLENGTH formula, because the Petition fails to show that a POSITA would have actually recognized any problem resulting from that formula. *See Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1356–57 (Fed. Cir.

2013) ("Indeed ordinary artisans would not have thought to try at all because they would not have recognized the problem.").

Bharadwaj-Prov059 teaches what was, at the time of the filing of that provisional, the current L_{LENGTH} formula in the development of the 802.11ax standard:

$$L_{LENGTH} = \left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 + m \text{ where } m = 1, 2$$

Ex. 1007, [0051] ("The value m shown above has been added in IEEE 802.11ax…."); Ex. 2021 at ¶ 57; *see also* Ex. 1016 at 2 (noting that the "Current L-LENGTH Equation" in the development of 802.11ax is the same as Baradwaj-Prov059's equation).[6] Bharadwaj-Prov059 teaches that by adding m to the L_{LENGTH} calculation, it "ensures that L_{LENGTH} is not exactly a multiple of 3" and can thus be "used to distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions." Ex. 1007, [0051]; Ex. 2021 at ¶ 57; *see also* Ex. 1003 ¶63 (Petitioner's expert: "From the above equation of L_{LENGTH}, a POSITA would have understood that so long as *m* is not chosen as 0 or as a multiple of 3, then L_{LENGTH} is not exactly a multiple of 3.").

The Petition alleges that "a POSITA would have understood that there were only a small number of values for *m* that could be applied to L_{LENGTH} by the

[6] Ex. 1016 is not prior art, at least because it post-dates the critical date of the '077 patent. However, it confirms Bharadwaj-Prov059's teachings that adding an "m" value of 1 or 2 was consistent with what was then contemplated by 802.11ax.

transmitter and that could be uniquely recovered by the receiver through a calculation of the remainder from the division L_{LENGTH} / 3—namely, a non-zero remainder could be only be either 1 or 2, which are the only values less than the divisor of 3. Any larger values of *m* added to L_{LENGTH} at the transmitter (e.g., m=4, 5, 7, or 8) would still produce the two remainder values of m=1 or 2 at the receiver." Ex. 1003, ¶65. On this basis, the Petition imply that "m" values other than 1 or 2 (such as, e.g., 4, 5, 7, 8, 10, or 11) would not be considered for use in Bharadwaj-Prov059's equation, because any other "m" values "would still produce the two remainder values of m=1 or 2 at the receiver." *Id.* However, this is inconsistent with the Petition's allegation later in his declaration that a POSITA would have found it "obvious to try other predictable potential values for m, including m = -1 or -2." Pet. 31[7]; Ex. 2021 at ¶¶ 58-60.

[7] Of course, only one of the following can be true: either, as the Petition alleges that m = 1 or 2 would have been seen as the relevant options by a POSITA in the context of 802.11ax and Bharadwaj-Prov059 (because only two values can be recovered by the receiver) in order to differentiate between legacy vs non-legacy transmissions; ***or*** values other than m = 1 and m = 2 would have been considered (such that any other value that is not exactly a multiple of three such as -5, -4, -2, - 1, 1, 2, 4, 5, 7, 8 etc.) would have been potential candidates for consideration. Both cannot be true; if only two values being recoverable by the receiver means that only two values would be considered, then a POSITA would clearly not have considered values of "m" other than 1 or 2 in Bharadwaj-Prov059's formula. Furthermore, if a POSITA ***would*** have considered values of "m" other than 1 or 2 in Bharadwaj-Prov059's formula, there are an infinite number of possibilities such that there would not be a "finite number of identified, predictable solutions" as the Petition alleges. *See* Pet. 31.

The Petition proposes that, despite Bharadwaj-Prov059's teaching that in the LLENGTH calculation formula, m should be set to 1 or 2 consistent with the current 802.11ax standards development process, a POSITA would have chosen an "m" value of *negative* 1 or *negative* 2. *See* Pet. 31 (alleging that it would be "obvious to try other predictable potential values for m, including m = -1 or -2"). The Petition proposes that this would be obvious in view of Yu's teachings (as expressed in Yu-Prov428). But critically, neither Yu-Prov428 or ***any*** prior art recognized the problem with Bharadwaj's formula, such that there would be no motivation for a POSITA to "fix" Bharadwaj-Prov059's formula in the way that the Petition alleges would have been obvious to a POSITA. Ex. 2021 at ¶¶ 61-62.

For example, nothing in Bharadwaj-Prov059 itself recognizes any problem with its formula. Ex. 2021 at ¶ 62. Furthermore, nothing in Yu-Prov428 suggests that if a positive value of "m" (where m = 1 or 2) were added to the Length formula (instead of a negative "M" offset of 0, 1, or 2), that the outcome would be less desirable in any way than what Yu-Prov428 proposes to be the Length formula. Ex. 2021 at ¶ 63. Simply put, Yu-Prov428 provides no motivation for a POSITA to modify Bharadwaj's formula in view of Yu-Prov428—it teaches no advantage relative to Bharadwaj-Prov059's formula, and teaches no problem in Bharadwaj-Prov059's formula that would need solving. Ex. 2021 at ¶ 63.

None of the Petition's obviousness rationales cures this deficiency in the prior art of record. For instance, the Petition contends that it would have been obvious to "subtract[] m in the LLENGTH equation, rather than adding m as Bharadwaj-Prov059 originally proposed," in order "to provide additional information (e.g., information distinguishing between 802.11ax and 802.11ac transmissions) through L_LENGTH 'without changing the operation of the legacy receiver' and to allow legacy devices to correctly calculate Nsym and RXTIME so that the legacy devices need not defer transmissions for a longer duration than required." Pet. 21–22 (quoting Yu-Prov428, Ex. 1020 at 16). These are two distinct alleged motivations – ***(1)*** an alleged motivation to not "chang[e] the operation of the legacy receiver" (quoting language in Yu-Prov428 at 16), and ***(2)*** an alleged motivation "to allow legacy devices to correctly calculate Nsym and RXTIME so that the legacy devices need not defer transmissions for a longer duration than required." *See id.*; Ex. 2021 at ¶ 65.

Regarding the Petition's alleged first motivation (which refers to a quotation from Yu-Prov428 to propose modifying Bharadwaj-Prov059's formula so that it would operate "without changing the operation of the legacy receiver"), a POSITA would not have viewed Bharadwaj-Prov059's formula as "changing the operation of the legacy receiver." *See* Ex. 1020 at 16; Ex. 2021 at ¶ 66. Yu-Prov428 teaches that its formula does not "chang[e] the operation of the legacy receiver" regardless of

whether M = 0, 1, or 2 is used in its equation, and the "the legacy receiver [will] identify the same length (the same packet duration) ***because one OFDM symbol with the lowest rate includes 3 bytes [of] data***." Ex. 1020 at 16; Ex. 2021 at ¶ 66. In other words, the choice of M value (between M = 0, 1, or 2) in Yu-Prov428 does not change legacy calculation of "packet duration" relative to any other choice of M value (between M = 0, 1, or 2) in Yu-Prov428's formula, because legacy calculation of M value is based on a multiple of 3. *See id.* For instance, selecting M = 1 (i.e., a "-1" offset to the length calculation) would necessarily return the same packet duration as if M = 2 (i.e., a "-2" offset to the length calculation) were selected. Ex. 2021 at ¶ 66.

A POSITA would have readily understood that the ***same*** would be true as applied to Bharadwaj-Prov059's formula—selecting "m=1" (i.e., a "+1" offset to the L_{LENGTH} calculation) would necessarily return the same packet duration as if "m=2" (i.e., a "+2" offset to the L_{LENGTH} calculation) for exactly the same reason that Yu-Prov428 recognized: "Because one OFDM symbol with the lowest rate includes 3 bytes [of] data" (Ex. 1020 at 16), any two consecutive-integer offsets that are not a multiple of 3 will necessarily result in "the same packet duration" regardless of which of those offsets is chosen. Ex. 2021 at ¶ 66.

Accordingly, the Petition's first motivation—not changing the operation of the legacy receiver—would not have motivated a POSITA to modify Bharadwaj-

Prov059's formula in any way. Ex. 2021 at ¶ 67. Instead, a POSITA would have understood that Bharadwaj-Prov059 *conformed to* Yu-Prov428's teaching that when a range of offsets is provided as a possibility, the range should be set such that regardless of which of the possible offsets are provided, "the operation of the legacy receiver" will not be changed between offsets. *Id*. And regardless of whether "m=1" or "m=2" in Bharadwaj-Prov059 is chosen, the legacy receiver will operate exactly the same between those two options for exactly the reasons expressed in Yu-Prov428, such that Yu-Prov428's teachings do not motivate any modification to Bharadwaj-Prov059's formula. *Id*.

The Petition also fails to show its second alleged motivation: that a POSITA would be motivated to modify Bharadwaj-Prov059's formula "to allow legacy devices to correctly calculate Nsym and RXTIME so that the legacy devices need not defer transmissions for a longer duration than required." *See* Pet. 21–22; Ex. 2021 at ¶ 68. Importantly, legacy devices deferring transmissions for a longer duration than required is a problem identified by the inventors of the '077 patent, but ***not*** identified in the prior art. Ex. 2021 at ¶ 68. No teaching prior to the invention by the '077 patent inventors identifies any problem in Bharadwaj-Prov059's formula of longer-than-necessary transmission deferral. *Id*. And neither Bharadwaj-Prov059 nor Yu-Prov428 even ***mention*** legacy deferral in the context of any length

calculation, such that this motivation could not come from either of those disclosures. *Id*.

The Petition contends that a POSITA would have independently discovered that Bharadwaj-Prov059's formula would lead to longer-than-necessary deferral of transmission, despite this problem not being taught in any prior art reference. *See* Pet. 21–31. For instance, the Petition alleges (in the context of legacy 802.11ac devices):

> [A] POSITA would have been motivated to use m=-1 or -2 (i.e., "-m" with m=1, or 2) to allow legacy 802.11ac devices to correctly calculate RXTIME and other parameters based on L_LENGTH, e.g., so that the legacy receiver devices would not defer channel access for a longer duration than required based on an incorrect RXTIME or other parameter incorrectly derived from an L_LENGTH value to which m had been added at the transmitter.

Pet. 23. But this assumes (without any support) that a POSITA would have ***recognized*** that Bharadwaj-Prov059's LLength formula would have resulted in "an incorrect RXTIME or other parameter incorrectly derived from an L_LENGTH value to which m had been added at a transmitter"—of course, if a POSITA would not have ***recognized*** the problem, they would not have been motivated to ***solve*** that problem. Ex. 2021 at ¶¶ 69-70.

But importantly, the only way to ***recognize*** the problem (given that no prior art identifies the problem of Bharadwaj-Prov059's formula leading to an incorrect parameter calculation) would be for a POSITA to go through and check the formula's results on calculations that are not part of the 802.11ax standard that Bharadwaj-Prov059 relates to. Ex. 2021 at ¶ 71. As Dr. Cooklev explains, this is not a task that POSITAs typically engage in, because standards development (and the interaction between standards) is almost exclusively performed by persons of greater than ordinary skill in the art, and the effect of one standard's requirements on other standards is a complex analysis with a potentially infinite scope for analysis. Ex. 2021 at ¶¶ 71-72. For example, while the Petition focuses exclusively on Bharadwaj-Prov059's length formula and the impact that this formula would have on legacy 802.11ac and 802.11n devices, there were a significant number of requirements in 802.11ax, all of which could potentially have had downstream effects on legacy standards in a number of ways. *Id*.

Without guidance that the particular length formula in Bharadwaj-Prov059 was causing inefficiency in legacy devices (which the prior art does not provide), it would not be realistic to expect a POSITA to discover this inefficiency on their own. Ex. 2021 at ¶ 73. A POSITA is not an automaton, slavishly checking every formula in developmental standards to see if modification of each formula might result in increased accuracy or efficiency as processed in the context of legacy device; instead,

POSITAs use known concepts in the art to direct their attention to solving problems of which they are aware. *Id*. Given that there is no evidence that a POSITA would have been ***aware*** that Bharadwaj-Prov059's formula would have caused any error in legacy 802.11 devices, a POSITA would not have identified this problem on their own because checking legacy impact of each requirement in the in-development 802.11ax standard would have been an enormous undertaking not appropriate for a person of ordinary skill in the art. Ex. 2021 at ¶ 73.

Likewise, in the context of 802.11n, the Petition alleges that "a POSITA would have recognized that an L_LENGTH equation using m = +1 or +2 would result in an error in the calculation of Nsym whereas an L_Length equation using m = -1 or -2 (i.e., "-m" with m=1 or 2) would result in the desired NSYM value…. Thus, a POSITA would have been motivated to use m = -1 or -2 (i.e., '-m' with m=1 or 2) to allow legacy 802.11n devices to correctly calculate NSYM so that the legacy devices need not defer transmission for a duration longer than required." Pet. 25–26. But a POSITA would ***not*** have recognized any error in the desired NSYM calculation for legacy devices, because as noted above any error that might result was not known in the prior art, and a POSITA would not have engaged in mechanical checking of equations in the 802.11ax standard to see if such formulas might resulted in some amount of inefficiency as applied to legacy devices. Ex. 2021 at ¶ 74.

Indeed, the Petition asserts that any inefficiency of Bharadwaj-Prov059's formula as applied to 802.11n devices would be recognized "[b]y performing these calculations of NSYM for 802.11n devices" (where "these calculations" constitutes applying Bharadwaj-Prov059's formula in a set of legacy calculations). *See* Pet. 25. A POSITA would not actively go searching for potential inefficiencies to devices that do not practice the standard under consideration (in this case, 802.11ax) caused by every single equation in the standard under consideration—this would be a monumental task, and without any indication in the prior art as to which equations were inefficient in the first place, a POSITA would not have engaged in such a process. Ex. 2021 at ¶ 75.

The fact that a POSITA would not have recognized any problem that needed correction in Bharadwaj-Prov059 itself is strongly suggested by the development timeline of 802.11ax itself. Ex. 2021 at ¶ 76.

As noted in Section III above, the development of 802.11ax involved the named inventors of both Yu-Prov428 and Bharadwaj-Prov059. However, despite obviously being aware of the teachings of their own references (and the fact that inventors of Yu-Prov428 would have been aware of both Yu-Prov428—by virtue of having authored it—***and*** the formula from Bharadwaj-Prov059 by virtue of it being submitted in 802.11ax), none of these individuals recognized the problem with Bharadwaj-Prov059's formula (at least, not prior to this formula being introduced to

the 802.11ax working group in the submission provided at Exhibit 1016). Ex. 2021 at ¶ 76. And before then, over ***100*** different highly skilled authors presented the positive "m" offset L_LENGTH formula (*see* Ex. 2022), and the 802.11ax working group held a vote and adopted that formula (*see* Ex. 2028 at 66–67). Ex. 2021 at ¶ 76.

Instead, the very first recognition of the problem with Bharadwaj-Prov059's formula was when the inventors of the '077 patent recognized it, which was at least as early as August 20, 2015. Ex. 2021 at ¶ 77. And the Petition does not dispute that the '077 patent is entitled to a priority date (or "Critical Date") of August 20, 2015. *See generally* Pet. 2.

After the August 20, 2015 Critical Date of the '077 patent, the *next* recognition of any problem in Bharadwaj-Prov059's provisional was provided in Exhibit 1016, which was submitted to the 802.11ax working group in a document dated November 8, 2015 (i.e., Ex. 1016). Importantly, Ex. 1016 was not submitted by a POSITA, but as discussed above in Section III, it was submitted by individuals having far greater than ordinary skill in the art. The Petition fails to provide any coherent explanation as to why Petitioner believes a non-prior art submission (i.e. Ex. 1016) by seven persons (including at least six having ***extraordinary*** skill in the art) identified the same problem and the same solution as the '077 patent—after the '077 patent's

priority date—is evidence of what a person of ***ordinary*** skill in the art would have found obvious as of the '077 patent's priority date.[8] Ex. 2021 at ¶ 77.

The Petition also relies on the fact that "Bharadwaj, the non-provisional application of Bharadwaj-Prov059, implemented this change to the L_{LENGTH} equation," as supposedly being "contemporaneous evidence" that modifying Bharadwaj-Prov059's formula to include a negative integer offset as opposed to a positive integer offset would have been obvious. *See* Pet. 28–29. However, the Petition's allegation that the Bharadwaj publication itself (as distinct from Bharadwaj-Prov059) is "contemporaneous evidence that using m = -1 or -2… would have been within the knowledge and capability of a POSITA" (*see* Pet. 26–27) is not accurate for at least two reasons: (1) the Bharadwaj inventors did not independently arrive at this solution by virtue of the fact that they would have had knowledge of it due to Arjun Bharadwaj and Bin Tian's participation in 802.11ax development (*see* Ex. 2015, listing both individuals as authors) and the submission of Ex. 1016, and (2) the inventors of Bharadwaj were both individuals of greater than ordinary skill in the art (with Bin Tian being an individual having ***significantly greater*** than ordinary skill in the art—*see* Exs. 2037 & 2038 at 2). Ex. 2021 at ¶ 78.

[8] The Petition fails to establish that *any* non-prior-art "contemporaneous evidence" it cites is evidence of "what would have been known to the ordinarily skilled artisan at the time the invention was made (*see* Pet. 26–31 & n.6) because the Petition makes no effort to establish that any of these concepts were derived by anyone of ***ordinary*** skill in the art.

The Petition also cites to the "Lee" reference as proposing a negative "n" offset for L_Length value. *See* Pet. 26–27 (citing Ex. 1018, [0078]-[0079]). But this is applicable to 802.11n, not 802.11ax, and Lee is also not evidence that a POSITA would have viewed ***adding*** a positive offset would have caused any inefficiency even as applied to 802.11n Length; for instance, Lee does not even mention the result that its proposed L_Length formula would have on any calculation of any other values. *See* Ex. 2042 at 24:22–25:9 (Petitioner's expert explaining that Lee does not teach that Bharadwaj-Prov059's formula "would cause an incorrect result in any subsequent calculations," and instead alleging only that a POSITA "would have had the opportunity to test it" for themselves to recognize the problem with Bharadwaj-Prov059's formula); Ex. 2021 at ¶ 79.

Finally, the Petition's allegation that "it would have been obvious to try other predictable potential values for m, including m= -1 or -2, to address the need to 'ensure that LLENGTH is not exactly a multiple of 3… to distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions' and to ensure compatibility with legacy devices" also fails. *See* Pet. 31 (quoting Ex. 1006, [0050] and Ex. 1007, [0051]). First, Bharadwaj-Prov059's formula ***already*** ensures that LLENGTH is not exactly a multiple of three, because a multiple of three plus either one or two is *necessarily* not a multiple of three. Ex. 2021 at ¶ 80. Therefore, this would not have provided a motivation for a POSITA to try any other values for m. *Id*. Second, a POSITA would

not have viewed modifying Bharadwaj-Prov059's "m" value as helpful to "ensure compatibility with legacy devices" as the Petition. Ex. 2021 at ¶ 80. As discussed above, a POSITA would not have recognized any problem that Bharadwaj-Prov059's formula would have caused for legacy devices (much less a problem of incompatibility). *Id*. Indeed, as the Petition appears to acknowledge, Bharadwaj-Prov059's formula *would* have been compatible with legacy devices, it simply would have caused some amount of inefficiency (which a POSITA would not have recognized, as discussed above) as a result of legacy devices "deferring channel access for a longer duration than required." *See* Pet. 23; *see also id.*, 21, 26 (alleging that the Petition's modification would cause "legacy devices" to "not defer transmissions for a duration longer than required"); Ex. 2021 at ¶ 80.

Accordingly, the Petition does not identify any "design need or market pressure to solve a problem" that would have caused a POSITA to try different "m" values in the first place. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *see also Novartis Pharms. Corp. v. Watson Lab'ys, Inc.*, 611 F. App'x 988, 996 (Fed. Cir. 2015) ("Without the knowledge of a problem, one of skill in the art would not have been motivated to [solve the problem].").

Thus, the Petition fails to identify that a POSITA would have recognized the problem solved by the inventors of the '077 patent, nor does the Petition establish any other motivation to arrive at the claimed solution to that problem. And as noted

extensively throughout, the actual evidence of record is that, prior to the critical date of the '077 patent, the persons of extraordinarily skill in the art tasked with defining L_{LENGTH} formula in the 802.11ax standard did not recognize either the problem or its solution that the Petition alleges would have been obvious to a person of ordinary skill in the art.

VI. The Petition also fails to show invalidity based on Bharadwaj alone.

The Petition's analysis for its invalidity ground based on Bharadwaj alone is limited to a single page, and merely alleges that a POSITA would recognize that an "m" offset of -1 or -2 would accomplish exactly what Bharadwaj-Prov059's formula already accomplishes, which is "to distinguish between IEEE 802.11ax and IEEE 802.11ac transmissions. Pet. 75–76. This is not, however, a motivation to modify Bharadwaj-Prov059's teachings, particularly given that those teachings were at the time adopted by the 802.11ax standard working group. Ex. 2021 at ¶ 81. As explained above with respect to the Petition's proposed combination of Bharadwaj in combination with Yu, the Petition fails to provide any legally sufficient obviousness rationale (and certainly not one that would outweigh the strong objective evidence of how highly skilled engineers failed to solve the problem recognized and solved by the inventors of the '077 patent prior to the critical date).

VII. Bharadwaj and Yu are not prior art.

All of the Petition's grounds rely on at least Bharadwaj alone or in

combination with other references; other grounds additionally rely on Yu. Both Bharadwaj and Yu were published in 2016, after the August 20 critical date of the ‘’077 patent. *See* Ex. 1006 (November 2,4 2016 publication date); Ex. 1019 (September 29, 2016 publication date).

35 U.S.C. § 311(b) limits IPR challenges to “prior art consisting of patents or printed publications.” Neither Bharadwaj nor Yu are ***patents***; instead they are patent application ***publications***. And these publications were indisputably not published until ***after*** the critical date of the ’077 patent, such that neither Bharadwaj nor Yu qualify as prior art printed publications (as they must in order to be properly considered under 35 U.S.C. §311(b)).

A petition for certiorari addressing this same issue is currently pending before the U.S. Supreme Court, *Lynk Labs, Inc. v. Samsung Electronics Co.*, No. 25-308 (U.S.). There, like here, Samsung (the same entity as Petitioner) relied on back-dating a patent application publication even though a patent was never issued from the application. The Federal Circuit rejected Lynk Labs’ argument, finding that a patent application publication can be back-dated like a patent. *Lynk Labs, Inc. v. Samsung Electronics Co., Ltd.*, 125 F.4th 1120, 1127 (Fed. Cir. 2025). Patent Owner believes, however, that this decision is inconsistent with the statutory authority and the Supreme Court may grant certiorari to reverse the Federal Circuit’s ruling. If it does, the Board should find that Petitioner has failed to meet its burden.

VIII. Conclusion

Petitioner contends (with the benefit of hindsight) that a POSITA would have recognized the problem in the prior art that would be caused by a positive "m" offset in the L_{LENGTH} formula taught by Bharadwaj-Prov059, and would have instead modified the teachings of Bharadwaj-Prov059 a negative "m" offset in that L_{LENGTH} formula. But this is contrary to the actual evidence of record, including that numerous highly skilled artisan tasked with arriving at an appropriate L_{LENGTH} formula ***failed*** to recognize the supposedly "obvious" solution proposed by the Petition prior to the critical date of the '077 patent.

Accordingly, for the reasons set forth above, Patent Owner respectfully requests that the Board find all challenged claims not unpatentable.

Date: March 25, 2026

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CERTIFICATION REGARDING WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Patent Owner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this **PATENT OWNER'S RESPONSE**, that the amount of words in this paper is 7,890. Pursuant to 37 C.F.R. § 42.24, this word count is in compliance with the word limit set forth in 37 C.F.R. § 42.24(b)(2) excluding the portions exempted under 37 C.F.R. § 42.24(a)(1).

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CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on March 25, 2026, by filing this document through the Patent Trial and Appeal Case Tracking System as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioners:

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