

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG ELECTRONICS CO., LTD.,  
Petitioner,

v.

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

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IPR2025-00935  
Patent 11,129,163 B2

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Before KRISTEN L. DROESCH, JON M. JURGOVAN, and  
DANIEL J. GALLIGAN, *Administrative Patent Judges*.

GALLIGAN, *Administrative Patent Judge*.

DECISION  
Granting Institution of *Inter Partes* Review  
35 U.S.C. § 314

## I. INTRODUCTION

### *A. Background*

Samsung Electronics Co., Ltd. (“Petitioner”) filed a Petition for *inter partes* review (Paper 2 (“Pet.” or “Petition”)) challenging claims 1–16 of U.S. Patent 11,129,163 B2 (Ex. 1001 (the “’163 patent”)). Wilus Institute of Standards and Technology Inc. (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”).

This Petition has been referred to the Board to determine whether to institute review. Paper 12. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and the Preliminary Response shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons explained below, we institute an *inter partes* review of all challenged claims on all grounds raised in the Petition.

### *B. Related Matters*

As required by 37 C.F.R. § 42.8(b)(2), the parties identify various related matters. Pet. 78; Paper 4 at 1–2; Paper 8 at 1–2.

### *C. Real Parties in Interest*

Petitioner identifies itself and Samsung Electronics America, Inc. as the real parties in interest. Pet. 78. Patent Owner identifies itself as the real party in interest. Paper 4 at 1; Paper 8 at 1.

### *D. Illustrative Claim of the ’163 Patent*

Claim 1 is reproduced below with Petitioner’s identifiers in brackets. *See* Pet. v.

1. [1.1] A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:
  - [1.2] a transceiver; and
  - [1.3] a processor,
  - [1.4] wherein the processor is configured to receive a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) by using the transceiver, and not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed,
  - [1.5] wherein the BSS color is an identifier of a BSS,
  - [1.6] wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.

*E. Asserted Grounds of Unpatentability*

Petitioner presents the following grounds (Pet. 1–2):

<b>Claim(s) Challenged</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>
1, 7, 9, 15	103 <sup>1</sup>	Lee <sup>2</sup>
2, 3, 6, 10, 11, 14	103	Lee, Stacey <sup>3</sup>
4, 5, 12, 13	103	Lee, Zhou <sup>4</sup>
7, 8, 15, 16	103	Lee, Choudhury <sup>5</sup>
1, 7–9, 15, 16	103	Choudhury
2, 3, 6, 10, 11, 14	103	Choudhury, Stacey
4, 5, 12, 13	103	Choudhury, Zhou

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<sup>1</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102 and 103, effective March 16, 2013, which precedes the earliest priority date for the ’163 patent. Ex. 1001, code (30). Therefore, we apply AIA §§ 102 and 103.

<sup>2</sup> US 2017/0223731 A1, published Aug. 3, 2017 (Ex. 1005).

<sup>3</sup> Robert Stacey et al., *Proposed TGax Draft Specification*, IEEE 802.11-16/0024r1 (Mar. 2, 2016) (Ex. 1006).

<sup>4</sup> US 2016/0345258 A1, published Nov. 24, 2016 (Ex. 1007).

<sup>5</sup> EP 2930997 A1, published Oct. 14, 2015 (Ex. 1009).

## II. ANALYSIS

### *A. Principles of Law*

A patent claim is unpatentable “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any secondary considerations, if in evidence.<sup>6</sup> *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

### *B. Level of Ordinary Skill in the Art*

Petitioner argues that a person of ordinary skill in the art “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,” which Petitioner identifies as March 4, 2016. Pet. 2, 4 (citing Ex. 1003 ¶¶ 33–35). Petitioner also contends that “[i]ncreased educational experience can make up for less work experience, and vice versa.” Pet. 4.

Patent Owner does not object to Petitioner’s definition at this stage other than as follows: “To the extent that Petitioner requires that the

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<sup>6</sup> Patent Owner has not introduced secondary considerations evidence.

required experience and/or education level to be acquired by March 4, 2016, Petitioner [sic, Patent Owner] objects to this requirement because it is not relevant or needed for someone to be a [person of ordinary skill in the art].” Prelim. Resp. 7–8.

Patent Owner’s position is unclear, but we provide the following guidance on possible interpretations. To the extent Patent Owner disputes the critical date, Patent Owner should explain what date should apply. We understand Petitioner to have chosen the earliest possible date as the critical date. *See* Ex. 1001, code (30) (March 4, 2016).

To the extent Patent Owner contends that a person of ordinary skill in the art need not be defined as of the critical date, we disagree. Under Section 103, we must determine “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious *before the effective filing date* of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains” (emphasis added). “Obviousness is determined from the vantage point of a hypothetical person having ordinary skill in the art to which the patent pertains.” *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998). Thus, we define the hypothetical person of ordinary skill in the art as of a time before the effective filing date.

To the extent Patent Owner’s argument is that, to testify from the perspective of a person of ordinary skill in the art, one need not have been a person of ordinary skill in the art as of the critical date, we agree. Although one must at least possess ordinary skill in the art to testify from the perspective of a person of ordinary skill,

[a]n expert need not have acquired that skill level prior to the time of the invention to be able to testify *from the vantage point* of a person of ordinary skill in the art. Rather, an expert can acquire the necessary skill level later and develop an understanding of what a person of ordinary skill knew at the time of the invention.

*Osseo Imaging, LLC v. Planmeca USA Inc.*, 116 F.4th 1335, 1341 (Fed. Cir. 2024).

To the extent necessary, and for purposes of this Decision, we accept the uncontested assessment offered by Petitioner, which appears consistent with the '163 patent and the asserted prior art, except that we delete the qualifier “at least” to eliminate vagueness as to the amount of experience.

### *C. Claim Construction*

The parties agree that no claim terms require express construction. Pet. 3; Prelim. Resp. 8. On this record, we determine that no terms need express construction. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

### *D. Alleged Unpatentability Based on Lee (Claims 1, 7, 9, and 15)*

Petitioner asserts that claims 1, 7, 9, and 15 would have been obvious over Lee. Pet. 1, 5–18. Patent Owner opposes. Prelim. Resp. 8–11.

#### *1. Overview of Lee*

Lee discloses that in a wireless system a basic service set (BSS) “is a set of stations (STAs) capable of communicating with each other by successfully establishing synchronization.” Ex. 1005 ¶ 34. Lee discloses performing a clear channel assessment (CCA) in a wireless communication

system to determine whether a transmission medium is idle or busy. Ex. 1005, code (57), ¶ 63. Lee explains that CCA involves comparing a received signal strength to a reference level to determine if the medium is busy or idle. Ex. 1005 ¶ 63. For example, if a reference level is set at  $-70$  dBm and a signal of  $-75$  dBm is received, the medium is determined to be idle because the received signal strength is lower than the reference level, whereas the medium would be determined to be busy if the reference level were set to  $-82$  dBm. Ex. 1005 ¶ 63. Lee discloses that “IEEE 802.11ax considers a case that there are huge number of STAs and APs [(access points)]. In this case, in order to increase a frequency reuse rate, various methods are used to increase a CCA level.” Ex. 1005 ¶ 62.

Lee explains that collisions and interference may occur when STAs belong to the same BSS and that BSS coloring, in which “BSS coloring bits can be differently set according to a BSS,” can be used to help avoid collisions and interference. Ex. 1005 ¶¶ 63–64. Lee discloses setting a CCA level to a lower value if the coloring bit indicates that the station belongs to the BSS of a received frame but setting the value higher if the coloring bit indicates a BSS to which the station does not belong. Ex. 1005 ¶ 67. Thus, a medium is more likely to be determined busy with a lower CCA level to avoid intra-BSS collisions. *See* Ex. 1005 ¶ 64 (“If a BSS corresponds to a BSS to which the STA belongs thereto, although a signal of a very low level is received, the STA may not transmit a signal. If a BSS corresponds to a BSS to which the STA does not belong, the STA can determine whether or not a medium is busy based on the newly changed CCA level.”).

Lee also discloses a coloring disable bit, which will be discussed in more detail below. Ex. 1005 ¶ 7.

## 2. *Claim 1*

Claim 1 recites “[a] wireless communication terminal communicating wirelessly, the wireless communication terminal comprising: [1.2] a transceiver; and [1.3] a processor.” Petitioner argues that Lee discloses wireless terminals (stations or STAs) that communicate within BSSs and include a transceiver and a processor. Pet. 9–11 (citing Ex. 1005 ¶¶ 7, 35, 93, Figs. 1, 8; Ex. 1003 ¶¶ 83–85); *see* Ex. 1005 ¶ 93 (“An STA 20 can include a processor 21, a memory 22, and a transceiver 23.”).

Limitation 1.4 recites “wherein the processor is configured to receive a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) by using the transceiver, and not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed.”

Petitioner argues that in Lee an STA receives a PPDU, citing disclosure that the STA receives a “frame [that] may correspond to a HE-PPDU (high efficiency PLCP protocol data unit) frame” (Ex. 1005 ¶ 16). Pet. 12 (citing Ex. 1005 ¶¶ 16, 67–68; Ex. 1003 ¶ 86). Petitioner also notes that Lee discloses including a coloring bit and a coloring disable bit in a received frame. Pet. 12–13 (citing Ex. 1005 ¶¶ 17, 67); *see* Ex. 1005 ¶ 17 (“The coloring bit and the coloring disable bit can be included in a HE-SIG field.”).

Petitioner argues that Lee discloses performing a CCA level change based on the coloring bit in the received frame and, therefore, that “Lee’s CCA level change is an operation based on the BSS color.” Pet. 12–13 (citing Ex. 1005 ¶ 67; Ex. 1003 ¶ 88). Petitioner argues, however, that the coloring disable bit disables the use of BSS color. Pet. 13 (citing Ex. 1005, code (57), ¶¶ 7–8, 68; Ex. 1003 ¶ 89). In support of this assertion, Petitioner

relies on the following disclosure of Lee: “[I]f the coloring disable bit indicates that the frame corresponds to a trigger frame related to multiuser transmission, the STA may not perform the change of the CCA level irrespective of information indicated by the coloring bit.” Ex. 1005 ¶ 68, *quoted in* Pet. 13. Petitioner argues that, “[i]n this way, Lee’s ‘coloring disable bit’ disables use of the BSS color and the STA operates ‘without regard to information indicated by the coloring bit.’” Pet. 13 (emphasis omitted) (citing Ex. 1005, code (57), ¶¶ 7–8, 68).

Limitation 1.5 recites “wherein the BSS color is an identifier of a BSS.” Petitioner argues that Lee teaches this subject matter because the coloring bit indicates a BSS. Pet. 13–14 (citing Ex. 1005 ¶¶ 64, 67; Ex. 1003 ¶ 90; Ex. 1006, 51; Ex. 1010, 5; Ex. 1011 ¶ 14); *see* Ex. 1005 ¶ 64 (disclosing that “BSS coloring bits can be differently set according to a BSS” and that an STA checks the coloring bit to determine if it “corresponds to a BSS to which the STA belongs thereto”).

Limitation 1.6 recites “wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.” Petitioner argues that the AP that transmits the trigger frame having the coloring disable bit is a base wireless communication terminal with which the STA is associated. Pet. 14–15 (citing Ex. 1005 ¶¶ 36, 65, 69; Ex. 1003 ¶¶ 91–93).

Patent Owner argues that Lee does not teach a processor that is configured “not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed,” as recited in limitation 1.4. Prelim. Resp. 8–11. According to Patent Owner, “the coloring disable bit of Lee indicates that a frame containing that bit is a trigger frame; it does not indicate that ‘an operation

based on the BSS color is not allowed,’ as is required by the claims of the ‘163 Patent.” Prelim. Resp. 9 (citing Ex. 1005, code (57), ¶ 7).

On this record, we find Petitioner’s contentions persuasive. As noted above, Lee states the following: “[I]f the coloring disable bit indicates that the frame corresponds to a trigger frame related to multiuser transmission, the STA may not perform the change of the CCA level irrespective of information indicated by the coloring bit.” Ex. 1005 ¶ 68. Even though the coloring disable bit indicates that the frame corresponds to a trigger frame for multiuser transmission, Lee states that “the coloring disable bit can also be comprehended as a bit indicating that CCA level change is not performed.” Ex. 1005 ¶ 68. This supports Petitioner’s contention that the coloring disable bit is signaling information that indicates that a CCA level change is not allowed, even if it indicates other things as well. *See* Pet. 13.

Patent Owner also argues that, “in Lee, even if the color disabling bit is received, CCA can still be performed using the BSS color” (Prelim. Resp. 10), relying on the following disclosure of Lee: “If the coloring disable bit indicates that the frame corresponds to a trigger frame related to multiuser transmission, the change of the CCA level can be performed when an uplink frame related to the trigger frame is received.” Ex. 1005 ¶ 69. This disclosure states what might happen when an uplink frame is received, but it does not undermine Petitioner’s reliance on Lee’s trigger frame disclosures discussed above. *See* Ex. 1005 ¶ 68 (“*Since a current frame corresponds to a trigger frame, the coloring disable bit can also be comprehended as a bit indicating that CCA level change is not performed and whether or not a medium is busy is not determined.*” (emphasis added)).

Patent Owner also argues that “Lee still uses BSS color for a device to recognize whether the data unit is from its own BSS or overlapping BSS

(OBSS).” Prelim. Resp. 10–11 (citing Ex. 1005 ¶¶ 12–13). Patent Owner argues that the “Petition also agrees that Lee still uses BSS color to distinguish between BSS and OBSS.” Prelim. Resp. 11 (citing Pet. 13–14). According to Patent Owner, therefore, Lee does not teach a processor that is configured “not to use a Basic Service Set (BSS) color,” as recited in claim 1. Prelim. Resp. 10–11.

On this record, we are persuaded by Petitioner’s contentions in this regard because Lee discloses that a certain value of the coloring disable bit means that there is no change to the CCA level “irrespective of information indicated by the coloring bit” and “without regard to information indicated by the coloring bit.” Ex. 1005, code (57), ¶ 7. Therefore, the BSS color is not used. Patent Owner’s citation of Petitioner’s contentions for limitation 1.5 does not warrant a contrary finding. *See* Prelim. Resp. 11 (citing Pet. 13–14). Limitation 1.5 recites “wherein the BSS color is an identifier of a BSS,” and Petitioner’s contentions for that limitation show that Lee’s coloring bit identifies a BSS. Pet. 13–14. If the fact that the BSS color identifies a BSS as in limitation 1.5 means that a BSS color is used, then it is not clear on this record how both limitations 1.4 and 1.5 could be met.

For the reasons discussed above, we find Petitioner’s contentions sufficiently persuasive for limitation 1.4, and we are also persuaded by Petitioner’s contentions for the remaining limitations of claim 1, which Patent Owner does not presently dispute. Therefore, we determine that there is a reasonable likelihood that Petitioner would prevail with respect to at least claim 1 based on the Lee obviousness ground.

*E. Additional Grounds*

Having determined that the Petition meets the threshold for institution (reasonable likelihood of prevailing as to at least one of the challenged claims) based on Lee, we provide a brief discussion of the parties' dispute with respect to Choudhury, which also relates to limitation 1.4.

Petitioner has alternative theories for how Choudhury teaches limitation 1.4, arguing that “[t]he ‘Low Power/High Interference Indicator’ or the presence of the reserved value in the COLOR field indicate whether an operation based on the BSS color is not allowed.” Pet. 52 (citing Ex. 1003 ¶ 167).

Petitioner's first theory is that Choudhury's “Low Power/High Interference Indicator functions as signaling information that, when set to ‘1’, indicates that devices receiving a transmission from an OBSS STA with the indicator set to 1 are ‘required to defer channel access,’ regardless of the BSS color information.” Pet. 54 (citing Ex. 1009 ¶ 29). Patent Owner counters that Choudhury still teaches using the color field to determine whether the received data are from the same BSS or a different BSS. Prelim. Resp. 15–16 (citing Ex. 1009 ¶¶ 23, 25).

On this record, it is not entirely clear that comparing a BSS color value to determine if a receiving station is in that BSS is prohibited by the claim's recitation “not to use” a BSS color, as Patent Owner's argument implies. Rather, claim 1's recitation “not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed” appears directed to prohibiting a particular operation based on the BSS color, not necessarily disregarding the BSS color entirely. Further, comparing BSS values to determine BSS identity appears consistent with claim 1's recitation that “the BSS color is an

identifier of a BSS” and with claim 4’s recitation that “the wireless communication terminal recognizes that a BSS color collision has occurred.” On this record, it appears that BSS color would need to be identified to determine if a color collision occurs. *See* Prelim. Resp. 4 (“BSS color collisions occur when two or more BSSs operating on the same frequency channel (and overlapping in coverage area) use the same BSS color. *See* ’163 Patent at 2:46-59, 10:41-62. In other words, a wireless communication terminal receives a signal with the same BSS color that device understands applies to it, even though the signal is intended for another device in a different BSS (albeit using the same BSS color). When a color collision is detected, the wireless communication terminal reports to the base wireless communication terminal, which will indicate that a color collision has occurred. ’163 Patent at 3:16-20.”).

In that light, we see some merit in Petitioner’s position that an “operation based on BSS COLOR (e.g., allowing access and re-using the channel) is not allowed” based on the Low Power/High Interference Indicator, even if some reference is made to the BSS color to resolve a condition precedent to that determination, namely whether the data are from a different BSS. *See* Pet. 53–54 (citing Ex. 1009 ¶ 26; Ex. 1003 ¶ 170).

Petitioner’s second theory is based on setting the color field to a reserved value of “0000,” which Petitioner argues “indicates that operations based on BSS COLOR are not allowed and the receiving STA does not use BSS COLOR.” Pet. 54–55 (citing Ex. 1009 ¶¶ 25, 29; Ex. 1003 ¶ 172). On this record, we question how setting a color value to 0000 can teach the subject matter of claim 1, which also requires that “the BSS color is an identifier of a BSS.” Petitioner acknowledges that a reserved value of 0000 in the color field does not identify a BSS. *See* Pet. 54–55 (asserting that a

person of ordinary skill in the art “would have understood or found obvious that a COLOR field value of ‘0000’ does not represent a valid BSS identifier”). We also recognize, however, that claim 7, depending from claim 1, recites “the BSS color indicated by the signaling field of the PPDU is a predetermined value” and that claim 8, depending from claim 7, recites that the predetermined value is 0. Thus, Choudhury’s reserved value disclosures appear to teach *this* subject matter of claims 7 and 8, even if claims 7 and 8 are inconsistent with claim 1’s requirement that “the BSS color is an identifier of a BSS.” *See* Ex. 1001, 21:23–30 (disclosing that the BSS color value may be set to a predetermined value such as zero).

Finally, we note Patent Owner’s assertion that “[t]he ’163 Patent’s technology is utilized by products that implement the Wi-Fi 6 (IEEE 802.11ax) standard for wireless communications.” Prelim. Resp. 2. Patent Owner cites no evidentiary support for this statement. The claims themselves do not recite the 802.11ax standard, and the ’163 patent mentions several 802.11 standards but not 802.11ax. Thus, on this record, we find inapposite Patent Owner’s criticism of Choudhury as “rest[ing] on the 802.11ah standard and propos[ing] to modify the 802.11ah standard.” *See* Prelim. Resp. 12.

### III. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging at least one claim of the ’163 patent, and we institute *inter partes* review of all challenged claims on all grounds raised in the Petition. *See* 37 C.F.R. 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the

challenged claims and on all grounds of unpatentability asserted for each claim.”). At this stage of the proceeding, we have not made a final determination with respect to the patentability of any of the challenged claims or the construction of any claim term.

#### IV. ORDER

Accordingly, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a) and 37 C.F.R. § 42.4, an *inter partes* review is hereby instituted as to claims 1–16 of the ’163 patent on all challenges raised in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which will commence on the entry date of this decision.

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