

Petition for *Inter Partes* Review of
U.S. Patent No. 10,848,398 B2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Charter Communications, Inc.,
Petitioner

v.

Adaptive Spectrum and Signal Alignment, Inc.,
Patent Owner

Case No. IPR2025-00012

U.S. Patent No. 10,848,398 B2

Filing Date: May 6, 2014
Issue Date: November 24, 2020

Title: METHOD, APPARATUS, AND SYSTEM FOR OPTIMIZING PERFORMANCE OF A
COMMUNICATION UNIT BY A REMOTE SERVER

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,848,398 B2**

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List of Exhibits

Exhibit No.	Description of Document
1001	U.S. Patent No. 10,848,398 B2 to Wonjong Rhee (Application filed May 6, 2014, issued November 24, 2020)
1002	Declaration of Dr. James Martin
1003	U.S. Patent No. 7,408,907 B2 to Neil Diener (Application filed August 15, 2003, issued August 5, 2008)
1004	U.S. Patent Application Publication No. 2012/0320768 A1 to Shmuel Shaffer, et al. (Application filed June 20, 2011, issued December 20, 2012)
1005	<i>Adaptive Spectrum and Signal Alignment, Inc. v. Charter Communications, Inc.</i> , No. 2:24-cv-00124 (E.D. Tex.), Complaint
1006	'398 Patent File History
1007	<i>Adaptive Spectrum and Signal Alignment, Inc. v. Charter Communications, Inc.</i> , No. 2:24-cv-00124 (E.D. Tex.), Docket Control Order
1008	Docket Navigator – Time to Milestones for the Eastern District of Texas, <i>available at</i> https://search.docketnavigator.com/patent/court/222/14
1009	Docket Navigator – Time to Milestones for the District of Colorado, <i>available at</i> https://search.docketnavigator.com/patent/court/10/14
1010	IEEE Std. 802.11n-2009™ (Amendment to IEEE Std. 802.11™, 1999 Edition (Reaff 2003))
1011	U.S. Patent No. 5,699,365 to Jeffrey T. Klayman, et al. (Application filed March 27, 1996, issued December 16, 1997)
1012	U.S. Patent No. 6,477,669 to Anil K. Agarwal, et al. (PCT Application filed July 15, 1998, issued November 5, 2002)

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Exhibit No.	Description of Document
1013	U.S. Patent No. 7,809,996 to John M. Cioffi (Application filed August 4, 2008, issued October 5, 2010)
1014	F. Peng, J. Zhang, and W. Ryan, “Adaptive Modulation and Coding for IEEE 802.11n”, IEEE (2007)
1015	Y. Song, X. Zhu, Y. Fang, and H. Zhang, “Threshold Optimization for Rate Adaptation Algorithms in IEEE 802.11 WLANs,” IEEE Transactions on Wireless Communications, Vol. 9 No. 1 (Jan. 2010)
1016	H. Jung, K. Cho, Y. Seok, T. Kwon, and Y. Choi, “RARA: Rate Adaptation Using Rate-adaptive Acknowledgment for IEEE 802.11 WLANs,” IEEE (2008)
1017	S. Wong, H. Yang, S. Lu, and V. Bharghavan, “Robust Rate Adaptation for 802.11 Wireless Networks,” ACM (Sept. 23-26, 2006)
1018	Cisco Enterprise Wireless, Intuitive Wi-Fi Starts Here, CISCO E-Book
1019	Cisco Spectrum Expert Users Guide, Software Release 4.0, CISCO Systems, Inc. (Dec. 2010)
1020	Cisco CleanAir Technology: Intelligence in Action, White Paper, CISCO (2010)
1021	’398 Patent Claim Listing
1022	L. Deek, E. Garcia-Villegas, E. Belding, S. Lee, K. Almeroth, “The Impact of Channel Bonding on 802.11n Network Management,” ACM CoNEXT (2011)
1023	IEEE Std. 802.11g™-2003 (Amendment to IEEE Std. 802.11™, 1999 Edition (Reaff 2003))
1024	U.S. Patent No. 11,770,313 B2 to Wonjong Rhee (Application filed November 23, 2020, issued September 26, 2023)

I. INTRODUCTION

Petitioner Charter Communications, Inc. (“Petitioner”) respectfully submits this Petition for *Inter Partes* Review of claims 1-25 (the “Challenged Claims”) of U.S. Patent No. 10,848,398 (the “’398 patent”) (EX1001). Petitioner requests institution of *Inter Partes* Review (“IPR”) and a finding that all Challenged Claims are unpatentable.

II. MANDATORY NOTICES UNDER 37 CFR § 42.8(A)(1)

A. Real Parties-In-Interest under § 42.8(b)(1)

Petitioner and Plume Design, Inc. are the real parties-in-interest to this IPR petition.

B. Related Matters under § 42.8(b)(2)

The ’398 patent is asserted in pending litigation involving Petitioner and Patent Owner, *Adaptive Spectrum and Signal Alignment, Inc. v. Charter Communications, Inc., et al.*, Case No. 2:24-cv-00124 (E.D. Tex.). The complaint in the related case was first served on Petitioner on February 22, 2024. (EX1005). The ’398 patent is the parent of U.S. Patent No. 11,770,313 (the “’313 patent”) which has also been asserted in the litigation. EX1024. Petitioner has concurrently filed an IPR petition challenging the ’313 patent, IPR2025-00013. There are no other known related cases involving Patent Owner and the ’398 patent.

C. Lead and Back-Up Counsel under § 42.8(b)(3)

Petitioner provides the following designation of counsel.

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D. Service Information under § 42.8(b)(4)

This Petition is being served by Federal Express to the attorneys of record for the '398 patent, Michael North, Chung Park, Donald Gibson, and Xin Dai at North Weber & Baugh, 3260 Hillview Ave., Palo Alto, CA 94304 and 228

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Hamilton Ave., 3rd Floor, Palo Alto, CA 94301. Petitioner consents to and prefers electronic service at the addresses provided above for lead and back-up counsel.

III. FEE PAYMENT UNDER 37 CFR § 42.103

Petitioner requests review of twenty-five claims, with a \$47,125 payment.

IV. REQUIREMENTS UNDER 37 CFR §§ 42.104 AND 42.108

A. Grounds for Standing

Petitioner certifies the '398 patent is available for IPR and Petitioner is not barred or otherwise estopped.

B. Identification of Challenge and Statement of Precise Relief Requested

Petitioner requests the Board institute IPR of claims 1-25 based on:

Ground	'398 Patent Claims	Basis for Challenge (35 U.S.C. §§ 102, 103)	Application of Prior Art
1	1-25	§ 103	Diener
2	1-25	§ 103	Diener in view of Shaffer

Submitted with this Petition is the Declaration of James Martin, Ph.D.
("Martin") (EX1002), a qualified technical expert.

C. Considerations Under 35 U.S.C. § 325(d)

This Petition does not present a situation in which "the same or substantially the same prior art or arguments previously were presented to the Office." 35 U.S.C. § 325(d). After receiving the initial application, the patent examiner issued a Non-Final Rejection for several reasons including: invalidity under 35 U.S.C. §§

101, 112, and 102 and provisionally for non-statutory double-patenting over co-pending Application No. 13/995,901. (EX1006, 1536-1550). The claims were rejected over Roy which disclosed a method of optimizing performance of a communication unit. (*Id.*). Applicant's amendments and arguments in response were not found persuasive by the examiner and a Final Rejection was issued on November 25, 2016. (*Id.*, 1486-1502).

A series of Non-Final Rejections, Final Rejections, Requests for Continued Examination, and applicant amendments and arguments followed between 2016 and August of 2020. (*Id.*, 12-560, 600-1484). As part of the various amendments, applicant amended claim 1 to include: the communication unit “implements one or more algorithms that use the parameter and at least a rule or a condition” (*Id.*, 555); “in response to the server detecting the absence of an interference or noise from nearby wireless channels, communicating the policy” (*id.*, 377); and “determining that packets will be lost regardless of rate selection” (*id.*, 126). Additionally, applicant removed “generating the policy comprises generating a pseudo code or code for an adaptation algorithm” from independent claim 1. (*Id.*, 1012). With these amendments—and various others to overcome the non-statutory double patenting and §§ 112, 101, 102, and 103 rejections—the examiner issued a Notice of Allowance on August 18, 2020. (*Id.*, 12-15). The '398 patent issued on November 24, 2020. (EX1001).

The prior art references identified in this Petition were never discussed nor analyzed during prosecution of the '398 patent, however, a patent related to Diener (regarding which Diener is a continuation-in-part) was disclosed to the Patent Office and cited on the face of the '398 patent as prior art. Shaffer was not disclosed during prosecution and is not listed on the face of the '398 patent. None of the other cited prior art references, discussed in this Petition to evidence the state of the art at the time of invention, were discussed or analyzed during prosecution.

D. The Board Should Not Exercise its Discretion Under 35 U.S.C. § 314(a) to Deny Institution

The Challenged Claim is presently asserted by Patent Owner in the parallel district court litigation. In *Apple v. Fintiv* (Paper 11), the Board issued precedential guidance on six non-dispositive factors to be considered when there is a co-pending district court litigation (“*Fintiv* Factors”). Taken as a whole, these factors weigh against exercising discretion to deny institution.

***Fintiv* Factor 1: Whether the court granted a stay or evidence exists that one may be granted if the proceeding is instituted.** Petitioner has not yet moved for a stay in the co-pending litigation; therefore, *Fintiv* Factor 1 is neutral. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019 (Paper 12) (PTAB Dec. 1, 2020) at 14; *Sand Revolution II, LLC v. Continental Intermodal Grp. Trucking*

LLC, IPR2019-01393 (Paper 24) (PTAB June 16, 2020). As noted in *Fintiv* Factor 4 below, Petitioner stipulates it will not pursue any of the invalidity references relied on in this Petition in the co-pending litigation.

***Fintiv* Factor 2: Proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision.** The co-pending litigation is in its early stages. At the time of filing this Petition, Plaintiff has only served infringement contentions and Petitioner’s motion to transfer the co-pending litigation to the District of Colorado is pending. The parties have not yet engaged in any other written discovery, depositions, nor begun claim construction.

According to the Court’s Docket Control Order, a *Markman* hearing is set for March 19, 2025 and trial is currently set for September 22, 2025. (EX1007).

However, as indicated in Petitioner’s Motion to Transfer, both the Eastern District of Texas and District of Colorado have median times-to-trial that indicate a trial date may not be until early 2026 to early 2027. (EX1008-1009). The projected statutory deadline for a final written decision is in April 2026. Thus, given the pending transfer decision which may affect case deadlines and based on the Courts’ median times-to-trial, this factor is neutral.

***Fintiv* Factor 3: Investment in the parallel proceedings by the court and the parties.** This factor weighs in favor of not exercising discretion to deny institution. The district court case is in its early stages and the claim construction

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hearing will not occur until March 2025. (EX1007). Indeed, the most fact-intensive work (fact and expert discovery), substantive issues (e.g., claim construction), and dispositive decisions (summary judgment and trial) have not yet begun in the co-pending litigation. *See, e.g., Juniper Networks, Inc. v. Huawei Digit. Techs. (Cheng Du) Co.*, IPR2020-01130, Paper 13 at 13 (Jan. 22, 2021); *Sand Revolution II*, IPR2019-01393, Paper 24 at 11. The district court has expended minimal resources to this case.

Where, as here, “the evidence shows that the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising discretion to deny institution.” *Fintiv, Inc.*, IPR2020-00019 (Paper 11) at 10-11. Petitioner was served with infringement contentions—identifying the asserted claims—on June 28, 2024 and has filed this Petition approximately 17 weeks after that date. Thus, Petitioner was “reasonably diligen[t]” in filing this Petition under Factor 3 which weighs against exercising discretion. *See Peloton Interactive, Inc. v. iFit, Inc.*, IPR2022-00029 (Paper 13) at 45 (Apr. 22, 2022) (determining that filing a Petition within 10 weeks after Patent Owner informed petitioner of the claims being asserted “show[s] reasonable diligence that weighs against discretionary denial”); *Apple Inc. v. Jawbone Innovations, LLC*, IPR2022-01084 (Paper 9) at 18-19 (Dec. 16, 2022) (concluding factor 3 weighs against discretionary denial where Petitioner waited four months to

file the Petition after being served with infringement contentions containing the asserted claims); *cf. Comcast Cable Communications, LLC v. Touchstream Technologies, Inc.*, IPR2024-00324 (Paper 13) at 11-12 (July 24, 2024) (determining that waiting 7 months after learning of asserted claims is too long of a delay in filing the Petition, but still instituting on other grounds).

***Fintiv* Factor 4: Overlap between issues raised in the petition and the parallel proceeding.** This factor weighs in favor of not exercising discretion to deny institution. If this Petition is instituted, Petitioner will not pursue any of the invalidity references relied on in the Petition in the district court litigation. *See generally Sand Revolution II, LLC*, IPR2019-01393 (Paper 24).

***Fintiv* Factor 5: Whether the petitioner and the defendant in the parallel proceedings are the same party.** Petitioner is a defendant in the parallel proceeding; however, this factor alone should not be dispositive. *See Sand Revolution II, LLC*, IPR2019-01393 (Paper 24), at 12-14, 57.

***Fintiv* Factor 6: Other circumstances that impact the Board's discretion, including the merits.** This Petition presents a strong case for invalidity of the '398 patent. Director Vidal's Interim Guidance, dated June 21, 2022, indicated that the Board would not exercise discretion to deny institution where a petition presents compelling evidence of unpatentability. The claim at issue is broad and rendered obvious by the asserted grounds. Where, as here, a strong case

for obviousness is presented, this factor weighs in favor of not exercising discretion to deny institution. *See Fintiv, Inc.*, IPR2020-00019 (Paper 11), at 14-16; *Sand Revolution II, LLC*, IPR2019-01393 (Paper 24), at 12-14, 57.

Thus, *Fintiv* factors 3-4 and 6 weigh in favor of not exercising discretion to deny institution, factors 1-2 are neutral, and only factor 5 favors denying institution. Taken together, the factors weigh in favor of not exercising discretion to deny institution and the merits of this Petition warrant consideration.

V. TECHNICAL BACKGROUND AND STATE OF THE ART

The overall scope of the '398 patent pertains to: (1) a centralized communications system utilizing communication units and a remote server to acquire performance information; and (2) generic algorithms relating to adaptation. (EX1002 ¶¶27-29). Adaptation involves inputting performance data into an algorithm to result in an actionable output (i.e., the adaptation) which communicates modifications and transmission control strategies to communication units within the system network. (*Id.* ¶31). Adaptation is used in communications systems that serve numerous end users and, by 2011, network standards (e.g., IEEE 802.11 Wi-Fi, 3GPP 3G/4G, ISO DSL, CableLabs DOCSIS 3.0) reflected these technologies. (*Id.*; EX1010).

The exemplary “Adaptation Algorithm” in the '398 Patent is a well-known “rate adaptation algorithm” which involves observing channel conditions and

adapting transmission modulation and coding to optimal settings (e.g., highest permitted bit rate). (EX1001, 1:44-54; EX1002 ¶32). The concept of a rate adaptation algorithm such as this was well-known and disclosed in prior art. (*See, e.g.,* EX1011-1013). Indeed, the '398 patent points to the IEEE 802.11g standard as disclosing a “rate adaptation algorithm[] implemented in the WiFi communication system” which “uses real-time data.” EX1001, 1:45-51. As Dr. Martin explains, determining “optimal rate adaptation is one of the most widely researched topics in the related academic literature in the time between 2000-2011.” (EX1002 ¶35; EX1014-1017). To optimize communications between a base station (e.g., an Access Point (AP)) and a communications device (corresponding to a Wi-Fi device or station) those in the field have used either closed-loop or open-loop methodologies. (EX1002 ¶¶35-37).

Also by 2011, it was known to manage performance of the base stations and associated communications devices. (*Id.* ¶38). This includes monitoring spectrum conditions at a central controller which receives data and creates decisions regarding how to best manage spectrum. (*Id.*). Examples of spectrum management across multiple base stations and communications devices—including across multiple networks—include: load balancing, channel reallocation, link level adaptations, altering communications parameters, and selecting new algorithms. (*Id.*; *see also* EX1018-1020).

VI. OVERVIEW OF THE '398 PATENT

A. Level of Ordinary Skill in the Art

A person of ordinary skill in the art as of November 10, 2011 (“POSITA”) would have possessed at least a bachelor’s degree in electrical engineering, or a related field, with at least two years of experience with transmission optimization techniques in the field of DSL, cable, or wireless communication systems. Additional education could compensate for less practical experience and vice versa. (EX1002 ¶61).

B. Priority Date

Patent Owner has alleged that the '398 patent claims the benefit of the PCT Application filed on November 10, 2011. (EX1005, 6). Petitioner uses November 10, 2011 as the priority date for the purposes of this Petition, but does not concede that the Challenged Claims are entitled to that date.

C. Specification

The '398 patent is directed to a method and system that optimizes performance of communication unit(s) via a remote server. (EX1001, Abstract). The disclosed system includes one or more communication units and a remote server with a memory and processor. (*Id.*). The specification acknowledges “exemplary prior art communication system[s]” including access points connected

to wireless stations similar to the system recited in the '398 patent. (*Id.*, 1:26-30).

An exemplary prior art system is depicted in Figure 1:

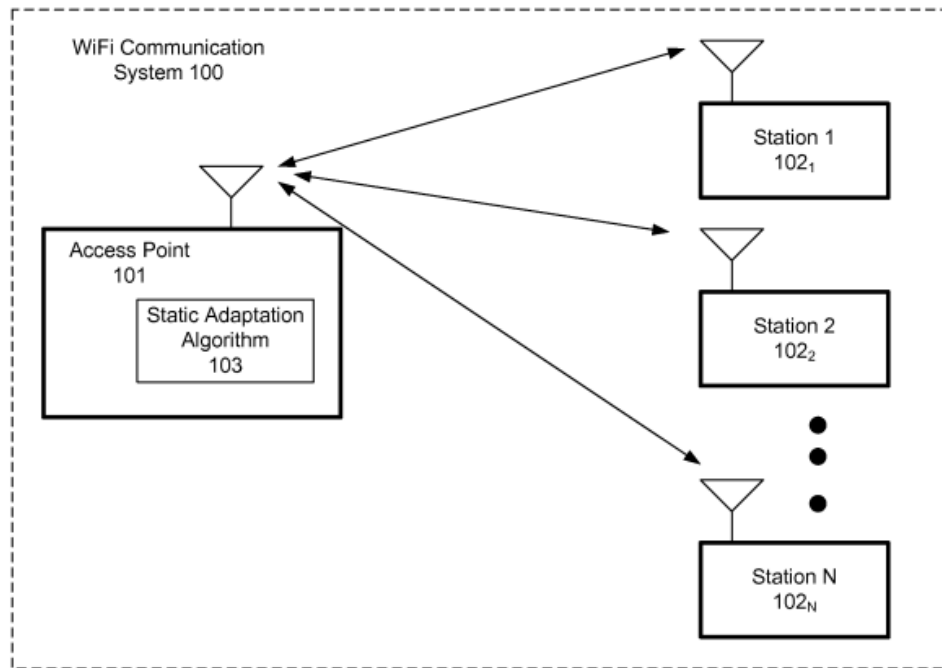


FIG. 1 (prior Art)

(*Id.*, Fig. 1).

According to the specification, the inventions of the '398 patent improve upon these prior art systems by analyzing real-time and historical data and providing rules and conditions based on that data to improve system performance. (*Id.*, 4:57-61, 5:17-23). The '398 patent teaches a “dedicated server” (i.e., the remote server or optimization center) which collects this data and provides the rules and conditions to the communication units for execution. (*Id.*, 5:24-30, 8:41-46). Thus, the disclosed system is “similar to the communication system of FIG. 1,

but is operable to communicate with [a] remote server 204 (interchangeably referred to as an optimization center),” as depicted in Figure 2:

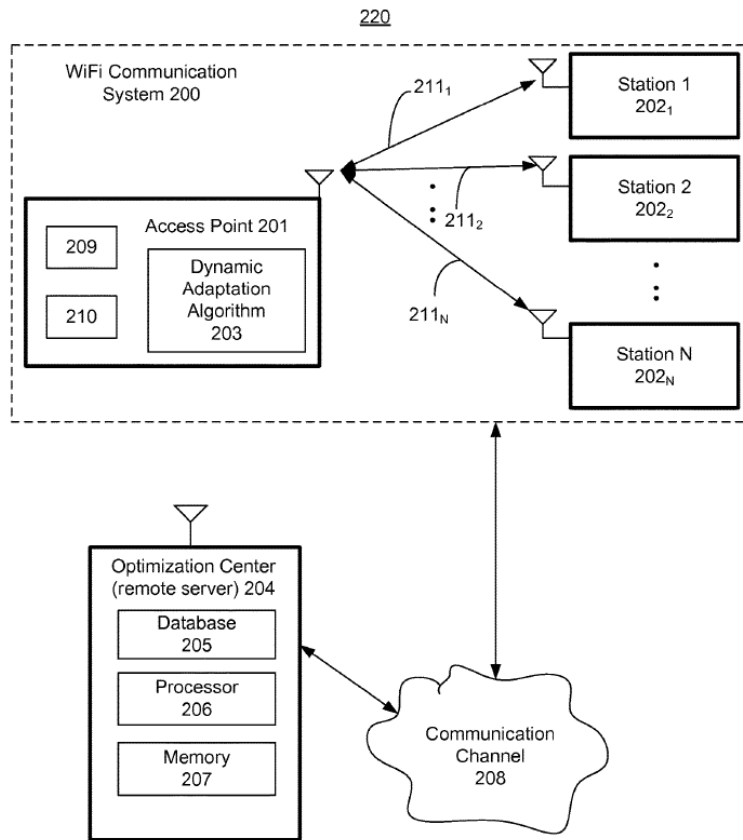


FIG. 2

(*Id.*, Fig. 2). This disclosed system is not “limited to DSL or WiFi communication systems, but appl[ies] to any communication system that needs to run/execute adaptation algorithms . . . to cope with real-time variations in link channel, noise, interference, and other factors that affect communication performance.” (*Id.*, 11:37-42). The ’398 patent also teaches an embodiment in which the remote server determines the presence of an interference condition and, accordingly,

communicates, where applicable, the optimum algorithm to be used by the communication units. (*Id.*, 10:51-56).

The disclosed method includes: (1) collecting operational and/or performance data from communication unit(s); (2) generating a policy for those communication units based on the collected data; and (3) sending the policy to the communication units which implement those policies based on time-varying data. (*Id.*, 14:59 – 15:42). This method is depicted in Figure 4:

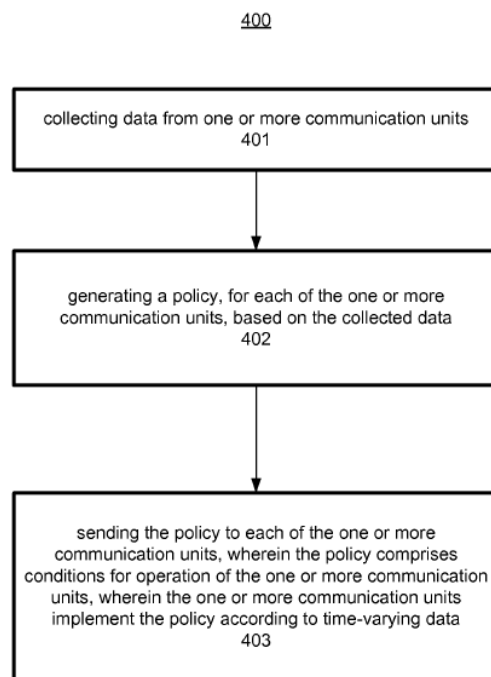


FIG. 4

(*Id.*, Fig. 4).

D. The Challenged Claims

This Petition challenges claims 1-25 of the '398 patent.

E. Claim Listing

Exhibit 1021 is a claim listing enumerating each claim element. Bracketed notations (e.g., [a], [b], etc.) are used to refer to individual elements.

VII. CLAIM CONSTRUCTION

Petitioner does not believe any claim constructions are required and interprets the claims at issue in accordance with their ordinary and customary meanings to the extent possible. 37 C.F.R. § 41.100(b). To be clear, Petitioner is not suggesting that there are no disputes regarding claim scope, including with respect to § 112 issues. Rather, the invalidity Grounds raised herein render obvious the Challenged Claims under any reasonable interpretation of the claims, and thus the Board need not issue any formal constructions. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

VIII. THE CHALLENGED CLAIMS ARE INVALID

As detailed below, claims 1-25 of the '398 patent are obvious in view of the identified prior art.

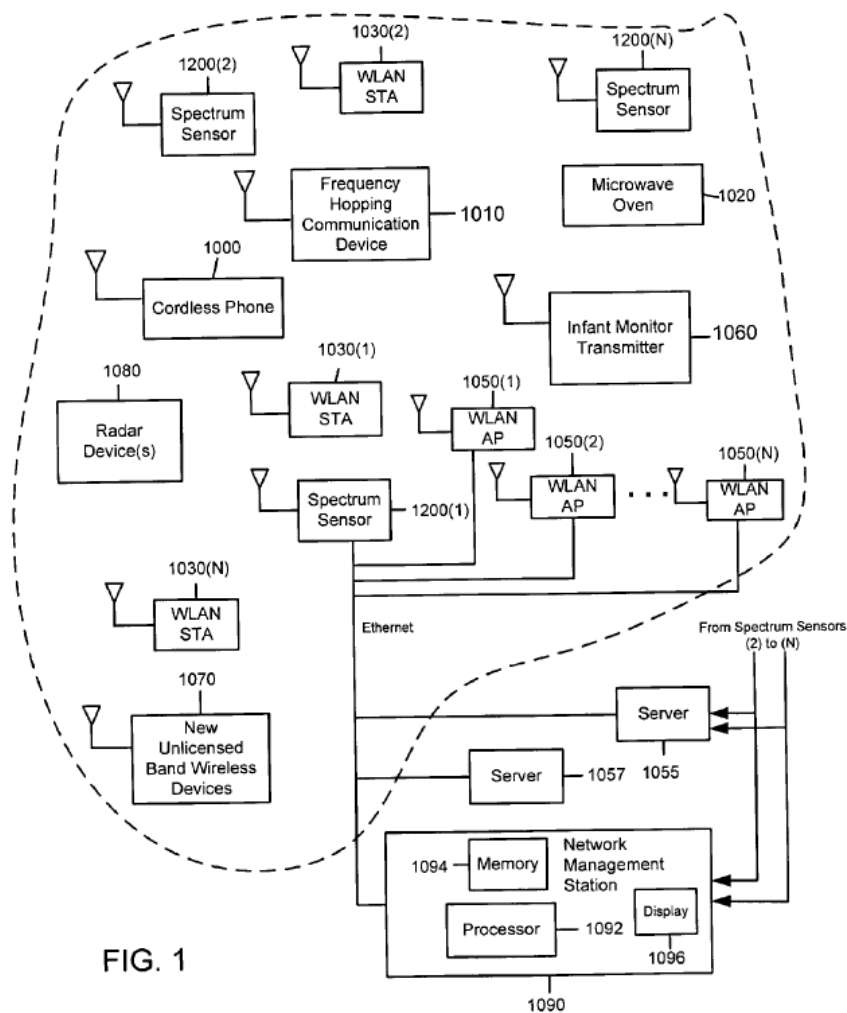
A. Summary and Date Qualification of the Prior Art

1. Diener (EX1003)

U.S. Patent No. 7,408,907 to Neil R. Diener (“Diener”) is a patent entitled “System and Method for Management of a Shared Frequency Band Using Client-

Specific Management Techniques,” filed August 15, 2003, issued August 5, 2008,
and qualifies as prior art under 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA).

Diener teaches a communication management system involving radio
communication parameters. (EX1003, Abstract). Like the disclosed inventions of
the '398 patent, Diener analyzes real-time and historical data and provides rules
and conditions based on that data to improve system performance. An exemplary
system as taught by Diener is depicted in Figure 1:



(*Id.*, Fig. 1). As shown above, Diener teaches APs, sensors, and different devices within the network gather spectrum intelligence which is provided to a Network Management Station (i.e., a server). (*Id.*, Fig. 1, 6:58-63, 8:40-45). Diener explicitly states: “Any device that receives radio frequency energy in the frequency band of interest may be equipped with a SAGE 20 to generate spectrum activity information.” (*Id.*, 24:16-18).

The management devices receive spectrum intelligence information which is stored and processed through signal classification. (*Id.*, 6:45-61, 9:15-33). Diener explains that the management devices then may generate controls “to adjust one or more operating parameters of devices or networks of devices operating in the frequency band.” (*Id.*, 9:57-59). Diener further teaches using spectrum intelligence information for “[s]mart data rate selection” as the system is configured to differentiate between errors caused by interference, packet errors, and hidden nodes based on the spectrum intelligence that is collected. (*Id.*, 63:65-64:3).

2. Shaffer (EX1004)

U.S. Patent Application Publication No. 2012/0320768 to Shmuel Shaffer, et al. (“Shaffer”) is a published patent application entitled “Reducing the Impact of Hidden Nodes in Mesh Networks,” filed June 20, 2011, published December 20, 2012, and qualifies as prior art under 35 U.S.C. § 102(e) (pre-AIA)002E

Shaffer teaches a two-algorithm technique that helps to optimize performance within a communications network with detected hidden nodes. (EX1004, Abstract, [0058]). These techniques result in a system with “a greatly reduced collision rate compared with current systems” and “improves network efficiency”. (*Id.*, [0113]). Shaffer discloses two specific algorithms to help avoid collisions based on hidden nodes: (1) a cost function algorithm that optimizes route selection; and (2) a transmission power algorithm to minimize hidden nodes. (*Id.*, [0058]).

Shaffer’s disclosed system and method operates within a wireless network, consisting of a head-end device and multiple nodes, as well as a network administrator which determines the appropriate algorithm to employ based on network conditions. (*Id.*, Fig. 1, [0103]). The system disclosed in Shaffer is depicted in Figure 1 below:

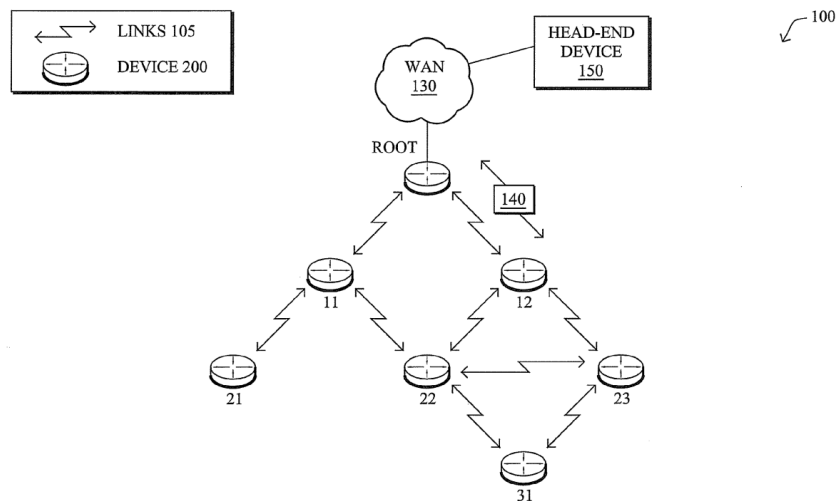


FIG. 1

(*Id.*, Fig. 1).

B. Ground 1: Obviousness of Claims 1-25 Based on Diener

1. Claim 1

Diener teaches and/or renders obvious claim 1.

i. Claim 1, Preamble

To the extent the preamble is limiting, it is taught by Diener. The preamble recites “A method for improving performance of one or more communication units, the method comprising.” Diener teaches “a system and method for managing communication with a plurality of wireless client devices operating in a radio frequency band” (EX1003, 3:49-53). Diener explains that, in accordance with its disclosed method, these wireless client devices (i.e., communication units) “recognize and react to the occupancy of [their] local RF environment through measurement and classification.” (*Id.*, 3:41-48). In doing so, wireless capacity is increased “by enabling short-range wireless devices as secondary access users on unoccupied licensed bands” and services are not impacted. (*Id.*). A POSITA would have recognized that the method taught by Diener, therefore, improves performance of the communication units operating within the system. (EX1002 ¶¶87-88).

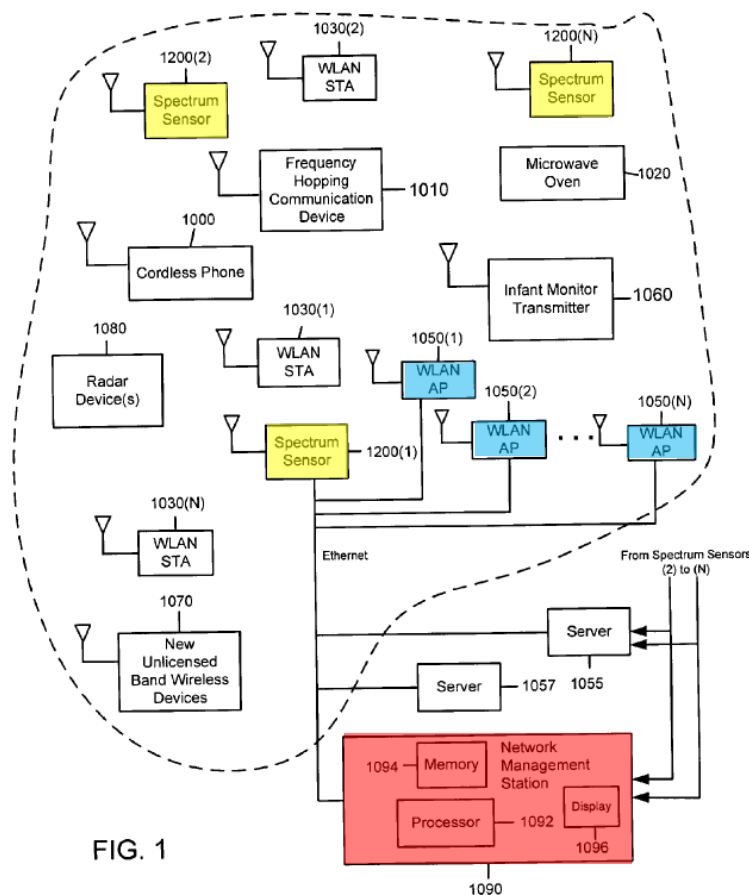
Thus, Diener teaches the preamble of claim 1.

ii. Element 1(a)

Diener discloses “receiving, by a server from network monitoring devices that monitor, in real-time, data associated with an operation of two or more communication units located in different geographical areas, the data comprising a parameter.” Diener teaches two servers a network management station 1090 (i.e., a server) and server 1055 which both receive real-time data from communication units and/or spectrum sensors (i.e., network monitoring devices). For simplicity, Petitioners will rely on the network management station 1090 as the claimed “server”, but note that both network management station 1090 and server 1055 have substantively similar functionality.

Diener explicitly discloses that the network management station receives data (i.e., spectrum information): “The spectrum intelligence gathered by the spectrum sensors is fed to one or several processing platforms such as a network management station 1090 or server 1055, the host processor of an AP, etc., where policy decisions are made and controls may be generated.” (EX1003, 6:58-62 (emphasis added)). Additionally, the network management station 1090 “may receive spectrum activity information” (i.e., data) “from one or more WLAN APs” (i.e., communication units) or from spectrum sensors (i.e., network monitoring devices). (*Id.*, 7:3-7 (emphasis added); *see also id.*, 10:24-25).

Diener states that the APs are connected via a WAN “or other longer distance wired or wireless connection.” (*Id.*, 24:11-15). Accordingly, a POSITA would have understood that the spectrum sensors (i.e., network monitoring devices) and communication units (e.g., WLAN APs) are located in different geographical areas, as shown in Figure 1 below:



(EX1003, Fig. 1 (annotated); *see also id.*, Fig. 4; EX1002 ¶¶91-92).

A POSITA would have also understood that the spectrum information collected is monitored real-time data. (EX1002 ¶¶93-96). Diener teaches the use of

a “real-time spectrum analysis component” called SAGE which may be part of an AP or part of a spectrum sensor. (EX1003, 4:38-40, 26:26-28, 72:60-65, Fig. 6).

Regarding the SAGE, Diener teaches: “The SAGE 20 obtains real-time information about the activity in a frequency band.” (*Id.*, 11:40-41). Moreover, Diener explains that “spectrum activity information . . . [is] used to generate real-time alerts.” (*Id.*, 9:34-37). “For example, when an interference condition (presence of another signal in the frequency band of operation, adjacent frequency channel of operation, etc., of a device or network of devices in the frequency band) is detected, a real-time alert may be generated to advise a network administrator about the condition.” (*Id.*, 9:37-42). A POSITA would have understood that this data is collected in real-time as it is monitored to indicate, for example, the current presence of other devices on a frequency channel such that a real-time alert may be generated to address that current condition. (*Id.* ¶94).

Diener discloses that the received data is associated with the operation of two or more communication units (i.e., wireless client devices such as a WLAN APs 1050(1) and 1050(2)). For example, Diener explains:

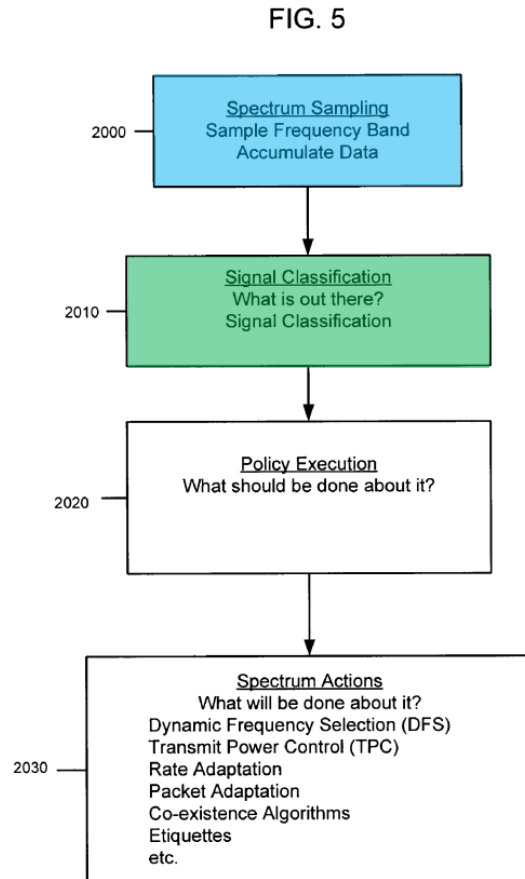
Spectrum profile information describing the radio frequency environment (activity in the frequency band) at a wireless client device is sent to the wireless base station device (where the parameter controls are made) from either a wireless client device or another radio device in the proximity of one or more wireless client devices that is capable of generating the spectrum profile information. The spectrum profile information may include information identifying signals that are

occurring in the frequency band in the proximity of a wireless client device.

(EX1003, 3:60-4:2 (emphasis added); *see also id.*, 8:59-62 (the collected data “comprise[s] information related to the activity in the frequency band as a whole, as well as statistics associated with a wireless network operating in the frequency band . . . which may be obtained by an AP.”); Figs. 1, 4). Additionally, this spectrum profile or activity information (i.e., data) “is gathered at multiple devices (such as at multiple spectrum sensors of a sensor overlay network)” (e.g., pertaining to “one or more APs” operating in the frequency band). (*Id.*, 8:34-40). Thus, the data is associated with two or more communication units (e.g., WLAN APs 1050(1) and 1050(2)) which oversee various wireless client devices within the networks.

Diener discloses that the spectrum activity information is monitored. For example, Diener explains that obtaining spectrum activity information “is referred to as spectrum sampling . . . and may involve sampling radio frequency energy in the entire frequency band for a time period or scanning sub-bands of the frequency band (on demand or periodically), to determine spectral-based and time-based activity in the frequency band.” (*Id.*, 8:27-32 (emphasis added)). A POSITA would have considered scanning sub-bands periodically to determine activity to constitute monitoring. (EX1002 ¶96). Moreover, the monitored spectrum activity information

includes a parameter. The spectrum sampling step “accumulate[s] data” which is then classified as part of a signal classification step as shown in Figure 5:



(*Id.*, Fig. 5 (annotated)). According to Diener, signal classification “involves processing the output of the spectrum sampling step to measure and classify signals based on characteristics such as power, duration, bandwidth, frequency hopping nature.” (*Id.*, 9:25-29 (emphasis added); *see also id.*, 15:60-16:31 (depicting a table of parameters which are received by the server)). A POSITA would have understood that the listed characteristics (power, duration, bandwidth,

frequency hopping nature) are part of the spectrum data and obtained during spectrum sampling. (EX1002 ¶97; *see also* EX1003, 9:33-37 (“signal classification information generated by processing the spectrum activity information”); *Id.*, 15:16-21 (explaining parameters for “center frequency, bandwidth, power, pulse duration, etc.” are “obtained directly from the signal detector output of the SAGE”)). A POSITA would have also recognized these listed characteristics to be parameters as claimed. (EX1002 ¶97). During signal classification those parameters are used to identify the appropriate classification for “the signals/devices detected” which may be a cordless phone, microwave oven, or 802.11 WLAN devices. (EX1003, 9:29-34). Accordingly, the monitored parameters are associated with the operation of the communication units (i.e., signals from the 802.11 WLAN devices which are associated with WLAN AP 1050(1) and 1050(2)).

Thus, Diener teaches element 1(a).

iii. Element 1(b)

Diener discloses “processing, by the server, at least one of the data and historical data.” As explained regarding element 1(a) above, Diener teaches that the network management station processes real-time data that is received from network monitoring devices (i.e., spectrum sensors). Diener also teaches that the network management station processes historical data.

Diener explicitly teaches that data (i.e., spectrum intelligence or spectrum activity information) is “processed”: “[i]n addition, or separately from the reporting function, the spectrum activity information may be processed in a processor (local to or remote from the source devices of the actual spectrum activity information).” (EX1003, 9:22-25 (emphasis added)). A POSITA would have understood that this processor, which is remote from the source devices, would be part of the network management station which includes processor 1092. (EX1002 ¶99; EX1003, Fig. 1).

Diener further discloses that the “server that manages multiple APs will have intelligence for the entire multiple AP network.” (EX1003, 9:6-8). Accordingly, the network management station 1090 stores data across multiple APs (i.e., spectrum activity information associated with two or more communication units). (*Id.*, 9:12-21 (“the spectrum activity information can be accumulated and stored on a short-term basis (seconds or minutes) or a long-term basis (minutes to hours) for subsequent analysis”)). A POSITA would have known that storage of spectrum activity information, generated from “raw data”, is a form of processing. (EX1002 ¶101; *see also* EX1001, cl. 7 (“processing comprises storing at least one of the data . . .”)).

Diener further teaches signal classification, performed by the server, which includes processing the data. As explained immediately above regarding element

1(a), the signal classification step “involves processing the output of the spectrum sampling step” which “is data classifying the signals/devices detected” and includes the received spectrum activity information. (*Id.*, 9:22-37). Diener also teaches that “the spectrum activity information [is] processed at a computing device to generate reports and/or controls for one or more devices or network of devices (e.g., one or more APs)”. (*Id.*, 8:34-45). A POSITA would have known that these generated reports include both real-time and historical data, i.e., data stored “on a short-term basis” and data stored “on a long-term basis”. (EX1002 ¶102). For example, Diener teaches building “histograms of signal pulse data that are useful for signal classification,” which a POSITA would have recognized to include historical data. (*Id.* ¶103; EX1003, 14:35-37). As another example, Diener teaches that “spectrum activity information can be accumulated and stored . . . for subsequent analysis.” (EX1003, 9:12-21).

Thus, Diener teaches element 1(b).

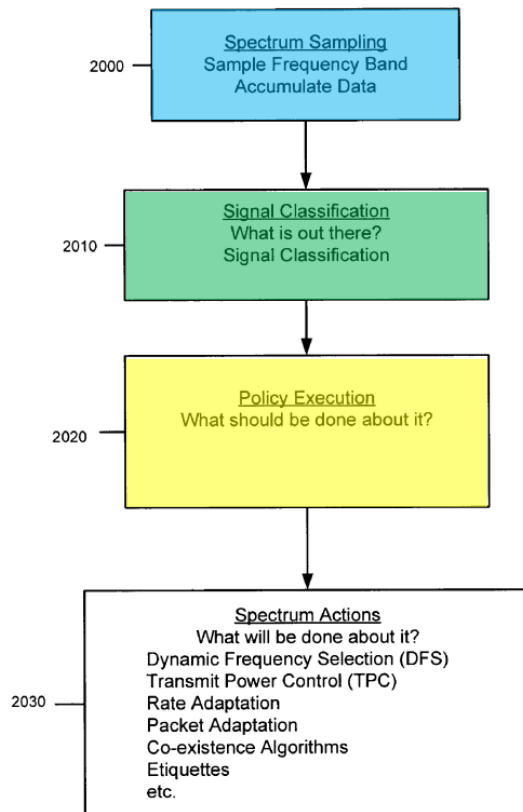
iv. Element 1(c)

Diener discloses “based on the processed data, determining a policy for at least one of the two or more communication units.” As explained regarding element 1(b) above, Diener teaches processing data—corresponding to spectrum activity or intelligence information—that is received from network monitoring

devices. Diener also teaches that this received data is used to determine a policy for interference avoidance or mitigation.

Diener explains that the analysis of spectrum information (i.e., processed data) is used to determine a policy for, at least, a WLAN AP (i.e., communication unit). Diener specifically teaches that spectrum information is processed by the network management station 1090 “where policy decisions are made”. (EX1003, 6:58-67). As explained regarding element 1(a), Diener discloses gathering spectrum activity information during the “spectrum sampling” step, which includes parameters of the WLAN APs, and then performing signal classification on that spectrum activity information to determine what devices are present on the frequency band. These two steps are followed by a “policy execution” step where the network management station determines what to do in response to the processed information, as shown in Figure 5:

FIG. 5



(*Id.*, Fig. 5 (annotated)).

Regarding the policy execution step, Diener explains:

The policy execution step 2020 involves determining what, if anything, should be done about the information output by the signal classification step 2010. For example, the policies dictate what spectrum actions in or controls of a communication device or network of devices to take on the basis of the output of the signal classification step 2010.

(*Id.*, 9:47-52). The policies are determined for at least one of the communication units. For example, Diener explains that a network expert 80 (which may be executed on or interfaced with the network management station) “makes broader

type policy decisions . . . such as those that affect an entire network of devices (e.g., multiple APs and their associated STAs in a WLAN).” (*Id.*, 20:4-10, 21:44-53).

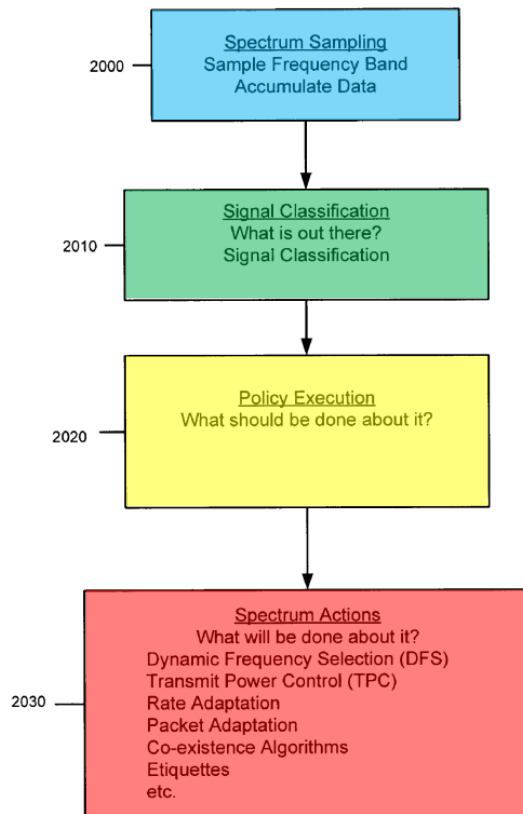
The disclosed “policy” in Diener includes, for example, determining that interference needs to be avoided or mitigated in a particular frequency environment and generating “suggestions for taking corrective action” by the WLAN APs. (*Id.*, 54:63-55:3). The determined policies may differ “depending on the interfering signal” that is generated during the signal classification step. (*Id.*, 60:58-60).

Diener teaches a variety of “recommended actions” to be taken when the network management station determines a policy of interference avoidance or mitigation. For example, Diener explains that “policies dictate what spectrum actions in or controls of a communication device or network of devices to take” including:

[A]ssigning a device to a different frequency sub-band or channel in the frequency band (dynamic frequency selection—DFS), network load balancing (on the basis of channel frequencies or time), adjusting the transmit power (transmit power control—TPC), adjusting the communication data packet, executing interference mitigation or co-existence algorithms, executing spectrum etiquette procedures, executing spectrum priority schemes, or re-assigning STAs to APs in a WLAN.

(*Id.*, 9:49-10:2). The determined policy including some of these recommended actions are also depicted in Figure 5 below:

FIG. 5



(*Id.*, Fig. 5 (annotated)).

Thus, Diener teaches element 1(c).

v. Element 1(d)

Diener discloses “in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection.” Diener explicitly acknowledges that interference can occur between device signals when “devices are sufficiently close in proximity to each other, or transmit signals at sufficiently high power levels, there will inevitably be interference between signals of one or more devices.” (EX1003, 6:2-5). When this

interference inevitably occurs, Diener teaches “causing the sending device to retransmit . . . or possibly entirely destroying the communication link between two communication devices.” (*Id.*, 7:33-38 (emphasis added)). Diener discloses “transmit[ting] data packet[s]” over these communication links and a POSITA would have understood “entirely destroying the communication link” to describe “a situation where packets are lost regardless of rate selection.” (EX1003, 9:66, Figs. 39-40, 11:24-26; EX1002 ¶¶112-113).

Diener discloses two ways that APs may respond to interference: “(1) retreat from the interference by allowing the client station to switch to a different channel/AP, or (2) stay on that channel but otherwise contend with the interference.” (*Id.*, 74:1-8). Furthermore, Diener teaches that “retreat” comprises either switching the AP to a different communication channel or moving a specific client station to a different channel or AP. (*Id.*). For example, Diener teaches that spectrum aware drivers at an AP “may receive commands to perform dynamic packet scheduling to avoid transmitting a packet that may interfere in time and frequency with a signal from another device.” (*Id.*, 11:20-26, 73:20-44). A POSITA would have understood Diener to therefore disclose that APs would retreat from interference because packets are going to be lost regardless of the selected transmission rate. (*Id.*; *see also* EX1002 ¶¶114-116; *see also* EX1022, 2 (explaining “[f]or simultaneous transmissions between links with strong signal

strengths to each other, a minimum channel separation of 20Mhz is necessary to avoid interference”). And, when a device must change to a different communication channel, a POSITA would have also understood Diener to disclose that packets would be lost regardless of the selected rate. (*Id.* ¶115). Additionally, a POSITA would have found it obvious—based on the above-described teachings of Diener—that network management station determines packets will be lost regardless of rate selection. (*Id.* ¶119).

Diener also explicitly teaches that packet loss may occur as a result of detected noise: “An 802.11a network carries a video stream. Background noise is causing a problem with packet loss.” (EX1003, 60:55-56 (emphasis added)). As explained in Diener, the determination that “noise is causing a problem with packet loss” occurs prior to the network management station 1090 determining a policy to be applied. (*Id.*, 60:55-61:13; *see also* EX1002 ¶120).

Moreover, Diener details signal classification, which can classify the types of interference and/or noise that are present on nearby channels. (EX1003, 9:25-29, 15:2-10). A POSITA would have understood that signal classification would involve detecting the existence—or absence—or interference on these channels. (EX1002 ¶¶117-118). Diener explains that, after signal classification, the system determines whether this type of interference can be contended with via adaptive data rate selection. (EX1003, 64:10-12 (“the system described above uses signal

classification and other interference timing information to make intelligent decisions on data rate.”)). And, when Diener’s system determines “the interferer is one that cannot be automatically mitigated,” a POSITA would have recognized that packets would, therefore, be lost regardless of rate selection. (EX1002 ¶118). Again, a POSITA would have therefore found it obvious that, in response to detecting interference based on the received data, network management station 1090 would determine that packets will be lost regardless of rate selection. (*Id.* ¶119).

Thus, Diener teaches and/or renders obvious element 1(d).

vi. Element 1(e)

Diener discloses “otherwise, communicating the policy to at least one or more communication units that implement one or more algorithms that use the parameter and at least a rule or a condition for the one or more communication units to improve a performance of the one or more communication units.”¹ As explained regarding element 1(c), Diener teaches determining a policy for the communication units (i.e., WLAN APs). And, as explained immediately above, Diener teaches using signal classification to determine whether interference can be automatically mitigated. Diener also teaches communicating that policy of

¹ Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this limitation, but contends the prior art meets this limitation under any interpretation.

interference mitigation to the wireless devices or APs (i.e., communication units) including recommendations or controls of specific actions to be taken by the APs. (EX1003, 2:18-24, 9:46-59).

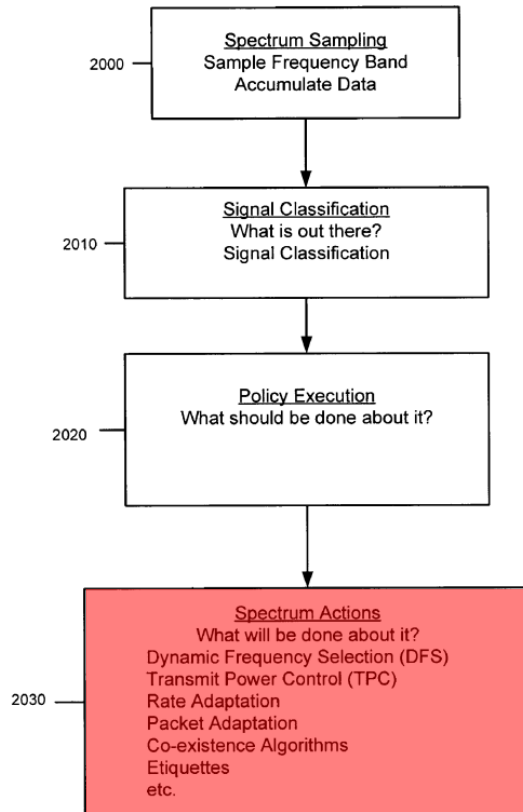
Diener explains that when the policy of interference avoidance or mitigation is determined after spectrum sampling and signal classification, “a real-time alert may be generated” by network management station 1090 which “may include recommendations to a user or to a network administrator to make adjustments to a device or network of devices operating in the frequency band.” (*Id.*, 9:37-46). As explained above regarding element 1(c), the “controls” dictated by the determined policies may include assigning a device to a different channel or frequency sub-band, network load balancing, adjusting transmission power, adjusting communication data rate, adjusting transmitted data packet parameters, executing interference algorithms, executing spectrum etiquette or priority schemes, or re-assigning STAs to a different WLAN AP. (*Id.*, 9:60-10:2).

Diener further discloses that the policy—indicating interference mitigation is needed and recommending an action—is “delivered by the network management station 1090 . . . via the network connection to one or more APs (e.g., one or more of APs 1050(1) to 1050(N)).” (*Id.*, 10:28-31). This transmission is done via control signal which is also generated by the network management station 1090. (*Id.*, 10:19-25). Diener also explicitly states that “[t]he AP will receive the control

signal and change one of its operational parameters” according to the communicated policy. (*Id.*, 10:31-33). Thus, a POSITA would have understood that the policy is communicated to communication units (i.e., WLAN APs) when it is not determined that packets will be lost regardless of rate selection. (EX1002 ¶122).

Diener further explains that, in response to the communicated policy from the network management station, the communication units (e.g., WLAN APs) implement one or more algorithms. For example, as shown in Figure 5 below, spectrum actions are performed in response to the policy execution step:

FIG. 5



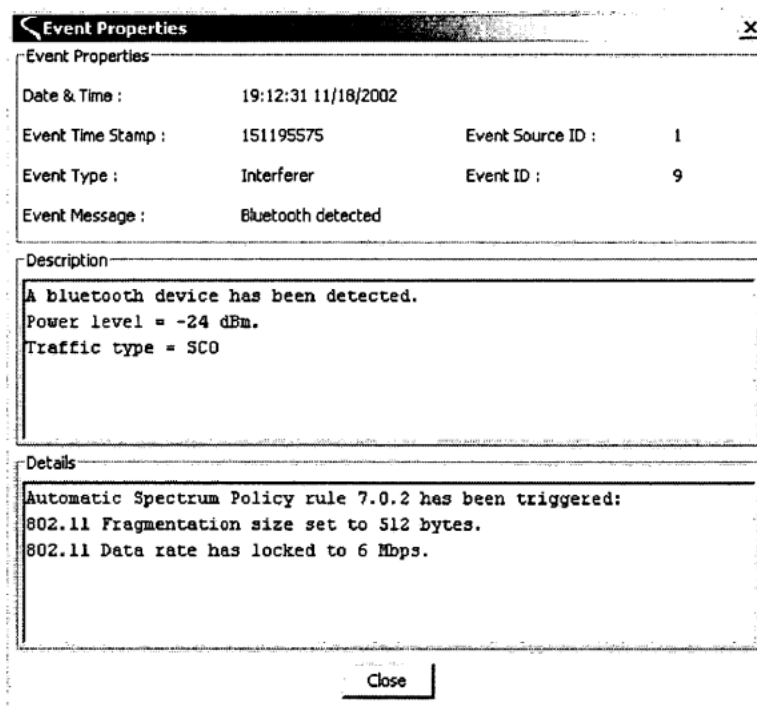
(*Id.*, Fig. 5 (annotated)). A POSITA would have understood that these spectrum actions occur at the WLAN AP—where the control signal communicates the policy and associated controls. (EX1002 ¶124; *see also* EX1003, 10:27-33). Moreover, a POSITA would have recognized that each of the previously-described “controls” and “spectrum actions” depicted in Figure 5 correspond to algorithms that would be employed by a WLAN AP. (EX1002 ¶125). Indeed, Diener explicitly teaches “executing interference mitigation or co-existence algorithms”. (EX1003, 9:67, Fig. 5). Diener explains that these suggested actions are done “to maintain

desirable performance” in light of current interference affecting transmissions. (EX1003, 2:24-27, 6:2-5). A POSITA would have understood that implementation of any of the above actions (i.e., using algorithms) by the WLAN AP would improve performance of that communication unit. (EX1002 ¶126).

In one specific example, Diener describes a situation where background noise results in data packet loss which is reflected in the collected spectrum information. (*Id.*, 60:53-57). “The policy associated with this case may be to use a spatial processing algorithm to improve the link margin between two devices.” (*Id.*, 60:60-64). Thus, a POSITA would have understood that, in this situation, the WLAN AP receiving that policy would employ a spatial processing algorithm to improve the link margin. (EX1002 ¶126). A POSITA would have also understood that improving the link margin would improve performance of the communication unit. (*Id.*).

In another example, as shown in Figure 19 below, the spectrum activity information indicated to the server the presence of a Bluetooth™ device with specific parameters causing interference:

FIG. 19



(EX1003, Fig. 19). In this situation, Diener's system triggered an automatically-determined policy which tells the WLAN AP to adjust fragmentation size and data rate on its 802.11 network. (*Id.*). A POSITA would have recognized that the WLAN AP, after receipt of this policy, would employ two algorithms to adjust fragmentation size to 512 bytes and set the data rate to 6 Mbps. (EX1002 ¶125). Doing so would result in improving performance of the WLAN AP, and its associated devices on the network, by mitigating interference with the detected Bluetooth™ device. (*Id.* ¶126).

A POSITA would have also understood that the one or more algorithms employed by the WLAN AP in response to the policy would use the parameter

previously received by network management station 1090. (*Id.* ¶¶127-128). As explained regarding element 1[a], the spectrum activity information received by the network management station includes monitored parameters such as power, duration, bandwidth, and frequency hopping nature. (EX1003, 9:25-29). Diener explains that spectrum aware drivers within the WLAN AP (*see id.*, Fig. 6) employ the controls communicated by the policy by changing “frequency[] of operation, bandwidth of operation, data rate, transmit power, etc.” (*Id.*, 11:20-33). These changes are done by applying the algorithms indicated by the policy (i.e., dynamic frequency selection, transmit power control, rate adaptation, packet adaptation, etc.). (EX1002 ¶¶127-128; EX1003, Fig. 5, 11:20-33). Accordingly, the algorithms implemented by the WLAN AP in response to the communicated policy use the parameter (e.g., frequency, bandwidth, data rate, transmit power). Diener also explains that these “operational parameters” “may affect a change in the operation of the AP as well as the STAs that are associated with that AP.” (EX1003, 11:1-19). Thus, the algorithm’s use of the parameter also improves performance of the device. (*See also* EX1002 ¶¶127-128).

Lastly, Diener teaches that the communicated policy includes a rule or condition associated with the WLAN APs implementation of the one or more algorithms to mitigate or avoid interference. A POSITA would have understood that the policies communicated to the WLAN APs “affect changes in the one or

more APs” by instructing them to employ specific interference mitigation or avoidance algorithms, those policies include rules associated with the requisite algorithms. (EX1002 ¶129). Diener refers to those rules as “controls” which are instructions communicated by control signals to the WLAN APs dictating the specified action to be taken. (EX1003, 10:19-36). Diener explains that the controls (i.e., rules) include:

[A]ssigning a device to a different frequency sub-band or channel in the frequency band (dynamic frequency selection—DFS), network load balancing (on the basis of channel frequencies or time), **adjusting** the transmit power (transmit power control—TPC), **adjusting** the communication data rate, **adjusting** a parameter of the transmitted data packet, **executing** interference mitigation or co-existence algorithms, **executing** spectrum etiquette procedures, **executing** spectrum priority schemes, or **re-assigning** STAs to APs in a WLAN.

(*Id.*, 9:60-10:2 (emphasis added)). A POSITA would have recognized that these controls operate as rules instructing the WLAN AP to take a specific action by implementing an algorithm (such as dynamic frequency selection, transmit power control, rate adaptation, packet adaptation, or co-existence algorithms) to comply with the policy. (*Id.*; EX1002 ¶129).

Thus, Diener teaches element 1(e). In sum, Diener teaches and/or renders obvious claim 1.

2. Claim 2

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses “wherein the data further comprises determining a received signal strength indication.” Diener teaches that the data received by the network management station includes a received signal strength indication. (EX1003, 69:27-29). SAGE outputs “timing, strength and duration” of the received signals and “[t]he L1 measurement engine 220 outputs a timestamp and associated received signal strength indicator (RSSI) power values for each of a plurality of Fast Fourier Transform (FFT) bins.” (*Id.*, 15:35-42, 69:27-29 (emphasis added)). A POSITA would have, therefore, understood Diener to disclose that the data includes a received signal strength indication. (EX1002 ¶132).

Thus, Diener teaches and/or renders obvious claim 2.

3. Claim 3

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses “further comprising, based on a change in the operation, updating the policy.”

Diener teaches that “spectrum intelligence may be used to suggest actions to a device user or network administrator, or to automatically invoke actions in a device or network of devices to maintain desirable performance.” (EX1003, 2:24-

27). As explained regarding element 1(c), Diener maintains desirable performance by determining an interference avoidance or mitigation policy at a server that instructs WLAN APs to implement specific actions. The generated policy is based on signal classification and Diener explains that the “signal classification database may be updated with the reference data for new devices that use the frequency band.” (*Id.*, 15:14-16).

Diener further explains that policies are generated “based on conditions determined to be occurring in the frequency band” and “[t]his body of information may be updateable to account for new devices that operate in the frequency band and/or changing regulations concerning requirements for the frequency band.” (*Id.*, 19:34-40). Diener also teaches that “[n]ew or updated policies [may be] created”. (*Id.*, 71:42-44). Accordingly, a POSITA would have understood Diener to disclose that the network management station may update the generated policy when there is a change in operation of the frequency band as indicated by new devices operating in the band or new regulations. (EX1002 ¶134).

Thus, Diener teaches and/or renders obvious claim 3.

4. Claim 4

As explained immediately above, Diener teaches and/or renders obvious the method of claim 3. Additionally, Diener discloses “wherein updating the policy comprises updating the parameter.” Diener teaches that updating the policy, as

explained regarding claim 3 above, may include “intelligently control[ling] IEEE 802.11 WLAN parameters in an AP.” (EX1003, 19:34-40). Diener describes specific examples of an updated policy that updates a parameter, including “adjusting a transmit data rate of the AP and/or STAs” or “adjusting the transmit power of an AP”. (*Id.*, 19:48-64). A POSITA would have understood that transmit data rate and transmit power to be parameters of the respective device and a policy adjusting that rate or power to comprise updating that parameter. (EX1002 ¶¶136-137).

Thus, Diener teaches and/or renders obvious claim 4.

5. Claim 5

As explained above, Diener teaches and/or renders obvious the method of claim 1. The remainder of claim 5 recites: “wherein determining the policy comprises selecting the policy from a set of policies that are stored on the one or more communication units.” Diener teaches examples of specific policies which may be used by the AP. (EX1003, 73:12-17, 73:20-45, Fig. 43). Diener also provides a table which indicates types of data that are stored in a database, including control policies, at the AP:

Client Station	Spectrum Profile (Identified Interferers)		Selected Client Specific Control Therapy(ies)
1	Bluetooth TM piconet	Microwave Oven	1. Hold Data Rate High 2. Dynamic Packet Fragmentation (change fragmentation threshold) 3. Packet Scheduling
2	Video Camera (constant interferer)		Reassign to a different AP (or a different channel on same AP if a multi-channel AP).
3	Cordless Phone		Maintain Data Rate High
4	Radar		Reassign to a different AP (or a different channel on same AP if a multi-channel AP).
5	Microwave Oven		1. Hold Data Rate High 2. Dynamic Packet Fragmentation (change fragmentation threshold) 3. Packet Scheduling
...			
N			

(*Id.*, 73:20-45). Diener also explicitly teaches that “[n]ew or updated policies created . . . may be downloaded by the L2 policy manager 340 to the L1 policy engine.” (*Id.*, 71:41-44). The L1 policy engine is “in a host processor of the communication device.” (*Id.*, 65:11-13). A POSITA would have understood the L1 policy engine may be within the host processor of the AP (i.e., communication unit). (EX1002 ¶140). Diener also explains that a user can “select the spectrum policy to be executed”. (EX1003, 55:48-49). A POSITA would have understood that the policies would, therefore, be stored on the device such that a user could select one. (EX1002 ¶140). Additionally, a POSITA would have found it obvious,

based on the teachings of Diener, to store policies on the AP (i.e., communication unit) and select a policy from the database. (EX1002 ¶140).

Thus, Diener teaches and/or renders obvious claim 5.

6. Claim 6

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses that the communication units comprise access points (APs). As explained regarding claim 1 above, Diener discloses WLAN APs which correspond to the claimed communication units. (*See also* EX1003, 6:11-12, Fig. 1).

Thus, Diener teaches and/or renders obvious claim 6.

7. Claim 7

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses “wherein processing comprises storing at least one of the data and historical data in a memory.” Diener teaches “the spectrum activity information can be accumulated and stored on a short-term basis (seconds or minutes) or a long-term basis (minutes to hours) for subsequent analysis.” (EX1003, 9:12-21). Thus, Diener teaches that data (i.e., spectrum activity information) can be stored for subsequent analysis. A POSITA would have understood that real-time and/or historical data would be stored in a memory of the

network management station of Diener, such as memory 1094. (EX1002 ¶144; EX1003, Fig. 1).

Thus, Diener teaches and/or renders obvious claim 7.

8. Claim 8

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses “wherein the data further comprises time-varying data.” Diener teaches “spectrum activity information[] is obtained from any one or several devices operating in [a] frequency [band].” (EX1003, 8:23-25). And Diener explains that this process of obtaining spectrum activity information (“spectrum sampling”) “may involve sampling radio frequency energy in the entire frequency band for a time period . . . to determine spectral-based and time-based activity in the frequency band.” (*Id.*, 8:27-32). A POSITA would have known that the spectrum activity information (i.e., data) therefore comprises time-varying data. (EX1002 ¶146).

As another example, Diener teaches monitoring BER which a POSITA would have understood to be time-varying data because BER changes depending on the device’s operation over time. (EX1003, Fig. 26; EX1002 ¶147).

Thus, Diener teaches and/or renders obvious claim 8.

9. Claim 9

As explained above, Diener teaches and/or renders obvious the method of claim 1. Additionally, Diener discloses “wherein the server performs an analysis of at least one of the data and historical data.” Diener teaches “[t]he spectrum activity information (or the raw data used to generate it) is reported locally, or remotely, to other devices to display, analyze and/or generate real-time alerts related to activity in the frequency band.” (EX1003, 9:12-21). As explained regarding element 1(c), Diener teaches processing the data to determine a policy. A POSITA would have understood that the processor of the network management station also analyzes the data and the historical data to determine the policy. (EX1002 ¶150). For example, Diener teaches “build[ing] histograms of signal pulse data that are useful for signal classification.” (*Id.*, 14:35-36). A POSITA would have understood, based on these disclosures, that Diener’s network management station (i.e., server) performs an analysis of both the data and historical data. (EX1002 ¶150).

Thus, Diener teaches and/or renders obvious claim 9.

10. Claim 10

As explained immediately above, Diener teaches and/or renders obvious the method of claim 9. Additionally, Diener discloses “wherein the analysis comprises a statistical analysis of at least one of the data and historical data.” Diener teaches generating reports and controls relating to spectrum activity information (i.e.,

data). (EX1003, 8:34-45). Diener also specifically teaches that the “spectrum activity information may comprise information relating to the activity in the frequency band as a whole, as well as statistics associated with a wireless network operating in the frequency band, such as IEEE 802.11x WLAN statistics which may be obtained by an AP or STA operating in the WLAN.” (*Id.*, 8:59-64). A POSITA would have understood the generation of these reports and controls to include a statistical analysis of the received data. (EX1002 ¶153).

Diener also teaches signal classification involving “processing the output of the spectrum sampling step to measure and classify signals based on characteristics such as power, duration, bandwidth, frequency hopping nature.” (EX1003, 9:22-30). And, as explained immediately above, Diener teaches building histograms as part of signal classification. (*Id.*, 14:35-37). Again, a POSITA would have recognized that signal classification process includes statistical analyses of data. (EX1002 ¶154).

Thus, Diener teaches and/or renders obvious claim 10.

11. Claim 11

Diener teaches and/or renders obvious claim 11.²

² Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this claim, but contends the prior art meets this limitation under any interpretation.

i. Claim 11, preamble

To the extent the preamble is limiting, it is taught by Diener. The preamble recites “A non-transitory machine-readable storage medium having computer executable instructions stored thereon that when executed cause a processor of a server to perform a method for improving performance of one or more communication units, the method comprising.” Diener explicitly teaches: “a processor readable medium storing instructions that, when executed by a processor in a wireless network base station device, cause the processor to control radio communication.” (EX1003, 77:2-6). A POSITA would have understood this disclosure of Diener to correspond to a non-transitory machine-readable storage medium with computer executable instructions stored thereon that can cause a processor to control radio communication. (EX1002 ¶158).

As explained regarding the preamble of claim 1, Diener also teaches a method for improving performance of one or more communication units. The preamble of claim 1 is hereby incorporated by reference. Thus, Diener teaches the preamble of claim 11.

ii. Element 11(a)

Element 11(a) is substantively identical to element 1(a), which is hereby incorporated by reference. Thus, Diener teaches element 11(a).

iii. Element 11(b)

Element 11(b) is substantively identical to element 1(b), which is hereby incorporated by reference. Thus, Diener teaches element 11(b).

iv. Element 11(c)

Element 11(c) is substantively identical to element 1(c), which is hereby incorporated by reference. Thus, Diener teaches element 11(c).

v. Elements 11(d)-(e)

Elements 11(d)-11(e) are substantively identical to elements 1(d)-(e), which are hereby incorporated by reference. Element 11(d) differs from element 1(d) in that it recites that the server detects “the absence of” an interference or noise. As explained regarding element 1(d), Diener teaches that its system would detect both the existence of or absence of interference or noise. Additionally, element 11(e) is broader than element 1(e) as it does not require the use of the parameter. Thus, Diener teaches and/or renders obvious elements 11(d)-(e).

In sum, Diener teaches and/or renders obvious claim 11.

12. Claim 12

Claim 12 is substantively identical to claim 7 and, as explained above, Diener teaches claim 7. Additionally, as explained above, Diener teaches and/or renders obvious claim 11. Thus, for the reasons stated above regarding claims 7 and 11, Diener teaches and/or renders obvious claim 12.

13. Claim 13

As explained above, Diener teaches and/or renders obvious the non-transitory medium of claim 11. Additionally, Diener discloses “wherein determining the policy comprises determining a condition for communicating the policy.” Diener teaches determining if the type of interference that is detected can be automatically mitigated: “if in step 5120 it is determined that the interferer is a type that can be mitigated using interference mitigation techniques, then the device executes those techniques automatically”. (EX1003, 59:42-46). A POSITA would have understood that this determination constitutes determining a condition for communicating the policy before that policy is, in fact, communicated. (EX1002 ¶172 (citing EX1003, 60:51-64:12)).

Thus, Diener teaches and/or renders obvious claim 13.

14. Claim 14

Claim 14 is substantively identical to claim 2 and, as explained above, Diener teaches claim 2. Additionally, as explained above, Diener teaches and/or renders obvious claim 11. Thus, for the reasons stated above regarding claims 2 and 11, Diener teaches and/or renders obvious claim 14.

15. Claim 15

Claim 15 is substantively identical to claim 7 and, as explained above, Diener teaches claim 4. Additionally, as explained above, Diener teaches and/or

renders obvious claim 11. Thus, for the reasons stated above regarding claims 4 and 11, Diener teaches and/or renders obvious claim 15.

16. Claim 16

Claim 16 is substantively identical to claim 5 and, as explained above, Diener teaches claim 5. Additionally, as explained above, teaches and/or renders obvious claim 11. Thus, for the reasons stated above regarding claims 5 and 11, Diener teaches and/or renders obvious claim 16.

17. Claim 17

Claim 17 is substantively identical to claim 8 and, as explained above, Diener teaches claim 8. Additionally, as explained above, Diener teaches and/or renders obvious claim 11. Thus, for the reasons stated above regarding claims 8 and 11, Diener teaches and/or renders obvious claim 17.

18. Claim 18

Claim 18 is substantively identical to claim 9 and, as explained above, Diener teaches claim 9. Additionally, as explained above, Diener teaches and/or renders obvious claim 11. Thus, for the reasons stated above regarding claims 9 and 11, Diener teaches and/or renders obvious claim 18.

19. Claim 19

Claim 19 is substantively identical to claim 10 and, as explained above, Diener teaches claim 10. Additionally, as explained above, Diener teaches and/or

renders obvious claim 18. Thus, for the reasons stated above regarding claims 10 and 18, Diener teaches and/or renders obvious claim 19.

20. Claim 20

Diener teaches and/or renders obvious claim 20.³

i. Claim 20, preamble

To the extent the preamble is limiting, it is taught by Diener. The preamble recites “an apparatus comprising.” Diener explicitly teaches “[e]mbodiments of the present invention also relate to an apparatus for performing these operations.” (*Id.*, 19:24-25 (emphasis added)). Diener also explicitly discloses network management station 1090. (*Id.*, 6:58-62).

Thus, Diener teaches the preamble of claim 20.

ii. Element 20(a)

Diener discloses “a memory”. Diener teaches “[t]he network management station 1090 has, for example, a processor 1092, a memory 1094 that stores one or more software programs executed by the processor and a display monitor 1096.” (*Id.*, 7:7-11, Fig. 1).

Thus, Diener teaches element 20(a).

³ Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this claim, but contends the prior art meets this limitation under any interpretation.

iii. Element 20(b)

Diener discloses “a processor, coupled to the memory, and operable to.” As explained immediately above, Diener discloses: “The network management station 1090 has, for example, a processor 1092, a memory 1094 that stores one or more software programs executed by the processor and a display monitor 1096.” (*Id.*, 7:7-11, Fig. 1). A POSITA would have understood that the processor is coupled to the memory. (EX1002 ¶192 (citing EX1003, 7:7-11, Fig. 1, 9:22-25)).

Thus, Diener teaches element 20(b).

iv. Element 20(c)

Element 20(c) is substantively identical to element 1(a) and, as explained above, Diener teaches element 1(a). Thus, for the reasons stated above regarding element 1(a), Diener teaches element 20(c).

v. Element 20(d)

Element 20(d) is substantively identical to element 1(b) and, as explained above, Diener teaches element 1(b). A POSITA would have considered the “processing” carried out by the processor of the network management station as discussed regarding element 1(b) to be an analysis. (EX1002 ¶196). Thus, for the reasons stated above regarding element 1(b), Diener teaches element 20(d).

vi. Element 20(e)

Element 20(e) is substantively identical to element 1(c) and, as explained above, Diener teaches and/or renders obvious element 1(c). A POSITA would have considered that the “processed data” discussed regarding element 1(c) to be analyzed data. (EX1002 ¶198). Thus, for the reasons stated above regarding element 1(c), Diener teaches element 20(e).

vii. Element 20(f)

Element 20(f) is substantively identical to elements 1(d)-1(e) and, as explained above, Diener teaches and/or renders obvious elements 1(d)-(e). Element 20(f) differs from element 1(d) in that it recites that the server detects “the absence of” an interference or noise. As explained regarding element 1(d), Diener teaches that its system would detect both the existence of or absence of interference or noise. Additionally, element 20(f) is broader than element 1(e) as it does not require the use of the parameter. Thus, for the reasons stated above regarding elements 1(d)-1(e), Diener teaches and/or renders obvious element 20(f).

In sum, Diener teaches and/or renders obvious claim 20.

21. Claim 21

Claim 21 is substantively identical to claim 2 and, as explained above, Diener teaches claim 2. Additionally, as explained above, Diener teaches and/or

renders obvious claim 20. Thus, for the reasons stated above regarding claims 2 and 20, Diener teaches and/or renders obvious claim 21.

22. Claim 22

Claim 22 is substantively identical to claims 4 and 5 and, as explained above, Diener teaches claims 4 and 5. Additionally, as explained above, Diener teaches and/or renders obvious claim 20. Thus, for the reasons stated above regarding claims 4, 5, and 20, Diener teaches and/or renders obvious claim 22.

23. Claim 23

Claim 23 is substantively identical to claim 13 and, as explained above, Diener teaches claim 13. Additionally, as explained above, Diener teaches and/or renders obvious claim 20. Thus, for the reasons stated above regarding claims 13 and 20, Diener teaches and/or renders obvious claim 23.

24. Claim 24

Claim 24 is substantively identical to claim 8 and, as explained above, Diener teaches claim 8. Additionally, as explained above, Diener teaches and/or renders obvious claim 20. Thus, for the reasons stated above regarding claims 8 and 20, Diener teaches and/or renders obvious claim 24.

25. Claim 25

Claim 25 is substantively identical to claim 9 and, as explained above, Diener teaches claim 9. Additionally, as explained above, Diener teaches and/or

renders obvious claim 20. Thus, for the reasons stated above regarding claims 9 and 20, Diener teaches and/or renders obvious claim 25.

C. Ground 2: Obviousness of Claims 1-25 Based on Diener in View of Shaffer

1. Claim 1

Diener in view of Shaffer renders obvious claim 1.

i. Claim 1, Preamble

As explained in Ground 1, to the extent the preamble is limiting, it is taught or rendered obvious by Diener. Thus, for the reasons stated in Ground 1 regarding the preamble of claim 1, Diener teaches the preamble of claim 1.

ii. Element 1(a)

As explained in Ground 1, Diener teaches element 1(a). Thus, for the reasons stated in Ground 1 element 1(a), Diener teaches element 1(a).

iii. Element 1(b)

As explained in Ground 1 Diener teaches element 1(b). Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches element 1[b].

iv. Element 1(c)

Element 1(c) is obvious over Diener in view of Shaffer. Element 1(c) recites: “based on the processed data, determining a policy for at least one of the two or more communication units.” As explained regarding element 1(b) in Ground 1, Diener teaches processing data—corresponding to spectrum activity or intelligence

information—that is received from network monitoring devices. Diener also teaches that this received data is used to determine actions to be taken by the wireless devices or APs (i.e., communication units) “to avoid interfering with other signals, and in general to optimize simultaneous use of the frequency band with the other signals.” (EX1003, 2:18-24).

Combination of Diener and Shaffer: As explained in Ground 1, Diener teaches determining a policy of interference mitigation or avoidance, including specific actions to be taken by the APs in response to received data and to improve the performance of the system. Diener teaches that two such actions may include “adjusting the transmit power” or “executing an RTS/CTS sequence” when interference is detected in a wireless network. (EX1003, 9:64-65, 19:41-59). Shaffer teaches “two new, non-exclusive algorithms to mitigate the hidden neighbor issue” and explains its invention is an improvement over prior RTS/CTS techniques in response to a hidden node. (EX1004, [0058], [0052]-[0053]).

In the combined system of Diener and Shaffer, a POSITA would have recognized that the policy of Diener would include spectrum actions of implementing one or both of the algorithms taught by Shaffer. (EX1002 ¶239). The first algorithm is a “cost function . . . used for optimizing route selection to minimize interference from hidden neighbors.” (*Id.*, [0058]). The second algorithm “optimizes the transmission power and/or receiver sensitivity of nodes in the mesh

in order to minimize the number of hidden neighbors while attempting to have a minimal impact on the overall delay through the network.” (*Id.*). Shaffer teaches a “network administrator” which determines which algorithm to use for each device. (*Id.*, [0103]-[0104], [0106]). The network administrator may consider “the physical parameters of the environment and the impact of potential collisions with packets from hidden nodes” when setting a policy that indicates which algorithm should be employed. (*Id.*, [0113]).

Shaffer further discloses that the purpose of these cost protection and transmission power algorithms is to “reduce the impact of hidden nodes in wireless networks by accounting for hidden nodes wireless parameter selection and routing decisions.” (*Id.*, [0056]). In the combined system of Diener and Shaffer, a POSITA would have recognized that when Diener’s network management station 1090 determines a policy, it sends a control signal to the relevant APs controlling them to implement either the first algorithm of Shaffer (i.e., cost function) or the second algorithm of Shaffer (i.e., transmission power) based on the received spectrum activity information, including parameters. (EX1002 ¶239).

Motivation to Combine Diener and Shaffer: A POSITA would have been motivated to combine the system of Diener with the two-algorithm policy taught by Shaffer. (EX1002 ¶¶213-227). Diener and Shaffer are within the same field of communications systems. (EX1003-1004). And, as noted above, Diener explicitly

teaches a “policy execution step 2020” that takes the processed spectrum activity information which may, for example, indicate an interference condition, and dictates “what, if anything, should be done” by the AP in response such, as “adjusting the transmit power” or “executing interference mitigation or co-existence algorithms.” (EX1003, 9:22-67). Diener also acknowledged certain mitigation algorithms—such as RTS/CTS—may be needed to mitigate a hidden node issue. (EX1003, 19:41-59). By 2011, POSITAs had knowledge of these interference mitigation algorithms and the ’398 patent itself acknowledges existing protocols used to address the “Hidden Node problem”. (EX1001, 17:31-36; EX1004, [0050]-[0054], [0058] (describing prior art interference algorithms and two new algorithms to overcome the hidden node problem); EX1023, 9, 13 (describing protection mechanism algorithms, such as RTS/CTS and CTS-to-self to avoid interference)). Thus, a POSITA reading Diener’s teachings of a policy that implements transmission power and interference mitigation algorithms would have been motivated to look to other references, such as Shaffer, that disclose those specific algorithm implementations. (EX1002 ¶¶214, 216, 218-220).

Diener and Shaffer both teach communication systems operating in wireless networks. (EX1003; EX1004). Additionally, Diener and Shaffer both utilize a “network administrator” to make determinations and recommendations to the specific devices (e.g., APs or nodes) in the network. (EX1003, 9:37-46; EX1004,

[0103]). As noted above, Diener explicitly teaches a “hidden node” problem that Diener’s system will attempt to address with, for example, RTS/CTS. (EX1003, 19:54-59). Shaffer teaches that its two new algorithms—which are specifically intended to address the hidden node problem—are an improvement over conventional techniques such as RTS/CTS which may “not always [be] suitable for all types of networks”. (EX1004, [0053]).

Moreover, as noted above, Diener explicitly teaches having an AP to adjust transmit power in response to a policy determined at a server and Shaffer provides two specific algorithms relating to transmission power and interference mitigation to avoid collisions with hidden node transmissions. (EX1003, 9:22-67; EX1004, [0058]). A POSITA would have known that the hidden node algorithms taught by Shaffer, including the cost function and transmission power algorithms, could be the type of transmission power adjustments and interference mitigation algorithms referenced in Diener. (EX1002 ¶¶220-222).

A POSITA would have also had a reasonable expectation of success in implementing Shaffer’s two-algorithm policy in Diener’s system. (*Id.* ¶¶223-227). Diener and Shaffer both teach systems is operable in a wireless network (specifically, a WLAN), that comprise multiple nodes. (EX1003, 5:50-52; EX1004, [0024]). And both Diener and Shaffer teach that their systems, and corresponding communication devices, are operable on the IEEE 802.11 frequency

band. (EX1003, 7:45-62; EX1004, [0027]). As explained in Ground 1, Diener teaches a server (i.e., network management station 1090) that is communicatively coupled to the APs such that it may transmit a policy, such as a policy indicating which of the two algorithms of Shaffer the AP should implement to best avoid a hidden node. Moreover, because both Diener and Shaffer teach a network administrator that can control an AP, a POSITA would have recognized that Shaffer's cost function and power transmission algorithms could easily be included within the controls of Diener's policies and implemented by the APs in Diener's system. (EX1002 ¶¶223-225). A POSITA would have found no technological hurdles to implementing the specific two-algorithm policy found in Shaffer within Diener's system. (*Id.* ¶¶226-227).

Thus, Diener in view of Shaffer renders obvious element 1(c).

v. Element 1(d)

As explained in Ground 1 Diener teaches and/or renders obvious element 1(d). Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches and/or renders obvious element 1(d).

vi. Element 1(e)

Element 1(e) is obvious over Diener in view of Shaffer.⁴ As explained in Ground 1 regarding this element, Diener teaches that the policy is communicated to the communication units (i.e., APs). In the combined system of Diener and Shaffer, a POSITA would have understood that the communicated policy instructs an AP to invoke the specific cost function algorithm and/or a power transmission algorithm of Shaffer to reduce the impact of a hidden node in the network. (*See* element 1[c], *supra*; EX1002 ¶¶238-239). And a POSITA would have understood that the APs implement the two algorithms (e.g., cost function or power transmission) in response to the policy that is communicated by the server. (*Id.*; *see also* EX1002 ¶246). The rationale and motivation to combine Diener and Shaffer is explained above in Ground 2 regarding element 1[c]. Thus, for these reasons and the reasons stated in Ground 1 regarding this element, Diener in view of Shaffer renders obvious element 1[e].

In sum, Diener in view of Shaffer renders obvious claim 1.

2. Claim 2

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener discloses the additional limitations in

⁴ Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this limitation, but contends the prior art meets this limitation under any interpretation.

claim 2. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 2.

3. Claim 3

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener discloses the additional limitations in claim 3. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 3.

4. Claim 4

As explained above, Diener in view of Shaffer renders obvious the method of claim 3. As explained in Ground 1, Diener discloses the additional limitations in claim 4. Thus, for the reasons stated regarding Ground 1 and claim 3 above, Diener in view of Shaffer renders obvious claim 4.

5. Claim 5

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener teaches and/or renders obvious the additional limitations in claim 5. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 5.

6. Claim 6

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener discloses the additional limitations in

claim 6. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 6.

7. Claim 7

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener teaches the additional limitations in claim 7. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 7.

8. Claim 8

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener discloses the additional limitations in claim 8. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 8.

9. Claim 9

As explained above, Diener in view of Shaffer renders obvious the method of claim 1. As explained in Ground 1, Diener discloses the additional limitations in claim 9. Thus, for the reasons stated regarding Ground 1 and claim 1 above, Diener in view of Shaffer renders obvious claim 9.

10. Claim 10

As explained above, Diener in view of Shaffer renders obvious the method of claim 9. As explained in Ground 1, Diener discloses the additional limitations in

claim 10. Thus, for the reasons stated regarding Ground 1 and claim 9 above, Diener in view of Shaffer renders obvious claim 10.

11. Claim 11

Claim 11 is obvious over Diener in view of Shaffer.⁵

i. Claim 11, preamble

As explained in Ground 1, to the extent the preamble is limiting, it is disclosed by Diener. Thus, for the reasons stated in Ground 1 regarding the preamble of claim 11, Diener teaches the preamble of claim 11.

ii. Element 11(a)

Element 11(a) is substantively identical to element 1(a), which is hereby incorporated by reference. Thus, Diener teaches element 11(a).

iii. Element 11(b)

Element 11(b) is substantively identical to element 1(b), which is hereby incorporated by reference. Thus, Diener teaches element 11(b).

iv. Element 11(c)

Element 11(c) is substantively identical to element 1(c), which is hereby incorporated by reference. Thus, Diener in view of Shaffer renders obvious

⁵ Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this claim, but contends the prior art meets this limitation under any interpretation.

element 11(c). The rationale and motivation to combine Diener and Shaffer is explained regarding element 1(c) above.

v. Elements 11(d)-(e)

Elements 11(d)-11(e) are substantively identical to elements 1(d)-(e), which are hereby incorporated by reference. Element 11(d) differs from element 1(d) in that it recites that the server detects “the absence of” an interference or noise. As explained regarding element 1(d), Diener teaches that its system would detect both the existence of or absence of interference or noise. Additionally, element 11(e) is broader than element 1(e) as it does not require the use of the parameter. Thus, Diener in view of Shaffer render obvious elements 11(d)-(e). The rationale and motivation to combine Diener and Shaffer is explained regarding element 1(c) above.

In sum, Diener in view of Shaffer renders obvious claim 11.

12. Claim 12

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 12. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 12.

13. Claim 13

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 13. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 13.

14. Claim 14

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 14. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 14.

15. Claim 15

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 15. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 15.

16. Claim 16

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 16. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 16.

17. Claim 17

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 17. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 17.

18. Claim 18

As explained above, Diener in view of Shaffer renders obvious the medium of claim 11. As explained in Ground 1, Diener discloses the additional limitations in claim 18. Thus, for the reasons stated regarding Ground 1 and claim 11 above, Diener in view of Shaffer renders obvious claim 18.

19. Claim 19

As explained above, Diener in view of Shaffer renders obvious the method of claim 18. As explained in Ground 1, Diener discloses the additional limitations in claim 19. Thus, for the reasons stated regarding Ground 1 and claim 18 above, Diener in view of Shaffer renders obvious claim 19.

20. Claim 20

Diener in view of Shaffer renders obvious claim 20.⁶

⁶ Petitioner has not addressed any arguments concerning 35 U.S.C. § 112 for this claim, but contends the prior art meets this limitation under any interpretation.

i. Claim 20, preamble

As explained in Ground 1, to the extent the preamble is limiting, it is disclosed by Diener. Thus, for the reasons stated in Ground 1 regarding the preamble of claim 20, Diener teaches the preamble of claim 20.

ii. Element 20(a)

As explained in Ground 1, element 20(a) is taught by Diener. Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches element 20(a).

iii. Element 20(b)

As explained in Ground 1, element 20(b) is taught by Diener. Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches element 20(b).

iv. Element 20(c)

As explained in Ground 1, element 20(c) is taught by Diener. Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches element 20(c).

v. Element 20(d)

As explained in Ground 1, element 20(d) is taught by Diener. Thus, for the reasons stated in Ground 1 regarding this element, Diener teaches element 20[d].

vi. Element 20(e)

Element 20(e) is substantively identical to element 1(c), which is hereby incorporated by reference. Thus, for the reasons stated above regarding element 1(c), Diener in view of Shaffer renders obvious element 20(e). The rationale and

motivation to combine Diener and Shaffer is explained regarding element 1(c) above.

vii. Element 20(f)

Element 20(f) is substantively identical to elements 1(d)-1(e) and, as explained above, Diener in view of Shaffer renders obvious elements 1(d)-(e). Element 11(d) differs from element 1(d) in that it recites that the server detects “the absence of” an interference or noise. As explained regarding element 1(d), Diener teaches that its system would detect both the existence of or absence of interference or noise. Additionally, element 20(f) is broader than element 1(e) as it does not require the use of the parameter. Thus, for the reasons stated above regarding elements 1(d)-1(e), Diener teaches and/or Diener in view of Shaffer renders obvious element 20(f). The rationale and motivation to combine Diener and Shaffer is explained regarding element 1(c) above.

In sum, Diener in view of Shaffer renders obvious claim 20.

21. Claim 21

As explained above, Diener in view of Shaffer renders obvious the apparatus of claim 20. As explained in Ground 1 Diener discloses the additional limitations in claim 21. Thus, for the reasons stated regarding Ground 1 and claim 20 above, Diener in view of Shaffer renders obvious claim 21.

22. Claim 22

As explained above, Diener in view of Shaffer renders obvious the apparatus of claim 20. As explained in Ground 1 Diener discloses the additional limitations in claim 22. Thus, for the reasons stated regarding Ground 1 and claim 20 above, Diener in view of Shaffer renders obvious claim 22.

23. Claim 23

As explained above, Diener in view of Shaffer renders obvious the apparatus of claim 20. As explained in Ground 1 Diener discloses the additional limitations in claim 23. Thus, for the reasons stated regarding Ground 1 and claim 20 above, Diener in view of Shaffer renders obvious claim 23.

24. Claim 24

As explained above, Diener in view of Shaffer renders obvious the apparatus of claim 20. As explained in Ground 1 Diener discloses the additional limitations in claim 24. Thus, for the reasons stated regarding Ground 1 and claim 20 above, Diener in view of Shaffer renders obvious claim 24.

25. Claim 25

As explained above, Diener in view of Shaffer discloses the apparatus of claim 20. As explained in Ground 1 Diener discloses the additional limitations in claim 25. Thus, for the reasons stated regarding Ground 1 and claim 20 above, Diener in view of Shaffer renders obvious claim 25.

IX. SECONDARY CONSIDERATIONS

Patent Owner has not identified any evidence of secondary indicia of non-obviousness for the '398 patent. Accordingly, there is no objective evidence of non-obviousness that might warrant a finding that the Challenged Claims are patentable. (EX1002 ¶¶321-322). Should Patent Owner identify any evidence of non-obviousness in response to this Petition, Petitioner reserves the right to respond in its Reply.

X. CONCLUSION

Petitioner respectfully requests institution of review on claims 1-25 and a finding that they are unpatentable.

Respectfully submitted,

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Dated: October 25, 2024

Attorney for Petitioner

Petition for *Inter Partes* Review of
U.S. Patent No. 10,848,398 B2

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105, I hereby certify that on October 25, 2024, I caused a complete copy of this Petition for *Inter Partes* Review of U.S. Patent No. 10,848,398 and all exhibits, to be served on the Patent Owner of the subject Patent as follows:

Michael V. North
North Weber & Baugh LLP
3260 Hillview Ave.
Palo Alto, CA 94304

Michael V. North
North Weber & Baugh LLP
228 Hamilton Ave., 3rd Floor
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/Erik B. Milch/
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CERTIFICATE OF COMPLIANCE

Petitioner certifies:

1. This Petition complies with the type-volume limitations of 37 C.F.R. § 42.24(a)(1)(i) and contains 13,027 words, excluding the portions of the Petition exempted by 37 C.F.R. § 42.24(a)(1); and

2. This Petition complies with the typeface and style requirements of 37 C.F.R. §§ 42.6(a)(2)(ii), 42.6(a)(2)(iii) and has been prepared in proportionally spaced, 14-point Times New Roman font using Microsoft Word Version 2308 (2024).

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