United States Patent and Trademark Office
Before the Patent Trial and Appeal Board

MediaTek Inc. and MediaTek USA, Inc.,
Petitioners

v.

Nippon Telegraph and Telephone Corp.,
Patent Owner

Inter Partes Review

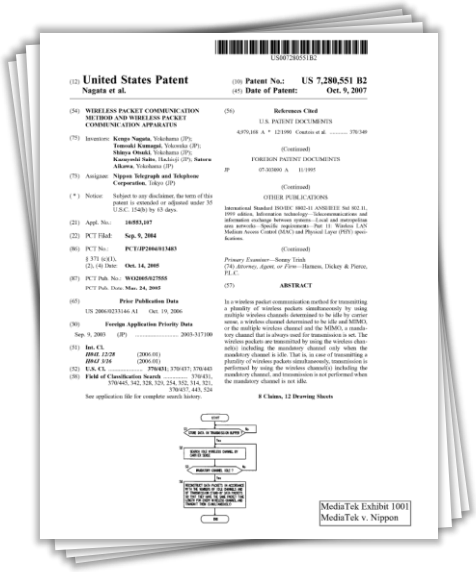
No. IPR2020-01404 | **U.S. Patent No. 7,280,551**

Petitioners' Demonstrative Exhibits

MediaTek Exhibit 1063
MediaTek v. Nippon
IPR2020-01404

November 18, 2021

Challenged U.S. Patent No. 7,280,551



(12) **United States Patent**
Nagata et al.

(10) **Patent No.: US 7,280,551 B2**
(45) **Date of Patent: Oct. 9, 2007**

(54) **WIRELESS PACKET COMMUNICATION METHOD AND WIRELESS PACKET COMMUNICATION APPARATUS**

(56) **References Cited**

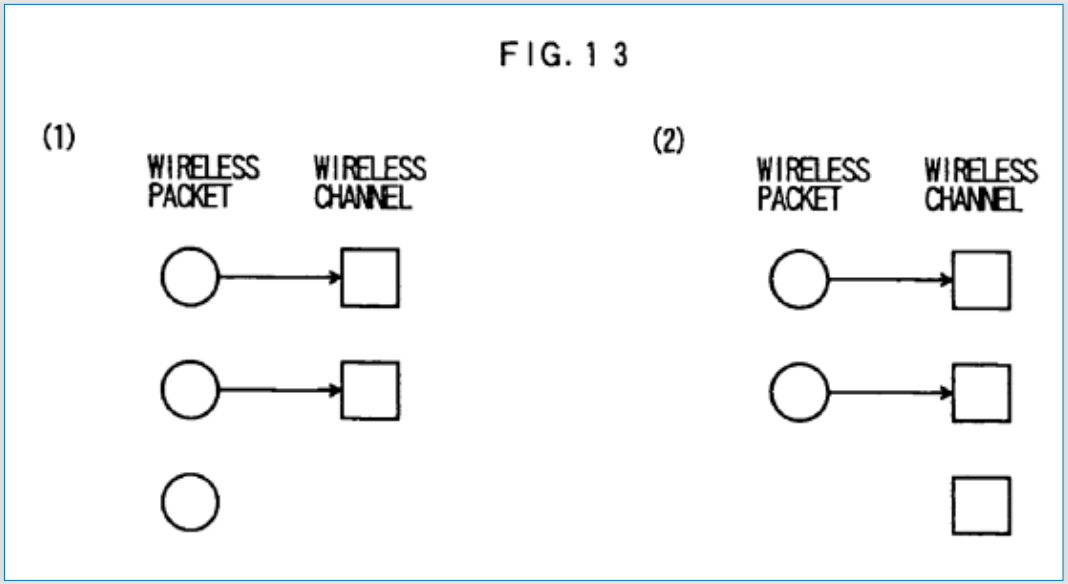
U.S. PATENT DOCUMENTS

In a wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a wireless channel determined to be idle and MIMO, or the multiple wireless channel and the MIMO, a mandatory channel that is always used for transmission is set. The wireless packets are transmitted by using the wireless channel(s) including the mandatory channel only when the mandatory channel is idle. That is, in case of transmitting a plurality of wireless packets simultaneously, transmission is performed by using the wireless channel(s) including the mandatory channel, and transmission is not performed when the mandatory channel is not idle.

551 Patent (EX1001) at Abstract (cited in Petition at 29)

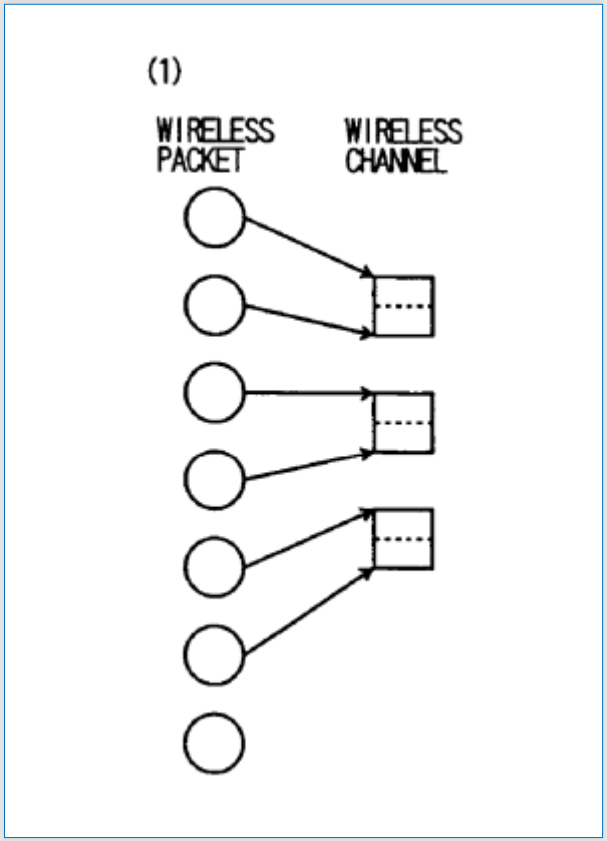
Background: Simultaneous Transmission of Wireless Packets Was Known

Multiple Wireless Channels



551 Patent (EX1001) at FIG. 13(1) and 13(2) (cited in Petition at 8)

MIMO

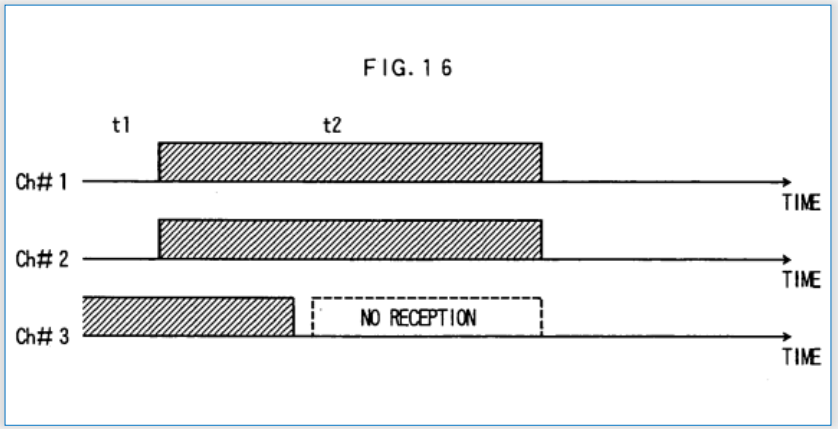


551 Patent (EX1001) at FIG. 14 (cited in Petition at 10)

The 551 Patent: The Purported "Leakage Power" Problem

At timing t**1**, wireless channels #**1** and #**2** of a transmit-side STA are idle, while a wireless channel #**3** is busy. Thus, the transmit-side STA transmits wireless packets having the same packet time length by using the idle wireless channels #**1** and #**2**. Therefore, the effect of leakage power can be avoided between the wireless channels #**1** and #**2**. When the wireless channel #**3** becomes idle during transmission of those wireless packets (at timing t**2**), another STA may determine that the wireless channel #**3** is idle and may transmit a wireless packet to the above transmit-side STA by using the wireless channel #**3**. However, the transmit-side STA is transmitting the wireless packets by using the wireless channels #**1** and #**2** and therefore cannot receive the wireless packet on the wireless channel #**3** because of leakage power from the wireless channels #**1** and #**2**. In other words, the STA in transmission cannot receive a wireless packet transmitted on a wireless channel that is adjacent to the wireless channel being in transmission. This problem occurs not only in case of simultaneous transmission using multiple wireless channels but also in a conventional case where wireless packets are transmitted by using one wireless channel and an adjacent wireless channel that is affected by leakage power receives the wireless packets.

551 Patent (EX1001) at 3:10-32 (cited in Petition at 11-12)



551 Patent (EX1001) at FIG. 16 (cited in Petition at 11)

BACKGROUND ART

In a conventional wireless packet communication apparatus, a wireless channel to be used is determined in advance. Prior to transmission of a data packet, the wireless packet communication apparatus performs carrier sense to detect whether or not that wireless channel is idle. Only

551 Patent (EX1001) at 1:23-27 (cited in Petition at 6)

The 551 Patent: The Purported Solution Is the Use of a "Mandatory" Channel that Must Always Be Used for Transmissions To/From a Device

A first aspect of the invention provides a wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO. The wireless packet communication method includes setting a mandatory channel that is always used for transmission and transmitting the wireless packets by using a wireless channel or wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

In other words, for transmitting a plurality of wireless packets simultaneously, transmission is performed by using the wireless channel(s) including the mandatory channel. Transmission is not performed when the mandatory channel is not idle. Moreover, wireless packets are always transmit-

551 Patent (EX1001) at 3:39-54 (cited in Petition at 12, 15)

Challenged Independent Claims 1 and 5

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

5. A wireless packet communication apparatus for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the apparatus comprising

a unit setting a mandatory channel that is always used for transmission, and transmitting the wireless packets only when the mandatory channel is idle by using a wireless channel or wireless channels that includes/include the mandatory channel.

Challenged Independent Claims 2 and 6

2. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

distinguishing an STA A from an STA B, the STA A for which a mandatory channel is set, the STA B for which no mandatory channel is set, the mandatory channel being always used for transmission; and

when wireless packets are addressed to said STA A, transmitting the wireless packets to said STA A by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle; and

when wireless packets are addressed to said STA B, transmitting the wireless packets to said STA B by using idle wireless channel(s).

6. A wireless packet communication apparatus for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the apparatus comprising

a unit distinguishing an STA A from an STA B and determining destinations of the wireless packets so as to transmit wireless packets addressed to said STA A only when said mandatory channel is idle by using a wireless channel or wireless channels that includes/include a mandatory channel, and to transmit wireless packets addressed to said STA B by using idle wireless channel or channels, the mandatory channel being always used for transmission, the STA A for which the mandatory channel is set, the STA B for which no mandatory channel is set.

Challenged Dependent 3-4 and 7-8 Claims

3. The wireless packet communication method according to claim **1** or **2**, wherein

the plurality of wireless packets transmitted simultaneously are set to have a same or equivalent packet time length that corresponds to a packet size or a transmission time.

4. The wireless packet communication method according to claim **1** or **2**, further comprising

simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

7. The wireless packet communication apparatus according to claim **5** or **6**, wherein

the plurality of wireless packets transmitted simultaneously are set to have a same or equivalent packet time length that corresponds to a packet size or a transmission time.

8. The wireless packet communication apparatus according to claim **5** or **6**, further comprising:

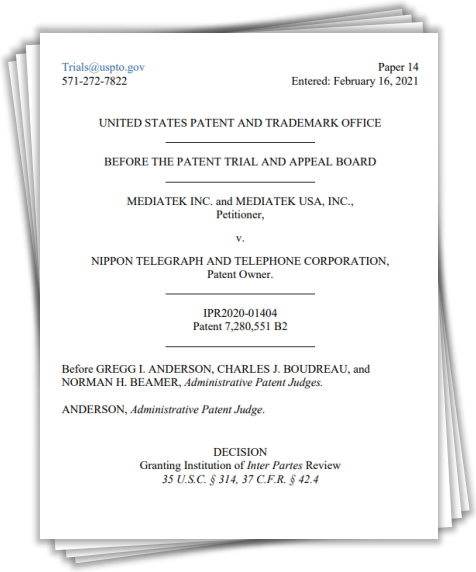
a unit simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

Overview of the Grounds

Ground	Claims	Basis
1. Shpak in view of Ho	1, 3, 5, and 7	103
2. Shpak in view of Lundby	1, 3-5, and 7-8	103
3. Bugeja in view of Ho	1-3 and 5-7	103
4. Shpak-Ho or Bugeja-Ho in view of Thielecke	4 and 8	103

Ground 2 (Obviousness) (Claims 1, 3-5, 7-8): Shpak + Lundby

The Institution Decision Found a Reasonable Likelihood that Claims 1, 3-5, and 7-8 Were Unpatentable Over Shpak-Lundby



Trials@uspto.gov
571-272-7822

Paper 14
Entered: February 16, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDIATEK INC. and MEDIATEK USA, INC.,
Petitioner,

v.

NIPPON TELEGRAPH AND TELEPHONE CORPORATION,
Patent Owner.

IPR2020-01404
Patent 7,280,551 B2

Before GREGG I. ANDERSON, CHARLES J. BOUDREAU, and NORMAN H. BEAMER, *Administrative Patent Judges.*

ANDERSON, *Administrative Patent Judge.*

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

D. Obviousness of Claims 1, 3–5, 7, and 8 over Shpak and Lundby

Petitioner alleges claims 1, 3–5, and 7–8 would have been obvious over Shpak and Lundby. Pet. 39–51. Petitioner also relies on the Williams Declaration. Ex. 1003 ¶¶ 119–159.

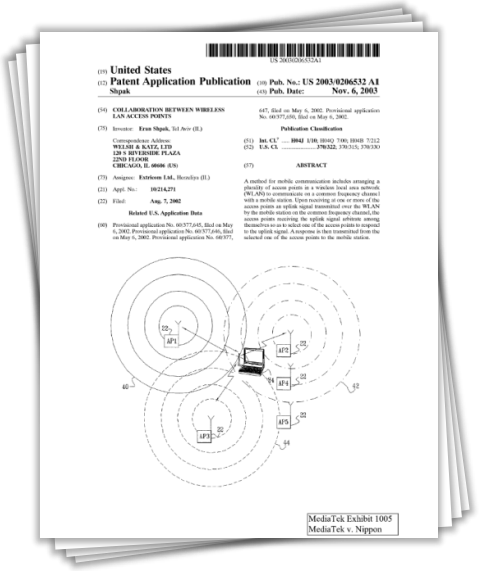
Institution Decision at 22

7. Conclusion

Petitioner has shown a reasonable likelihood that claims 1, 3–5, 7, and 8 would have been obvious over Shpak and Lundby.

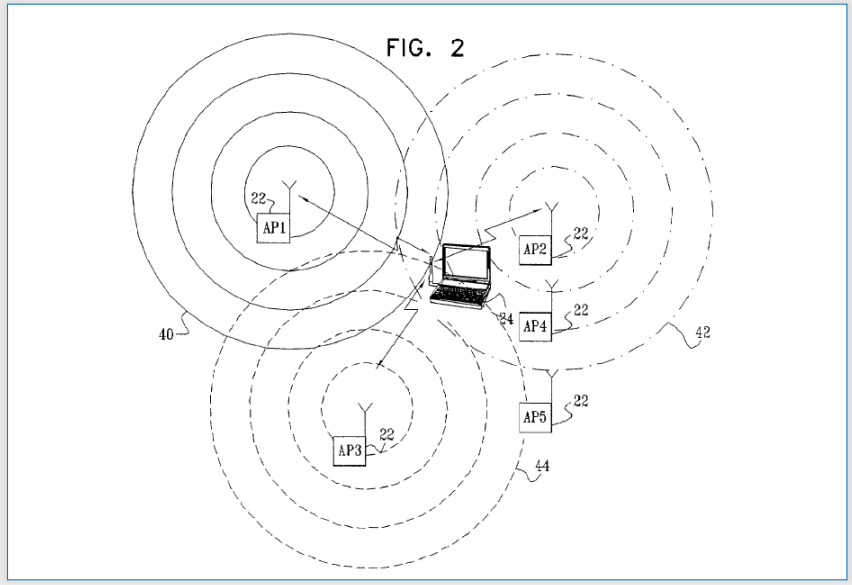
Institution Decision at 33

The Teachings of Shpak (EX1005)



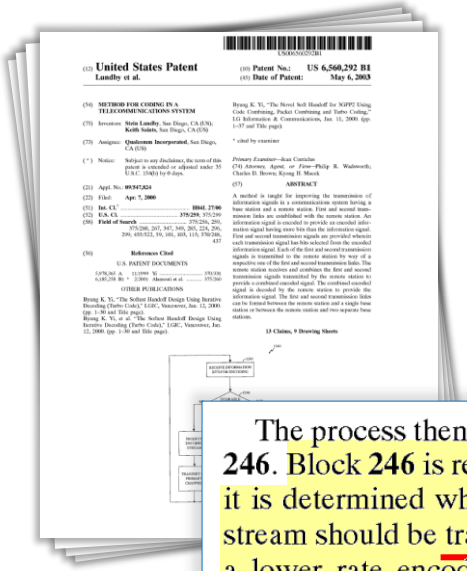
(57) **ABSTRACT**

A method for mobile communication includes arranging a plurality of access points in a wireless local area network (WLAN) to communicate on a common frequency channel with a mobile station. Upon receiving at one or more of the access points an uplink signal transmitted over the WLAN by the mobile station on the common frequency channel, the access points receiving the uplink signal arbitrate among themselves so as to select one of the access points to respond to the uplink signal. A response is then transmitted from the selected one of the access points to the mobile station.



Shpak (EX1005) at Abstract, FIG. 2 (cited in Petition at 18-19)

The Teachings of Lundby (EX1008)



United States Patent
Lundby et al.

(12) (10) Patent No.: US 6,560,292 B1
(45) Date of Patent: May 6, 2003

(54) METHOD FOR CODING IN A TELECOMMUNICATIONS SYSTEM

(75) Inventors: Stein Lundby, San Diego, CA (US); Keith Saints, San Diego, CA (US)

(73) Assignee: Qualcomm Incorporated, San Diego, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/547,824

(22) Filed: Apr. 7, 2000

(51) Int. Cl.[7] H04L 27/00

(52) U.S. Cl. 375/259; 375/299

(58) Field of Search 375/259, 295, 375/260, 267, 347, 349, 265, 224, 295, 299; 455/522, 59, 101, 103, 115, 570/208, 437

(56) References Cited

U.S. PATENT DOCUMENTS

OTHER PUBLICATIONS

(57) ABSTRACT

13 Claims, 9 Drawing Sheets

The process then moves from block **244** to decision block **246**. Block **246** is representative of a decision block wherein it is determined whether a single standard rate encoded bit stream should be transmitted on a single channel or whether a lower rate encoded bit stream should be transmitted in portions over two channels. Any parameter(s) within a CDMA communication system can be used as the basis of the decision in decision block **246**. The only criterion for selecting a parameter for use in decision block **246** is whether the parameter can be used to optimize the communication system in some way. Thus, the quality determination made in decision block **246** can be made based on any one of a large number of different quality factors. A straightforward way to make the decision is to have the transmitter recognize that it is transmitting at a high power level (for example, recognizing that more than 10% of the base station's transmit power capacity is being used on any given remote station), and that it should switch from one transmit stream to two transmit streams.

Lundby (EX1008) at 4:26-52
(cited in Petition at 40)

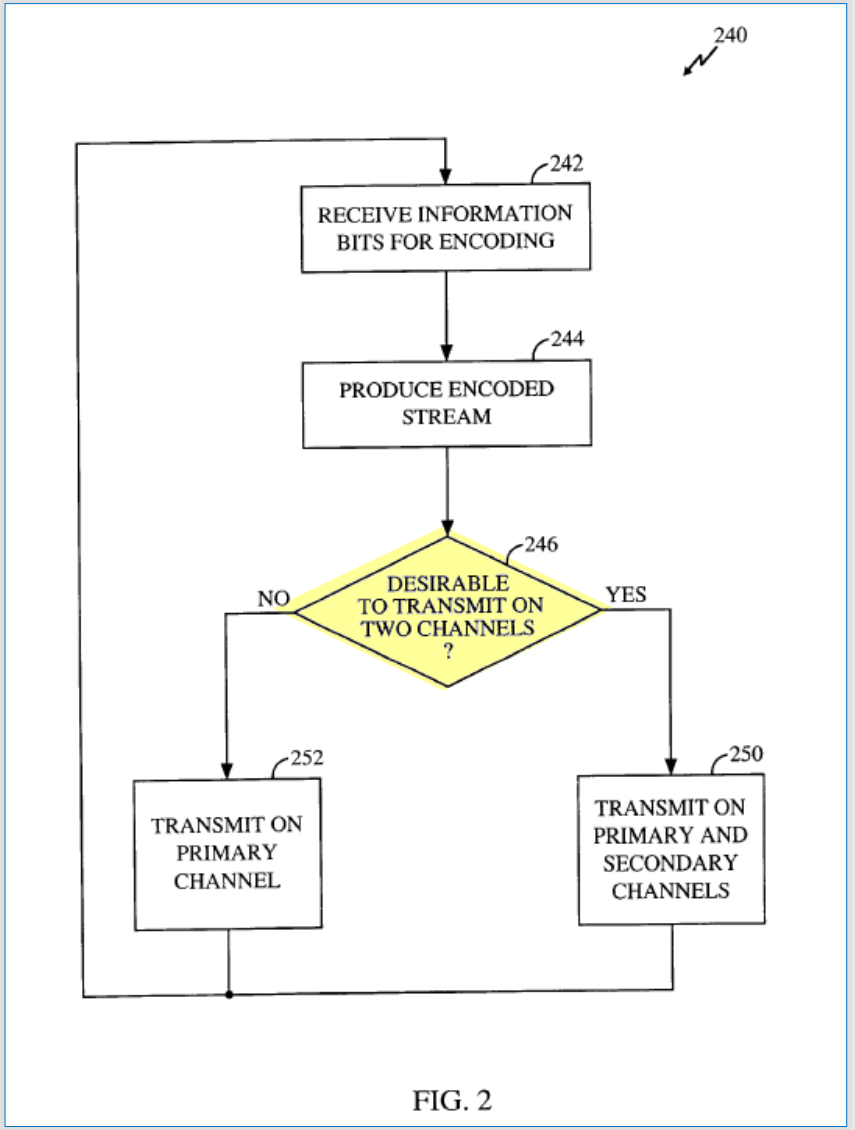


FIG. 2

Lundby (EX1008) at FIG. 2
(cited in Petition at 40)

The Proposed Shpak-Lundby Combination

quency channels. Theoretically, the 802.11b and 802.11g standards define 14 frequency channels in the 2.4 GHz band, but because of bandwidth and regulatory limitations, WLANs operating according to these standards in the United States actually have only three different frequency channels from which to choose. (In other countries, such as

Shpak (EX1005) at [0006] (cited in Petition at 41)

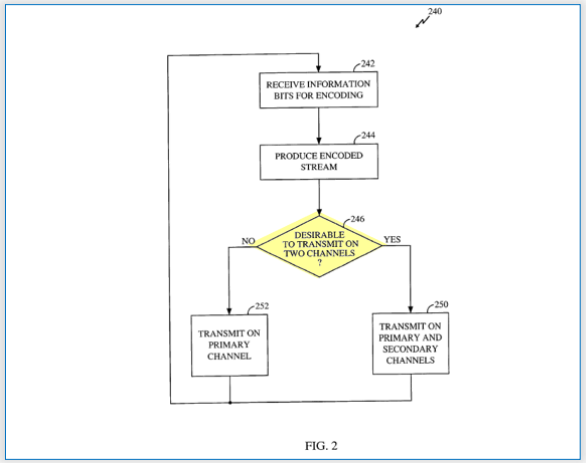


FIG. 2

Lundby (EX1008) at FIG. 2 (cited in Petition at 41)

[0051], claims 1, 13; Williams, ¶ 124. A POSA would have had reasons to implement Shpak, in view of Lundby, to use Shpak's "common frequency channel" as a "primary channel," and to use another available 802.11b channel as a "secondary channel" to augment the primary channel's bandwidth such that wireless packets are transmitted on both channels simultaneously. Williams, ¶ 125. This combination is referred to as "Shpak-Lundby."

Petition at 41

Shpak-Lundby's AP would have implemented Shpak's "common frequency channel" as the "primary channel" Lundby discloses. *Id.*; *supra* §V.B.2. The primary channel is selected from the available 802.11b channels and is thus "set" as "a mandatory channel that is always used for transmission" as claimed because Shpak-Lundby's AP would have applied Lundby's decision tree to select which channel(s) to use: (a) the "***primary*** channel" or (b) the "***primary*** and secondary channels." Lundby, 3:49-4:55, FIG. 2; Williams, ¶ 140. That Lundby does not disclose using ***only*** the secondary channel underscores that the primary channel is ***always*** used for transmission, as claimed. Williams, ¶ 140.

Petition at 46

POSAs Had Reason to Pursue the Shpak-Lundby Combination

First, POSAs would have been motivated to use Lundby's technique of expanding the number of channels a device can utilize on an ad hoc basis (Lundby, 3:49-4:55, FIG. 2) to enhance the speed of Shpak's system, given Shpak's stated desire to "enhance[e] the…speed of WLAN systems" (Shpak, [0007]), because adding a secondary channel would have allowed for nearly doubling the speed of a particular AP-client communication in Shpak. Williams, ¶ 126. POSAs would have also recognized the benefit in having Shpak's AP recognize particular circumstances where increased speed on an ad hoc basis is desired, such as when a particular client device begins performing a particularly data intensive operation, e.g., streaming videos. *Id.*

Petition at 42

POSAs Had Reason to Pursue the Shpak-Lundby Combination

operations, such as, streaming video. Lundby teaches that one "straight forward way to make the decision" to add a secondary channel is to recognize when the AP "is transmitting at a high power level." Lundby, 4:37-43. A POSA would have understood that transmitting at a high-power level can indicate the access point's is responding to a client's request to transmit a high volume of data, and thus transmission power would be a "straightforward way" to identify when Shpak's system would benefit from adding a second channel for communicating to this client.

Williams-Decl. (EX1003) at ¶ 126 (cited in Petition at 42)

[0033] The wireless data system **100** operates to permit the mobile devices **114-120** to utilize additional channels beyond their fixed channel in order to transmit or receive data through the wireless network **104**. The mobile devices **114-120** thus include hardware support (e.g., programmable transceivers) for additional channels. Conventionally, a mobile device has a single channel (fixed channel) over which the mobile device is able to communicate with a base station to receive and transmit voice and/or data. Here, the mobile devices **114-120** support not only the normal single channel but also one or more additional channels that can be temporarily utilized or assigned to one or more of the mobile devices **114-120**. A mobile device is thus able to communicate with a base station using multiple channels. Consequently, data transfer rates between a mobile device and a wireless network are substantially improved.

EX1043 at [0033] (cited in Petition at 43)

129. POSAs would have recognized data rate would have been an equally straightforward parameter to use as an alternative to power, so that the AP adds an additional channel when the client requests a data rate above the primary channel's capacity. As corroborating evidence that POSAs knew that the data rate of an individual channel was often inadequate, Ex. 1025 at 3:3-13 notes that "a transmission data rate for a particular data channel may be inadequate for a high-bandwidth receiving device" because of the "maximum data rate" set by the 802.11 standard. Similarly, Ex. 1043 corroborates that additional channel to a wireless network were known to "increase[] data transfer capabilities." Ex. 1043, Abstract, [0012], [0014], [0028], [0033]-[0038]. Thus, Ex. 1043 further demonstrates that POSAs knew additional channel could be added on an ad hoc basis, such as when a "mobile device" wants to "transmit data over the wireless network at greater data transfer rates," and thus the data rates can be "adjusted in accordance with the user's needs or desires." Ex. 1043, [0035], [0048].

Williams-Decl. (EX1003) at ¶ 129 (cited in Petition at 43)

The Parties' Dispute Is Narrow

- **No dispute Lundby's teachings are applicable to Shpak's 802.11 system.**
- **No dispute adding a second channel benefits Shpak's system.**
- **No dispute POSAs had reasonable expectation of success.**
- **No dispute that if implemented as Petitioner alleged, the proposed combination discloses all elements of claims 1, 3-5, and 7-8.**
- **Only dispute is whether POSAs had reason to implement the combination as alleged in the Petition.**

Patent Owner Proposes an Alternate Implementation that Prioritizes Channel Independence

In the absence of any teaching modifying the decision to transmit based on a special status accorded to one channel in a multichannel system, a POSA would understand that the default is to transmit whenever a channel is available, as is consistent with Shpak and legacy 802.11 systems. Geier at ¶110. Indeed, the '551 specification teaches that that is the case in prior multichannel systems—*i.e.*, the straightforward application of carrier-sensing to a multichannel setting is simply to sense multiple channels instead of just one, and transmitting on channel(s) sensed to be idle. *Id.* (citing '551 Patent at 1:43-2:3; *also* EX1007 at ¶¶40-41, 44;

Patent Owner Response at 33

Patent Owner Ignores the Rationale Behind the Proposed Combination: Bandwidth Augmentation for a Particular Client

[0051], claims 1, 13; Williams, ¶ 124. A POSA would have had reasons to implement Shpak, in view of Lundby, to use Shpak's "common frequency channel" as a "primary channel," and to use another available 802.11b channel as a "secondary channel" to augment the primary channel's bandwidth such that wireless packets are transmitted on both channels simultaneously. Williams, ¶ 125. This combination is referred to as "Shpak-Lundby."

Petition at 41

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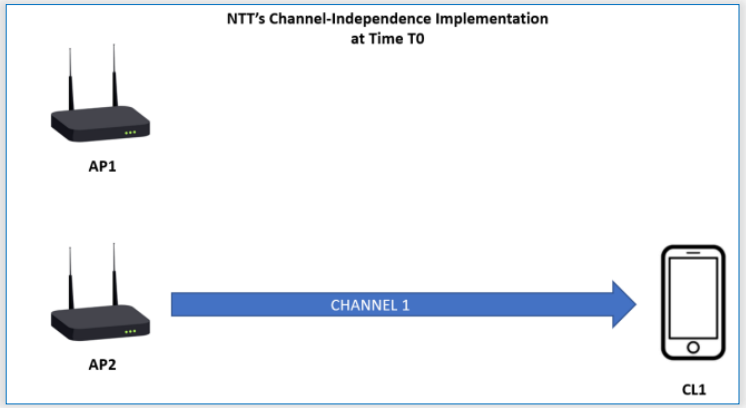
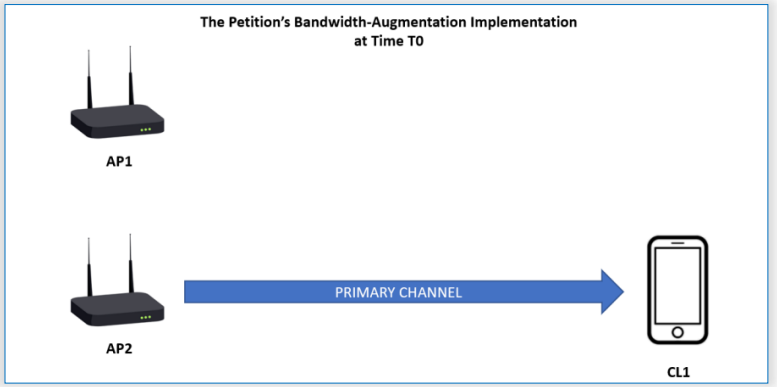
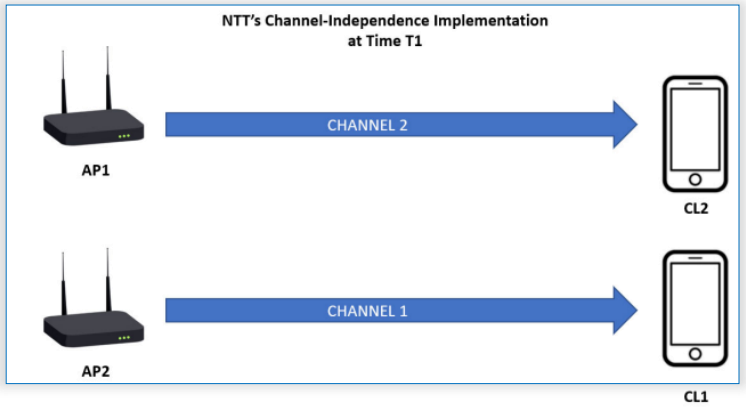
Petition at 42

Unlike the Petition's Proposed Implementation, Patent Owner's Alternate Implementation Does Not Guarantee Bandwidth-Augmentation for a Client

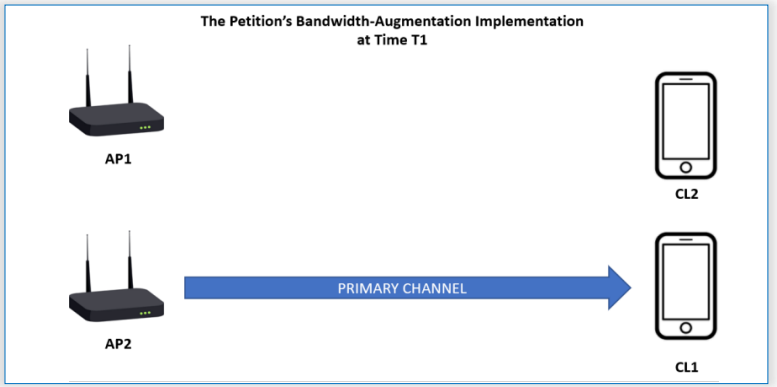


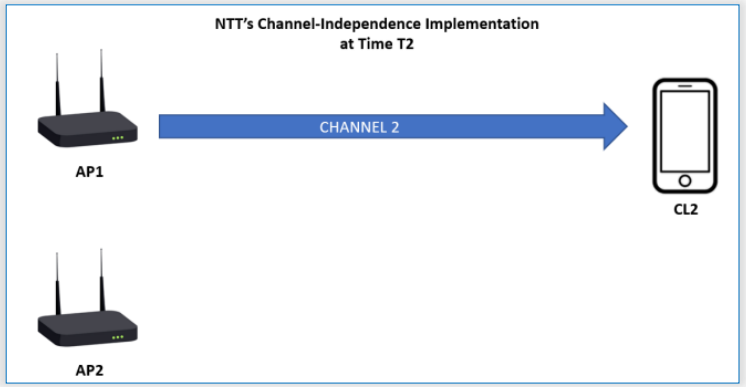
T0



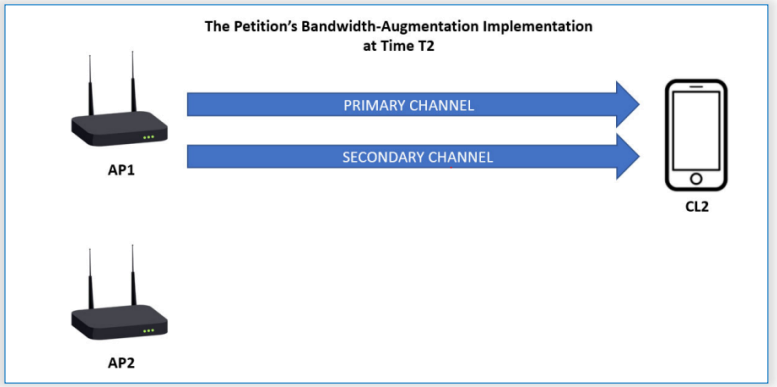


T1





T2



Williams-Reply (EX1062) at ¶¶ 56-64 (cited in Reply at 3-6)

Dr. Williams' Reply Testimony Reinforces the Advantages of the Petition's Proposed Implementation

55. I disagree and in my opinion a POSA disagrees as well. In fact, the teachings from Lundby that I and Petitioners rely on provided just such a "reason" to implement Shpak-Lundby in the manner I described in my First Declaration at, for example, Paragraphs 125 to 126—"to augment the primary channel's bandwidth [with the secondary channel] such that wireless packets are transmitted on both channels simultaneously." *See also* Petition at 41-42. The implementation I discussed in my First Declaration has advantages over the implementation NTT proposed in its POR and Mr. Geier discusses in his declaration because the implementation I discussed would have ensured that the secondary channel was more-readily available for a ***bandwidth-augmentation*** purpose. This is because in that implementation, the secondary channel is ***only used*** along with the primary channel and ***only used*** when needed to augment the primary channel's bandwidth, as I discussed in my First Declaration at Paragraphs 125-131, 133 and 140-14. *See also* Petition at 41-44, 46-47. In contrast, the alleged "default" implementation identified by NTT and Mr. Geier does not prioritize bandwidth augmentation—it prioritizes channel independence (POR at 38; Geier Decl., ¶¶ 116-117) which has the cost of making it less likely that a device that desires to use two-channels will be able to do so.

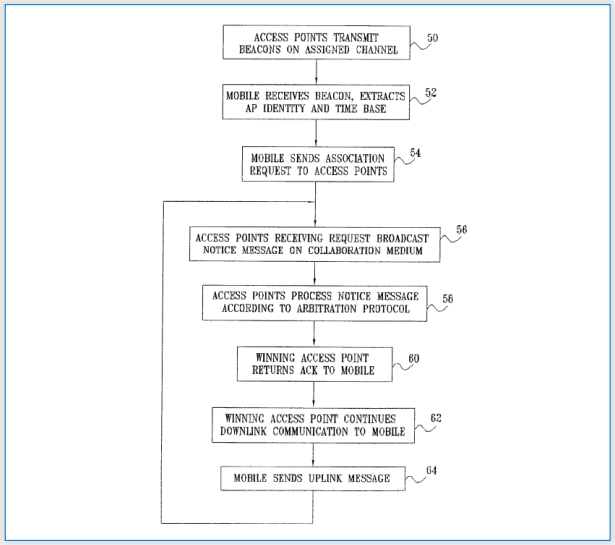
Williams-Reply (EX1062) at ¶ 55 (cited in Reply at 3)

64. Thus, my and Petitioners' bandwidth-augmentation implementation of Shpak-Lundby—unlike NTT and Mr. Geier's channel-independence implementation—reserves additional bandwidth for potential augmentation, which is advantageous for data-intensive operations like streaming video that requires higher bandwidth for each transmission, as I discussed in my First Declaration at Paragraph 126. *See also* Bugeja, [0037], [0046]; *see also* Petition, 42.

65. In contrast, NTT and Mr. Geier's channel-independence implementation is less effective at bandwidth augmentation than my and Petitioners' implementation because in the channel-independence implementation no channel is held in reserve, which may result in situations where bandwidth augmentation is not possible and/or delayed (because, as I explained above, another device may have come along and captured the Secondary Channel before it could be used to augment the Primary Channel).

Williams-Reply (EX1062) at ¶¶ 64-65 (cited in Reply at 5, 7)

The Petition's Proposed Implementation Is Consistent with Shpak and Lundby



Shpak (EX1005) at FIG. 3 (cited in Petition at 19)

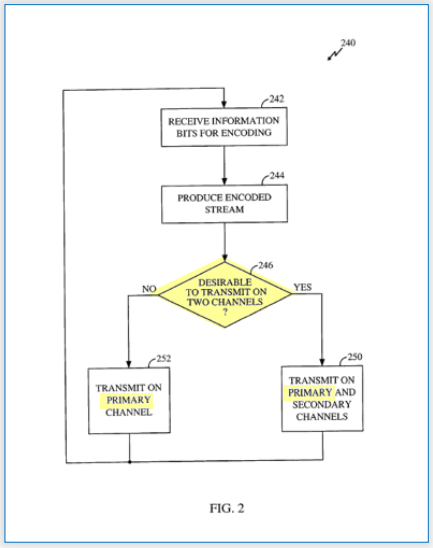
[0037] **FIG. 3** is a flow chart that schematically illustrates a method for establishing communications between mobile station **24** and one of access points **22** in system **20**, in accordance with a preferred embodiment of the present invention. Access points **22** (say AP**1**, AP**2** and AP**3**) transmit beacon signals on their common frequency channel, at a beacon transmission step **50**. In accordance with the 802.11 standard, the beacon signals transmitted by any given access point provide the time base with which the mobile station should synchronize its communications and indicate the BSS identification (BSSID) of the access point. The BSSID can be regarded as the MAC address of the access point. In 802.11 WLAN systems known in the art, each access point has its own unique BSSID. In system **20**, however, access points AP**1**, AP**2** and AP**3** share the same BSSID, so that they appear logically to the mobile station to be a single, extended, distributed access point, which has multiple antennas at different locations. The time bases of AP**1**, AP**2** and AP**3** are mutually synchronized using medium **34**, and the beacon signals transmitted by the access points are interlaced to avoid collision between them.

Shpak (EX1005) at [0037] (cited in Petition at 19)

Upon receiving the mobile station's uplink signal, the APs arbitrate amongst themselves to determine which one should respond to the station's association request. Ex. 1005 ¶¶ 39–42, Fig. 3 (steps 56, 58). The "winning access point" answers the association request with an acknowledgement and subsequently sends an association response message to the mobile station. *Id.* ¶ 43, Fig. 3 (step 60). The winning AP then continues "its downlink transmission to the mobile station as appropriate." *Id.* ¶ 43, Fig. 3 (step 62). Data is transmitted from the winning AP to the station only over the common frequency channel. *Id.* ¶¶ 22, 24, claim1. Shpak's APs are coupled together, preferably by a hard-wired network, and "communicate among themselves using a novel protocol." *Id.* ¶¶ 8–9.

Institution Decision at 24

The Petition's Proposed Implementation Is Consistent with Shpak and Lundby



Lundby (EX1008) at FIG. 2
(cited in Pettion at 40)

> We addressed the motivation to combine above. Apart from the motivation issue, Lundby shows that the primary channel is always used and a secondary channel is only used along with the primary channel when desired. *See* Pet. 40 (citing Ex. 1008, 4:26–30, Fig. 2). This teaching meets our construction of "mandatory channel."

Institution Decision at 30

> At decision block 246 "it is determined whether a single standard rate encoded bit stream should be transmitted **on a single channel or** whether a lower rate encoded bit stream should be transmitted **in portions over two channels**." EX1008 at 4:26-30. Thus, Lundby ***only*** illustrates two outcomes—transmitting on the primary channel or on both the primary and secondary channels. Geier at ¶98; Williams Decl. at ¶142. Lundby's decision tree does not include any situation where transmission is ***prevented***. *Id.*

Patent Owner Response at 26

> Shpak-Lundby's AP would have implemented Shpak's "common frequency channel" as the "primary channel" Lundby discloses. *Id.*; *supra* §V.B.2. The primary channel is selected from the available 802.11b channels and is thus "set" as "a mandatory channel that is always used for transmission" as claimed because Shpak-Lundby's AP would have applied Lundby's decision tree to select which channel(s) to use: (a) the "***primary*** channel" or (b) the "***primary*** and secondary channels." Lundby, 3:49-4:55, FIG. 2; Williams, ¶ 140. That Lundby does not disclose using ***only*** the secondary channel underscores that the primary channel is ***always*** used for transmission, as claimed. Williams, ¶ 140.

Petition at 46

Patent Owner Failed to Rebut Petitioners' Bandwidth-Augmentation Rationale

For example, Petitioner's first alleged motivation to combine Shpak with Lundby is to increase transmission speed. Pet. at 42; Williams Decl. at ¶126. At most, this motivation provides a reason to use two channels instead of one, but ***does not*** provide any reason to prevent transmission altogether based on the status of one of multiple channels. Geier at ¶119. To the contrary, this motivation would suggest that transmission should proceed whenever a channel is idle. *Id.*

Patent Owner Response at 40

119. For example, Petitioner's first alleged motivation to combine Shpak with Lundby is to increase transmission speed. Pet. at 42; Williams Decl. at ¶126. It is my opinion that, at most, this motivation provides a reason to use two channels instead of one, but ***does not*** provide any reason to prevent transmission altogether based on the status of one of multiple channels. To the contrary, this motivation would suggest to a POSA that transmission should proceed whenever a channel is idle.

Geier Decl. (EX2026) at ¶ 119

Expert testimony that merely "repeats the [Patent Owner Response's] conclusion…is entitled to little or no weight."

Tesla, Inc. v. Nikola Corp., IPR2019-01646, Paper 7 at 19 (PTAB March 27, 2020) (cited in Reply at 8)

That Neither Lundby nor Shpak Discuss "Power Leakage" is Immaterial

Patent Owner's Argument

> **First**, Lundby only describes code channels that occupy ***the same frequency channel***. As such, Lundby neither describes nor addresses the problem of power leakage "where center frequencies of multiple wireless channels used at the same time are close to each other." Geier at ¶83, *citing* '551 Patent at 2:26-28.

Patent Owner Response at 22

> [0051], claims 1, 13; Williams, ¶ 124. A POSA would have had reasons to implement Shpak, in view of Lundby, to use Shpak's "common frequency channel" as a "primary channel," and to use another available 802.11b channel as a "secondary channel" to augment the primary channel's bandwidth such that wireless packets are transmitted on both channels simultaneously. Williams, ¶ 125. This combination is referred to as "Shpak-Lundby."

Petition at 41

> First, POSAs would have been motivated to use Lundby's technique of expanding the number of channels a device can utilize on an ad hoc basis (Lundby, 3:49-4:55, FIG. 2) to enhance the speed of Shpak's system, given Shpak's stated desire to "enhance[e] the…speed of WLAN systems" (Shpak, [0007]), because adding a secondary channel would have allowed for nearly doubling the speed of a particular AP-client communication in Shpak. Williams, ¶ 126. POSAs would have also recognized the benefit in having Shpak's AP recognize particular circumstances where increased speed on an ad hoc basis is desired, such as when a particular client device begins performing a particularly data intensive operation, e.g., streaming videos. *Id.*

Petition at 42

"We have repeatedly held that the motivation to modify a prior art reference to arrive at the claimed invention need not be the same motivation that the patentee had."

Alcon Research, Ltd. v. Apotex Inc., 687 F.3d 1362, 1368 (Fed. Cir. 2012) (cited in Reply at 12)

That Shpak Does Not Disclose Multiple Channels Is Wrong, But Immaterial Because the Proposed *Combination* Does

Patent Owner's Argument

> Thus, there is no disclosure in Shpak regarding how carrier-sensing may function in a ***multichannel*** system, much less how the decision to transmit would be made. *See id.*; Geier at ¶81. There is likewise no disclosure relating to the problem of power leakage between channels with different center frequencies. *Id.*

Patent Owner Response at 21

> **[0006]** Therefore, in 802.11 WLANs known in the art, access points in mutual proximity must use different frequency channels. Theoretically, the 802.11b and 802.11g standards define 14 frequency channels in the 2.4 GHz band, but because of bandwidth and regulatory limitations, WLANs operating according to these standards in the United States actually have only three different frequency channels from which to choose. (In other countries, such as Spain, France and Japan, only one channel is available.) As a result, in complex, indoor environments, it becomes practically impossible to distribute wireless access points closely enough to give strong signals throughout the environment without substantial overlap in the coverage areas of different access points operating on the same frequency channel.

Shpak (EX1005) at [0006] (cited in Reply at 12)

> POSAs would have had a reasonable expectation of success because Shpak recognizes 802.11b systems in the United States had three "channels from which to choose," Shpak, [0006], and "transmit[ing wireless packets] simultaneously by using [multiple] wireless channels" was known, as admitted by the '551 Patent (1:45-47) and confirmed by corroborating evidence. Williams, ¶ 132 (citing, e.g., Bugeja, FIGS. 3-5 (depicting multi-channel 802.11-compliant APs)); Ex. 1002, 306.
>
> It would have required only ordinary skill to have an 802.11b-AP include software for determining whether adding a secondary channel would have enhanced communications and indicating that decision to a station. Williams, ¶ 133. Indeed, Lundby discloses basing the decision on transmission power is "straight forward," underscoring that only ordinary skill would have been required. Lundby, 4:37-42; Williams, ¶ 133. POSAs would have recognized using data rates (or known parameters indicative of data rates) would have been equally straightforward. Williams, ¶ 133.

Petition at 44

That Lundby Purportedly Does Not Address the Decision to Transmit Is Immaterial, Because Shpak Supplies that Teaching

Patent Owner's Argument

2. Lundby Neither Addresses the Decision to Transmit Nor Prevents Transmission

Patent Owner Response at 25

A. Well, Shpak -- Shpak's common frequency channel is a mandatory channel because the CCA algorithm inherent in 802.11 checks for the idle nature of the channel before transmissions. So that checking of -- of the decision to transmit or not is -- occurs before figure 2 in Lundby.

So adding to figure 2 the decision to transmit or not based on the CCA technology of 802.11 would include the key elements of the mandatory channel definition per the plain and ordinary meaning.

Willams-Depo-2 (EX2025) at 45:13-23 (cited in Reply at 11)

In fact, Petitioner's expert ***repeatedly*** acknowledges that Lundby's methods do not affect the decision to transmit at all. For instance, Dr. Williams admits that Lundby's methods ***presume*** that a transmission will take place, because Fig. 2 does not come into play until ***after*** a positive decision has been made. *E.g.*, Williams2 at 47:12-15 ("And the use of the decision tree from Lundby, figure 2, does not include the decision to transmit or not. **The decision's already been made**—been made to transmit in Lundby figure 2."); 45:16-18; Geier at ¶99.

Patent Owner Response at 26-27

That Lundby Purportedly Does Not Teach Channel "Reservation" Is Immaterial, Because Reservation Is the Natural Consequence of Applying Lundby to Shpak

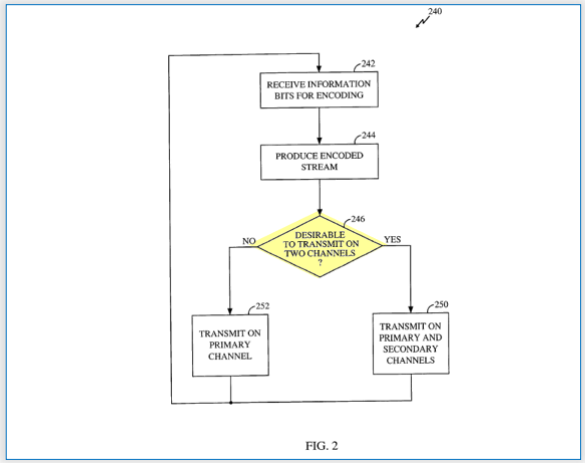
Patent Owner's Argument

GROUND 2 (SHPAK-LUNDBY) FAILS—NOTHING IN LUNDBY SUGGESTS PERMANENT "RESERVATION" OF A SECONDARY CHANNEL

Sur-Reply at 1

A method for mobile communication includes arranging a plurality of access points in a wireless local area network (WLAN) to communicate on a common frequency channel with a mobile station. Upon receiving at one or more of the access points an uplink signal transmitted over the WLAN by the mobile station on the common frequency channel, the access points receiving the uplink signal arbitrate among themselves so as to select one of the access points to respond to the uplink signal. A response is then transmitted from the selected one of the access points to the mobile station.

Shpak (EX1005) at Abstract (cited in Petition at 18)



Lundby (EX1008) at FIG. 2 (cited in Petition at 41)

[0051], claims 1, 13; Williams, ¶ 124. A POSA would have had reasons to implement Shpak, in view of Lundby, to use Shpak's "common frequency channel" as a "primary channel," and to use another available 802.11b channel as a "secondary channel" to augment the primary channel's bandwidth such that wireless packets are transmitted on both channels simultaneously. Williams, ¶ 125. This combination is referred to as "Shpak-Lundby."

Shpak-Lundby's AP would have implemented Shpak's "common frequency channel" as the "primary channel" Lundby discloses. *Id.*; *supra* §V.B.2. The primary channel is selected from the available 802.11b channels and is thus "set" as "a mandatory channel that is always used for transmission" as claimed because Shpak-Lundby's AP would have applied Lundby's decision tree to select which channel(s) to use: (a) the "***primary*** channel" or (b) the "***primary*** and secondary channels." Lundby, 3:49-4:55, FIG. 2; Williams, ¶ 140. That Lundby does not disclose using ***only*** the secondary channel underscores that the primary channel is ***always*** used for transmission, as claimed. Williams, ¶ 140.

Petition at 41, 46

The "Common Frequency Channel" Is a "Mandatory Channel" Under Any Interpretation Because Its Idle State Controls Transmissions

> Shpak-Lundby's "common frequency channel" is a "mandatory channel" under (1) Petitioners' plain-meaning construction because it is "always used for transmission" (*infra* §IV.A), (2) the Board's construction because "transmission must occur [over it] before transmission may occur over the other wireless channels" (DI, 21), and (3) NTT's construction because its "idle state determines whether there can be a transmission over the other channels," (POR, 11-12).

Reply at 11

> Shpak-Lundby's transmissions are sent as wireless packets, in accordance with the 802.11 standards. *Id.*; Ex. 1001, 1:23-42. As discussed *supra* §V.B.2, Shpak-Lundby's AP would have always sent packet transmissions using the primary (mandatory) channel, alone or in combination with Shpak-Lundby's secondary channel. Williams, ¶ 141. Thus, using Lundby's decision tree, if the primary (mandatory) channel was not idle, Shpak-Lundby's AP would not transmit data on any channel until the primary channel became idle. *Id.*; Lundby, FIG. 2, 4:25-30.

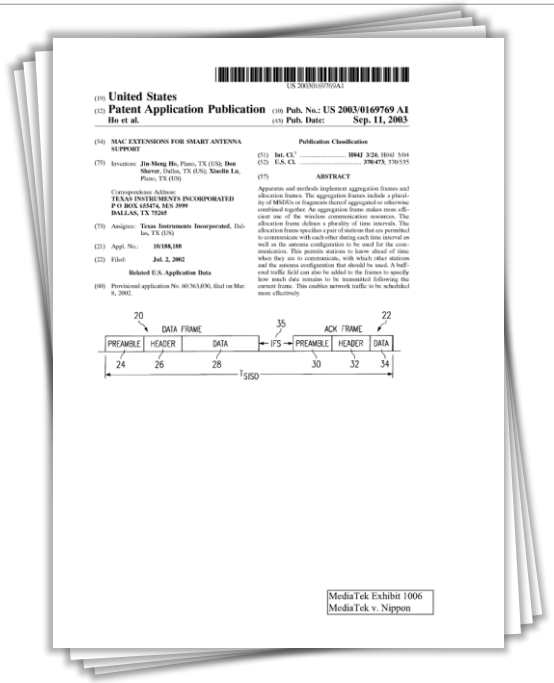
Petition at 47

> wireless ***packet*** communication apparatus"). Thus, Shpak-Lundby access points would have always sent packet transmissions using the primary (mandatory) channel, alone or in combination with Shpak-Lundby's secondary channel. As explained in Section VI.B.4.a.(2) above (citing Ex. 1037 at 1:42-49 as additional corroborating evidence), using Lundby's decision tree to transmit on the primary channel or primary and secondary channels (Lundby, FIG. 2, 4:25-30), access points in Shpak-Lundby use 802.11's clear channel assessment (CCA) technology to sense the channels and thus would have only used the mandatory "common frequency channel" when the carrier sense mechanism determined the primary channel was idle, and would not transmit data on any channel until the primary channel was detected as being idle.

Williams-Decl. (EX1003) at ¶ 141 (cited in Reply at 47)

Ground 1 (Obviousness) (Claims 1, 3, 5, 7): Shpak + Ho

The Shpak + Ho Combination



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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2003/0169769 A1

Ho et al. (43) Pub. Date: Sep. 11, 2003

(54) MAC EXTENSIONS FOR SMART ANTENNA SUPPORT

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(21) Appl. No.: 10/188,188

(22) Filed: Jul. 2, 2002

Related U.S. Application Data

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Publication Classification

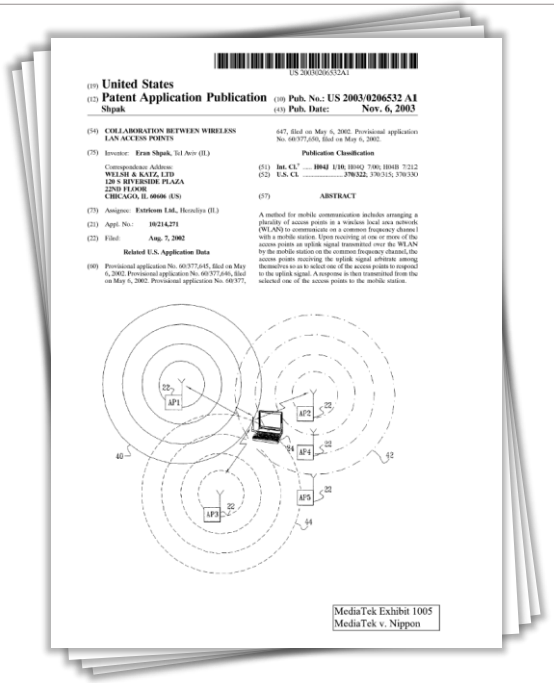
(51) Int. Cl.[7] H04J 3/24; H04J 3/04

(52) U.S. Cl. 370/473; 370/535

(57) ABSTRACT

Apparatus and methods implement aggregation frames and allocation frames. The aggregation frames include a plurality of MSDUs or fragments thereof aggregated or otherwise combined together. An aggregation frame makes more efficient use of the wireless communication resources. The allocation frame defines a plurality of time intervals. The allocation frame specifies a pair of stations that are permitted to communicate with each other during each time interval as well as the antenna configuration to be used for the communication. This permits stations to know ahead of time when they are to communicate, with which other stations and the antenna configuration that should be used. A buffered traffic field can also be added to the frames to specify how much data remains to be transmitted following the current frame. This enables network traffic to be scheduled more effectively.

MediaTek Exhibit 1006
MediaTek v. Nippon



US 20030206532A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2003/0206532 A1

Shpak (43) Pub. Date: Nov. 6, 2003

(54) COLLABORATION BETWEEN WIRELESS LAN ACCESS POINTS

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(73) Assignee: Extricom Ltd., Herzliya (IL)

(21) Appl. No.: 10/214,271

(22) Filed: Aug. 7, 2002

Related U.S. Application Data

(60) Provisional application No. 60/377,645, filed on May 6, 2002. Provisional application No. 60/377,646, filed on May 6, 2002. Provisional application No. 60/377,647, filed on May 6, 2002. Provisional application No. 60/377,650, filed on May 6, 2002.

Publication Classification

(51) Int. Cl.[7] H04J 1/10; H04Q 7/00; H04B 7/212

(52) U.S. Cl. 370/322; 370/315; 370/330

(57) ABSTRACT

A method for mobile communication includes arranging a plurality of access points in a wireless local area network (WLAN) to communicate on a common frequency channel with a mobile station. Upon receiving at one or more of the access points an uplink signal transmitted over the WLAN by the mobile station on the common frequency channel, the access points receiving the uplink signal arbitrate among themselves so as to select one of the access points to respond to the uplink signal. A response is then transmitted from the selected one of the access points to the mobile station.

MediaTek Exhibit 1005
MediaTek v. Nippon

- **Combination implements Shpak's "common frequency channel" as a MIMO-implemented channel.**
- **No dispute claims 1, 3, 5, and 7 are unpatentable if Petitioners' construction of "mandatory channel" is adopted.**

Ground 1: The Various Proposed Constructions of "Mandatory Channel"

what it means. *See* Geier Decl. at ¶69. NTT submits that, as properly construed, a "mandatory channel" is **"one of several frequency channels provided between two STAs, whose busy/idle state determines whether there is transmission regardless of idle state of the other available channels."**

Preliminary Response at 16

On this record, we determine that construing the claimed invention to cover a "single wireless channel" would be contrary to the purpose of the invention, which is to prevent leakage between multiple channels. Further, the "mandatory channel" may be the only channel used and still be within the scope of the claims. Based on the preceding, we preliminarily determine that "mandatory channel" means "one channel in a wireless multichannel communication system over which transmission must occur before transmission may occur over the other wireless channels." Our construction is similar to the District Court construction.

Institution Decision at 21

occur before transmission over the other wireless channels." *Id.* at 21. NTT agrees with the multichannel aspect of the construction, but proposes a modification to the bolded language: "one channel in a wireless multichannel communication system **whose idle state determines whether there can be a transmission** over the other channels." This language better reflects the intrinsic record because there is no support for transmitting on the "mandatory channel" "**before**" transmitting on other channels.

Patent Owner Response at 11-12

NTT's attempt to import a multi-channel requirement into the claims via a 26-word construction for "mandatory channel" should be rejected, and the term's plain meaning should govern.

Petitioners' Preliminary Reply (Paper 6) at 6

Ground 1: The District Court Agreed with Petitioners, and the Board Should As Well to Avoid Inconsistencies

Term	Plaintiff's Proposed Construction	Defendants' Proposed Construction	Court's Final Construction
"mandatory channel" ('551 Patent, Claims 1, 2, 5, 6)	"one of several frequency ranges provided between two STAs, whose busy/idle state determines whether there is transmission regardless of idle state of the other available channels"	Plain meaning	Plain-and-ordinary meaning wherein the "mandatory channel" may be the only channel and wherein its busy/idle state determines whether there is transmission regardless of idle state of other channels (if any).

EX1055 (Markman Order) at 4 (cited in Reply at 16)

Response: The Office agrees that aligning the claim construction standard used in PTAB proceedings with that used by the federal courts and the ITC promotes consistency in claim construction rulings and patentability determinations. The Federal Circuit has

2012). Adoption of the *Phillips* standard will reduce the potential for inconsistent results between different fora. We further agree that consistency leads to a more uniform, reliable, and predictable patent system. Specifically, as discussed above, the adoption of the federal court claim construction standard is consistent with "uniform interpretation of the patent laws," which is a well-recognized goal of the patent system as it allows the strength of patents to be meaningfully and positively predicted. Hearings on H.R.

83 Fed. Reg. 51340, 51347-48 (Oct. 11, 2018) (cited in Reply at 19)

Ground 1: This Same Dispute Was Before the District Court

MediaTek's co-pending IPR Petition, as well as the Defendants' invalidity contentions citing the same references, make clear that they are treating the claimed "mandatory channel" as nothing more than "a channel," with nothing to distinguish it. Ex. P ('551 IPR Pet) at 33-34, Ex. Q (Inv. contentions for Shpak). Indeed, even if there is ***only one*** channel provided between a pair of devices, Defendants would call this a "mandatory channel" within the meaning of the '551 Patent. *See* Ex. P. at 2, 18, 27, 33-35, 46-47 (citing Shpak reference); Ex. Q at 551-A13-10

EX1056 (NTT's Opening Markman Brief) at 14-15 (cited in Reply at 19)

Defendants may attempt to argue that the claim language does not require the "mandatory channel" to be one of multiple provided channels, but that is not correct. To the contrary, the

EX1056 (NTT's Opening Markman Brief) at 16 (cited in Reply at 19)

Defendants argue that the claimed "mandatory channel" should be given a "plain meaning," but in doing so ask the Court to find that this means the "mandatory channel" need not be one of multiple provided channels, but merely the ***only*** channel provided. Response at 11. This is not correct—there is a significant difference between ***using*** only one channel out of many provided, and only being ***provided*** one channel at the outset. One cannot read the '551 Patent in

EX1057 (NTT's Reply Markman Brief) at 7 (cited in Reply at 19)

Ground 1: This Same Dispute Was Before the District Court

But basically I think what the core of the dispute has boiled down to on "mandatory channel" is whether or not the mandatory channel is one out of multiple provided channels, channels that have been provided for use between, say, a given pair of communicating stations, or if it could be literally the only channel that is there.

EX1058 (Markman Transcript) at 22:20-25 (cited in Reply at 19)

But then to distinguish that from plaintiffs' position, Your Honor, it's not our argument at all that you're not allowed to just use one channel. You can certainly do that. However, in order for the mandatory channel to have meaning, in order for setting a mandatory channel and then transmitting only when that channel is idle, in order for that language to have meaning, you had to have been provided multiple channels at the outset. You don't have to use them all, but they are there. They're available.

EX1058 (Markman Transcript) at 29:23-30:6 (cited in Reply at 19),

THE COURT: Okay. And also -- and that was -- and it was being done by using, and then there are ellipses, a single wireless channel. That's what it says in the preamble, correct?

MS. LU: Correct.

THE COURT: And it could be multiple wireless channels, correct? It could be multiple wireless channels, right?

MS. LU: Right.

THE COURT: Could you address how that's consistent with what you're advocating?

EX1058 (Markman Transcript) at 29:2-11 (cited in Reply at 19)

THE COURT: If we could go back on the record, please.

Mr. Johnson, I don't want to disappoint you, but I may be disappointing you here. I'm going to -- I don't really need to hear a rebuttal. I'm going to make final the preliminary claim construction for mandatory channel and move to the next claim

EX1058 (Markman Transcript) at 30:18-22 (cited in Reply at 19)

Ground 1: The Claim Language Already Defines "Mandatory Channel" as a Channel "Always Used for Transmission"

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

551 Patent (EX1001) at Claim 1 (cited in Reply at 20)

2. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

distinguishing an STA A from an STA B, the STA A for which a mandatory channel is set, the STA B for which no mandatory channel is set, the mandatory channel being always used for transmission; and

when wireless packets are addressed to said STA A, transmitting the wireless packets to said STA A by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle; and

when wireless packets are addressed to said STA B, transmitting the wireless packets to said STA B by using idle wireless channel(s).

551 Patent (EX1001) at Claim 2 (cited in Reply at 20)

Moreover, it is respectfully submitted that the feature "setting a mandatory channel" is clear. More specifically, the independent claims already define the mandatory channel by stating that it is a channel "*that is always used for transmission*". Defining a mandatory channel in terms of priorities, as has been suggested in the above-referenced communication, would only add unnecessary features to the independent claims, thereby rendering the claims unclear.

EX1059 (EPO FH) at 130 (cited in Reply at 20))

Ground 1: No Dispute that the Preamble Recites Transmissions Over Either Multiple Channels OR a Single MIMO-Implemented Channel

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

[3] the multiple wireless channels and the MIMO." The preamble is therefore clear on its own: packets can be transmitted simultaneously using multiple channels (with or without MIMO on those channels), or alternatively by using "a single wireless channel determined to be idle and MIMO."

Williams Reply Decl. (EX1062) at ¶ 13 (cited in Reply at 21)

Patent is directed to multiple channels accessible to a single user. Indeed, the '551 Patent treats single-channel MIMO and using "multiple wireless channels" as *alternatives* to each other for transmitting packets simultaneously, which would make little sense if each of the "multiple wireless channels" were assigned to different users. *E.g.*, '551 Patent at cl. 1.

Geier Decl. (EX2026) at ¶ 55 (cited in Reply at 21)

Ground 1: The Board's Preliminary Understanding of MIMO Was Mistaken

Still considering the claim language, one transmission method alternative recited in the preamble is "a single wireless channel determined to be idle by carrier sense *and MIMO*." The Specification describes MIMO as a configuration in which "different wireless packets are transmitted from a plurality of antennas at the same time on the same wireless channel." Ex. 1001, 1:61–63. However, MIMO may be used over more than a single channel, e.g., three channels. *Id.* at 2:11–25 (describing Figs. 14(2) and (3)). Extrinsic evidence from the Ho reference describes MIMO as including at least two channels. Ex. 1006 ¶¶ 9–10.[9] On this record, we determine MIMO requires at least two channels or transmission links.

Institution Decision at 20

(2001-10)) is used together. In MIMO, different wireless packets are transmitted from a plurality of antennas at the same time on the same wireless channel. Those wireless

551 Patent (EX1001) at 1:61-63 (cited in Petition at 8, Reply at 21)

Ground 1: A Single-Channel System "Sets" a Single Channel To Use From Multiple Available Channels

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

551 Patent (EX1001) at Claim 1 (cited in Reply at 20)

We also agree with Patent Owner that a reasonable interpretation of the claim language means "there is nothing 'mandatory' about a channel if it is merely the only channel provided." Prelim Sur-Reply 4–5; Prelim. Resp. 21–22. In support of this interpretation, limitation [1A] recites "setting a mandatory channel," and there can be no "setting" where there is only one channel.

Institution Decision at 20

21. There is therefore nothing inconsistent with "setting a mandatory channel" in a single-channel system because one of fourteen available channels must have been set/selected as the channel to always be used by a station for transmissions in the system at given point in time. This fact thus refutes NTT's argument that "there is nothing 'mandatory' about a channel if it is the only channel provided" (POR at 12; *see also* Geier Decl., ¶ 65) because even in a system where stations only transmit over one channel at a time there are thirteen other "provided" channels that, until a different mandatory channel is selected, are never used for transmission and one channel (the "mandatory" channel) that always is used for transmission.

Williams-Reply (EX1062) at ¶ 21 (cited in Reply at 22)

Ground 1: Patent Owner Agrees There Is No "Inconsistenc[y]" with a Single Channel Automatically Being "Mandatory"

We also agree with Patent Owner that a reasonable interpretation of the claim language means "there is nothing 'mandatory' about a channel if it is merely the only channel provided." Prelim Sur-Reply 4–5; Prelim. Resp. 21–22. In support of this interpretation, limitation [1A] recites "setting a mandatory channel," and there can be no "setting" where there is only one channel.

Institution Decision at 20

2.5 The features "*wireless channel/wireless channels*" used in **claims 1, 2, 5 and 6** are interpreted as an alternative. If only one channel is present, than said only channel is automatically defined as "***mandatory***".

EX1059 (EPO FH) at 125 (cited in Reply at 23)

4. The feature "wireless channel/wireless channels" used in the independent claims should not be considered unclear. The fact that, in case of only one channel, this channel is defined as the mandatory channel does not lead to any inconsistencies. Therefore, this feature does not render the independent claims unclear.

EX1059 (EPO FH) at 130 (cited in Reply at 23)

Ground 1: Petitioners Do Not Seek to *Limit* the Claims to a Single Wireless Channel

A proper construction of the term "mandatory channel" includes reference to the Specification. For reasons detailed in Patent Owner's citations to the Specification, the Specification also supports a determination that the invention is not limited to a "single wireless channel." This is not a situation where Patent Owner proposes reading a limitation from the Specification into the claim. Thus, we find that the invention is described in the context of a multi-channel embodiment. *See* Prelim. Sur-Reply 2.

Institution Decision at 20

In a wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a wireless channel determined to be idle and MIMO, or the multiple wireless channel and the MIMO, a mandatory channel that is always used for transmission is set. The wireless packets are transmitted by using the wireless channel(s) including the mandatory channel only when the mandatory channel is idle. That is, in case of transmitting a plurality of wireless packets simultaneously, transmission is performed by using the wireless channel(s) including the mandatory channel, and transmission is not performed when the mandatory channel is not idle.

551 Patent (EX1001) at Abstract (cited in Reply at 24)

wireless channels and the MIMO. The wireless packet communication method includes setting a mandatory channel that is always used for transmission and transmitting the wireless packets by using a wireless channel or wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

551 Patent (EX1001) at 3:44-49 (cited in Reply at 24)

Ground 1: Although Legally Irrelevant, the Alleged Purpose of the "Invention" Applies to Single Channel Systems Too

On this record, we determine that construing the claimed invention to cover a "single wireless channel" would be contrary to the purpose of the invention, which is to prevent leakage between multiple channels. Further, the "mandatory channel" may be the only channel used and still be within the scope of the claims. Based on the preceding, we preliminarily determine that "mandatory channel" means "one channel in a wireless multichannel communication system over which transmission must occur before transmission may occur over the other wireless channels." Our construction is similar to the District Court construction.

Institution Decision at 20

single-channel systems addressed above. Thus, the '551 is directed to solving is a ***multichannel*** problem. Geier at ¶52.

Patent Owner Response at 5

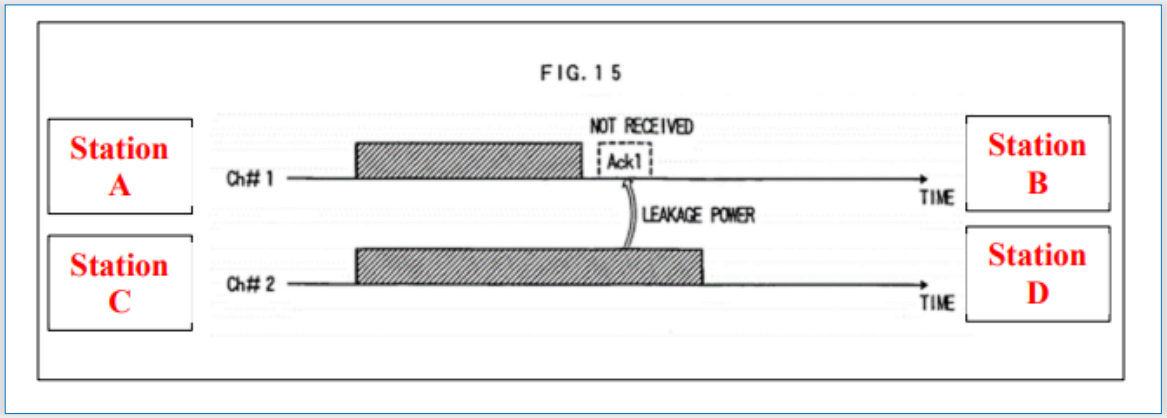
of the Board's construction. Indeed, as discussed above in §II.A, the specification teaches that the problem addressed by the '551 arises specifically in the context of multichannel systems—*i.e.*, that power leakage "where center frequencies of

Patent Owner Response at 14

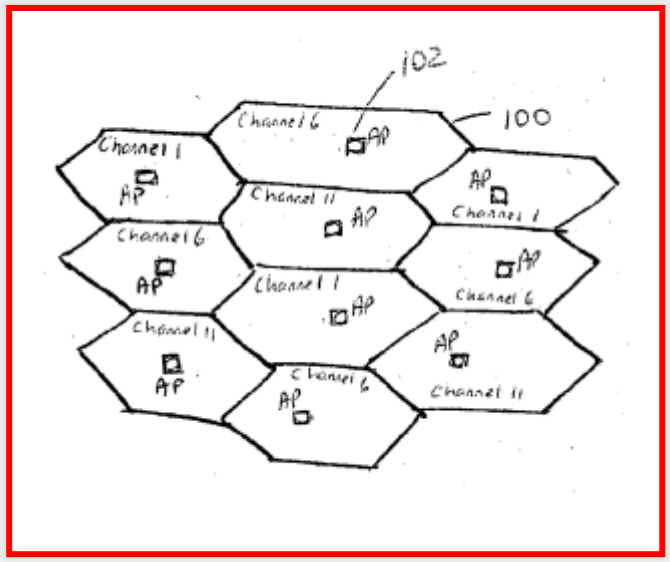
leakage power from the wireless channels #**1** and #**2**. In other words, the STA in transmission cannot receive a wireless packet transmitted on a wireless channel that is adjacent to the wireless channel being in transmission. This problem occurs not only in case of simultaneous transmission using multiple wireless channels but also in a conventional case where wireless packets are transmitted by using one wireless channel and an adjacent wireless channel that is affected by leakage power receives the wireless packets.

551 Patent (EX1001) at 3:27-32 (cited in Reply at 27)

Ground 1: Although Legally Irrelevant, the Alleged Purpose of the "Invention" Applies to Single Channel Systems Too



Reply at 27; Williams-Reply (EX1062) at ¶ 39



Bugeja (EX1007) at FIG. 1

42. In its Background and illustrated in its FIG. 1, Bugeja discloses a collection of access points ("APs") operating physically near each other with distinct mandatory channels assigned in order to reduce interferences between nearby APs. Bugeja, [0002]-[0006]; *see* First Declaration at ¶¶ 162-167. Bugeja thus recognized and explained how even in single-channel systems, mandatory channels can be used so that a collection of single-channel systems can be organized so that the mandatory channel of each AP is assigned to avoid power leakage between the mandatory channels of nearby APs. A POSA would also understand that Bugeja's use of mandatory channels in single-channel systems would not have been possible if there were not multiple wireless channels available from which to choose to select the mandatory channels of nearby APs.

Williams-Reply (EX1062) at ¶ 42 (cited in Reply at 28)

Ground 1: The File History Supports Petitioners' Interpretation

> The present invention in claims 1 and 5 differs in that it performs wireless packet transmission by using one or more wireless channel(s) that include(s) a mandatory channel (i.e., an indispensable channel) only when the mandatory channel set in advance is idle.

File History (EX1002) at 307 (cited in Reply at 28)

> The issue of whether a "mandatory channel" can be the sole channel provided simply never came up—rather, both applicant and examiner accepted as a given that the "mandatory channel" must be one of multiple provided channels.

Patent Owner Response at 16

Ground 1: The European File History Is Relevant and Supports Petitioners' Interpretation

- **EP Application and 551 Patent share identical specification.**
- **Both claim priority to the same JP Application.**
- **Prior to EP amendments, claims were identical.**

Repy at 29-30

"This court has also considered statements made before a foreign patent office when construing claims if they are relevant and not related to unique aspects of foreign patent law."

Apple Inc. v. Motorola, Inc., 757 F. 3d 1286, 1312-13 (Fed. Cir. 2014)
(cited in Reply at 29)

Ground 1: The European File History Is Relevant and Supports Petitioners' Interpretation

Identical Claim Language

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method characterized by comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

EPO FH (EX1059) at 98 (cited in Reply at 29)

EPO's Interpretation

2.5 The features "*wireless channel/wireless channels*" used in **claims 1, 2, 5 and 6** are interpreted as an alternative. If only one channel is present, than said only channel is automatically defined as "***mandatory***".

EPO FH (EX1059) at 125 (cited in Reply at 29-30)

Patent Owner's Interpretation Then

4. The feature "wireless channel/wireless channels" used in the independent claims should not be considered unclear. The fact that, in case of only one channel, this channel is defined as the mandatory channel does not lead to any inconsistencies. Therefore, this feature does not render the independent claims unclear.

EPO FH (EX1059) at 125 (cited in Reply at 29-30)

Patent Owner's Interpretation Now

By contrast, Petitioner's interpretation that the "mandatory channel" can apply to a single-channel system would render the claim language a nullity—if

EPO FH (EX1059) at 125 (cited in Reply at 29-30)

Ground 1: The European File History Is Relevant and Supports Petitioners' Interpretation

1. A wireless packet communication method for transmitting a plurality of wireless packets having equal packet time lengths simultaneously by using multiple wireless channels (Ch#1, Ch#2) determined to be idle by carrier sense and MIMO, the method characterized by comprising:

setting a mandatory channel among multiple wireless channels that is always used for transmission and has the highest priority among wireless channels that have a plurality of priorities; and

transmitting the wireless packets by using wireless channels (Ch#1, Ch#2) that include the mandatory channel, only when the mandatory channel is idle, wherein

the packet time length corresponds to a packet size or a transmission time.

EPO FH (EX1059) at 184 (cited in Reply at 30)

1. A wireless packet communication method for transmitting a plurality of wireless packets having equal packet time lengths simultaneously by using ~~at least one of~~ multiple wireless channels (Ch#1, Ch#2) determined to be idle by carrier sense~~, a single wireless channel determined to be idle and MIMO, and the multiple wireless channels (Ch#1, Ch#2)~~ and ~~the~~ MIMO, the method characterized by comprising:

setting a mandatory channel among multiple wireless channels that is always used for transmission and has the highest priority among wireless channels that have a plurality of priorities; and

transmitting the wireless packets by using ~~a wireless channel/~~wireless channels (Ch#1, Ch#2) that ~~includes/~~include the mandatory channel, only when the mandatory channel is idle.

EPO FH (EX1059) at 190 (cited in Reply at 30)

"The applicants knew how to claim a linkage group that does not substantially interfere with hybridization, as they did in the '824 and '767 patents, but specifically omitted that language from the claims of the related '928 patent."

Enzo Biochem, Inc. v. Applera Corp., 599 F.3d 1325, 1333 (Fed. Cir. 2010) (cited in Reply at 31)

Ground 1: The Claims Are Obvious Even if They Require a "Multichannel" System Because Shpak Selects the "Common Frequency Channel" From *Multiple* Channels

[0006] Therefore, in 802.11 WLANs known in the art, access points in mutual proximity must use different frequency channels. Theoretically, the 802.11b and 802.11g standards define 14 frequency channels in the 2.4 GHz band, but because of bandwidth and regulatory limitations, WLANs operating according to these standards in the United States actually have only three different frequency channels from which to choose. (In other countries, such as Spain, France and Japan, only one channel is available.) As a result, in complex, indoor environments, it becomes practically impossible to distribute wireless access points closely enough to give strong signals throughout the environment without substantial overlap in the coverage areas of different access points operating on the same frequency channel.

Shpak (EX1005) at [0006] (cited in Petition at 33)

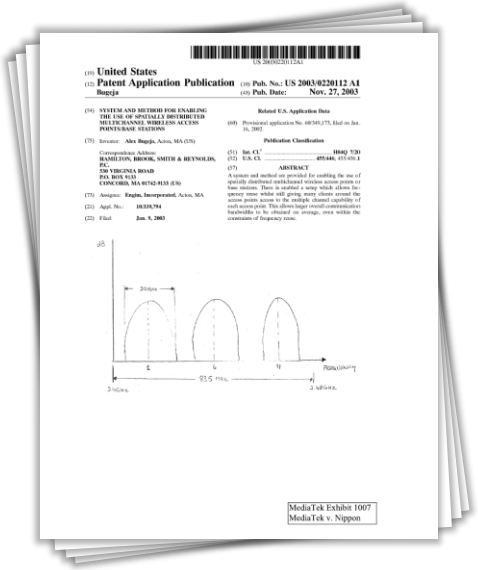
As Shpak explains, 802.11b defines 14 frequency channels but because of "bandwidth and regulatory limitations," 802.11b-WLANs in the United States "have only three frequency channels from which to choose." Shpak, [0006].

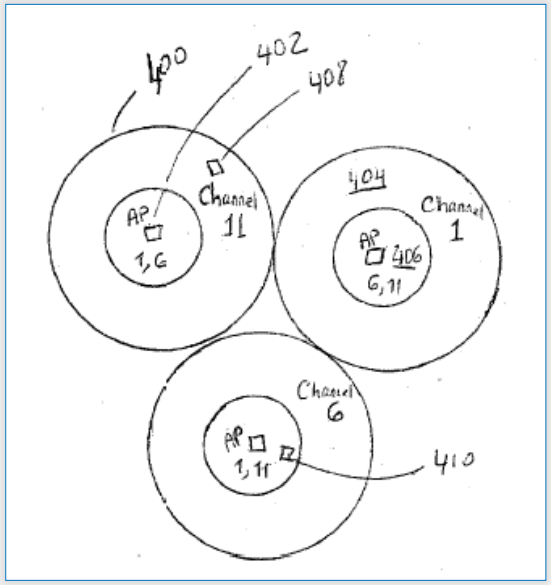
Shpak-Ho uses Shpak's method for "arranging" APs "to communicate on a common frequency channel with a mobile station," e.g., one of the three 802.11b channels available in the U.S. Shpak, [0011]; [0022]; *supra* §V.A.3. A POSA would

Petition at 33

Ground 3 (Obviousness) (1-3 and 5-7): Bugeja + Ho

The Teachings of Bugeja (EX1007)



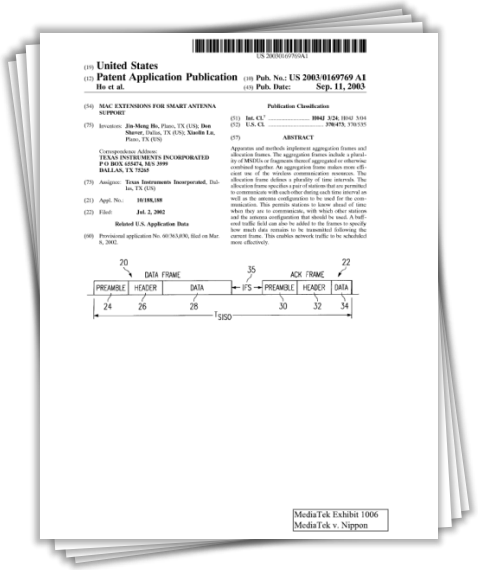


[0032] The multi-channel access point **402** assigns channels based on detected signal strength. Channel assignment in the IEEE 802.11 protocol can be performed by refusing to communicate with the client on a particular channel and waiting for the client to hop to a better channel before responding. Thus, client **408** in the outer region **404** is assigned to the primary channel. A client **410** in the inner region **410** is assigned the primary channel or any of the secondary channels, but likely one of the secondary channels to free the primary for peripheral clients. Thus more bandwidth is available for clients in the inner region **410** close to the access point. Communication in the outer region **404** is assigned to the primary channel to minimize interference between channels assigned to the outer regions **404** of adjacent cells **400**.

[0033] The two secondary channels in the inner region **406** are transmitted at about half power so as not to cause interference with adjacent cells **400**. The primary channel in the outer region **404** is transmitted at full power to provide coverage for the entire cell. The frequency of the primary channel for each cell **400** is selected so as not to interfere with the primary channels of adjacent multichannel access points. A client **410** located within the inner region **406** can communicate on all three channels. A client in the outer region **404** communicates only with the full power primary channel.

Bugeja (EX1007) at [0032]-[0033], FIG. 4
(cited in Petition at 54)

The Teachings of Ho (EX1006)



(19) United States
(12) Patent Application Publication
Ho et al.

(10) Pub. No.: US 2003/0169769 A1
(43) Pub. Date: Sep. 11, 2003

(54) MAC EXTENSIONS FOR SMART ANTENNA SUPPORT

Publication Classification

(57) ABSTRACT

Apparatus and methods implement aggregation frames and allocation frames. The aggregation frames include a plurality of MSDUs or fragments thereof aggregated or otherwise combined together. An aggregation frame makes more efficient use of the wireless communication resources. The allocation frames include a pair of stations. The allocation frame specifies a pair of stations that are permitted to communicate with each other during each time interval as well as the antenna configuration to be used for the communication. This permits stations to know ahead of time when they are to communicate, with which other stations and the antenna configuration that should be used. A buffered traffic field can also be added to the frames to specify how much data remains to be transmitted following the current frame. This enables network traffic to be scheduled more effectively.

MediaTek Exhibit 1006
MediaTek v. Nippon

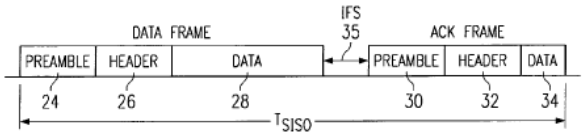


FIG. 4a

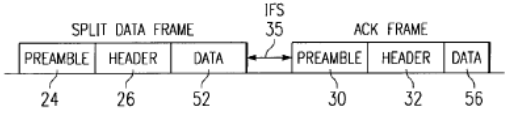


FIG. 4b

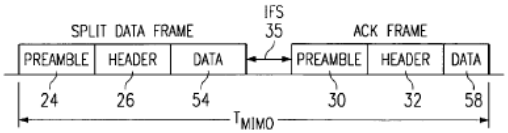


FIG. 4c

[0010] The advantage of a MIMO antenna configuration is illustrated with regard to **FIGS. 4***a*-**4***c*. **FIG. 4***a* simply repeats the SISO frame exchange sequence from **FIG. 2**. As noted above, the time required to transfer the data and acknowledgment frames is T_{SISO}. **FIGS. 4***b* and **4***c* depict the frame exchange sequence using the 2×2 MIMO antenna configuration of **FIG. 3**. With MIMO, the bit stream can be broken into two parts and the parts can then be transmitted simultaneously via the two communication links **48** and **50**. Thus, the overall time required to transfer the same information is advantageously reduced. In **FIG. 4***c*, the total time is shown as T_{MIMO}, which is less than T_{SISO}. The time savings largely comes from being able to divide the data payload **28** of the data frame **24** into two smaller fields **52** and **54**. Various techniques are known for doing this such as putting all of the even bits of data field **28** into field **52** and the odd bits into field **54**. At the receiving station, the data parts **52** and **54** then can be reassembled into a single data payload.

Ho (EX1006) at [0010], FIGS. 4a-4c
(cited in Petition at 21-22)

The Proposed Combination: Bugeja's Primary and Secondary Channels Are Implemented as MIMO Channels

> Although Bugeja's Figure 4 embodiment utilizes a multi-channel access point that can transmit simultaneously on three channels, POSAs would have understood each to be a SISO channel. Bugeja, [0053], [0059], FIGS. 8-10; Williams, ¶¶ 169-170. Given Ho, a POSA would have had numerous reasons to implement Bugeja's system such that its APs and stations utilized MIMO on Bugeja's primary and secondary channels.

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> In Bugeja-Ho, Bugeja's APs and stations utilize multiple antennas to simultaneously transmit packets over MIMO subchannels on the primary channel for outer-region clients and on the secondary channels for inner-region clients, utilizing the conventional MIMO data frames (MPDU packets) in Ho's Figures 4b-4c. Williams, ¶¶ 74, 175-176. The devices would otherwise maintain 802.11

Petition at 57-58

The Proposed Combination: Outer-Region Clients Are Only Assigned the "Primary" Channel, While Inner-Region Clients Are Only Assigned "Secondary" Channel(s)

When client 408 enters the top-left cell 400, the AP senses the client's location, and determines if it resides in outer region 404 or inner region 406. Bugeja, [0031]-[0032]. Because client 408 is in the cell's outer region, AP 402 assigns it, i.e., "sets" it, to channel 11—the only channel transmitting at full power and thus the only one serving the cell's outer region. Bugeja, [0033] (explaining outer-region client "communicates ***only*** with the full power primary channel"); [0035] (explaining outer-region "client is assigned to channel 11"). Any other outer-region client the AP senses would also be assigned only to primary channel 11. *Id.*, [0035] ("[Outer-region clients] share…the full-power channel[.]"), claim 9 ("client is ***restricted*** to primary channels in an outer region of the cell"), claim 19 (same); Williams, ¶¶ 186-187.

Conversely, when a client is sensed to be in the inner region, it is assigned to one (or both) of the two secondary channels, i.e., channel 1 or 6. Bugeja, [0032], claims 2, 12. Although inner-region clients "may" be assigned to channel 11, Bugeja discloses a preference not to do so to "give more bandwidth on channel 11 to the outer region." *Id.*, [0035]; [0032]; [0037]; Williams, ¶ 188.

Petition at 61

Bugeja explains inner-region clients with multi-channel capability can "operate multichannel" to use multiple channels. Bugeja, [0037]. Bugeja further teaches its primary channel should not be available to inner-region clients. *Id.*, [0032], [0035], [0037]; Williams, ¶¶ 221, 227; *supra* §V.C.1. Thus, an inner-region, multi-channel client seeking to "operate multichannel" to upload/download data faster would have been assigned both secondary channels. Bugeja, [0037], [0009], [0033]; Williams, ¶ 227.

In this scenario, whenever wireless packets are transmitted to a multi-channel, inner-region client, i.e., "said STA B," then both secondary channels, i.e., "wireless channel(s)," use Ho's MIMO. Bugeja, [0033], [0037]; Williams, ¶ 228. As explained *supra* §V.C.3, Bugeja-Ho's APs use carrier sense and thus would only send packets over a secondary channel via MIMO to the multi-channel, inner-region client if the channel was "idle." Williams, ¶ 228.

When both secondary channels are idle, packets would be sent simultaneously via MIMO over both channels, i.e., "by using idle wireless channel(s)" as recited in limitation 2C. Williams, ¶ 229. Other times, when only one secondary channel was idle, then conventional carrier sense—as the '551 Patent explains (1:43-48, 2:61-3:33)—would cause the AP to transmit one packet over the idle channel and wait until the other channel became idle to transit packets over it. Williams, ¶ 229. Because the AP could use the secondary channels separately when one is not idle, neither channel is a "mandatory" channel. *Id.*

Petition at 70

The Proposed Combination Meets Each Element of Challenged Claims

1. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

setting a mandatory channel that is always used for transmission; and

transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

The primary MIMO-implemented channel is a "mandatory channel" that a Bujega-Ho AP (a) "set[s]" and then (b) "always use[s] for transmission" to outer-region clients. *See* Petition at 58-64.

2. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

distinguishing an STA A from an STA B, the STA A for which a mandatory channel is set, the STA B for which no mandatory channel is set, the mandatory channel being always used for transmission; and

when wireless packets are addressed to said STA A, transmitting the wireless packets to said STA A by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle; and

when wireless packets are addressed to said STA B, transmitting the wireless packets to said STA B by using idle wireless channel(s).

Based on signal strength, a Bujega-Ho AP distinguishes between:

(1) outer-region clients for which the primary channel has been "set" and is "always used for transmission, and

(2) inner-region clients for which both secondary channels have been assigned and neither of which must always be used for transmission to those clients. *See* Petition at 65-70.

The outer-region clients are "STA A," and the inner-region clients are "STA B."

The Parties' Dispute Is Narrow

- No dispute Ho's MIMO teachings are applicable to Bugeja's 802.11 system.
- No dispute adding MIMO benefits Bugeja's system.
- No dispute POSAs had reasons to pursue the combination.
- No dispute POSAs had reasonable expectation of success.
- Dispute is whether the combination discloses a "mandatory channel."

The Board's Preliminary Finding that the "Mandatory Channel" Controls System Transmission Cannot Be Maintained

Petitioner concludes by arguing Bugeja and Ho's AP thus performs the claimed "'wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using' option [2], i.e., 'a single wireless channel' (i.e., Bugeja's primary channel) 'determined to be idle and MIMO.'" Bugeja's "primary channel" is not the recited "mandatory channel" because there is no showing that there is no transmission on the secondary channels when the primary channel is transmitting, i.e., is not idle. *See also* Prelim. Resp. 36 (the references fail to disclose a mandatory channel).

Institution Decision at 38

Institution Decision at 39

As we have interpreted the claims of the '551 patent, *even if a channel is available*, it is not used unless the mandatory channel is transmitting. *See*, Ex. 1001, 3:56–57 ("[w]hen the mandatory channel is busy, each STA does not perform transmission even if there is other idle wireless channel."); 12:22–25 (claim 1) ("transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, *only when the mandatory channel is idle*."). Under our preliminary interpretation, all the claims of the '551 patent control system transmission by "setting a mandatory channel" which must be transmitting, i.e., not idle, before any other channel of the multichannel system is available for use. *See* Section IV.C.1 above. Bugeja does not meet our preliminary interpretation of mandatory channel.

The Specification is Clear: The "Mandatory Channel" Is Set for a Particular Device, And Need Not Be Set for All Devices

communication method. In this embodiment, there are an STA A for which a mandatory channel is set and an STA B for which no mandatory channel is set. There is no specific limitation to transmission to the STA B, while transmission to the STA A is allowed only when the mandatory channel is idle, and is not performed when the mandatory channel is busy even if another wireless channel is idle. Please note that

551 Patent (EX1001) at 6:51-55 (cited in Reply at 16)

On the other hand, when no mandatory channel is set for the receive-side STA in S12, the state of the mandatory channel need not be considered so that the transmission stand-by data packets are reconstructed to have the same packet time length for every wireless channel in accordance with the number of idle channels and the number of the transmission stand-by data packets. The reconstructed data

551 Patent (EX1001) at 7:13-19 (cited in Reply at 16)

Moreover, in the case where there is an STA for which no mandatory channel is set, transmission is enabled between STAs including the STA even when the mandatory channel is busy. Thus, reduction of the throughput can be suppressed.

551 Patent (EX1001) at 12:7-11 (cited in Reply at 16)

Dr. Geier Agrees: The "Mandatory Channel" Is Set for a Particular Device, And Need Not Be Set for All Devices

A. Certainly the way the -- the claims read is that -- with the '551 patent is that if a mandatory channel is set, then there is a form of control of whether or not the transmission is going to take place that goes beyond what the carrier-sense multiple access protocol would provide.

And that step that it goes on with is to check the mandatory channel and only transmit if that's idle, and that counts -- it's also pertains to the -- any idle channels other than the mandatory channel.

So that control would -- would be exercised there if -- if there's no mandatory channel sent, then -- then the transmissions can happen without having that -- that -- you don't have to implement that procedure because there's no mandatory channel set. So you would just check the idle state and just transmit on all of those if that's what the system decides to do.

Q. So if you had a single access point that's serving two clients, Client A has a mandatory channel assigned to it, and Client B has no mandatory channel assigned to it.

Do you have that hypothetical in mind?

A. Uh-huh, right.

Q. Does the idle status of the mandatory channel for -- for Client A dictate whether there's transmissions sent to Client B for which there is no mandatory channel?

A. From what I understand, and it is a hypothetical so I haven't analyzed it fully, and I know we talked about it earlier, but my first thought is that the access point would control those transmissions based on a mandatory channel to, let's say, Client A, you know, that has a mandatory channel set. And if that mandatory channel is busy but it needs to communicate with another client that does not have a mandatory channel set, is that that wouldn't necessarily control or -- or preclude that transmission from happening because that other client does not have a -- does not have a mandatory channel set.

Geier-Depo. (EX1061) at 158:12-159:8 (cited in Reply at 15)

In Bugeja-Ho, the Primary Channel Is a "Mandatory Channel" Because It Is Set for a Particular Station and Its Idle State Controls Transmission to that Station

In Bugeja-Ho, an AP's primary channel is a "mandatory channel that is always used for transmission" to outer-region clients because that channel is always used when the AP transmits packets to outer-region clients using Ho's MIMO technique. Bugeja, [0033], [0035], claims 2-3, 9, 12-13, 19, FIG. 4; Williams, ¶ 189; *supra* §V.C.3.

That the AP can also communicate with ***inner-region*** clients on other channels, i.e., the secondary channels, while it communicates with the outer-region clients on the primary channel, does not detract from the primary channel being "always used for transmission," as claimed. A POSA would have understood the "always used for transmission" language of limitation 1A applies to one or more clients (e.g., outer-region client(s)) for whom a "mandatory channel" is "set," but not all clients must have such a "mandatory channel." Williams, ¶ 190.

Petition at 61-62

Patent Owner's Claim Construction-Based Argument Fails

Patent Owner's Argument

> Petitioner argues that Bugeja, in combination with Ho ("Bugeja-Ho"), discloses transmission using "a single wireless channel determined to be idle and MIMO" and therefore meets the claims' requirement of transmitting on a "mandatory channel that is always used for transmission." As with Ground 1, Ground 3 fails because Petitioner only relies on Bugeja's teaching of a ***single*** channel assigned to a given client. Pet. at 59; DI at 38 ("Petitioner relies on Bugeja's 'primary channel' as the 'single wireless channel'"). This is not a "mandatory channel." Geier at ¶151.

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- **Fails if the Board, like the district court, adopts Petitioners' proposed construction of "mandatory channel." (Reply at 17).**
- **Fails even if the Board imposes a "multichannel communication system" limitation on the claims because Bugeja-Ho uses a multi-channel AP as the Board correctly explained in its Institution Decision. (Reply at 17 (citing Institution Decision at 35-36)).**
- **Fails even if the Board maintains its preliminary finding that the "mandatory channel" must control all system transmissions, rather than transmissions to a particular station(s), at least when only outer-region clients are present in the system. (Reply at 18).**

In the Proposed Combination, the Primary Channel Is Not Assigned to Inner-Region Clients

Patent Owner's Argument

by Bugeja's explicit teachings. *See* Geier at ¶157. First, Petitioner argues that the primary channel cannot be assigned to a client in the inner region (Pet. at 70), but this is not correct. To the contrary, Bugeja teaches that "[a] client 410 in the inner

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Conversely, when a client is sensed to be in the inner region, it is assigned to one (or both) of the two secondary channels, i.e., channel 1 or 6. Bugeja, [0032], claims 2, 12. Although inner-region clients "may" be assigned to channel 11, Bugeja discloses a preference not to do so to "give more bandwidth on channel 11 to the outer region." *Id.*, [0035]; [0032]; [0037]; Williams, ¶ 188.

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assigned to the primary channel. A client **410** in the inner region **410** is assigned the primary channel or any of the secondary channels, but likely one of the secondary channels to free the primary for peripheral clients. Thus more bandwidth is available for clients in the inner region **410** close to the access point. Communication in the outer region

Bugeja (EX1007) at [0032] (cited in Petition at 61)

ing channels together if they are equipped to do so. Furthermore, clients in the outer region **404** also benefit because they have reduced bandwidth sharing in general with other clients in the inner region **406** who can be shifted to other channels.

Bugeja (EX1007) at [0037] (cited in Petition at 61)

In the Proposed Combination, Inner-Region Clients Are Assigned Both Secondary Channels

Patent Owner's Argument

> Petitioner admits that a single-channel client may be assigned to only a secondary channel for transmission, but contends that this channel is not a "mandatory channel." Pet. at 59, 68. However, Petitioner's arguments only

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> Bugeja's primary channel is a "mandatory channel" for outer-region clients because that channel is always used for transmissions to outer-region clients. Bugeja, [0032]-[0033], [0035], claims 2-3, 9, 12-13, 19; Williams, ¶ 222; *supra* §V.C.4.b. Further, as discussed *infra* §V.C.8.d, neither of Bugeja's secondary channels is a "mandatory channel" because transmission to a multi-channel, inner-region client can be sent over either secondary channel. Bugeja, [0031]-[0033], [0035]; Williams, ¶ 222

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> Bugeja explains inner-region clients with multi-channel capability can "operate multichannel" to use multiple channels. Bugeja, [0037]. Bugeja further teaches its primary channel should not be available to inner-region clients. *Id.*, [0032], [0035], [0037]; Williams, ¶¶ 221, 227; *supra* §V.C.1. Thus, an inner-region, multi-channel client seeking to "operate multichannel" to upload/download data faster would have been assigned both secondary channels. Bugeja, [0037], [0009], [0033]; Williams, ¶ 227.

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Claims 2 and 6 Only Requiring Distinguishing Between STAs, They Do Not Limit How the Distinction Is Made

Patent Owner's Argument

> Petitioner argues that because Bugeja can distinguish between clients "based on their distance from the AP," this satisfies claim element [2A]. Pet. at 68. This argument is beside the point—claim 2 requires distinguishing a client based on **whether it has a "mandatory channel,"** not whether it is close to an AP or not.

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2. A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:

distinguishing an STA A from an STA B, the STA A for which a mandatory channel is set, the STA B for which no mandatory channel is set, the mandatory channel being always used for transmission; and

when wireless packets are addressed to said STA A, transmitting the wireless packets to said STA A by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle; and

when wireless packets are addressed to said STA B, transmitting the wireless packets to said STA B by using idle wireless channel(s).

6. A wireless packet communication apparatus for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the apparatus comprising

a unit distinguishing an STA A from an STA B and determining destinations of the wireless packets so as to transmit wireless packets addressed to said STA A only when said mandatory channel is idle by using a wireless channel or wireless channels that includes/include a mandatory channel, and to transmit wireless packets addressed to said STA B by using idle wireless channel or channels, the mandatory channel being always used for transmission, the STA A for which the mandatory channel is set, the STA B for which no mandatory channel is set.

Ground 4 (Obviousness) (Claims 4 and 8):
Shpak + Ho + Thielecke
Bugeja + Ho + Thielecke

Ground 4: Patent Owner's Interpretation of Claims 4 and 8 is Wrong

4. The wireless packet communication method according to claim **1** or **2**, further comprising

simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

8. The wireless packet communication apparatus according to claim **5** or **6**, further comprising:

a unit simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

Further, Shpak-Ho-Thielecke fails to disclose claims 4 or 8 because merely reducing the number of MIMO streams cannot satisfy "selectively using the **multiple wireless channels or the MIMO**." Geier at ¶175. Petitioner admits that Shpak-Ho only discloses a single channel that is MIMO, but argues that selecting between "multiple wireless channels or the MIMO" can consist simply of adjusting the number of MIMO data streams. Pet. at 73. This is not what the claim language requires—the choice presented in claims 4 and 8 is between "multiple wireless channels" and "MIMO," **not** between "single channel without MIMO" and "single channel with MIMO." As the '551 Patent teaches, MIMO technology permits

Patent Owner Response at 63-64

Ground 4: The Claimed "Selection" Is Not Between MIMO and Multiple Channels

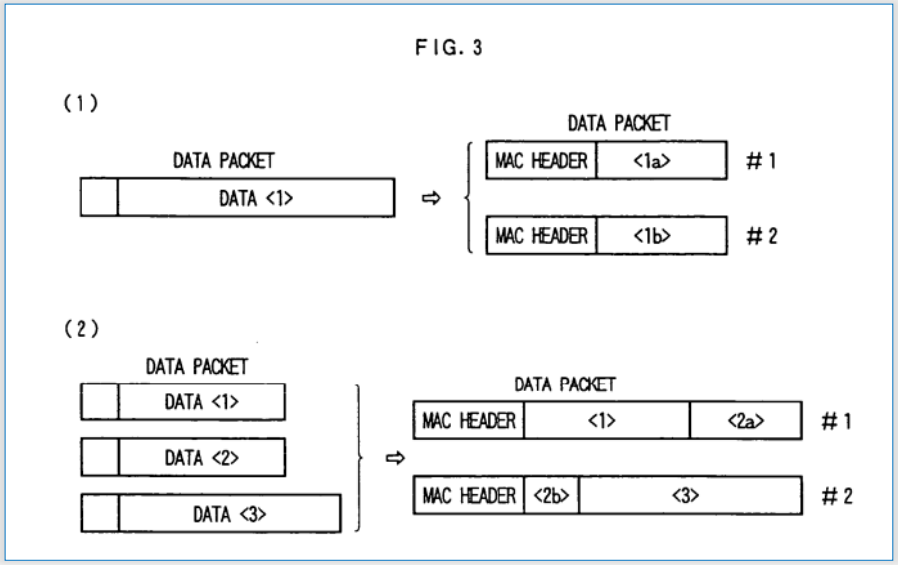
4. The wireless packet communication method according to claim **1** or **2**, further comprising

simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

FIFTH EMBODIMENT

FIG. **8** is a flowchart of a wireless packet communication method according to the fifth embodiment of the present invention. This embodiment has a feature that simultaneous transmission using multiple wireless channels as described in the first embodiment or simultaneous transmission using MIMO as described in the third embodiment is selected in accordance with the number of pieces of data stored in the transmission buffer or the number of MIMOs as described in the fourth embodiment that depends on a channel condition (S**7**). In accordance with this selection, wireless packets are reconstructed to have the same packet time length for the number of idle channels or the Number of MIMOs. The reconstructed packets are transmitted simultaneously (S**4** and S**8**). Except for the above, this embodiment is the same as the first embodiment.

551 Patent (EX1001) at 8:8-23 (cited in Petition at 49)



551 Patent (EX1001) at FIG. 3 (cited in Petition at 49)

(2001-10)) is used together. In MIMO, different wireless packets are transmitted from a plurality of antennas at the same time on the same wireless channel. Those wireless packets transmitted at the same time on the same wireless channel are separated from each other by digital signal processing that can deal with a difference between propagation coefficients of the wireless packets received by a plurality of antennas in an opposed STA. The number of MIMOs is determined in accordance with the propagation coefficients and the like.

551 Patent (EX1001) at 1:63-2:3
(cited in Williams-Reply at ¶ 29)

Ground 4: The Board Correctly Found that the Claimed "Selection" Is Not Between MIMO and Multiple Channels When Evaluating Shpak-Lundby

4. The wireless packet communication method according to claim **1** or **2**, further comprising

simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.

Claim 4 depends from claim 1, and requires "simultaneously transmitting wireless packets selectively ***using the multiple wireless channels*** or the MIMO ***in accordance with a number of pieces of data*** or a number of MIMOs that depends on a channel condition."

As Petitioners' emphasis illustrates, claim 4 covers the multi-channel transmission aspect of the patent's Fifth Embodiment (8:8-22), which refers to the First Embodiment's packet reconstruction technique (5:63-6:11). With that technique, packets are reconstructed such that each has the "same packet time length for every wireless channel in accordance with the number of idle channels and the number of transmission stand-by data packets." *Id.*, 6:2-7, FIG. 3. For example, if there is one packet and two channels, the packet is split into two equal-sized packets, but if there are three packets and two channels, then the three packets are reconstructed into two equal-sized packets. *Id.*, 6:12-33, FIG. 3; Williams, ¶ 150. As the '551 Patent admits, these reconstruction methods were "known." Ex. 1001, 6:12.

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3. Claim 4

Dependent claim 4 depends from claims 1 or 2. Shpak-Lundby does not disclose any of the methods of claims 1 or 2 for at least the reasons addressed above in claim 3. Further, neither Shpak nor Lundby discloses the use of MIMO, or "multiple wireless channels" within the meaning of the '551 Patent. Geier Decl. at ¶106. Thus, Shpak-Lundby does not disclose "simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO."

Preliminary Patent Owner Response at 33

On this record, Petitioner has shown sufficiently that the combination of Shpak and Lundby teach claims 3 and 4's dependency from claim 1. *See*

Institution Decision at 31