**UNITED STATES DISTRICT COURT**
**EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

| | |
|---|---|
| XIFI NETWORKS R&D, INC.,<br><br>Plaintiff,<br><br>v.<br><br>SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC.,<br><br>Defendants. | Case No. 2:24-cv-01057-JRG |

# DECLARATION OF DR. MARK MAHON

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I, Dr. Mark Mahon, declare as follows:

## I. Introduction

1. I have knowledge of the facts set forth in this declaration based on my own personal information or investigation into the relevant subject matter.

2. I have been retained as an expert to provide opinions regarding the understanding of a person of ordinary skill in the art (hereinafter, "POSITA") in connection with certain terms in the claims of U.S. Patent Nos. 11,818,591 ("the '591 patent"), 11,849,337 ("the '337 patent"), 11,856,414 ("the '414 patent"), 11,974,143 ("the '143 patent"), 11,950,105 ("the '105 patent"), 12,003,976 ("the '976 patent"), 12,015,933 ("the '933 patent"), 12,114,177 ("the '177 patent"), 12,169,756 ("the '756 patent"), 12,190,198 ("the '198 patent"), and 12,250,564 ("the '564 patent") (collectively "the asserted patents").

3. I am being compensated at my usual hourly rate of $550 per hour. I am also being reimbursed for any out-of-pocket expenses. I have no financial interest in, or affiliation with, any party in this case. My compensation does not depend in any way on the outcome of this case, the substance of my testimony, or opinions that I express.

4. In rendering my opinions, I have considered the asserted patents, their file histories, the parties' claim construction disclosures, filings in the parallel PTAB proceedings, and any other documents referenced, discussed, or listed in my declaration. I have also relied upon my own knowledge and experience in the relevant fields. I have also reviewed the productions associated with the claim construction disclosures in this case.

5. My analysis of the materials produced in this matter is ongoing and I will continue to review any new material as it is provided. This declaration represents only opinions I have formed to date. I reserve the right to amend or supplement my opinions based on additional

documents or evidence I am presented, including without limitation any arguments or expert declarations advanced by the plaintiff in this case.

## II. Qualifications and Experience

6. My qualifications for forming the opinions set forth in this Declaration are summarized here and explained in more detail in my curriculum vitae, which is attached as Exhibit 1.

7. I am a Teaching Professor in the School of Electrical Engineering and Computer Science at Pennsylvania State University, University Park, PA ("Penn State" or "PSU"). I have worked on wireless networks, including AMPS, IS-95, CDMA2000, GSM, EDGE, UMTS/WCDMA, WiMAX, LTE, and 5G cellular as well as various proprietary and standardized WLANs such as 802.11 and 802.15 protocols since 1988.

8. I received my B.S. in Electronics Engineering from the University of Scranton in 1987. I received my M.S. in Electrical Engineering and Ph.D. in Acoustics from Penn State in 1991 and 2001, respectively.

9. In 1988, after I received my bachelor's degree, I joined the Central Intelligence Agency (CIA) while pursuing my M.S. degree at Penn State part-time. My first job at the CIA involved designing and testing systems to automatically capture and characterize telecommunication signals and emissions from various computer networking devices.

10. I returned to Penn State in early 1990 to pursue graduate research full-time and complete my M.S. degree. My graduate research work focused on wideband beamforming and adaptive signal processing. After completing my M.S. degree in EE in 1991, I accepted a full-time faculty research position at the Applied Research Lab at PSU, primarily working on classified programs, and began working on diverse radio frequency and acoustic sensor systems including

wireless communications and small wireless networks for acoustic tracking, source localization, and feature extraction.

11. I began pursuing my Ph.D. part-time in 1993 while continuing my faculty research position. In 1997, as part of my faculty research position, I began working on classified programs focused on mathematical analytical modeling of cellular communication networks and the development of hardware and software systems to test against cellular networks. My role was to develop algorithms and write the code running on a specially developed embedded system. For this work, I received a letter of recognition as the "genius behind the VELA software algorithms" from the Director of National Reconnaissance Office (NRO) Systems Engineering and Technology Office. As part of this same work, I was extensively involved in protocol and signaling analysis as well as researching model-specific performance and unique functional characteristics associated with individual mobile devices. The work involved testing dozens of handsets from many manufacturers in controlled and real-world environments against network simulators and live operational networks for each research project.

12. In 2000 my research extended into utilizing non-orthogonal wavelets for improving detection and localization of cellular handsets from high altitude sensor systems. In 2001, I completed my Ph.D. and my research focused on the utilization of advanced communication signals for wideband characterization and remote sensing of propagation channels.

13. Beginning in 1997 my cellular communications research work focused primarily on CDMA, GSM, EDGE, UMTS, LTE, and 5G cellular and shorter range wireless protocols (IEEE 802.11, 802.15, UWB, NFC, RFID, etc.) primarily under grants sponsored primarily by the Department of Defense. This classified research work required 3GPP protocol analysis and development of real-time embedded hardware and software systems capable of interacting with

cellular networks and cellular handsets. A large portion of my work was directed at architectures, protocols, software, and signaling.

14. I have been working on classified projects since 1988. Before 1998, because the work was not deemed highly classified, I was able to publish eight journal and conference papers prior to 2000. Between 1999 and 2015, however, I was allowed to publish only one article in an unclassified symposium and published and presented about a dozen articles in classified settings. This is because during this period, the vast majority of my research was highly classified. As a result, nearly all of my research results were summarized in classified reports and not available to the general public. Further, because the U.S. government owns any intellectual property resulting from the sponsored research work, I did not pursue or file patent applications.

15. In 2015, I transferred to the School of Electrical Engineering and Computer Science at Penn State as a teaching faculty member. In that role, I have continued teaching graduate and undergraduate courses, guiding Ph.D. and M.S. students in communication and mobile networking (including LTE and 5G cellular networks), and pursuing research in this and related areas. Since 2015, I have been an author on ten refereed papers as listed in my curriculum vitae (CV) (attached as Exhibit 1).

16. Because of my decades of research and my continuing work at Penn State, I have intimate knowledge of telecommunication networks, including the technology involved in the patents in this case. I have been highly recognized as an expert in such systems within the research community. I was recognized twice by the National Reconnaissance Office with commendation letters for work dealing with detecting cellular signals in low signal to noise ratio environments. The U.S. government awarded me over $12M in grants between 2003 and 2015 for projects

focused on mobile communication devices and networks, in which I served as a Principal Investigator (PI), Co- PI, and/or technical lead.

17. Additionally, during my research career, I interacted extensively with computer scientists and engineers responsible for the design, development, and testing of telephony and data networking systems and testbeds. As a research faculty member, I oversaw engineers and computer scientists that executed many joint projects with development organizations. These interactions exposed me to a wide range of computer scientists and engineers working on telecommunication network technologies. Since 2011, I have been teaching undergraduate and graduate classes in communication and mobile networking and am familiar with the curricula being taught to electrical engineers and computer scientists. The interactions with a wide range of computer scientists and engineers working on telecommunication network technologies and the familiarity with the classes taught to electrical engineers and computer scientists have allowed me to have a good understanding of the level of skills possessed by a person of ordinary skill in the field of cellular technology.

**A. Experience with Wireless Networks**

18. I have extensive experience with wireless and mobile networks in general and LTE, 5G, 802.11, 802.15, 802.16 and various short range protocols specifically. While most of my research efforts between 1998 and 2015 are highly classified, I can state that they included detailed investigation of network architectures, signaling, and functional behavior. A typical research effort would involve studying 3GPP, 3GPP2, IEEE, and other protocol standards to fully comprehend all aspects of L1, L2, and L3 requirements including timing, bit-level construction of the control and user plane messages, and timing characteristics for a given standard as well as functional behavior of network components and user equipment.

19. From 2006 through 2015 my research focused primarily on LTE. My research continues to this day, although I am no longer operating in a classified environment. During this time, I investigated the performance and functional differences of many varied network and handset devices to see how differing signaling and environmental factors influenced the behavior of user equipment in a given network environment. This included how synchronization, timing, and signal to interference plus noise ratio (SINR) for a given device would affect specific functional aspects including elements of the receiver structure, decoding and demodulation performance, calculation of parameters used by the device for making decisions and deriving parameters reported to the network. Much of the classified research work I performed also led to similar approaches for other wireless protocols including IEEE 802.11, 802.15 (e.g., Zigbee, Bluetooth, and UWB), HART, and other short-range standards as well as HF radio and 802.16 (Wi-MAX).

20. As part of my research work, I built several custom LTE and WLAN platforms that implemented specific network-side and user equipment-side functionality including custom signal generation and processing structures, particularly the signal processing chains on both the transmit and receive sides. This equipment was developed using network simulation hardware in a laboratory environment and was later tested with LTE or 802.11-based networks in both controlled and fully operational environments. Implementing the transmit and receive chains for custom built equipment required me to gain an intimate understanding of the relevant 3GPP and IEEE protocol specifications and the underlying OFDM and WCDMA structures. Since 2015, I have been primarily focused on guiding graduate students pursuing research into network tasking and resource allocation in optimized distributed processing algorithms, edge computing resource allocation in 5G (NR) networks, implementation of block chain coding techniques to improve

handover security, multiple-input multiple-output (MIMO) sparse coding multiple access techniques to minimize latency and maximize user density in grant free Internet of Things (IoT) environments, and hybrid split federated/distributed AI models in IoT and WLAN networks.

21. Additional details about my employment history, fields of expertise, and publications are further included in my attached curriculum vitae.

## III. Legal Standards

22. I am not a lawyer, and I do not intend to offer any opinions on legal matters. However, in order to provide my technical opinions, I have been provided the following legal understanding relevant to claim construction.

23. I am informed that a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim incorporates all limitations of the independent claim upon which it depends, plus the additionally recited limitations.

24. I am informed that claim construction is a matter of law to be decided by the Court. I understand that claim terms are generally given their plain and ordinary meaning, as understood by a person of ordinary skill in the art ("POSITA") at the time of the invention, in the context of the patent specification, the prosecution history, and any other relevant evidence.

25. I am informed that to determine how a POSITA would understand a claim term, one should look to those sources available that show what a POSITA would have understood the claim language to mean. Such sources include the words of the claims themselves, the remainder of the patent's specification, the prosecution history of the patent and the cited references, Patent Owner's Preliminary Responses in *inter partes* review proceedings (all considered "intrinsic" evidence), and "extrinsic" evidence, such as dictionary definitions, learned treatises, and the

opinions of qualified experts concerning relevant scientific principles, the meaning of technical terms, and the state of the art.

26. I am informed that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent specification, and the prosecution history.

27. I am informed that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence is insufficient.

28. I am informed that words or terms should be given the meaning that a POSITA would have given them at the time of invention. In making this determination, the intrinsic evidence—that is the claims, the patent specification, the prosecution history, and the Patent Owner Preliminary Response in *inter partes* review proceedings—are of paramount importance.

29. I am informed that a POSITA is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. For this reason, the words of the claim must be interpreted in view of the entire specification. The specification is the primary basis for construing the claims and provides a safeguard such that correct constructions closely align with the specification. Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelope with the claim as set forth in the patent itself.

30. Additionally, the specification and prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (*i.e.*, provided its own special meaning to any disputed terms).

31. I also understand that statements by the patentee in the prosecution history (including in a Patent Owner Preliminary Response in *inter partes* review proceedings) can result in the patentee intentionally disclaiming, disavowing, or surrendering claim scope. I am informed that arguments by the applicant/patentee in the prosecution history that objectively convey to one of skill in the art that certain subject matter that is not included within the claimed invention can restrict the scope of the claims. I am informed that any such disclaimer must be both clear and unmistakable to one of ordinary skill in the art. I am informed that this doctrine of disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution. I am informed that prosecution history disclaimer can arise from both claim amendments and arguments made to the PTO, as well as from arguments made in a Patent Owner Preliminary Response in *inter partes* review proceedings.

32. I am informed that while intrinsic evidence is of primary importance, extrinsic evidence, *e.g.*, all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may help one better understand the underlying technology and the way in which one of skill in the art might use the claim terms. Extrinsic evidence should not be considered, however, divorced from the context of the intrinsic evidence. Evidence beyond the patent specification, prosecution history, and other claims in the patent should not be relied upon unless the claim language is ambiguous in light of these intrinsic sources. Furthermore, while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of the claim language.

33. I am informed that, through the patent claims, an applicant must particularly point out and distinctly claim the subject matter which it regards as its invention. I am informed that a

patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.

## IV. Level of Ordinary Skill in the Art

34. I understand that the claims must be understood from the perspective of a POSITA at the time of the alleged invention. I also understand that to determine the level of skill of a POSITA, one must consider several factors including the types of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the education level of active workers in the field.

35. In my opinion, a POSITA relevant to the asserted patents at the time of the invention would have had at least a Bachelor of Science in electrical engineering, computer engineering, or similar fields and at least two years of practical experience in the field of computer networks and wireless communication applications. More education can supplement for less practical experience, and vice versa.

36. I understand that this is the level of ordinary skill in the art proposed in IPR2025-01203, -01204, -01205, -01206, 01207, -01208, -01209, -01270, and PGR2025-00067, -00068, and -00069, and I agree that this is the appropriate level of or ordinary skill in the art.

37. I meet each of these criteria and consider myself a person with at least ordinary skill in the art pertaining to each of the asserted patents. I would have been such a person at the time of the invention of each of the asserted patents.

38. I applied these levels of skill of a POSITA for purposes of my analysis in this declaration.

39. The opinions that I express in this declaration would not change if the appropriate level of ordinary skill in the art was ultimately determined to be slightly higher or lower than what I have listed above. Additionally, I reserve the right to respond to any differing level of ordinary skill in the art offered by XiFi or its experts.

## V. Technical Background

40. I understand the Asserted Patents are all continuation applications stemming from a common ancestor and thus have a common specification.[1] The Asserted Patents all claim priority to provisional applications Nos. 61/897,216 and 61/897,219, both filed on October 30, 2013.

41. The Asserted Patents are directed to a "wireless networking system" that has multiple wireless transceivers. The system includes an application layer associated with one or more applications that have a wireless bandwidth requirement. A processing layer evaluates the wireless bandwidth availabilities of the transceivers and a bandwidth allocator allocates bandwidths to virtual MAC and virtual PHY layers. Bandwidth is allocated to the virtual MAC and virtual PHY layers to satisfy the bandwidth requirement of the application layer. *E.g.*, '591 patent, abstract.

42. As shown in FIG. 1, for example, the architecture includes an application layer, actual MAC and PHY layers, and a processing layer between the application layer and actual MAC and PHY layers. *E.g.*, '591 patent at 2:41-44. The specification explains that the processing layer may comprise "virtual MAC and PHY layers" which help to "enable simultaneous allocation of

[1] Throughout this Declaration, where I cite a passage or figure from the common specification of any one of the eleven Asserted Patents, such citation should be understood to include the corresponding passages and/or figures from all other Asserted Patents including the claim term at issue.

multiple PHY resources for different signal types associated with different applications." *E.g.*, *id.* at 3:36-38.

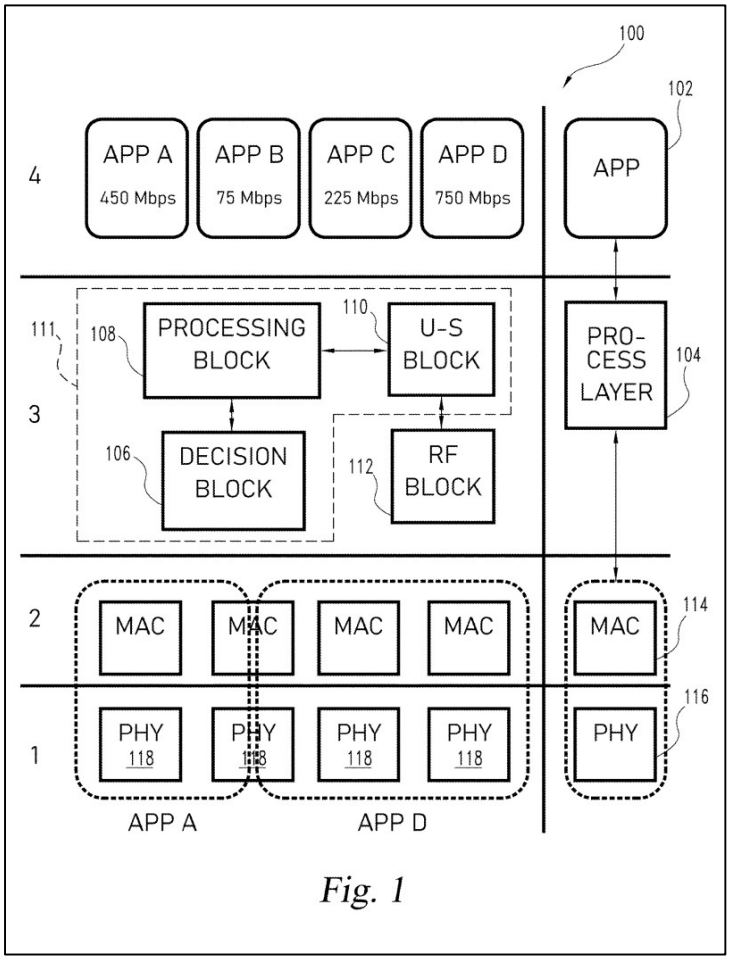


*Fig. 1*

43. I understand that in connection with its Patent Owner Response in the parallel PTAB proceedings, XiFi has submitted expert testimony analogizing the layered architecture of the purported XiFi invention to the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) model. *E.g.*, PGR2025-00069, Akl Declaration in support of POPR at ¶ 90.

44. By way of background, the OSI framework divides communication systems components into seven discrete abstraction layers. From top to bottom, these are: the application layer (layer 7), presentation layer (layer 6), session layer (layer 5), transport layer (layer 4),

network layer (layer 3), data link layer (layer 2), and physical layer (layer 1). Each layer in the hierarchical structure performs designated functions while providing services to the layer immediately above and receiving services from the layer immediately below. *See*, *e.g.*, ISO/ED 7498-1 (*Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model*) at 28 (XIFI_0028977 at -29010) describing the seven layers of the OSI seven layer reference model.

**6.1 Specific layers**

**6.1.1** The general structure of the OSI architecture described in clause 5 provides architectural concepts from which the Reference Model of Open Systems Interconnection has been derived, making specific choices for the layers and their contents.

**6.1.2** The Reference Model contains seven layers:

a) the Application Layer (layer 7);

b) the Presentation Layer (layer 6);

c) the Session Layer (layer 5);

d) the Transport Layer (layer 4);

e) the Network Layer (layer 3);

f) the Data Link Layer (layer 2); and

g) the Physical Layer (layer 1).

**6.1.3** These layers are illustrated in Figure 11.

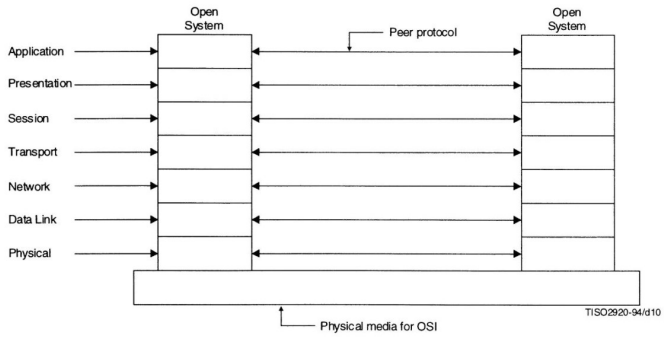


**Figure 11 – Seven layer reference model and peer protocols**

45. I note that the common specification of the Asserted Patents does not refer specifically to the OSI model, or incorporate its concepts by reference. While a POSITA at the time of the invention would have been aware of the OSI model, and would recognize some similarity in terminology between the concepts described in the OSI model and the patent, I do not

understand the OSI model to introduce or justify limitations beyond those specified in the claims themselves.

46. For example, while the claims in view of the common specification of the Asserted Patents indicate that the claimed "processing interface" comprising the "virtual MAC interface" is between an "application interface" and actual MAC/PHY interfaces, I disagree that the OSI model implies any further location requirements or architectural features beyond those specified by the claims themselves.

## VI. Opinions Regarding Disputed Claims Terms

### A. Preamble

47. The preamble in independent claim 1 of the '591, '976, '756, and '564 patents reads "A wireless networking device, comprising." The preamble in independent claim 1 of the '337, '414, '105, and '143 patents reads "A method of improving the performance of a wireless networking device, comprising the steps of." The preamble in independent claim 1 of the '933 and '177 patents reads "A method of improving the performance of circuitry, comprising the steps of." The preamble in independent claim 1 of the '198 patent reads "A method for improving the operation of circuitry that is adapted to be used in a wireless networking device, the method comprising the steps of."

48. In my opinion, a POSITA reading the independent claims of the '591, '976, '756, '564, '337, '414, '105, '143, and '198 patents would understand that the "wireless networking device" term in the body of these claim refers to the same "wireless networking device" introduced in the preamble. A POSITA would recognize that the "circuitry" term in the body of the claims of the '933, '177, and '198 patents refers to the same "circuitry" introduced in the preamble.

49. Thus, for each of the '591, '976, '756, '564, '337, '414, '105, and '143 patents, the preamble provides antecedent basis for "the wireless networking device" in the body of the claim.

For the ’933 and ’177 patents, the preamble provides antecedent basis for “the circuitry” in the body of the claim. For the ’198 patent, the preamble provides antecedent basis for both the “wireless networking device” and the “circuitry” recited in the body of the claim.

50. I am informed by counsel that were a term in the body of the claim relies on the preamble for antecedent basis, the preamble is generally considered limiting. Thus, it is my opinion that the preamble of each of the asserted claims should be considered limiting.

### B. Wireless Networking Device

51. I understand the parties have proposed the following proposed constructions for the term “wireless networking device,” which appears in the claims of all eleven patents:

| Term | XiFi’s Construction | Samsung’s Construction |
|---|---|---|
| “wireless networking device” (all patents) | Plain and ordinary meaning | “a device that relays or provides network access to another device” |

52. It is my opinion that Samsung’s proposed construction is most consistent with the understanding of a POSITA in light of the evidence. I disagree with XiFi’s proposed construction because it does not give sufficient meaning to how a POSITA would understand “wireless networking device” in the context of the intrinsic and extrinsic evidence. Further, XiFi’s proposed construction does not meaningfully distinguish between the types of different devices that a POSITA would recognize comprise a wireless network.

53. As an initial matter, the independent claims of each of the eleven patents include a distinction between a “wireless networking device” and a “recipient.” For example, the preamble of claim 1 of the ’591 patent (which is representative of the other claims for this analysis) recites a “wireless networking device” comprising the further limitations of the claim. Specifically, the “wireless networking device” comprises a “processing interface” and “transceivers” that are associated with “actual MAC” and “actual PHY” interfaces. The “processing interface” of the

"wireless networking device" is configured to request or create "association[s]" between a "***recipient***" and the "actual MAC"/"actual PHY" interfaces of one or more of the transceivers.

54. Thus, the claim establishes a distinction between a "wireless networking device," which is the subject of the claim, and a "recipient" device with which the "wireless networking device" associates and ultimately communicates. A POSITA would recognize that given the use of different terms, there would be a difference in scope between a "wireless networking device" and a "recipient" device.

55. A POSITA would understand that the distinction between a "wireless networking device" and a "recipient" is more than just a matter of the network perspective from which the claim is drafted. Elsewhere, the independent claims recite that the "wireless networking device's utilization of the available bandwidth" of its transceiver "does not prevent ***other wireless networking devices*** from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availability" of those transceivers. In other words, the claims contemplate other "wireless networking devices" within the wireless network even though the recited "association" of the "wireless networking device" is with a "recipient."

56. That there is a difference in scope between the recited "wireless networking device" and the recited "recipient" device is further reinforced by the common specification of the asserted patents. For example, the patents describe various embodiments for "wireless networking systems" in which wireless access points with multiple wireless transceivers are arranged in various configurations to provide network access to a "***user***." *See generally* '591 patent at 6:8-47 (emphasis added).

57. Specifically, the embodiment shown in Figure 7 and its corresponding description describe "wireless networking system" 610 for "increas[ing] the range of wireless network

access." *E.g.*, '591 patent at 6:48-50. The network includes "multiple wireless access points, or nodes, 612A-612E." *Id.* at 6:50-52. Node 612A, for example, "includes multiple radios A1 and A2." *Id.* at 6:58-60. Radio A1 is "able to broadcast and receive signals within its coverage area to ***users*** that are in the area 614, thereby serving as a wireless access point for that area." *Id.* at 6:65-7:2 (emphasis added). "User U1 thus may access the Internet via radio A1." *Id.* at 7:2-3. Thus, wireless access point radio A1 provides network access to users in node 612A.

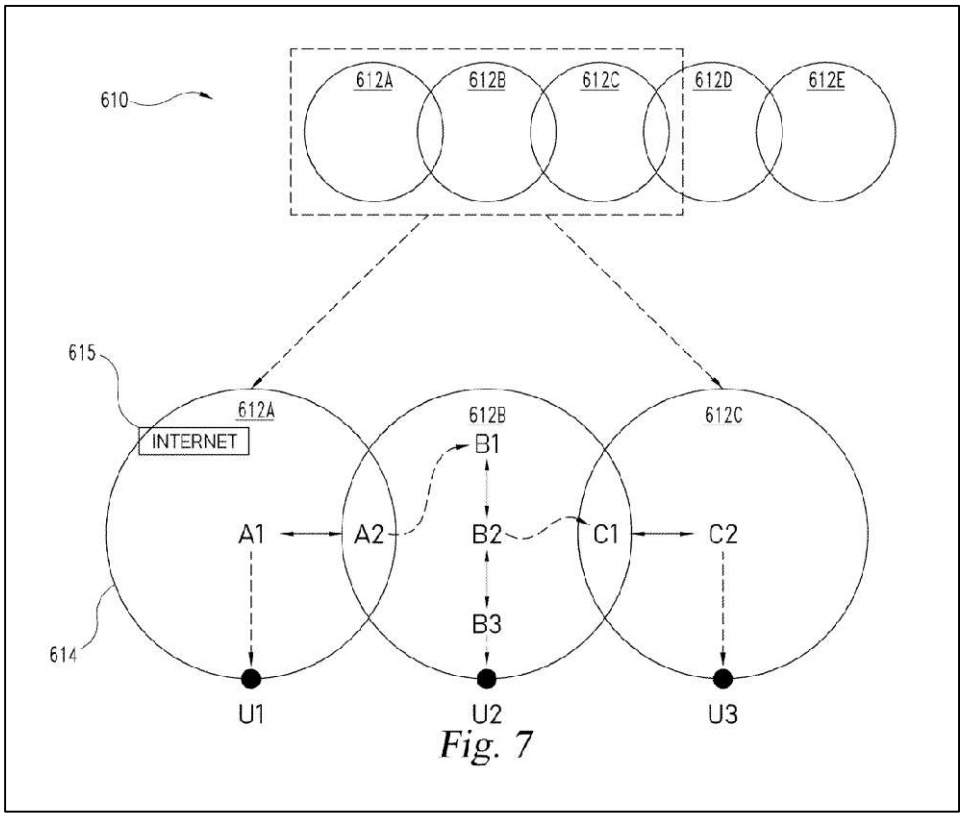

*Fig. 7*

58. The system also includes relay radios to extend the range of the wireless network by receiving signals from a wireless access point in a first node and retransmitting them to radios in a second node. For example, node 612A includes "relay radio A2, which may be disposed near the periphery" of the node. *E.g.*, '591 patent at 7:3-5. Relay radio A2 communicates with radio B1 in node 612B. *Id.* at 7:7-13, 7:14-16. Node 612B also includes radio B2, which acts as a further relay radio to radio C1 in a third node, 612C. *Id.* at 7:16-20. Thus radios A2, B2, and C1

relay network access from a wireless access point in one node to a wireless access point in another node.

59. Signals that are relayed from one node to another can then be used by wireless access points in that node in order to provide network access to users with the corresponding coverage area. For example, node 612B includes radio B3, which receives network access from node 612A via relay radios A2 and B2. Radio B3 can then act as a wireless access point to a second user U2 within node 612B. *E.g.*, '591 patent at 7:17-18. Likewise, node 612C includes radio C2, which receives network access from node 612A via relay radios A2, B2, and C1. Radio C2 can then act as a wireless access point to a third user U3 within the coverage area of node 612C. *Id.* at 7:20-22.

60. Thus, to summarize, the Figure 7 embodiment describes a wireless network comprised of two types of devices. On one hand, the network includes "wireless access points" (*e.g.*, A1, B3, and C2) and "relay" devices (*e.g.*, A2, B2, and C1), which facilitate network access for other devices. This type of device either provides network access to users or relays network access to adjacent nodes. On the other hand, the network includes "users" which may comprise network end-points. This class of devices do not necessarily provide or relay network access to other devices, but rather may be mere consumers of network services.

61. The distinction between a "wireless networking device" and a "user" in the wireless network is further described in the context of Figure 11 and its associated description. In describing Figure 11, the common specification describes "how multiple wireless management systems cooperate to efficiently allocate transceiver resources." *E.g.*, '591 patent at 9:63-65. The common specification describes how a "first node management system 962" may control transceiver resources A1 and A2 within a first node, while a "second management system 964"

may control transceiver resources B1, B2, and B3. *Id.* at 9:65-10:1. The first and second node management systems are depicted as comprising the elements of the claimed "wireless networking device" (*e.g.*, application interface, processing interface, actual MAC interfaces, actual PHY interfaces).

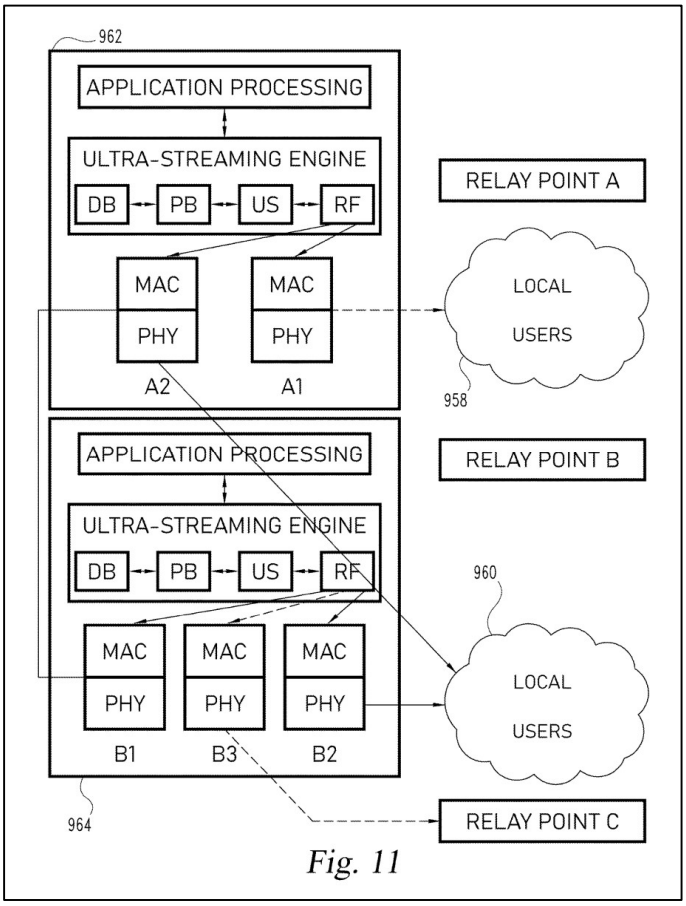


*Fig. 11*

62. The common specification describes how these node management systems cooperate together to "determine the optimal resource allocation to service respective ***local users***, at 958 and 960." *Id.* at 10:1-4. Thus, again, the specification draws a distinction between devices that operate as the recited "wireless networking device," and users that comprise the network endpoints.

63. Based on this intrinsic record, a person of ordinary skill in the art would understand that a "wireless networking device" as recited in the claims of the asserted patents refers to a device

that relays or provides network access to another device (*e.g.*, the wireless access points and relay devices). Samsung's proposed construction ("*a device that relays or provides network access to another device*") accords with the foregoing intrinsic evidence and the understanding of a POSITA.

64. Samsung's proposed construction also accords with the plain language "wireless networking device," which a POSITA would understand to suggest a device that facilitates wireless networking services for other devices. I note that the claim does not recite a generic "wireless device," but rather a "wireless *networking* device."

65. Samsung's proposed construction also fits within the context of the other dependent claims within the asserted patents. I observe that certain dependent claims of the asserted patents recite additional types of "wireless networking devices." For example: "wherein the wireless networking device comprises a wireless access point," *e.g.* '591 patent, claim 2; "wherein the wireless networking device comprises a handheld computing device," *e.g.*, '591 patent, claim 3; "wherein the handheld computing device comprises a tablet," *e.g.*, '414 patent, claim 15; and "wherein the wireless networking device comprises a telephone," *e.g.*, '414 patent, claim 22. In my opinion these additional limitations are not rendered redundant or unnecessary by Samsung's proposed construction. For example, Samsung's proposed construction includes *both* wireless access points and relay devices, and is therefore broader than dependent claims requiring that the "wireless networking device" be a "wireless access point." Similarly, Samsung's proposed construction does not place any requirements on the *type* of device, and it is therefore broader than the dependent claims requiring a "handheld computing device," a "tablet," or a telephone."

66. Samsung's proposed construction is also consistent with the extrinsic evidence. For example, in the context of 802.11 WiFi networks, the extrinsic evidence describes two different

network modes: (i) an infrastructure mode involving clients communicating with the network through one or more wireless access points; and (ii) an ad hoc mode involving devices that can directly communication amongst themselves without the need for an access point.

> **4.4.1 The 802.11 Architecture and Protocol Stack**
>
> 802.11 networks can be used in two modes. The most popular mode is to connect clients, such as laptops and smart phones, to another network, such as a company intranet or the Internet. This mode is shown in Fig. 4-23(a). In infrastructure mode, each client is associated with an **AP** (**Access Point**) that is in turn connected to the other network. The client sends and receives its packets via the AP. Several access points may be connected together, typically by a wired network called a **distribution system**, to form an extended 802.11 network. In this case, clients can send frames to other clients via their APs.
>
> The other mode, shown in Fig. 4-23(b), is an **ad hoc network**. This mode is a collection of computers that are associated so that they can directly send frames to each other. There is no access point. Since Internet access is the killer application for wireless, ad hoc networks are not very popular.

SamsungXiFi_00028567 at 8625.

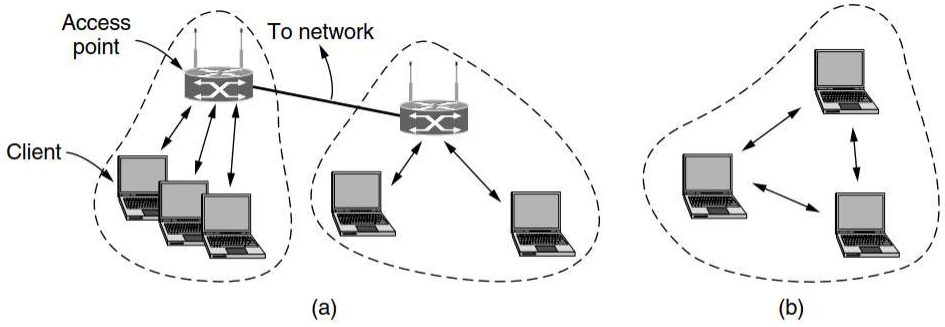


**Figure 4-23.** 802.11 architecture. (a) Infrastructure mode. (b) Ad-hoc mode.

SamsungXiFi_00028567 at 8626.

67. Samsung's proposed construction is consistent with this description of wireless networks because it preserves the distinction between "client" devices and "access points" in an infrastructure mode architecture. Samsung's proposed construction also preserves the distinction between the role of "client" devices in the infrastructure mode and the role of devices operating in the ad-hoc mode.

68. Specifically, the "access points" and the computers in the ad-hoc mode would both constitute "wireless networking devices" under Samsung's proposed construction because those devices would constitute "*a device that relays or provides network access to another device*." The "client" devices in the infrastructure mode, however, would not qualify as a "wireless networking device" as they are merely end-users and do not relay or provide network access to another device.

69. I understand that XiFi has contended that "wireless networking device" requires no construction and instead should be interpreted according to its plain and ordinary meaning. To the extent that XiFi is suggesting that the term can be satisfied by *any* type of wireless device operating within a wireless network, I do not agree. A POSITA would not understand end-users in a network that merely consume network services to qualify as a "wireless networking device" in light of intrinsic and extrinsic evidence. I therefore disagree with XiFi's proposed construction.

70. Thus, in my opinion, Samsung's proposed construction ("*a device that relays or provides network access to another device*") is most appropriate for this disputed claim term.

### C. Information Regarding the Bandwidth Availabilities

71. I understand the parties have proposed the following proposed constructions for the term "information regarding the bandwidth availabilities of the first, second, and third wireless transceivers" / "information regarding the bandwidth availabilities of the first and second wireless transceivers" / "information regarding the first and second bandwidth availabilities" which appears in the claims of all eleven patents:

| Term | XiFi's Construction | Samsung's Construction |
|---|---|---|
| "information regarding the bandwidth availabilities of the first, second, and third wireless transceivers" / "information regarding the bandwidth availabilities of the first and second wireless transceivers" / "information regarding the first and second bandwidth availabilities" (all patents) | "information regarding current bandwidth availabilities of the recited wireless transceivers, that can be obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s)" | "information regarding current bandwidth availabilities of each of the wireless transceivers" |

72. In my opinion, Samsung's proposed construction is most consistent with the understanding of a POSITA in light of the evidence. I disagree with XiFi's proposed construction because it is inconsistent with the context of the full claim language, and it introduces unwarranted limitations that are not supported by the intrinsic evidence.

73. Each of the independent claims of the eleven patents requires either that "virtual PHY interfaces" or "at least one resource monitoring interface" provide or feed information "back to the at least one virtual MAC interface." The parties appear to agree this term requires that the information fed back or provided is information regarding the "current" bandwidth availabilities of the wireless transceivers. The dispute appears to center on what specifically is fed back/provided from the wireless transceivers to the virtual MAC interface, and the manner in which it is fed back/provided.

74. First, In my opinion, a POSITA would understand that the claim language clearly contemplates providing or feeding back information regarding current bandwidth availabilities of "***each***" of the wireless transceivers that are recited in the respective claims.

75. The claims recite multiple, distinct wireless transceivers (for some claims first and second wireless transceivers are recited; for other claims, first, second, and third wireless

transceivers are recited). The claims then go on to recite that that the "virtual PHYs" / "resource monitoring interface(s)" feedback or provide information regarding "the bandwidth availabilities" of each of the separately recited transceivers. Specifically, the independent claims of the '591, '143, and '177 patents recite that the "first, second, and third virtual PHY interfaces" / "at least one resource monitoring interface" "feed information regarding the bandwidth availabilities of the first, second, ***and*** third wireless transceivers back to the at least one virtual MAC." The independent claims of the '337, '414, '105, '143, '976, '933, and '564 patents recite that the "first and second virtual PHY interfaces" / "at least one resource monitoring interface" "feed information regarding the bandwidth availabilities of the first ***and*** second wireless transceivers back to the at least one virtual MAC interface." The independent claims of the '756 and '198 patents recite that the first and second wireless transceivers respectively have "first and second wireless availabilities," and that "resource monitoring interface" "provides information regarding the first ***and*** second bandwidth availabilities to the virtual MAC interface."

76. All eleven independent claims include a conjunctive "and," indicating that the what is fed back/provided is the separately recited bandwidth availabilities of each separately recited wireless transceiver. A POSITA would understand that the claim is not met simply by feeding back or providing a subset of the transceiver bandwidth availabilities. Nor would it be satisfied by feeding back or providing some composite measure of the total bandwidth availabilities across all of the recited transceivers. What is required is feeding back/providing information regarding current bandwidth availabilities of ***each*** of the wireless transceivers."

77. This interpretation is consistent with the intrinsic evidence. For example, the common specification teaches that "[b]y employing a virtual MAC and virtual PHY layer, wireless transceiver resources may be allocated more efficiently to handle various data bandwidth

requirements from different applications." *E.g.*, '591 patent at 5:54-58; *see also id.* at 8:20-29. A POSITA would recognize that in order for the described virtual layers to more efficiently allocate transceiver resources, information regarding the bandwidth availabilities must be fed back on a *per* transceiver basis. Feeding back or providing just some of the bandwidth availabilities, or the total bandwidth availability across all transceivers would not facilitate the more efficient allocation of resources described by the specification.

78. This conclusion is further supported by Fig. 4 and its associated description. That description explains how the virtual MAC and PHY layers "involve[] an evaluation of available transceiver resources to meet peak bandwidth demands of applications running in the application layer." *E.g.*, '591 patent at 4:45-48. The transceiver resources in Fig. 4 are illustrated as "Device 1" and "Device 2." *Id.* at 4:50-51.

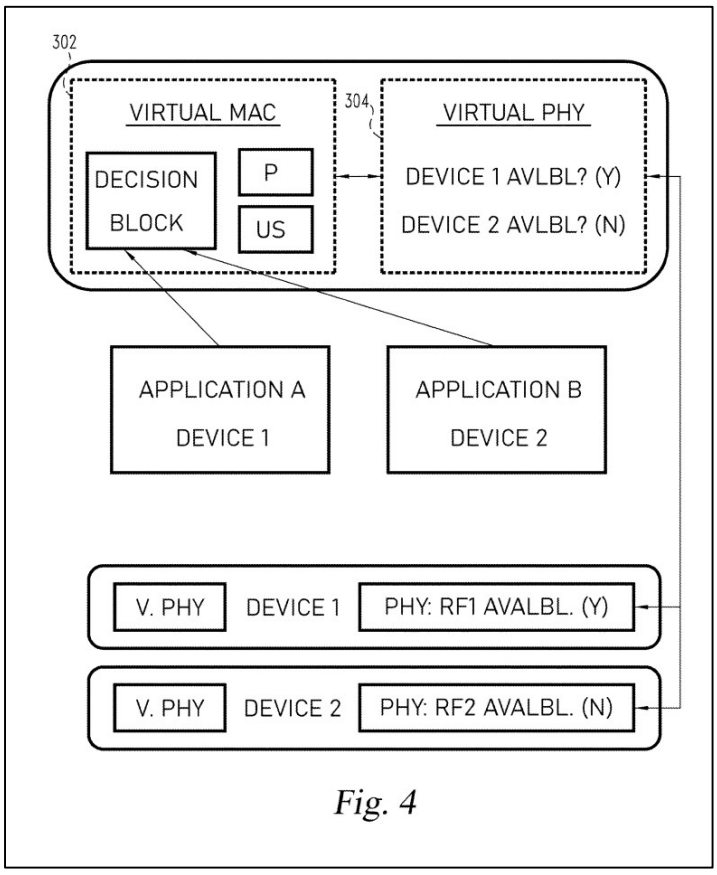


*Fig. 4*

79. The description of Figure 4 explains how "[t]he virtual MAC 302 interfaces with the virtual PHY 304 to determine device availability," *id.* at 4:52-53, which "involves a determination at the PHY layer as to the actual availability of the initially assigned transceiver resources," *id.* at 4:54-56. "Should ***a given resource*** be unavailable, such as through insufficient bandwidth or having an existing assignment, a replacement resource may be identified and assigned." *Id.* at 4:56-59 (emphasis added). Thus, again, a POSITA would understand the intrinsic evidence to describe a system in which information regarding the bandwidth availabilities of ***each*** of the wireless transceivers is fed back/provided to the virtual MAC to enable per-transceiver evaluation and allocation of resources.

80. This conclusion is also consistent with the prosecution history. For example, during prosecution of the application that became the '756 patent, the applicant submitted an August 15, 2024 preliminary amendment arguing in connection with FIG. 1 that "***each actual MAC and each actual PHY*** in a particular wireless networking device communicates directly with the processing layer [shown by the two-way arrow in FIG. 1 connecting MAC 114 and PHY 116 with process layer 104] to allow it to receive information regarding bandwidth availabilities from the wireless transceiver associated with ***each*** MAC/PHY pair." XIFI_0012343 at -13810 (at -13817) (August 15, 2024 Preliminary Amendment and Remarks). This further supports Samsung's proposed construction that the information that is fed back/provided is "*information regarding current bandwidth availabilities of each of the wireless transceivers*."

81. I disagree with XiFi's proposed construction: "*information regarding current bandwidth availabilities of the recited wireless transceivers, that can be obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s)*."

82. First, rather than requiring that the information fed back/provided be information regarding current bandwidth availabilities of each of the wireless transceivers, XiFi's proposed construction merely requires feeding back/providing such information "of the recited wireless transceivers." This proposed construction would cover a system, for example, that merely feeds back/provides information regarding the total bandwidth availability across all the transceivers, as opposed to the information regarding the individual bandwidth availability of each individual transceiver.

83. For example, if a system had three wireless transceivers with bandwidth availabilities of 0.5 GHz, 0.5 GHz, and 1.0 GHz, respectively, XiFi's proposed construction would allow for merely feeding backing information regarding a total bandwidth availability of 2.0 GHz. I disagree that a POSITA would interpret the claim to cover such an implementation. Such an implementation would not facilitate the efficient allocation of resources across individual transceivers, and would not be consistent with the intrinsic evidence in the specification and the prosecution history.

84. Second, XiFi's proposed construction requires that the information regarding current bandwidth availabilities that is provided or fed back be information "that can be obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s)." I see no basis in the plain claim language or intrinsic evidence for a requirement that the information be obtained "directly" from the actual PHY and actual MAC interfaces.

85. The plain claim language does not support any "direct" feedback requirement. The language of the independent claims merely provides that the recited virtual PHYs/resource monitoring interface "feed" the recited information back, or provide the information, to the recited virtual MAC interface. The plain claim language does not preclude the existence or presence of

additional components or intermediate functionality between either (i) the wireless transceivers and the virtual PHYs/resource monitoring interface, or (ii) between the virtual PHYs/resource monitoring interface and the virtual MAC interface.

86. Indeed, the intrinsic evidence describes many different alternative configurations for accomplishing the claimed feeding back/providing of information. For example, the specification describes how the "virtual PHY layer" may further include an "RF block" or multiple "RF blocks to denote the virtual use of two sets of allocated transceiver resources." *E.g.*, '591 patent at 4:35-38. Moreover, the specification describes alternative embodiments in which (i) "the RF block(s) communicate directly with the ultra-streaming block about actual resource availability, and the ultra-streaming block sends the information back to the decision block in the virtual MAC layer"; or "the virtual PHY RF block may directly communicate with the virtual MAC decision block and/or the processing block." *Id.* at 4:38-44. This supports the conclusion that there are different possible implementations and configurations for achieving the claimed feeding back or providing of information.

87. In connection with describing feeding back wireless resource availability, the specification further provides that "[v]arious ways for determining availability of resources include common memory, host interfaces, common threads, and/or queues or other data structures." *Id.* at 8:14-17. This indicates to a POSITA that the feeding back or providing of information regarding bandwidth availabilities need not be "direct" in the manner that XiFi's proposed construction requires, but rather may make use of intermediate interfaces, common memory, queues or other data structures. Thus, XiFi's proposed construction would exclude these contemplated embodiments. In light of this intrinsic evidence and analysis, I disagree with XiFi's position that there is a "direct" feedback requirement implied by the claims.

88. Finally, I note that XiFi's proposed construction is confusing and introduces ambiguities that are not helpful to understanding the claim scope. XiFi's proposal that the information fed back/provided must be "*obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s)*" seems to require that this information be obtained directly from both the actual PHY interfaces and actual MAC interfaces. It is unclear if XiFi's proposal is that this information must be received independently from the two mentioned interfaces, if it must be received from a combination of information from each of the interfaces, or if it can be received from either of the two interfaces. Also, XiFi's proposal that this information be obtained directly from "at least" the two mentioned interfaces appears to contemplate the possibility that the information could be obtained from some other source as well, but it is unclear to a POSITA what such source the construction is contemplating. In sum, a POSITA would recognize that XiFi's proposed construction adds additional ambiguity to the claim, and is not helpful to a POSITA in understanding the scope of the claimed invention.

89. Thus, in my opinion, Samsung's proposed construction ("*information regarding current bandwidth availabilities of each of the wireless transceivers*") is most appropriate for this disputed claim term.

**D. Without Requiring Disassociation**

90. I understand the parties have proposed the following proposed constructions for the term "without requiring [the] disassociation of the recipient" which appears in claim 1 of '337, '105, '976, '933, '177, '564, and claims 3-4 of the '414 patent, and claims 19-20 of the '143 patent.

| Term | XiFi's Construction | Samsung's Construction |
|---|---|---|
| "without requiring [the] disassociation of the recipient"<br>(claim 1 of '337, '105, '976, '933, '177, '564; '414 (claims 3-4); '143 (claims 19-20)) | Plain and ordinary meaning | "while maintaining association of the recipient" |

91. It is my opinion that Samsung's proposed construction is most consistent with the understanding of a POSITA in light of the evidence. I disagree with XiFi's proposed construction because it does not give sufficient meaning to how a POSITA would understand "without requiring [the] disassociation of the recipient" in the context of the claims, the extrinsic evidence, and XiFi's statements in the parallel PTAB proceedings.

92. For claims 1 of the '337, '105, '976, '933, '177, '564 patents, claims 3 and 4 of the '414 patent, and claims 19 and 20 of the '143 patent, this term refers to "the processing interface [being] [configured/adapted] to . . . [prepare for transmission/transmit a] data stream, without requiring disassociation of the recipient from [the] actual MAC and PHY interfaces."

93. As an initial matter, I note that the common specification of these patents do not disclose any process of creating an "association" between the claimed wireless network device MAC and PHY interfaces and a recipient. While the common specification includes some generalized discussion of users accessing a wireless network via the wireless transceivers of a wireless access point, the concept of establishing an "association" between a wireless network device and a recipient is nowhere described in the common specification.

94. Similarly, nowhere in the common specification of these patents do they disclose transmitting a data stream without requiring dissociation of a recipient from the MAC and PHY

interfaces. Indeed, the specifications of these eight asserted patents never once use the terms "disassociation" or "disassociate."

95. While there is no indication from the patent specification that the inventor had the concept of "association" in mind as of the time of its initial filing, a POSITA would have understood that "association" in the context of wireless networking, and in particular wireless local area networking, could refer to a type of process for a recipient to connect itself to an access point (which is in turn connected to the network). For example, in an 802.11 network, a recipient may carry out a process of learning the identity and capability of the access point from beacon frames, and may then send a request to associate with the access point. The access point may accept or reject the request. SamsungXiFi_00028567 at -8637 ("The association service is used by mobile stations to connect themselves to APs.").

96. Similarly, while the common specification is devoid of any description of "disassociation, a POSITA would have understood this term, in the context of wireless networking, to refer to the possibility that a prior association or relationship between the recipient and the wireless network device be broken.

> **Reassociation** lets a station change its preferred AP. This facility is useful for mobile stations moving from one AP to another AP in the same extended 802.11 LAN, like a handover in the cellular network. If it is used correctly, no data will be lost as a consequence of the handover. (But 802.11, like Ethernet, is just a best-effort service.) ***Either the station or the AP may also disassociate, breaking their relationship***. A station should use this service before shutting down or leaving the network. The AP may use it before going down for maintenance.

SamsungXiFi_00028567 at -8637 (emphasis added).

97. Accordingly, a POSITA confronted with the claim language as of 2013, would have understood that transmitting a data stream "without requiring [the] disassociation of the recipient"

means transmitting the data stream without breaking the "association" established with the recipient," *i.e.*, "while maintaining association of the recipient."

98. This conclusion is consistent with XiFi's statements made in its POPR in the parallel PTAB proceedings. In PGR2025-00069, I understand Samsung took the position that "without requiring disassociation of the recipient from either or both of the first and second actual MAC and PHY interfaces" in the '564 patent was a "negative limitation" with no support in the written description of the '564 patent specification. PGR2025-00069, Petition at 94. In its POPR, XiFi disputed that the claim term was a negative limitation. *See* PGR2025-00069, POPR at 76 n.17. Specifically, XiFi argued, with supporting expert testimony, that "rather than describing an exclusion or an absence, a POSITA would understand the 'without requiring disassociation' limitation, in light of the entire claim, to be one of two alternative choices for system configuration: 'make before break' rather than 'break before make.'" XiFi continued, "[i]n effect, 'without requiring disassociation' ***is a positive limitation*** indicating to a POSITA that a system would employ 'make before break.'" *Id.* (emphasis added).

99. Thus, even if the plain and ordinary meaning of the term "without requiring disassociation," standing alone, could be interpreted broadly to simply preclude a system mandating or "requiring" disassociation (thus allowing for a system that does, in fact, disassociate despite no requirement to do so), a person of ordinary skill in the art would understand XiFi's statements in the POPR to have rejected this interpretation.

100. Specifically, in the POPR, XiFi clearly and unmistakably took the position that the claim term requires more than just the absence of a requirement for disassociation, but rather is a "positive limitation" requiring "make before break." A POSITA would objectively understood

XiFi to have argued that "without requiring disassociation of the recipient" to require "while maintaining association of the recipient."

101. Indeed, I understand that XiFi itself has explained that the alleged invention of the asserted patents is to facilitate a "make ***without break***" wireless network.

> Prior to the XiFi Patents, application data transmitted over a Wi-Fi network was confined to a single band, and any switch to another band required that the association between a transmitter and a receiver on one band be broken before a new association on a different band could be made, i.e., "break before make." ***The inventions of the XiFi Patents***, in contrast, allow simultaneous associations to be made between a transmitter and a receiver on two or more different Wi-Fi bands ***which allows, for example, a switch between bands to be made without needing to first break the current association, i.e., "make without break."***

Dkt. 13 ¶ 34 (emphasis added).

102. I understand that XiFi has contended that "without requiring [the] disassociation of the recipient" requires no construction and instead should be interpreted according to its plain and ordinary meaning. To the extent that XiFi is suggesting that this term can be satisfied by, for example, a system or method were disassociation does, in fact, occur so long as the processing interface does not impose a requirement for such disassociation, I disagree. Such a broad interpretation is exactly what XiFi argued was inappropriate in the PGR in an effort to defeat Samsung's lack of written-description argument. XiFi insisted in the intrinsic evidence that this claim requirement is a "positive" limitation, and it must therefore be interpreted to require that an already established association be maintained.

103. Thus, in my opinion, a POSITA would have understood the term "without requiring [the] disassociation of the recipient," within the context of XiFi's POPR statements, to mean "*while maintaining association of the recipient*."

### E. Different Bands of Frequencies

104. I understand the parties have proposed the following proposed constructions for the term "different bands of frequencies" / "bands of frequencies being different" / "frequency bands being different from each other," which appears in the claims of all eleven patents:

| Term | XiFi's Construction | Samsung's Construction |
|---|---|---|
| "different bands of frequencies" / "bands of frequencies being different" / "frequency bands being different from each other" (all patents) | Plain and ordinary meaning | "different ranges of frequencies that are defined or allocated by a regulatory or standards body as a band" |

105. It is my opinion that Samsung's proposed construction is most consistent with the understanding of a POSITA in light of the evidence. I disagree with XiFi's proposed construction because it does not address a POSITA's understanding with respect to the meaning of "bands of frequencies"/"frequency bands."

106. As described in the common specification, the purported invention of the asserted patents "relates to wireless networks." *E.g.*, '591 patent at 1:24-25. The common specification discloses that a wireless networking system that "may involve a WiFi network, a mobile wireless network, or a combination of the two." '591 patent at 2:66-3:3 and 7:50-55.

107. A POSITA understands that the ranges of frequencies available for these types of wireless networks are regulated by local governmental agencies (*e.g.*, in the United States, the Federal Communications Commission ("FCC")) and often formalized in industry-standards. A recognized range of frequencies defined or allocated by a regulatory or standards body is typically referred to in the field as a "frequency band" or "band of frequencies."

108. For example, in the WiFi context, it is well-known to a POSITA that a WiFi network may operate within any one of the so-called 2.4 GHz band (defined as 2400-2483.5 MHz),

the 5 GHz band (defined as 5725-5850 MHz), and the 6 GHz band (defined as 5925-7125 MHz). Thus, in the WiFi context, when a POSITA refers to a "frequency band" or "band of frequencies," such reference is understood to refer to one of these established bands.

109. The foregoing is supported the prosecution history. During prosecution of the '591 patent, the Examiner issued a February 8, 2023 Non-Final Rejection finding, amongst other things, that the applicant was not entitled to its claimed priority date because "[t]he disclosure of the prior-filed application, Application 61897216, 61897219, 14526799, and 16039660 fail to provide adequate support or enablement in the manner provided by 35 U.S.C. 112(a) . . . ." XIFI_0000244 at -0323 (at page -0325). In Remarks accompanying an August 8, 2023 amendment, the applicant provided a claim chart mapping the limitations of the amended claims against the originally filed provisional applications. *Id.* at -1021-1028. For the limitation of then-pending claim 22 (now claim 1) reading "first, second, and third wireless transceivers . . . adapted to emit radio waves in first, second, and third ***different bands of frequencies*** . . . ," the applicant provided the following characterization of the provisional filings:

> On page two of the 10/30/2013 '216 provisional, "Wi-Fi radios" and "multiple radios" are referenced. A single radio is associated with each individual actual PHY layer. Each radio has bandwidth availability up to an actual bandwidth. Wi-Fi radios emit radio waives in different bands of frequencies such as, for example, 2.4 GHz, 5 GHz and 6 GHz."

*Id.* at -1021. Thus, the applicant clearly stated for purposes of identifying support for the claimed "different bands of frequencies," that the "bands" referred to frequency ranges defined or allocated by a regulatory or standards body, such as the established 2.4 GHz, 5 GHz, and 6 GHz bands recognized in the WiFi context.

110. I note that Samsung's proposed construction is also consistent with the manner in which XiFi has characterized its purported invention in this case. In its complaint, XiFi claimed

that the asserted patents enabled "Multi-Link Operation (MLO), which is a significant aspect of WiFi 7."[2] Dkt. 13 ¶ 40. According to XiFi, pre-Wi-Fi 7 technologies "allow[ed] a device to connect and jump between either ***2.4 GHz, 5 GHz and 6 GHz bands***" but could "only send data via one band at a time." *Id.* (emphasis added). XiFi claimed that the inventor of the patents (Mr. Manapragada) was inspired to create the invention of the asserted patents because he was allegedly frustrated with the capability of a device to use "only one channel or band (then, either 2.4 GHz or 5 GHz) at a time." *Id.* ¶ 18. Thus, XiFi's own characterization of its invention supports my opinion that "frequency band" refers to an established/recognized frequency band, as opposed to merely some arbitrary range of frequencies.

111. Extrinsic evidence supports my opinion that a POSITA would have understood that different bands of frequencies refers to different ranges of frequencies that are defined or allocated by a regulatory or standards body as a band. For example, at the time of the alleged invention, MAC and PHY layers were standardized by the IEEE (Institute of Electrical and Electronics Engineers) in IEEE 802.11 "*IEEE Standard for Information Technology – Telecommunications and Information Exchange Between Systems, Local and Metropolitan Area Networks – Specific Requirements*." Part 11 of this standard (IEEE 802.11-2012; SamsungXiFi_00033601) is on "*Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification*." An operative Wi-Fi standard as of October 2013 was the IEEE 802.11-2012 standard (which includes 802.11n, Wi-Fi 4). *See*, *id.* at -3612.

112. The IEEE 802.11-2012 standard states that "IEEE 802.11 devices can operate on frequencies that are licensed by national regulatory bodies. Although this standard has been generalized so that it is independent of license type, band, and country of operation, only the bands

[2] WiFi 7 is the latest version of the standardized WiFi protocol, 802.11-be.

and associated regulations listed in Annex D have been specifically considered." SamsungXiFi_00033601 at -33753 (page 55); *see also* Annex D (Regulatory references) at -35985 (page 2287) indicating that, in the United States, approval authority is provided by the Federal Communications Commission). The FCC documents listed in Annex D include 47 CFR, Part 15, Section 15.247. That Section defines "***Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz***," the latter two of which a POSITA would understand to be the Wi-Fi standard 2.4 GHz and 5 GHz frequency bands. *See*, SamsungXiFI_00037943 at -8776 (emphasis added).

113. The IEEE 802.11-2012 standard further states that "The OFDM PHY ***shall not operate in frequency bands not allocated by a regulatory body in its operational region***. Regulatory requirements for a given frequency band are set by the regulatory authority responsible for spectrum management in a given geographic region or domain. The particular channelization to be used for this standard is dependent on such allocation, as well as the associated regulations for use of the allocations. These regulations are subject to revision, or may be superseded." SamsungXiFI_00033601 at -35304 (page 1606) (emphasis added). Clause 20.1.3.3 of the 802.11-2012 standard, on the HT PMD (high through physical medium dependent) sublayer indicates that "[t]he HT PMD sublayer provides a means to send and receive data between two or more STAs. This clause is concerned with ***the 2.4 GHz and 5 GHz frequency bands*** using HT OFDM modulation." *Id.* at -35368 (page 1670) (emphasis added).

114. I understand that XiFi has contended that "different bands of frequencies" / "bands of frequencies being different" / "frequency bands being different from each other" requires no construction and instead should be interpreted according to its plain and ordinary meaning. Apparently this is because XiFi intends to read "different bands of frequencies" to refer to any

arbitrary range of frequencies. I disagree that this would constitute an appropriate or valid reading of the claim to a POSITA.

115. To illustrate the consequences of XiFi's proposed approach, consider the following: Within the recognized, WiFi 2.4 GHz frequency band, there are recognized 20 MHz channels. For example, channel 1 is recognized to refer to 2402-2422 MHz, channel 5 is recognized to refer to 2422-2442 MHz, and channel 9 is recognized to refer to 2442-2462 MHz. To any reasonable POSITA, each of these channels would be understood to operate within the same 2.4 GHz band. XiFi's proposed approach, however, would hypothesize that each individual channel *within* the 2.4 GHz band can *itself* be conceptualized as a frequency band, and thus use of different channels within that one single band could meet the claim limitation for "different frequency bands."

116. In fact, XiFi's approach would allow it to treat any arbitrary, contiguous range of frequencies its own "band." For example, any arbitrary range of frequencies within a single channel could be considered its own "band" under XiFi's apparent approach. Such an approach would render the "different frequency bands" limitation a virtual nullity, because there are countless arbitrary ways to subdivide a range of frequencies.

117. To put this into further context, the claims differentiate between "different bands of frequencies" and "at least one portion of each one of the first, second, and third bandwidths of the first, second, and third wireless transceivers that are available for communication." *See*, *e.g.*, '591 patent, claim 1. In '591 patent, claim 1, for example, the claim recites that if a first bandwidth requirement is satisfied by bandwidth availabilities of two transceivers, a data stream is prepared for transmission from the two transceivers "using a specific subset of frequencies corresponding to the identified portions of their available bandwidth." In my opinion, a POSITA would understand that the respective subsets of frequencies corresponding to the identified portions are

frequencies (*e.g.*, channels) of the same band, and are not themselves different frequency bands (*e.g.*, 2.4 GHz, 5 GHz, 6 GHz) or channels on different bands.

118. The dependent claims further recite portions of the bandwidths distinct from the portions of the bandwidths identified in the independent claims. That is, the claims contemplate that there are multiple portions within a band. *See*, *e.g.*, '591 patent, claim 7 ("another at least one portion of the bandwidth of any of the first, second or third wireless transceivers"), '105 patent, claim 14 ("identify at least one second portion of the first actual bandwidth of the first wireless transceiver, the identified second bandwidth portion comprising a set of given resources, the first and second identified actual bandwidth portions not being contiguous with each other"), '143 patent, claim 19 ("identify at least one new portion of the bandwidth of the first selected wireless transceiver that is available for communication"). Therefore, in my opinion, a POSITA would understand that the portions themselves cannot be bands, otherwise the distinction set up by the claims wouldn't make sense.

119. In my opinion, XiFi's proposed approach is not consistent with how XiFi treated the "different frequency bands" language in the prosecution history, it is not consistent with how XiFi has characterized its purported invention (*i.e.*, as covering Wi-Fi 7 MLO operation), and it is not consistent with the understanding of a POSITA.

120. Thus, in my opinion, Samsung's proposed construction ("*different ranges of frequencies that are defined or allocated by a regulatory or standards body as a band*") is most appropriate for this disputed claim term.

## VII. Supplementation

121. I reserve the right to supplement this report based on additional information, including documents, depositions, or discovery disclosures.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge and belief.

Executed this 4th day of February, 2026, at Marshall, Texas.

Mark Mahon