

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS AMERICA, INC.,
SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

COLLISION COMMUNICATIONS, INC.
Patent Owner.

Case No. IPR2024-01250
U.S. Patent No. 8,089,946

**DECLARATION OF GIUSEPPE CAIRE REGARDING PATENT
OWNER'S PRELIMINARY RESPONSE FOR *INTER PARTES REVIEW* OF
U.S. PATENT NO. 8,089,946**

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I, Dr. Giuseppe Caire, hereby declare as follows:

I. Introduction

1. My name is Giuseppe Caire. I have been retained in the above-referenced *inter partes* review proceeding by Collision Communications, Inc., to evaluate United States Patent No. 8,089,946 (the “’946 patent”) against certain references that are presented by the Petitioner. As detailed in this report, it is my opinion that the Petition does not establish that any of the challenged claims are anticipated or rendered obvious by the references presented by the Petitioner. If requested by the Patent Trial and Appeal Board, I am prepared to testify at trial about my opinions expressed herein.

II. Qualifications

2. I have over thirty years of experience in the field of electrical engineering. For the past nine years I have held a Full Professorship and faculty position as the Chair of Communications and Information Theory at Technische Universität Berlin. In my work and research, I have researched and written about Information Theory, Communication Theory and Coding Theory, Wireless Communication Systems, Signal Processing and Statistics.

3. Prior to my appointment at the Technische Universität, Berlin I was a tenured Full Professor at the University of Southern California, Los Angeles from 2005-2016. Although I am currently at the Technische Universität Berlin, I have

retained the title of Adjunct Research Professor at the University of Southern California, Los Angeles since 2016. Prior to my tenure at the University of Southern California, Los Angeles, I spent seven years as a Professor at Eurecom Institute, and held various Assistant Professorships from 1995-1998.

4. I studied Electrical Engineering and received my Ph.D. in 1994 from the Politecnico di Torino, my Master's Degree in 1992 from Princeton University, and my Bachelor of Science Degree in 1990 from the Politecnico di Torino. In addition to my studies at undergraduate and graduate levels and academic qualifications, I have held industrial research positions such as my current role as the Director of the Huawei-TU Berlin Joint Innovation Center, which has a focus on fundamental research in wireless technology.

5. I have authored or co-authored over four hundred publications in the areas of computer networks, and telecommunications. My publication and patents are listed on my curriculum vitae, which is attached hereto as EX2002.

6. In 2021, I was awarded the Leibniz Price, which is awarded to "exceptional scientists and academics for their outstanding achievements in the field of research" and known as the most important research award in Germany. In 2022, I was elected a Member of the Berlin Brandenburg Akademie der Wissenschaften (BBAW). Further, I served as President of the Institute of Electrical and Electronics Engineers (IEEE) Information Theory Society in 2011.

7. I am thanked in the preface of S. Verdu, *Multiuser Detection*, Cambridge University Press 1998, which is submitted by the Petitioner as EX1012.

8. As a result of my background in information and communication theory, I have extensive knowledge regarding the state of the technical art in this area at the time of filing of the '946 patent.

9. I am co-author of an article titled "Bit-Interleaved Coded Modulation" which was published in IEEE Transactions on Information Theory, Vol. 44, No. 3, May 1998 at pp. 927-946. This paper has been cited in other publications over thirty-three hundred (3300) times (Google Scholar).

10. In addition, I am co-author of an article titled "Iterative Multi-User Joint Decoding: Unified Framework and Asymptotic Analysis," which was published in IEEE Transactions on Information Theory 48, No. 7 (2002): 1772-1793. This paper has been cited 409 times, which makes it one of the most referenced papers on turbo multiuser joint decoding. In this paper, we presented the idea of feeding back to the MUD the soft-estimations of the symbols produced by the soft-output decoders and do partial interference cancellation in order to clean up the signal from interfering along the iterations.

III. Materials Considered

11. In preparing this declaration, I have reviewed the specification and claims of the '946 patent (EX1001) and the file history of the '946 patent (EX1002).

I understand the '946 patent was issued on January 3, 2012, from U.S. Patent Application No. 12/548,502.

12. I have also reviewed the Petition, declaration of Dr. Paul S. Min (EX1003) and all publications and exhibits cited in the Petition and declaration of Dr. Paul S. Min including:

- U.S. Patent Application Publication No. 2003/0235147 to Walton et al (“Walton” EX1004).
- U.S. Patent No. 7,190,743 to Learned et al. (“Learned” EX1005).
- U.S. Patent No. 7,139,283 to Quigley et al. (“Quigley” EX1006).
- U.S. Patent No. 6,826,140 to Brommer et al. (“Brommer” EX1007).
- Infringement Contentions – Chart for U.S. Patent No. 8,089,946 (EX1009).
- S. Verdu, “Computational Complexity of Optimum Multiuser Detection,” *Algorithmica* (1989) (EX1011).
- S. Verdu, *Multiuser Detection*, Cambridge University Press 1998 (“Verdu” EX1012).
- RFC 791 Internet Protocol, IETF, available at <https://datatracker.ietf.org/doc/html/rfc791#page-11> (EX1013)

13. I have also reviewed relevant parts of the publications and exhibits cited in this declaration, including the following publications:

- U. Madhow, *Fundamentals of Digital Communication*, Cambridge University Press 2008 (“Madhow” (EX2003));
- R.G. Gallager, *Principles of Digital Communication*, Cambridge University Press 2008 (“Gallagher” (EX2004)); and
- A. Goldsmith, *Wireless Communications*, Cambridge University Press 2005 (“Goldsmith” (EX2005)).

IV. Wireless Communication Background

14. The challenged claims generally concern a modem that can packet a wireless signal received over one network for subsequent use in a different network. More specifically, the improved modem can demodulate and recover a plurality of wireless signals, embed those signals in “network data packets” for use in a subsequent network, and then, from the resulting plurality of signals and corresponding packets, identify a target signal whose packet can then be passed on over the subsequent network.

15. To provide context for the claimed subject matter and Samsung’s Petition, the following brief background addresses the following topics:

- packeting modems;
- network data packets versus recovered signals; and
- network data packet formatting modes versus diversity transmission

modes.

A. Packeting Modems

16. The '946 Patent describes a modem that, among other things, can packet a wireless signal received over one network for subsequent use in a different network.

17. Such a packeting modem has a variety of applications. For example, the modem could be used in a cell phone to embed an incoming cellular signal in a packet for use in another network, such as a local Wi-Fi or Bluetooth network. (EX2003 at 4; EX2005 at 2). In this manner, a cellphone could be used to receive cellular signals and pass them on to a wirelessly connected device, such as a laptop, tablet, or listening device. (EX2003 at 4; EX2005 at 2, 12, 17, 19, 537, 544).

18. Thus, in one application, a user could tether their laptop to their cellphone using a local Wi-Fi network, and then receive texts on their laptop via signals received, packeted, and forwarded by their cellphone modem. (EX2005 at 5, 19, 537). In another application, the user could use their phone to wirelessly access the internet and a streaming service, tether earphones to the cellphone using a local Bluetooth network, and then listen to music streaming from the internet using signals received, packeted, and forwarded by their cellphone modem. (EX2005 at 19-20, 601-603).

19. In each application, the cellphone includes a modem that (unlike any of the asserted reference modems) packets the wireless signals recovered at the phone

for transmission over a second network, such as a local Wi-Fi or Bluetooth network. (EX2005 at 5, 19-20, 537, 601-603).

B. Material Differences Between “Recovered Signals” and “Network Data Packets”

20. None of the references concern the production of network data packets.

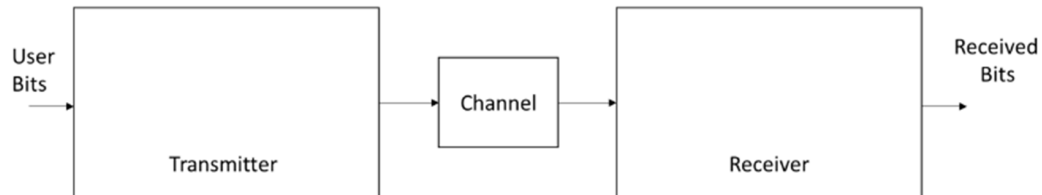
I understand the Petition points to the mere recovery of wireless signals as somehow also satisfying the claimed subsequent production of network data packets for those recovered wireless signals. (*E.g.*, Pet. at 16). But the identified recovered wireless signals are not network data packets, and I understand the Petition identifies no basis for its attempt to confuse and conflate the two.

1. Recovered Wireless Signals

21. A typical wireless transmission generally involves a transmitter and receiver at opposite ends of a wireless channel, wherein an original signal is input at the transmitter and a recovered signal is calculated at the receiver.

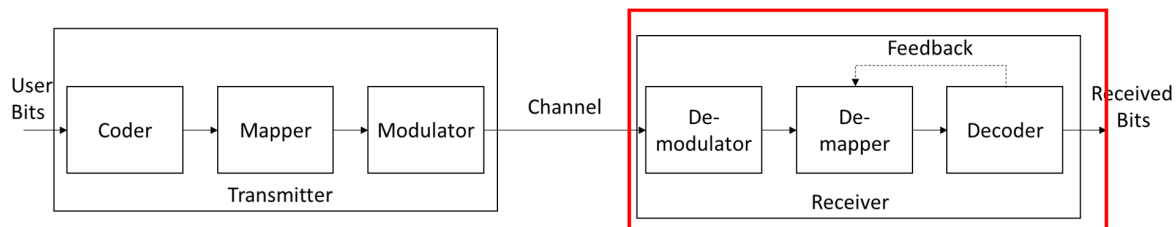
22. As illustrated in the simplified figure below, an original information signal in the form of user bits (sequences of 0s and 1s) is input to the transmitter, which first converts those bits into an analog carrier wave and then transmits that carrier wave over the wireless channel to the receiver. (EX2003 at 2-4; EX2004 at 1-5, 95, 181-183, 208-209). The receiver receives the wave and attempts to recover

the original signal by converting the received wave into received bits. These received bits are the recovered signal. (EX2003 at 2-4; EX2004 at 3-5).



(Based on FIG. 1.1 of EX2003).

23. The receiver recovers the signal using a decoder. A typical receiver includes a demodulator, a demapper, and a decoder.



(EX2003 at 3-4; EX2004 at 4-7).

24. The “demodulator” receives the modulated wave via the channel and attempts to extract the wave’s symbol values. (EX2003 at 3-4; EX2004 at 4-7). The extracted symbol values are then input to the “demapper,” which is used to help identify which bit sequence may correspond to the original signal. (EX2003 at 3-4, 43-46; EX2004 at 4-7).

25. Next, the “decoder” uses information from the demapper and error-correcting code and other redundancies to identify the appropriate bit sequence and construct the recovered signal. (EX2003 at 3-4; EX2004 at 11).

2. Network Data Packets

26. But this recovered signal is not a network data packet. Rather, the recovered signal (received bits) is merely an example of data that may be embedded within a network data packet for transmission over a packet-switching network. Accordingly, a network data packet is more than just a recovered signal and must also include additional specialized information that allows the entire packet to be carried over a packet-switched network. (EX2003 at 4; EX2005 at 2, 17, 544-546).

27. The '946 Patent describes an exemplary packet in its Figure 11, one that “shows essential functions common to all network protocols.”

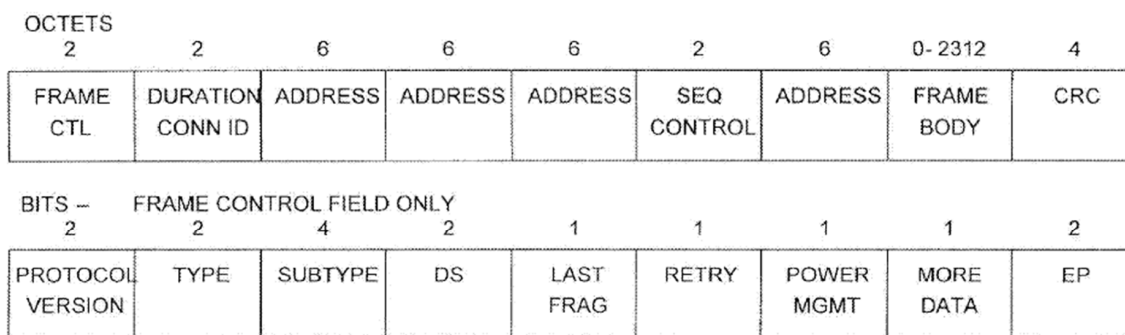


Fig. 11

(EX1001 at Fig. 11, 9:29-50).

28. As shown and described, a network data packet includes much more than “the actual data embedded in the packet” for transmission, but also includes synchronization information necessary for receipt of the packet; protocol type information; power control information; packet type information; fragmentation information; packet duration information; recipient address information; and error correction information:

This packet [in FIG. 11] is taken from the IEEE 802.11 protocol, but it shows essential functions common to all network protocols. The packet begins with synchronization bits necessary for network receiver elements to acquire the asynchronously transmitted packet. ... Next follows a control sequencing necessary for the correct packet interpretation. Its fields include protocol type, power control, packet type, fragmentation information, and similar network housekeeping functions. Next are bits indicating the duration of the packet. Next are address fields for identifying the intended recipient. Next comes the actual data embedded in the packet. Last comes the error correction bits.

(EX1001 at 9:29-50).

29. Thus, a recovered signal cannot by itself be transmitted over a subsequent packet-switching network but must first be embedded in a network data packet, which includes other necessary information not found in the recovered signal. Accordingly, contrary to the Petition’s unstated presumption, the receiver’s recovered signal and bits are not by themselves a data network packet.

C. Material Differences Between “Network Data Packet Formatting Modes” and “Diversity Transmission Modes”

30. Consistent with the foregoing, “packetizing” modems like those described in the challenged claims can produce a data network packet for a recovered signal so that the recovered signal may be transmitted over one or more subsequent networks. And that packetizing includes placing the bits into a “network data packet” particularly designed and formatted for use in that subsequent network. (EX2003 at 4; EX2005 at 2, 12, 17, 19, 537, 544).

31. Thus, if the subsequent network is a Wi-Fi network, the network data packet will include the recovered user bits plus Wi-Fi packet data that allows for the packet to be sent and received over that Wi-Fi network. (EX2005 at 5, 19, 537). If the subsequent network is a Bluetooth network, the network data packet will include the recovered user bits plus specialized Bluetooth packet data that allows for the packet to be sent and received over that Bluetooth network. (EX2005 at 19-20, 601-603). And so on for other types of potential subsequent networks, such as an Asynchronous Transfer Mode Network, Public Switched Telephone Network, or Integrated Services Digital Network – in each instance, the network data packet will include not only the reconstructed user bits but also additional specialized packet data that allows for the packet to be sent over the network in question. (EX2005 at 5, 19-20, 537, 601-603).

32. The particular packet format that is suitable for a particular network is known as its “network data packet formatting mode.” Depending on the type of subsequent network to be used, the modem may reformat a signal into a data network packet using a Wi-Fi network data packet formatting mode, a Bluetooth network data packet formatting mode, or any other relevant network data packet formatting mode. (EX2005 at 5, 19-20, 537, 601-603).

33. These “network data packet formatting modes” are yet another area where I understand the Petition conflates and confuses different concepts and technology in an attempt to cover up deficiencies in the asserted references. In this instance, because none of the references concerns or addresses Packeting modems or the network data packet formatting modes used by such modems, I understand the Petition attempts to satisfy the claimed limitations concerning “network data packet formatting modes” by instead pointing to disclosures concerning “diversity transmission modes.” (*E.g.*, Pet. at 26-27). But “diversity transmission modes” have nothing to do with “network data packet formatting modes,” and I understand the Petition does not assert or establish otherwise.

34. Rather, “diversity transmission modes” concern a different concept. Some wireless communication systems may use a technique referred to as “diversity transmission” on the transmitter side to improve reliable wireless transmission. (EX2005 at 204-205). As the name “diversity transmission” suggests, rather than

send a carrier wave once, the carrier wave is sent two or more times, and a transmission characteristic (such as the transmit antenna) is varied between the multiple (diverse) transmissions. (EX2005 at 204-205). These redundant transmissions help mitigate the effect of noise and distortion on the receiver's ability to reconstitute the original signal. (EX2005 at 204).

35. There are numerous diverse approaches (modes) to varying a transmission characteristic among the redundant transmission, including space, polarity, angle, and frequency. (EX2005 at 204-205). These “diversity transmission modes” are entirely different from and unrelated to the claimed “network data packet formatting modes.”

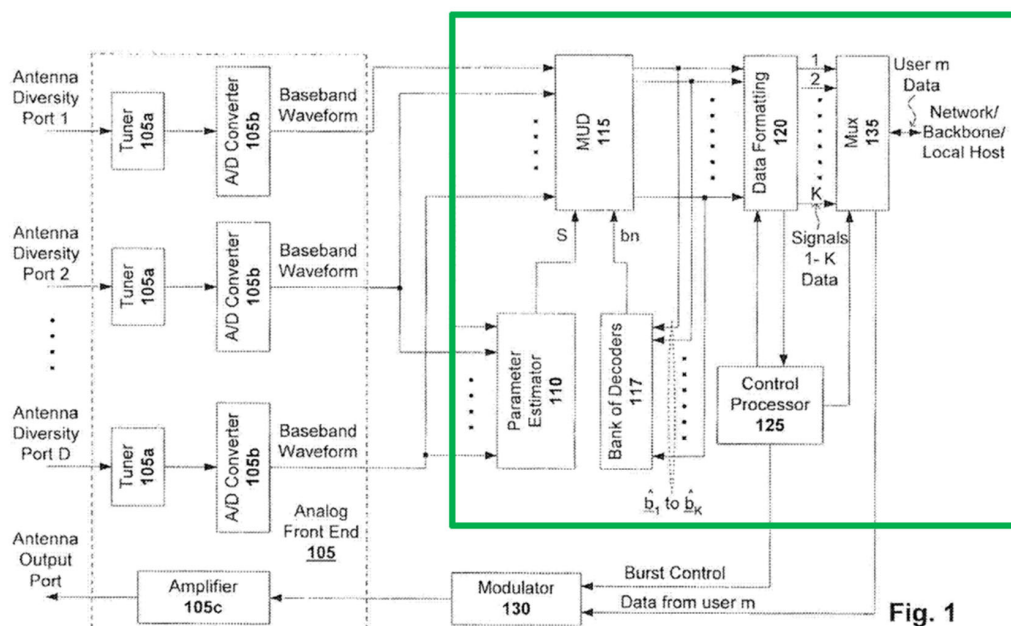
V. The '946 Patent's Improved Packeting Modem

36. The '946 Patent and its challenged claims generally concern wireless communication systems with multiple signals that may interfere with one another. More specifically, the claims are directed to an improved modem for demodulating and recovering a plurality of wireless signals, embedding those signals in “network data packets” for use in a subsequent network, and then, from the resulting plurality of signals and corresponding packets, identifying a target signal whose packet can then be passed on over the subsequent network. (EX1001 at independent claims 1, 10, and 20).

A. Overview

37. For a variety of reasons, a wireless channel may include not just one, but multiple transmissions. For example, transmissions from other channels may crossover into the channel and interfere with the intended transmission, or a channel may be intentionally overpacked with multiple signals. (EX1001 at 3:4-9). There is thus a need for a modem that can receive multiple transmissions, identify the target transmission, reconstruct its signal, and embed that target signal in one or more packets to be sent over one or more subsequent networks. (EX1001 at 4:17-20).

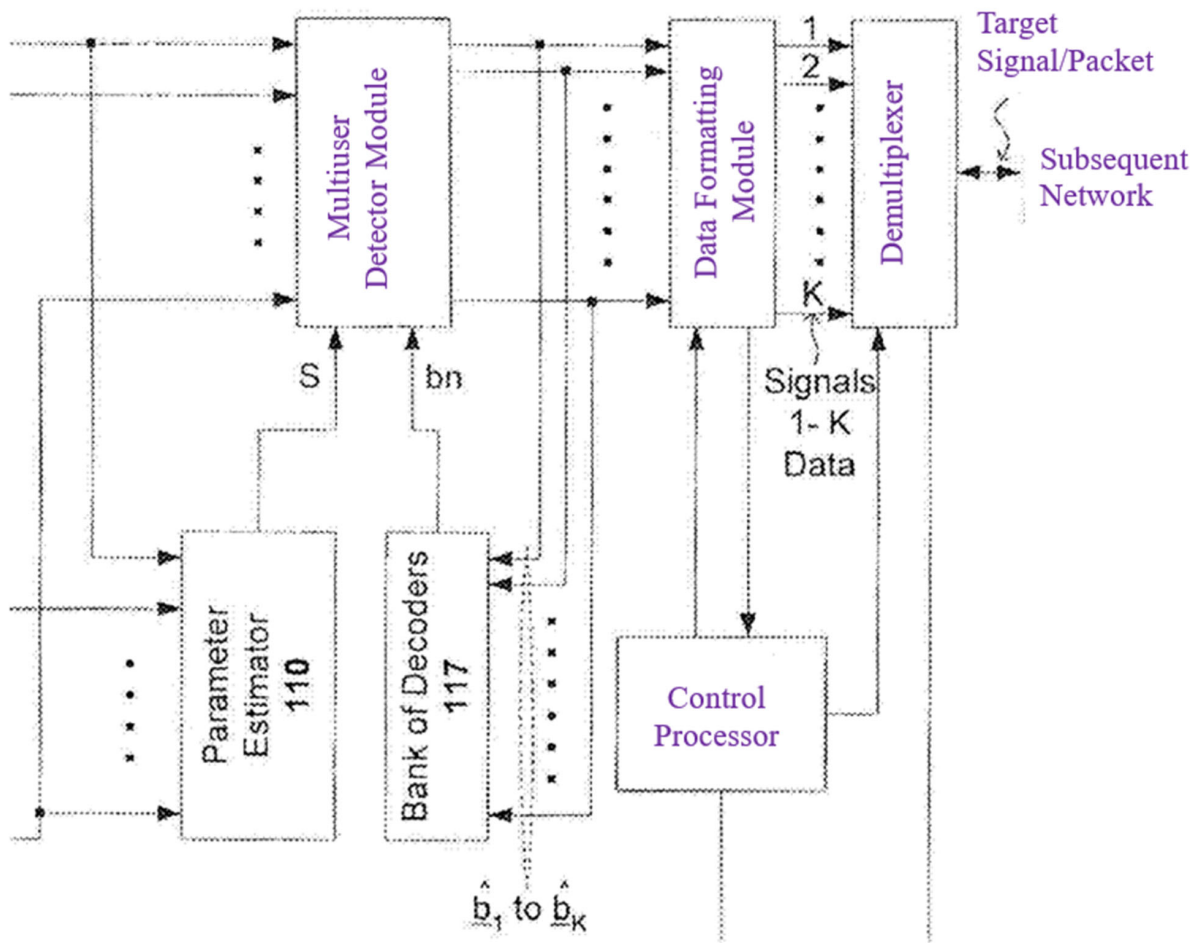
38. The '946 Patent discloses and claims an improved modem for doing just that. Figure 1 illustrates an exemplary improved modem. As shown, the modem includes an analog front end that converts the received multiple transmission (numbered 1 through K) into digital waveforms and passes those waveforms onto the modem's backend, highlighted in green:



(EX1001 at Fig. 1, 12:41-64).

39. Concentrating on the modem's backend (reproduced below) and its features relevant to this Preliminary Response, it includes:

- a multiuser detector module for demodulating and recovering the originally sent signals;
- a data formatting module for producing network data packets for the recovered signals (EX1001 at 4:5-11, 14:20-29); and
- a control processor and demultiplexer for identifying and selecting a target signal of interest so that its packet may then be relayed over a subsequent network (EX1001 at 14:44-61; 16:2-5).



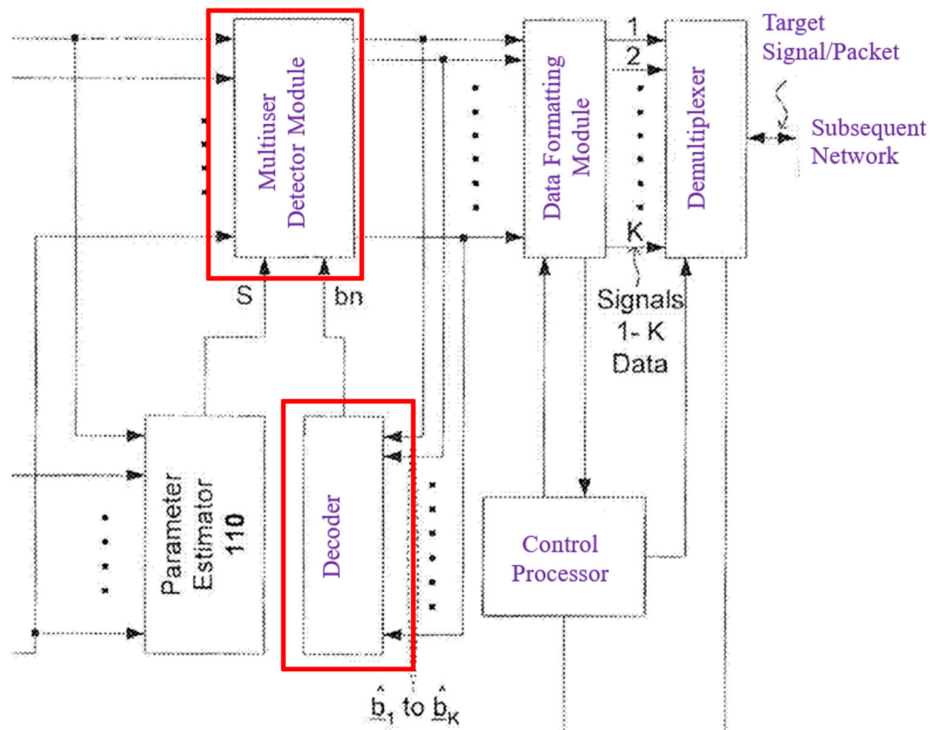
(E.g., EX1001 at Fig. 1, 12:41-64).¹

40. These features are explained in more detail in the following sections.

¹ Annotations are added to this excerpt of FIG. 1 and other figures for illustrative purposes or to ease the understanding of block names. Annotations are made clear using red boxes, purple text, and orange highlighting.

B. Multiuser Detector Module

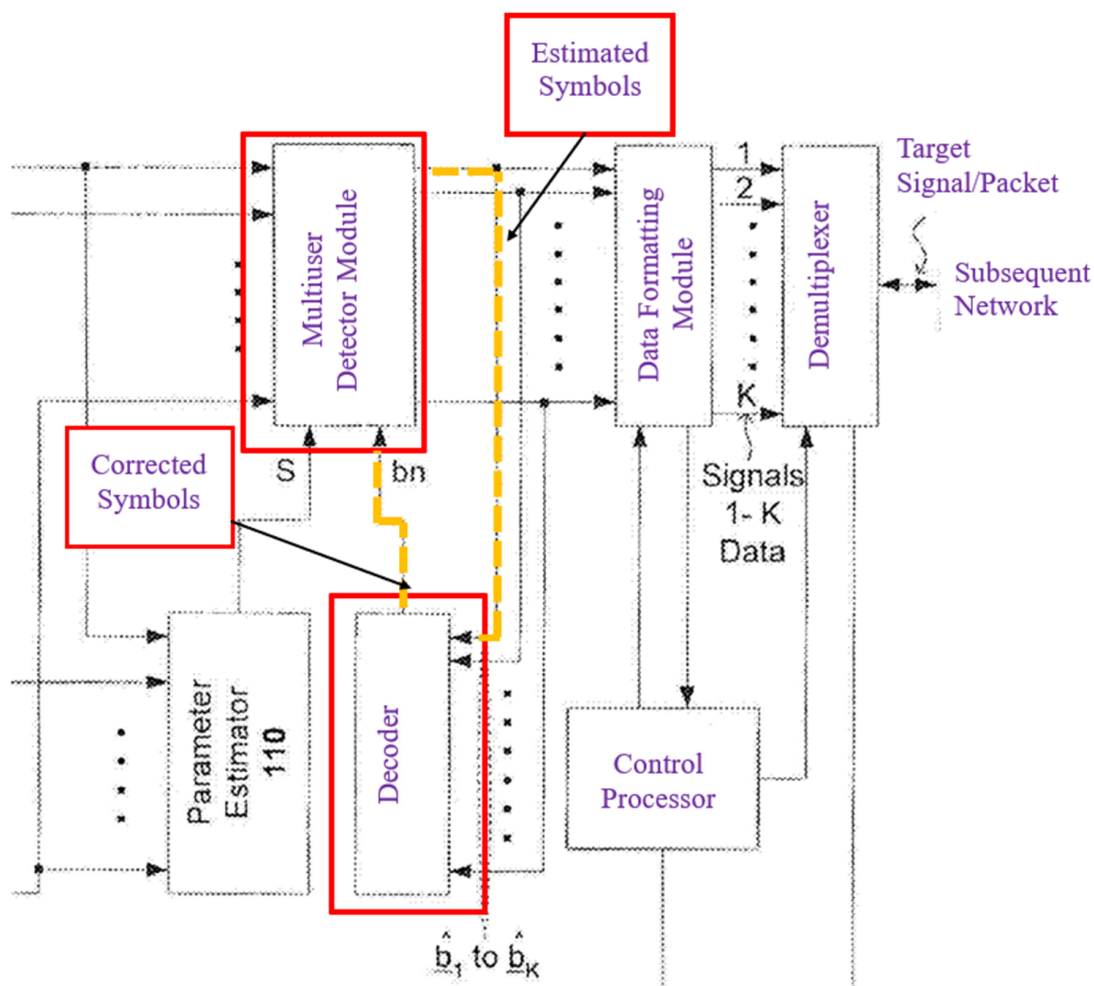
41. The illustrative modem of Figure 1 includes multiuser detector module that utilizes a bank of decoders to separate, demodulate, and recover the originally sent signals 1 through K:



(*E.g.*, EX1001 at Fig. 1, 12:41-64, 13:40-14:6).

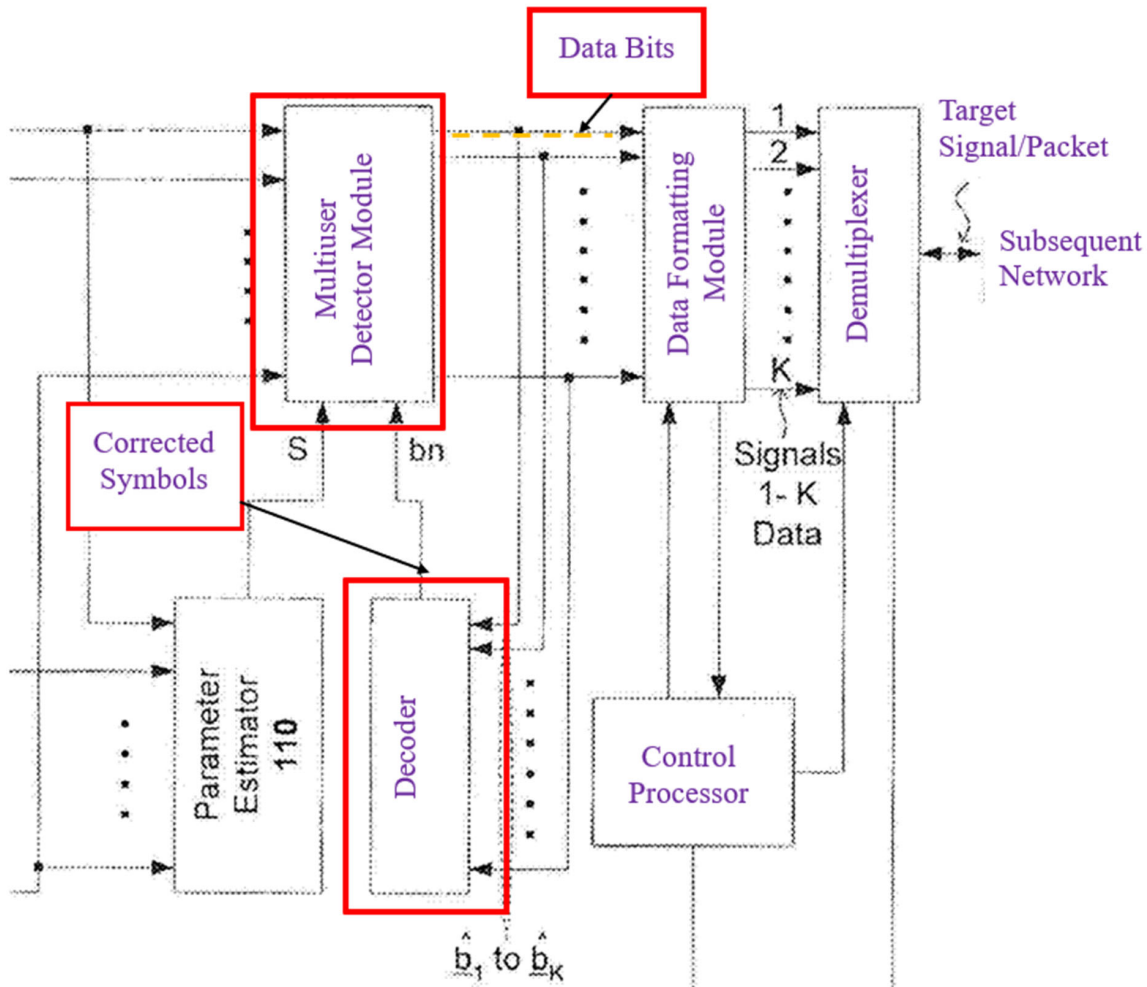
42. As described, the multiuser detector module 115 (also called the MUD module) receives the multiple waveforms sent on the channel. It is configured to separate the received multiple waveforms and then estimate symbols for each. (*E.g.*, EX1001 at 13:22-43).

43. As illustrated in Figure 1, the multiuser detector module 115 then supplies the estimated symbols to a bank of decoders 117. (*E.g.*, '946 Patent at Fig. 1, 13:54-66). These decoders apply error-correcting codes to calculate corrected symbols, which they send back to the multiuser detector module 115. (EX1001 at 13:54-62).



(*E.g.*, EX1001 at Fig. 1, 12:41-64, 13:54-66).

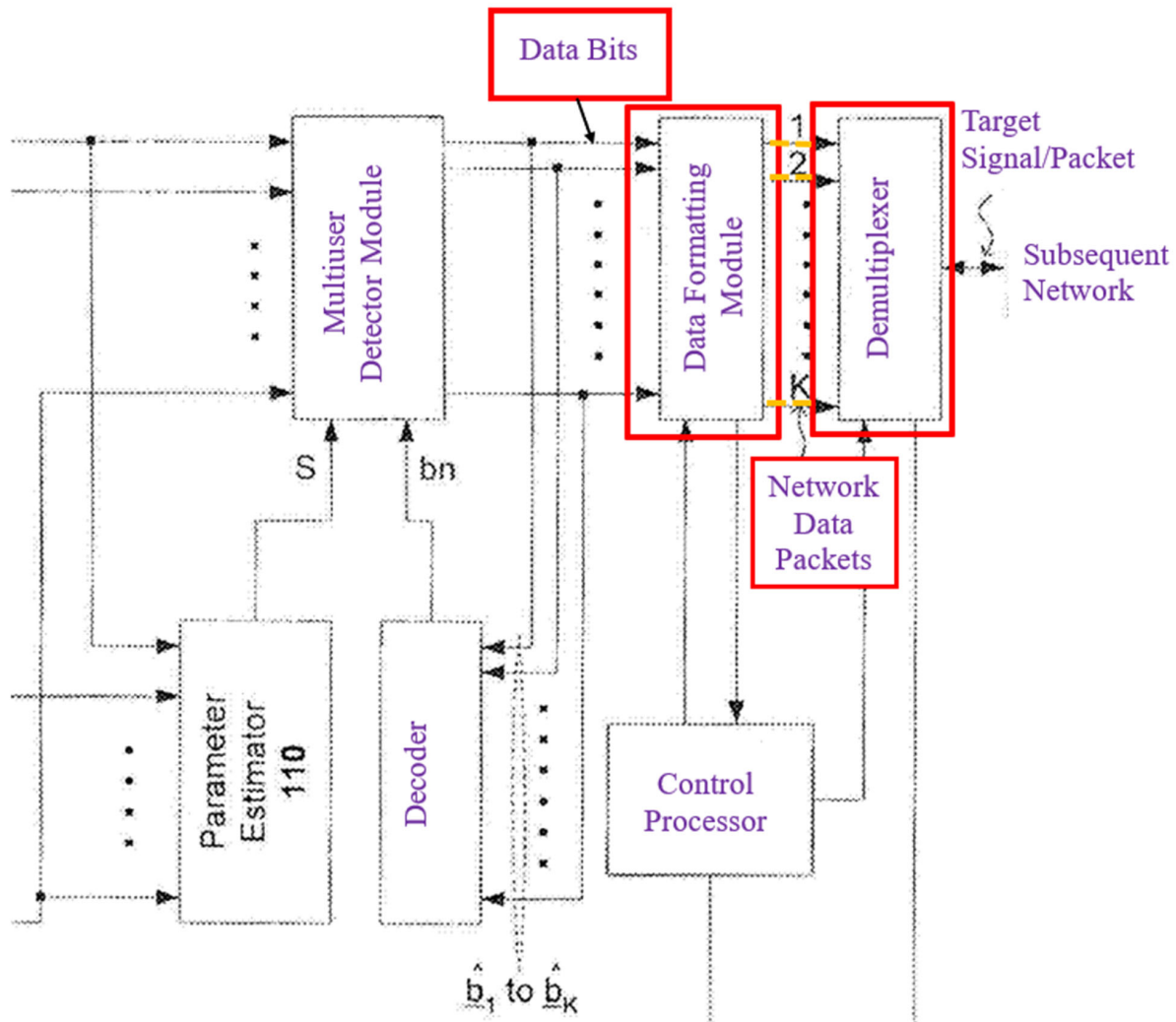
44. Multiuser detector module 115 uses those corrected symbols to construct a signal for each received waveform 1 through K. (EX1001 at 13:47-49). The multiuser detector module 115 then sends these signals 1-K to data formatting module 115. The multiuser detector module 115 then sends these signals 1-K to data formatting module 115.



(E.g., EX1001 at Fig. 1, 12:41-64, 13:40-14:6).

C. Data Formatting Module

45. Data formatting module 120 receives the constructed signals 1-K from multiuser detector module 115, produces network data packets for those recovered signals, and then forwards these packets 1-K (including each packet's corresponding embedded signal) to demultiplexer 135:

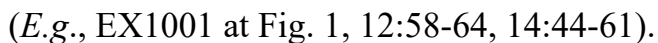


(EX1001 at 13:47-53).

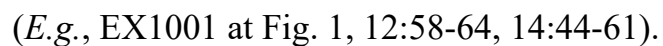
46. In the described example, data formatting module 120 operates in a data packet formatting mode, which is selected by the control processor (discussed more below) depending on the subsequent network over which the packet and embedded signal will be sent. (EX1001 at 14:20-29). Advantageously, the data formatting module 120 may support different formats and use them selectively for each packet. (EX1001 at 14:20-29).

D. Control Processor and Demultiplexer

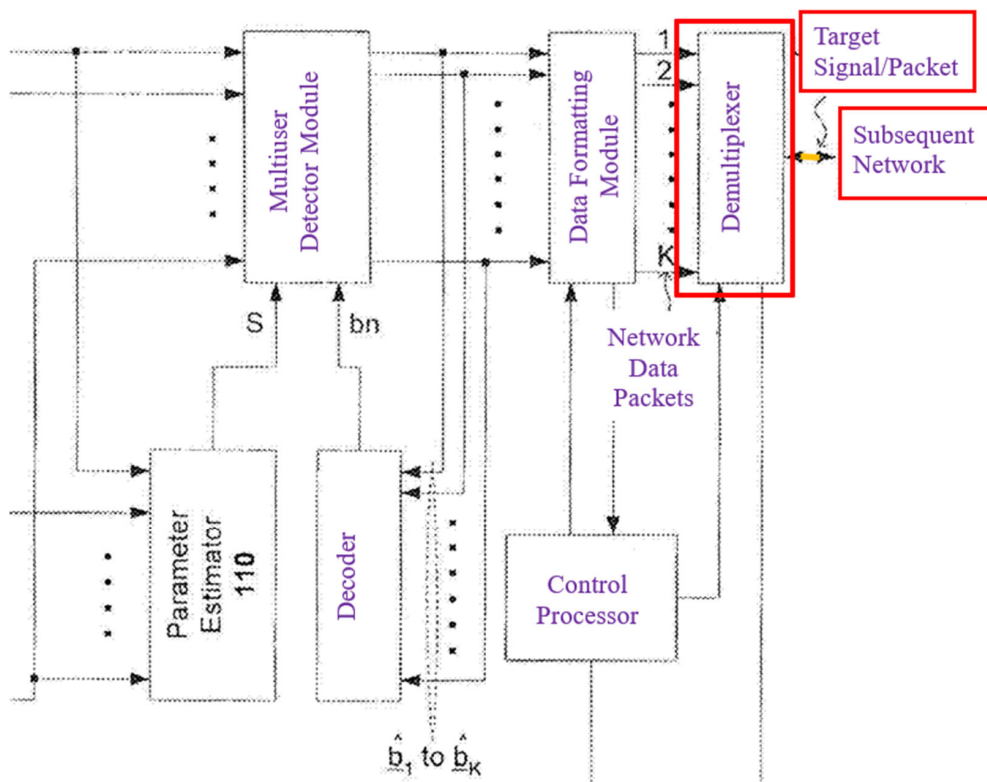
47. Although the demultiplexer receives packets 1 through K, not each of those packets is intended for a subsequent network. Accordingly, Figure 1's modem also includes a control processor and demultiplexer for identifying and selecting a target signal of interest so that its packet may then be relayed over a subsequent network:



22



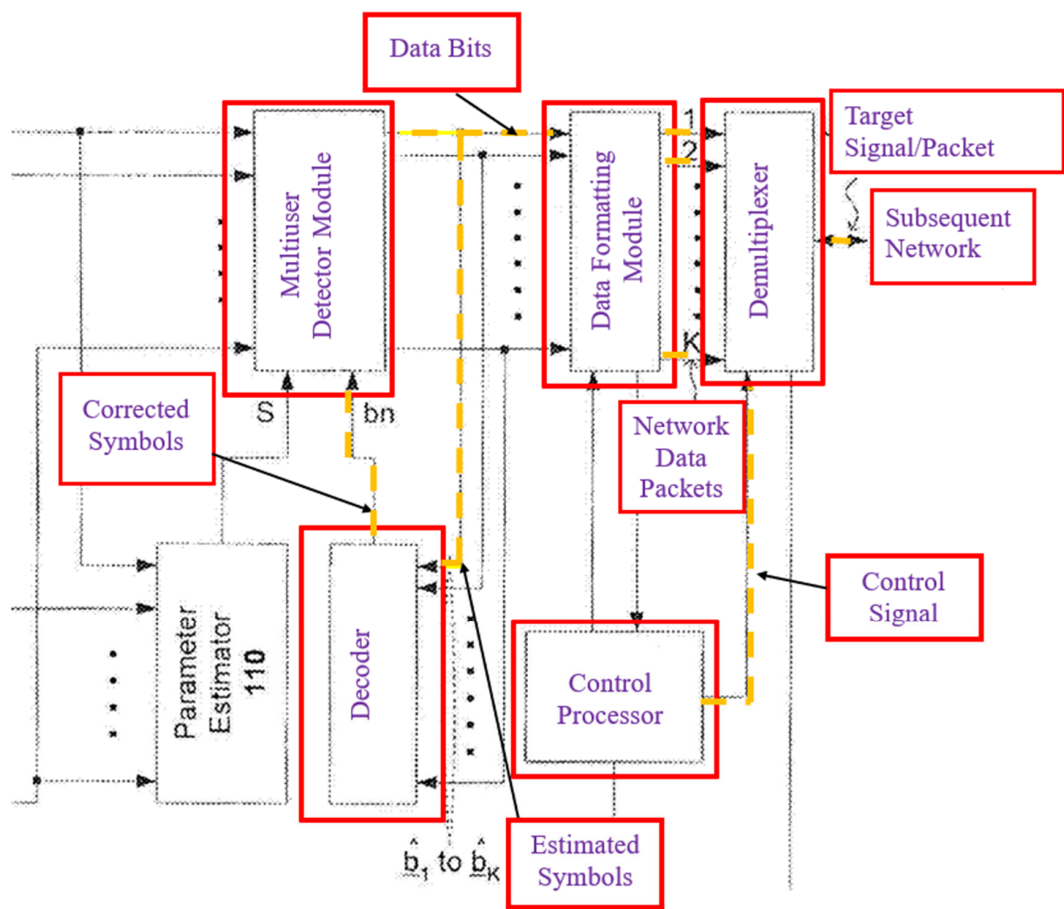
23



(E.g., EX1001 at Fig. 1, 12:58-64, 14:44-61).

* * * *

50. In summary, the '946 Patent thus describes an improved packeting modem that includes (as illustrated in the annotated Figure 1 below) a multiuser detector module that demodulates and recovers the originally sent signals; a data formatting module that produces network data packets for the recovered signals according to relevant network data packet mode; and a control processor and demultiplexer that use a control signal to identify and select a target signal of interest so that its packet may then be relayed over a subsequent network. (EX1001 at 12:41-15:13).



(E.g., EX1001 at Fig. 1, 12:58-64, 14:44-61).

VI. The Petition

A. The Grounds

51. I understand that Samsung’s Petition asserts the following Grounds:

Ground	References	Basis	Challenged Claims
1	<i>Walton</i>	§ 103	1-5, 7, 9-16, and 20
2	<i>Walton</i> and <i>Learned</i>	§ 103	1-5, 7, 9-16, and 20
3	<i>Walton</i> and <i>Learned</i> and <i>Quigley</i>	§ 103	20

52. I understand that the primary reference relied upon in Ground 1, Ground 2, and Ground 3 is *Walton*. The secondary reference relied upon in both Ground 2 and Ground 3 is *Learned*. The tertiary reference relied upon in Ground 3 is *Quigley*. As discussed below *Lilleberg* does not disclose the claimed parameter tracking unit.

53. I understand that each Ground relies solely on *Walton* (not *Learned* or *Quigley*) as supposedly disclosing or making obvious each of the following limitations required in every challenged claim:

- “a control processor ... configured to select a network data packet formatting mode;”
- “a data formatting module ... configured to produce network data packets for at least one of the K recovered signals;” and
- “a demultiplexer ... configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, where the selection is based on a control input from the control processor.”

(*E.g.*, Pet. at 11-27, 39-47, 53-57, 61-62, and 73-74).

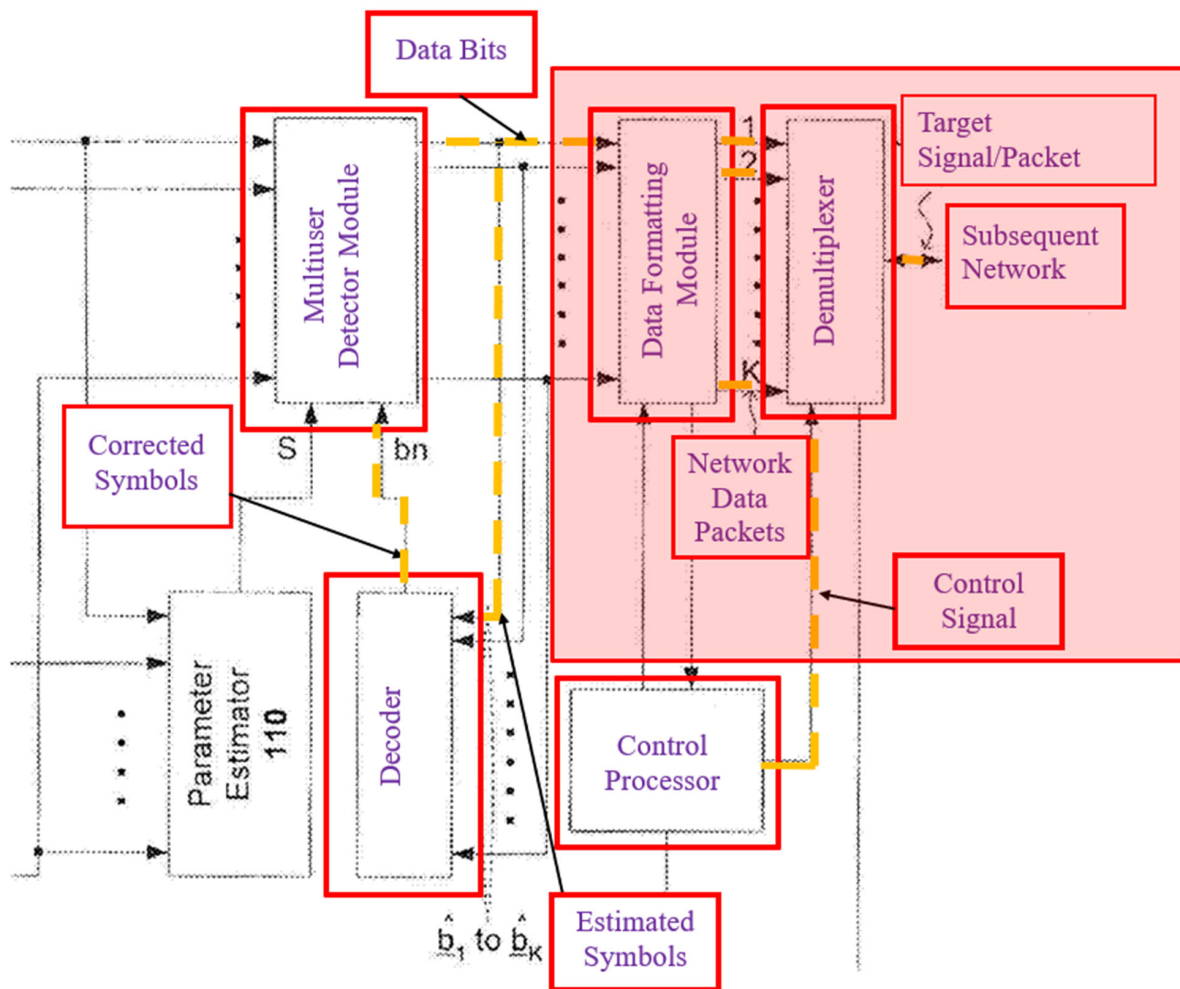
54. I understand the Petition fails if *Walton* fails to disclose or render obvious any one of these limitations. But *Walton* does not disclose or render obvious any of them.

B. None of the Asserted References Concerns or Describes a Packeting Modem

55. *Walton* does not and cannot disclose or make obvious any of these limitations because the limitations all concern the packet aspects of the disclosed and claimed modem, and *Walton*—like the other asserted references—does not even concern a packeting modem.

56. Instead, *Walton* describes an irrelevant topic, a modem using a number of diversity transmission modes. (EX1004 at *Abstract*). *Walton* is not concerned with packeting a recovered signal to be passed on to a subsequent network. Accordingly, *Walton* does not describe or make obvious the concepts and features such as producing network data packets for recovered signals, selecting a network data packet formatting mode for those packets, or selecting a target signal using a demultiplexer and a controller.

57. Put another way, *Walton* (and again, the other asserted references) does not disclose the following aspects of the inventive modem highlighted in red:



VII. The Board should Deny Institution Because Walton Fails to Disclose or Render Obvious

I understand the Petition fails if *Walton* fails to disclose or render obvious any one of these limitations:

- “a data formatting module ... configured to produce network data packets for at least one of the K recovered signals;”
- “a control processor ... configured to select a network data packet formatting mode;” and

- “a demultiplexer ... configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, where the selection is based on a control input from the control processor.”

58. *Walton* does not disclose or render obvious any of them.

A. *Walton* Does Not Disclose or Suggest the Claimed “Data Formatting Module”

59. Each challenged claim requires a data formatting module for producing network data packets for the recovered signals:

a data formatting module operatively coupled to the multiuser detection module, and **configured to produce network data packets for at least one of the K recovered signals**

(*See, e.g.*, EX1001 at claims 1, 10, and 20).

60. *Walton* does not describe such a data formatting module—it could not because it does not describe the production of network data packets at all, much less the claimed data formatting module for producing such data network packets.

61. I understand the Petition does not even attempt to identify such a data formatting module. I understand the Petition instead points to and relies on *Walton*’s “receive (RX data processor) 262.” (*E.g.*, Pet. at 16). But this “receive (RX data processor) 262” does not produce network data packets, and I understand the Petition provides no evidence showing otherwise.

62. Instead, Walton’s “receive (RX data processor) 262” merely decodes and outputs the user bits—in other words, it recovers a wireless signal. (EX1004 at [0146]). But recovering a wireless signal is what the claimed multiuser detection (MUD) module does. This “receive (RX data processor) 262” does not then take the additional required step of creating a network data packet for the recovered signal, which is what the claimed (but missing from Walton) data formatting module must do.

63. As illustrated below, *Walton* describes that its “receive (RX data processor) 262” receives symbols from *Walton*’s receive processor 260 and then decodes those symbols to produce the recovered signal, i.e., the “decoded bits”:

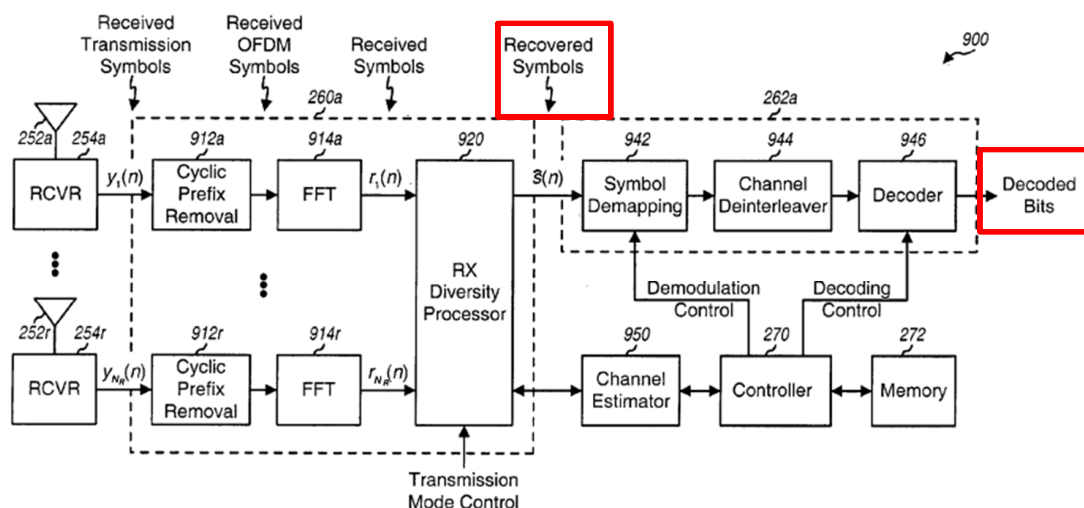


FIG. 9

(EX1004 at [0146], Figure 9).

64. As described and depicted above, *Walton*’s “receive (RX data processor) 262” includes a symbol demapper 942, a channel deinterleaver 944, and

a decoder 946. These generic structures are described and designed to receive symbols from receive processor 260 to and decode them into the recovered signal, i.e., the decoded bits. (EX1004 at [0146]). They are not designed to, and do not, then create network data packets in which to insert those decoded bits—the only things created and output by the “receive (RX data processor) 262” are “decoded bits.” (EX1004 at [0146]).

65. And, as established above, these decoded bits are the recovered signal and cannot be conflated and confused with “network data packets” as I understand the Petition attempts to do. To recap, the recovered signal (Walton’s decoded bits) is merely an example of data that may be embedded within a network data packet for transmission over a packet-switching network. Accordingly, a network data packet is more than just Walton’s “decoded bits” and must also include additional specialized information that allows the entire packet to be carried over a packet-switched network. (EX2003 at 4; EX2005 at 2, 17, 544-546).

66. But *Walton’s* “receive (RX data processor) 262” produces and outputs only those decoded user bits; it does not (and does not include any structures to) also produce a packet including those decoded bits plus all the other necessary packet information.

67. Accordingly, the decoded bits produced by Walton’s “receive (RX data processor) 262” are not network data packets and, contrary to every asserted

Ground, Walton's "receive (RX data processor) 262" cannot be the claimed "data formatting module ... configured to produce network data packets for at least one of the K recovered signals." Put another way, Walton's "receive (RX data processor) 262" only produces, at most, the one of the K recovered signals, it does not produce a network data packet for that recovered signal. The Petition should therefore be denied.

B. *Walton Does Not Disclose or Suggest the Claimed "Control Processor"*

68. Recall that network data packets sent over different subsequent networks require different "network data packet formatting modes." (EX1001 at 14:20-29). Thus, depending on the type of subsequent network to be used, the foregoing claimed "data formatting module" may produce a data network packet using a Wi-Fi network data packet formatting mode, a Bluetooth network data packet formatting mode, or any other relevant network data packet formatting mode. (EX1001 at 14:25-27).

69. To this end, each challenged claim includes "a control processor" for selecting the appropriate network data packet formatting mode for the packets produced by the "data formatting module": "a control processor ... configured to select a network data packet formatting mode." (*See, e.g.*, EX1001 at claims 1, 10, and 20).

70. Walton does not describe such a control processor. Again, Walton does not concern or describe the production of packets for any of its recovered signals, so it has no need to—and does not—include any discussion or suggestions about a “network data packet formatting mode,” much less about the claimed “control processor ... configured to select a network data packet formatting mode.”

71. Attempting to avoid this fatal deficiency, I understand the Petition simply ignores it, asserting without explanation that *Walton*’s description “diversity transmission modes” somehow teaches this limitation. (*E.g.*, Pet. at 26-27). But “diversity transmission modes” have nothing to do with “network data packet formatting modes,” and I understand the Petition does not assert or establish otherwise.

72. Rather, as established above, “diversity transmission modes” concern a different concept—rather than send a carrier wave once, the carrier wave is sent two or more times, and a transmission characteristic (such as the transmit antenna) is varied between the multiple (diverse) transmissions. These redundant transmissions help mitigate the effect of noise and distortion on the receiver’s ability to reconstitute the original signal. (EX2005 at 204).

73. *Walton*’s “diversity transmission modes” are thus entirely different from and unrelated to the claimed “network data packet formatting modes.” Because *Walton* does not concern the proper modes, it does not and cannot

disclose or suggest the claimed “control processor ... configured to select a network data packet formatting mode.” Each Ground therefore fails and the Petition should be denied.

C. Walton Does Not Disclose Or Suggest The Claimed Demultiplexer Selecting A Target Signal Based On Control Input From the Control Processor

74. All of the challenged claims require that the claimed multiplexer must select a target signal based on a control input received from the control processor:

a demultiplexer operatively coupled to the data formatting module and the control processor, and configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, where the selection is based on a control input from the control processor, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

(See, e.g., EX1001 at claims 1, 10, and 20).

75. Contrary to each asserted Ground, Walton does not teach this limitation for at least two reasons:

- I understand the Petition does not even assert, much less prove, that the purported *Walton* demultiplexer selects a target signal based on control input from the control processor; and

- I understand the Petition fails to identify any evidence that the purported *Walton* control processor provides any control input to the purported *Walton* demultiplexer.

1. The Petition Ignores The Challenged Claims' Selection Requirement

76. I understand the Petition asserts that *Walton*'s "multiplexer 1140" is the claimed "demultiplexer." (*E.g.*, Pet. at 24). But multiplexer 1140 does not select a target signal based on a control input received from the control processor, as required by all of the challenged claims. And, critically, I understand the Petition does not even assert, much less prove, otherwise.

77. Instead, I understand the Petition irrelevantly asserts only that *Walton*'s "multiplexer 1140" selects a "network data packeting format mode" based on a control input. (*E.g.*, Pet. at 27). Ignoring for now that *Walton*'s "multiplexer 1140" does no such thing, **this is the wrong selection.**² I understand the claims do not require that the demultiplexer select a "network data packeting format mode" based on the control input from the control processor. Rather, I understand the claims require that the demultiplexer **select a target signal based on that control input:**

a demultiplexer operatively coupled to the data formatting module and the control processor, and **configured to select one of the recovered K wirelessly transmitted signals as a target signal** intended for a user associated with the modem, **where the selection is based on a control input**

² Unless otherwise noted, all emphases herein are added.

from the control processor, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

(See, e.g., EX1001 at claims 1, 10, and 20).

78. I understand the selection asserted by Petition is a completely different selection, and is performed by the control processor, not the demultiplexer:

a demultiplexer operatively coupled to the data formatting module and the control processor, and configured to select one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the modem, where the selection is based on a control input from the control processor, wherein the data formatting module supports multiple types of format modes, and **the control processor is configured to select a network data packet formatting mode in which the data formatting operates**.

(See, e.g., EX1001 at claims 1, 10, and 20).

79. I understand the Petition does not acknowledge or attempt to support this baseless attempt to rewrite the challenged claims. (E.g., Pet. at 27). There is none, and for this reason alone the Petition fails and should be denied.

2. Walton Does Not Disclose the Claimed “Control Input”

80. In addition to arguing the wrong selection, the I understand the Petition also fails to identify any evidence that the purported *Walton* control processor provides any control input to the purported *Walton* demultiplexer, as required by each challenged claim:

a **demultiplexer** operatively coupled to the data formatting module and the control processor, and **configured to select** one of the recovered K wirelessly transmitted signals as a target signal intended for a user associated with the

modem, where **the selection is based on a control input from the control processor**, wherein the data formatting module supports multiple types of format modes, and the control processor is configured to select a network data packet formatting mode in which the data formatting operates.

(See, e.g., EX1001 at claims 1, 10, and 20).

81. I understand the Petition asserts that *Walton's* controller 270 is the claimed "control processor" and Walton's multiplexer 1140 is the claimed "demultiplexer." (E.g., Pet. at 23-25). But controller 270 in *Walton* does not provide a control input to multiplexer 1140, and I understand the Petition identifies no evidence to the contrary. (E.g., Pet. at 23-25). Indeed, I understand the Petition is entirely silent on multiplexer 1140 receiving a control input from the controller 270. (Pet. at 23-25).

82. This failure of proof is yet another reason the Petition has not established the required likelihood of prevailing on this limitation.

83. For any of these reasons, all the Grounds fail and the Petition should be denied.

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Dated: December 27, 2024


Dr. Giuseppe Caire