

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.
Petitioner

v.

DYNAMIC MESH NETWORKS, INC.
D/B/A MESHDYNAMICS
Patent Owner

Case No. IPR2025-01303
U.S. Patent No. 11,368,537

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 11,368,537

CHALLENGING CLAIMS 1-19
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. MANDATORY NOTICES	1
A. Real Party-In-Interest (37 C.F.R. §42.8(b)(1))	1
B. Related Matters (37 C.F.R. §42.8(b)(2)).....	1
C. Lead And Back-up Counsel (37 C.F.R. §42.8(b)(3)).....	1
D. Service Information (37 C.F.R. §42.8(b)(4))	2
III. FEES	3
IV. CERTIFICATION OF GROUNDS FOR STANDING	3
V. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED.....	3
A. Prior Art References	3
B. Grounds For Challenge	4
VI. LEVEL OF ORDINARY SKILL IN THE ART.....	4
VII. THE '537 PATENT.....	5
A. Prosecution History	6
B. Effective Priority Date	7
VIII. PRIOR ART REFERENCES	12
A. Rahman (EX1003).....	12
B. Rahman-II (EX1004).....	14
C. Rahman-III (EX1006)	16
D. Goel (EX1005)	18
IX. CLAIM CONSTRUCTION	20

X.	Specific Grounds For Challenge.....	20
A.	Ground 1: Rahman In View Of Rahman-II Renders Obvious Claims 1-4, 10-15, And 17-18.....	20
1.	Reasons To Combine Rahman and Rahman-II	20
2.	Claim 1	23
3.	Claim 2	48
4.	Claim 3	52
5.	Claim 4	54
6.	Claim 10	55
7.	Claim 11	57
8.	Claim 12	58
9.	Claim 13	59
10.	Claim 14	61
11.	Claim 15	62
12.	Claim 17	63
13.	Claim 18	64
B.	Ground 2: Rahman-Rahman-II In View Of Rahman-III Renders Obvious Claims 5-9 and 19.....	66
1.	Reasons To Combine The Rahman/Rahman-II Combination With Rahman-III (“Rahman/Rahman- II/Rahman-III Combination”)	66
2.	Claim 5	68
3.	Claim 6	70
4.	Claim 7	71
5.	Claim 8	72

6.	Claim 9.....	73
7.	Claim 19.....	75
C.	Ground 3: Rahman-Rahman-II In View Of Goel Renders Obvious Claims 1 and 16.	76
1.	Reasons to Combine Rahman, Rahman-II, and Goel	76
2.	Claim 1	79
3.	Claim 16.....	80
XI.	CONCLUSION.....	82

TABLE OF AUTHORITIES

	<u>Page(s)</u>
<u>Cases</u>	
<i>Droplets, Inc. v. E*TRADE Bank</i> , 887 F.3d 1309 (Fed. Cir. 2018)	12
<i>Encyclopedia Britannica, Inc. v. Alpine Elecs. of Amer., Inc.</i> , 609 F.3d 1345 (Fed. Cir. 2010)	8, 11
<i>Game and Tech. Co., Ltd. v. Activision Blizzard Inc.</i> , 926 F.3d 1370 (Fed. Cir. 2019)	50, 64
<i>In re NTP, Inc.</i> , 654 F.3d 1268 (Fed. Cir. 2011)	11
<i>Medtronic CoreValve, LLC v. Edwards Lifesciences Corp.</i> , 741 F.3d 1359 (Fed. Cir. 2014)	8
<i>SkinMedica, Inc. v. Histogen Inc.</i> , 727 F.3d 1187 (Fed. Cir. 2013)	50, 64
<u>Statutes</u>	
35 U.S.C. §102	3, 4
35 U.S.C. §103	3, 4
35 U.S.C. §314(a)	4
35. U.S.C. §120	8, 9
<u>Rules</u>	
37 C.F.R. §42.22(a)(1)	3
37 C.F.R. §42.104(b)(1)-(2)	3

PETITIONER’S TABLE OF EXHIBITS

Exhibit No.	DESCRIPTION
EX1001	U.S. Pat. No. 11,368,537
EX1002	Expert Declaration of Christopher Hansen, Ph.D.
EX1003	U.S. Pat. App. Pub. No. 2008/0043637 (Rahman)
EX1004	U.S. Pat. App. Pub. No. 2008/0112363 (Rahman-II)
EX1005	U.S. Pat. No. 8,665,841 (Goel)
EX1006	U.S. Pat. No. 7,653,011 (Rahman-III)
EX1007	File History for U.S. Pat. No. 11,368,537
EX1008	U.S. Pat. No. 10,785,316
EX1009	U.S. Pat. No. 7,420,952
EX1010	U.S. Pat. App. No. 60/421,930
EX1011	U.S. Pat. No. 8,520,691
EX1012	“Load-Sensitive Routing for Mobile Ad Hoc Networks,” Wu et al., IEEE Proceedings Tenth International Conference on Computer Communications and Networks, 2001
EX1013	IEEE Std 802-2001, The Institute of Electrical and Electronics Engineers, Inc., 2002
EX1014	Wi-Fi Alliance Timeline
EX1015	“Network Access Server Requirements Next Generation (NASREQNG) NAS Model,” Mitton et al., The Internet Society, RFC 2881, 2000
EX1016	File History for U.S. Pat. No. 10,785,316
EX1017	U.S. Pat. No. 9,819,747
EX1018	File History for U.S. Pat. No. 9,819,747
EX1019	U.S. Pat. No. 9,172,738
EX1020	File History for U.S. Pat. No. 9,172,738
EX1021	U.S. Pat. App. No. 15/728,863
EX1022	File History for U.S. Pat. App. No. 15/728,863
EX1023	File History for U.S. Pat. No. 7,420,952
EX1024	File History for U.S. Pat. No. 8,520,691
EX1025	U.S. Pat. App. No. 11/084,330
EX1026	File History for U.S. Pat. App. No. 11/084,330
EX1027	Curriculum Vitae of Christopher Hansen, Ph.D.

Petition for *Inter Partes* Review of U.S. Patent No. 11,368,537
Claims 1-19

Throughout the Petition, all annotations, coloring, and emphases have been added unless indicated otherwise.

LISTING OF CLAIMS

Claim 1

[1Pre] A wireless mesh network comprising:

[1A] a plurality of Wi-Fi nodes in the wireless mesh network organized in a tree shape;

[1B] an access server in data communication with the nodes

[1C] (i) wherein the nodes are comprised of:

one or more root access point (RAP) nodes having a wired connection to an external network;

[1C] (ii) one or more mesh access point (MAP) nodes;

[1D] wherein a MAP node is in a data communication with the external network through an associated RAP node;

[1E] (i) wherein the MAP node is in a direct wireless data communication with a single associated parent node,

[1E] (ii) wherein the associated parent node is either the associated RAP node, or

[1E] (iii) another MAP node in a data communication with the external network through its associated RAP node;

[1F] wherein the MAP node automatically connects to the associated parent node by selecting the single associated parent node from one or more potential parent

nodes that are within a direct wireless communication range of the MAP node and establishing a parent-child relationship with the associated parent node, process for the automatic connection comprising:

[1G] (i) selecting a parent node from the one or more potential parent nodes based at least in part on one or more parent selection criteria defined by the access server,

[1G] (ii) wherein the parent node so selected is the associated parent node;
and

[1H] establishing a direct wireless data connection between the MAP node and the associated parent node;

[1I] wherein the automatic connection process establishes the MAP node's routing path to the external network;

[1J] (i) the one or more parent selection criteria comprising:

a throughput value representing signal strength between two nodes; and

[1J] (ii) a latency value representing number of hops in a routing path;

[1K] (i) the MAP node comprising:

one or more identifier values representing a unique identity of the MAP node in the wireless mesh network;

[1K] (ii) two or more radios for wirelessly communicating with another node or a client device in the wireless mesh network.

Claim 2

[2pre] The wireless mesh network of claim 1 further comprising:

[2A] one or more network health monitoring criteria defined by the access server, wherein the one or more network health monitoring criteria comprises one or more of:

[2A] (i) whether or not the associated parent node is offline or can be found in the wireless mesh network;

[2A] (ii) whether or not data can be routed to the external network through the MAP node's routing path;

[2A] (iii) whether or not the one or more parent selection criteria is satisfied; and

[2B] testing whether the MAP node's routing path fails to satisfy the one or more network health monitoring criteria;

[2C] when it is determined that the MAP node's routing path does not meet one or more of the one or more network health monitoring criteria, establishing a new routing path from the MAP node to the external network by connecting the MAP node to a new associated parent node through the automatic connection process.

Claim 3

[3] The wireless mesh network of claim 2 wherein the access server further comprises causing an update to the wireless mesh network, the update comprising one or more of: a change to the one or more parent selection criteria, a change to the one or more network health monitoring criteria, and an upgrade of software or firmware residing on at least some of the nodes.

Claim 4

[4] The wireless mesh network of claim 2 wherein the at least one of the one or more network health monitoring criteria overlap with at least one of the one or more parent selection criteria.

Claim 5

[5] The wireless mesh network of claim 1 wherein the selection of the parent node further comprises selecting a potential parent node over another potential parent node based at least in part on a comparison of their latency values.

Claim 6

[6] The wireless mesh network of claim 5 wherein the selection of the parent node further comprises selecting the potential parent node over the another potential parent node if the potential parent node has a lower latency value than the another potential parent node.

Claim 7

[7] The wireless mesh network of claim 1 wherein the selection of the parent node further comprises selecting a potential parent node over another potential parent node based at least in part on a comparison of their throughput values.

Claim 8

[8] The wireless mesh network of claim 7 wherein the selection of the parent node further comprises selecting the potential parent node over the another potential parent node if the potential parent node has a higher throughput value than the another potential parent node.

Claim 9

[9] The wireless mesh network of claim 1 wherein the selection of the parent node further comprises not selecting a potential parent node if the potential parent node's wireless signal strength with the MAP node does not meet a threshold throughput value defined by the access server.

Claim 10

[10] The wireless mesh network of claim 1 wherein the MAP node further comprises a data store having data representing the MAP node's routing path to the external network.

Claim 11

[11] The wireless mesh network of claim 1 wherein the MAP node further comprises: an ethernet port through which a direct wired connection can be established with another device.

Claim 12

[12] The wireless mesh network of claim 1 wherein the one or more identifier values of the MAP comprises a MAC address or an IP address.

Claim 13

[13] The wireless mesh network of claim 1 wherein a first radio of the MAP is adapted for communicating with the client device and wherein a second radio is adapted for communicating with another node.

Claim 14

[14] The wireless mesh network of claim 13, wherein the second radio is configurable to be used as a dual-purpose radio for communicating with both the client and another node.

Claim 15

[15] The wireless mesh network of claim 1 further comprising a client device wirelessly connected to the MAP node, wherein the client device exchanges data with the external network through the MAP's routing path to the external network.

Claim 16

[16] The wireless mesh network of claim 1 further comprising one or more data types being routed through the routing path, wherein the one or more data types include at least two of: voice data, video data, and other data type that is not the voice or video data; wherein routing a priority data type with a higher priority than another type of data, wherein the priority data type may be one or both of: the voice data or the video data.

Claim 17

[17Pre] A wireless mesh network comprising:

[17A] a plurality of Wi-Fi nodes in the wireless mesh network organized in a tree shape;

[17B] an access server in data communication with the nodes, wherein the nodes are comprised of:

[17B] (i) one or more root access point (RAP) nodes having a wired connection to an external network;

[17B] (ii) one or more mesh access point (MAP) nodes;

[17B] (iii) wherein a MAP node is in a data communication with the external network through an associated RAP node;

[17B] (iv) wherein the MAP node is in a direct wireless data communication with a single associated parent node, wherein the associated parent node is either the

associated RAP node, or another MAP node in a data communication with the external network through its associated RAP node;

[17B] (v) wherein the MAP node automatically connects to the associated parent node by selecting the single associated parent node from one or more potential parent nodes that are within a direct wireless communication range of the MAP node and establishing a parent-child relationship with the associated parent node, process for the automatic connection comprising:

[17B] (vi) selecting a parent node from the one or more potential parent nodes based at least in part on one or more parent selection criteria defined by the access server, wherein the parent node so selected is the associated parent node; and

[17B] (vii) establishing a direct wireless data connection between the MAP node and the associated parent node;

[17B] (viii) wherein the automatic connection process establishes the MAP node's routing path to the external network;

[17C] the one or more parent selection criteria comprising:

[17C] (i) a throughput value representing signal strength between two nodes;
and

[17C] (ii) a latency value representing number of hops in a routing path;

[17D] the MAP node comprising:

[17D] (i) one or more identifier values representing a unique identity of the MAP node in the wireless mesh network;

[17E] two or more radios for wirelessly communicating with another node or a client device in the wireless mesh network;

[17E] (i) one or more network health monitoring criteria defined by the access server, wherein the one or more network health monitoring criteria comprises one or more of:

[17E] (ii) whether or not the associated parent node is offline or can be found in the wireless mesh network;

[17E] (iii) whether or not data can be routed to the external network through the MAP node's routing path;

[17E] (iv) whether or not the one or more parent selection criteria is satisfied; and

[17E] (v) whether or not the MAP node's routing path is more congested than a threshold load value representing data congestion level of a routing path;

[17F] testing whether the MAP node's routing path fails to satisfy the one or more network health monitoring criteria;

[17G] when it is determined that the MAP node's routing path does not meet one or more of the one or more network health monitoring criteria, establishing a new routing path from the MAP node to the external network by connecting the

MAP node to a new associated parent node through the automatic connection process.

Claim 18

[18Pre] A wireless mesh network comprising:

[18A] a plurality of Wi-Fi nodes in the wireless mesh network organized in a tree shape;

[18B] an access server in data communication with the nodes, wherein the nodes are comprised of:

[18B] (i) one or more root access point (RAP) nodes having a wired connection to an external network;

[18B] (ii) one or more mesh access point (MAP) nodes;

[18B] (iii) wherein a MAP node is in a data communication with the external network through an associated RAP node;

[18B] (iv) wherein the MAP node is in a direct wireless data communication with an a single associated parent node, wherein the associated parent node is either the associated RAP node, or another MAP node in a data communication with the external network through its associated RAP node;

[18B] (v) wherein the MAP node automatically connects to the associated parent node by selecting the single associated parent node from one or more potential parent nodes that are within a direct wireless communication range of the MAP node

and establishing a parent-child relationship with the associated parent node, process for the automatic connection comprising:

[18B] (vi) selecting a parent node from the one or more potential parent nodes based at least in part on one or more parent selection criteria defined by the access server, wherein the parent node so selected is the associated parent node; and

[18B] (vii) establishing a direct wireless data connection between the MAP node and the associated parent node;

[18B] (vii) wherein the automatic connection process establishes the MAP node's routing path to the external network;

[18C] the one or more parent selection criteria comprising:

[18C] (i) a loop prevention criterion which verifies that a potential parent node's routing path to the external network does not contain the MAP node;

[18C] (ii) a throughput value representing signal strength between two nodes;
and

[18C] (iii) a latency value representing number of hops in a routing path;

[18D] the MAP node comprising:

[18D] (i) one or more identifier values representing a unique identity of the MAP node in the wireless mesh network;

[18E] two or more radios for wirelessly communicating with another node or a client device in the wireless mesh network.

Claim 19

[19] The wireless mesh network of claim 18 wherein the selection of the parent node further comprises not selecting a potential parent node if the MAP node's potential routing path to the external network through the potential parent node exceeds a threshold latency value.

I. INTRODUCTION

Petitioner respectfully requests cancellation of all claims in U.S. Patent No. 11,368,537 (the “’537 patent”).

II. MANDATORY NOTICES

A. Real Party-In-Interest (37 C.F.R. §42.8(b)(1))

Petitioner, Cisco, identifies itself as a real party-in-interest (RPI).

B. Related Matters (37 C.F.R. §42.8(b)(2))

On May 5, 2025, Patent Owner, Dynamic Mesh Networks, Inc., originally asserted the ’537 patent against Petitioner, Cisco, in *Dynamic Mesh Networks, Inc. et al. v. Cisco Systems, Inc.*, No. 2:25-cv-00472 (EDTX). On July 31, 2025, Patent Owner voluntarily dismissed the action without prejudice. That same day, Petitioner filed a Declaratory Judgment action against Patent Owner identifying the ’537 patent, which is currently pending. *Cisco Systems, Inc. v. Dynamic Mesh Networks, Inc. et al.*, No. 3:25-cv-06441 (NDCal) (“Litigation”).

C. Lead And Back-up Counsel (37 C.F.R. §42.8(b)(3))

Petitioner is filing a Power of Attorney appointing the practitioners associated with Customer Number 132,593. Petitioner designates the following lead and back-up counsel:

Lead Counsel	First Back-up Counsel
Taeg Sang Cho (Reg. No. 69,618) Desmarais LLP 230 Park Ave New York, NY 10169 Telephone: (212) 351-3400 Email: tcho@desmaraisllp.com	Michael Wueste (<i>pro hac vice</i> forthcoming) Desmarais LLP 230 Park Ave New York, NY 10169 Telephone: (212) 351-3400 Email: mwueste@desmaraisllp.com
Back-up Counsel	Back-up Counsel
Lindsey Miller (<i>pro hac vice</i> forthcoming) Desmarais LLP 230 Park Ave New York, NY 10169 Telephone: (212) 351-3400 Email: lmiller@desmaraisllp.com	Ryan Thorne (Reg. No. 76,462) Desmarais LLP 230 Park Ave New York, NY 10169 Telephone: (212) 351-3400 Email: rthorne@desmaraisllp.com

D. Service Information (37 C.F.R. §42.8(b)(4))

Post and hand delivery: Desmarais LLP

230 Park Ave, New York, NY 10169

Telephone: 212-351-3400

Email: Cisco-DynamicMesh-IPR@desmaraisllp.com

Please address all correspondence to counsel identified above. Petitioner consents to electronic service by email at:

tcho@desmaraisllp.com

mwueste@desmaraisllp.com

lmiller@desmaraisllp.com

rthorne@desmaraisllp.com

Cisco-DynamicMesh-IPR@desmaraisllp.com

III. FEES

Petitioner is concurrently electronically submitting the required fees for this Petition. The Board is authorized to charge Desmarais LLP's deposit account, No. 50-6822, for any fee deficiency.

IV. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies that the '537 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review.

V. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Under 37 C.F.R. §§42.22(a)(1) and 42.104(b)(1)-(2), Petitioner requests cancellation of claims 1-19 ("Challenged Claims") of the '537 Patent.

A. Prior Art References

For the reasons provided in Section VII.B, the '537 patent is entitled to a priority date no earlier than January 29, 2010. Accordingly, this Petition applies pre-AIA provisions of 35 U.S.C. §§ 102 and 103.

The following references are pertinent to the grounds of unpatentability:

1. U.S. Patent Publication No. 2008/0043637 ("Rahman") (EX1003), published February 21, 2008, is prior art under at least 35 U.S.C. §102(b).
2. U.S. Patent Publication No. 2008/0112363 ("Rahman-II") (EX1004), published May 15, 2008, is prior art under at least 35 U.S.C. §102(b).

3. U.S. Patent No. 8,665,841 (“Goel”) (EX1005), filed May 19, 2009, is prior art under at least 35 U.S.C. §102(e).

4. U.S. Patent No. 7,653,011 (“Rahman-III”) (EX1006), filed February 10, 2006, is prior art under at least 35 U.S.C. §102(b).

B. Grounds For Challenge

Petitioner requests cancellation of all claims of the ’537 patent under 35 U.S.C. §103 based on the following Grounds.

Grounds	Claims	Prior Art References
I	1-4, 10-15, 17-18	Rahman, Rahman-II
II	5-9, 19	Rahman, Rahman-II, Rahman-III
III	1, 16	Rahman, Rahman-II, Goel

This Petition demonstrates that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the Challenged Claims. 35 U.S.C. §314(a).

VI. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill in the Art (“POSITA”), as of the proper claimed priority date of January 29, 2010, would have had working knowledge of the wireless mesh networking art that is pertinent to the ’537 patent, including familiarity with standards such as IEEE 802.11 and mesh networking and route discovery protocols. EX1002, ¶19.

A POSITA would have had a bachelor's degree in computer science, computer engineering, electrical engineering, or equivalent training, and approximately two years of experience working in the field of network communications. Additional work experience could have been substituted for educational experience, and vice versa. EX1002, ¶¶20.

VII. THE '537 PATENT

The '537 patent describes a “wireless mesh network” including an **access server 10**, a single **root node 20**, and multiple **AP nodes 30**, and illustrates an example of such network in Figure 1. EX1001, Abstract. EX1002, ¶¶33-34.

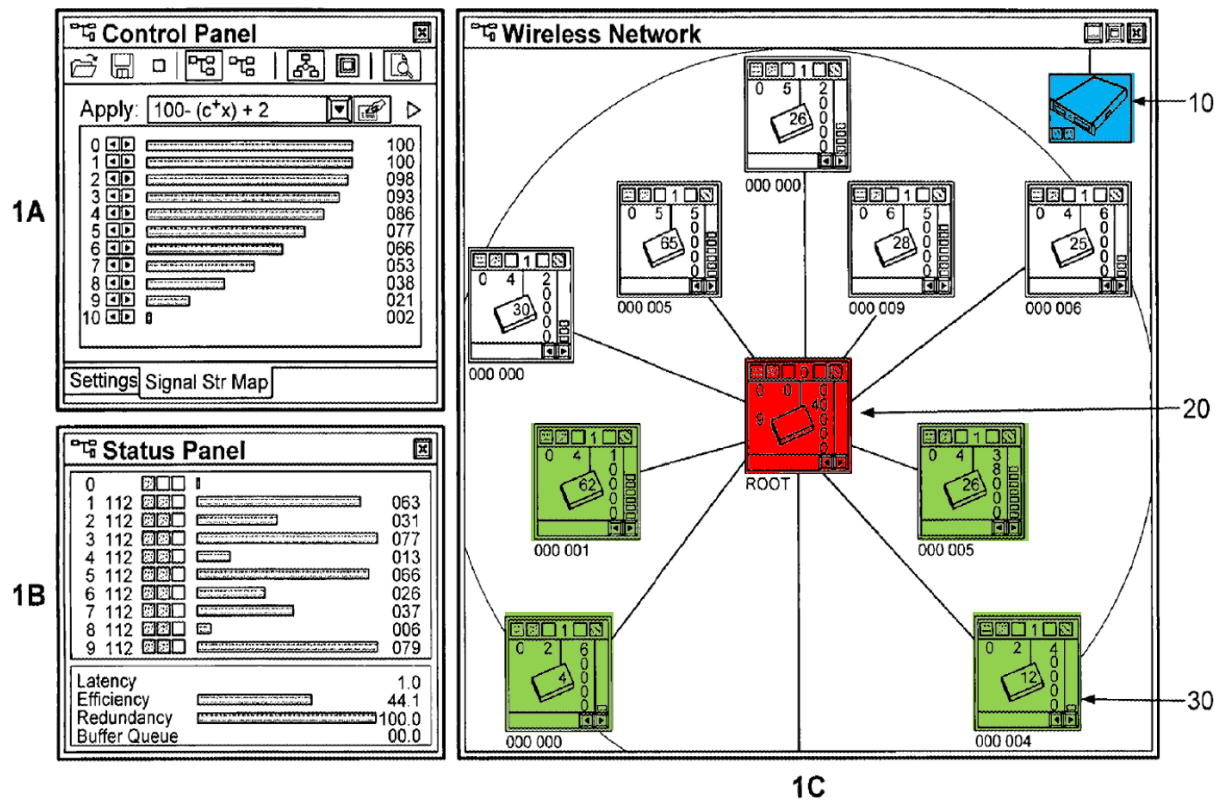


FIG. 1

EX1001, Figure 1.

The '537 patent's mesh network configuration provides an "adaptive wireless network, based on 'smart' communication devices such as **Access Points (AP)**." EX1001, 3:8-12. The **access server** provides centralized control of network characteristics. EX1001, 3:12-18. EX1002, ¶¶34-35.

The **access server** sets a network "'profile' that each wireless communication device (30) in the network strives towards." EX1001, 6:45-49. Based on the information received from the **access server's** network profile—and information from nearby neighboring nodes—each **AP node** selects the "correct 'route' or path to the **root node**." EX1001, 8:17-21. EX1002, ¶¶34-35.

A. Prosecution History

The applicant filed U.S. Patent Application No. 17/027,381 ("537 patent application") on September 21, 2020. The '537 patent application is a continuation-in-part of U.S. Patent Application No. 15/908,108, filed on February 28, 2018, and which issued as U.S. Patent No. 10,785,316 ("316 patent", EX1008). The '537 patent application claims priority through the '316 patent and several other patent applications to U.S. Patent Appl. No. 11/084,330 ("330 application"), filed on March 17, 2005, though another patent application to U.S. Patent No. 7,420,952 ("952 patent", EX1009), filed on May 8, 2003, and to U.S. Provisional Patent Application No. 60/421,930 ("930 provisional", EX1010), filed on October 28,

2002. However, the '537 patent is not entitled to the '952 patent's filing date or to the '930 Provisional's filing date, as discussed further below. EX1002, ¶¶38-39.

During prosecution, the presented claims were repeatedly rejected as obvious. EX1007, 209-214. For example, on October 18, 2021, the Examiner rejected the amended claims as obvious over U.S. Patent Publication No. 2008/0080414 ("Thubert") in view of Rahman-II. EX1007, 270. In response, the applicant argued that Thubert and Rahman-II are not prior art because the '537 patent application claims priority to the '952 patent filed on May 8, 2003 and to the '930 provisional filed on October 28, 2002, both of which predated Thubert and Rahman-II. EX1007, 307. The Examiner subsequently allowed the claims in the '537 patent application on April 18, 2022. EX1002, ¶40.

B. Effective Priority Date

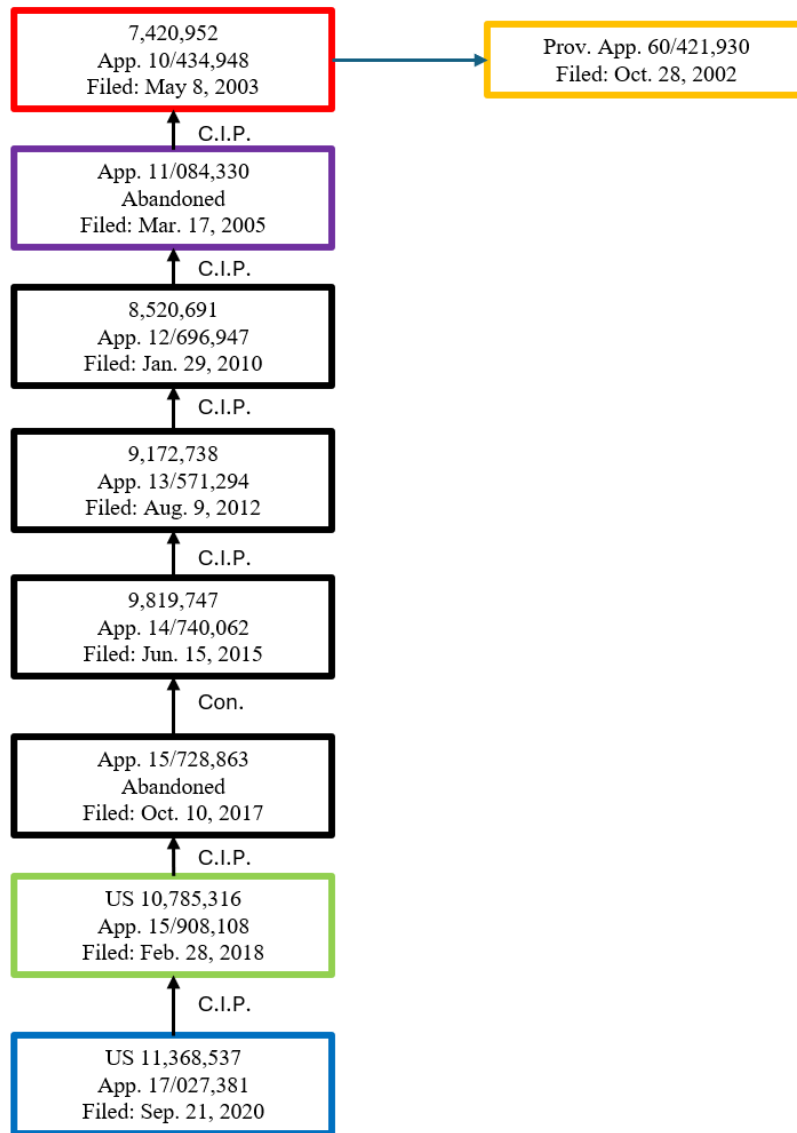
The earliest priority date to which the '537 patent can claim priority is January 29, 2010—not October 28, 2002 (per the '930 provisional), or to May 8, 2003 (per the '952 patent), or to March 17, 2005 (per the '330 application)—because the '537 patent fails to comply with the "specific reference" requirement of 35. U.S.C. §120 with respect to the '930 provisional, the '952 patent, and the '330 application.

In order to claim the benefit of the filing date of an earlier filed application, an application must "contain a *specific reference* to the earlier filed application." 35 U.S.C. §120. Where an application claims priority to an earlier-filed application

under Section 120, the “specific reference” requirement “mandates ‘*each* [intermediate] application in the chain of priority to refer to the prior applications.’” *Medtronic CoreValve, LLC v. Edwards Lifesciences Corp.*, 741 F.3d 1359, 1363 (Fed. Cir. 2014) (citing *Encyclopedia Britannica, Inc. v. Alpine Elecs. of Amer., Inc.*, 609 F.3d 1345, 1352 (Fed. Cir. 2010)). Where intermediate applications in the chain of priority fail to make such specific reference to the prior applications, the later filed application is not entitled to the priority date of the earliest application. *See Encyclopedia Britannica*, 609 F.3d at 1352; *Medtronic*, 741 F.3d at 1367 (“because intermediate U.S. Applications 6 and 8 failed to specifically reference the earlier filed applications in the priority chain, the ’281 patent is not entitled to claim the priority date of [earlier-filed] International Application 2b under § 120.”).

The **’537 patent** claims priority to the **’930 provisional**, the **’330 application**, and the **’952 patent** through a chain of five intervening applications, illustrated below:

Petition for *Inter Partes* Review of U.S. Patent No. 11,368,537
Claims 1-19



Accordingly, if each intervening application in the chain of priority claimed by the '**537 patent** does not specifically reference the earliest filed '**930 provisional**, the '**330 application**, or the '**952 patent**, the '**537 patent** is not entitled to either the respective October 28, 2002, the May 8, 2003, or the March 17, 2005 priority dates. And the '**316 patent**—to which the '**537 patent** claims priority—fails to reference, incorporate by reference, or otherwise identify the '**930 provisional**, the '**952**

Petition for *Inter Partes* Review of U.S. Patent No. 11,368,537
Claims 1-19

patent, or the '**330 application** at all, let alone in the portions of the “Related U.S. Application Data” section relevant to the priority chain of the '**537 patent** identified below:

Does not reference or identify the '**330 application**, the '**952 patent** or the '**930 provisional**.

This application claims priority as a non-provisional of U.S. Provisional Application 62/465,526 filed on Mar. 1, 2017, the contents of which are incorporated by reference.

The instant application claims is a continuation in part of U.S. application Ser. No. 15/728,863, filed on Oct. 10, 2017, presently pending, which in turn claimed as a continuation of U.S. application Ser. No. 14/740,062, filed on Jun. 15, 2015, patented as U.S. Pat. No. 9,819,747 on Nov. 14, 2017, which in turn claimed priority as a non-provisional of U.S. Provisional Application Ser. No. 62/012,196, filed on Jun. 13, 2015, the contents of each are hereby incorporated by reference.

U.S. application Ser. No. 15/728,863 is also continuation in part of U.S. Utility application Ser. No. 13/764,008, filed on Feb. 11, 2013, which is issued as U.S. Pat. No. 9,363,651 on Jun. 7, 2016, which in turn claimed priority as a continuation in part of U.S. Utility application Ser. No. 13/627,883, filed on Sep. 26, 2012, and issued as U.S. Pat. No. 8,923,186 on Dec. 30, 2014, which in turn claimed priority as a non-provisional utility application of Provisional U.S. Patent Application Ser. No. 61/555,400 filed on Nov. 3, 2011, and Provisional U.S. Patent Application Ser. No. 61/615,802, filed on Mar. 26, 2012, and Provisional U.S. Patent Application Ser. No. 61/621,926, filed on Apr. 9, 2012, the contents of which are hereby incorporated by reference.

U.S. application Ser. No. 15/728,863 is also continuation in part of U.S. patent application Ser. No. 13/571,294, filed on Aug. 9, 2012, issued as U.S. Pat. No. 9,172,738 on Oct. 27, 2015, which in turn claimed priority to U.S. patent application Ser. No. 12/696,947, filed on Jan. 29, 2010, issued as U.S. Pat. No. 8,520,691 which issued on Aug. 27, 2013, which in turn claimed priority as a non-provisional of U.S. application Ser. No. 61/148,803, filed on Jan. 30, 2009, the contents of each prior application is hereby incorporated by reference. Application Ser. No. 13/571,294 also claimed priority as a continuation in part of U.S. Utility application Ser. No. 12/352,457, filed on Jan. 12, 2009, and issued as U.S. Pat. No. 8,477,762 on Jun. 2, 2013, the contents of each prior application is hereby incorporated by reference.

U.S. application Ser. No. 15/728,863 is also continuation in part of U.S. application Ser. No. 13/541,446 filed on Jul. 3, 2012, presently abandoned, the contents of which are hereby incorporated by reference.

U.S. application Ser. No. 15/728,863 is also continuation in part of U.S. Utility application Ser. No. 14/523,778, filed on Feb. 12, 2015, which issued as U.S. Pat. No. 9,730,100 on Aug. 8, 2017, which in turn claims priority to U.S. Utility application Ser. No. 12/625,365, filed on Nov. 24, 2009, issued as U.S. Pat. No. 8,514,852 on Aug. 20, 2013, which in turn claimed priority to U.S. application 61/117,502, filed on Nov. 24, 2008, which are hereby incorporated by reference.

The contents of each application is hereby incorporated by reference.

EX1008 (the '**316 patent**), 1:5-55.

Moreover, the Application Data Sheet submitted with the application for the '**316 patent** (EX1016, “**316 ADS**”) confirms that it is not entitled to the priority date of the '**330 application**, '**952 patent**, or '**930 provisional**, because the '**316**

ADS also fails to identify, reference, or claim priority to any of the '330 application,'952 patent or '930 provisional. EX1016, 4-7.

The Examiner's apparent acceptance of the Applicant's argument that the claims are entitled to the May 8, 2003 priority date (EX1007, 307) does not save the '537 patent's failure to comply with Section 120's specific reference requirement. Neither the Applicant nor the Examiner addressed or considered Section 120 at all. EX1007, 307-311, 369-371; *see In re NTP, Inc.*, 654 F.3d 1268, 1279 (Fed. Cir. 2011) (holding, *inter alia*, that a later-issued patent was not entitled to claim the priority date of an earlier application where the examiner made no "affirmative statement" showing consideration of a full priority date analysis under Section 120). Accordingly, because the intermediate '316 patent "failed to specifically reference the earlier filed ['330 application,'952 patent or '930 provisional], it is not entitled to the priority date of [those earlier-filed patents and applications] under § 120," and therefore the '537 patent "cannot claim priority to the ['952 patent or to the '930 provisional] through the" '316 patent. *Encyclopedia Britannica*, 609 F.3d at 1352.

The '316 patent does specifically identify U.S. Patent No. 8,520,691 (the "'691 patent", EX1011), which was filed on January 29, 2010. *See* EX1008 (the '316 patent), 1:30-36; *compare* EX1001 (the '537 patent), 1:15-19. Although the '691 patent claims priority to the '952 patent (*see* EX1011 (the '691 patent), 1:10-13), that is not sufficient to entitle the '537 patent to the '952 patent's May 8, 2003

priority date because of the break in the chain arising from the '**316 patent**'s failure to specifically reference all intervening applications. Section 120's specific reference requirement "does not contemplate incorporation by reference." *Droplets, Inc. v. E*TRADE Bank*, 887 F.3d 1309, 1320 (Fed. Cir. 2018) (a later-filed patent that only contained a specific reference to and incorporated by reference an intervening patent, and not *all* earlier-filed patents, was not entitled to the filing dates of all earlier patents, even where the intervening patent included a priority claim to earlier patents). As such, the fact that the '691 patent claims priority to the '**952 patent**' does not cure the '**316 patent**'s failure to specifically refer to the '**952 patent**, the '**330 application**, or the '**930 provisional** in its own priority chain. Therefore, the '**316 patent** is entitled only to the priority date of the earliest specifically-referenced patent: the '691 patent's January 29, 2010 filing date.

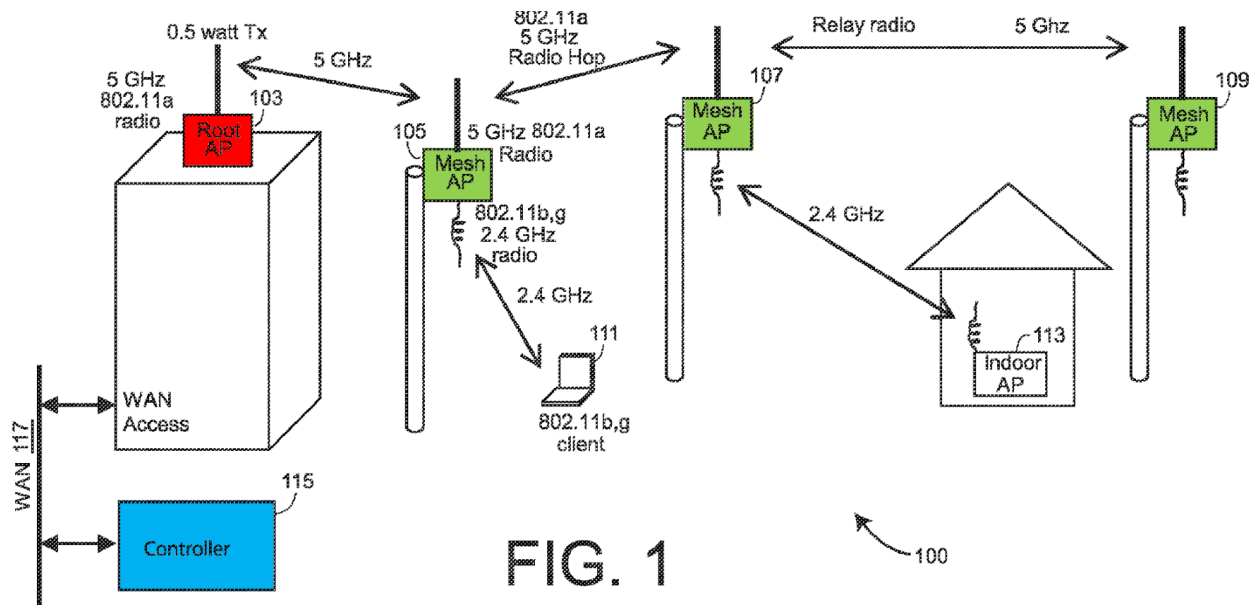
Accordingly, because the '**316 patent** fails to comply with the "specific reference" requirement of Section 120, it is entitled to a priority date no earlier than January 29, 2010, and therefore the '**537 patent** is entitled, at the earliest, to the same *January 29, 2010* priority date. EX1002, ¶¶42-44.

VIII. PRIOR ART REFERENCES

A. Rahman (EX1003)

Rahman discloses a system for "Route Tree Building In a Wireless Mesh Network." EX1003, Title. Rahman's wireless mesh network includes "lightweight

mesh APs” that “form a tree topology for a wireless backhaul between mesh points, with one mesh point forming the root of the mesh tree topology” that connects to a WLAN **controller** in an external wired network. EX1003, [0003]-[0004]. Rahman’s wireless mesh network, including the wired **WLAN controller**, the **Root AP**, and the **Mesh APs**, is shown below. EX1002, ¶¶50-52.



EX1001, Figure 1.

Rahman discloses that the **mesh APs** may form their own tree topology by selecting parent nodes—single other **mesh APs** or **root APs**—that create a “suitable path to the **root** of the tree” EX1003, [0004]. EX1002, ¶¶51-52.

In Rahman’s primary embodiment, the **WLAN controller** provides a “centralized route calculation method based on wireless link metrics collected via neighbor reports.” EX1003, [0024]. The neighbor reports, called “RRM [Radio

Resource Management] Neighbor Reports,” include metrics useful for determining the best route to the **root AP**, including link metrics such as signal strength and node metrics such as hop count. EX1003, [0074]. Rahman also discloses alternative embodiments in which the **mesh APs** use the information provided by the WLAN **controller**’s centralized route calculation method to run “a local tree building method, e.g., AWPP [Adaptive Wireless Path Protocol] to possibly connect to the mesh” in the event of link failure or parent loss (EX1003, [0078]) for more rapid recovery from failover. EX1003, [0079]. EX1002, ¶¶53-55.

B. Rahman-II (EX1004)

Rahman-II discloses a system for providing an “Access Point Profile For A Mesh Access Point In A Wireless Mesh Network.” EX1004, Title. Rahman-II’s mesh network includes **mesh APs** that form a tree topology from a **root AP**, which is itself connected via a **controller** to a wired network, as shown below. EX1004, [0028]; EX1002, ¶¶56-58.

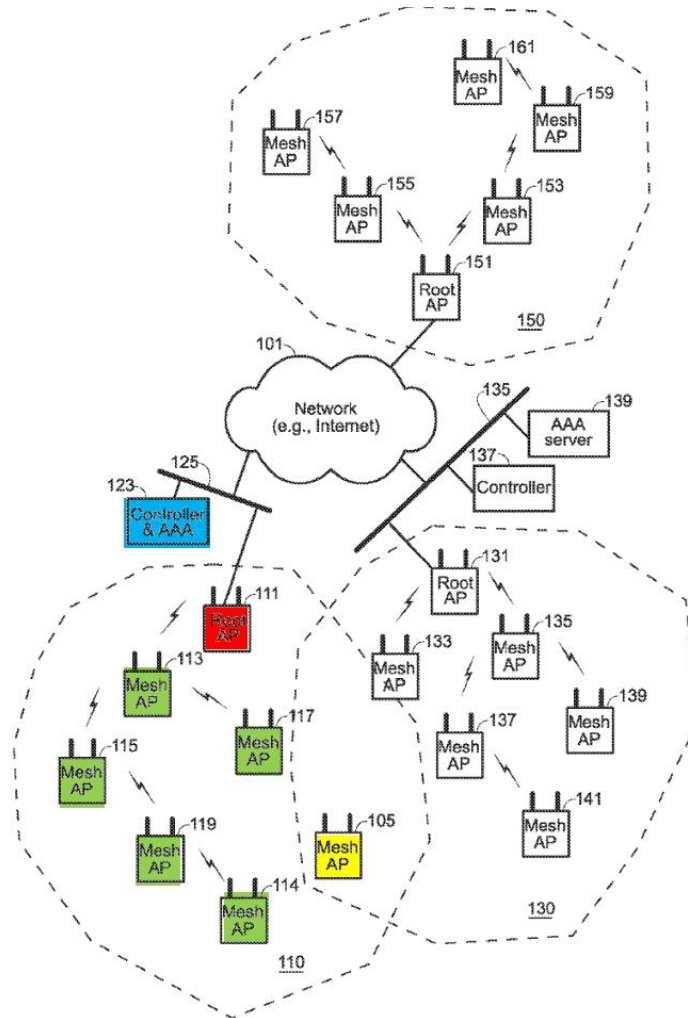


FIG. 1

EX1004, Figure 1.

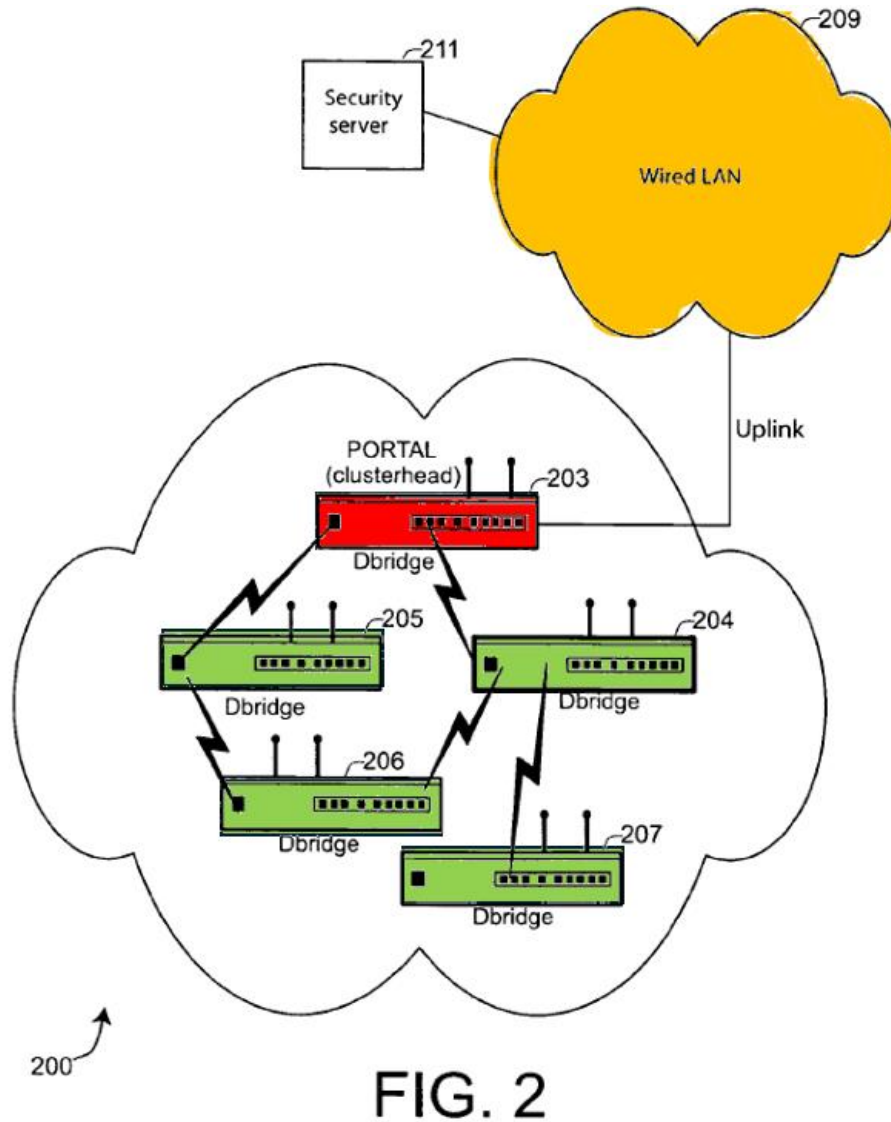
Rahman-II describes a system for provisioning the **mesh APs** with “access point profiles” (AP profiles) that store network parameters useful for joining mesh networks and providing client devices with services. EX1004, Abstract. Such parameters may include metrics useful for establishing a parent-child relationship with another **mesh AP**, such as a “mesh network identifier and a set of capabilities such as security parameters for mutual authentication, QoS parameters and layer-2

radio parameters.” EX1004, [0113]. Additionally, the **controller** may “push” updated AP profiles to the connected **mesh APs** to reflect updated network policies or goals. EX1004, [0110]. EX1002, ¶¶59-62.

Rahman-II in combination with another reference was considered by the Examiner during prosecution of the ’537 patent, but the applicant argued that Rahman-II was not prior art based on the incorrect 2003 priority date. EX1007, 307. The Examiner subsequently allowed the ’537 patent over the Rahman-II combination, but did not further substantively review Rahman-II’s disclosures. EX1007, 369. Nor did the Examiner consider the combination of Rahman in view of Rahman-II, since Rahman was not present before the Examiner. EX1002, ¶56.

C. Rahman-III (EX1006)

Rahman-III discloses a method for “Spanning Tree Protocol For Wireless Networks.” EX1006, Title. Rahman-III is directed to methods for building paths between nodes within IEEE 802.11-compliant wireless mesh networks, including **mesh points (mesh nodes)** called “**wireless Dbridges**,” connected to a Dbridge that **acts as a portal providing an uplink** to a “**wired local area network (LAN) 209**” (EX1006, 12:10-16), as shown in Figure 2 below. EX1002, ¶¶235-237.



EX1006, Figure 2.

Rahman-III describes a method for implementing a WSTP (wireless spanning tree protocol) in a wireless network so that the **wireless Dbridge** “can discover the best path to the root bridge of a spanning tree topology prior to establishing radio links with other **wireless Dbridges**,” such that “even temporary loops are avoided.” EX1006, 13:24-28. Rahman-III describes sending “radio parameters for path cost

calculation,” such as “received signal strength, the received signal quality, the available transmission power, a parameter called the **wireless Dbridge** mobility, and the hop count” (EX1006, 14:20-26) between **wireless Dbridges**. EX1006, Abstract. Using these radio parameters, each **wireless Dbridge** performs a path cost calculation that weights the radio parameters to determine the least path cost for each link in the path to the root. EX1006, 14:22-36. In certain cases, where “equal cost paths emerge,” Rahman-III discloses that the **wireless Dbridge** breaks the tie by choosing one path to one neighbor over another path to another neighbor “based on radio signal parameters, e.g., one or both of signal strength and signal quality.” EX1006, 15:44-47. EX1002, ¶¶238-240.

D. Goel (EX1005)

Goel discloses a system for providing “Multiple Simultaneous Mesh Routes,” in a mesh network based on different traffic requirements for different applications. EX1005, Title. Goel’s mesh network includes wireless **mesh nodes** and a “**mesh portal**” that provides a connection to a **wired network**, as shown in annotated Figure 1, below. EX1002, ¶¶305-306.

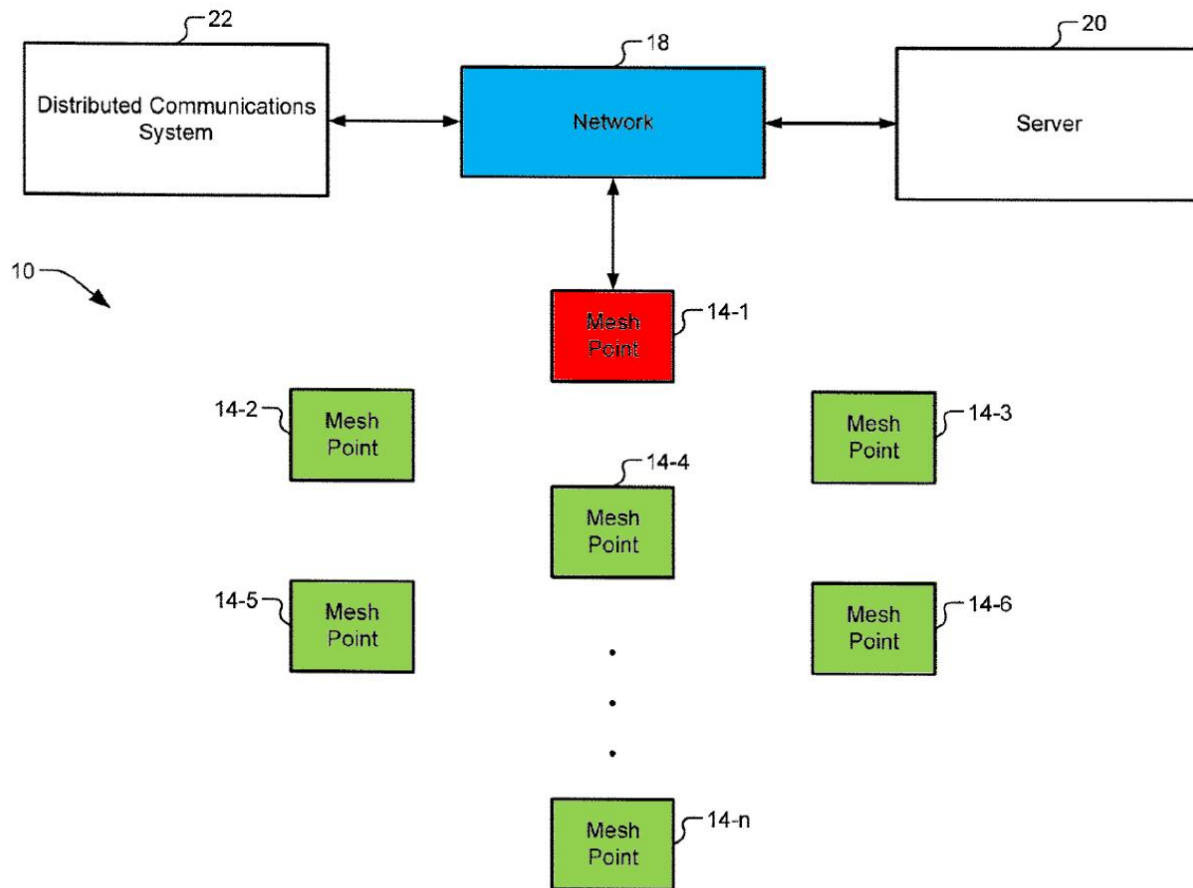


FIG. 1

Goel describes a route determination system that changes the route between mesh points to the mesh portal based on the traffic needs of different applications. The mesh points communicate with each other using “a route request frame that includes *identification data (e.g., traffic identifier data)* indicative of the type of data to be transmitted from the source node along with a *route metric value*.” EX1005, 6:56-67. The route metric value indicates what kinds of traffic requirements are necessary for the relevant application; for example, voice

applications might prioritize minimum latency, while video applications might prioritize higher bandwidth. EX1005, 5:41-49. Accordingly, the route metric value helps the mesh points choose a route that prioritizes relevant network metrics, such as minimum latency or higher throughput or hop count based on the data type. EX1005, 6:56-67. EX1002, ¶¶307-310.

IX. CLAIM CONSTRUCTION

Petitioner submits that no terms require construction for the purposes of this IPR.¹

X. Specific Grounds For Challenge

A. Ground 1: Rahman In View Of Rahman-II Renders Obvious Claims 1-4, 10-15, And 17-18.

1. Reasons To Combine Rahman and Rahman-II

Rahman and Rahman-II describe ways for improving tree-building methods in mesh networks. EX1003, [0064], [0068], [0070]; EX1004, [0108]. And Rahman and Rahman-II further disclose methods by which mesh APs choose paths to a root node based on radio parameters transmitted in beacon frames and probe responses between mesh APs. EX1003, [0060]; EX1004, [0018] (“[the claimed method comprises] transmitting in a mesh access point of a wireless mesh network one or more beacon frames to advertise the mesh APs capabilities for servicing wireless

¹ Petitioner reserves all rights to raise claim construction arguments in other forums.

clients. Each beacon frame includes one or more parameters determined from content stored in an access point profile in the mesh access point.”). Further, Rahman and Rahman-II permit **controllers** to provide information to **mesh APs** useful for selecting potential parent nodes and joining mesh networks. EX1003, [0064]; EX1004, [0032]. EX1002, ¶¶63-67.

Rahman and Rahman-II describe mesh networks including **mesh APs** and a **root AP**, with the root AP providing wired access to an external network. EX1003, [0031]; EX1004, [0028]. Both Rahman and Rahman-II disclose that the **mesh APs** are LWAPP-compatible, but may use local tree-building protocols like AWPP to join mesh networks and select potential parent nodes. EX1003, [0029]; EX1004, [0028], [0047], [0080]. EX1002, ¶¶63-67.

**a) Combination of Rahman and Rahman-II
 (“Rahman/Rahman-II Combination”)**

Rahman describes using a **controller**-based parent selection method to identify link and radio parameters useful for identifying the “best” path to a **root AP** for a **mesh AP** joining a mesh network. EX1003, [0074], [0079]. But Rahman’s list of potential parents may not reflect updates to desired network parameters or security settings, based on changing client device or application needs. EX1002, ¶¶68-71.

Rahman-II's access point profile addresses the problem of provisioning child **mesh APs** with updated policies to “filter and ensure proper mesh services from a parent.” EX1004, [0003]. Rahman-II discloses “**updating** the AP profile” as the **mesh AP** operates in the mesh network. EX1004, [0110], [0111]. EX1002, ¶¶72-73.

Accordingly, a POSITA would have been motivated to apply Rahman-II's technique—using a **controller** to provide AP profiles to **mesh APs** wishing to join a mesh network—to improve Rahman's LWAPP-compatible **mesh APs** and **root APs**, thereby providing **controller**-centered methods for provisioning **mesh APs** with network parameters during joining procedures. Rahman-II's access point profiles would have improved Rahman's mesh network by ensuring that the **mesh APs** have the most up-to-date desired policies and parameters in the event of parent loss or link failure. In such an event, when the **mesh AP** “takes advantage of the quick convergence” of distributed, local tree-building methods as disclosed by Rahman (EX1003, [0080]), it would also be assured of choosing a parent **mesh AP** that represents the best route path to the **root AP** based on the most recent network policies, as disclosed by Rahman-II. EX1002, ¶¶69-73.

A POSITA would have had a reasonable expectation of success in combining Rahman and Rahman-II. **First**, both Rahman and Rahman-II are directed to improvements to mesh networks comprising LWAPP- and AWPP-compatible mesh

access points (**mesh APs**), **root APs**, and wireless **controllers**. EX1003, [0029], [0031], [0080]; EX1004, [0028], [0047]. In fact, both Rahman and Rahman-II describe Cisco-compatible **mesh APs**. EX1003, [0005]; EX1004, [0028]; EX1002, ¶74.

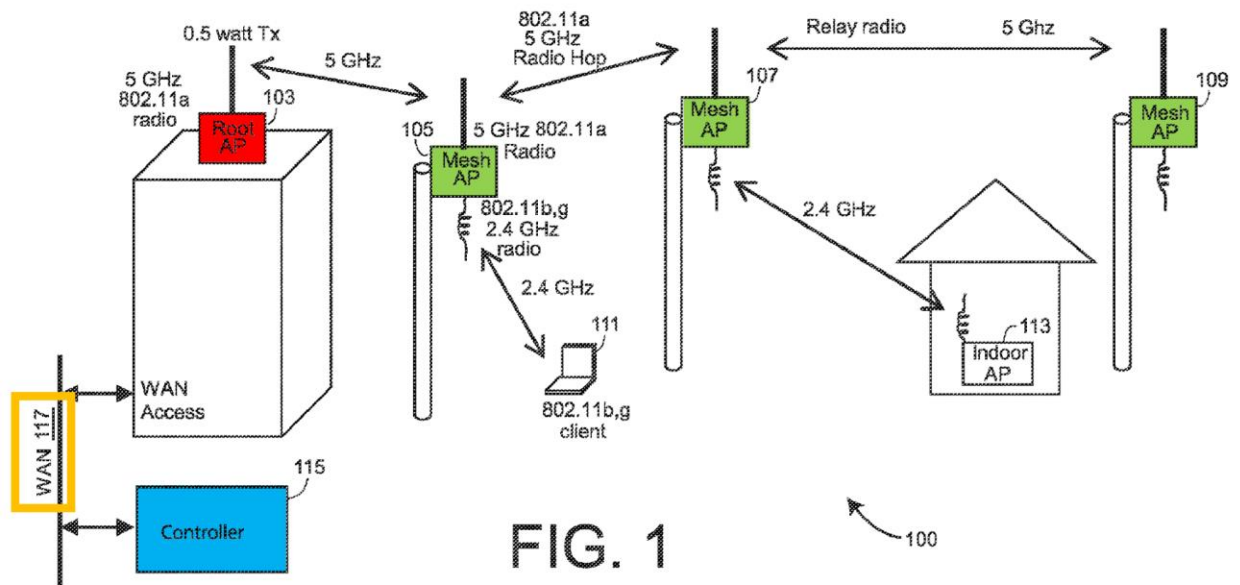
Second, both Rahman and Rahman-II describe embodiments in which a central **controller** provides parent selection methods or criteria that can be effectuated by distributed **mesh APs**. EX1003, [0079]; EX1004, [0018]. Rahman’s **controller**-based parent selection and provisioning methods may be implemented using a variety of protocols. EX1003, [0084]. Accordingly, including Rahman-II’s AP profiles in Rahman’s **mesh APs** would require only the use of a known technique—Rahman-II’s AP profiles—to improve similar devices—Rahman’s provision of “alternate” potential parent nodes in **mesh APs**—in the same way to provide Rahman’s **mesh APs** with additional relevant information during link loss or parent failure. EX1002, ¶75.

2. Claim 1

a) [1.0] *A wireless mesh network comprising:*

To the extent the preamble is limiting, Rahman discloses limitation [1.0]. EX1002, ¶76.

Rahman “relates generally to *wireless mesh networks*”, and Rahman’s Figure 1 shows an “example wireless mesh network 100 that include [sic] wireless **mesh access points (APs)**.” EX1003, [0001], [0026]. EX1002, ¶¶77-78.



EX1003, Figure 1.

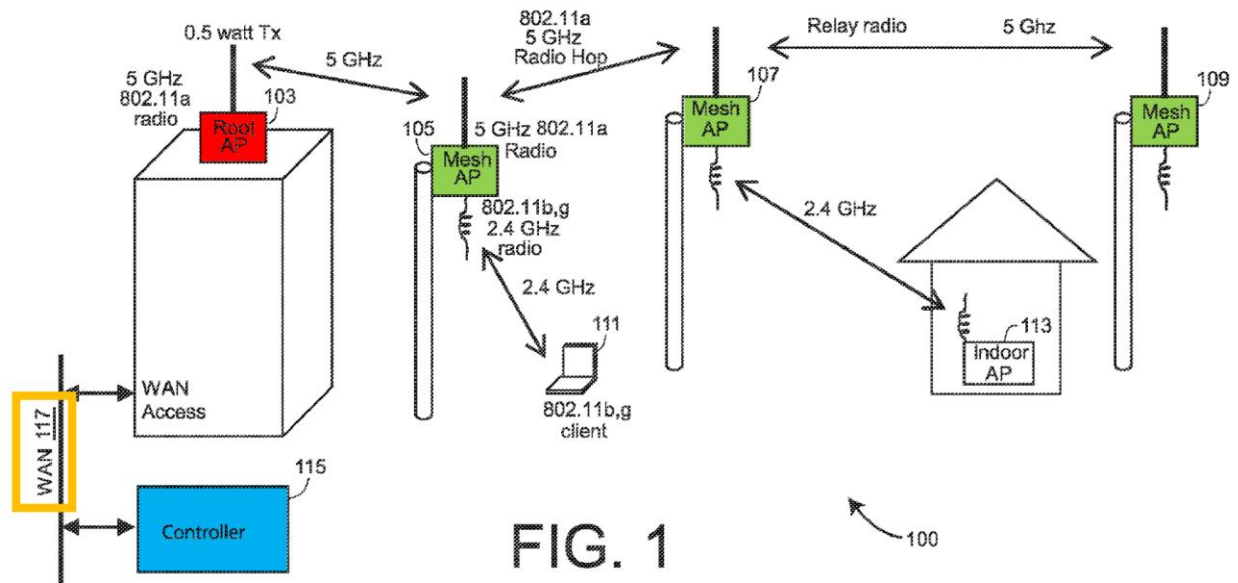
- b) [1.1] *a plurality of Wi-Fi nodes in the wireless mesh network organized in a tree shape;*

Rahman discloses limitation [1.1]. EX1002, ¶¶79-83.

First, Rahman discloses “a plurality of Wi-Fi nodes in the wireless mesh network.” For example, Rahman discloses that the wireless mesh network includes IEEE 802.11(WiFi) compliant **mesh APs** and **root AP**: “The example system uses the IEEE 802.11a standard”. EX1003, [0026]; EX1014 (tying “Wi-Fi® brand” to “IEEE 802.11”). The mesh APs and root APs are “nodes.” See EX1003, [0040]

(“root APs are the root *nodes*”); [0041] (“mesh APs are APs that are also mesh *nodes*.”). EX1002, ¶¶79-80.

Second, Rahman discloses that the wireless **mesh APs** are “*organized in a tree shape*,” with the **root AP** as the root of the tree connected to the **controller**: “Typically, the mesh points form a *tree topology* for routing traffic between these mesh points, with the mesh point that has a portal to the wired network forming the root of the tree.” EX1003, [0045]; [0031]; [0018]. EX1002, ¶¶79-83.

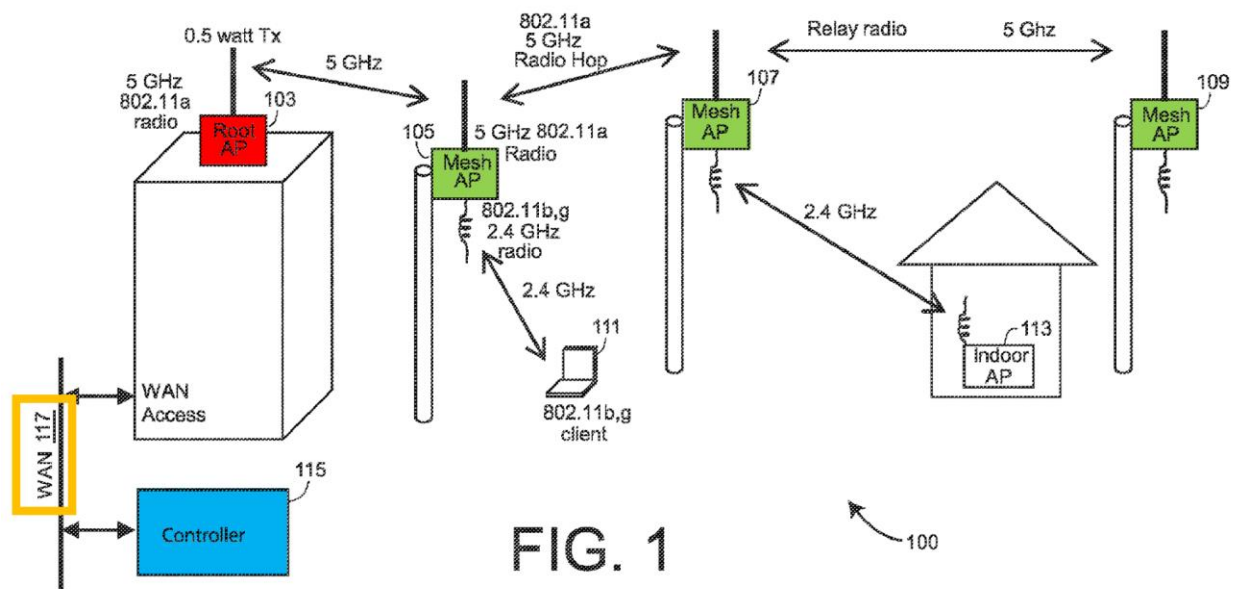


EX1003, Figure 1.

- c) [1.2] *an access server in data communication with the nodes,*

Rahman discloses limitation [1.2]. EX1002, ¶¶84-88.

Rahman discloses a “WLAN **controller** (WLC), or simply a **controller**” (EX1003, [0003]) that is “coupled to the **root AP** 103 by a network.” EX1003, [0030]. The **controller** is “*in data communication with the nodes*”—the **root AP** and the **mesh APs**—through the **WAN** (wired wide area network) 117 as shown in Figure 1 below. EX1002, ¶84.



EX1003, Figure 1.

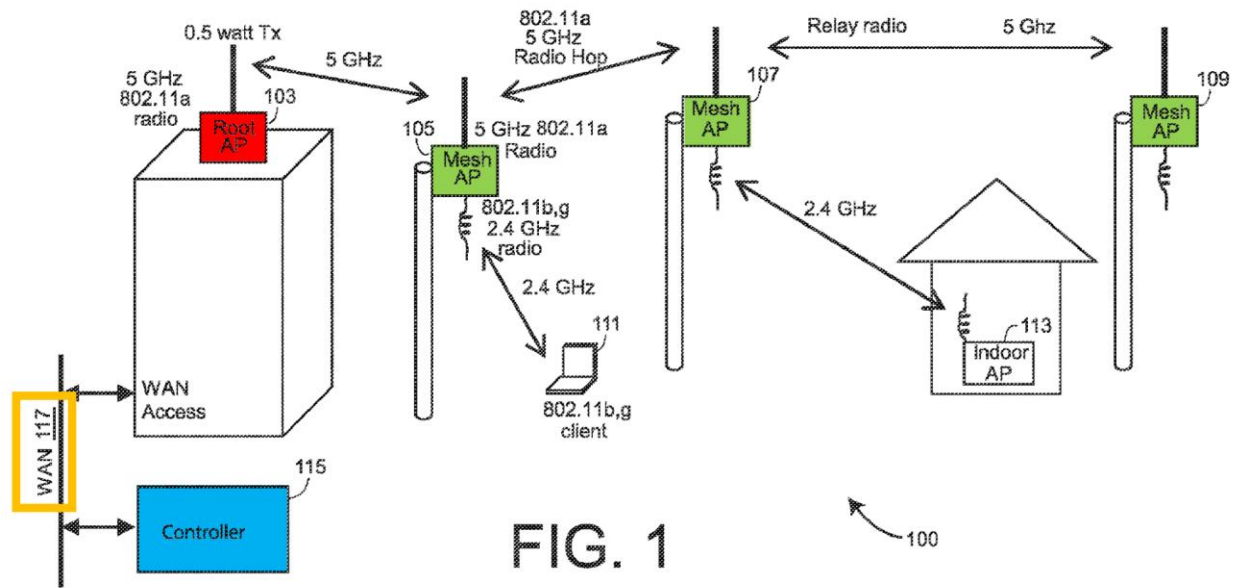
The **controller** is an “*access server*” because the **controller** manages access to the network for the **root AP**, the **mesh APs**, and the client devices connected to the **mesh APs**, and “manages” the network in the way described by the ’537 patent. EX1001, 6:35-36 (“The Access server (10) ‘manages’ the network, by setting control parameters for the network.”). For example, the **controller** “performs all

mesh control functions” (EX1003, [0036]), includes RADIUS servers for authentication of network devices (EX1003, [0051]), includes a DHCP server for assigning IP addresses to devices joining the network (EX1003, [0051]), and may act as a network switch for routing network traffic and thus providing network access. EX1003, [0052]. Accordingly, the **controller** serves as an “*access server*” by managing access to the network. EX1015 (describing a network access server (NAS) providing a RADIUS interface for allowing access to network services). EX1002, ¶¶85-88.

- d) [1.3] *wherein the nodes are comprised of: one or more root access point (RAP) nodes having a wired connection to an external network;*

Rahman discloses limitation [1.3]. EX1002, ¶¶89-93.

Rahman discloses a **root AP** at the root of the tree topology that is coupled to the **controller** “by a network, shown here as a *wired* wide area network (**WAN**) 117.” EX1003, [0030]. The **WAN** 117 is external to the mesh network formed by the **root AP** and the **mesh APs**, because wireless clients connected to the **mesh APs** may “bridge” to a remote—e.g., external—network through the **root AP**. EX1003, [0041] (discussing use of “**root APs** to access an *external* network” or “a *remote wired network*”); EX1002, ¶¶89-90.

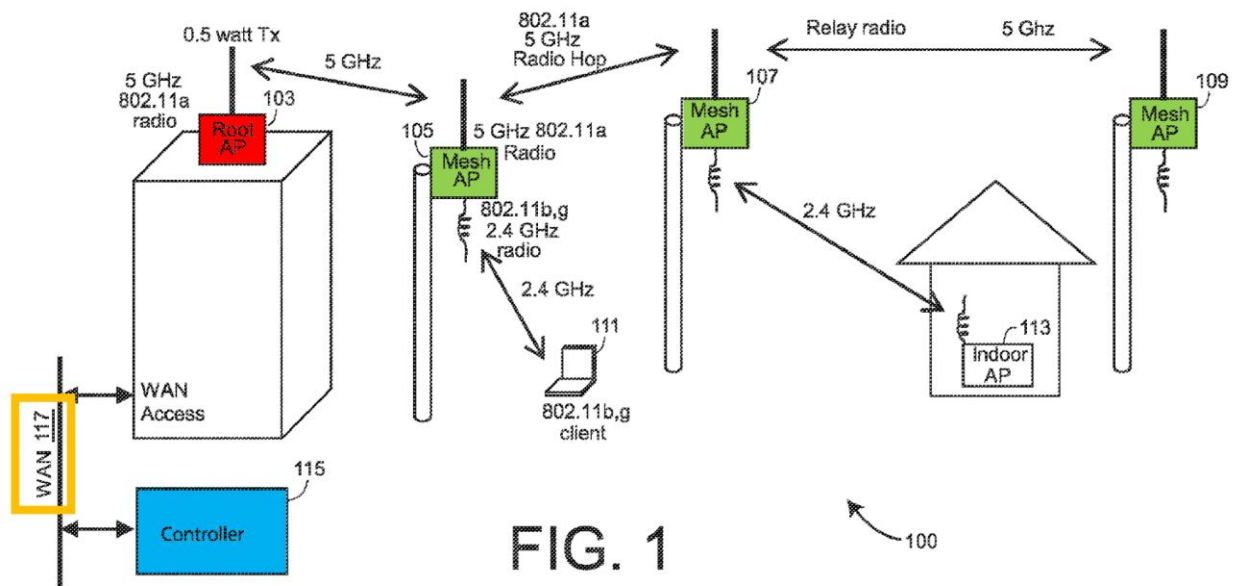


The **Root AP** may be coupled to the **controller** “via a fast network such as a Gigabit Ethernet” connection, which is a wired connection. EX1003, [0054]. A POSITA would have understood that an Ethernet connection is a *wired* connection; the ’537 patent describes the connection between the root node and the access server in the same way: “The ‘Root’ Node (20), is connected to the Access Server through an Ethernet link”. EX1001, 6:37-38; *see also id.* at 6:50-54. And the **Root AP** has a “direct connection to the mesh **controller**” that is part of a “*wired* network.” EX1003, [0038]. The **Root AP** is a **mesh AP** with “a *wire interface* connectable to a *wired* network, and serve [as] a bridging entity to a *remote wired network*” (EX1003, [0041]), such as the “Gigabit Ethernet” (EX1003, [0054]). EX1002, ¶¶91-93.

e) [1.4] *one or more mesh access point (MAP) nodes;*

Rahman discloses limitation [1.4]. EX1002, ¶¶94-95.

Rahman discloses that the mesh network comprises multiple “mesh access point (**mesh AP**, MAP),” each of which “acts as an access point,” as shown in Figure 1, below. EX1003, [0028]. EX1002, ¶94.

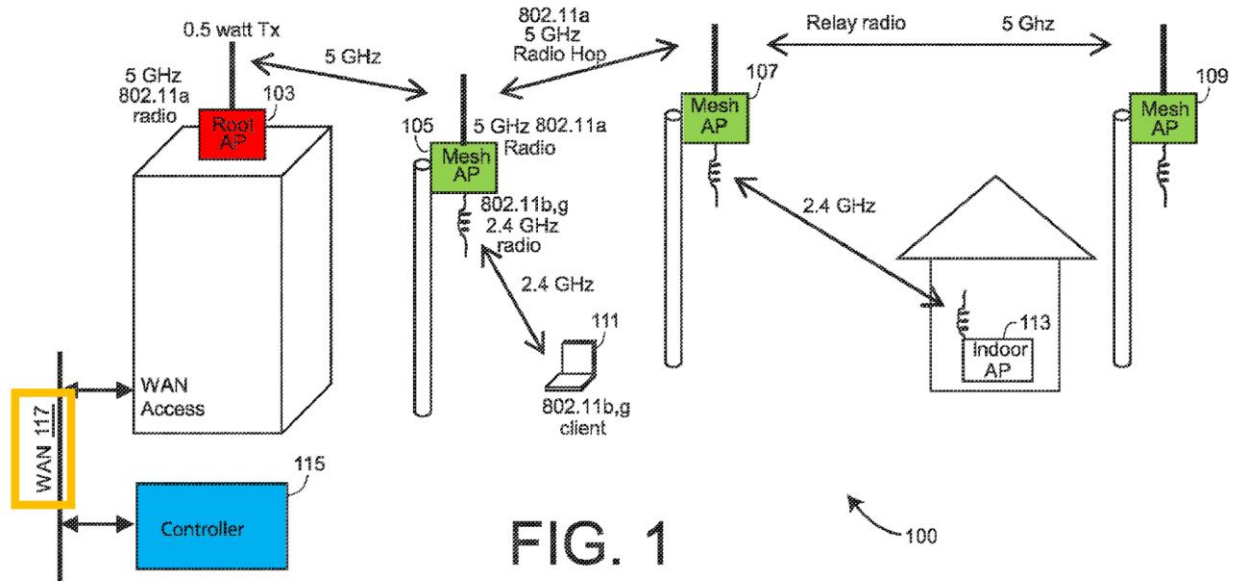


f) [1.5] *wherein a MAP node is in a data communication with the external network through an associated RAP node;*

Rahman discloses limitation [1.5]. EX1002, ¶¶96-101.

As shown in Figure 1 below, Rahman discloses that the **mesh APs** (each individually showing “*the MAP node*”) communicate using 802.11-compliant wireless backhauls with each other and with the associated **root AP** (“*an associated RAP node*”), which itself manages access to an external **WAN** (“*the external*

network”). A **mesh AP** communicates “to other **mesh APs** and **root APs** to access an external network” as shown in Figure 1 below. EX1003, [0041], [0038], [0040] (“Thus, **root APs** are the root nodes to any bridging or mesh network and connect a bridge or mesh network to the **wired network**”). The wireless backhauls are used for “data transmission between the mesh points.” EX1003, [0026]. EX1002, ¶¶96-101.



EX1003, Figure 1.

- g) [1.6] wherein the MAP node is in a direct wireless data communication with a single associated parent node,

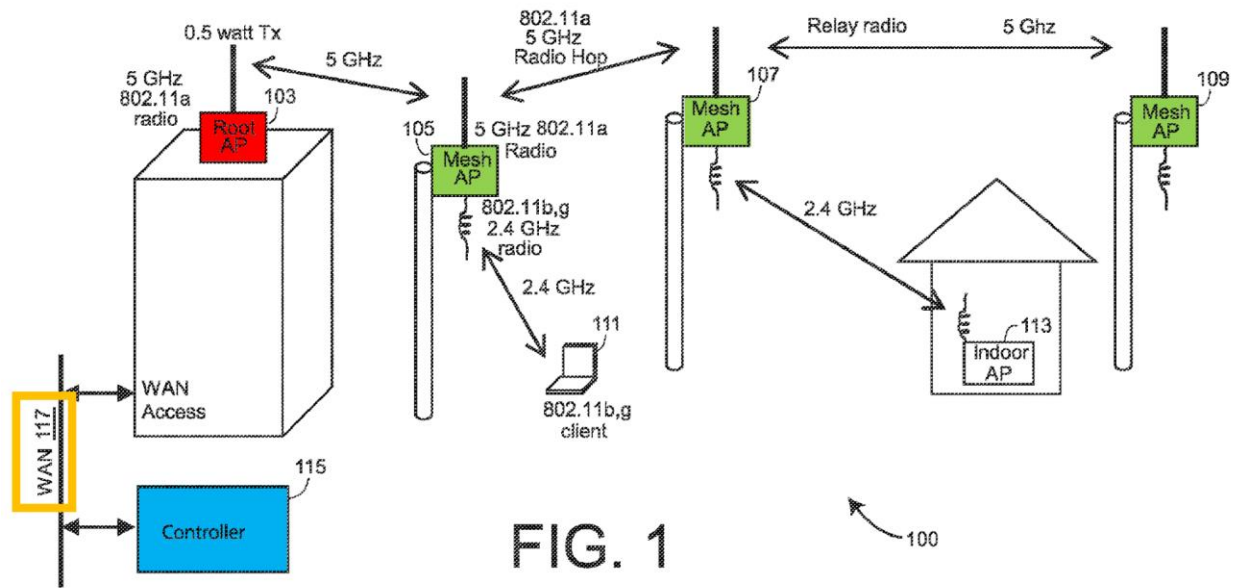
Rahman discloses limitation [1.6]. EX1002, ¶¶102-106.

Rahman discloses that each **mesh AP** is in “*direct wireless data communication*” with either another **mesh AP**, or the **root AP**, and does so in a

parent-child format: “[e]ach mesh point attempts to select *a parent* that provides a suitable path to the root of the tree topology.” EX1003, [0004]. The **mesh AP** selects a parent node that it can connect to in order to transmit data to and from the root AP: “The mesh points, whether also access points, or only mesh points of a wireless mesh networks *route traffic*.” EX1003, [0045]. EX1002, ¶¶102-104.

As shown in Rahman’s Figure 1 below, the **mesh APs** are in direct communication with a single other parent node when they connect in a “point-to-point”—as opposed to a “point-to-multipoint”—fashion: “**mesh APs** form *point-to-point* or point-to-multipoint connections”. EX1003, [0043]. And the mesh APs connect to the root AP wirelessly: “A **root AP** 103 uses its backhaul *wireless* interface to communicate to neighboring **mesh APs** 105, 107, and 109.” EX1003, [0040]. EX1002, ¶¶105-106.

For example, in the context of Figure 1, the **mesh AP 107** (“*the MAP node*”) is in a direct wireless data communication with the **mesh AP 105** in a point-to-point fashion (“*a single associated parent node*”). As another example, the **mesh AP 105** (“*the MAP node*”) is in a direct wireless data communication with the **root AP 103** in a point-to-point fashion (“*a single associated parent node*”). EX1002, ¶¶105-106.



EX1003, Figure 1.

- h) [1.7]-[1.8] wherein the associated parent node is either the associated RAP node, or another MAP node in a data communication with the external network through its associated RAP node;

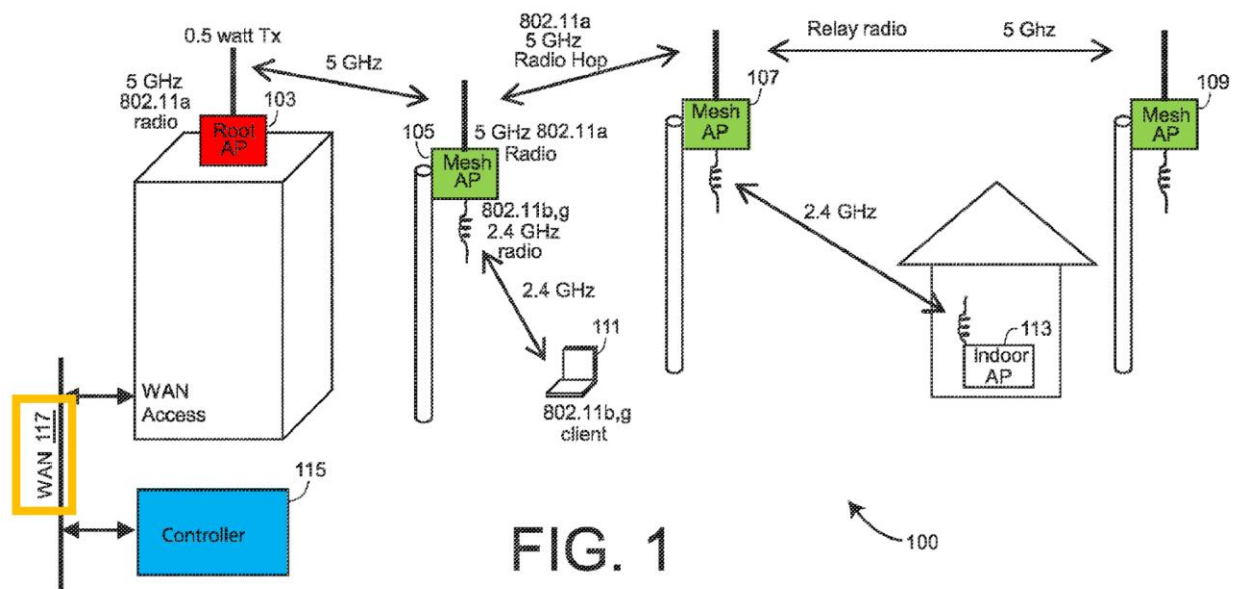
Rahman discloses limitations [1.7]-[1.8]. EX1002, ¶¶107-113.

As discussed in Section X.A.2.g)[1.6], Rahman discloses that each **mesh AP** selects “a *parent* that provides a suitable path to the root of the tree topology.” EX1003, [0004]. EX1002, ¶¶107-108.

The parent node may be the **root AP**, as shown in Figure 1 below. For example, to the mesh AP 105 (the “*MAP node*”), the “*associated parent node*” is the root AP 103 (“*associated RAP node*”), satisfying [1.7]. EX1002, ¶¶107-108.

The parent node may also be another mesh AP node that is connected to the external **WAN** network via the **root AP**: “They can be completely wireless

supporting clients, communicating to other **mesh APs** and **root APs** to access an external network.” EX1003, [0041]. For example, to the mesh AP 107 (the “*MAP node*”), the “*associated parent node*” is mesh AP 105 (“*another MAP node*”) in a data communication with the external **WAN** network through the root AP 103 (“*its associated RAP node*”), satisfying [1.8]. EX1002, ¶¶110-113.



EX1003, Figure 1.

- i) [1.9] wherein the MAP node automatically connects to the associated parent node by selecting the single associated parent node from one or more potential parent nodes that are within a direct wireless communication range of the MAP node and establishing a parent-child relationship with the associated parent node,

Rahman discloses limitation [1.9]. EX1002, ¶¶114-123.

First, Rahman discloses “*wherein the MAP node automatically connects to the associated parent node.*” Rahman discloses that the **mesh APs** may use a local, tree-building method like AWPP to automatically connect to a potential parent node from a list of potential parents in the event of link failure or parent loss, or on startup, without waiting for the **controller** to initiate a parent selection process: “In one embodiment, whenever a **mesh AP** loses its parent, or in the case that **mesh AP** does not receive a JOIN-OFFER for a pre-defined period of time, the **mesh AP** runs a local tree building method, e.g., AWPP to possibly connect to the mesh.” EX1003, [0078], [0079]. When using a local mesh routing protocol such as AWPP, the **mesh APs** “*automatically*” connect to another, parent **mesh AP**: “*Each mesh point attempts to select a parent* that provides a suitable path to the root of the tree topology.” EX1003, [0004]; *see also id.* at [0032]. By having the **mesh APs** select their own parent from a list of potential parents rather than waiting for the **controller**, “recovery from a fail over occurs more rapidly....” EX1003, [0079]; *cf.* EX1001 [’537 patent], 2:40-41 (“a distributed approach is more fault tolerant and has built in fail-safe redundancy.”). Additionally, the **mesh APs** may use distributed, local tree-building protocols, such as AWPP, to connect to a potential parent node on startup: “In yet another embodiment, a local tree-building method is run *on startup* by each **mesh AP**. ... This method can take advantage of the quick convergence achieved by

a distributed, local mesh routing protocol, such as AWPP.” EX1003, [0080].
EX1002, ¶¶115-123.

A POSITA would have understood that a local mesh routing protocol such as AWPP “*automatically*” connects a child node to a parent node. For example, the ’537 patent describes its automatic parent selection process as comprising a “distributed system,” such that each **mesh AP** runs an algorithm to determine what the best or correct route to the root node is, based on information it receives from the access server and other nodes. EX1001, 8:17-21. In the same way, Rahman describes the distributed, local tree-building methods as requiring each **mesh AP** to discover other nearby **mesh APs**, form the correct path to the **root AP**, and mutually authenticate with each other. EX1003, [0032]. Accordingly, a POSITA would have understood that Rahman describes an “automatic” connection and parent selection process. EX1002, ¶¶120-121.

Second, Rahman discloses connecting to the associated parent node “*by selecting the single associated parent node from one or more potential parent nodes that are within a direct wireless communication range of the MAP node and establishing a parent-child relationship with the associated parent node.*” Rahman discloses that when using the local tree route methods, such as AWPP, each **mesh AP** selects a parent to form a point-to-point route to the root of the tree topology: “*Each mesh point attempts to select a parent* that provides a suitable path to the

root of the tree topology.” EX1003, [0004]; *see also id.* at [0032]; [0043] (“**mesh APs** form *point-to-point* or point-to-multipoint connections”). The nearby mesh APs are in “*direct wireless communication range*” of each other because they wirelessly transmit response frames to receiving nodes. EX1003, [0060]. These connections establish parent-child relationships: “The **controller** has a *parent* selection process as part of a tree building process that determines which **mesh APs** are to be a selected *child mesh AP* to the selected **mesh AP** as a selected *parent mesh AP*.” EX1003, [0062]. EX1002, ¶¶115-123.

- j) [1.10]-[1.11] *process for the automatic connection comprising: selecting a parent node from the one or more potential parent nodes based at least in part on one or more parent selection criteria defined by the access server, wherein the parent node so selected is the associated parent node; and*

Rahman in view of Rahman-II renders obvious limitations [1.10]-[1.11]. EX1002, ¶¶124-130.

First, as discussed in Sections X.A.2.g)[1.6] and X.A.2.i)[1.9], Rahman discloses “*selecting a parent node from the one or more potential parent nodes.*” For example, Rahman discloses that the **controller** (“*access server*”) provides the **mesh APs** with potential parent nodes to connect to using a local tree-building protocol (such as AWPP) upon startup or in the event of link failure or parent loss: “In one embodiment the **controller-based parent selection method described herein**

determines and sends out information on a plurality of alternate/backup neighbors as potential parents so that there are potential parent **mesh APs** available in case of current parent loss.” EX1003, [0079], [0078]. Therefore, the mesh APs select a parent node from a list of potential parent nodes using a local tree-building protocol without waiting for the controller, and thereby reconnect to the mesh network more quickly: “In presence of fresh alternate/backup neighbors, recovery from a failover occurs more rapidly than in the case of a mesh AP attempting to re-discover neighbors by running exhaustive channel scan.” EX1003, [0079]; *cf.* EX1001 [’537 patent], 2:40-41 (“a distributed approach is more fault tolerant and has built in fail-safe redundancy.”). EX1002, ¶¶124-127.

Second, Rahman discloses that the potential parent nodes are selected “*based at least in part on one or more parent selection criteria.*” When the mesh APs choose from the list of potential parents supplied by the controller, they choose from parents identified based on network criteria supplied by the controller: “In one embodiment the controller-based parent selection method described herein determines and sends out information on a plurality of alternate/backup neighbors as potential parents so that there are potential parent mesh APs available in case of current parent loss.” EX1003, [0079]. The **controller**-based parent selection method uses link metrics transmitted via RRM Neighbor Reports—link metrics such as load, admission capacity, and data rate—and node metrics—such as hop count—

to determine the tree topology beginning from the **root AP**, and calculates a cumulative metric for each branch of the tree (e.g., each link between **mesh APs**):

As the **controller** 115 receives a ‘RRM Neighbor Report’ from **mesh APs**, the **controller** builds a tree topology rooted at the **root AP** and calculates a cumulative metric for each branch of the tree terminating at a **mesh AP**. Different embodiments use different tree branch metrics. One version uses a flexible tree branch metric that uses one or more of the available RRM link measurements such as BER/PER, noise, interference, load, admission capacity, and so forth. One embodiment further uses one or more link properties such as data rate; and one ore [sic] more node properties, such as hop count.

EX1003, [0074]. EX1002, ¶¶124-126.

The link metrics, node metrics, and cumulative metric are “*one or more parent selection criteria*” for selecting the parent node that are defined by the access server (the **controller**), because they are used to select the best route—to the best parent node—for a particular **mesh AP**: “In one embodiment, whenever a **mesh AP** appears in multiple RRM reports, the Parent Selection Method only keeps the best branch and saves all others as backups.” EX1003, [0076]. EX1002, ¶¶126-127.

Rahman II describes provisioning **mesh APs** with an access point profile including parameters for selecting a potential parent AP to join a mesh network: “A

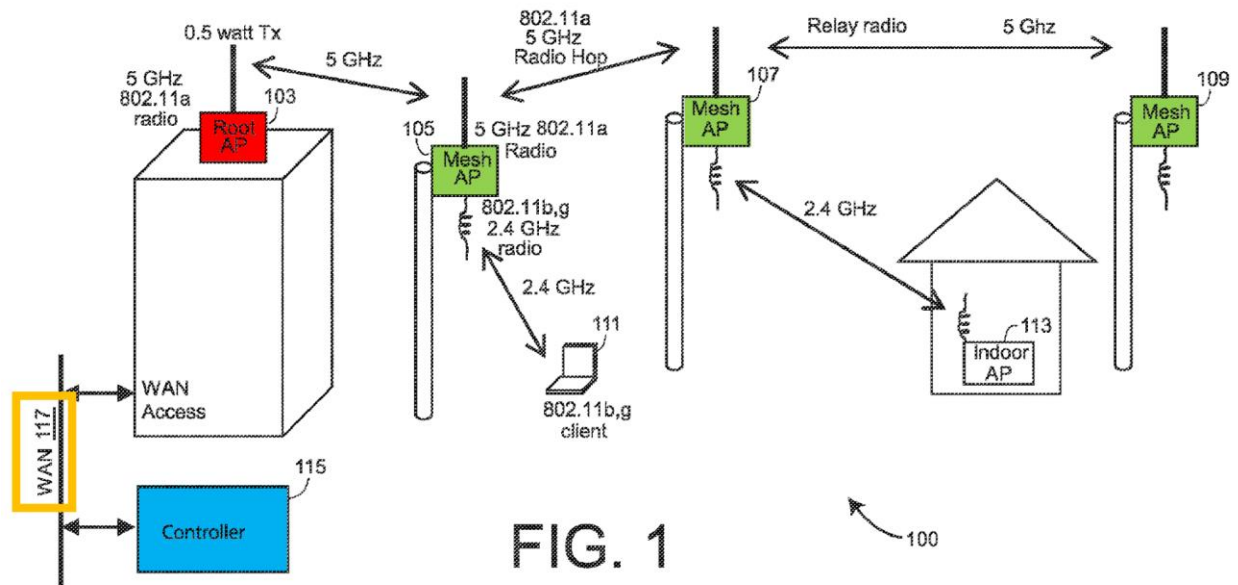
mesh access point that includes *an access point profile storing one ore [sic] more parameters in non-volatile memory [...] to establish itself to the mesh network using information in the access point profile.*” EX1004, Abstract. Rahman-II describes that the access point profile may include information, such as a mesh network identifier and radio parameters, for configuring **mesh APs** to be potential parent **mesh APs**. EX1004, [0113]. Rahman-II also describes that the access point profile may include information for child **mesh APs** to locally select parent APs using AWPP: “In one embodiment, a potential child **mesh AP** such as **mesh AP** 105 *selects* the parent mesh node using Cisco AWPP. This uses information from the AP profile 223 stored in the potential child **mesh AP**”. EX1004, [0047]. The AP profile used for calculating the best path to the **root AP** would include Rahman’s flexible cumulative metric including various link and node metric inputs, including throughput values such as data rate, latency values such as load, and other network parameters including signal strength and hop count, as discussed in the paragraph above. *See* EX1003, [0074]. EX1002, ¶¶128-129.

Thus, the combination of Rahman and Rahman-II would have suggested to a POSITA to provision the **mesh APs** with Rahman-II’s AP profile, and to include Rahman’s RRM metrics, including data rate, noise, signal strength, load, path loss, and hop count, in Rahman-II’s AP profile, so that potential child APs joining the network using AWPP or similar distributed, local tree-building protocols were

provisioned with information and network parameters provided by Rahman's **controller** 115. EX1002, ¶¶129-130.

A POSITA would have found it obvious to combine Rahman and Rahman-II for the reasons discussed above in Section X.A.1.

Rahman discloses *wherein the parent node so selected is the associated parent node*. For example, in the context of Figure 1, the mesh AP 105 (the “*associated parent node*” to the mesh AP 107) is so selected for the mesh AP 107; and the root AP 103 (the “*associated parent node*” to the mesh AP 105) is so selected for the mesh AP 105. EX1002, ¶¶131-133.



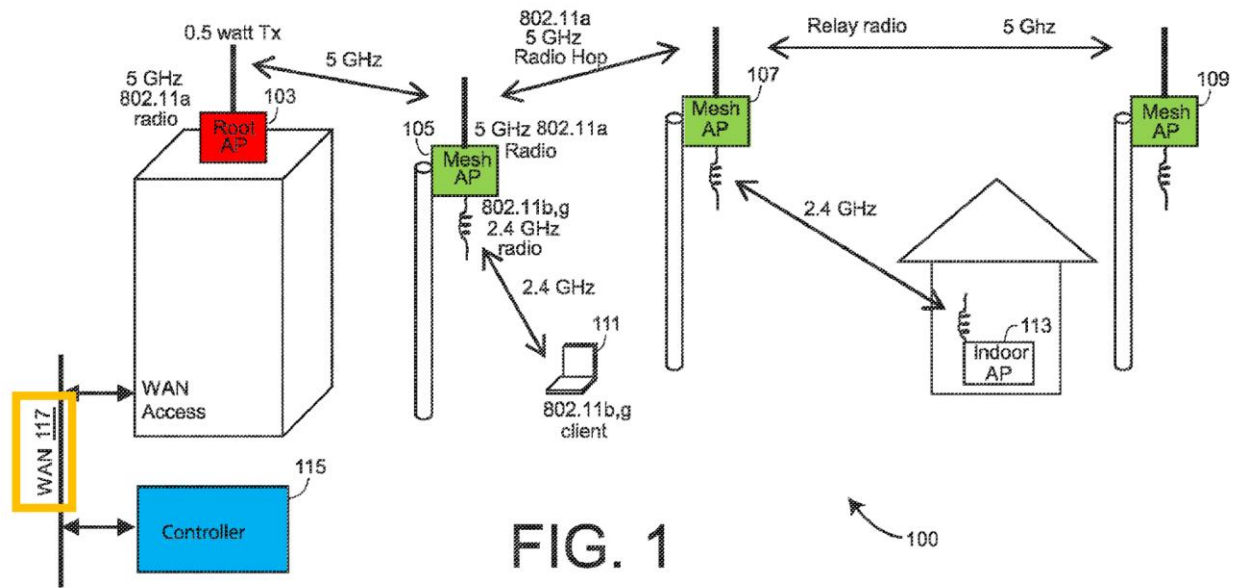
EX1003, Figure 1.

- k) [1.12] *process for the automatic connection comprising: ... establishing a direct wireless data connection between the MAP node and the associated parent node;*

Rahman discloses limitation [1.12]. EX1002, ¶¶135-136.

As discussed in Section X.A.2.g)[1.6], each **mesh AP** is in direct wireless communication with a parent **mesh AP** or **root AP** via 802.11-compliant wireless backhauls that transmit response frames to nearby nodes. EX1003, [0041], [0026], [0038], [0040], [0060]. As shown in Rahman’s Figure 1 below, the **mesh APs** are in direct communication with a single other parent node when they connect in a “point-to-point”—as opposed to a “point-to-multipoint”—fashion: “**mesh APs** form *point-to-point* or point-to-multipoint connections”. EX1003, [0043]; EX1002, ¶¶135-136.

For example, in the context of Figure 1, Rahman establishes a “*direct wireless data connection*” via 802.11-compliant wireless backhauls between the mesh AP 107 (the “*MAP node*”) and the mesh AP 105 (the “*associated parent node*”). Similarly, Rahman establishes a “*direct wireless data connection*” via 802.11-compliant wireless backhauls between the mesh AP 105 (the “*MAP node*”) and the root AP 103 (the “*associated parent node*”). EX1002, ¶135.



EX1003, Figure 1.

- I) [1.13] *wherein the automatic connection process establishes the MAP node's routing path to the external network;*

Rahman discloses limitation [1.13]. EX1002, ¶¶137-139.

As discussed in Sections X.A.2.f)[1.5], X.A.2.h)[1.8], X.A.2.i)[1.9] and X.A.2.j)[1.10], the parent selection process connects a **mesh AP** to a parent node that represents the best route to the **root AP**, which provides access to the external network (**WAN**): “Each mesh point attempts to select a parent that provides a suitable path to the root of the tree topology.” EX1003, [0004]; *see also id.* at [0030], [0032], [0076], [0041] (“They can be completely wireless supporting clients, communicating to other mesh APs and root APs to access an *external network*”),

[0042]. This process happens automatically on startup or in the event of link failure or parent loss. EX1003, [0078], [0079]. EX1002, ¶¶137-138.

- m) [1.14]-[1.16] *the one or more parent selection criteria comprising: a throughput value representing signal strength between two nodes; and a latency value representing number of hops in a routing path;*

Rahman in view of Rahman-II renders obvious limitations [1.14]-[1.16]. EX1002, ¶¶140-149.

As discussed in Section X.A.2.j) [1.10], Rahman discloses that in the event of parent loss or link failure, or on start-up, the **mesh APs** may select a parent node from a list of potential parent nodes that represents the best route to the **root AP**. EX1003, [0078], [0079], [0080]. The list of potential parent nodes is determined based upon the link metrics, node metrics, and cumulative metrics provided by RRM Neighbor Reports. EX1003, [0030], [0032], [0060], [0074], [0079]. The link, node, and cumulative metrics include node parameters such as transmit power, received signal strength, error rates, noise, load, and more. EX1003, [0060] (“the receiving nodes can collect and report such parameters as their transmit power, e.g., for determining the path loss in a link, the received signal strength, the bit error rate (BER) or packet error rate (PER) on a link, noise, interference, signal-to-noise ratio (SNR), signal-to-interference-noise ratio (SINR), load.”). EX1002, ¶¶140-141.

In the Rahman-Rahman-II combination, the **controller** would provision each **mesh AP** with an AP profile including such parameters for calculating the best route to the **root AP**. See Section X.A.2.j). A POSITA would have understood that “throughput” is calculated from parameters including data rate, bandwidth, and other network metrics (EX1006, 5:44-47), and “latency” is calculated from parameters including load and other network metrics. EX1012, 540, 544. EX1002, ¶¶143-148.

The AP profile used for calculating the best path to the **root AP** would include Rahman’s flexible cumulative metric that uses various link and node metrics:

As the **controller** 115 receives a ‘RRM Neighbor Report’ from **mesh APs**, the **controller** builds a tree topology rooted at the **root AP** and calculates a cumulative metric for each branch of the tree terminating at a **mesh AP**. Different embodiments use different tree branch metrics. One version uses a flexible tree branch metric that uses one or more of the available RRM link measurements such as BER/PER, noise, interference, load, admission capacity, and so forth. One embodiment further uses one or more link properties such as data rate; and one or more node properties, such as hop count.

EX1003, [0074]. EX1002, ¶141.

Accordingly, Rahman’s cumulative metric is based upon the input parameters, and discloses both a *throughput value* that represents the input parameters such as

data rate and signal strength, as well as a *latency value* that represents the input parameters such as load and hop count. EX1002, ¶¶142-147.

Thus, the combination of Rahman and Rahman-II would have suggested to a POSITA to provision the **mesh APs** with Rahman-II's AP profile, and to include Rahman's cumulative RRM metrics based on (and representative of) various network parameters—including data rate, noise, signal strength, load, and hop count—in Rahman-II's AP profile, so that potential child APs joining the network using AWPP or similar distributed, local tree-building protocols were provisioned with information and network parameters provided by Rahman's **controller** 115. EX1002, ¶¶148.

A POSITA would have found it obvious to combine Rahman and Rahman-II for the reasons discussed above in Section X.A.1.

- n) **[1.17] *the MAP node comprising: one or more identifier values representing a unique identity of the MAP node in the wireless mesh network;***

Rahman discloses limitation [1.17]. EX1002, ¶¶150-151.

Rahman discloses that each **mesh AP** has a MAC address: “Each **mesh AP** also includes in its memory an adjacency data structure that maintains information on the tree, e.g., *the MAC address of any parent, and of any children.*” EX1003, [0042]; [0046]. A POSITA would have understood that a MAC address provides a unique device ID. EX1013 (Section 9.2 “48-bit universal LAN MAC addresses”:

“all potential members of a network need to have a *unique identifier*”). Indeed, the ’537 patent describes a “Device ID” or Device Identification Sequence as a “MAC Address.” EX1001, Appendix A², 51-52. EX1002, ¶150.

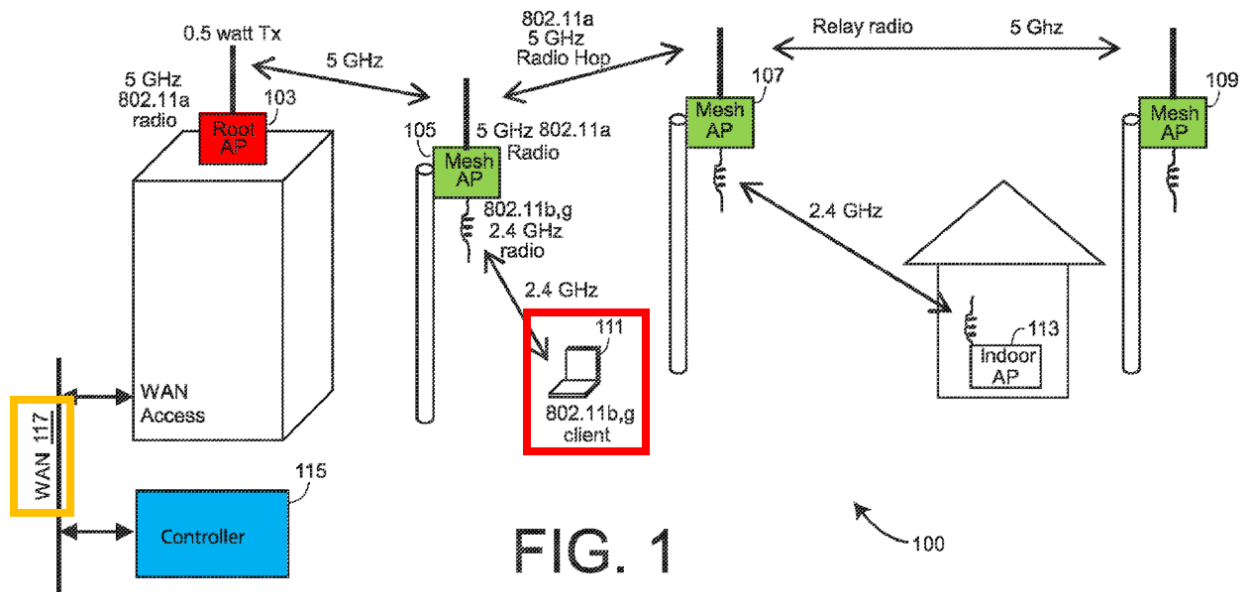
- o) [1.18] *two or more radios for wirelessly communicating with another node or a client device in the wireless mesh network.*

Rahman discloses limitation [1.18]. EX1002, ¶¶152-155.

Rahman discloses that each **mesh AP** includes two radios, one based on the 802.11b/g protocol for communicating to client devices, and another based on the 802.11a protocol to connect to other **mesh APs** or to the **root AP**: “One embodiment of the *wireless mesh node includes two simultaneous operating radio transceivers*. One of the radio transceivers operates the IEEE802.11b/g protocol (MAC and PHY) in the approximately 2.4 GHz band to *allow wireless connections to 802.11 b/g clients*. The second radio transceiver operates the IEEE802.11a protocol in the approximately 5 GHz band to allow *point-to-point (P2P) connections*, point-to-multipoint (P2 MP) connections, and *connections between mesh points in a mesh*,

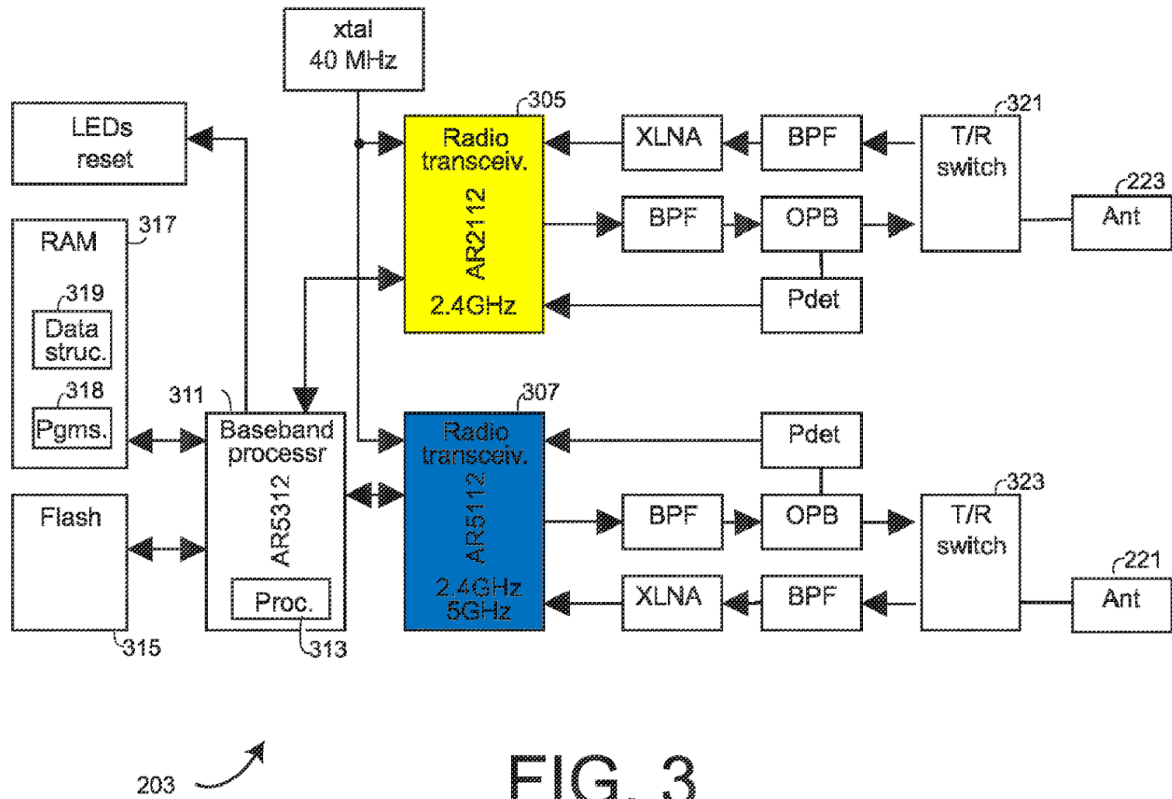
² Appendix A, which the ’537 patent describes as “the 802.11 Infrastructure Control Layer Protocol version 2.0,” is known prior art. EX1001, 13:5-7. EX1002, ¶150.

called the backhaul wireless connection.” EX1003, [0046]. These connections are shown in Figure 1, below. EX1002, ¶152.



EX1003, Figure 1.

The two radios—“both a **2.4 GHz 802.11b/g radio [305]** and a **5 GHz 802.11a radio [307]**,”—are located in a “dual-band radio circuit card 203” within each **mesh AP**, as shown in Figure 3 below. EX1002, ¶¶152-154.



EX1003, Figure 3.

3. Claim 2

- a) [2.0] The wireless mesh network of claim 1 further comprising:

The combination of Rahman and Rahman-II renders obvious claim limitation

[2.0]. See Section X.A.2. EX1002, ¶¶156-166.

- b) [2.1] one or more network health monitoring criteria defined by the access server, wherein the one or more network health monitoring criteria comprises one or more of: [2.2] whether or not the associated parent node is offline or can be found in the wireless mesh network; [2.3] whether or not data can be routed to the external network through the MAP node's routing path; [2.4] whether or not the one or more parent selection criteria is satisfied; and

Rahman discloses limitations [2.1]-[2.4]. EX1002, ¶¶157-162.

Rahman discloses that the **controller** (“*access server*”) defines “*one or more network health monitoring criteria.*” For example, the **controller** uses a heartbeat mechanism to detect link failure: “In one embodiment, the Parent Selection Method uses a heartbeat mechanism to detect link failure between **mesh APs.**” EX1003, [0077]. The heartbeat mechanism determines whether a parent has been lost or whether a link with the parent is alive: “One version of the **controller**-based parent selection method use [sic] a *heartbeat mechanism* that includes a so-called *heartbeat message being sent and received to know aliveness.*” EX1003, [0079]. A heartbeat mechanism is an example of a *network health monitoring criteria*; for example, the ’537 Patent defines “Heartbeat Interval” as “the interval at which Access Points send in a ‘heartbeat’ signal, that specifies the conditions of their operations” and includes it as an example of “Network Health Monitoring.” EX1001, Appendix A at 19-20; EX1002, ¶¶157-158.

The plain language of the claim recites *wherein the one or more network health monitoring criteria comprises one or more of*, and therefore requires only that the *network health monitoring criteria* comprise at least **one** of the claimed categories [2.2]-[2.4]. Accordingly, Rahman need only disclose one of the *network health monitoring criteria*. See, e.g., *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1199 (Fed. Cir. 2013) (“The disjunctive ‘or’ plainly designates that a series describes alternatives”); *Game and Tech. Co., Ltd. v. Activision Blizzard Inc.*, 926 F.3d 1370, 1378 (Fed. Cir. 2019). Rahman’s “heartbeat mechanism” tests whether or not a link between **mesh APs** is alive, e.g., whether or not data can be transmitted over the link, and thereby discloses limitations [2.2] and [2.3]: “One version of the **controller**-based parent selection method use [sic] a heartbeat mechanism that includes a *so-called heartbeat message being sent and received to know aliveness*.” EX1003, [0079]. Additionally, as discussed in Section X.A.2.f) [1.5] the **mesh APs** connect to the external network (**WAN**) via a path through the **root AP**; therefore, a link failure would prevent the **mesh AP** from routing data through the **root AP** to the external network. EX1002, ¶¶159-162.

- c) **[2.5] testing whether the MAP node’s routing path fails to satisfy the one or more network health monitoring criteria;**

Rahman discloses limitation [2.5]. EX1002, ¶¶163-164.

As discussed in Section X.A.3.b) [2.1], Rahman discloses a “heartbeat mechanism” that examines whether a link has failed or a parent has been lost; e.g., whether the network health criteria of a lost parent or if data can be routed can be satisfied. EX1003, [0077], [0079]. When the heartbeat mechanism detects link failure or an offline **mesh AP**, then the network health monitoring criteria has failed to be satisfied. EX1002, ¶163.

- d) **[2.6] when it is determined that the MAP node's routing path does not meet one or more of the one or more network health monitoring criteria, establishing a new routing path from the MAP node to the external network by connecting the MAP node to a new associated parent node through the automatic connection process.**

Rahman discloses limitation [2.6]. EX1002, ¶¶165-166.

As discussed in Section X.A.3.b) [2.1], Rahman discloses a “heartbeat mechanism” that examines whether a link has failed or a parent has been lost; e.g., whether the network health criteria of a lost parent or if data can be routed can be satisfied. EX1003, [0077], [0079]. Rahman further discloses that in anticipation of parent loss or link failure—e.g., when the **mesh AP**'s routing path cannot be completed—the **controller** pre-provisions each **mesh AP** with a list of potential parents, so that the **mesh AP** can automatically connect to another parent using a local tree-building protocol like AWPP: “In one embodiment the **controller**-based parent selection method described herein determines and sends out information on a

plurality of alternate/backup neighbors as potential parents so that there are potential parent **mesh APs** available in case of current parent loss.” EX1003, [0079], [0078] (disclosing “**mesh AP** run[ning] a local tree building method, e.g., AWPP to possibly connect to the mesh.”). This has the advantage of reestablishing the link to the **root AP** via a new parent after failover: “In presence of fresh alternate/backup neighbors, recovery from a fail over occurs more rapidly than in the case of a **mesh AP** attempting to re-discover neighbors by running exhaustive channel scan.” EX1003, [0079]; *see also* Sections X.A.2.i) [1.9], X.A.2.j) [1.10]. EX1002, ¶¶165-166.

4. Claim 3

- a) **The wireless mesh network of claim 2 wherein the access server further comprises causing an update to the wireless mesh network, the update comprising one or more of: a change to the one or more parent selection criteria, a change to the one or more network health monitoring criteria, and an upgrade of software or firmware residing on at least some of the nodes.**

Rahman and Rahman-II also render obvious the additional limitation of Claim 3. EX1002, ¶¶167-172. Section XII.A.3.

First, Rahman discloses that the **controller** (“*access server*”) can *cause an update to the wireless mesh network*, the update comprising either *a change to the one or more parent selection criteria* or *a change to the one or more network health monitoring criteria*. For example, the **controller** maintains the tree topology and

sends any changes to the topology to affected **mesh APs** in the network: “The route tree topology is maintained at the **controller** 115 in a memory data structure via RRM Neighbor Reports that are received from **mesh APs** and processed by the **controller** 115. *Any changed [sic] to the maintained tree topology are send to the affected mesh APs*, e.g., in the form of LWAPP JOIN OFFER frame.” EX1003, [0075]. EX1002, ¶¶167-168.

Second, as discussed in Section X.A.2.j) [1.10], the RRM Neighbor Reports include *parent selection criteria* such as link metrics and node metrics. EX1003, [0060], [0074], [0079]. Accordingly, when the **controller** sends out changes to the route tree topology, those changes will include different link and node metrics, including throughput values determined from parameters such as data rate, latency values determined from parameters such as load, and other network parameters including signal strength and hop count (“*change to the one or more parent selection criteria*”) based on different neighboring nodes and different paths. EX1002, ¶¶168-169.

Rahman-II discloses updating an AP profile with new policies and network parameters by “pushing” the new AP profile out to **mesh APs**: “In addition, one embodiment includes updating the AP profile when the **mesh AP** connects to a **controller**, e.g., as part of a mesh network.” EX1004, [0110]; *id.*, [0108]. Accordingly, in the Rahman-Rahman-II combination, when updates to network

topology, network parameters, or network policies are necessary, Rahman's **controller** 115 would push the updated data out to access point profiles stored in each **mesh AP**, thereby disclosing *a change to parent selection criteria or one or more network health monitoring criteria*. EX1002, ¶¶170-172.

A POSITA would have found it obvious to combine Rahman and Rahman-II for the reasons discussed above in Section X.A.1.

5. Claim 4

- a) **The wireless mesh network of claim 2 wherein the at least one of the one or more network health monitoring criteria overlap with at least one of the one or more parent selection criteria**

Rahman and Rahman-II also render obvious the additional limitation of Claim 4. Section XII.A.3. EX1002, ¶¶173-175.

As discussed in Section X.A.3.b) [2.1], Rahman discloses “*network health monitoring criteria*” including link failures between nodes and parent loss. EX1003, [0079]. And as discussed in Sections X.A.2.j) [1.10], X.A.2.m) [1.15], and X.A.2.m) [1.16], Rahman discloses “*parent selection criteria*” including link metrics such as data rate and load. EX1003, [0060], [0074], [0079]. In the event of link failure or parent loss, the path loss from one **mesh AP** through to the **root AP** will necessarily be affected, as a link will have disappeared. Therefore, the subsequent RRM Neighbor Reports (or the “heartbeat mechanism”) sent by affected **mesh APs** will

reflect both the “*network health monitoring criteria*” (due to link failure or parent loss) and the “*parent selection criteria*” (due to affected path loss), and therefore Rahman discloses that such criteria overlap. For example, the ’537 patent defines “Network Health Monitoring” as including both a “heartbeat interval” as well as a “health Index,” the latter of which “determines the number of unique paths to the ‘wire.’” EX1001, Appendix A, 19-20. Accordingly, when Rahman’s RRM Neighbor Reports and/or heartbeat mechanism report a path loss (a *parent selection criteria*), that will overlap with the link failure (*network health monitoring criteria*). EX1002, ¶¶173-175.

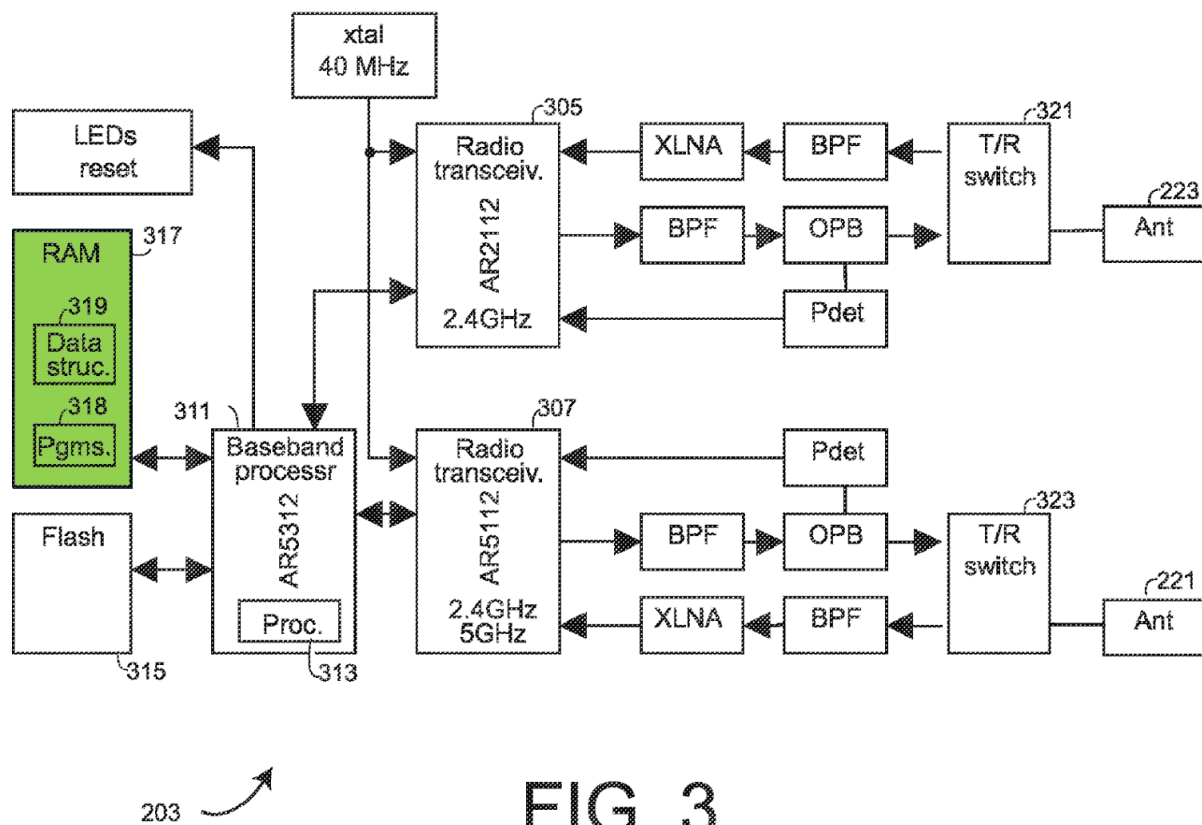
6. Claim 10

- a) **The wireless mesh network of claim 1 wherein the MAP node further comprises a data store having data representing the MAP node’s routing path to the external network**

Rahman and Rahman-II also render obvious the additional limitation of Claim 10. Section X.A.2. EX1002, ¶¶176-178.

Rahman discloses that the **mesh APs** (the MAP nodes) each include a memory that contains a forwarding and a data structure (a memory structure that stores data) with routing information on the entire tree, including how to route to parents or children within the network: “Each mesh point includes a memory, and maintains in the memory **a forwarding data structure**, e.g., a forwarding table that includes

bridging information that shows/provides information on all entities directly connected to the entity, and **routing information for how to route, e.g., to a parent or child of the tree of the mesh network.** Each **mesh AP** also includes in its memory **an adjacency data structure that maintains information on the tree, e.g., the MAC address of any parent, and of any children.”** EX1003, [0042]; *see also id.*, [0049]. Because the data structure stores data regarding information of the entire tree, including “*any* parent, and of *any* children,” that would include data on the route to the **root AP** and thereby to the **WAN**. That data structure is shown in Rahman’s Figure 3 below. EX1002, ¶¶177-178.



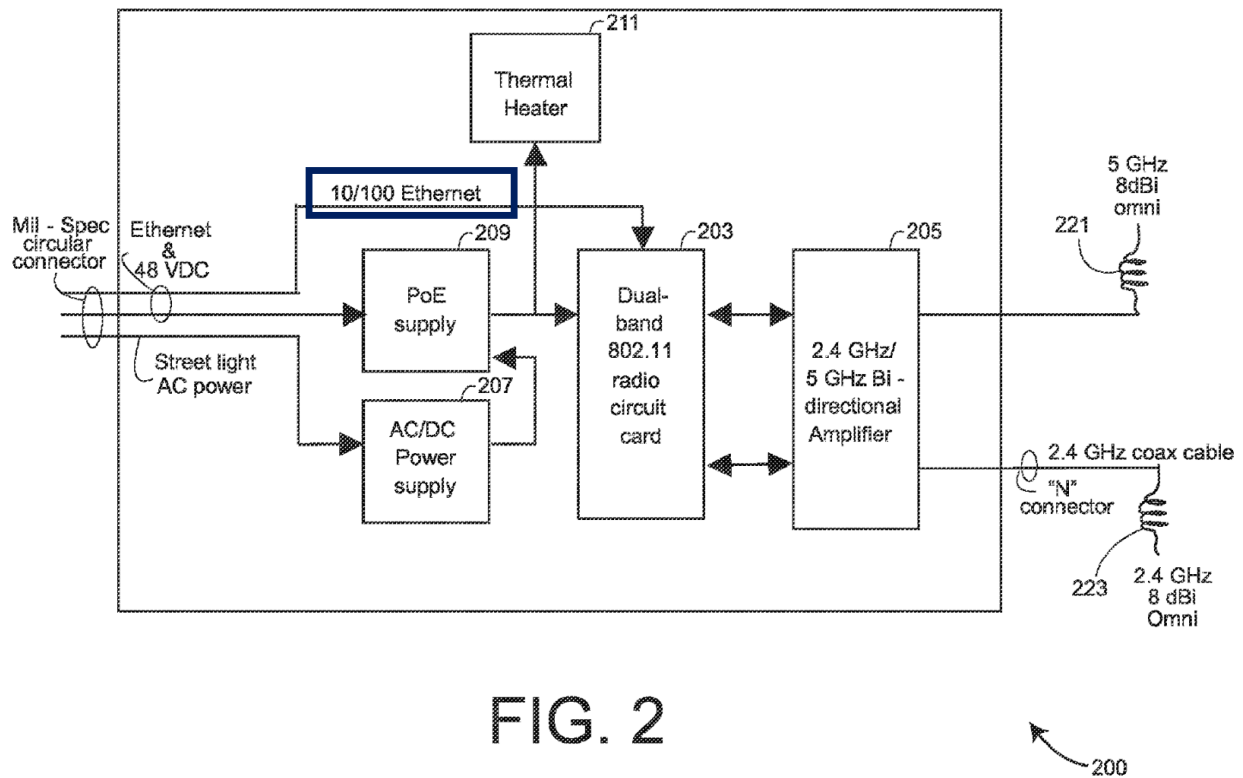
EX1003, Figure 3.

7. **Claim 11**

- a) **The wireless mesh network of claim 1 wherein the MAP node further comprises: an ethernet port through which a direct wired connection can be established with another device.**

Rahman and Rahman-II also render obvious the additional limitation of Claim 11. Section X.A.2. EX1002, ¶¶179-181.

As discussed in Section X.A.2.d) [1.3] above, Rahman discloses that the **root AP**, which is a **mesh AP**, connects to the external network via a wired Gigabit Ethernet connection. *See also* EX1003, [0054], [0041]. Additionally, Rahman's Figure 2 shows a **mesh AP** dual-radio wireless node 200, including a **10/100 Ethernet** connection. EX1002, ¶¶180-181.



EX1003, Figure 2.

8. Claim 12

- a) **The wireless mesh network of claim 1 wherein the one or more identifier values of the MAP comprises a MAC address or an IP address.**

Rahman and Rahman-II also render obvious the additional limitation of Claim

12. *See* Section X.A.2.n)[1.17]; Section X.A.2. EX1002, ¶¶182-184.

9. Claim 13

- a) The wireless mesh network of claim 1 wherein a first radio of the MAP is adapted for communicating with the client device and wherein a second radio is adapted for communicating with another node.

Rahman and Rahman-II also render obvious the additional limitation of Claim 13. Section X.A.2. EX1002, ¶¶185-189.

Rahman discloses that the **mesh APs** include a “dual-band radio circuit card 203,” including “both a **2.4 GHz 802.11b/g radio [305]** and a **5 GHz 802.11a radio [307]**,” as shown in Figure 3 below. EX1002, ¶¶186-187.

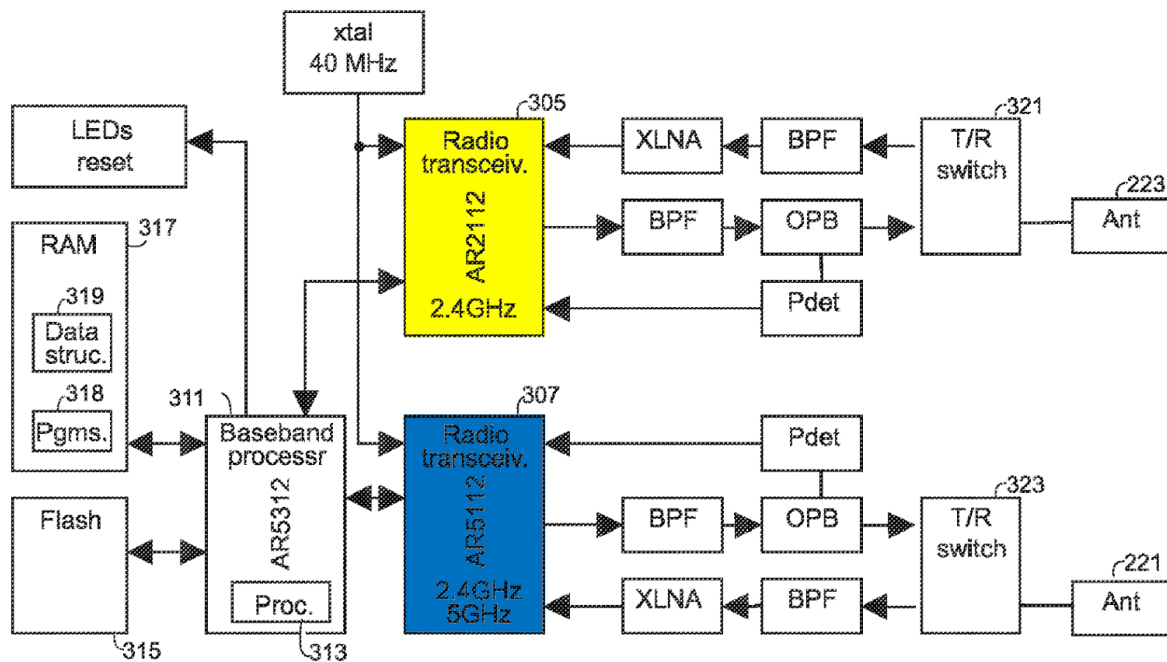
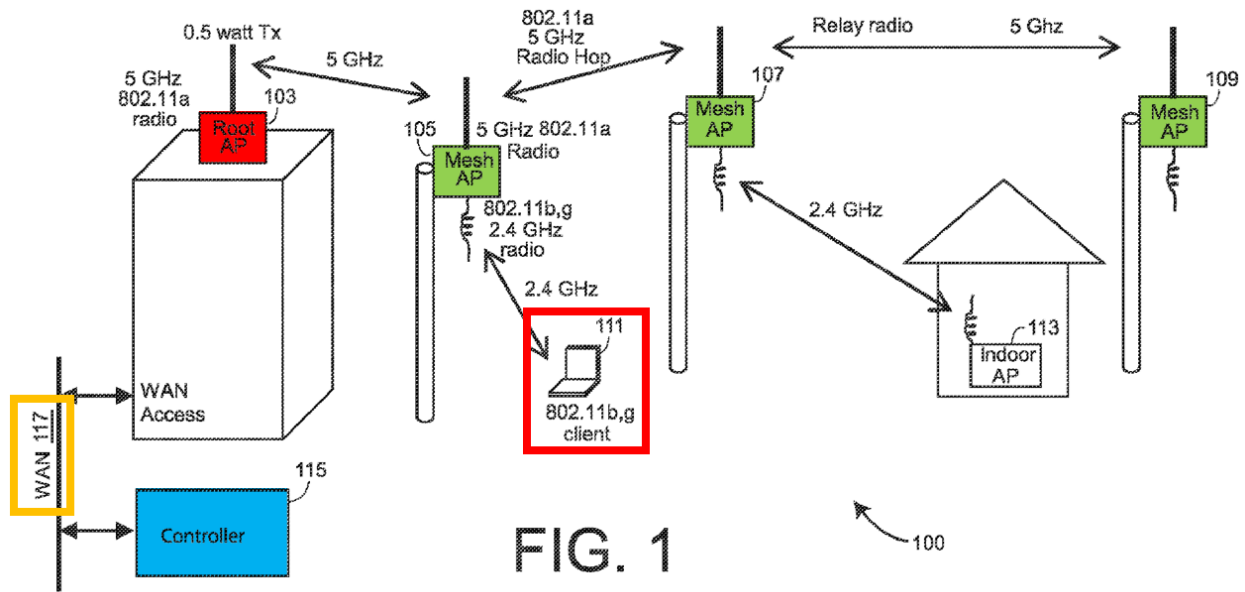


FIG. 3

EX1003, Figure 3.

The **2.4 GHz 802.11b/g radio [305]** (the *first radio*) is “to *allow wireless connections to 802.11 b/g clients.*” EX1003, [0046]. The **5 GHz 802.11a radio [307]** (the *second radio*) includes a “**Atheros AR5112 integrated circuit 307** that can operate in *both the 2.4 and the 5 GHz bands.*” EX1003, [0048]. Rahman discloses that the 5 GHz band is used for point-to-point connections between **mesh APs**: “The second radio transceiver operates **the IEEE802.11 a protocol in the approximately 5 GHz band** to allow *point-to-point (P2P) connections*, point-to-multipoint (P2 MP) connections, and *connections between mesh points in a mesh.*” EX1003, [0046]. However, because the (*second radio*) “**Atheros AR5112 integrated circuit 307** [...] can operate in *both the 2.4 and the 5 GHz bands*” (EX1003, [0038]) it is also capable of connecting to wireless clients using the 2.4 GHz band. Accordingly, the **Atheros AR5112 integrated client 307** is configured to communicate both with a wireless client and with another node. EX1002, ¶¶185-189.



EX1003, Figure 1.

10. Claim 14

- a) The wireless mesh network of claim 13, wherein the second radio is configurable to be used as a dual-purpose radio for communicating with both the client and another node

Rahman and Rahman-II also render obvious the additional limitation of Claim 14. Section X.A.9.a). EX1002, ¶¶190-194.

For example, as discussed in Section X.A.9.a) [13.0] above, Rahman discloses a **5 GHz 802.11a radio [307]** (the *second radio*), that includes a “**Atheros AR5112 integrated circuit 307** that can operate in *both the 2.4 and the 5 GHz bands*” and is capable of connecting to other mesh APs using a backhaul wireless interface, and is also capable of connecting to wireless clients using the 2.4 GHz band. EX1003, [0048]. Accordingly, the **Atheros AR5112 integrated client 307** is configured to

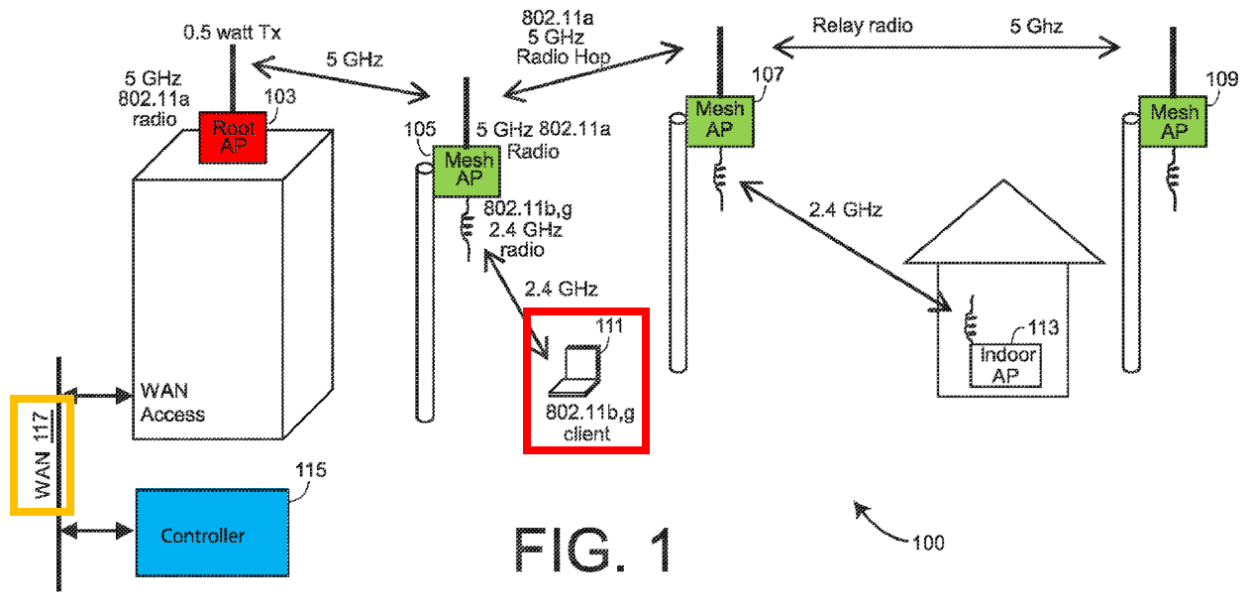
communicate both with a wireless client and with another node. EX1002, ¶¶191-194.

11. Claim 15

- a) **The wireless mesh network of claim 1 further comprising a client device wirelessly connected to the MAP node, wherein the client device exchanges data with the external network through the MAP's routing path to the external network**

Rahman and Rahman-II also render obvious the additional limitation of Claim 15. Section X.A.2. EX1002, ¶¶196-199.

Rahman discloses wireless clients connected to the **mesh APs** (MAP nodes) via 802.11b/g radio transceivers in the 2.4GHz band. *See* EX1003, [0046]. The wireless clients, such as client 111 in Figure 1 below, connect through the **mesh APs** to the **root AP**, which provides access to the external wired area network (**WAN**) for relaying wireless client data: “Once a secure LWAPP tunnel to the controller is established, the new child mesh AP start relaying wireless client data frames.” EX1003, [0069]. EX1002, ¶¶196-199.



EX1003, Figure 1.

12. Claim 17

Claim 17 is identical to claim 1 except for limitations [17.17]-[17.23]. The combination of Rahman and Rahman-II renders obvious claim limitations [17.0]-[17.16] for the reasons explained above in Sections X.A.2.a)-X.A.2.o). EX1002, ¶¶200-213.

Claim limitations [17.17]-[17.20] and [17.22]-[17.23] are identical to claim 2. The plain language of claim limitation [17.17] recites *wherein the one or more network health monitoring criteria comprises one or more of*, and therefore requires only that the *network health monitoring criteria* comprise at least **one** of the following categories: (a) *whether or not the associated parent node is offline or can be found in the wireless mesh network*; (b) *whether or not data can be routed to the*

external network through the MAP node's routing path; (c) whether or not the one or more parent selection criteria is satisfied; or (d) whether or not the MAP node's routing path is more congested than a threshold load value representing data congestion level of a routing path. Accordingly, Rahman need only disclose one of the *network health monitoring criteria*. *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1199 (Fed. Cir. 2013) (“The disjunctive ‘or’ plainly designates that a series describes alternatives”); *Game and Tech. Co., Ltd. v. Activision Blizzard Inc.*, 926 F.3d 1370, 1378 (Fed. Cir. 2019). The combination of Rahman and Rahman-II renders obvious claim limitations [17.17]-[17.20] and [17.22]-[17.23] for the reasons explained above in Sections X.A.3.a)-X.A.3.d). EX1002, ¶¶214-216.

13. Claim 18

Claim 18 is identical to claim 1 except for limitation [18.12]. The combination of Rahman and Rahman-II renders obvious claim limitations [18.0]-[18.11] and [18.13]-[18.16] for the reasons explained above in Sections X.A.2.a)-X.A.2.o). EX1002, ¶¶217-234.

- a) **[18.12] *a loop prevention criterion which verifies that a potential parent node's routing path to the external network does not contain the MAP node;***

Rahman discloses limitation [18.12]. EX1002, ¶¶229-230.

Rahman discloses that the **controller**-based parent selection method forms a “loop-free tree topology”: “Thus, the **root AP** 103 has a direct LWAPP connection

back to a **controller** 115 that manages the mesh network, e.g., to form the *loop-free tree topology*.” EX1003, [0039]. At the time of invention of the ’537 patent, it was well-known that a loop in a network is formed when the same node is included in two different paths for network traffic to travel through, such that data traffic may never reach its destination as it circles between nodes. *See, e.g.*, EX1013, 13-14 (“A key aspect of ISO/IEC 15802-3 is its specification of the Spanning Tree Protocol, which is used by bridges to configure their interconnections in order to prevent looping data paths in the bridged LAN. In the event that the basic interconnection topology of bridges and LANs contains multiple possible paths between certain points, use of the Spanning Tree Protocol blocks some paths in order to produce a simply connected active topology for the flow of MAC user traffic between end stations.”). At the time of invention of the ’537 patent, several solutions existed to prevent loops by ensuring that each network node was included in only one possible routing path. *See, e.g.*, EX1006, 1:28-30 (“In the area of local area networks (LANs), and in particular, LAN bridges, spanning tree protocols are known for preventing loops in a bridged (typically wired) network.”). Similarly, Rahman accomplishes its goal of forming a “loop-free tree topology” (EX1003, [0039]), by ensuring that the **controller** looks for situations in which the same **mesh AP** appears in multiple RRM reports (e.g., a *loop prevention criterion*), and chooses only *one* such route: “In one embodiment, whenever a **mesh AP** appears in multiple RRM

reports, the Parent Selection Method ***only keeps the best branch*** and saves all others as backups.” EX1003, [0076]. By looking for and ensuring that a **mesh AP** only appears in one branch, the parent selection method ensures that multiple routes do not contain the same **mesh AP** (the *MAP node*), thereby preventing a potential parent from forming loops. EX1002, ¶¶229-230.

B. Ground 2: Rahman-Rahman-II In View Of Rahman-III Renders Obvious Claims 5-9 and 19.

1. Reasons To Combine The Rahman/Rahman-II Combination With Rahman-III (“Rahman/Rahman-II/Rahman-III Combination”)

It would have been obvious to combine the features of the Rahman/Rahman-II Combination with Rahman-III’s path cost calculation features. Although the Rahman/Rahman-II Combination identifies the best path to a root AP based on link and radio parameters provisioned in AP profiles, it would not have addressed situations in which a mesh AP has to choose between two paths to the root AP with similar total path costs. EX1002, ¶¶241-250.

On the other hand, Rahman-III’s path cost calculation and tie-breaker policies address the problem of allowing a mesh node to choose between two potential parent nodes “because equal cost paths emerge.” EX1006, 15:44-45. For example, Rahman-III discloses that “suppose there are two paths A to B to C that have equal cost. In one embodiment, A chooses one of these paths to C based on the A to B

path cost.” EX1006, 15:56-59. And Rahman-III discloses a path cost calculation that weights and provides minimum or maximum values for radio parameters such as signal strength and hop count to determine the least cost path to the root. EX1006, 14:22-36, 14:37-48. EX1002, ¶251.

Accordingly, a POSITA would have been motivated to apply Rahman-III’s technique of using IEEE 802.11- and 802.11-compatible spanning tree protocols including path cost calculations for mesh nodes to choose links to a root device to improve the Rahman/Rahman-II Combination’s 802.11-compatible mesh APs and root APs provisioned with AP profiles to provide methods for building tree topologies in mesh networks based on path cost to a root AP. Rahman-III’s path cost calculations and tie-breaker policies would have improved the mesh network of the Rahman/Rahman-II Combination by ensuring that mesh APs are able to distinguish between equally useful paths to the root AP by selecting the paths with specific links that provide the least path cost or have the highest radio parameters, based on what is important to the network profile. EX1002, ¶¶248-252.

A POSITA would have had a reasonable expectation of success in combining Rahman-III with the Rahman/Rahman-II Combination. **First**, each of Rahman, Rahman-II, and Rahman-III are directed to improvements to mesh networks comprising 802.11-compatible mesh access points (mesh APs) and root APs. EX1003, [0002], [0007], [0026], [0035], [0066]; EX1004, [0028], [0047]; EX1006,

1:54-67, 3:19-26, 6:66-7:20, 11:15-25. And each of Rahman, Rahman-II, and Rahman-III share a first named inventor, Shahriar I. Rahman. EX1003, (54); EX1004, (76); EX1006, (75). EX1002, ¶253.

Second, each of Rahman, Rahman-II, and Rahman-III describe embodiments in which mesh APs select parent nodes based on radio parameters that provide the best path to a root node. EX1003, [0060]; EX1004, [0018]; EX1006, 14:20-26. Rahman makes clear that the local tree-building methods may be implemented using a variety of protocols, not just AWPP. EX1003, [0086]. Accordingly, including Rahman-III's path cost calculation in Rahman and Rahman-II's mesh APs with AP profiles would require only the use of a known technique—Rahman-III's path cost calculation and tie-breaker policies—to improve similar devices—mesh APs using local tree-building methods—in the same way to provide Rahman and Rahman-II's mesh APs including AP profiles with additional criteria to choose the best path to the root AP by selecting particular potential parent nodes based on radio parameters. EX1002, ¶254.

2. Claim 5

a) [5.0] The wireless mesh network of claim 1

The combination of Rahman and Rahman-II renders obvious claim limitation [5.0]. *See* Section X.A.2. EX1002, ¶255.

- b) **[5.1] wherein the selection of the parent node further comprises selecting a potential parent node over another potential parent node based at least in part on a comparison of their latency values.**

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [5.1]. EX1002, ¶¶255-261.

Rahman discloses transmitting RRM Neighbor Reports in beacon and probe response frames that contain link and node parameters, including load, for neighboring mesh APs. EX1003, [0060]. Rahman also discloses a parent selection method that chooses one branch of a route tree over another based on those metrics, including latency values such as load, as well as other values including hop count. EX1003, [0074]. Rahman in combination with Rahman-II discloses provisioning mesh APs with AP profiles to aid in selecting from potential parent nodes to provide the best path to the root AP, as explained above in Section X.A.2.j). EX1002, ¶¶256-257.

Rahman-III discloses a path cost calculation based on neighbor information, such that each “wireless Dbridge determines path cost to the root” based on information on neighbors including the wireless link cost to each neighbor.” EX1006, 15:8-23. The path cost calculation weights radio parameters, including “received signal strength” and “hop count.” EX1006, 14:22-28. In the event two paths have equal cost, Rahman-III discloses that the wireless Dbridge breaks the tie

by choosing one link (e.g., to one node) over another “based on radio signal parameters, e.g., one or both of signal strength and signal quality.” EX1006, 15:45-47, 15:56-59. EX1002, ¶¶258-259.

Accordingly, the combination of Rahman, Rahman-II, and Rahman-III would have suggested to a POSITA to include path cost calculation and tie-breaker policies, so that potential child APs joining the network using AWPP or similar distributed, local tree-building protocols based on information supplied in AP profiles could choose specific parent nodes (particular links) that provide the least path cost to the root AP, based on the comparison of metrics, including throughput values such as data rate or latency values such as load, as well as other values including signal strength and hop count, for each individual link. EX1002, ¶¶260-261.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

3. Claim 6

a) [6.0] The wireless mesh network of claim 5

The combination of Rahman and Rahman-II renders obvious claim limitation [6.0]. *See* Section X.B.2. EX1002, ¶262.

- b) **[6.1] wherein the selection of the parent node further comprises selecting the potential parent node over the another potential parent node if the potential parent node has a lower latency value than the another potential parent node.**

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [6.1]. EX1002, ¶¶263-270.

As discussed in Sections X.A.2.j) [1.10], X.A.2.m) [1.14]-[1.16], and X.B.2.b) [5.1], the combination of Rahman, Rahman-II, and Rahman-III discloses selecting a particular link in a route tree (to a particular parent node), based upon a comparison of radio parameters, including latency values such as load, as well as other values including hop count. EX1002, ¶¶263-269.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

4. Claim 7

- a) **[7.0] The wireless mesh network of claim 1**

The combination of Rahman and Rahman-II renders obvious claim limitation [7.0]. See Section X.A.2. EX1002, ¶271.

- b) **[7.1] wherein the selection of the parent node further comprises selecting a potential parent node over another potential parent node based at least in part on a comparison of their throughput values.**

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [7.1]. EX1002, ¶¶271-277.

As discussed in Sections X.A.2.j) [1.10], X.A.2.m) [1.14]-[1.16], and X.B.2.b) [5.1] the combination of Rahman, Rahman-II, and Rahman-III discloses selecting a particular link in a route tree (to a particular parent node), based upon a comparison of radio parameters, including throughput values such as data rate, as well as other values such as signal strength. EX1002, ¶¶272-276.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

5. Claim 8

a) [8.0] The wireless mesh network of claim 7

The combination of Rahman and Rahman-II renders obvious claim limitation [8.0]. *See* Section X.B.4X.B.4. EX1002, ¶¶278.

b) [8.1] wherein the selection of the parent node further comprises selecting the potential parent node over the another potential parent node if the potential parent node has a higher throughput value than the another potential parent node.

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [8.1]. EX1002, ¶¶278-286.

As discussed in Sections X.A.2.j) [1.10], X.A.2.m) [1.14]-[1.16], and X.B.2.b) [5.1] the combination of Rahman, Rahman-II, and Rahman-III discloses selecting a particular link in a route tree (to a particular parent node), based upon a

comparison of radio parameters, including throughput values such as data rate, as well as other values such as signal strength. EX1002, ¶¶279-285.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

6. Claim 9

a) [9.0] The wireless mesh network of claim 1

The combination of Rahman and Rahman-II renders obvious claim limitation [9.0]. *See* Section X.A.2. EX1002, ¶287.

b) [9.1] wherein the selection of the parent node further comprises not selecting a potential parent node if the potential parent node's wireless signal strength with the MAP node does not meet a threshold throughput value defined by the access server.

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [9.1]. EX1002, ¶¶287-295.

As discussed in Sections X.A.2.j) [1.10], X.A.2.m) [1.14]-[1.16], and X.B.2.b) [5.1] the combination of Rahman, Rahman-II, and Rahman-III discloses selecting a particular link in a route tree (to a particular parent node), based upon a comparison of radio parameters, including throughput values such as data rate, as well as other values such as signal strength. Rahman-III further discloses that each of the radio parameters may be “appropriately scaled and normalized” in calculating path cost, including by setting minimum or maximum values for a node:

Note that those in the art will understand that in determining the weighted sum, each of the radio parameters is appropriately scaled and normalized. In one embodiment, `signal_strength` is the signal strength mapped from dBm to an unsigned integer index, `transmission_power` is the transmission power mapped from dBm to an unsigned integer index, `mobility` is a configurable integer parameter that has a predefined maximum value indicating fixed, and a pre-defined minimum value indicating that sending device is highly mobile, and `hop_count` is an integer indicating the number of hops from the root bridge, with a single increment of 1 for each hop away from the root bridge.

EX1006, 14:37-48. EX1002, ¶¶288-291.

Rahman-III also discloses that appropriately weighting the factors to determine which factor is most important to a node is based on network policy: “Selecting the weightings w_1 , w_2 , and w_3 (and w_4) gives more weight on whichever factor is more important for a wireless bridging entity. In one embodiment, selecting the weights is based on policy and administered as per a given network.” EX1006, 14:62-66. Accordingly, a POSITA would have understood that Rahman-III discloses applying various weights or minimum or maximum values (threshold values) for the disclosed radio parameters to determine the most important factors for each parameter, including throughput values such as data rate, as well as other

values such as signal strength, based on network policies. And as discussed in X.A.2.j) [1.10], Rahman discloses that the parameters for **mesh AP** links are set by the **controller** (access server). EX1002, ¶¶292-295.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

7. Claim 19

a) [19.0] The wireless mesh network of claim 18

The combination of Rahman and Rahman-II renders obvious limitation [19.0].
See Section X.A.13. EX1002, ¶296.

b) [19.1] wherein the selection of the parent node further comprises not selecting a potential parent node if the MAP node's potential routing path to the external network through the potential parent node exceeds a threshold latency value.

The combination of Rahman, Rahman-II, and Rahman-III renders obvious limitation [19.1]. EX1002, ¶¶296-304.

As discussed in Sections X.B.2.b) [5.1] and X.B.3.b)[6.1], the combination of Rahman, Rahman-II, and Rahman-III discloses selecting a particular link in a route tree (to a particular parent node), based upon a comparison of radio parameters, including latency values such as load, as well as other values including hop count. And discussed in Sections X.B.2.b)[5.1] and X.B.3.b)[6.1], the combination of Rahman and Rahman-III discloses selecting between two links (between two parent

nodes), based on setting maximum values for radio parameters, including latency values such as load, as well as other values including hop count. EX1002, ¶¶296-304.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Rahman-III for the reasons discussed above in Section X.B.1.

C. Ground 3: Rahman-Rahman-II In View Of Goel Renders Obvious Claims 1 and 16.

1. Reasons to Combine Rahman, Rahman-II, and Goel

Each of Rahman, Rahman-II, and Goel describe route discovery protocols that use messages passed between mesh nodes which include network parameters such as signal strength, throughput, latency, and hop count. EX1003, [0063]; EX1004, [0018], [0078], [0108]; EX1005, 3:7-12 (“[T]he route metric value represents an evaluation of a distinct route operating parameter (e.g., path length, hop count, latency, or throughput) that reflects the performance of the given route.”). Each of Rahman, Rahman-II, and Goel describe methods for creating tree topology-based 802.11-compliant mesh networks comprising mesh APs and an AP providing wired access to an external network. EX1003, [0026], [0031]; EX1004, [0028], [0047]; EX1005, 4:8-12, 4:29-34. And both Rahman and Goel contemplate transmitting different types of data for different applications over the network. EX1003, [0103]; EX1005, 3:40-45. EX1002, ¶¶311-312.

Rahman does not explicitly consider the type of data being transmitted—or the application sending such data—in calculating the “best branch.” However, Goel describes a route metric that considers data type: “a route metric value represents an evaluation of a distinct route operating parameter indicative of the performance of a given route for a particular type of data.” EX1005, 6:15-18. This allows mesh points to prioritize certain metrics for certain types of applications: “For example, when transmitting voice data, it is generally preferable to transmit the voice data along a route within a mesh network that minimizes latency (i.e., high priority). When transmitting video data, it may be preferable to transmit the video data along a route which maximizes overall bandwidth utilization (i.e., greater throughput but lower priority).” EX1005, 5:41-47. EX1002, ¶¶312-313.

A POSITA would have found it obvious to combine the features of Rahman, Rahman-II and Goel for multiple reasons. EX1002, ¶¶315-318.

The combination of Rahman and Goel represent the use of a known technique (Goel’s use of data frames to identify different types of data transmissions for different applications in route discovery) to improve similar devices (Rahman’s mesh APs and root APs including Rahman-II’s AP profiles) in the same way (providing messages between mesh APs for route discovery that include node and network parameters). As described above, Rahman discloses a controller-based parent selection method to identify link and radio parameters such as latency and

throughput values communicated through “Radio Resource Management” (RRM) reports useful for identifying the “best” path to a root AP for a mesh AP joining a mesh network. EX1003, [0063]. Combining Rahman and Goel to include Goel’s data type information in Rahman’s RRM Neighbor Reports would provide additional relevant information prioritizing certain metrics over others based on application type that would serve Rahman’s goals of providing the best route back to the Root AP. EX1002, ¶¶316-318.

A POSITA would have had a reasonable chance of success in combining Rahman and Goel. As described above, each of Rahman, Rahman-II, and Goel are directed to 802.11-compliant wireless mesh networks with a single “Root AP” or “mesh portal” that provides access to a wired network. EX1003, [0026], [0031]; EX1004, [0028], [0047]; EX1005, 4:8-12, 4:29-34. And each of Rahman, Rahman-II, and Goel describe using messages containing link, node, and network parameters in a route discovery process for determining the best route back to the Root AP or the mesh portal. EX1003, [0063]; EX1004, [0018], [0078], [0108]; EX1005, 3:7-12. Including Goel’s data type data frame in Rahman’s RRM Neighbor Reports would require only the use of a known technique—Goel’s data type network metric—to improve a similar device—Rahman’s mesh network route discovery protocol relying on similar network metrics such as BER/PER, SNR, RSSI, etc.—in

the same way of applying a network or link metric to determine the correct route to the Root AP. EX1002, ¶319.

2. Claim 1

a) [1.0]-[1.13]

The combination of Rahman and Rahman-II renders obvious limitations [1.0]-[1.13]. *See* Section X.A.2. EX1002, ¶320.

b) [1.14]-[1.16] *the one or more parent selection criteria comprising: a throughput value representing signal strength between two nodes; and a latency value representing number of hops in a routing path*

Rahman in view of Rahman-II and further in view of Goel renders obvious limitations [1.14]-[1.16]. As discussed in Sections X.A.2.j)[1.10], and X.A.2.m) [1.14]-[1.16], Rahman discloses a cumulative metric that is based upon throughput values such as data rate, latency values such as load, and other network parameters including signal strength and hop count. EX1003, [0060], [0063], [0074]. EX1002, ¶¶321-323.

Goel discloses use of a “route metric” for calculating a route to a node that is based on operating parameters for the branch including throughput and latency: “[T]he route metric value represents an evaluation of a distinct route operating parameter (e.g., path length, hop count, *latency, or throughput*) that reflects the performance of the given route.” EX1005, 3:7-12. The route metric is used to select a path between two different nodes based upon the operating parameter, including

to select “*the route that minimizes the latency of data transmissions through the mesh network.*” EX1005, 4:8-12, 4:29-34. EX1005, 7:1-14. EX1002, ¶¶321-323.

Accordingly, the combination of Rahman, Rahman-II, and Goel would have suggested to a POSITA to include Goel’s traffic-type data frame in Rahman’s RRM Neighbor Reports, so that potential child APs joining the network could choose the best route to the root AP for a given application. Doing so would have improved Rahman’s mesh APs, providing the ability to prioritize certain metrics, such as latency or throughput, for different types of data sent by different applications, such as voice applications or video applications respectively, that value those metrics. EX1002, ¶323.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Goel for the reasons discussed above in Section X.C.1.

a) [1.17]-[1.18]

The combination of Rahman and Rahman-II renders obvious limitations [1.17]-[1.18]. *See* Section X.A.2. EX1002, ¶324.

3. Claim 16

a) [16.0] The wireless mesh network of claim 1

The combination of Rahman and Rahman-II renders obvious limitation [16.0]. *See* Section X.A.2. EX1002, ¶325.

- b) **[16.1] further comprising one or more data types being routed through the routing path, wherein the one or more data types include at least two of: voice data, video data, and other data type that is not the voice or video data; wherein routing a priority data type with a higher priority than another type of data, wherein the priority data type may be one or both of: the voice data or the video data.**

The combination of Rahman, Rahman-II, and Goel renders obvious limitation [16.1]. EX1002, ¶¶325-330.

Rahman discloses that its invention may be used for a multitude of applications, including “digital video” and “voice-over-IP.” EX1003, [0103]. EX1002, ¶326.

Rahman further discloses that the mesh APs may act as routing entities, routing data from child APs to the correct destination in the network or to external wired networks: “[W]hen the mesh AP receives data from a child, it looks up its forwarding data structure by first looking up its bridging information. If the destination of the data is in a wired network connected to the mesh AP, the mesh AP's bridging information so indicates, and the mesh AP sends the information on. If not, the mesh AP looks up the routing information, and then sends the data frame on to its parent in the mesh tree topology.” EX1003, [0042]. EX1002, ¶327.

Goel discloses using a data frame in messages between mesh APs that identifies a type of data, including voice or video data, for prioritizing a particular route within the mesh network. EX1005, 6:38-49. EX1002, ¶328.

Accordingly, the combination of Rahman, Rahman-II, and Goel would have suggested to a POSITA to include Goel's traffic-type data frame in Rahman's RRM Neighbor Reports, so that potential child APs joining the network could choose the best route to the root AP for a given application. Doing so would have improved Rahman's mesh APs, providing the ability to prioritize certain metrics, such as latency or throughput, for different types of data sent by different applications, such as voice applications or video applications respectively, that value those metrics. EX1002, ¶329.

A POSITA would have found it obvious to combine Rahman, Rahman-II, and Goel for the reasons discussed above in Section X.C.1.

XI. CONCLUSION

Petitioner respectfully requests that the Board institute *inter partes* review, hold the challenged claims unpatentable, and cancel the challenged claims.

Petition for *Inter Partes* Review of U.S. Patent No. 11,368,537
Claims 1-19

Dated: August 8, 2025

Respectfully submitted,

/Taeg Sang Cho/

Taeg Sang Cho (Reg. No. 69,618)

DESMARAIS LLP

230 Park Ave

New York, NY 10169

212-808-1060 (telephone)

212-351-3401 (facsimile)

Counsel for Petitioner

Cisco Systems, Inc.

CERTIFICATION UNDER 37 C.F.R. § 42.24(D)

I hereby certify that this Petition for *Inter Partes* Review of U.S. Patent No. 11,368,537 has, excluding the portions exempted under 37 C.F.R. § 42.24(a), 13,944 words as counted by the word-processing system used to prepare this document, in compliance with 37 C.F.R. § 42.24(d).

Dated: August 8, 2025

Respectfully submitted,

/Taeg Sang Cho/
Taeg Sang Cho (Reg. No. 69,618)
DESMARAIS LLP
230 Park Ave
New York, NY 10169
212-808-1060 (telephone)
212-351-3401 (facsimile)

Counsel for Petitioner
Cisco Systems, Inc.

CERTIFICATE OF SERVICE

Under 37 C.F.R. §§ 42.6(e) and 42.105, the undersigned certifies that on August 8, 2025, complete copies of the foregoing and any accompanying exhibits were caused to be served by sending them via Federal Express Priority Overnight shipping, which is at least as fast and reliable as U.S. Priority Mail Express, to the correspondence address of record for U.S. Patent No. 11,368,537 as indicated in Patent Center:

27197 – Michael J. Cherskov
Szymon M. Gurda
903 Commerce Drive, Suite 310
Oak Brook, IL 60523

Dated: August 8, 2025

Respectfully submitted,

/Taeg Sang Cho/
Taeg Sang Cho (Reg. No. 69,618)
DESMARAIS LLP
230 Park Ave
New York, NY 10169
212-808-1060 (telephone)
212-351-3401 (facsimile)

Counsel for Petitioner
Cisco Systems, Inc.