

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 No. IPR2025-01069
U.S. Patent No. 10,313,077

PATENT OWNER'S PRELIMINARY RESPONSE

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Cases

Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.,
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PATENT OWNER’S EXHIBIT LIST

Exhibit	Description
2001	Order, <i>Wilus Institute of Standards and Technology Inc., v. HP Inc.</i> , 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 Invalidation Contentions and Subject Matter Eligibility Contentions in the consolidated case, <i>Wilus Institute of Standards and Technology Inc., v. HP Inc.</i> , 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, <i>Estoppel Gutted: A Pelican’s Guide to Patent Litigation</i> , 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

Patent Owner's Preliminary Response
IPR2025-01069 (U.S. Patent No. 10,313,077)

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 TM -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.

I. Introduction

The Petition on U.S. Patent No. 10,313,077 (the "'077 Patent") should be denied because the prior art does not disclose at least elements d and e of the '077 Patent. The '077 Patent claims an improved way of calculating the number of data symbols (N_{sym}) by a receiving device, where the old technique, unfairly prejudices legacy devices. The old technique was the one used in the asserted prior art Bharadwaj-Prov59 (Ex. 1007). To the extent that the Petition relies on subject matters solely in Bharadwaj (Ex. 1006), the Petition failed to demonstrate that Bharadwaj-Prov59 supports those subject matters, as Bharadwaj includes additional matters than Bharadwaj-Prov59. As a result, Bharadwaj should be accorded only the filing date of its publication on May 19, 2016 which postdates the '077 Patent's invention.

Moreover, a POSITA would not have modified this old technique to arrive at the '077 Patent. The old technique was proposed and widely supported by the industry, including the inventors of Bharadwaj-Prov59, and adopted by IEEE as the industry standard at the time of the '077 Patent's invention. In other words, at the time of the '077 Patent, the alleged modification to the old approach was not commonly known or obvious in the field. Furthermore, a POSITA would not have modified the old approach in Bha-

radwaj-Prov59 by Yu (Exs. 1019, 1021), since these two are directed to different issues (one for signal extension and another for signal reduction), and the disputed variable m represents different meanings in Bharadwaj-Prov59 and Yu.

II. Level of Ordinary Skill in the Art

The Petition proposes that a POSITA “would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least 3 years of experience in the research, design or development of wireless communication devices, systems, and/or networks, or the equivalent, as of the Critical Date. Increased educational experience can make up for less work experience, and vice versa.” Petition at 10 (internal citations omitted). For purposes of this Preliminary Response, Patent Owner does not dispute this definition except to the extent that Petitioner requires that the required experience and/or education level be acquired by the Critical Date, Petitioner objects to this requirement because it is not relevant or needed for someone to be a POSITA. Patent Owner reserves the right to dispute the Petitioner’s definition of Critical Date if it becomes necessary in a later stage.

III. Claim Construction

“Petitioner submits that no formal claim constructions are necessary....” Petition at 10. Despite this, Petitioner identified terms for construction in the

district court. Recently, in district court Petitioner has identified several terms in the '077 Patent for construction, such as the terms “obtain[\ing] length information indicating information on a duration of the non-legacy physical layer frame [after a legacy signaling field], from the legacy signaling field,” “obtain[\ing] information other than [the] 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,” “a duration of the non-legacy physical layer frame” in the independent claims. Petitioner contends that these terms are indefinite under 35 U.S.C. § 112. Ex. 2013 (Email from Petitioner's counsel in the district court litigation) at 1.

Petitioner asserted this indefiniteness position for the '077 Patent in the district court for the first time on August 27, 2025, which was after Patent Owner filed its Request for Discretionary Denial of Institution on August 25, 2025. *See* Paper 8; Ex. 2013. The Petitioner has offered no explanation, in this *inter partes* review or in the district court litigation, why it has adopted inconsistent claim construction positions between the two proceedings.

When the Patent Office transitioned IPRs away from the Broadest Reasonable Interpretation claim construction and to the same *Phillips* standard

applied in district court, one goal was to “reduce the potential for inconsistency in the interpretation of the same or similar claim terms” between PTAB and district court proceedings. *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,343 (Oct. 11, 2018). Petitioner's adoption of inconsistent claim construction arguments between its district court position and its Petition generates the risk with which the Patent Office was concerned. If Petitioner prevails in this IPR and obtains a final written decision finding any challenged claim unpatentable, such a decision would both suggest the challenged claims are not indefinite under *Phillips* and be inconsistent with a district court finding the claims are indefinite.

In any event, for purposes of this Preliminary Response, Patent Owner applies the plain and ordinary meaning of the challenged claims. But, as further discussed below, the Petition fails to show that the alleged art discloses the claims even when applying the plain and ordinary meaning of the term.

IV. Overview of the '077 Patent

The '077 Patent was filed on December 26, 2017, and issued on June 4, 2019. It is a continuation of PCT Application No. PCT/KR2016/06976, filed on June 29, 2016. Ex. 1001 ('077 patent) at pg. 1. The PCT Application further claims priority to multiple Korean applications filed in 2015, including KR10-

2015-0092525 filed on June 29, 2015, and KR10-2015-0117434 filed on August 20, 2015. '077 Patent at pg. 1, 1:10-17. Petitioner does not dispute that the '077 Patent is entitled to the August 20, 2015 priority date. Petition at 2¹.

The '077 Patent describes that there is a continued need “for providing a high-efficiency and high-performance wireless LAN communication technology in a high-density environment” and recognizes that “in a next-generation wireless communication technology environment, communication having high frequency efficiency needs to be provided indoors/outdoors under the presence of high-density terminals and base terminals.” '077 Patent at 2:37-43. The techniques provided in the '077 Patent can advantageously improve the efficiency of the wireless LAN system while allowing coexistence with legacy wireless LAN devices. '077 Patent, 5:39-47. The '077 Patent is utilized by products that implement the Wi-Fi 6 (802.11ax) standard for wireless communications.

In Wi-Fi 6, the Physical Layer Protocol Data Unit's (PPDU) preamble consists of a legacy portion at the beginning of the preamble. '077 Patent at

¹ Petitioner reserves the right to address the issue of whether the '077 Patent is entitled to the priority of the earlier Korean application filed on June 29, 2015 at a later stage, as the resolution of this issue is not necessary for the purposes of this Preliminary Response.

14:17-34. The image below illustrates an example legacy preamble in the previous generation of Wi-Fi standards.

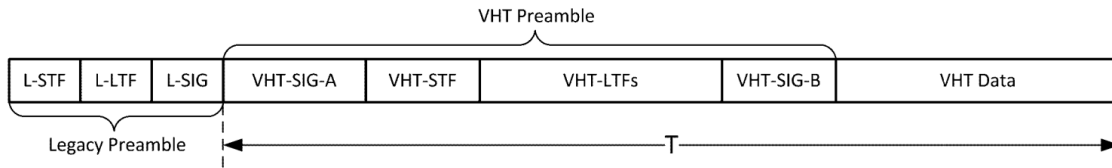


FIG. 6

'077 Patent, FIG. 6. In Wi-Fi 6, the “legacy preamble may include L-STF, L-LTF, and L-SIG for compatibility with a legacy terminal.” '077 Patent at 14:22-24. The Figure below illustrates exemplary preamble fields in the Wi-Fi 6 standard, including the exemplary legacy preamble fields such as L-STF, L-LTF, and L-SIG.

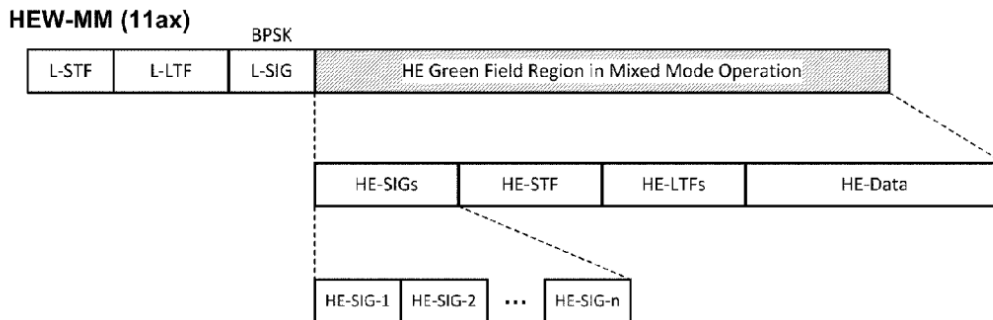


FIG. 9

'077 Patent, FIG. 9. As shown in FIG. 9 of the '077 Patent, the preamble includes an L-SIG field. The L-SIG field “is used to communicate rate and length information.” Ex. 2014 (802.11ax-2021) at 542.

The '077 Patent recognizes that

when a non-legacy physical layer frame is transmitted, the legacy wireless communication terminal may not know the duration of the non-legacy physical layer frame and may perform channel sensing repeatedly. Also, if the legacy wireless communication terminal does not repeatedly perform channel sensing, when a non-legacy physical layer frame is transmitted, a legacy wireless communication terminal may attempt transmission and a transmission collision with a non-legacy wireless communication terminal may occur.

To solve this problem, the L-SIG may include length information used for determining the duration of a non-legacy physical layer frame after the L-SIG. For convenience of explanation, the length information is referred to as L_LENGTH.

'077 Patent at 28:32-52, 11:3-41 (emphasis added). The '077 Patent proposes that the length information in the L-SIG field to be calculated as follows is calculated using the formula

$$L_Length = \left\lceil \frac{TXTIME-20}{4} \right\rceil \times 3 - 3 - m;$$

where TXTIME is the duration of the PPDU and $m = 1$ or 2 . '077 Patent, FIG. 30. The current Wi-Fi 6 standard also adopted the same formula as shown below for calculating the length in the L_SIG field.

$$Length = \left\lceil \frac{TXTIME - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \quad (27-11)$$

where

TXTIME	is defined in 27.4.3 (in μs)
m	is 1 for an HE MU PPDU and HE ER SU PPDU and 2 otherwise
SignalExtension	is 0 μs if the TXVECTOR parameter NO_SIG_EXTN is true and is aSignalExtension as defined in Table 27-54 if the TXVECTOR parameter NO_SIG_EXTN is false

Ex. 2014 (802.11ax-2021) at 542.

The Length information can be used by a receiving device, such as a mobile terminal, to calculate the number of data symbols N_{SYM} . The '077 Patent uses the following formula to calculate N_{SYM} .

$$N_{SYM} = \left\lfloor \left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE_Disambiguity}$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) - N_{SYM} \times T_{SYM}}{4} \right\rfloor \times 4$$

where $\lfloor x \rfloor$ denotes the largest integer less than or equal to x (flooring)
 L_LENGTH is the Length field value in L-SIG
 $b_{PE_Disambiguity}$ is PE-Disambiguity field value (0 or 1)
 $T_{HE_PREAMBLE}$ is the duration of HE preamble
 T_{SYM} is the duration of HE symbol

FIG. 31

'077 Patent at FIG. 31 (emphasis added). The current Wi-Fi 6 standard also illustrates a similar formula for N_{SYM} .

The receiver computes N_{SYM} , T_{PE} , and N_{MA} using Equation (27-119), Equation (27-120), and Equation (27-122), respectively.

$$N_{SYM} = \left\lfloor \left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE-PREAMBLE} - N_{MA} N_{HE-LTF} T_{HE-LTF-SYM} \right) / T_{SYM} \right\rfloor - b_{PE-Disambiguity} \quad (27-119)$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE-PREAMBLE} \right) - N_{SYM} T_{SYM} - N_{MA} N_{HE-LTF} T_{HE-LTF-SYM}}{4} \right\rfloor \times 4 \quad (27-120)$$

where
L_LENGTH is the value indicated by the LENGTH field of the L-SIG field

Ex. 2014 (802.11ax-2021) at 622.

A. Claims of the '077 Patent

The '077 Patent has two independent claims, i.e., Claims 1 and 8. These independent claims recite the following.

1[pre]. A wireless communication terminal that communicates wirelessly, the terminal comprising:	8[pre]. An operation method of a wireless communication terminal that communicates wirelessly, the method 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,	8[a]. receiving 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,	8[b]. obtaining 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,	8[c]. obtaining length information indicating information on a duration of the non-legacy physical layer frame after a legacy signaling field, from the legacy signaling field,

<p>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</p>	<p>8[d]. obtaining information other than the 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</p>
<p>1[e]. determine the number of symbols of data of the non-legacy physical layer frame according to a following equation,</p> $N_{SYM} = \left\lfloor \left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE_Disambiguity}$ <p>where $\lfloor x \rfloor$ denotes a largest integer less than or equal to x, L_LENGTH denotes the length information,</p> <p>m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame,</p> <p>$b_{PE_Disambiguity}$ denotes a value of PE Disambiguity field,</p> <p>$T_{HE_PREAMBLE}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame,</p> <p>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</p>	<p>8[e]. determining the number of symbols of the data of the non-legacy physical layer frame according to a following equation,</p> $N_{SYM} = \left\lfloor \left(\frac{L_LENGTH + m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE_Disambiguity}$ <p>where $\lfloor x \rfloor$ denotes a largest integer less than or equal to x, L_LENGTH denotes the length information,</p> <p>m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame,</p> <p>$b_{PE_Disambiguity}$ denotes a value of PE Disambiguity field,</p> <p>$T_{HE_PREAMBLE}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame,</p> <p>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</p>

based on a duration of a symbol of the legacy physical layer frame.	based on a duration of a symbol of legacy physical layer frame.
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B. Prosecution History of the '077 Patent

The examiner allowed the '077 Patent without issuing rejections. The Examiner found that elements d and e “in combination with the remaining limitations as substantially described in the independent claims of the instant application, are not taught or fairly suggested by the prior art of record in any reasonable combination.” Ex. 1002 at 259-260.

V. Overview of Prior Art Landscape at the Time of the '077 Patent's Invention

The '077 Patent claims priority to two Korean applications 10-2015-0092525 and 10-2015-0117434 filed on June 29, 2015 and August 20, 2015, respectively. '077 Patent at pg. 1. The Petition alleges that the critical date of the '077 Patent is August 20, 2015. Petition at 2. For purposes of this POPR, Patent Owner uses the August 20, 2015 date as the critical date, although Patent Owner disputes Petitioner's position that the '077 Patent is not entitled to the June 29, 2015 date.

Nevertheless, before August 20, 2015, and even a few months afterward, the industry's consensus is that N_{sym} is calculated using “ $L_{\text{Length}} + 3 - m$ ” where m is defined as the numerical value of 1 or 2. This approach, however,

is different from the '077 Patent's approach, where N_{sym} is calculated using "L_Length + 3 + m".

For example, in July 2015, right before the alleged critical date, the industry widely believed that N_{sym} is to be calculated using "L_Length + 3 - m" as shown below.

- Rx Side Computation:

$$N_{SYM} = \left\lfloor \left(\frac{L_LENGTH - m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE_Disambiguity}$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{L_LENGTH - m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) - N_{SYM} \times T_{SYM}}{4} \right\rfloor \times 4$$

Ex. 2015 (IEEE 802.11-15/0810, July 2015) at 24, 1-7 (listing all authors supporting this method). And relatedly, the L_Length used in calculating N_{sym} is calculated as follows.

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

Ex. 2015 (IEEE 802.11-15/0810, July 2015) at 23.

Subsequently, even after the alleged critical date of the '077 Patent in September 2015, the industry still believed that N_{sym} should be calculated using "- m."

- Rx Side Computation:

$$N_{SYM} = \left\lfloor \left(\frac{L_LENGTH - m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE_Disambiguity}$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{L_LENGTH - m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) - N_{SYM} \times T_{SYM}}{4} \right\rfloor \times 4$$

Ex. 2016 (IEEE 802.11-15/0810, Sept. 2015) at 24. This way of deriving N_{sym} based on “– m” was agreed to by over 100 people in major companies in the communications industry, as evidenced in the proposals submitted to IEEE. Ex. 2015 (IEEE 802.11-15/0810, July 2015) at 2; Ex. 2016 (IEEE 802.11-15/0810, Sept. 2015) at 1-7, 23-24 (same). In fact, the inventors of the Bharadwaj reference asserted in this Petition are also among the people who endorsed this method of “– m”. Ex. 2016 (IEEE 802.11-15/0810, Sept. 2015) at 2 (listing Arjun Bharadwaj and Bin Tian as two of the authors); Ex. 2015 (IEEE 802.11-15/0810, July 2015) at 2 (same). The IEEE accepted this proposal around the time of Petitioner’s asserted critical date of the ’077 Patent. Ex. 2017 (IEEE802.11-15/098r6) at 66-67.

Moreover, contrary to Petitioner’s position, the old technique and the ’077 Patent are not just different in the sign of m. The old equations have a different consequence and create issues in legacy devices that are only solved by the ’077 Patent’s approach. The ’077 Patent recognizes that under

the old approach “the duration of the non-legacy physical layer frame obtained by the legacy wireless communication terminal is longer by one symbol of the legacy physical layer frame compared to a case that information other than the duration of the non-legacy physical layer frame is not signaled through the L-LENGTH. This is because the legacy wireless communication terminal obtains the duration of the non-legacy physical layer frame based on the ceiling operation as described with reference to FIG. 27.” ’077 Patent at 35:61-36:2. In short, the old technique creates unfairness for the legacy device because N_{sym} is one symbol longer than the non-legacy, 11ax devices.

Indeed, the industry did not recognize this issue until after the priority date of the ’077 Patent. *See* Ex. 1016 (which is dated November 2015, after the priority date of the ’077 Patent). Months after the priority date of the ’077 Patent, a submission² to IEEE around November 2015, also pointed out that under the old approach, the legacy devices would not be able to reach the

desired value of $\left\lceil \frac{TXTIME - 20}{4} \right\rceil$ in certain situations. Ex. 1016 (IEEE 802.11-15/1372) at 2-3. And the new approach with “+ m” (i.e., the one claimed by the ’077 Patent) solves this issue.

² This submission, also cited in the the Petition, was created after the Patent Owner pointed out the issue to the submitter, and the submitter agreed with the Patent Owner.

All these examples demonstrate that at the time of the '077 Patent, it would not be obvious to a POSITA to derive the '077 Patent's way of calculating N_{sym} (and relatedly L_{Length}) at the time of the '077 Patent's invention. The industry's consensus at the time was a method of calculating N_{sym} using “- m”, rather than the '077 Patent's approach of “+ m”. And the old technique was accepted by IEEE and was the industry standard even after the priority date of the '077 Patent. The industry did not even realize the issue of the “- m” approach until later, again after the critical date of the '077 Patent. Thus, at the time of the '077 Patent, a POSITA would not have thought of using “+ m” to calculate N_{sym} as the '077 Patent, and instead would have used the industry consensus of “- m”.

VI. The Alleged Art Does Not Teach the Independent Claims of the '077 Patent

A. Bharadwaj-Prov59 (Ex. 1007) Does Not Disclose At Least Elements d and e of the Independent Claims

Bharadwaj (Ex. 1006) was asserted as the primary reference for all grounds in the Petition. Petition at 1-2. Bharadwaj was filed on May 19, 2016 and published on November 26, 2016. Bharadwaj at pg. 1.

Despite calling Bharadwaj as a prior art, the Petition actually relies on disclosures of its provisional application, Bharadwaj-Prov59 (Ex. 1007) as prior art. But Bharadwaj-Prov59 (Ex. 1007) does not teach the '077 Patent,

and instead, it calculates the N_{sym} using the different, old approach of “- m” discussed above.

Specifically, the Petition relies on Bharadwaj-Prov059 for independent claims. The Petition states that Bharadwaj-Prov 59 discloses the following equations:

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

$$N_{sym} = \left\lfloor \frac{\left\lceil \frac{L_{LENGTH} - m + 3}{3} \right\rceil \times 4 - T_{HE_PREAMBLE}}{T_{SYM}} \right\rfloor - SE_{disambiguation_bit}$$

Petition at 18, 56; Baradwaj-Prov59 at paras. [0056]-[0057]. As discussed in the preceding section, these equations are precisely the type of old “-m” technique for calculating N_{sym} that was initially endorsed by the industry and was later substituted by the '077 Patent's approach after the critical date of the '077 Patent, as the old approach failed to produce the desired value for certain legacy device communications.

In contrast to the old approach, the '077 Patent's approach for calculating N_{sym} is based on “+ m” approach where, the number of symbols is calculated as follows:

$$N_{sym} = \left\lfloor \left(\frac{L_{Length} + m + 3}{3} \times 4 - T_{HE_PREAMBLE} \right) / T_{sym} \right\rfloor - bPE_Disambiguity.$$

See, e.g., '077 Patent, FIGS. 30 and 31, Claims 1 and 8. And the related

L_Length is calculated as $L_Length = \left\lceil \frac{TXTime-20}{4} \right\rceil \times 3 - 3 - m$. Id.

While the Bharadwaj-Prov59 uses “- m” to calculate the N_{sym} , the Petitioner altered the Bharadwaj-Prov59's formula to create an appearance that Bharadwaj-59 discloses the method in the '077 Patent. Specifically, Bharadwaj-Prov59 discloses the following formula for calculating N_{sym} .

$$N_{sym} = \left\lfloor \frac{RXTIME - T_{L_PREMABLE} - T_{HE_PREMABLE}}{T_{sym}} \right\rfloor - SE_{disambiguation_bit}$$

Where RXTIME is calculated using the following.

$$RXTIME = \left\lceil \frac{L_{LENGTH} - m + 3}{3} \right\rceil \times 4 + 20$$

Bharadwaj-Prov59 at ¶¶ [0056]-[0057], and the m is defined as 1 or 2.

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

Bharadwaj-Prov59 at ¶ [0051], the Petitioner and its expert changed the RXTIME formula disclosed in Bhardwaj-Prov59 in their example as

$$RXTIME = \left\lceil \frac{(240+m)+3}{3} \right\rceil \times 4 + 20 = 348. \text{ Petition at 22, 57. This alterna-}$$

tion is truly disingenuous as the formula in Bhardwaj-Prov59 clearly discloses

it's " $L_{\text{LENGTH}} - m$ " not " $L_{\text{Length}} + m$ " in Petition's example. *Contrast* Bharadwaj-Prov59 at ¶ [0056] with Petition at 22.

Furthermore, Petition changed the definition of m in Bharadwaj-Prov59 in an attempt to adapt it to the '077 Patent's invention. Petition at 23, *citing* Ex. 1003 at ¶ 67. Specifically, Petitioner argues that m is -1 or -2 instead of a positive integer of 1 or 2. Ex. 1003 at ¶ 67. Not only is this definition of m not in Bharadwaj-Prov59 (which requires m to be a positive integer), it is not mathematically possible under the Petitioner's own position that m is $L_{\text{Length}} \bmod 3$. Petition at 58. Since the L_{Length} cannot be a negative value, it is impossible that $L_{\text{Length}} \bmod 3$ is negative. In other words, Petitioner's alterations to m would not be mathematically possible.

Moreover, as discussed in the preceding section, at the time of the '077 Patent, a POSITA would not have thought to modify Bharadwaj-Prov59's formula since the industry's consensus was to use the "- m " approach for N_{sym} . Indeed, even the inventors of the Bharadwaj agree to the old approach without modification. Ex. 2016 (IEEE 802.11-15/0810, Sept. 2015) at 2 (listing Arjun Bharadwaj and Bin Tian as two of the authors, which proposed the old approach); Ex. 2015 (IEEE 802.11-15/0810, July 2015) at 2 (same). And the failure to reach optimal value in certain legacy device communications, and hence the issue of unfair prejudice to legacy devices in N_{sym} calculations, were

not discovered by the industry until after the critical date of the '077 Patent. Thus, it would not be obvious for a POSITA to modify the formula in Bharadwaj-Prov59 to reach the '077 Patent's formula.

B. Petitioner Failed to Demonstrate that Bharadwaj (Ex. 1006) is Entitled to the Priority Date of Bharadwaj-Prov59 (Ex. 1007)

While Bharadwaj was filed on May 19, 2016, Petitioner claimed that it is entitled to a filing date of June 2, 2015, due to its provisional application No. 62/170,059 filed on that date (Bharadwaj-Prov59). Petitioner at 2-3.

For an alleged prior art reference to rely on its provisional filing date, the provisional application “to which the reference patent document claims a right of priority must ‘describe the subject matter’ relied upon in the reference patent document as prior art.” *Penumbra, Inc. v. RapidPuls, Inc.*, IPR2021-01466, Paper 34 (March 10, 2023) (precedential as to §II.E.3) (internal citations omitted); *see also In re Riggs*, 131 F.4th 1377, 1384 (Fed. Cir. 2025) (“to claim priority to the provisional filing date, the portion of the application relied on by the examiner as prior art must be supported by the provisional application.”). It is not sufficient to compare the claims of the alleged prior art reference with the disclosure of its provisional application. *Id.*

Bharadwaj has additional disclosures that are not in the Bharadwaj-Prov59. While Bharadwaj incorporates by reference Bharadwaj-Prov59 through a boilerplate sentence, many of Bharadwaj's disclosures were not in

Bharadwaj-Prov59. And the Petition failed to establish that such subject matters are in fact disclosed by the Bharadwaj-Prov59.

Notably, Bharadwaj-Prov59 does not support the following formula to the extent Petitioner contends that Bharadwaj discloses them.

$$L_Length = \lceil \frac{TXTime-20}{4} \rceil \times 3 - 3 - m, \text{ where } m \text{ is } 1 \text{ or } 2.$$

$$RXTIME = \lceil \frac{L_Length+m+3}{3} \rceil \times 4 - 20;$$

$$N_{sym} = \lfloor (RXTIME - T_{L_PREAMBLE} - T_{HE_PREAMBLE}) / T_{sym} \rfloor - SE_{Disambiguation_bit}$$

Instead, Bharadwaj-Prov59 discloses a different formula where

$$L_Length = \lceil \frac{TXTime-20}{4} \rceil \times 3 - 3 + m;$$

$$RXTIME = \frac{L_Length-m+3}{3} \times 4 + 20;$$

And accordingly in Bharadwaj-Prov59,

$$\begin{aligned} N_{sym} &= \lfloor (RXTIME - T_{L_PREAMBLE} - T_{HE_PREAMBLE}) / T_{sym} \rfloor - SE_{Disambiguation_bit} \\ &= \lfloor (\frac{L_Length-m+3}{3} \times 4 + 20 - T_{L_PREAMBLE} - T_{HE_PREAMBLE}) / T_{sym} \rfloor - SE_{Disambiguation_bit} \end{aligned}$$

See Bharadwaj-Prov5 at [0051], [0056]-[0057] (emphasis added).

Since Bharadwaj includes new matter not in Bharadwaj-Prov59, Petitioner's argument that Bharadwaj incorporates by reference Bharadwaj-Prov59 is not sufficient to establish that Bharadwaj is in fact entitled to the date of Bharadwaj-Prov59. To the extent Petitioner relies on matters in Bha-

radwaj beyond “incorporation by reference” of the Bharadwaj-Prov59, Petitioner failed to meet its burden of proving that these other matters in Bharadwaj are entitled to the priority date of its provisional application. Accordingly, because Petitioner failed to meet its burden to establish an earlier priority date for Bharadwaj, Bharadwaj should be accorded filing date, which is November 26, 2016. This date is after the critical date of the '077 Patent.

C. Yu Does Not Cure the Deficiencies of Bharadwaj

The Petition proposes combining Bharadwaj-Prov059 with Yu. Petition at 18-21. However, a POSITA would not be motivated to combine the two because they are of technically different fields. “Bharadwaj” is related to an extension of a signal, and “Yu” is related to a reduction of a signal duration. Ex. 1007 at ¶ [1029]; Ex. 1020 at 16. Moreover, despite both using the letter m (in Bharadwaj-Prov059) or M (in Yu), the variables have different meanings and serve different purposes.

In Bharadwaj-Prov059, the lower case value m “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., auto-detections).” Bharadwaj-Prov059 at ¶ [0051]. In contrast, Yu uses the capitalized M symbol to “indicate the structure of the last symbol.” Yu at ¶¶ [0230], [0232]-[0236]. Specifically, in Yu, “[t]he receiver

starts the decoding process at the end of the first period waveform of the last symbol. That is, the remaining waveforms of the last symbol are just the repeated part of the first period waveform.” Yu at ¶ [0228]. Thus, the M value is used to explicitly indicate the structure after the last symbol. Id. at ¶ [0232], Table 3 (indicating potential cases for the structure after the last symbol).

Thus, a POSITA would not have been motivated to combine the formula in Yu with Bharadwaj-Prov059 since they are directed to different issues. *See Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 381 F.3d 1371, 1376 (Fed. Cir. 2004) (“the suggestion to combine references must not be derived by hindsight from knowledge of the invention itself”). A POSITA would also not have been motivated to use Yu’s method of calculation of length in Bharadwaj-Prov59, particularly because Bharadwaj-Prov59 was widely regarded as an industry standard, even after the priority date of the ’077 Patent, and a POSITA would not have a reason to modify this approach or find it obvious to modify it to achieve the ’077 Patent. Indeed, the Petition appears to be using the ’077 Patent as a blueprint and attempted to piece together the components from the alleged prior art references. This type of hindsight obviousness analysis has been explicitly rejected by the Federal Circuit. *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (In finding claims as nonobvious, the Federal Circuit states “Care must be taken to avoid hindsight reconstruction by using

the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.”) (internal citations and quotations omitted).

Moreover, even with this alleged combination, Yu still does not cure the deficiencies of Bharadwaj-Prov059. For example, there was no disclosure in Yu that “m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame.” Instead, M in Yu is defined to have a completely different definition relating to, e.g., the number of used data tones in the last symbol before padding. ’077 Patent at Table 3, ¶ [0232]. Nor was such disclosure present in Bharadwaj-Prov059, as Bharadwaj-Prov059 simply set the m value as 1 or 2. Additionally, while Yu discloses the calculation for the length field, it provides no disclosure of calculations performed by a receiving device, such as N_{sym} . Furthermore, as the M value serves a different purpose in Yu, it would result in calculation errors if the Length calculation in Yu is imported into Bharadwaj-Prov059’s formula.

VII. Conclusion

For the foregoing reasons, the Petition fails to demonstrate that the alleged art teaches the independent claims. Accordingly, the Petition fails to establish that it has a reasonable likelihood to succeed on the merits, and it

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should not be instituted.

Dated: September 24, 2025

/Neil A. Rubin/

Reza Mirzaie (Reg. No. 69,138)
Neil A. Rubin (Reg. No. 67,030)
Philip X. Wang (Reg. No. 74,621)
Linjun Xu (Reg. No. 73,887)
RUSS AUGUST & KABAT
12424 Wilshire Boulevard, 12th Floor
Los Angeles, CA 90025
Telephone: 310-826-7474
Email: rmirzaie@raklaw.com
Email: nrubin@raklaw.com
Email: pwang@raklaw.com
Email: lxu@raklaw.com

Attorneys for Patent Owner,
WILUS INSTITUTE OF
STANDARDS AND TECHNOLOGY
INC.

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I certify that there are 4,523 words in this paper, excluding the portions exempted under 37 C.F.R. § 42.24(a)(1), according to the word count tool in Microsoft Word.

Dated: September 24, 2025

/Neil A. Rubin/

Reza Mirzaie (Reg. No. 69,138)
Neil A. Rubin (Reg. No. 67,030)
Philip X. Wang (Reg. No. 74,621)
Linjun Xu (Reg. No. 73,887)
RUSS AUGUST & KABAT
12424 Wilshire Boulevard, 12th Floor
Los Angeles, CA 90025
Telephone: 310-826-7474
Email: rmirzaie@raklaw.com
Email: nrubin@raklaw.com
Email: pwang@raklaw.com
Email: lxu@raklaw.com

Attorneys for Patent Owner,
WILUS INSTITUTE OF
STANDARDS AND TECHNOLOGY
INC.

CERTIFICATE OF SERVICE

I hereby certify that "Patent Owner's Preliminary Response" was served on September 24, 2025 by email sent to:

W. Karl Renner
Jeremy J. Monaldo
Nicholas Stephens
Kim H. Leung
FISH & RICHARDSON PC
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
Telephone: 202-783-5070
Email: renner@fr.com
Email: jjm@fr.com
Email: IPR39843-0193IP1@fr.com
Email: PTABInbound@fr.com

Dated: September 24, 2025

/Neil A. Rubin/

Reza Mirzaie (Reg. No. 69,138)
Neil A. Rubin (Reg. No. 67,030)
Philip X. Wang (Reg. No. 74,621)
Linjun Xu (Reg. No. 73,887)
RUSS AUGUST & KABAT
12424 Wilshire Boulevard, 12th Floor
Los Angeles, CA 90025
Telephone: 310-826-7474
Email: rmirzaie@raklaw.com
Email: nrubin@raklaw.com
Email: pwang@raklaw.com
Email: lxu@raklaw.com

Attorneys for Patent Owner,
WILUS INSTITUTE OF
STANDARDS AND TECHNOLOGY
INC.