

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. IPR2025-00988
U.S. Patent No. 10,687,281

PATENT OWNER'S PRELIMINARY RESPONSE

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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. 130 (E.D. Tex., June 11, 2025) (“Docket Control Order”)
2002	US 2016/0330300 A1 (Josiah '300)
2003	Excerpts of Defendants' P.R. 3-3 and 3-4 Invalidity 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 July 22, 2024 until July 22, 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/wifi6/#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
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2011	Letter re “Notice of Wi-Fi 6 License offer” from Sisvel to Samsung Electronics Co., Ltd. with Attachments 1-2, January 18, 2023
2012	US 2016/0353322 A1 (Li '322)
2013	European Search Report for Samsung EP21173524.6
2014	Published U.S. Patent Application 2020/267654 A1
2015	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

I. Introduction

The Board should deny institution of this IPR because the references relied on are not prior art. The independent claims of the '281 Patent are fully supported by provisional applications filed on or before March 4, 2016¹. In contrast, Petitioner claims that the Josiam and Kim references in Grounds 1A and 1B have a priority date of April 27, 2016, and March 23, 2016, respectively. These dates are after the priority date of the '281 Patent on March 4, 2016. Therefore, they should not be asserted as prior art to the '281 Patent. Furthermore, Petitioner claims that the primary reference Bharadwaj in Grounds 2A-2D is prior art based on Bharadwaj's provisional application. Bharadwaj has more disclosures than its provisional, and Petitioner made no efforts to demonstrate that the relevant subject matter was in fact disclosed by its provisional. Since Petitioner failed to demonstrate that Bharadwaj is supported by its provisional, Bharadwaj is not prior art to the '281 Patent because Bharadwaj's filing date is December 21, 2016 which is after the priority date of the '281 Patent.

¹ For purposes of this Preliminary Response, it is not necessary to discuss whether the '281 Patent is entitled to a priority date earlier than March 4, 2016 from other provisionals in the '281 Patent's priority chain. Respondents reserve the right to demonstrate that the '281 Patent is entitled to an even earlier priority date, to the extent that issue becomes necessary later.

Furthermore, none of the alleged art discloses the specific claimed configuration of indicating an unassigned resource with channel puncturing based on a combination of the bandwidth field of the HE-SIG-A and a resource unit allocation field of the HE-SIG-B, where “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.”

II. Overview of the '281 Patent

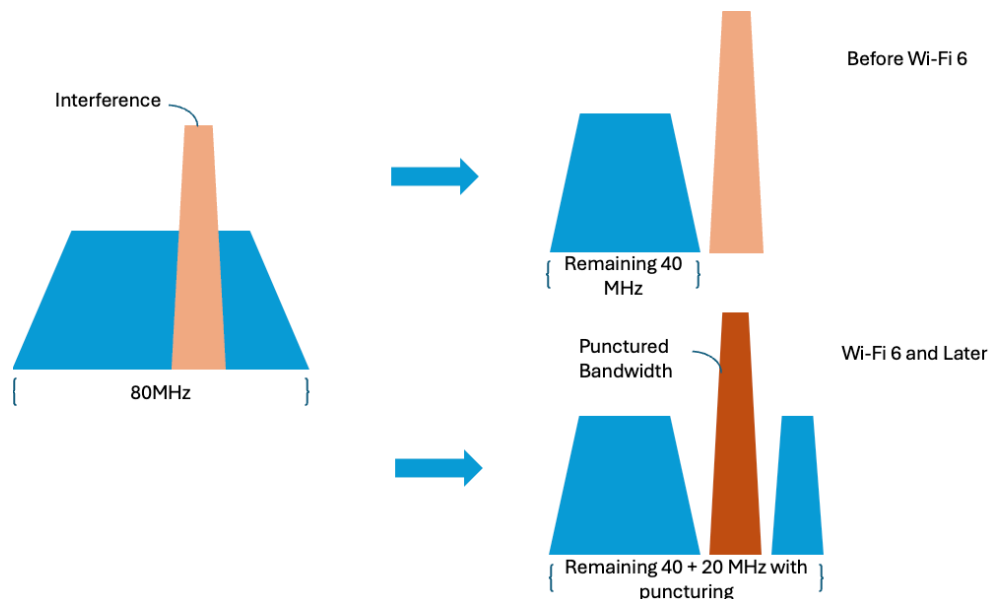
The '281 Patent was filed on June 22, 2018 and issued on June 16, 2020. It is a continuation of PCT Application No. PCT/KR2016/015297, filed on December 26, 2016. Ex. 1001 ('281 patent) at pg. 1. The PCT Application further claims priority to multiple Korean applications filed in 2015-2016 with the earliest priority claim to a Korean application filed on December 24, 2015. '281 Patent at pgs. 1-2.

A. Technology Overview of the '281 Patent

The '281 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 LAN environment, communication having high frequency efficiency needs to be provided indoors/outdoors under the presence of high-

density stations and access points (AP).” ’281 Patent at 2:50-59. The ’281 Patent is utilized by products that implement the Wi-Fi 6 (802.11ax) or higher standard for wireless communications. The ’281 Patent describes techniques for wireless devices to identify and use non-contiguous resources. ’281 Patent at 1:33-37, 3:43-45. The ’281 Patent can signal non-contiguous channel allocation information, including the unassigned resource unit. ’281 Patent at 1:33-37, 3:43-45, Abstract. The techniques provided in the ’281 Patent can advantageously increase the total resource utilization rate, and improve the performance of the wireless LAN system. ’281 Patent at 5:10-14.

For example, the ’281 Patent addresses issues for signaling unassigned resource unit with preamble puncture in a channel. Below is a graphical illustration of the high-level concept of preamble puncture.



In OFDMA (Orthogonal Frequency-Division Multiple Access) for Wi-Fi 6,

the channel can be divided into multiple resource units (RUs). For example, an 80 MHz channel can be divided into a 40MHz (484-tone RU), and two 20MHz (each is a 242-tone RU). There can also be smaller RUs. As an example, a 20MHz channel supports a maximum of nine 26-tone RUs, a maximum of four 52-tone RUs, or a maximum of two 106-tone RUs.

Before Wi-Fi 6, a small portion of the entire channel's available bandwidth may be occupied, yet it still impacts the entire channel. The channel may have to scale back to a much smaller bandwidth and, as a result, will not be able to take advantage of all available bandwidth. Wi-Fi 6 now allows a much more granular control of the punctured bandwidth, where it can simply carve out the bandwidth with the interference and take advantage of the remaining bandwidth, resulting in greater utilization of the bandwidth.

The '281 Patent can indicate puncture information in a channel, and identify an unassigned resource unit with preamble puncturing. *See, e.g.,* '281 Patent at 3:43-64, 4:8-34, 33:59-62. The '281 Patent describes that, due to the limitation of the available number of bits in the HE-SIG-A, various non-contiguous channel allocation information might not be signaled if the non-contiguous channel allocation information were signaled solely via subfield(s) of the HE-SIG-A. '281 Patent at 38:64-66. If the non-contiguous channel allocation information were signaled solely via subfield(s) of the HE-SIG-B, the

signaling overhead of the HE-SIG-B would increase. '281 Patent at 39:23-25.

The '281 Patent teaches that non-contiguous channel allocation information may be signaled via a combination of subfield(s) of the HE-SIG-A and subfield(s) of the HE-SIG-B. Therefore, the subfield(s) of the HE-SIG-A (e.g. the bandwidth field) may signal at least a portion of the non-contiguous channel allocation information (e.g., channel information to be punctured) and the subfield(s) of the HE-SIG-B may signal the remaining portion of the non-contiguous channel allocation information. '281 Patent at 3:43-4:34; *see also* '281 Patent, Claims 1 and 8. This solution allows the required information about unassigned resource units to be signaled without increasing the signal overheads.

As described in the '281 Patent,

“the non-contiguous channel allocation information may be signaled via ***a combination of subfield(s) of the HE-SIG-A and subfield(s) of the HE-SIG-B***. The subfield(s) of the HE-SIG-A may signal at least a portion of the non-contiguous channel allocation information, and the subfield(s) of the HE-SIG-B may signal the remaining information.”

'281 Patent at 39:17-25; *see also id.* at 3:43-4:34. Specifically, “[t]he non-contiguous channel allocation information may be indicated via a combination of a bandwidth field of the HE-SIG-A and a resource unit allocation field of the HE-SIG-B.” '281 Patent at 4:7-10; *see also id.* at 3:43-4:34, 40:4-18. For example, “[t]he bandwidth field may indicate total bandwidth information

through which the packet is transmitted and channel information to be punctured within the total bandwidth, and the resource unit allocation field may indicate additional puncturing information within the total bandwidth.” ’281 Patent at 4:11-15. “When the bandwidth field indicates puncturing of a secondary 20 MHz channel in a total bandwidth of 160 MHz or 80+80 MHz, the resource unit allocation field may indicate additional puncturing in a secondary 80 MHz channel.” ’281 Patent at 4:21-24.

The ’281 Patent has two independent claims, Claims 1 and 8. The Petitioner used Claim 8 as the representative claim. Claim 8 recites the following.

[8.pre] A wireless communication method of a wireless communication terminal, the method comprising:

[8.1] receiving a wireless packet;

[8.2] obtaining bandwidth information indicated via a bandwidth field of HE-SIG-A of the received packet;

[8.3] obtaining information of an unassigned resource unit via at least one of the bandwidth field of the HE-SIG-A and a subfield of HE-SIG-B of the received packet; and

[8.4] decoding the received packet based on the bandwidth information and the information of the unassigned resource unit,

[8.5] wherein the information of the unassigned resource unit is indicated via a combination of the bandwidth field of the HE-SIG-A and a resource unit allocation field of the HE-SIG-B, and

[8.6] wherein the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth,

and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.

'281 Patent, Claim 8.

B. Overview of the '281 Patent's File History

Claims 1-3, 6, 10-12, 15 of the '281 Patent's application were initially rejected as anticipated by Hedayat (U.S. Pat. No. 10,219,271). Ex. 1002 at 58. Claims 4-5 and 13-14 were rejected as obvious over Hedayat and Josiam (which is asserted in this IPR as Ex. 1014). Ex. 1002 at 62. Claims 7-9 and 16-18 were rejected as obvious over Hedayat and Yang (US Publ. No. 2016/0366666) or Ex. 1002 at 63. The file history suggests that the examiner did not consider Josiam to be the best reference for the independent claims since the examiner used the Josiam reference, but not for rejecting the independent claims.

In the Office Action Response, the applicant added the following elements to the independent claims.

wherein the information of the unassigned resource unit is indicated via a combination of the bandwidth field of the HE-SIG-A and a resource unit allocation field of the HE-SIG-B, and wherein the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.

Ex. 1002 at 39, 41. The applicant stated that the amendments were made to

expedite prosecution, despite that the applicant disagrees with the examiner.
Ex. 1002 at 45.

Applicant argued in the Office Action Response that the prior art does not teach or suggest that “the information of the unassigned resource unit is indicated via a **combination** of the bandwidth field of the HE-SIG-A **and** a resource unit allocation field of the HE-SIG-B.” Ex. 1002 at 46 (emphasis in original). In addition, applicant argued that the prior art also does not teach or suggest “the **bandwidth field of the HE-SIG-A** indicates **channel information to be punctured within the bandwidth**, and the **resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth**.” Ex. 1002 at 46-47 (emphasis in original). The applicant pointed out that the “‘explicit resource indication 215 of an extended SIG-B area 235’ of Yang is not a teaching or suggestion of ‘**channel information to be punctured within the bandwidth**’ ‘indicated via a bandwidth field of HE-SIG-A’”. Ex. 1002 at 47 (emphasis in original).

The examiner then allowed the '281 Patent. In the Notice of Allowance, the examiner states that “[t]he independent claims require that information on an unassigned resource unit is conveyed in a particular fashion: a bandwidth subfield of HE-SIGA field indicates the bandwidth used, and channel information about particular channel(s) to be punctured within this bandwidth; a

RU allocation subfield of a HE-SIGB field includes further information about the puncturing of the channel where the unassigned RU is; and the unassigned RU is indicated using a combination of these two subfields.” Ex. 1002 at 27. The examiner further “believes that the cited prior art is the best available, and believes that one of ordinary skill in the art would not have found it obvious to combine with another reference(s) such that the independent claims would be taught.” Ex. 1002 at 27.

III. 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 three 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 (for Grounds 1A-1B and 2C-2D) or the Earliest Filing Date (for Grounds 2A-2B). Increased educational experience can make up for less work experience, and vice versa.” Petition at 4 (internal citations omitted). For purposes of this Preliminary Response, Patent Owner does not dispute this definition except for the definition of the Critical Date, which Petitioner defined as May 14, 2016. Petition at 1. For reasons discussed above, the ’281 Patent is entitled to a priority of no later than Janu-

ary 13, 2026.² Furthermore, 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.

IV. Claim Construction

“Petitioner submits that no formal claim constructions are necessary....”
Petition at 3. Despite this, Petitioner identified terms for construction in the District Court. Recently, in district court, however, Petitioner has identified several terms in the '281 Patent for construction, including the terms “obtain[\ing] information of an unassigned resource unit via at least one of the bandwidth field of the HE-SIG-A and a subfield of HE-SIG-B of the received packet,” which appear in both independent Claims 1 and 8. Petitioner contends that these terms are indefinite under 35 U.S.C. § 112. *See* Ex. 2015 at 1 (correspondence from Petitioner's trial counsel identifying indefiniteness position for the '281 Patent).

Petitioner asserted this indefiniteness position for the '281 Patent in the district court for the first time on August 27, 2025, which was after Patent

² For purposes of this Preliminary Response, it is not necessary to determine whether the '281 Patent is entitled to another earlier filed Korean application in its priority chain. The Patent Owner nevertheless reserves the right to demonstrate that the '281 Patent can claim priority to an earlier application in its priority chain.

Owner filed its Request for Discretionary Denial of Institution on August 18, 2025. *See* Paper 8; Ex. 2015. 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.

V. The Independent Claims Are Not Taught by Grounds 1A (Josiam) and 1B (Josiam and Kim)

A. Josiam (Ex. 1014) and Kim (Ex. 1018) Are Not Prior Art

Josiam is asserted as the primary reference in Grounds 1A and 1B. Kim is asserted in Grounds 1B, 2C and 2D. These grounds should be denied because Josiam and Kim are not prior art to the '281 patent.

Josiam is Petitioner's own patent application. It was filed on June 24, 2016, and published on January 5, 2017, as U.S. Publ. No. 2017/0006608. It claims priority to several provisional applications filed in 2015-2016. Petitioner asserts that Josiam's priority date is April 27, 2016 which is the filing date of its provisional application U.S. 62/328,106.

Petitioner's basis that Josiam and Kim are prior art rests on its assumption that the '281 Patent is not entitled to priority date of its earlier filed provisional applications. Petition at 7-8. This is incorrect.

The '281 Patent is supported by at least its earlier filed Korean application, KR10-2016-0004471 (the "KR'447 Application"; Ex. 1007), filed on January 13, 2016 and KR10-2016-0026683 (the "KR'683 Application"; Ex. 1009) filed on March 4, 2016. '281 Patent at pg. 1. Both provisional applications predate the purported priority dates of Josiam and Kim, on April 27, 2016 and March 23, 2016 respectively. Petition at 2 (Petitioner contends that

Josiam and Kim are entitled to a priority date of April 27, 2016, and March 23, 2016, respectively)³.

Petitioner argued that Josiam and Kim qualify as prior art because the last element of the independent claim (e.g., element 8.5) of the '281 Patent is not disclosed by its earlier filed Korean applications. Petition at 7. In particular, Petitioner's expert argues that the Korean applications failed to "disclose[] using both the bandwidth field of the HE-SIG-A and the resource unit allocation field of the HE-SIG-B to indicate channel puncturing information as the claim element requires." Petition at 7. The Petitioner argued that the disclosure indicating unused channel either through HE-SIG-A or through HE-SIG-B, but not both. Petition at 7. This is incorrect.

Element 8.5 recites "wherein the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth." '281 Patent, Claim 8. This element is at least supported by FIG. 17, paragraphs 159-164 of the

³ Petitioner alleged that Josiam is entitled to a priority date of April 27, 2016 based on Josiam's provisional application (Ex. 1017), and Kim is entitled to a priority date of March 23, 2026 based on its provisional application (Ex. 1019). Since the '281 Patent predates both provisional applications, it is not necessary to discuss whether Josiam and Kim are in fact entitled to claim the priority dates of their respective provisionals. Patent Owner nevertheless reserves the rights to address this issue at a later stage if necessary.

KR '447 Application (Ex. 1007). Ex. 1007 (KR '447 Application) at FIG. 17, ¶¶ <159>-<164>; *see also id.* at ¶¶ <150>-<151>.

The KR '447 Application discusses how to signal non-contiguous PPDU transmission throughout the specification. One example way of signaling through the bandwidth field in HE-SIG-A plus HE-SIG-B which further specifies where the unassigned resource is given the punctured channel. For example, the KR '447 application discloses that “the BW bit field in HE-SIG-A signals the bandwidth in the form of P20+S40, and HE-SIG-B, which contains the information for (A, C, D) bands.” Ex. 1007 (KR '447 Application) at ¶<160>.

The KR'447 Application also discloses the resource allocation field in HE-SIG-B which is a field with 8 bits indicating “OFDMA frequency division allocation information for the corresponding bandwidth.” Ex. 1007 (KR'447 Application) at ¶ <96>. KR '683 Application provides an example, where “[t]he Resource Allocation information may include an x-Null indicator, which signifies that a user is either not allocated in a particular frequency band or allocated but not transmitting user information over the SIG-B transmission channel. The x-Null indicator can have specific bandwidth-based indicators such as 242 Null (20MHz/242SC (subcarriers)), 484 Null (40MHz/484SC),

and 996 Null (80MHz/996SC), or it may have a multi-purpose Null indicator.”

Ex. 1009 (KR '683 Application) at ¶ <93>.

A POSITA reading these paragraphs in light of the entire disclosures of the KR '447 Application and KR '683 Application would understand that they support the element of “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth” in the independent claims.

Thus, because the independent claims are supported by the '281 Patent's priority applications predating Josiam and Kim, Grounds 1A and 1B should be denied because the asserted references are not prior art.

B. Ground 1A: Josiam (Ex. 1014): Failed to Demonstrate that the Alleged Art Discloses at Least the Element of “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.”

Josiam discloses using the bandwidth subfield to indicate whether a 20 MHz channel is not available. Josiam at [0006]. Petitioner makes reference to Josiam at [0155]-[0168], [0285]-[0287]. But unlike the '281 Patent where bandwidth field in HE-SIG-A and the resource unit allocation field in HE-SIG-A *collectively* indicate information for the unassigned resource unit, Josiam fails to teach “the resource unit allocation field indicates additional

puncturing information for the unassigned resource unit within the bandwidth” in the independent claims.

Specifically, Josiam uses the bandwidth field signaled in HE-SIG-A to decipher “both the bandwidth of the PPDU and the location of the content channel.” Josiam at [0161]; *see also* Petition at [0163], Table 1. As described in Josiam’s Table 1 and [0165], the bandwidth value of 011 means the bandwidth is 80 MHz, therefore the HE-SIG-B consists of two 20 MHz content channels repeated twice, and “[s]econdary channel not used. HE-SIG-B Content Secondary channel 2 in secondary 40 is not available.” When the bandwidth value is set to 100 it means that the bandwidth is set to 80 MHz, but “secondary channel in secondary 40 MHz not used.” Josiam Table 1. These examples confirm that Josiam is using the bandwidth field in HE-SIG-A to map the PPDU bandwidth and the HE-SIG-B content channel, and it does not use the bandwidth field together with the RA field in the way claimed by the ’281 Patent. *See also* Petition at 22-23.

Petitioner’s argument that the bandwidth field is used to decode information HE-SIG-B (Petition at 11-12, 13-14) does not help since it still does not show that HE-SIG-B field, such as the resource unit allocation field, “indicates additional puncturing information for the unassigned resource unit within the bandwidth” as recited in the independent claims.

Petitioner also points to certain discussions in Josiam of HE-SIG-B's common field. *See* Petition at 23-24, *citing* Josiam at [0154]-[0168]. But in Josiam, the HE-SIG-B common field is used to indicate information of the 20MHz that was not used based on the value set in the bandwidth field. Josiam does not disclose the specific configuration where “the bandwidth field of the HE-SIG-A indicates channel information to be punctured, *and the resource unit allocation field indicates additional puncturing information.*” ’281 Patent, Claim 1 (emphasis added).

Lastly, the Petitioner pointed to the nulled edge RU adjacent to an available channel as allegedly meeting the claims. Petition at 18, 25. This argument failed for multiple reasons. First, Petitioner failed to establish that the nulled edge RU is the “additional puncturing information”. Moreover, the nulled edge RU is not an “unassigned resource unit.” Instead, these edge RUs were nulled to “ensure compliance with spectral masks and out of band emission requirements.” Petition at 18, *citing* Josiam at [0139]. Thus, Josiam still fails to teach “*the resource unit allocation field indicates additional puncturing information* for the unassigned resource unit within the bandwidth.” Furthermore, the claim requires “the bandwidth field of the HE-SIG-A *indicates channel information to be punctured* within the bandwidth” and Petitioner

presented no evidence that the nulling edge RUs are channel information indicated in HE-SIG-A.

Thus, at least for the foregoing reasons, Josiam failed to teach “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.”

C. Ground 1B: Kim Does Not Cure the Deficiency of Josiam

The Petition asserted the combination of Josiam and Kim for a subset of claims of the '281 Patent, i.e., Claims 1-7, 13. Petition at 2, 50-51. For independent Claim 1, Kim was asserted solely for purposes of the “processor” element. Petition at 50-51. Accordingly, the Josiam and Kim combination suffers from the deficiencies as discussed above in Ground 1A.

VI. Independent Claims Are Not Taught by Grounds 2A-2B.

Bharadwaj (Ex. 1021) is asserted as the primary reference in Grounds 2A-2B. The Petition additionally asserts Li (Ex. 1023) in Ground 2A. As to Ground 2B, the Petition asserts Bharadwaj in combination with Li and Chen (Ex. 1025). For reasons discussed below, Petitioner failed to demonstrate it has a reasonable likelihood to succeed on the merits

A. Petition Failed to Demonstrate Bharadwaj (Ex. 1021) is Prior Art

Bharadwaj is not prior art to the '281 Patent because the Petitioner failed to establish that the relevant subject matter was disclosed Bharadwaj's provisional application (Ex. 1022). As a result, Bharadwaj is not entitled to the earlier filing date of its provisional. Based on the actual filing date of the Bharadwaj on December 21, 2016, it is not prior art to the '281 Patent since the '281 Patent is entitled to a priority date no later than March 4, 2016.

Bharadwaj was filed on December 21, 2016. Ex.1022. Petitioner argues that Bharadwaj is entitled to claim an earlier priority date than its filing date of December 21, 2016, due to its provisional application (Appl. No. 62/270,562) filed on December 21, 2015. Petition at 2; Ex. 1021 (Bharadwaj) at pg. 1; Ex. 1022 (Bharadwaj provisional). But the Petitioner failed to establish that all subject matters of Bharadwaj are disclosed in its provisional. *In re Riggs*, 131 F.4th 1377, 1384 (Fed. Cir. 2025) (to claim priority to the provisional application used in a prior art rejection, "the provisional application must also provide written description support for the specific portions of the patent specification identified and relied on in the prior art rejection.").

For example, Petitioner cited to Bharadwaj at [0132]-[0142], which discusses FIGS. 11A-D. But these figures were not in the Bharadwaj provisional application. In fact, aside from conclusory statements, Petitioner did not make

any effort to establish that the subject matter of Bharadwaj is disclosed in its provisional application. *See* Petition at 2. The Petition should be denied on this failure alone.

B. Ground 2A Bharadwaj (Ex. 2021) and Li (Ex. 2023) Failed to Disclose at Least the Element of “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth”

Bharadwaj does not teach using the bandwidth field of the HE-SIG-A (which indicates channel information to be punctured) in combination with the resource unit allocation field (which indicates additional puncturing information) for signaling the unassigned resource unit.

As the Petition itself has pointed out, when the secondary 20MHz channel is punctured, there are two alternative indicators in HE-SIG-A. One way is to use an indication in the SIG-A field alone. Petition at 52. Or, alternatively, use an indication in the SIG-A field to indicate decoding SIG-B, e.g., decoding SIG-B of the 4th 20MHz channel. Petition at 52-53; Bharadwaj at [0138]. But there is no disclosure in Bharadwaj that HE-SIG-A's “indicator” corresponds to bandwidth information. On the contrary, Bharadwaj states that the indicator is for “identifying a number of multi-user multiple-input/multiple-output (MU-MIMO) stations associated with a first resource unit (RU) in a

first content channel of the transmission frame.” Bharadwaj at Abstract, [0008].

When the other 20 MHz channels are punctured, Bharadwaj suggested a special bit may be added to the allocation table to indicate that this 20 MHz channel is punctured. Petition at 53. The Petition also agrees that in this case, “an explicit indication of the punctured 20 MHz channel may not be needed” in the HE-SIG-A field. Petition at 53, *citing* Bharadwaj at [0140].

In other words, Bharadwaj fails to teach the specific method of signaling unassigned resource unit with preamble puncturing, where “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.”

Li does not disclose this element either. As also pointed out by the Petitioner itself, Li adds additional bits to HE-SIG-A's bandwidth field to indicate various configurations of puncturing 20 MHz channel. *See, e.g.*, Li at [0026]-[0028], [0030]-[0032]; Petition at 54. HE-SIG-B is not considered in the solution proposed by Li, which even suggests that “the size of the common part of the HE-SIG-B field may be reduced. The size of HE-SIG-B may be reduced after a puncturing out of Subchannel. For example, the transmitting device may reduce the size of the common part of the HE-SIG-B field when

the total channel bandwidth is reduced ... ” Li at [0034]. Since Li's solution focuses on HE-SIG-A, it does not teach the claimed element of “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.”

Lastly, there is no motivation to combine Bharadwaj and Li because the combination would significantly increase signal overhead and would not work. For example, Li proposes adding extra signal bits to HE-SIG-A to signal 20 MHz channel, whereas Bharadwaj uses HE-SIG-B to signal this information. A POSITA would not combine the two because it would result in redundant signaling in both HE-SIG-A and HE-SIG-B, which increases signal inefficiencies. Indeed, even with the combination, they still fail to teach “bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and *the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth*”, as claimed.

C. Chen (Ex. 1025) Does Not Cure the Deficiencies of Bharadwaj and Li

The Petitioner pointed to the null station ID in the user specific field of HE-SIG-B in Chen for obtaining information of an unassigned resource unit.

Petition at 80-81. “If one RU is not allocated or is skipped, AP 110 may assign a special (e.g., blank or null) PAID which is not decodable by or known to any of the scheduled STA. As a result, all of the STAs 140 will skip that RU.” Chen at [0092]. Therefore, once again, Chen failed to disclose the information of the unassigned resource unit is indicated via a combination of the bandwidth field of the HE-SIG-A and a resource unit allocation field of the HE-SIG-B. More specifically, Chen still does not cure the deficiencies of Bharadwaj and Li as none of which discloses “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth” in the independent claims, as claimed.

Lastly, a POSITA would have no reason to combine Chen, Bharadwaj, and Li for reasons discussed above in the preceding section.

VII. Grounds 2C and 2D Should Be Denied At Least for the Same Reasons as Grounds 2A and 2B

Grounds 2C and 2D are directed to dependent Claims 6 and 13. Petition at 2. Thus, they should be denied at least for the same reasons as the base independent Claims in grounds 2A-2B. Moreover, for reasons discussed above, the Petitioner failed to demonstrate that Bharadwaj is prior art (*see* Section VI.A), and Kim is not prior art because the '281 Patent is supported

by its provisional applications filed on January 13, 2016, and March 4, 2016, which predate Kim (*see* Section V.A).

VIII. Conclusion

For the foregoing reasons, the Petition fails to demonstrate the prior art discloses the element of “the bandwidth field of the HE-SIG-A indicates channel information to be punctured within the bandwidth, and the resource unit allocation field indicates additional puncturing information for the unassigned resource unit within the bandwidth.” More importantly, Josiam and Kim are not prior art because their priority dates are after the provisionals’ filing dates of the ’281 Patent. Accordingly, the Petition fails to establish that it has a reasonable likelihood to succeed on the merits, and it should not be instituted.

Dated: September 16, 2025

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

I certify that there are 5,131 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.

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