UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

Wilus Institute of Standards and Technology Inc., *Plaintiff*, vs. Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., *Defendants*.	CASE NO. 2:24-cv-00746 **Complaint for Patent Infringement** **JURY DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Wilus Institute of Standards and Technology Inc. ("Wilus") files this complaint against Defendants Samsung Electronics Co., Ltd. ("SEC"), and Samsung Electronics America, Inc. ("SEA") (collectively, "Defendants" or "Samsung"), alleging infringement of U.S. Patent Nos. 10,313,077, 10,687,281, 11,470,595, and 11,159,210. The Accused Products are Wi-Fi 6 (802.11ax) enabled devices used, offered for sale, sold, and/or imported by Defendants in the United States and supplied by Defendants to customers in the United States.

BACKGROUND

1. This complaint arises from Defendants' infringement of the following United States patents owned by Wilus, each of which relate to the "PHY" or "physical layer" of wireless communications technology: United States Patent Nos. 10,313,077 ("'077 patent"), 10,687,281 ("'281 patent"), 11,470,595 ("'595 patent"), and 11,159,210 ("'210 patent") (collectively, "Asserted Patents").

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NOTICE OF THE ASSSERTED PATENTS

2. The patented technologies which are the subject of this lawsuit are well known to Defendants.

3. For example, on January 15, 2021 and December 27, 2022, Wilus submitted Letters of Assurance to the IEEE Standards Association Standards Board Patent Committee, stating that Wilus may own, control, or have the ability to license patent claims that might be or become essential patent claims for the IEEE 802.11ax and 802.11 standards. Samsung was a participant in the IEEE task group that developed the 802.11ax standard. On information and belief, Samsung was aware of the Letters of Assurance submitted by Wilus.

4. As another example, on April 8, 2022, SEC was sent a letter by Sisvel International S.A. ("Sisvel"), acting in its role as a licensing manager of certain patents related to the IEEE Wi-Fi 6 (802.11ax) standard. This letter conveyed Wilus's and Sisvel's belief that Samsung products practiced Wilus patents and required a license to these Wilus patents. The letter contained a list of "patents essential to the 802.11ax standard," which included the '077, '281, and '210 patents. The patent application that resulted in the '595 patent was still pending before the U.S. Patent Office at the time this letter was sent. The letter identified specific Samsung products as examples of products that implement essential features of the Wi-Fi 6 standard. It also contained a link to a brochure that included a table identifying specific sections and figures of the Wi-Fi 6 standard as illustrations of what the essential patents covered in the standard. The letter included an offer to grant a patent license for Wilus patents including the '077, '281, and '210 patents to SEC in exchange for royalty payments.

5. As another example, on January 18, 2023, SEC was sent another letter by Sisvel that included a "list of Pool Wi-Fi 6 SEPs evaluated by independent third-party patent evaluators as being essential to the Wi-Fi 6 Standard." This list included the '077, '281, '595, and '210 patents.

PLAINTIFF WILUS AND THE ASSERTED PATENTS

6. Plaintiff Wilus is a research and development company specializing in the development of new technologies related to wireless communications and multimedia, including Wi-Fi and other wireless protocols. Founded in 2012, Wilus has been at the forefront of research and development in wireless communications for more than a decade. The company is employee-owned, and its team currently consists of 20 engineers and inventors.

7. Since its formation Wilus has made over 700 technical contributions to leading standards bodies that define international standards for technologies including cellular wireless, wireless LAN, and multimedia compression. In particular, Wilus has played a crucial role in the development and standardization of Wi-Fi 6 technologies, contributing significantly to the enhanced speed, efficiency, capabilities, and performance of Wi-Fi 6 networks. Its work is significant in the context of the standards pertaining to Wi-Fi 6, both in terms of the number of technical contributions and in terms of the importance of those technical contributions to the standards.

8. Wilus is a corporation organized under the laws of South Korea, with its principal place of business at 5F 216 Hwangsaeul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13595 Republic of Korea.

9. Wilus is the owner of all right, title, and interest in U.S. Patent No. 10,313,077, titled "Wireless communication method and wireless communication terminal for coexistence with

legacy wireless communication terminal," and issued June 4, 2019. A copy of the '077 patent is attached as Exhibit 1.

10. Wilus is the owner of all right, title, and interest in U.S. Patent No. 10,687,281, titled "Wireless communication method and wireless communication terminal, which use discontinuous channel," and issued June 16, 2020. A copy of the '281 patent is attached as Exhibit 2.

11. Wilus is the owner of all right, title, and interest in U.S. Patent No. 11,470,595, titled "Wireless communication method and wireless communication terminal, which use discontinuous channel," and issued October 11, 2022. A copy of the '595 patent is attached as Exhibit 3.

12. Wilus is the owner of all right, title, and interest in U.S. Patent No. 11,159,210, titled "Wireless communication method and wireless communication terminal for signaling multi-user packet, and issued October 26, 2021. A copy of the '210 patent is attached as Exhibit 4.

DEFENDANTS AND THE ACCUSED PRODUCTS

13. On information and belief, Defendant Samsung Electronics Co., Ltd. is a corporation organized under the laws of South Korea, with its principal place of business at 129, Samsung-Ro, YeongTong-Gu, Suwon-Si, Gyonggi-Do, 443-742, South Korea.

14. On information and belief, Defendant Samsung Electronics America, Inc. is a United States corporation organized under the laws of the State of New York, with its principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660.

15. SEA is a wholly-owned subsidiary of SEC.

16. SEA distributes certain Samsung consumer electronics products, including the Accused Products, in the United States.

17. On information and belief, SEA has corporate offices in the Eastern District of Texas at 1303 East Lookout Drive, Richardson, Texas 75082, 2800 Technology Drive, Suite 200, Plano, Texas 75074, and at 6625 Excellence Way, Plano, Texas 75023.

18. SEA may be served with process through its registered agent CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201-3136.

19. The Accused Products are all of Samsung's Wi-Fi 6 (802.11ax) enabled devices, including mobile phones, tablets, laptops, e-readers, cameras, appliances, and wearables, used, offered for sale, sold, and/or imported by Defendants in the United States.

JURISDICTION AND VENUE

20. This action arises under the patent laws of the United States, Title 35 of the United States Code.

21. This Court has original subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

22. This Court has personal jurisdiction over Samsung in this action because Samsung has committed acts of infringement within this District giving rise to this action, has a regular and established place of business in this District, and has established minimum contacts with this forum such that the exercise of jurisdiction over Samsung would not offend traditional notions of fair play and substantial justice. Samsung, directly and/or through subsidiaries or intermediaries, conducts its business extensively throughout Texas, by shipping, distributing, offering for sale, selling, and advertising its products and/or services in Texas and the Eastern District of Texas, regularly does business or solicit business, engage in other persistent courses of conduct, and/or derives substantial revenue from products and/or services provided to individuals in Texas, and commits acts of infringement of Wilus's patents in this District by, among other things, making,

using, importing, offering to sell, and selling products that infringe the asserted patents, including without limitation the Samsung Wi-Fi 6 enabled devices accused of infringement in this case.

23. Samsung, directly and/or through subsidiaries or intermediaries, has purposefully and voluntarily placed one or more products and/or services in the stream of commerce that practice the Asserted Patents with the intention and expectation that they will be purchased and used by consumers in the Eastern District of Texas. These products and/or services have been and continue to be purchased and used in the Eastern District of Texas.

24. Venue as to Samsung is proper in this District under 28 U.S.C. §§ 1391 and 1400(b). Samsung has transacted business in this District and has committed acts of direct and indirect infringement in this District by, among other things, making, using, importing, offering to sell, and selling products that infringe the Asserted Patents.

25. Defendant SEA maintains a regular and established place of business at 1301 East Lookout Drive, Richardson, Texas 75082, 2800 Technology Drive, Suite 200, Plano, Texas 75074, and 6625 Excellence Way, Plano, Texas 75023.

26. Defendant SEC is a foreign corporation. Venue is proper as to a foreign defendant in any district. 28 U.S.C. §§ 1391(c)(3).

27. Further, Samsung has admitted or not contested proper venue in this Judicial District in other patent infringement actions.

COUNT 1 – CLAIM FOR INFRINGEMENT OF THE ’077 PATENT

28. Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

29. On June 4, 2019, the United States Patent and Trademark Office issued U.S. Patent No. 10,313,077, titled “Wireless communication method and wireless communication terminal for

coexistence with legacy wireless communication terminal." Exhibit 1.

30. The '077 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

31. Wilus is the owner of the '077 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

32. The claims of the '077 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the '077 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

33. Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the '077 patent, and Wilus is entitled to damages for Defendants' past infringement. For example, Sisvel's letters conveying Wilus's and Sisvel's belief that Samsung products practiced Wilus's '077 patent and offering to license Wilus's patents to Samsung provided Samsung with actual notice of infringement.

34. Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the '077 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of the '077 patent; and inducing and contributing to infringement by others of the claims of the '077 patent.

35. On information and belief, Defendants use, import, offer for sale, and sell certain infringing products in the United States. The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including mobile phones, tablets, laptops, e-readers, cameras, appliances, and wearables, used, offered for sale, sold, and/or imported by Defendants in the United States.

36. The Accused Products satisfy all claim limitations of one or more claims of the ’077 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include “A wireless communication terminal that communicates wirelessly, the terminal”:

Samsung Galaxy S24 Ultra

Featuring Snapdragon 8 Gen 3 for Galaxy.

Introducing Samsung Galaxy S24 Ultra, now with many next-gen AI features and capabilities enabled by Snapdragon 8 Gen 3 for Galaxy. Powered with Galaxy AI, Galaxy S24 Ultra adapts to your passions and behaviors to make a new level of achievement possible. And, with Qualcomm FastConnect 7800 Mobile Connectivity System, you’ll get the best possible connection and premium WiFi 7 connectivity.

(https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s24-ultra)

37. The Accused Products include “a transceiver” and “a processor”:

Wi-Fi	**Wi-Fi/Bluetooth System:** Qualcomm® FastConnect™ 7800
	Peak Speed: 5.8 Gbps
	Generation: Wi-Fi 7, Wi-Fi 6, Wi-Fi 5, Wi-Fi 4
	Standards: 802.11be, 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a

(https://www.qualcomm.com/products/mobile/snapdragon/smartphones/snapdragon-8-series-mobile-platforms/snapdragon-8-gen-3-mobile-platform)

38. In the Accused Products, the processor is configured to "receive a non-legacy physical layer frame by using the transceiver":

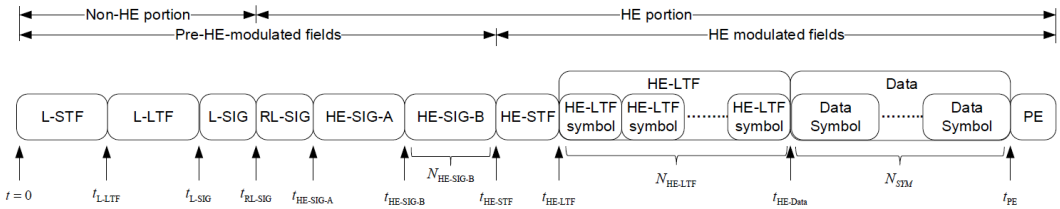

Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

(IEEE 802.11ax-2021, § 27.3.10)

39. In the Accused Products, the processor is configured to "obtain a legacy signaling field including information decodable by a legacy wireless communication terminal from the non-legacy physical layer frame":

27.3.11.5 L-SIG field

The L-SIG field is used to communicate rate and length information. The structure of the L-SIG field is defined in Figure 17-5.

…

The L-SIG field shall be encoded, interleaved, and mapped following the steps described in 17.3.5.6, 17.3.5.7, and 17.3.5.8. The stream of 48 complex numbers generated by these steps is denoted by

d_k, $k = 0, \ldots, 47$ and is mapped to subcarriers [–26, 26]. In addition, values [–1, –1, –1, 1] are mapped to the extra subcarriers [–28, –27, 27, 28] of the L-SIG field of a 20 MHz HE PPDU. Subcarriers [–28, –27, 27, 28] are also BPSK modulated. Pilots shall be inserted as described in 17.3.5.9.

(IEEE 802.11ax-2021)

40. In the Accused Products, the processor is configured to "obtain length information indicating information on a duration of the non-legacy physical layer frame, from the legacy signaling field":

For an HE TB PPDU, the LENGTH field is set to the TXVECTOR parameter L_LENGTH. For an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU, the LENGTH field is set to the value given by the Equation (27-11).

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

where

TXTIME is defined in 27.4.3 (in µs)

(IEEE 802.11ax-2021, § 27.3.11.5)

41. In the Accused Products, the processor is configured to "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":

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

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

(IEEE 802.11ax-2021, § 27.3.11.5)

The L_DATARATE parameter of the TXVECTOR shall be set to the value 6 Mb/s.

A STA that is transmitting a PPDU with the FORMAT parameter of the TXVECTOR equal to HT_MF shall set the value of the L_LENGTH parameter to the value (in octets) given by Equation (10-16):

$$\text{L_LENGTH} = \left\lceil \frac{((\text{TXTIME} - \text{Signal Extension}) - \text{NonHTLength})}{\text{aSymbolLength}} \right\rceil \times N_{OPS} - \left\lceil \frac{\text{PHYServiceLength} + \text{PHYConvolutionalTailLength}}{8} \right\rceil \quad (10\text{-}16)$$

where

TXTIME	is the duration (in microseconds) of the HT PPDU defined in 6.5.5
Signal Extension	is 0 µs when TXVECTOR parameter NO_SIG_EXTN is true and is aSignalExtension as defined in Table 19-25 of 19.4.4 when TXVECTOR parameter NO_SIG_EXTN is false
aSymbolLength	is the duration of a symbol (in microseconds), defined in 6.5.4
NonHTLength	is 20 µs, the duration of the non-HT PHY preamble and L-SIG
N_{OPS}	is the number of octets transmitted during a period of aSymbolLength at the rate specified by L_DATARATE
PHYServiceLength	is 16 bits, the number of bits in the PHY SERVICE field
PHYConvolutionalTailLength	is 6 bits, the number of bits in the convolutional code tail bit sequence

NOTE 1—The last term of the L_LENGTH definition corrects for the fact that non-HT STAs add the length of the SERVICE field and tail bits (assuming a single convolutional encoder) to the value communicated by the L_LENGTH field.

Equation (10-16) can be simplified to Equation (10-17)

$$\text{L_LENGTH} = \left\lceil \frac{((\text{TXTIME} - \text{Signal Extension}) - 20)}{4} \right\rceil \times 3 - 3 \quad (10\text{-}17)$$

(IEEE 802.11-2020, § 10.27.4)

42. In the Accused Products, the processor is configured to "determine the number of symbols of data of the non-legacy physical layer frame according to a following equation, $N_{\text{SYM}} = \left\lfloor \left(\frac{\text{L_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE_PREAMBLE}} \right) / T_{\text{SYM}} \right\rfloor - b_{\text{PE_Disambiguity}}$ where $\lfloor x \rfloor$ denotes a largest integer less than or equal to x, L_LENGTH denotes the length information, m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame, $b_{\text{PE_Disambiguity}}$ denotes a value of PE Disambiguity field, $T_{\text{HE_PREAMBLE}}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame, T_{SYM} denotes a duration of a symbol of the data of the non-legacy physical layer frame":

27.3.13 Packet extension

. . .

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

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

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

where

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

$$T_{\text{HE-PREAMBLE}} = \begin{cases} T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-T}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE TB PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE SU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + N_{\text{HE-SIG-B}} T_{\text{HE-SIG-B}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE MU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A-R}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE ER SU PPDU} \end{cases} \tag{27-121}$$

where

$T_{\text{RL-SIG}}$, $T_{\text{HE-STF-T}}$, $T_{\text{HE-STF-NT}}$, $T_{\text{HE-LTF-SYM}}$, $T_{\text{HE-SIG-A}}$, $T_{\text{HE-SIG-A-R}}$, and $T_{\text{HE-SIG-B}}$ are defined in Table 27-12

$N_{\text{HE-SIG-B}}$ and $N_{\text{HE-LTF}}$ are defined in Table 27-15

$b_{\text{PE-Disambiguity}}$ is the value indicated by the PE Disambiguity subfield of the HE-SIG-A field for an HE SU, HE ER SU, or HE MU PPDU or the value indicated by the PE Disambiguity subfield in the Common Info field in the Trigger frame (see Table 9-29g) for an HE TB PPDU

. . .

$$N_{MA} = \begin{cases} 0, \text{ if Doppler} = 0 \\ max\left(0, \left\lfloor \left(\frac{\text{L_LENGTH} + 3 + m}{3} \times 4 - T_{\text{HE-PREAMBLE}} - (b_{\text{PE-Diambiguity}} + 2) \cdot T_{SYM} \right) / T_{MA} \right\rfloor \right), \text{ if Doppler} = 1 \end{cases} \tag{27-122}$$

(IEEE 802.11ax-2021)

43. In the Accused Products, "the PE Disambiguity field is set based on the duration of a symbol of the data of the non-legacy physical layer frame and an increment of duration to set a value of the length information based on a duration of a symbol of the legacy physical layer frame."

The PE Disambiguity field of the HE-SIG-A field for an HE SU, HE ER SU (see Table 27-18), or HE MU PPDU (see Table 27-20) shall be set to 1 if the condition in Equation (27-118) is met; otherwise, it shall be set to 0.

The PE Disambiguity subfield in the Common Info field of the Trigger frame (see Table 9-29g) shall be set to 1 if the condition in Equation (27-118) is met for the HE TB PPDU solicited by the Trigger frame. Otherwise, it shall be set to 0.

$$T_{PE} + 4 \times \left(\left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil - \left(\frac{\text{TXTIME} - SignalExtension - 20}{4} \right) \right) \geq T_{SYM} \quad (27\text{-}118)$$

where

T_{PE} is the PE field duration

T_{SYM} is the symbol duration of the Data field as defined in 27.3.9

(IEEE 802.11ax-2021, § 27.3.13)

44. Defendants have also knowingly and intentionally induced and contributed to infringement of the ’077 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the ’077 patent and the infringing nature of the Accused Products at least because SEC had received the April 8, 2022, letter from Sisvel identifying the ’077 patent as “essential to the 802.11ax standard” and identifying examples of Samsung products that implement essential features of the standard.

45. Despite this knowledge of the ’077 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the ’077 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the ’077 patent, thereby specifically intending for and inducing their customers to infringe the ’077 patent through the customers’ normal and customary use of the Accused Products.

46. On information and belief, the Accused Products contain components that constitute a material part of the ’077 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and

imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the ’077 patent.

47. On information and belief, Defendants’ infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the ’077 patent.

48. Defendants have induced, and continue to induce, infringement of the ’077 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

49. Samsung and its customers benefit from the use of the inventions claimed in the ’077 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

50. Wilus has been damaged by Defendants′ willful infringement of the ’077 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

COUNT 2 – CLAIM FOR INFRINGEMENT OF THE ’281 PATENT

51. Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

52. On June 16, 2020, the United States Patent and Trademark Office issued U.S. Patent No. 10,687,281, titled "Wireless communication method and wireless communication terminal, which use discontinuous channel." Exhibit 2.

53. The '281 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

54. Wilus is the owner of the '281 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

55. The claims of the '281 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the '281 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

56. Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the '281 patent, and Wilus is entitled to damages for Defendants' past infringement. For example, Sisvel's letters conveying Wilus's and Sisvel's belief that Samsung products practiced Wilus's '281 patent and offering to license Wilus's patents to Samsung provided Samsung with actual notice of infringement.

57. Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the '281 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of

the ’281 patent; and inducing and contributing to infringement by others of the claims of the ’281 patent.

58. On information and belief, Defendants use, import, offer for sale, and sell certain infringing products in the United States. The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including mobile phones, tablets, laptops, e-readers, cameras, appliances, and wearables, used, offered for sale, sold, and/or imported by Defendants in the United States.

59. The Accused Products satisfy all claim limitations of one or more claims of the ’281 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include “A wireless communication terminal, the terminal”:

Samsung Galaxy S24 Ultra

Featuring Snapdragon 8 Gen 3 for Galaxy.

Introducing Samsung Galaxy S24 Ultra, now with many next-gen AI features and capabilities enabled by Snapdragon 8 Gen 3 for Galaxy. Powered with Galaxy AI, Galaxy S24 Ultra adapts to your passions and behaviors to make a new level of achievement possible. And, with Qualcomm FastConnect 7800 Mobile Connectivity System, you’ll get the best possible connection and premium WiFi 7 connectivity.

(https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s24-ultra)

60. The Accused Products include “a processor” and “a communication unit,” and the processor is configured to “receive a wireless packet through the communication unit”:

Wi-Fi	**Wi-Fi/Bluetooth System:** Qualcomm® FastConnect™ 7800
	Peak Speed: 5.8 Gbps
	Generation: Wi-Fi 7, Wi-Fi 6, Wi-Fi 5, Wi-Fi 4
	Standards: 802.11be, 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a

(https://www.qualcomm.com/products/mobile/snapdragon/smartphones/snapdragon-8-series-mobile-platforms/snapdragon-8-gen-3-mobile-platform)

61. In the Accused Products, the processor is configured to "obtain bandwidth information indicated via a bandwidth field of HE-SIG-A of the received packet":

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

62. In the Accused Products, the processor is configured to "obtain 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":

In an HE MU PPDU, an RU that is not allocated to a user can be indicated as follows:

— The Center 26-tone RU subfield in the Common field of the HE-SIG-B field is set to 0 (see Table 27-24).

— The RU Allocation subfield in the Common field of the HE-SIG-B field is set to a value between 16 and 31 or between 96 and 113 (see Table 27-26).

— Both RU Allocation subfields at the same position in each Common field of the two HE-SIG-B content channels are set to 114 (see Table 27-26).

— The STA-ID subfield in the User field of the HE-SIG-B field is set to 2046 (see 26.11.1 and 27.3.11.8.4).

(IEEE 802.11ax-2021, § 27.3.11.8.3)

63. In the Accused Products, the processor is configured to "decode the received packet based on the bandwidth information and the information of the unassigned resource unit":

A typical state machine implementation of the receive PHY is given in Figure 27-63.

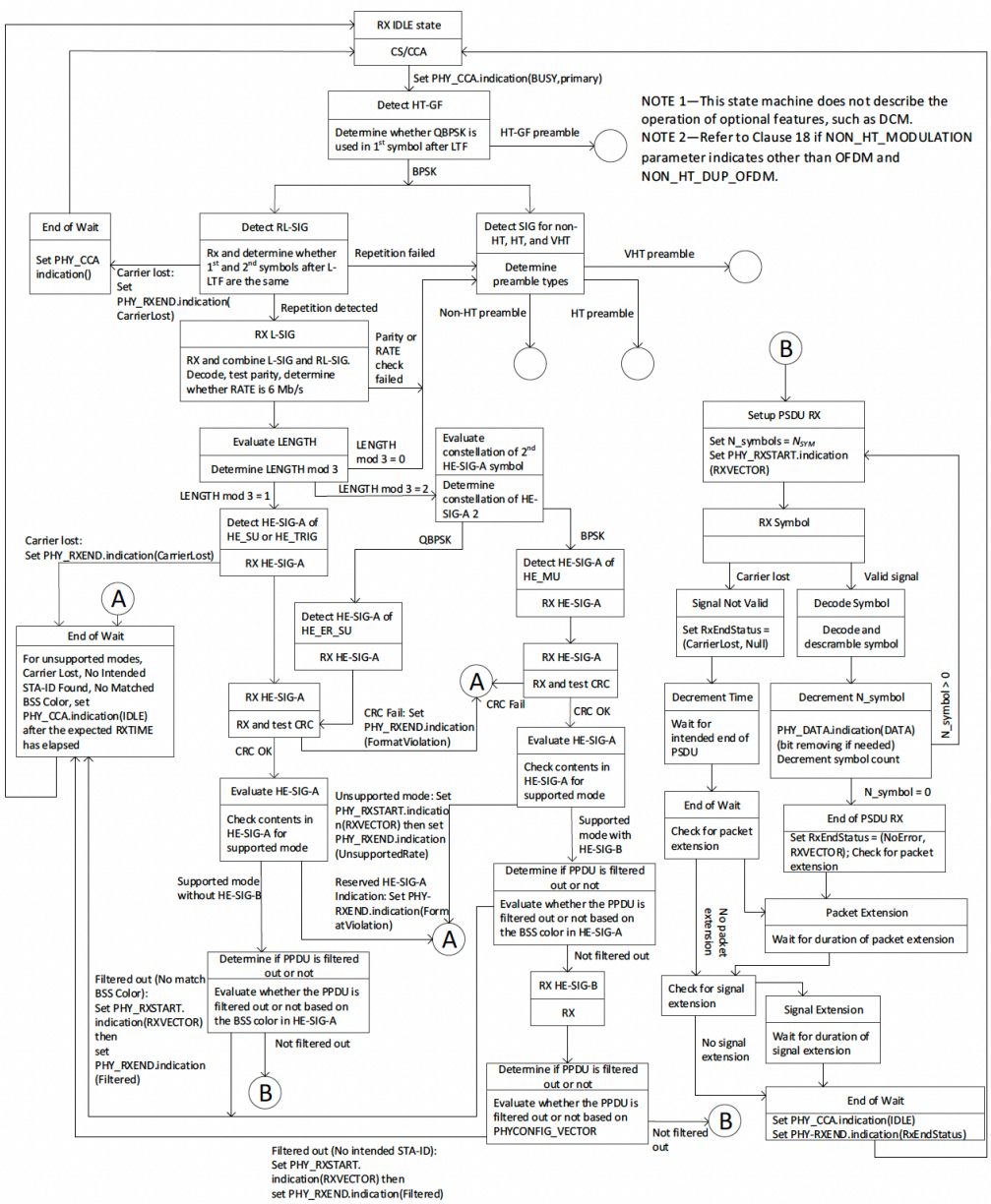

Figure 27-63—PHY receive state machine if midambles are not present

…

After the HE-SIG-A field, the PHY entity shall receive the HE-SIG-B field for the number of symbols predicted from the HE-SIG-A field. If the Common field is present in the HE-SIG-B field, the PHY entity shall check the CRC of the Common field. If the CRC in the Common field is valid or the Common field is not present, the PHY entity shall search for intended STA-ID in each User Specific subfield with a valid CRC. If no CRC is valid or no intended STA-ID is detected, the PHY entity shall issue a PHY-RXSTART.indication(RXVECTOR) and then issue a PHY-RXEND.indication(Filtered). If a complete allocation of an intended STA-ID is detected in block with valid CRC, the PHY entity shall continue receiving HE-STF for 4 µs after the HE-SIG-B field for the detected and intended STA.

(IEEE 802.11ax-2021, § 27.3.22)

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

64. In the Accused Products, "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":

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

27.3.11.8.3 Common field

This subclause is not applicable if the HE-SIG-B Compression field in the HE-SIG-A field of an HE MU PPDU is 1.

The Common field format is defined in Table 27-24.

A 996-tone RU is referred to by two consecutive RU Allocation subfields per HE-SIG-B content channel, for both HE-SIG-B content channels. The two consecutive RU Allocation subfields per HE-SIG-B content channel are labeled the first RU Allocation subfield and the second RU Allocation subfield. A 484-tone RU is referred to by a single RU Allocation subfield per HE-SIG-B content channel, for both HE-SIG-B content channels. Smaller RUs are referred to by a single RU Allocation subfield in a single HE-SIG-B content channel. If a Common field is present in a 160 MHz or 80+80 MHz PPDU, a 2×996 tone RU is not permitted and cannot be indicated by the RU allocation subfield.

Table 27-24—Common field

Subfield	Number of subfields	Number of bits per subfield	Description
RU Allocation	N	8	*N* RU Allocation subfields are present in an HE-SIG-B content channel, where *N* = 1 if the Bandwidth field in the HE-SIG-A field is 0 or 1 (indicating a 20 MHz or 40 MHz HE MU PPDU) *N* = 2 if the Bandwidth field in the HE-SIG-A field is 2, 4, or 5 (indicating an 80 MHz HE MU PPDU) *N* = 4 if the Bandwidth field in the HE-SIG-A field is 3, 6, or 7 (indicates a 160 MHz or 80+80 MHz HE MU PPDU) Each RU Allocation subfield in an HE-SIG-B content channel corresponding to a 20 MHz frequency subchannel indicates the RU assignment, including the size of the RU(s) and their placement in the frequency domain, to be used in the HE modulated fields of the HE MU PPDU in the frequency domain and indicates information needed to compute the number of users allocated to each RU, where the subcarrier indices of the RU(s) meet the conditions in Table 27-25.

(IEEE 802.11ax-2021)

65. In the Accused Products, "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":

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode. If the HE-SIG-B Compression field is 0: Set to 4 for preamble puncturing in 80 MHz, where in the preamble the only punctured subchannel is the secondary 20 MHz channel. Set to 5 for preamble puncturing in 80 MHz, where in the preamble the only punctured subchannel is one of the two 20 MHz subchannels in secondary 40 MHz channel. Set to 6 for preamble puncturing in 160 MHz or 80+80 MHz, where in the preamble the only punctured subchannels are the secondary 20 MHz channel and zero to two of the 20 MHz subchannels in the secondary 80 MHz channel. If two of the 20 MHz subchannels in the secondary 80 MHz channel are punctured, these are either the lower two or the higher two. No more than two adjacent 20 MHz subchannels are punctured across 160 MHz. Set to 7 for preamble puncturing in 160 MHz or 80+80 MHz, where in the preamble the only punctured subchannels are zero, one or both of the 20 MHz subchannels in the secondary 40 MHz channel and zero to two of the 20 MHz subchannels in the secondary 80 MHz channel; at least one 20 MHz subchannel is punctured. If two of the 20 MHz subchannels in the secondary 80 MHz channel are punctured, these are either the lower two or the higher two. No more than two adjacent 20 MHz subchannels are punctured across 160 MHz. If the HE-SIG-B Compression field is 1, then values 4–7 are reserved.

(IEEE 802.11ax-2021, § 27.3.11.7)

If the Bandwidth field in the HE-SIG-A field of an HE MU PPDU is 4, 5, 6 or 7, then one or more 20 MHz subchannels of the preamble are punctured, as defined in Table 27-20. If two adjacent 20 MHz subchannels that constitute a 40 MHz subchannel in which a 484-tone RU is located are punctured, then B7–B0 of the RU Allocation subfields corresponding to the two 20 MHz subchannels shall both be set to 113 (242-tone RU is empty) or shall both be set to 114 (see Table 27-26) to indicate that the preamble is punctured in both the 20 MHz subchannels. Each punctured 20 MHz subchannel that does not have B7–B0 of its corresponding RU Allocation subfield set to 114 shall have B7–B0 of its RU Allocation subfield set to 113.

(IEEE 802.11ax-2021, § 27.3.11.8.3)

66. Defendants have also knowingly and intentionally induced and contributed to infringement of the ’281 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the ’281 patent and the infringing nature of the Accused Products at least because SEC had received the April 8, 2022, letter from Sisvel identifying the ’281 patent as “essential to the 802.11ax standard” and identifying examples of Samsung products that implement essential features of the standard.

67. Despite this knowledge of the ’281 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the ’281 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the ’281 patent, thereby specifically intending for and inducing their customers to infringe the ’281 patent through the customers’ normal and customary use of the Accused Products.

68. On information and belief, the Accused Products contain components that constitute a material part of the ’281 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the ’281 patent.

69. On information and belief, Defendants’ infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the ’281 patent.

70. Defendants have induced, and continue to induce, infringement of the ’281 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

71. Samsung and its customers benefit from the use of the inventions claimed in the ’281 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

72. Wilus has been damaged by Defendants′ willful infringement of the ’281 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

COUNT 3 – CLAIM FOR INFRINGEMENT OF THE ’595 PATENT

73. Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

74. On October 11, 2022, the United States Patent and Trademark Office issued U.S. Patent No. 11,470,595, titled “Wireless communication method and wireless communication terminal, which use discontinuous channel.” Exhibit 3.

75. The ’595 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

76. Wilus is the owner of the ’595 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

77. The claims of the ’595 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the ’595 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

78. Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the ’595 patent, and Wilus is entitled to damages for Defendants’ past infringement. For example, Sisvel’s letters conveying Wilus’s and Sisvel’s belief that Samsung products practiced Wilus’s ’595 patent and offering to license Wilus’s patents to Samsung provided Samsung with actual notice of infringement.

79. Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the ’595 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of the ’595 patent; and inducing and contributing to infringement by others of the claims of the ’595 patent.

80. On information and belief, Defendants use, import, offer for sale, and sell certain infringing products in the United States. The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including mobile phones, tablets, laptops, e-readers, cameras, appliances, and wearables, used, offered for sale, sold, and/or imported by Defendants in the United States.

81. The Accused Products satisfy all claim limitations of one or more claims of the ’595 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include “A wireless communication terminal, the terminal”:

Samsung Galaxy S24 Ultra

Featuring Snapdragon 8 Gen 3 for Galaxy.

Introducing Samsung Galaxy S24 Ultra, now with many next-gen AI features and capabilities enabled by Snapdragon 8 Gen 3 for Galaxy. Powered with Galaxy AI, Galaxy S24 Ultra adapts to your passions and behaviors to make a new level of achievement possible. And, with Qualcomm FastConnect 7800 Mobile Connectivity System, you’ll get the best possible connection and premium WiFi 7 connectivity.

(https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s24-ultra)

82. The Accused Products include “a processor”:

Wi-Fi	**Wi-Fi/Bluetooth System:** Qualcomm® FastConnect™ 7800
	Peak Speed: 5.8 Gbps
	Generation: Wi-Fi 7, Wi-Fi 6, Wi-Fi 5, Wi-Fi 4
	Standards: 802.11be, 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a

(https://www.qualcomm.com/products/mobile/snapdragon/smartphones/snapdragon-8-series-mobile-platforms/snapdragon-8-gen-3-mobile-platform)

83. In the Accused Products, the processor is configured to “receive a wireless packet including an High Efficiency Signal A (HE-SIG-A) field and an High Efficiency Signal B (HE-SIG-B) field.”

The format of the HE MU PPDU is defined as in Figure 27-9. This format is used for transmission to one or more users if the PPDU is not a response of a Trigger frame. In the HE MU PPDU, the HE-SIG-A field is not repeated. The HE-SIG-B field is present in this format.

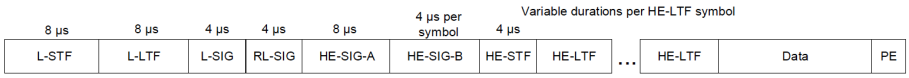

Figure 27-9—HE MU PPDU format

(IEEE 802.11ax-2021, § 27.3.4)

84. In the Accused Products, the processor is configured to "obtain bandwidth information indicated via a bandwidth field included in the HE-SIG-A field."

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

85. In the Accused Products, the processor is configured to "obtain information of an unassigned resource unit via at least one subfield included in the HE-SIG-B field."

In an HE MU PPDU, an RU that is not allocated to a user can be indicated as follows:

— The Center 26-tone RU subfield in the Common field of the HE-SIG-B field is set to 0 (see Table 27-24).

— The RU Allocation subfield in the Common field of the HE-SIG-B field is set to a value between 16 and 31 or between 96 and 113 (see Table 27-26).

— Both RU Allocation subfields at the same position in each Common field of the two HE-SIG-B content channels are set to 114 (see Table 27-26).

— The STA-ID subfield in the User field of the HE-SIG-B field is set to 2046 (see 26.11.1 and 27.3.11.8.4).

(IEEE 802.11ax-2021, § 27.3.11.8.3)

86. In the Accused Products, "the bandwidth field is related to bandwidth over which the received wireless packet is transmitted, and is used to obtain the information of the unassigned resource unit."

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B5–B10	BSS Color	6	An identifier of the BSS. Set TXVECTOR parameter BSS_COLOR.
B11–B14	Spatial Reuse	4	Indicates whether spatial reuse modes are allowed during the transmission of this PPDU: Set to a value from Table 27-22 (see 26.11.6 and 26.10). See TXVECTOR parameter SPATIAL_REUSE.
B15–B17	Bandwidth	3	Set to 0 for 20 MHz. Set to 1 for 40 MHz. Set to 2 for 80 MHz non-preamble puncturing mode. Set to 3 for 160 MHz and 80+80 MHz non-preamble puncturing mode.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

87. In the Accused Products, the bandwidth field is used to "decode a data of the received wireless packet based on the bandwidth information and the information of the unassigned resource unit."

> After the HE-SIG-A field, the PHY entity shall receive the HE-SIG-B field for the number of symbols predicted from the HE-SIG-A field. If the Common field is present in the HE-SIG-B field, the PHY entity shall check the CRC of the Common field. If the CRC in the Common field is valid or the Common field is not present, the PHY entity shall search for intended STA-ID in each User Specific subfield with a valid CRC. If no CRC is valid or no intended STA-ID is detected, the PHY entity shall issue a PHY-RXSTART.indication(RXVECTOR) and then issue a PHY-RXEND.indication(Filtered). If a complete allocation of an intended STA-ID is detected in block with valid CRC, the PHY entity shall continue receiving HE-STF for 4 µs after the HE-SIG-B field for the detected and intended STA.

(IEEE 802.11ax-2021, § 27.3.22)

> In Table 27-26, the "Number of entries" column refers to the number of RU Allocation subfield values that refer to the same RU assignment to be used in the frequency domain but differ in the number of User fields per RU. The number of User fields per RU indicated by the RU Allocation subfields and the Center 26-tone RU subfield of an HE-SIG-B content channel indicate the number of User fields in the User Specific field of the HE-SIG-B content channel.

(IEEE 802.11ax-2021, § 27.3.11.8.3)

88. In the Accused Products, "the unassigned resource unit is explicitly indicated with the information of the unassigned resource unit based on the bandwidth field and the at least one subfield" and "the information of the unassigned resource unit includes information of a C26 field indicating whether a user is allocated to a center 26-tone resource unit of 80 MHz upon the bandwidth related to a transmission of the received wireless packet indicated by the bandwidth field being 80 MH or more, not 20 MHz or 40 MHz":

Table 27-24—Common field

Subfield	Number of subfields	Number of bits per subfield	Description
RU Allocation	N	8	*N* RU Allocation subfields are present in an HE-SIG-B content channel, where *N* = 1 if the Bandwidth field in the HE-SIG-A field is 0 or 1 (indicating a 20 MHz or 40 MHz HE MU PPDU) *N* = 2 if the Bandwidth field in the HE-SIG-A field is 2, 4, or 5 (indicating an 80 MHz HE MU PPDU) *N* = 4 if the Bandwidth field in the HE-SIG-A field is 3, 6, or 7 (indicates a 160 MHz or 80+80 MHz HE MU PPDU) Each RU Allocation subfield in an HE-SIG-B content channel corresponding to a 20 MHz frequency subchannel indicates the RU assignment, including the size of the RU(s) and their placement in the frequency domain, to be used in the HE modulated fields of the HE MU PPDU in the frequency domain and indicates information needed to compute the number of users allocated to each RU, where the subcarrier indices of the RU(s) meet the conditions in Table 27-25.
Center 26-tone RU	0 or 1	1	The Center 26-tone RU field is present if the Bandwidth field in the HE-SIG-A field indicates a bandwidth greater than 40 MHz and not present otherwise. If the Bandwidth field in the HE-SIG-A field is 2, 4, or 5 (indicating 80 MHz): Set to 1 to indicate that a user is allocated to the center 26-tone RU (see Figure 27-7) and that its User field is present in HE-SIG-B content channel 1; otherwise, set to 0. The same value is applied to both HE-SIG-B content channels. If the Bandwidth field in the HE-SIG-A field is 3, 6, or 7 (indicating 160 MHz or 80+80 MHz): For HE-SIG-B content channel 1, set to 1 to indicate that a user is allocated to the center 26-tone RU of the lower frequency 80 MHz; otherwise, set to 0. For HE-SIG-B content channel 2, set to 1 to indicate that a user is allocated to the center 26-tone RU of the higher frequency 80 MHz; otherwise, set to 0.

(IEEE 802.11ax-2021, § 27.3.11.8.3)

89. Defendants have also knowingly and intentionally induced and contributed to infringement of the ’595 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the ’595 patent and the infringing nature of the Accused Products at least because SEC had received the January 18, 2023, letter from Sisvel identifying the ’595 patent as “essential to the 802.11ax standard” and because Samsung was aware that it sold products that implement essential features of the standard.

90. Despite this knowledge of the ’595 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the ’595 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the ’595 patent, thereby specifically intending for and inducing their customers to infringe the ’595 patent through the customers’ normal and customary use of the Accused Products.

91. On information and belief, the Accused Products contain components that constitute a material part of the ’595 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the ’595 patent.

92. On information and belief, Defendants’ infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the ’595 patent.

93. Defendants have induced, and continue to induce, infringement of the ’595 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

94. Samsung and its customers benefit from the use of the inventions claimed in the ’595 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

95. Wilus has been damaged by Defendants′ willful infringement of the ’595 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

COUNT 4 – CLAIM FOR INFRINGEMENT OF THE ’210 PATENT

96. Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

97. On October 26, 2021, the United States Patent and Trademark Office issued U.S. Patent No. 11,159,210, titled “Wireless communication method and wireless communication terminal for signaling multi-user packet.” Exhibit 4.

98. The ’210 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

99. Wilus is the owner of the ’210 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

100. The claims of the ’210 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the ’210 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

101. Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the ’210 patent, and Wilus is entitled to damages for Defendants’ past infringement. For example, Sisvel’s letters conveying Wilus’s and Sisvel’s belief that Samsung products practiced Wilus’s ’210 patent and offering to license Wilus’s patents to Samsung provided Samsung with actual notice of infringement.

102. Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the ’210 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of the ’210 patent; and inducing and contributing to infringement by others of the claims of the ’210 patent.

103. On information and belief, Defendants use, import, offer for sale, and sell certain infringing products in the United States. The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including mobile phones, tablets, laptops, e-readers, cameras, appliances, and wearables, used, offered for sale, sold, and/or imported by Defendants in the United States.

104. The Accused Products satisfy all claim limitations of one or more claims of the ’210 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include “A wireless communication terminal, the terminal”:

Samsung Galaxy S24 Ultra

Featuring Snapdragon 8 Gen 3 for Galaxy.

Introducing Samsung Galaxy S24 Ultra, now with many next-gen AI features and capabilities enabled by Snapdragon 8 Gen 3 for Galaxy. Powered with Galaxy AI, Galaxy S24 Ultra adapts to your passions and behaviors to make a new level of achievement possible. And, with Qualcomm FastConnect 7800 Mobile Connectivity System, you’ll get the best possible connection and premium WiFi 7 connectivity.

(https://www.qualcomm.com/snapdragon/device-finder/samsung-galaxy-s24-ultra)

105. The Accused Products include “a communication unit” and “a processor configured to process signals transmitted and received through the communication unit”:

Wi-Fi	**Wi-Fi/Bluetooth System:** Qualcomm® FastConnect™ 7800
	Peak Speed: 5.8 Gbps
	Generation: Wi-Fi 7, Wi-Fi 6, Wi-Fi 5, Wi-Fi 4
	Standards: 802.11be, 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a

(https://www.qualcomm.com/products/mobile/snapdragon/smartphones/snapdragon-8-series-mobile-platforms/snapdragon-8-gen-3-mobile-platform)

106. In the Accused Products, the processor is configured to “receive, through the communication unit, a high efficiency multi-user PHY protocol data unit (HE MU PPDU).”

27.3.4 HE PPDU formats

Four HE PPDU formats are defined: HE SU PPDU, HE MU PPDU, HE ER SU PPDU, and HE TB PPDU. The HE sounding NDP is a variant of the HE SU PPDU and defined in 27.3.17. The HE TB feedback NDP is a variant of the HE TB PPDU and defined in 27.3.18.

(IEEE 802.11ax-2021)

107. In the Accused Products, "a preamble of the HE MU PPDU includes high efficiency signal A field (HE-SIG-A) and high efficiency signal B field (HE-SIG-B)."

The format of the HE MU PPDU is defined as in Figure 27-9. This format is used for transmission to one or more users if the PPDU is not a response of a Trigger frame. In the HE MU PPDU, the HE-SIG-A field is not repeated. The HE-SIG-B field is present in this format.

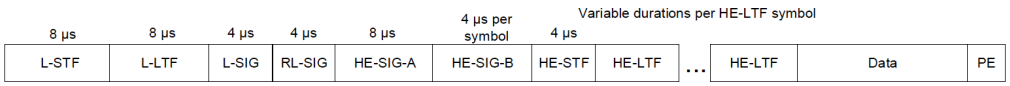

Figure 27-9—HE MU PPDU format

(IEEE 802.11ax-2021, § 27.3.4)

108. In the Accused Products, the processor is configured to "decode the received HE MU PPDU based on information obtained from the preamble."

27.3.11.7 HE-SIG-A field

27.3.11.7.1 General

The HE-SIG-A field carries information necessary to interpret HE PPDUs. The integer fields of the HE-SIG-A field are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position.

...

27.3.11.8 HE-SIG-B field

27.3.11.8.1 General

The HE-SIG-B field provides the necessary signaling, including the OFDMA and DL MU-MIMO resource allocation information, to allow the STAs to look up the corresponding resources to be used in the HE modulated fields of the PPDU. The integer fields of the HE-SIG-B field are transmitted in unsigned binary format, LSB first, where the LSB is in the lowest numbered bit position.

(IEEE 802.11ax-2021)

109. In the Accused Products, "when a SIG-B compression field of the HE-SIG-A indicates full bandwidth multi User-Multiple Input Multiple Output (MU-MIMO) transmission, a format of user field(s) included in a user specific field of the HE-SIG-B is identified based on a number of MU-MIMO users indicated by a subfield of the HE-SIG-A."

Table 27-20—HE-SIG-A field of an HE MU PPDU *(continued)*

Bit	Field	Number of bits	Description
B18–B21	Number Of HE-SIG-B Symbols Or MU-MIMO Users	4	If the HE-SIG-B Compression field is 0, indicates the number of OFDM symbols in the HE-SIG-B field: Set to the number of OFDM symbols in the HE-SIG-B field minus 1 if the number of OFDM symbols in the HE-SIG-B field is less than 16. Set to 15 to indicate that the number of OFDM symbols in the HE-SIG-B field is equal to 16 if Longer Than 16 HE-SIG-B OFDM Symbols Support subfield in the HE Capabilities element transmitted by at least one recipient STA is 0. Set to 15 to indicate that the number of OFDM symbols in the HE-SIG-B field is greater than or equal to 16 if the Longer Than 16 HE-SIG-B OFDM Symbols Support subfield in the HE Capabilities element transmitted by all the recipient STAs are 1 and if the HE-SIG-B-MCS field is set to 0, 1, 2, or 3 regardless of the value of the HE-SIG-B DCM field, or the HE-SIG-B-MCS field is set to 4 and the HE-SIG-B DCM field is set to 1. The exact number of OFDM symbols in the HE-SIG-B field is calculated based on the number of User fields in the HE-SIG-B content channel, which is indicated by the Common field of the HE-SIG-B field in this case. If the HE-SIG-B Compression field is 1, indicates the number of users and is set to the number of users minus 1. If the number of users is greater than 1, then MU-MIMO is used in the HE modulated fields.
B22	HE-SIG-B Compression	1	Set to 0 if the Common field in the HE-SIG-B field is present. Set to 1 if the Common field in the HE-SIG-B field is not present.

(IEEE 802.11ax-2021, § 27.3.11.7.2)

> If the HE-SIG-B Compression field in the HE-SIG-A field of an HE MU PPDU is 1 (indicating full-bandwidth MU-MIMO transmission) and the Number Of HE-SIG-B Symbols Or MU-MIMO Users field in the HE-SIG-A field of an HE MU PPDU is 0 (indicating 1 user), then the User Specific field in the HE-SIG-B field consists of a single User Block field containing one User field for a non-MU-MIMO allocation as shown in Table 27-28.

(IEEE 802.11ax-2021, § 27.3.11.8.4)

110. In the Accused Products, "when the number of MU-MIMO users indicates two or more users, the user specific field of the HE-SIG-B includes user fields for MU-MIMO allocation."

The HE-SIG-B content channel format is shown in Figure 27-26. The HE-SIG-B content channel consists of a Common field, if present, followed by a User Specific field.

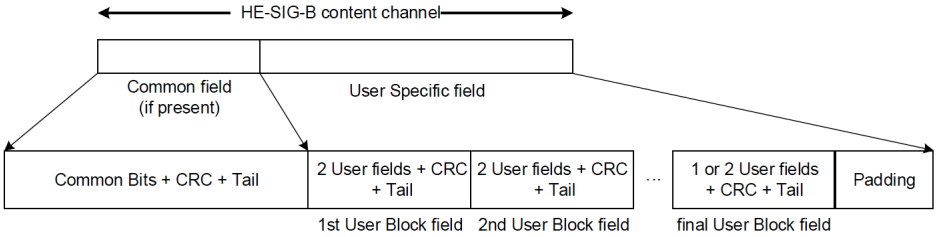

Figure 27-26—HE-SIG-B content channel format

(IEEE 802.11ax-2021, § 27.3.11.8.2)

Table 27-27—User Block field

Field	Number of fields	Number of bits per field	Description
User field	N	21	*N* User fields are present, where *N* = 1 if it is the final User Block field, and if there is only one user in the final User Block field. *N* = 2 otherwise. The User field format for a non-MU-MIMO allocation is defined in Table 27-28. The User field format for a MU-MIMO allocation is defined in Table 27-29.
CRC	1	4	The CRC is calculated over bits 0 to 20 for a User Block field that contains one User field and bits 0 to 41 for a User Block field that contains two User fields. See 27.3.11.7.3.
Tail	1	6	Used to terminate the trellis of the convolutional decoder. Set to 0.

(IEEE 802.11ax-2021, §, 27.3.11.8.4)

111. In the Accused Products, "when the number of MU-MIMO users indicates a single user, the user specific field of the HE-SIG-B includes one user field for non-MU-MIMO allocation."

> If the HE-SIG-B Compression field in the HE-SIG-A field of an HE MU PPDU is 1 (indicating full-bandwidth MU-MIMO transmission) and the Number Of HE-SIG-B Symbols Or MU-MIMO Users field in the HE-SIG-A field of an HE MU PPDU is 0 (indicating 1 user), then the User Specific field in the HE-SIG-B field consists of a single User Block field containing one User field for a non-MU-MIMO allocation as shown in Table 27-28.

(IEEE 802.11ax-2021, § 27.3.11.8.4)

112. Defendants have also knowingly and intentionally induced and contributed to infringement of the ’210 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the ’210 patent and the infringing nature of the Accused Products at least because SEC had received the April 8, 2022, letter from Sisvel identifying the ’210 patent as “essential to the 802.11ax standard” and identifying examples of Samsung products that implement essential features of the standard.

113. Despite this knowledge of the ’210 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the ’210 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the ’210 patent, thereby specifically intending for and inducing their customers to infringe the ’210 patent through the customers’ normal and customary use of the Accused Products.

114. On information and belief, the Accused Products contain components that constitute a material part of the ’210 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the ’210 patent.

115. On information and belief, Defendants’ infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the ’210 patent.

116. Defendants have induced, and continue to induce, infringement of the ’210 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

117. Samsung and its customers benefit from the use of the inventions claimed in the ’210 patent. On information and belief, these benefits include faster throughput, higher capacity, and broader coverage when using Wi-Fi 6 communications.

118. Wilus has been damaged by Defendants′ willful infringement of the ’210 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

JURY DEMAND

119. Wilus demands a jury trial pursuant to Federal Rule of Civil Procedure 38.

RELIEF REQUESTED

Wilus prays for the following relief:

A. A judgment in favor of Wilus that Defendants have infringed the Asserted Patents, and that the Asserted Patents are valid and enforceable;

B. A judgment and order requiring Defendants to pay Wilus past and future damages arising out of Defendants’ infringement of the Asserted Patents in an amount no less than a reasonable royalty, costs, expenses, and pre- and post-judgment interest for its infringement of the Asserted Patents, as provided under 35 U.S.C. § 284;

C. A permanent injunction prohibiting Defendants from further acts of infringement of the Asserted Patents;

D. A judgment and order requiring Defendants to provide an accounting and to pay supplemental damages to Wilus, including, without limitation, pre-judgment and post-judgment interest;

E. A judgement that Defendants' infringement is willful and enhanced damages and fees as a result of that willfulness under 35 U.S.C. § 284;

F. A finding that this case is exceptional under 35 U.S.C. § 285, and an award of Wilus' reasonable attorney's fees and costs; and

G. Any and all other relief to which Wilus may be entitled.

Dated: September 11, 2024

Respectfully submitted,

/s/ Marc Fenster

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