IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC., *Plaintiff*, v. CHARTER COMMUNICATIONS, INC., *Defendant*.	Civil Action No. 2:24-cv-124-JRG-RSP

DEFENDANT'S INVALIDITY CONTENTIONS AND SUBJECT MATTER ELIGIBILITY CONTENTIONS

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Pursuant to Patent Rules 3-3 and 3-4, the Docket Control Order entered by the Court (Dkt. 40), and Paragraph 3 of the Discovery Order (Dkt. 21), Defendant Charter Communications, Inc. ("Charter" or "Defendant")[1] hereby provides its Invalidity Contentions and accompanying document production with respect to the claims identified by Plaintiff Adaptive Spectrum and Signal Alignment, Inc. ("ASSIA" or "Plaintiff") in its Patent Rule 3-1 Disclosures. Defendant's Invalidity Contentions include the accompanying claim charts concerning U.S. Patent Nos. 7,809,996 (the "'996 Patent"), 10,848,398 (the "'398 Patent"), 11,050,654 (the "'654 Patent"), 11,477,108 (the "'108 Patent"), and 11,770,313 (the "'313 Patent") (collectively, the "Asserted Patents").

Defendant also submits its Subject Matter Eligibility Contentions concerning the Asserted Patents in accordance with the Court's July 25, 2019 Standing Order Regarding Subject Matter Eligibility Contentions Applicable to All Patent Infringement Cases Assigned to Chief District Judge Rodney Gilstrap ("Standing Order") and the Docket Control Order (Dkt. 40).

I. Introduction

As disclosed in its original and amended Patent Rule 3-1 infringement contentions (collectively, "Infringement Contentions"), Plaintiff asserts the following patents and claims:

Patent	Asserted Claims	Plaintiff's Alleged Priority Date	Chart Prefix
7,809,996	20	December 7, 2003	A
10,848,398	1-4, 6-10	November 10, 2011	B
11,050,654	1-6, 8-12, 16, 18-22, 33, 34, and 36	July 13, 2012	C
11,477,108	1-20	January 12, 2011	D
11,770,313	1-7, 11, 14-18, 19-21, 23	November 10, 2011	E

[1] ASSIA agreed to dismiss its claims against Charter Communications Operating, LLC, Charter Communications Holding Company, LLC, and Spectrum Management Holding Company, LLC in this case. Dkt. 80 in Case No. 2:24-cv-00029-JRG-RSP.

The claims identified above are referenced as "the Asserted Claims" unless reference is made specifically with respect to one or more of the Asserted Patents and/or one or more of the Asserted Claims. By identifying Plaintiff's alleged priority date for the Asserted Claims of each patent above, Defendant does not concede that Plaintiff's claims of priority are correct. Further, the citation of prior art herein and the accompanying exhibits are not intended to reflect Defendant's claim construction contentions, which will be disclosed in due course in accordance with the Docket Control Order. Instead, Defendant's Invalidity Subject Matter Eligibility Contentions as set forth herein and in the accompanying exhibits may reflect Plaintiff's apparent claim constructions based on its Infringement Contentions, with which Defendant disagrees.

As further detailed in and supported by these Invalidity Contentions, Defendant contends that each of the Asserted Claims is invalid under at least 35 U.S.C. §§ 101, 102, 103, and/or 112. Defendant reserves the right to prove the invalidity of the Asserted Claims on bases other than those required to be disclosed in these disclosures pursuant to Patent Rule 3-3.

II. Amendment/Supplementation

Defendant's Invalidity Contentions and Subject Matter Eligibility Contentions pertain to the Asserted Claims as identified in Plaintiff's Infringement Contentions. To the extent the Court later allows Plaintiff to further amend its Infringement Contentions and/or assert one or more claims other than the Asserted Claims, Defendant reserves the right to modify, amend, or supplement these Invalidity Contentions and Subject Matter Eligibility Contentions accordingly—for example, to show the invalidity and/or ineligibility of any such newly Asserted Claims.

These Invalidity Contentions and Subject Matter Eligibility Contentions are based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the

scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. A *Markman* Order in this case has not yet been issued, the parties have not yet identified terms for constructions or exchanged proposed constructions, and in no way should these Invalidity Contentions and Subject Matter Eligibility Contentions be taken as any admission or acquiescence by Defendant as to the proper scope of the Asserted Claims and/or proper claim constructions of terms and phrases recited in those claims. By identifying prior art that anticipates and/or renders obvious the Asserted Claims, Defendant does not admit that the claim limitations are capable of construction, does not admit that any claim limitations are supported with an appropriate written description and enabling disclosure in the applicable patent specifications, and does not adopt Plaintiff's apparent claim constructions or admit the accuracy of any particular claim construction. Defendant reserves all rights to later challenge or oppose any claim constructions advanced by Plaintiff and to present its own claim construction positions as permitted by the Court. To the extent Plaintiff's Infringement Contentions can be understood at all, Plaintiff appears to be pursuing overly broad constructions of the Asserted Claims in an effort to piece together an infringement claim where none exists and to accuse products that do not practice the claims as properly construed. At the same time, and as Defendant previously explained to Plaintiff, Plaintiff's Infringement Contentions are in many places too general and vague to discern exactly how Plaintiff contends the Accused Instrumentalities practice each element of the Asserted Claims. *See* August 12, 2024 Letter to Plaintiff re Infringement Contention Deficiencies; *see also* September 25, 2024 Letter to Plaintiff re Infringement Contention Deficiencies. Accordingly, these Invalidity Contentions are not intended to be, and are not, an admission that the Asserted Claims are infringed by any of Defendant's products or services, that any particular feature or aspect of the Accused Instrumentalities practices any

elements of the Asserted Claims, or that any of Plaintiff's apparent constructions/interpretations are supportable or proper. To the extent that any of the prior art references discloses the same functionality or feature of any of the Accused Instrumentalities, Defendant reserves the right to argue that said feature or functionality does not practice any element of any of the Asserted Claims, and to argue, in the alternative, that if said feature or functionality is found to practice any element of any of the Asserted Claims, then the prior art reference demonstrates that the particular element is not novel, is obvious, or is not patentable.[2]

Defendant reserves the right to revise these Invalidity Contentions and Subject Matter Eligibility Contentions in view of the Court's construction of terms and phrases recited in one or more of the Asserted Claims, additional information obtained during discovery, additional infringement theories put forth by Plaintiff during fact and/or expert discovery, any findings as to the priority dates of the Asserted Claims, and/or positions that Plaintiff, its fact witnesses, or its expert witnesses may take concerning claim construction, infringement, and/or invalidity issues, including those positions taken in any copending *inter partes* review as permitted by the Court.

Defendant further reserves the right to supplement its accompanying Patent Rule 3-4(b) document productions should it later discover additional prior art documents, information, testimony, prior art systems and related documentation, and/or software or hardware code,

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[2] Defendant does not concede that Plaintiff's apparent interpretation of the claims is correct, but rather asserts the well-established principle that whatever infringes a claim if later in time anticipates if earlier in time. *See Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc*., 246 F.3d 1368, 1378 (Fed. Cir. 2001). Thus, where Plaintiff, for purposes of its infringement case, alleges that a feature of an accused product or service meets a particular limitation recited in one or more of the Asserted Claims, then that feature, should it be found in the prior art, would also cause that limitation to be met for invalidity purposes.

including information provided by third parties after the date of service of these Invalidity Contentions and Subject Matter Eligibility Contentions.

Additionally, Plaintiff has not identified its contentions regarding the level of education or experience of a person of ordinary skill in the art ("POSITA") for any of the Asserted Patents. Thus, Defendant has based its Invalidity Contentions and Subject Matter Eligibility Contentions on the level of skill in the art apparent from the face of the Asserted Patents. For the avoidance of doubt, Defendant contends that the Asserted Claims are invalid for the reasons set forth in its Invalidity Contentions and Subject Matter Eligibility Contentions under any plausible definition of the level of ordinary skill for each of the Asserted Patents. Nevertheless, Defendant reserves the right to revise these Invalidity Contentions and Subject Matter Eligibility Contentions in response to any position taken by Plaintiff on the level of ordinary skill in the art applicable to a given Asserted Patent.

Defendant may further rely on inventor admissions concerning the scope or state of the prior art relevant to the Asserted Claims, the patent prosecution histories of the Asserted Patents, related patents, and/or patent applications, any deposition or trial testimony of the named inventors of the Asserted Patents, and the papers filed and any evidence produced or submitted by Plaintiff in connection with this case or other related litigation. Defendant reserves the right to contend that the Asserted Claims are invalid under 35 U.S.C. § 256 in the event Defendant obtains evidence that one or more of the named inventors did not invent the subject matter in the Asserted Claims.

Prior art not included in these Invalidity Contentions and Subject Matter Eligibility Contentions, whether known or not known to Defendant, may become relevant. In particular, Defendant is currently unaware of the extent, if any, to which Plaintiff will contend that

limitations of the Asserted Claims are not disclosed in the prior art identified in these Invalidity Contentions and Subject Matter Eligibility Contentions. Accordingly, Defendant reserves the right to identify other references that would disclose the allegedly missing limitation(s) of the claimed method, device, or system.

The references identified in these Invalidity Contentions and Subject Matter Eligibility Contentions, which include the attached claim charts, may disclose the elements of the Asserted Claims explicitly and/or inherently, render those elements alone or in combination obvious to those of ordinary skill in the art even absent an explicit or inherent disclosure, and/or may be relied upon to show the state of the art in the relevant time frame. References identified in these Invalidity Contentions and Subject Matter Eligibility Contentions, as well as the "References Cited" on the face of the Asserted Patents and the patents cited within the body of the Asserted Patents, may be used to illustrate, but not limit the scope of, the state of the art to which the Asserted Patents pertain (*i.e.*, at a time prior to the date of the alleged inventions). Moreover, Defendant reserves the ability to rely on later-identified sources of information, including but not limited to witness testimony and other discovery, to establish the state of the art in the relevant time frame pertaining to the Asserted Patents.

Because discovery is in its early stage, Defendant anticipates that additional prior art and invalidity bases may be found. Defendant's investigation and analysis of the prior art is continuing, and thus Defendant reserves the right to supplement, amend, and/or revise the information provided herein as Defendant conducts further investigation and/or analysis, including identifying, charting, and relying on additional references.

Additionally, in view of likely third-party discovery that will be taken, Defendant reserves the right to present additional items of prior art under 35 U.S.C. §§ 102(a), (b), (e),

and/or (g) and/or § 103 located during discovery or further investigation, and to assert contentions of invalidity under 35 U.S.C. §§ 102(c), (d), or (f), or 35 U.S.C. § 256. For example, Defendant has issued subpoenas to third parties believed to have knowledge, documents, and/or other evidence concerning invalidity of one or more of the Asserted Claims.

In addition to the positions and prior art identified in these Invalidity Contentions and Subject Matter Eligibility Contentions (including the accompanying claim charts), Defendant also incorporates by reference all invalidity contentions and subject matter eligibility contentions, prior art[3], and invalidity claim charts (including, without limitation, all anticipation positions, obviousness positions (including all prior art combinations and motivations to combine), indefiniteness positions, written description positions, and non-enablement positions) concerning one or more of the Asserted Patents, as disclosed at any time. This includes, without limitation, disclosures in previous or related litigation, in copending *inter partes* review petitions filed on the Asserted Patents, in United States Patent & Trademark Office ("USPTO") proceedings, by Plaintiff, by any other parties accused of patent infringement by Plaintiff, or by the named inventors or any individuals associated with the prosecution and/or any form of post-grant review or reexamination of the Asserted Patents.[4]

Specifically, for example, Defendant identifies, as prior art upon which it may rely to show the invalidity of the Asserted Claims, the prior art references disclosed by parties in any other litigation (including *inter partes* review and/or reexamination proceedings) involving one or more of the Asserted Patents, any patent related to any of the Asserted Patents, and/or any

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[3] Prior art appearing in the file histories of the Asserted Patents is not required to be separately produced by Defendant under Patent Rule 3-4(b).

[4] *See* IPR2024-01379, IPR2025-00012, IPR2025-00013, IPR2024-00087, IPR2024-00088.

other patent allegedly assigned to Plaintiff claiming priority to the Asserted Patents (collectively, "Other Proceedings"). To the extent Defendant has stipulated or will stipulate in the future that it will not pursue certain invalidity grounds in this case concerning patent claims subject to instituted *inter partes* review proceedings, Defendant will abide by those stipulations, and nothing in these contentions should be read as suggesting otherwise. Rather, these contentions are intended to put Plaintiff on notice of the grounds of invalidity, within the scope of Patent Rule 3-3, that Defendant may assert in this case, including because the conditions of any relevant stipulation are not met (*e.g*., if the corresponding *inter partes* review is not instituted) or because the grounds fall outside the scope of such stipulations.

Defendant notes that "Applicant Admitted Prior Art" ("AAPA") cannot form the basis of an IPR Ground and thus any stipulations of the type referenced above cannot preclude Defendant from relying on AAPA in this proceeding. *Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1375-76 (Fed. Cir. 2022). The law regarding whether AAPA may be used in other ways in an *inter partes* review is subject to at least one case currently pending before the Federal Circuit. *See* Br. of Appellant Qualcomm Incorporated at 13, *Qualcomm Inc. v. Apple Inc*., No. 23-1208 (Fed. Cir. March 20, 2023) ("Did the Board err in interpreting Section 311(b) to permit Apple's Ground 2, which consists of so-called applicant admitted prior art (AAPA) in view one or more prior art patents or printed publications?"). Further developments regarding the law may impact the scope and effect of any relevant stipulations.

Plaintiff has a present and ongoing duty to produce to Defendant all relevant documents from any other proceedings, including but not limited to all prior art, invalidity contentions, and expert reports on invalidity (among other relevant items). Defendant reserves the right to supplement or otherwise amend these Invalidity Contentions and Subject Matter Eligibility

Contentions in response to any relevant discovery provided by Plaintiff, third parties, opening or rebuttal expert reports, fact or expert depositions, or in response to any claim construction rulings issued by this Court (regardless of how and when such ruling is made). Defendant also reserves the right to supplement or otherwise amend these Invalidity Contentions and Subject Matter Eligibility Contentions in response to any rebuttal evidence disclosed by Plaintiff or as otherwise may be necessary or appropriate under the circumstances.

III. Priority Date of the Asserted Patents and Claims

Defendant reserves the right to amend its Invalidity Contentions with additional prior art and/or with additional charts of the art if Plaintiff is permitted to change its position and alleges earlier or later priority dates. In particular, Section V of Plaintiff's Infringement Contentions cover pleading, which sets out the alleged priority dates for the Asserted Patents, states that the Asserted Claims of the Asserted Patents are entitled to a priority date "at least as early as" and "possibly earlier than" the filing dates of the earliest provisional applications recited on the face of each of the Asserted Patents. Moreover, Plaintiff states that it "may rely on additional evidence to demonstrate earlier dates of conception, reduction to practice, and/or diligence in reducing to practice." Defendant reserves its right to amend its Invalidity Contentions if Plaintiff is permitted to allege earlier dates of conception for the Asserted Patents, or if Plaintiff does not meet its burden to prove the priority dates it asserts.

A. Priority Date for the '108 Patent

The '108 Patent is not entitled to a filing date prior to its actual filing date of July 11, 2020 because it relies on a broken priority chain. Priority claims are governed by statute, including 35 U.S.C. § 120. Section 120 allows an application to benefit from an earlier nonprovisional application that is "***filed before the patenting*** or abandonment of or termination

of proceedings on the first application or on an application similarly entitled to the benefit of the filing date of the first application ***and if it contains or is amended to contain a specific reference to the earlier filed application***." 35 U.S.C. § 120 (emphasis added); *Droplets, Inc. v. E*TRADE BANK*, 887 F.3d 1309, 1315 (Fed. Cir. 2018). As the *Droplets* court explained, "the [earlier filed] application must be copending" with the application to which it claims priority. *Droplets*, 887 F.3d at 1315. Likewise, the "specific reference" to the "prior-filed copending nonprovisional applications must include 'a reference to each such prior-filed application, identifying it by application number . . . ' and indicat[e] 'the relationship of the applications (*i.e.*, whether the later-filed application is a continuation, divisional, or continuation-in-part of the prior-filed nonprovisional application or international application).'" *Id.* (citing PTO regulation 37 C.F.R. § 1.78). The PTO's regulation further requires that the "specific reference" be included in an "application data sheet" ("ADS"). 37 C.F.R. § 1.78 (2015);[5] *Droplets*, 887 F.3d at 1315-16. Courts require strict adherence to the statute and place the burden squarely on applicants to "read and understand the applicable laws" and comply with the PTO's "clear guidance as to how to claim the benefit of a prior-filed application." *Droplets*, 887 F.3d at 1317-18.

The '108 Patent purports to be a continuation of the '819 patent, which issued from Application No. 15/182,513 (the "'513 application"). '108 Patent at (63). During prosecution, the applicant submitted two ADSs reciting the same reliance on the '513 application as a continuation. The '513 application and the application that led to the '108 Patent were never

[5] The *Droplets* case dealt with an earlier version of § 1.78 that permitted the "specific reference" to be in an ADS **or** the first sentence of the specification following the title. *Droplets*, 887 F.3d at 1315-16. Section 1.78 was amended (most recently in 2015) and now only permits the "specific reference" in an ADS.

copending. The former issued as the ’819 patent on June 25, 2019—more than one year before the application underlying the ’108 Patent was ever filed. ’108 Patent at (22); ’819 patent at (45).

The burden was squarely on Plaintiff to “provide a clear, unbroken chain of priority.” *Droplets*, 887 F.3d at 1317 (citing *Medtronic CoreValve, LLC v. Edwards Lifesciences Corp.*, 741 F.3d 1359, 1366 (Fed. Cir. 2014)). Among other necessities, an unbroken chain requires copendency between an application and its predecessor application in the chain. *Id.* at 1315-16; 35 U.S.C. § 120; 37 C.F.R. § 1.78. Plaintiff’s reliance on the ’513 application as a continuation broke its priority chain because the ’513 application and the ’108 Patent were never copending. Accordingly, the ’108 Patent is only entitled to its actual filing date of July 11, 2020.

IV. Patent Rule 3-3(a) – Identification of Prior Art[6]

Pursuant to Patent Rule 3-3(a), and subject to Defendant’s reservations of rights, Defendant identifies each item of prior art that anticipates or renders obvious the Asserted Claims below.[7]

Defendant identifies below the patent references, publications, and systems presently known to Defendant that anticipate and/or render obvious the Asserted Claims of the Asserted

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[6] To the extent one or more prior art patents or publications are identified in the claim charts attached to this document but are not included in the tables and lists for the Asserted Patents, those prior art patents or publications should also be considered as prior art to the Asserted Patents.

[7] Defendant’s disclosure of prior art is premised on the alleged priority dates of the Asserted Patents as identified in Plaintiff’s Infringement Contentions. Defendant contends Plaintiff is not entitled to the alleged priority dates and reserves the right to modify, amend, or supplement its Invalidity Contentions with additional prior art references if any Asserted Claim is shown to not be entitled to the respective alleged priority date or if Plaintiff alleges any other priority date for any of the Asserted Claims. Notwithstanding that reservation of rights, Defendant also reserves the right to argue that it has been unduly prejudiced should Plaintiff allege a different priority date for any of the Asserted Claims, and that accordingly Plaintiff should not be allowed to do so.

Patents. Defendant incorporates by reference all prior art references cited in the patents listed herein and/or their file histories. Defendant reserves the right to rely upon foreign counterparts of the U.S. patents identified in these Invalidity Contentions, U.S. counterparts of foreign patents and foreign patent applications identified in these Invalidity Contentions, U.S. and foreign patents and patent applications corresponding to articles and publications identified in these Invalidity Contentions, and any systems, products, or prior inventions related to any of the references identified in these Invalidity Contentions.

To the extent the following patents or publications disclose and describe particular products and/or software programs that were publicly known and/or in public use prior to the priority date of the Asserted Patents, in addition to each patent itself serving as a prior art reference under 35 U.S.C. § 102, Defendant may rely on the various products and/or software programs described in the patents as grounds for invalidity under 35 U.S.C. § 102 because they were in public use, in which case it would have been obvious to a person of ordinary skill in the art to combine the actual systems in public use with the patents describing those systems because the patents described the systems in public use and refer to them throughout.

Defendant identifies the patents, publications, and/or systems and products listed in the tables below as evidence of the state of the art as it relates to the Asserted Patents. Each of these references shows that the concepts set forth in the Asserted Patents are not novel and were well-known for many years before the alleged priority date of the Asserted Patents, as discussed in more detail in Section IV.B.1 (obviousness).

With respect to the systems or software products identified below, to the extent that one or more documents (*e.g.*, user manual) may be used to describe aspects of a particular device, that device is a single reference for prior art purposes under 35 U.S.C. § 102. Some or all of the

corroborating references may also separately qualify as prior art publications under 35 U.S.C. § 102 and may be used as invalidating references under 35 U.S.C. §§ 102 and/or 103. Further, Defendant is actively searching for information regarding at least the systems, devices, and/or inventions listed below. Defendant reserves the right to supplement these contentions on the basis of information uncovered during this search.

Discovery is ongoing, and Defendant has served third parties with document subpoenas and may serve additional third parties with subpoenas in the future. For example, Defendant has served subpoenas on Aerohive Networks, Inc., Arris International Limited, Cisco Systems, Inc., D-Link Systems, Inc., Extricom Inc., Hewlett Packard Enterprise Company, Juniper Networks, Inc. (in connection with Trapeze Networks), Motorola, Inc., Netgear, Inc., NetScout Systems, Inc., Ookla, LLC, Riverbed Technology LLC, Ruckus Wireless LLC, SolarWinds Worldwide, LLC, and , and reserves the right to rely on devices, documents, or other evidence produced by those third parties. One or more third-party devices, along with related documentation, may be invalidating, and Defendant reserves the right to supplement these contentions accordingly. Defendant continues to investigate each of the identified third-party devices, including through potential discovery needed to be obtained via third party subpoenas, and reserves the right to supplement these contentions and accompanying claim charts after further investigation.

Defendant's reference to a particular system, product, device, or software program in these Invalidity Contentions should be interpreted as a reference to the system itself as well as to any corresponding patents, publications, or product literature relating to the cited system. Defendant's investigation of prior art systems is still ongoing and discovery has not yet been received from third parties who may have information concerning such prior art systems. Accordingly, subsequent discovery may reveal information that affects the disclosures and

contentions herein. For example, subsequent discovery may provide additional information regarding whether or not any of the third-party prior art systems anticipate or render obvious the Asserted Claims. As such, Defendant reserves all rights to supplement its Invalidity Contentions.

Many of the inventive, research, design, and development activities concerning these systems, products, and technologies occurred in the United States before the alleged priority date of the Asserted Claims. Defendant has obtained, and is in the process of obtaining, additional information regarding the dates by which the cited products and services were publicly disclosed, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities through publicly available patents, publications, and product literature. The actual dates, circumstances, and identities of individuals will be the subject of third-party discovery during this case, which Defendant reserves the right to rely upon to corroborate the prior art status of the prior art identified herein. Furthermore, Defendant will make all such devices, software programs, or other products in Defendant's possession, custody, or control available for inspection by Plaintiff. Consequently, Defendant reserves the right to amend, modify, or supplement these Invalidity Contentions should additional information become available to it through discovery.

In addition, Defendant identifies, responsive to Plaintiff's Infringement Contentions, the patents, publications, and/or systems listed in the tables below as evidence of the state of the art as it relates to the respective Asserted Patents. Each of these references shows that the concepts claimed are not novel and were well-known for many years before the alleged priority dates of the Asserted Patents, as discussed in more detail below. In light of the references discussed herein, the Asserted Claims of the Asserted Patents are invalid.

Each prior art patent, publication, or product or system identified below was either effectively filed or issued (for patents), published (for publications), or known, used, offered for sale or sold (for products or systems or methods) before the earliest claimed priority date of the Asserted Patents to which it is applied for invalidity, and none was abandoned, suppressed, or concealed, so each such reference also constitutes evidence of prior invention pursuant to 35 U.S.C. § 102(g), if it is in the United States. The persons or entities involved with each such invention include the named inventors on the below-identified patents, the authors listed on the below-identified publications, and the entities and individuals identified in connection with the below-identified products and systems.

Because Defendant has not yet completed discovery in this case, including taking depositions of the named inventors, and otherwise obtaining discovery from Plaintiff and third parties, Defendant reserves the right to supplement these contentions with facts, documents, or other information learned at a later point through discovery or further investigation.

A. The ’996 Patent

Invalidity claim charts identifying disclosures in the references identified in the tables below as to the Asserted Claims of the ’996 Patent are provided in attached Exhibits A-01 through A-35.

Table 1-A: Prior Art Patents and Printed Publications for the ’996 Patent

Patent Number or Title (Primary Inventor/Author)	Date of Issue/Publication	Filing/Priority Date
US 5,699,365 (“Klayman”)	12/16/1997	03/27/1996
US 5,699,369 (“Guha”)	12/16/1997	03/29/1995
US 6,304,594 (“Salinger”)	10/16/2001	07/27/1998
US 6,314,535 (“Morris”)	11/06/2001	05/18/1999
US 6,477,669 (“Agarwal”)	11/05/2002	01/18/2000
US 6,553,534 (“Yonge”)	04/22/2003	05/23/2002
US 6,546,509 (“Starr”)	04/08/2003	04/17/1998
US 6,823,022 (“Fullerton”)	11/23/2004	06/02/2000

US 6,985,437 (“Vogel”)	01/10/2006	05/25/1999
US 7,162.676 (“Coleman”)	01/09/2007	09/22/2003
US 7,236,451 (“De Francesco”)	06/26/2007	03/03/2003
US 7,315,967 (“Azenko”)	01/01/2008	07/31/2003
US 2003/0046708 (“Jutzi”)	03/06/2003	08/28/2001
US 2004/0015765 (“Cooper”)	01/22/2004	12/06/2000
US 2004/0203392 (“Hsu”)	10/14/2004	09/18/2002
Adaptive Source Rate Control for Real-Time Wireless Video Transmission, Mobile and Applications 3 (1998) 49-60 (“Liu”)	1998	--
Advanced DSL Management, Topics in Broadband Access, IEEE 2003, Kerpez, Kenneth J. et al (“Kerpez”)	09/2003	--
An Adaptive FEC with QoS Provisioning for Real-Time Traffic in LEO Satellite Networks, IEEE 2001 (“Cho”)	2001	--
An Adaptive FEC Algorithm for Mobile Wireless Networks (“Heidmann”)	08/08/2002	--
An Adaptive Coding Scheme for Time-Varying Channels, IEEE Transactions on Communications, Vol. 39, No. 5, May 1991 (“Vucetic”)	1991	--
Arris Cadant C3 CMTS Installation, Operation, and Maintenance Guide	2003, 2004	--
Arris Cadant C3 Cable Modem Termination System Product Overview	12/2003	--
Cisco Products Quick Reference Guide	04/2003	--
D-Link Air DWL-900AP Wireless Access Point Manual, D-Link Systems, Inc.	2002	--
D-Link Air DWL-900AP Quick Install Guide, D-Link Systems, Inc.	2002	--
Data-Over-Cable Service Interface DOCSIS 2.0 (SP-RFIv2.0-I03-021218)	2002	--
Data-Over-Cable Service Interface DOCSIS 2.0 (SP-eDOCSIS-I01-030312)	2003	--
Data-Over-Cable Service Interface DOCSIS 2.0 (SP-OSSIv2.0-I05-040407)	2004	--
Data-Over-Cable Service Interface [Interim] Specifications (SP-OSSI-RFI-I04-010829)	08/29/2001	--
Efficient Hybrid ARQ Protocols with Adaptive Forward Error Correction (“Kallel”)	1994	--
ETSI TS 101 270-2 V1.2.1	07/2003	--
FCC External Photos, FCC ID: KA2DWL900AP-PLUS	2002-2003	--
FCC Internal Photos, FCC ID: KA2DWL900AP-PLUS	2002-2003	--

FCC Operational Description, FCC ID: KA2DWL900AP-PLUS	2002-2003	--
Improving Groupware Performance in Lossy Networks with Adaptive Forward Error Correction ("Dyck")	2002	--
IEEE Std 802.11a-1999 (R2003)	1999	--
IEEE Std 802.11b-1999	1999	--
ITU-T Rec. G.997.1	05/2003	--
Juniper Networks Field Guide and Reference	2002	--
Juniper Networks Reference Guide: JUNOS Routing, Configuration, and Architecture	2002	--
Juniper M5 and M10 Internet Routers Hardware Guide, Revision 3	06/2003	--
Juniper Networks Quick Reference Guide	2005	--
Motorola SBG1000 Wireless Cable Modem Gateway User Guide	2003	--
PacketCable™ MIBs Framework Specification (PKT-SP-MIBS-I08-040113)	2004	--
Spectrum Management Standard, Kerpez et al.	11/2002	--
Variable-Rate Transmission for Rayleigh Fading Channels ("Cavers")	02/1972	--

Table 2-A: Prior Art Systems and Inventions for the '996 Patent

Name of System[8] or Invention	Date of Sale/Offer for Sale/Public Use/Known by Others
Arris Cadant C3 Cable Modem Termination System	12/2003
Cisco uBR10012	01/24/2003
Cisco 7600 Routers	02/2001
Cisco 10700 Routers	2002
Cisco 12000 Routers	2003
D-Link DI-704 Cable/DSL Internet Gateway	2001
D-Link Air DWL-900AP	2002
D-Link Air DWL-900AP+	2002
Juniper M5 Routers	2000
Juniper M7 Routers	2000
Juniper M10 Routers	2000
Juniper G10 Cable Modem Termination System	2001-2002
Juniper P1-PTX-2-100G-WDM	2002
Juniper P1-PTX-24-10G-W-SFPP	2002
Motorola SURFboard SB5100 Cable Modem	2002

[8] "System" in these contentions includes any relevant combination of hardware and/or software.

Motorola SBG1000 Wireless Cable Modem Gateway	2002
Motorola Cablecomm system	2002
NetGear CG814M	2002
NetGear GS748T	2002
Touchstone™ CM550 Cable Modem	08/2003

B. The ’398 Patent

Invalidity claim charts identifying disclosures in the references identified in the tables below as to the Asserted Claims of the ’398 Patent are provided in attached Exhibits B-01 through B-17.

Table 1-B: Prior Art Patents and Printed Publications for the ’398 Patent

Patent Number or Title (Primary Inventor/Author)	Date of Issue/Publication	Filing/Priority Date
EP 2112781 (“Gomez”)	10/28/2009	04/24/2008
US 5,970,064 (“Clark”)	10/19/1999	06/12/1997
US 5,974,106 (“Dupont”)	10/26/1999	09/01/1995
US 6,430,612 (“Iizuka”)	08/06/2002	03/29/1999
US 6,469,982 (“Henrion”)	10/22/2002	07/29/1999
US 6,618,356 (“Bonaventure-356”)	09/09/2003	02/16/2000
US 6,678,247 (“Bonaventure-247”)	01/13/2004	12/03/1999
US 6,680,907 (“Bonaventure-907”)	01/20/2004	09/08/1999
US 7,840,220 (“Mitchell”)	11/23/2010	09/09/2004
US 7,864,669 (“Bonaventure-669”)	01/04/2011	10/20/2005
US 8,126,011 (“Evans”)	02/28/2012	07/27/2004
US 8,249,520 (“Chuang”)	08/21/2012	03/10/2010
US 8,355,316 (“Lushear”)	01/15/2013	12/16/2009
US 8,520,586 (“Husted”)	08/27/2013	12/16/2009
US 8,880,666 (“Aaron”)	11/04/2014	10/29/2010
US 9,277,564 (“Wang”)	03/01/2016	08/04/2011
US 9,313,752 (“Czaja”)	04/12/2016	05/20/2008
US 2003/0031180 (“Datta”)	02/13/2003	10/02/2002
US 2003/0076784 (“Ta”)	04/24/2003	10/24/2001
US 2003/0198200 (“Diener-200”)	10/23/2003	09/18/2002
US 2004/0221296 (“Ogielski”)	11/04/2004	03/18/2004
US 2005/0055466 (“Matsuno”)	03/10/2005	09/09/2004
US 2005/0055579 (“Kanda”)	03/10/2005	08/19/2004
US 2005/0114501 (“Raden”)	05/26/2005	11/25/2003
US 2005/0132044 (“Guingo”)	06/16/2005	12/12/2003
US 2005/0261915 (“Ooki”)	11/24/2005	09/24/2003
US 2006/0126613 (“Zweig”)	06/15/2006	12/09/2004

US 2006/0187885 (“Roy”)	08/24/2006	09/30/2005
US 2007/0153807 (“Cruz”)	07/05/2007	12/07/2006
US 2007/0180490 (“Renzi”)	08/02/2007	07/01/2004
US 2008/0049631 (“Morrill”)	02/28/2008	05/31/2007
US 2008/0098454 (“Toh”)	04/24/2008	10/27/2005
US 2008/0159124 (“Sasaki”)	07/03/2008	11/29/2007
US 2008/0186873 (“Pujet”)	08/07/2008	02/05/2007
US 2008/0219239 (“Bell”)	09/11/2008	03/04/2008
US 2009/0016358 (“Lee”)	01/15/2009	07/02/2008
US 2009/0055900 (“Gopalasetty”)	02/26/2009	08/21/2007
US 2009/0075648 (“Reed”)	03/19/2009	06/16/2008
US 2009/0147697 (“Malik”)	06/11/2009	12/05/2007
US 2009/0201805 (“Begen”)	08/13/2009	04/11/2008
US 2009/0207730 (“Stamoulis”)	08/20/2009	02/14/2008
US 2009/0310528 (“Tamura”)	12/17/2009	06/16/2009
US 2010/0153377 (“Rajan”)	06/17/2010	12/11/2009
US 2010/0290465 (“Ankaiah”)	11/18/2010	05/13/2010
US 2011/0002371 (“Forenza”)	01/06/2011	06/16/2010
US 2011/0013529 (“Bin”)	01/20/2011	04/02/2008
US 2011/0110359 (“Cooke”)	05/12/2011	07/13/2009
US 2011/0182182 (“Yang”)	07/28/2011	04/19/2010
US 2011/0267951 (“Stanwood”)	11/03/2011	07/14/2011
US 2011/0273979 (“Grabelsky”)	11/10/2011	06/21/2011
US 2011/0314145 (“Raleigh”)	12/22/2011	05/25/2011
US 2012/0089664 (“Igelka”)	04/12/2012	10/12/2010
US 2012/0151540 (“Stanwood”)	06/14/2012	06/07/2011
US 2012/0266020 (“Souvannarath”)	10/18/2012	04/18/2011
US 2012/0294310 (“Yen”)	11/22/2012	05/18/2011
US 2013/0077482 (“Krishna”)	03/28/2013	09/20/2011
US 2013/0122910 (“Singh”)	05/16/2013	09/28/2011
US 2014/0304408 (“Rhee-408”)	10/09/2014	11/10/2011
US 2016/0261490 (“Evans”)	09/08/2016	10/31/2014
US 2016/0315976 (“Detal”)	10/27/2016	12/08/2014
US 2018/0248984 (“Bonaventure-984”)	08/30/2018	09/19/2016
WO2013/070232 (“Rhee-232”)	05/16/2013	11/10/2011
Padam Kafle, Interference Management for TVWs Networks	07/15/2011	--
12 Ways to Optimize your Event Wi-Fi Deployment	07/05/2011	--
Cisco Radio Source Management under Unified Wireless Networks (“Cisco-71113”)	05/17/2010	--
Nabeel Ahmed, Interference Management in Dense 802.11	2009	--

Decision Making: Factors that Influence Decision Making, Heuristics Used, and Decision Outcomes	2010	--
US 8,995,996 (“Bims”)	03/31/2015	06/12/2009
US 2004/0137915 (“Diener -915”)	07/15/2004	11/19/2003
US 2005/0249157 (“Qian”)	11/10/2005	05/07/2004
US 2006/0182064 (“Durand”)	08/17/2006	04/11/2005
US 6,850,764 (“Patel”)	02/01/2005	12/17/1999
US 7,263,351 (“Ross”)	08/28/2007	07/01/2002
US 7,408,907 (“Diener-907”)	08/05/2008	08/15/2003
US 8,731,568 (“Epstein”)	05/20/2014	09/29/2008
US 2008/0070509 (“Kish”)	03/20/2008	08/20/2007
US 2008/0201109 (“Zill”)	08/21/2008	02/28/2007
US 2012/0082111 (“Tan”)	05/05/2012	11/09/2011
US 9,451,451 (“Chow – 451”)	10/23/2014	09/30/2011
US 2004/0087327 (“Guo”)	05/06/2004	04/18/2001
CN 1961530 (“Rhee”)	05/06/2004	12/02/2004
US 2008/0119215 (“Ji”)	05/22/2008	09/06/2007
US 2012/0320768 (“Shaffer”)	12/20/2012	06/20/2011
US 2010/0302957A1 (“Ketheesan”)	12/02/2010	12/07/2009
US 2002/0172186 (“Larsson”)	11/21/2002	04/08/2002
US 2007/0127360 (“Song”)	06/07/2007	12/05/2005
US 2010/0071053 (“Ansari”)	03/18/2010	09/07/2007
US 2010/0260173 (“Johnson”)	10/14/2010	04/08/2009
Andrew Tanenbaum, Computer Networks, 5th Edition.	2010	--
US 7,558,315 (“Cioffi - 315”)	06/23/2005	12/02/2004
IEEE 802.11-07/0118r4 (“Rudolph”)	05 2007	--
Daji Qiao et al., Fast-Responsive Link Adaptation For IEEE 802.11 WLANs (“Qiao”)	05/16/2005	--
Hariharasudhan Viswanathan, Adaptive Transmit Power Control Based on Signal Strength and Frame Loss Measurements for WLANs (“Viswanathan”)	10/2009	--
Starsky Wong et al., Robust Rate Adaptation for 802.11 Wireless Networks (“Wong”)	09/2006	--
Eduard Garcia Villegas, Self Optimization of Radio Resources on IEEE 802.11 (“Villegas”)	07/2009	--
IEEE Std 802.11k-2008	06/12/2008	--
802.11g Standard	2003	
IEEE Std 802.11v-2011	02/09/2011	--
IEEE Std 802.11-2007	06/12/2007	--
John C. Bicket, Bit-rate Selection in Wireless Networks (“Bicket”)	02/2005	--

IEEE P802.11 Improvement to BSS Transition Management	11/2009	--
Meraki Auto RF	2011	--

Table 2-B: Prior Art Systems and Inventions for the ’398 Patent

Name of System or Invention	Date of Sale/Offer for Sale/Public Use/Known by Others
Meraki Wireless LAN Solution	2010
Aruba Wireless LAN Solution	2008
Aerohive Enterprise Networking Solutions	03/14/2011
Cisco Unified Wireless Network solution	06/2010
Extricom Wireless LAN System	2009
Trapeze Mobility Exchange WLAN controllers	02/2008
Ruckus Smart Wireless LAN (WLAN) system	06/2011
HP ProCurve Multi Service Mobility WLAN Solution	2009

C. The ’654 Patent

Invalidity claim charts identifying disclosures in the references identified in the tables below as to the Asserted Claims of the ’654 Patent are provided in attached Exhibits C-01 through C-16.

Table 1-C: Prior Art Patents and Printed Publications for the ’654 Patent

Patent Number or Title (Primary Inventor/Author)	Date of Issue/Publication	Filing/Priority Date
US 6,681,232 (“Sistanizadeh”)	01/20/2004	05/22/2001
US 6,915,271 (“Meyer”)	07/05/2005	03/05/1999
US 7,633,869 (“Morris”)	12/15/2009	12/15/2005
US 7,530,020 (“Szabo”)	05/05/2009	12/21/2006
US 7,934,212 (“Lakhdhir”)	04/26/2011	08/23/2006
US 8,290,920 (“Mahajan”)	10/16/2012	09/09/2010
US 8,473,628 (“Kapoor”)	06/25/2013	08/29/2008
US 9,250,883 (“DeAnna”)	02/02/2016	06/02/2011
US 2002/0138443 (“Schran”)	09/26/2002	02/19/2002
US 2002/0174421 (“Zhao”)	11/21/2002	03/29/2002
US 2003/0005112 (“Krautkremer”)	01/02/2003	06/28/2001
US 2004/0039809 (“Ranous”)	02/26/2004	06/03/2003
US 2004/0044761 (“Phillipi-761”)	03/04/2004	08/29/2003
US 2005/0018697 (“Enns”)	01/27/2005	12/02/2003
US 2005/0114500 (“Monk”)	03/26/2005	11/24/2003

US 2005/0123027 (“Cioffi-027”)	06/09/2005	04/02/2004
US 2006/0164978 (“Werner”)	07/27/2006	01/21/2005
US 2006/0023638 (“Monaco”)	02/02/2006	07/29/2005
US 2007/0022443 (“Santhoff”)	01/25/2007	07/20/2005
US 2007/0250625 (“Titus”)	10/25/2007	04/25/2007
US 2008/0262901 (“Banga”)	10/23/2008	10/23/2006
US 2008/0002677 (“Bugenhagen-677”)	01/03/2008	05/31/2007
US 2008/0298444 (“Cioffi-444”)	12/04/2008	10/04/2005
US 2008/0139197 (“Misra”)	06/12/2008	04/14/2006
US 2008/0089347 (“Phillipi-347”)	04/17/2008	12/04/2007
US 2009/0207985 (“Cioffi-985”)	08/20/2009	06/06/2007
US 2010/00088410 (“Ridley”)	04/08/2010	03/11/2008
US 2011/0070906 (“Chami”)	03/24/2011	09/14/2010
US 2011/0149720 (“Phuah”)	06/23/2011	12/17/2009
US 2011/0119370 (“Huang”)	05/19/2011	11/17/2009
US 2011/0191465 (“Hofstaedter”)	08/04/2011	02/01/2010
US 2012/0057152 (“Eldesouki”)	03/08/2012	09/06/2010
US 2012/0017156 (“Broda”)	01/19/2012	07/19/2010
US 2012/0091724 (“Bodestein”)	04/19/2012	11/17/2009
US 2012/0096143 (“Suit”)	04/19/2012	10/15/2010
US 2012/0096159 (“Short”)	04/19/2012	10/20/2000
US 2012/0244863 (“Burnette”)	09/27/2012	03/23/2012
US 2012/0257535 (“DeWath”)	10/11/2012	04/06/2012
US 2014/0047100 (“Lachapelle”)	02/13/2014	08/09/2012
US 2007/0217436 (“Markley”)	09/20/2007	03/16/2006
WO 1999/019803 (“Barry”)	04/22/1999	09/25/1998
WO 2005/048629 (“Bostica”)	05/26/2005	11/17/2003
WO 2012/091725 (“Chow-725”)	07/05/2012	12/30/2010
WO 2008/030292 (“Bugenhagen-292”)	03/13/2008	06/29/2007
ITU-T Recommendation Y.1731, OAM functions and mechanisms for Ethernet based networks	05/2006	--
Li Zhang et al., Performance management for network QoS in EPON system	2007	--
Bruno P. Ramos et al., Internet Access Quality Monitor	2008	--
Shashank Srivastava et al., Enhancing the Efficiency of Secure Network Monitoring Through Mobile Agents	2010	--
TR-069 CPE WAN Management Protocol v.1.1, Issue 1, Amendment 2 (December 2007)	2007	--
David Chiang et al., A Mobile Agent Brokering Environment for the Future Open Network Marketplace	05/21/2002	--
Helmut Simonis et al., Bandwidth on Demand	08/18/2010	--

Network Performance Monitoring System for SLA: Implementation and Practices ("2004 Conference")	02/2004	--
Jiannong Cao et al., Scalable Load Balancing on Distributed Web Servers using Mobile Agents	05/14/2003	--
Jahangir Alam, Survey of Network Performance Monitoring Tools	06/15/2010	--
IP Bandwidth Allocation Management Using Agents and Neural Network Approach ("2002 Conference")	10/2002	--
Simone Basso et al., The Network Neutrality Bot Architecture: A Preliminary Approach for Self-Monitoring of Internet Access QoS	2011	--
Ajay Mahimkar et al., Bandwidth on Demand for Inter-Data Center Communication	11/14/2011	--
US 9,130,766 ("Phuah")	09/08/2015	12/17/2009
US 9,338,074 ("Puthenpura")	05/10/2016	12/08/2010
US 9,425,977 ("Pfeffer")	08/23/2016	09/27/2010
US 2009/0003219 ("Beacham")	01/01/2009	01/29/2007
US 2011/0119370 ("Huang")	05/19/2011	11/17/2009
US 9,531,607 ("Pai")	12/27/2016	06/20/2012
US 2014/0321298 ("Chow")	10/30/2014	01/12/2011
US 7,801,054 ("Reichman")	09/21/2010	10/02/2006
US 2008/0005156 ("Edwards")	01/03/2008	05/31/2007

Table 2-C: Prior Art Systems and Inventions for the '654 Patent

Name of System or Invention	Date of Sale/Offer for Sale/Public Use/Known by Others
AT&T U-Verse	2006
NetScout nGenius Packet Analyzer	1998-2010
PRTG Network Monitor 9 User Manual	11/2011
Solar Winds Network Performance Monitor	12/12/2006
Speed of Me	12/2011
Juniper Networks, ISM2000 Integrated Service Module	02/2009
MEF 7.1 – Phase 2 EMS-NMS Information Model	10/2009
MEF 3 – Circuit Emulation Service Definitions, Framework and Requirements in Metro Ethernet Networks	04/13/2004
Riverbed Steelhead products	2010
Xfinity Internet and Voice User Guide	2012
Broadband Tests and Tools	01/03/2012
PingTest – The Global Broadband Quality Test	11/27/2010
TestMyNet Automatic Speed Test	06/20/2012
Cisco WAN and Application Optimization Solution Guide	04/2008

Ookla	2006-2010
Meraki	2007-2011

D. The ’108 Patent

Invalidity claim charts identifying disclosures in the references identified in the tables below as to the Asserted Claims of the ’108 Patent are provided in attached Exhibits D-01 through D-17.

Table 1-D: Prior Art Patents and Printed Publications for the ’108 Patent

Patent Number or Title (Primary Inventor/Author)	Date of Issue/Publication	Filing Date
WO 2007146048 (“Cioffi-048”)	12/21/2007	06/06/2007
US 5,822,302 (“Scheetz”)	10/13/1998	11/25/1996
US 6,085,243 (“Fletcher”)	04/04/2000	12/03/1996
US 6,393,480 (“Qin”)	05/21/2002	07/21/1999
US 6,625,169 (“Tofano”)	09/23/2003	06/14/2002
US 6,785,279 (“Crooks-279”)	05/09/2002	12/23/1998
US 6,859,452 (“Crooks-452”)	02/22/2005	03/20/2000
US 7,633,869 (“Morris”)	12/15/2009	12/15/2005
US 7,672,319 (“Heath”)	02/02/2010	02/14/2005
US 7,991,881 (“Qian”)	08/02//2011	02/29/2008
US 7,991,872 (“Wong”)	08/02/2011	05/12/2008
US 8,533,687 (“Greifeneder”)	09/10/2013	11/30/2009
US 8,659,996 (“Manthoulis”)	02/25/2014	09/17/2004
US 9,026,639 (“Kelley”)	05/05/2015	10/04/2007
US 10,333,819 (“Chow-819”)	06/25/2019	06/14/2016
US 2001/0047406 (“Araujo”)	11/29/2001	04/13/2001
US 2002/0055988 (“Crooks-988”)	05/09/2002	12/23/1998
US 2002/0198952 (“Bell”)	12/26/2002	08/15/2002
US 2003/0039240 (“Sutanto”)	02/27/2003	08/24/2001
US 2003/0101244 (“Lockridge”)	05/29/2003	08/20/2002
US 2003/0145082 (“Son”)	07/31/2003	05/15/2002
US 2004/0133689 (“Vasisht”)	07/08/2004	12/22/2003
US 2004/0034800 (“Shinghai”)	02/19/2004	08/08/2003
US 2005/0058143 (“Kikuchi”)	03/17/2005	07/2/2004
US 2006/0164978 (“Werner”)	07/27/2006	01/21/2005
US 2006/0198356 (“Mayernick”)	09/07/2006	02/26/2004
US 2006/0218267 (“Khan”)	09/28/2006	03/24/2005
US 2006/0259583 (“Matsuura”)	11/16/2006	04/14/2005
US 2006/0280189 (“McRae”)	12/14/2006	06/13/2005
US 2006/0075093 (“Frattura”)	04/06/2006	10/05/2004

US 2008/0013554 (“Motegi”)	01/17/2008	07/10/2007
US 2008/0049776 (“Wiley-776”)	02/28/2008	05/31/2007
US 2008/0089237 (“Molen”)	04/17/2008	10/11/2006
US 2008/0159124 (“Sasaki”)	07/03/2008	11/29/2007
US 2008/0181240 (“Jiang-240”)	07/31/2008	01/30/2007
US 2008/0219168 (“Enomoto”)	09/11/2008	03/05/2008
US 2008/0225721 (“Plamondon”)	09/18/2008	03/12/2007
US 2008/0240089 (“Jiang-089”)	10/02/2008	03/29/2007
US 2009/0028181 (“Shimon”)	01/29/2009	02/28/2006
US 2009/0080448 (“Tarra”)	03/26/2009	09/24/2008
US 2009/0245278 (“Kee”)	10/01/2009	03/31/2008
US 2009/0257361 (“Deshpande”)	10/15/2009	09/28/2007
US 2010/0014415 (“Moeller”)	01/21/2010	05/15/2007
US 2010/0103941 (“Jiang -941”)	04/29/2010	10/24/2008
US 2010/0211673 (“Kosbab”)	08/19/2010	02/19/2009
US 2010/0238930 (“Shan”)	09/23/2010	06/07/2009
US 2011/0058575 (“Oshima”)	03/10/2011	04/19/2010
US 2011/0149720 (“Phuah”)	06/23/2011	12/17/2009
US 2011/0182182 (“Yang”)	07/28/2011	04/19/2010
US 2011/0191465 (“Hofstaedter”)	08/04/2011	02/01/2010
US 2011/0277001 (“Kaluskar”)	11/10/2011	05/06/2010
US 2012/0053901 (“Arefeen”)	03/01/2012	08/31/2010
US 2015/0230275 (“Kerpez”)	08/13/2015	09/29/2012
US 2016/0294669 (“Chow-669”)	10/06/2016	06/14/2016
US 2017/0111105 (“Ling”)	04/20/2017	07/11/2016
WO 2017/167938A1 (“Humphrye”)	10/05/2017	03/20/2017
JP 2022/368775 (“Kawabata”)	12/20/2002	06/11/2001
US 2002/0055988 (“Crooks”)	05/09/2002	12/23/1998
US 2004/0034800 (“Singhal”)	02/19/2004	08/09/2002
US 2005/0129218 (“Kimble”)	06/16/2005	12/15/2003
US 2011/0119370 (“Huang”)	05/19/2011	11/17/2009
WO 2005/048629 (“Bostica”)	05/26/2005	11/17/2003
US 2008/0089347 (“Phillipi”)	04/17/2008	12/04/2007
“LAN Segmentation,” tripod.com	2002	--
Do-Hyeon Kim et al., An Efficient Integrated Network Management for Heterogeneous LANs and WANs	2000	--
Sameh Rabie et al., An Integrated Architecture for LAN/WAN Management	1992	--
Tracy A. Brown et al., “And CNM for all: Customer Network Management Services for Broadband Data Services”	1993	--
Paul J. Kuhn, Kommunikation in verteilten Systemen	1989	--

Minoshi Hanaki, LAN/WAN Management Integration using ATM CNM Interface	1996	--
Mateen et al., Design and Implementation of Network Operational Management Systems for Integrated and Automated Management of LANs and WANs	01/05/2005	--
Series G: Transmission Systems And Media, Digital Systems And Networks (ITU-T)	05/2003	--
US 8,531,954 ("McNaughton")	09/10/2013	05/31/2007
US 2009/0092047 ("Gemelos")	04/09/2009	10/08/2007
US 2010/0329149 ("Singh")	12/30/2010	06/29/2010

Table 2-D: Prior Art Systems and Inventions for the '108 Patent

Name of System or Invention	Date of Sale/Offer for Sale/Public Use/Known by Others
Ethernet Connectivity Fault Management – Cisco	11/17/2006
Kenneth J. Kerpez, *Integrated DSL Test, Analysis, and Operations*, IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, Vol. 57, No. 4 (pages 770-80)	04/2008
MTR	2010
Traceroute	1987-2010
Ping	1983-2010
PingTest – The Global Broadband Quality Test	11/27/2010
NetScout nGenius Packet Analyzer	1998-2010
Solar Winds Network Performance Monitor	12/12/2006
Cisco WAN and Application Optimization Solution Guide	04/2008
Riverbed Steelhead products	2010
Ookla	2006-2010
Meraki	2007-2010

E. The '313 Patent

Invalidity claim charts identifying disclosures in the references identified in the tables below as to the Asserted Claims of the '313 Patent are provided in attached Exhibits E-01 through E-17.

Table 1-E: Prior Art Patents and Printed Publications for the '313 Patent

Patent Number or Title (Primary Inventor/Author)	Date of Issue/Publication	Filing Date
US 7408907 ("Diener - 907")	08/05/2008	08/15/2003
EP 2112781 ("Gomez")	10/28/2009	04/24/2008

US 5,970064 (“Clark”)	10/19/1999	06/12/1997
US 5,974,106 (“Dupont”)	10/26/1999	09/01/1995
US 6,430,612 (“Iizuka”)	08/06/2002	03/29/1999
US 6,469,982 (“Henrion”)	10/22/2002	07/29/1999
US 6,618,356 (“Bonaventure-356”)	09/09/2003	02/16/2000
US 6,678,247 (“Bonaventure-247”)	01/13/2004	12/03/1999
US 6,680,907 (“Bonaventure-907”)	01/20/2004	09/08/1999
US 7,840,220 (“Mitchell”)	11/23/2010	09/09/2004
US 7,864,669 (“Bonaventure-669”)	01/04/2011	10/20/2005
US 8,126,011 (“Evans”)	02/28/2012	07/27/2004
US 8,249,520 (“Chuang”)	08/21/2012	03/10/2010
US 8,355,316 (“Lushear”)	01/15/2013	12/16/2009
US 8,520,586 (“Husted”)	08/27/2013	12/16/2009
US 8,880,666 (“Aaron”)	11/04/2014	10/29/2010
US 9,277,564 (“Wang”)	03/01/2016	08/04/2011
US 9,277,564 (“Czaja”)	04/12/2016	05/20/2008
US 10,057,080 (“Evans”)	08/21/2018	10/20/2014
US 10,530,695 (“Cioffi - 695”)	01/07/2020	11/10/2017
US 2003/0031180 (“Datta”)	02/13/2003	10/02/2002
US 2003/0076784 (“Ta”)	04/24/2003	10/24/2001
US 2003/0198200 (“Diener-200”)	10/23/2003	09/18/2002
US 2004/0221296 (“Ogielski”	11/04/2004	03/18/2004
US 2005/0055466 (“Matsuno”)	03/10/2005	09/09/2004
US 2005/0055579 (“Kanda”)	03/10/2005	08/19/2004
US 2005/0114501 (“Raden”)	05/26/2005	11/25/2003
US 2005/0132044 (“Guingo”)	06/16/2005	12/12/2003
US 2005/0261915 (“Ooki”)	11/24/2005	09/24/2003
US 2006/0126613 (“Zweig”)	06/15/2006	12/09/2004
US 2006/0187885 (“Roy”)	08/24/2006	09/30/2005
US 2007/0153807 (“Cruz”)	07/05/2007	12/07/2006
US 2007/0180490 (“Renzi”)	08/02/2007	07/01/2004
US 2008/0049631 (“Morrill”)	02/28/2008	05/31/2007
US 2008/0098454 (“Toh”)	04/24/2008	10/27/2005
US 2008/0159124 (“Sasaki”)	07/03/2008	11/29/2007
US 2008/0186873 (“Pujet”)	08/07/2008	02/05/2007
US 2008/0219239 (“Bell”)	09/11/2008	03/04/2008
US 2009/0016358 (“Lee”)	01/15/2009	07/02/2008
US 2009/0055900 (“Gopalasetty”)	02/26/2009	08/21/2007
US 2009/0075648 (“Reed”)	03/19/2009	06/16/2008
US 2009/0147697 (“Malik”)	06/11/2009	12/05/2007
US 2009/0201805 (“Begen”)	08/13/2009	04/11/2008
US 2009/0207730 (“Stamoulis”)	08/20/2009	02/14/2008
US 2009/0310528 (“Tamura”)	12/17/2009	06/16/2009
US 2010/0153377 (“Rajan”)	06/17/2010	12/11/2009
US 2010/0290465 (“Ankaiah”)	11/18/2010	05/13/2010

US 2011/0002371 (“Forenza”)	01/06/2011	06/16/2010
US 2011/0013529 (“Bin”)	01/20/2011	04/02/2008
US 2011/0110359 (“Cooke”)	05/12/2011	07/13/2009
US 2011/0182182 (“Yang”)	07/28/2011	04/19/2010
US 2012/0266020 (“Souvannarath”)	10/18/2012	04/18/2011
US 2011/0267951 (“Stanwood”)	11/03/2011	07/14/2011
US 2011/0273979 (“Grabelsky”)	11/10/2011	06/21/2011
US 2011/0314145 (“Raleigh”)	12/22/2011	05/25/2011
US 2012/0089664 (“Igelka”)	04/12/2012	10/12/2010
US 2012/0151540 (“Stanwood”)	06/14/2012	06/07/2011
US 2012/0294310 (“Yen”)	11/22/2012	05/18/2011
US 2013/0077482 (“Krishna”)	03/28/2013	09/19/2012
US 2013/0122910 (“Singh”)	05/16/2013	09/25/2012
US 2014/0304408 (“Rhee-408”)	10/09/2014	11/10/2011
US 2016/0261490 (“Evans”)	09/08/2016	10/31/2014
US 2016/0315976 (“Detal”)	10/27/2016	12/08/2014
US 2018/0248984 (“Bonaventure-984”)	08/30/2018	09/19/2016
WO2013/070232 (“Rhee-232”)	05/16/2013	11/10/2011
Padam Kafle et al., Interference Management for TVWs Networks	07/15/2011	--
12 Ways to Optimize your Event Wi-Fi Deployment	07/05/2011	--
Cisco Radio Source Management under Unified Wireless Networks (“Cisco-71113”)	05/17/2010	--
Nabeel Ahmed, Interference Management in Dense 802.11 =	2009	--
Cindy Dietrich, Decision Making: Factors that Influence Decision Making, Heuristics Used, and Decision Outcomes	2010	--
US 8,995,996 (“Bims”)	03/31/2015	06/12/2009
US 2004/0137915 (“Diener-915”)	07/15/2004	11/19/2003
US 2005/0249157 (“Qian”)	11/10/2005	05/07/2004
US 2006/0182064 (“Durand”)	08/17/2006	04/11/2005
US 6,850,764 (“Patel”)	02/01/2005	12/17/1999
US 7,263,351 (“Ross”)	08/28/2007	07/01/2002
US 7,408,907 (“Diener-907”)	08/05/2008	08/15/2003
US 8,731,568 (“Epstein”)	05/20/2014	09/29/2008
US 2008/0070509 (“Kish”)	03/20/2008	08/20/2007
US 2008/0201109 (“Zill”)	08/21/2008	02/28/2007
US 2012/0082111 (“Tan”)	05/05/2012	11/09/2011
US 9,451,451 (“Chow – 451”)	10/23/2014	09/30/2011
US 2004/0087327 (“Guo”)	05/06/2004	04/18/2001
CN 1961530 (“Rhee”)	05/06/2004	12/02/2004
US 2008/0119215 (“Ji”)	05/22/2008	09/06/2007
US 2012/0320768 (“Shaffer”)	12/20/2012	06/20/2011

US 2010/0302957A1 (“Ketheesan”)	12/02/2010	12/07/2009
US 2002/0172186 (“Larsson”)	11/21/2002	04/08/2002
US 2007/0127360 (“Song”)	06/07/2007	12/05/2005
US 2010/0071053 (“Ansari”)	03/18/2010	09/07/2007
US 2010/0260173 (“Johnson”)	10/14/2010	04/08/2009
Andrew Tanenbaum, Computer Networks, 5th Edition.	2010	--
US 7,558,315 (“Cioffi - 315”)	06/23/2005	12/02/2004
IEEE 802.11-07/0118r4 (“Rudolph”)	05 2007	--
Daji Qiao et al., Fast-Responsive Link Adaptation For IEEE 802.11 WLANs (“Qial”)	05/16/2005	--
Hariharasudhan Viswanathan, Adaptive Transmit Power Control Based on Signal Strength and Frame Loss Measurements for WLANs (“Viswanathan”)	10/2009	--
Starsky Wong et al., Robust Rate Adaptation for 802.11 Wireless Networks (“Wong”)	09/2006	--
Eduard Garcia Villegas, Self Optimization of Radio Resources on IEEE 802.11 (“Villegas”)	07/2009	--
IEEE Std 802.11k-2008	06/12/2008	--
IEEE Std 802.11v-2011	02/09/2011	--
IEEE Std 802.11-2007	06/12/2007	--
802.11g Standard	2003	
John C. Bicket, Bit-rate Selection in Wireless Networks (“Bicket”)	02/2005	--
IEEE P802.11 Improvement to BSS Transition Management	11/2009	--
Meraki Audio RF	2007-2011	--

Table 2-E: Prior Art Systems and Inventions for the ’313 Patent

Name of System or Invention	Date of Sale/Offer for Sale/Public Use/Known by Others
Meraki Wireless LAN Solution	2010
Aruba Wireless LAN Solution	2008
Aerohive Enterprise Networking Solutions	03/14/2011
Cisco Unified Wireless Network solution	06/2010
Extricom Wireless LAN System	2009
Trapeze Mobility Exchange WLAN controllers	02/2008
Ruckus Smart Wireless LAN (WLAN) system	06/2011
HP ProCurve Multi Service Mobility WLAN Solution	2009

V. Patent Rule 3-3(b) – Invalidity Grounds

Pursuant to Patent Rule 3-3(b), Defendant contends that certain prior art references below anticipate one or more Asserted Claims and that to the extent the identified prior art references do not anticipate the Asserted Claims, those claims are invalid as obvious under 35 U.S.C. § 103. Each anticipatory prior art reference, either alone or in combination with other prior art, also renders the Asserted Claims invalid as obvious. In particular, each anticipatory prior art reference may be combined with (1) information generally known to persons skilled in the art at the time of the alleged invention, and/or (2) any of the other identified prior art references. To the extent Plaintiff contends that any of the anticipatory prior art fails to disclose one or more limitations of the Asserted Claims, Defendant contends that any difference between the reference and the corresponding patent claims would have been obvious to one of ordinary skill in the art. Thus, all anticipation charts should be interpreted as both reflecting anticipation by the reference as well as obviousness by the reference on its own (*i.e.*, single reference obviousness) or in combination with any of the other identified prior art references provided in connection with each respective Asserted Patent. Defendant reserves the right to rely on any portion of each reference,[9] cited or not, to show that the Asserted Claims are invalid.

Defendant's attached charts provide citations to certain prior art references where information that anticipates and/or renders obvious the claimed inventions may be found, either expressly or inherently. There may, however, be additional support in the cited references or other grounds for Defendant's contentions that such prior art meets a particular claim element,

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[9] An identification of a prior art reference for purposes of identifying an exhibit should be understood to mean that the chart discloses not only bases for invalidity based on that reference, but also that reference in combination with other references identified or referred to in these Invalidity Contentions, including any other references described in Exhibit A.

and Defendant reserves the right to supplement these Invalidity Contentions with such information. For example, persons of ordinary skill in the art at the time of the filing of the Asserted Patents knew to read prior art references as a whole (as opposed to excerpts in isolation), and in the context of other publications and literature as well as the general knowledge in the field. Defendant may rely on all such information, including uncited portions of the prior art references listed herein, and on other publications and testimony, to provide context and as aids to understanding and interpreting the listed references, or to establish that a person of ordinary skill in the art would have been motivated to modify or combine any of the cited references so as to render the claims obvious.

Some of the references on which Defendant relies are prior art systems that were known, in public use, on sale, and/or described in a printed publication prior to the priority date of the Asserted Patents. Defendant is continuing to collect documentation, software, and source code regarding these prior art systems, including through third party discovery. Defendant reserves the right to supplement its contentions to include any further information obtained in discovery.

A. Anticipation

As stated above, Defendant incorporates by reference all other invalidity contentions related to the Asserted Patents served on or otherwise provided to Plaintiff, whether past or future. In accordance with Patent Rule 3-3(a), prior art references anticipating the Asserted Claims are provided below. The prior art identified below anticipates the Asserted Claims under the proper construction of the claims and/or under Plaintiff's apparent interpretation of the claims reflected by Plaintiff's First Amended Complaint and Infringement Contentions.

The Asserted Claims are anticipated by prior art. Pursuant to Patent Rule 3-3(a), Defendant identifies the prior art references that anticipate the '996 Patent Asserted Claims in the

claim charts of Exhibits A-01 through A-35 (collectively "Appendix A"), the '398 Patent Asserted Claims in the claim charts of Exhibits B-01 through B-17 (collectively "Appendix B"), the '654 Patent Asserted Claims in the claim charts of Exhibits C-01 through C-16 (collectively "Appendix C"), the '108 Patent Asserted Claims in the claim charts of Exhibits D-01 through D-17 (collectively "Appendix D"), and the '313 Patent Asserted Claims in the claim charts of Exhibits E-01 through E-17 (collectively "Appendix E"), which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendices A-E show how these prior art references disclose, teach or suggest each and every element of the Asserted Claims.

In addition to contending that the Asserted Claims are invalid in view of the prior art references described in the claim charts of Appendices A-E, Defendant further contends that the Asserted Claims are invalid as anticipated in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As one example, and in view of § III.A above, to the extent any asserted claim of the '108 Patent is found to be infringed in a manner consistent with Plaintiff's infringement allegations, any such claim is invalid because the accused functionality was in use, on sale, and/or offered for sale before the filing date of the '108 Patent . *See* Exhibit D to Plaintiff's Disclosure of Asserted Claims and Infringement Contentions to the Charter Defendants (Patent Rule 3-1 and 3-2). As discovery is ongoing, Defendant continues to investigate these items and reserves the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems. In addition to contending that the Asserted Claims are invalid in view of the explicit disclosures of the prior art references cited in the claim charts of Appendices A-E, Defendant further contends that the knowledge of a POSITA as evidenced by those

references render those claims invalid. Defendant further contends that, even if a prior art reference does not expressly disclose all limitations as arranged or combined in the same manner as an Asserted Claim, a skilled artisan reading the reference would at once envisage the claimed arrangement or combination. *See, e.g., Kennametal Inc. v. Ingersoll Cutting Tool Co*., 780 F.3d 1376, 1381 (Fed. Cir. 2015).

Defendant's reference to a particular product, system, or method in the claim charts of Appendices A-E should be interpreted alternatively as both a reference to the product, system, or method itself and to any corresponding patents, publications, or product literature cited in Appendices A-E that relates to the cited product, system, or method. In addition, Defendant may rely on other documents or things that have not yet been located to support its contentions regarding such prior art products, systems, or methods that are referenced in the charts.

Where Defendant identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure, embodiment, or other material, the identification should be understood to include the referenced figure, embodiment, or other material as well. Consistent with Patent Rule 3-3(c), Defendant's citations to specific statements, figures, or disclosures in a prior art reference are sufficient to put Plaintiff on notice where each element of each Asserted Claim is found in the prior art. However, it should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information, including other publications and general scientific or engineering knowledge.

Defendant therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

Defendant also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been anticipated or obvious to a person of ordinary skill in the art, including the basis for modifying or combining certain cited references as noted in the sections that follow. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in the charts for the Asserted Patents' respective Appendices, including as noted in the sections that follow.

B. Obviousness

Each anticipatory prior art reference, either alone or in combination with other prior art, also renders the Asserted Claims obvious to one of ordinary skill in the art. To the extent any limitation in the Asserted Claims is deemed not to be exactly met, either explicitly or inherently, by an item of prior art listed above and in Appendices A-E, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art, as shown in Appendices A-E. In particular, each anticipatory prior art reference on its own renders obvious the claimed inventions and also may be combined with (i) information

known to persons skilled in the art at the time of the alleged invention and/or (ii) any of the other anticipatory prior art references, and /or (iii) any of the other references cited, referred to, or incorporated by reference into the prior art references identified in Appendices A-E. The item of prior art would, therefore, render the Asserted Claims invalid for obviousness under 35 U.S.C. § 103(a).

The Supreme Court clarified the standard for what types of inventions are patentable. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007) ("[T]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."). In particular, the Supreme Court emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense should not be patentable. *See id*. at 421, 415-16, 417, 427. Because the Asserted Patents simply combine elements well-known in the art in a straightforward fashion to achieve a well-known and obvious result and thus yield no more than one skilled in the art would expect from such combinations, the claims of those patents are obvious. The Asserted Claims are therefore invalid under 35 U.S.C. § 103 because they do nothing more than combine known techniques and apparatuses according to their known and ordinary uses to yield predictable results.

The Supreme Court further held that "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id*. at 417. Accordingly, a person of skill in the art would have been motivated to combine

or adapt known or familiar methods in the art, especially where market forces prompt such variations.

In view of *KSR*, the United States Patent and Trademark Office issued a set of new Examination Guidelines. *See* Examination Guidelines for Determining Obviousness Under 35 U.S.C. § 103, 72 Fed. Reg. 57526 (Oct. 10, 2007). These Guidelines identify various rationales under *KSR* for finding a claim obvious at the time of the filing of the application for a patent, including those based on other precedents, including but not limited to:

"(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known techniques to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; and

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention."

See 72 Fed. Reg. 57529.

These rationales apply in rendering obvious the Asserted Claims. Here, the state of the art at the relevant times corresponding to each patent expressly taught and suggested using each of the claimed products and systems and methods. As a result, one skilled in the art would have known to combine or modify references that described known products and systems and methods which one of skill in the art would have recognized as offering improvements to solutions at the respective times of each patent. Each of the prior art references identified herein described products and systems and methods that were known to offer such improvements, and, accordingly, one skilled in the art would have been motivated to combine or modify the references as described herein.

In light of the various reasons to combine discussed in detail below, invalidity under 35 U.S.C. § 103 can be based on one or more references disclosed herein (e.g., the references identified in Appendices A-E), whether taken alone or considered in combination. If and to the extent Plaintiff argues that one or more of these references, combined with the knowledge of persons of ordinary skill in the art at the relevant time, fails to disclose one or more specific elements of an Asserted Claim, Defendant reserves the right to rely on the combination of one or more of the references disclosed herein, with one or more other references disclosed herein. Further, to the extent Plaintiff argues that claim elements that are not disclosed in the specifications of the Asserted Patents and/or related applications are enabled, Defendant reserves the right to rely on any one or more of the references disclosed herein to demonstrate that such claim elements are not enabled.

Reasons exist to combine one or more of the references included in these Invalidity Contentions with each other. Generally, reasons to combine any of these references with others exist within the references themselves, as well as within the knowledge of those of ordinary skill

in the art at the relevant time. If and to the extent that Plaintiff challenges the correspondence of any of these references with respect to particular elements of the Asserted Claims, Defendant reserves the right to supplement these Invalidity Contentions to identify additional motivations to combine particular references with one another to the extent necessary. Defendant may rely upon all references or a subset of the references, depending upon further investigation. Defendant's contentions that the references identified in Appendices A-E, in various combinations, render the Asserted Claims obvious under 35 U.S.C. § 103 are in no way an admission or suggestion that each reference does not independently anticipate the Asserted Claims under 35 U.S.C. § 102. Any of the references disclosed herein may be combined with other references disclosed herein to render obvious, and therefore invalid, each of the Asserted Claims.

With respect to the prior art references disclosed in the attached exhibits, a person of ordinary skill in the art would have been motivated to combine any of them for a number of reasons, including the reasons set forth herein and/or based on the language cited in the attached exhibits.

1. The '996 Patent

The '996 Patent is directed to allegedly improving the performance of communication systems, and in particular purports to alleviate transmission errors arising from "impulse noise, other noise and other sources of error" that it claims "can substantially impact the accuracy of data transmitted by ADSL and other communications systems." '996 Patent, 1:37-39. The '996 Patent claims to do this by incorporating into a transmission system "a transmission error value monitor communicatively interfaced with the receiver/decoder to periodically monitor for transmission error values indicative of impulse noise events on the transmission channel." *Id*. at claim 20. The "transmission error value monitor" then provides feedback to the transmitter end

of the communication by "generate[ing] an input signal based on the transmission error values monitored," which is then sent to and received by "a controller coupled with the transmitter," which in turn "further generate[s] a retransmission overhead control signal for the transmitter in response to the input signal." *Id*. In short, the receiver end tells the transmitter end about measurements it detected that indicate there was an impulse noise event, and then the transmitter end can compensate for it for subsequent transmissions in the relevant timeframe.

The '996 Patent recognizes that POSITAs at the time were highly motivated to modify transmission systems to enhance transmission performance, and in particular to gain the benefits of error correction/avoidance while at the same time avoiding/reducing latency and other drawbacks. *See, e.g., id*. at 2:57-62 ("providers generally strive to minimize latency through their systems, though still tolerate it to gain the benefits of interleaving and offset adverse error effects. Therefore, it is desirable to minimize the interleaving necessary to achieve desired performance"); 2:48-57 (recognizing that correcting errors in a manner that leads to "transmission delay (or 'latency')" is a "significant drawback," and that "high latency can have a substantial negative impact on system performance, especially when the system is operating at high data transmission rates"); 3:5-18 (again recognizing that correcting errors in a manner that leads to "disproportionately large increase in latency" is "a highly undesirable consequence of error correction").

Because these interests often compete with one another (*i.e.*, better error detection/ correction techniques often come at the cost of increased latency, and reduced latency often comes at the cost of less robust error detection/correction), POSITAs were motivated to try applying various error correction techniques and architectures to transmission systems of all types to achieve better overall transmission performance with respect to these and other interests.

Id. (same). POSITAs were motivated to try error correction techniques to identify one or more of such techniques that achieved an acceptable balance between these competing interests (among others) for the given transmission system environment. *Id*. (same). Confirming these motivations, the ’996 Patent recognizes that the prior art includes several workable solutions that included features POSITAs would have readily understood how to implement in a range of transmission systems. *See, e.g.*, *id*. at 1:39-42 (“various techniques have been developed for reducing, avoiding and/or repairing the damage done to data during transmission by such error[s]” and were well known in the art.”); 1:47-49 (“[i]nterleaving is a coding technique commonly used to increase the performance of transmission systems by decreasing errors in the system”); 1:65-2:7 (“[o]ne redundancy coding technique used in connection with interleaving is forward error correction (FEC) employing Reed-Solomon encoding, which is well known to those skilled in the art.”); 2:63-3:1 (“[s]ome prior art systems use ‘adaptive’ interleaving [techniques]. . . [which] are known to those skilled in the art. U.S. Pat. Nos. 4,901,319 and 6,546,509 describe adaptive interleaving systems, which adjust for various channel problems, noise and other sources of error.”); 2:43-47 (with respect to Reed-Solomon codeword implementations of FEC, there is “one system by Alcatel currently allows 3 choices for D . . .”). Thus, not only were POSITAs at the time strongly motivated to modify transmission systems to try implementing various techniques available in the art, as well as combinations of techniques in the art, they had the capacity to do so with a reasonable expectation of success in implementing the same to identify those that achieved the best results, *e.g.*, higher performance in terms of both error correction and latency reduction, among other factors of interest (*e.g.*, higher throughput, higher quality of service, and the like).

In terms of the knowledge and capacity of POSITAs at the time of the alleged invention, the ’996 Patent confirms that a POSITA’s knowledge at that time was vast, and that the POSITA’s capacity to implement features and/or modify transmission systems to apply various error correction techniques with an expectation of success was robust. Indeed, the ’996 Patent acknowledges that POSITAs had extensive knowledge of transmission system hardware, communication channel properties, the ability to monitor signals and channel qualities in real-time, the mechanisms for providing feedback signals between receivers and transmitters (or elements coupled to those components), the consequences and benefits of different coding techniques, how to modify transmission systems to try different error correction techniques, and how to test and compare the performance of transmission systems applying different error correction techniques. *See, e.g.*, ’996 Patent at 2:63-3:4 (“[a]daptive interleavers are ***known to those skilled in the art***. U.S. Pat. Nos. 4,901,319 and 6,546,509 describe adaptive interleaving systems, which adjust for various channel problems, noise and other sources of error. However, they require changes to the interleaving depths (denoted by the variable D) to be applied to different transmissions, which in turn alters the latency of the system.”) (emphasis added); 6:66-7:3 (“FIG. 2 shows the relevant portions of the transmitter reference models from the ADSL1 standard for ATU-R and ATU-C transmitters using synchronous and asynchronous data transport. ***These models are well known to those skilled in the art***.”) (emphasis added); 10:15-16 (“Changes to the CCR can be determined and implemented in various ways ***apparent to those skilled in the art***.”) (emphasis added); 11:13-16 (“[i]t should be noted that implementation of the present invention when traffic on a system is low or zero may or may not be appropriate, as will be ***appreciated by those skilled in the art***.”) (emphasis added).

The ’996 Patent further confirms a POSITA, upon learning about an error correction coding technique (through a publication, written disclosure, block diagrams, or otherwise), would have understood and found it obvious that the given technique (or variations/modifications of such technique) would be applicable and could be implemented in a variety of ways in a variety of systems with high expectation of success in operation. *See* ’996 Patent at 13:55-59 (“[o]ther various structures implementable [that] ***will be apparent to those skilled in the art***. For example, as suggested by the dashed line in FIG. 5, module 540 may be an external module that is accessed as necessary by controller 500.”) (emphasis added); 14:4-38 (“. . . ***those skilled in the art will appreciate*** that [proposed error correction schemes may be] applicable to any system that incorporates codeword-type data structures and interleaving, especially where it is desirable to avoid increasing latency when improving error correction”; or, alternatively, “[as] will be ***appreciated by those skilled in the art***, embodiments of the present invention may also be used [in systems] where no interleaving is implemented (for example, where S=1 for ADSL systems).”) (emphasis added); 20:36-38 (“numerous modifications and changes will readily occur to those skilled in the art, . . .”); 4:46-48 (“[a] transmission system can implement the controller and/or utilize one or more of the methods . . ., as will be ***appreciated by those skilled in the art***.”) (emphasis added); 6:22-25 (“[t]he structure, programming and other specific features of a controller usable in connection with embodiments . . . will be ***apparent to those skilled in the art*** after reviewing the present disclosure.”) (emphasis added); 6:46-52 (“as will be ***appreciated by those skilled in the art***, [disclosed error correction techniques] may be applied to various communications and coding systems and the [disclosure] is not limited to any particular system.”) (emphasis added); *see also id*. at 8:8-28. Moreover, the ’996 Patent confirms that a POSITA would have understood block diagrams and figures within references in the art to

disclose teachings not explicitly depicted or referenced, based on the POSITA's understanding of the functionality and operation of transmission systems more generally. *See, e.g.*, *id*. at 14:32-38 ("As ***also will be appreciated by those skilled in the art***, FIG. 6 tacitly assumes that the means for generating CCR adjustment control talks to the transmitter.") (emphasis added).

Among the teachings and motivations in the prior art that a POSITA would have been familiar with, the '996 Patent also acknowledges that specific elements of its own claims would have been either "known," "apparent" or "obvious" to a POSITA. *See, e.g.*, '996 Patent at 4:56-64 ("[t]he transmission error value(s) used in embodiments of the present invention can be based upon or be computed from the bit error rate, errored seconds, errored minutes, the number of code violations over a fixed period of time, the signal-to-noise ratio measured at the receiver, the TCP/IP or other protocol throughput at a higher level and/or other quantities ***obvious to those skilled in the art*** that represent the amount or level of error detectable in a given system.") (emphasis added); 5:57-65 (same); 9:18-21 ("[h]owever, as will ***be apparent to those skilled in the art***, any quantity or value can be used as the CCR as long as it represents the relation between the payload and parity bytes in the applicable FEC coding scheme.") (emphasis added); 9:35-43 ("[t]he measured transmission error value(s), or MEV(s), may be selected from, include and/or be based upon one or more of the following: the BER, errored seconds, errored minutes, the number of code violations over a fixed period of time, the signal-to-noise ratio measured at the receiver, the TCP/IP (or other protocol) throughput at a higher level, and/or a combination of these values. Other values representative of the error rate of the transmission system may also be ***apparent to those skilled in the art***.") (emphasis added); 10:15-16 ("[c]hanges to the CCR can be determined and implemented in various ways ***apparent to those skilled in the art***.") (emphasis added); 13:55-59 ("[o]ther various structures implementable in connection with embodiments of

the present invention ***will be apparent to those skilled in the art***. For example, as suggested by the dashed line in FIG. 5, module 540 may be an external module that is accessed as necessary by controller 500.") (emphasis added); 15:13-21 (". . . original CCR is provided to and/or determined by the FEC coder 612 in any suitable manner, ***as is known to those skilled in the art***.") (emphasis added); 15:24-27 ("[a]ny suitable adjustable interleaver that is responsive to a multiple bit interleave depth adjustment control signal, ***as known to those skilled in the art***, can be configured for use . . .") (emphasis added); 15:31-37 ("[t]he transmitter 610 preferably comprises an ADSL transmitter ***known to those skilled in the art***. Alternatively, the transmitter 610 can comprise a digital transmitter for use with any form of transmission media ***as known to those skilled in the art***. Alternatively, the transmitter 610 can comprise any transmitter for use with any form of transmission media ***as known to those skilled in the art***.") (emphasis added); 15:40-43 ("[t]he transmitter 610 may modulate data . . . for transmission to the receiver 630 via the transmission channel 620 ***as known to those skilled in the art***.") (emphasis added); 15:43-45 ("[t]he transmitter 610 can preferably transmit data at different data rates ***as known to those skilled in the art***.") (emphasis added); 16:19-24 ("[t]he transmission channel 620 preferably comprises twisted-pair conductive wire ***as known to those skilled in the art***. Alternatively, the transmission channel can comprise coaxial cable, optical fiber, free-space laser, radio or any other type of transmission media ***as known to those skilled in the art***.") (emphasis added); 16:26-28 ("[t]he receiver 630 preferably comprises an ADSL receiver having an adjustable de-interleaver 634 and an adjustable decoder 632, ***as known to those skilled in the art***.") (emphasis added); 16:28-31 ("[a]lternatively, the receiver 630 can comprise a digital receiver for use with any type of transmission media ***as known to those skilled in the art***.") (emphasis added); 16:31-36 ("[a]lternatively, the receiver 630 can comprise any type of receiver for use with any type of

transmission media as ***known to those skilled in the art***. For example, the decoder 632 of receiver 630 can employ a Reed-Solomon decoder or any other suitable error correcting decoder ***as known to those skilled in the art***.") (emphasis added); 16:40-48 ("[t]he decoder 632 utilizes decoding techniques ***known to those skilled in the art*** to detect and correct errors in the transmitted data . . .") (emphasis added); 17:1-10 ("[v]arious values can be used and various ways of measuring those values are ***known to those skilled in the art***. Therefore, the transmission error value(s) can be determined through a variety of techniques, and any suitable method of selecting, measuring and determining the transmission error value(s) can be adapted for use in the presently preferred system. Averaging many measurements of the transmission error value(s) can be performed to improve the accuracy of the current transmission error value measurement, ***as is known to those skilled in the art***.") (emphasis added); 17:39-44 ("The CCR adjustment and interleave depth control signals 647, 648, 649 can take many forms. Control signals 647, 648, 649 can be based in whole or in part on one or more input signals, such as input signal 643. The control signals 647, 648, 649 can be analog or digital and linear or non-linear, ***as appreciated by those skilled in the art***.") (emphasis added).

The '996 Patent further acknowledges that the "means" for performing the functions of its alleged invention also would have been known to a POSITA. *See, e.g.*, '996 Patent at 13:10-13 ("[t]he means 510 for acquiring the MEV(s) preferably comprises a transmission error value monitor for acquiring a transmission error value and generating a signal representative of that MEV, ***as is known to those skilled in the art***.") (emphasis added); 14:65-15:1 ("[t]he FEC coder 612 preferably further comprises means for adjusting the composition of codewords produced in the coder 612, ***as known to those skilled in the art***.") (emphasis added); 14:62-65 (". . . means for receiving a multiple bit CCR adjustment control signal and means for adjusting the CCR in

response to the CCR adjustment control signal, ***as will be known to those skilled in the art***.") (emphasis added); 15:4-8 (". . . means for receiving a multiple bit interleave depth adjustment control signal and means for adjusting the depth of interleaving in response to the interleave depth adjustment control signal, ***as will be known to those skilled in the art***.") (emphasis added); 15:8-11 (". . . means for adjustably interleaving data at different interleave depths ***as known to those skilled in the art***.") (emphasis added); 16:55-63 ("[t]he controller 640 preferably comprises means 642 for collecting and/or calculating one or more MEVs, means 644 for analyzing the MEV(s) (for example, by comparing the MEV(s) to the TEV(s)), and means 646 for providing CCR adjustment and interleave depth adjustment control signals. The means 642 preferably comprises a monitor for measuring, collecting and/or calculating one or more of the transmission error values mentioned above, as is ***known to those skilled in the art***.") (emphasis added); 17:11-16 ("Means 642 preferably generates an input signal 643 that varies as a function of the MEV(s). Alternatively, the input signal 643 can take many forms and can be based in whole or in part on the BER, errored seconds, etc. The input signal 643 can be analog or digital and linear or non-linear, as will be ***appreciated by those skilled in the art***.") (emphasis added).

A POSITA likewise would have had a working knowledge of CableLabs DOCSIS 1.0 and DOCSIS 2.0 standards specifications, and the full scope of disclosures of those specifications up to the time of the '996 Patent would have been considered common and well-understood at the time.

With such vast knowledge, and together with the recognized interest in the art to reduce transmission errors, decrease latency, and increase throughput, among other things (*e.g.*, lower costs, make efficient use of resources, reduce power consumption, minimize overhead required to correct errors, and the like), a POSITA at the time of the alleged invention of the '996 Patent

would have been motivated to combine one or more of the references cited herein, including but not limited to the standards cited above and all the other prior art in cited herein and in Appendix A hereto, and/or to apply their background knowledge and/or the teachings of one reference to modify the system in another reference, in order to try obvious variants of error correction methods and solutions that might achieve any one or more of the foregoing interests. Such motivations, including further specific motivations, are apparent from the prior art cited herein.

For example, as the prior art references confirm, a POSITA would have been motivated to combine these references to enhance performance within transmission systems more generally, such as by achieving higher throughput, reducing transmission errors, reducing latency, and obtaining higher quality of service and more efficient and reliable transmission. *See, e.g.*, Agarwal at 1:12-15 (acknowledging motivation to achieve "efficient and reliable transmission"); Cho at 2938 (recognizing the need to "propose[] [a] scheme [that] guarantees the quality of service (QoS) requirements of real-time applications" including to enhance performance "[i]n terms of throughput (from network provider's viewpoint) and packet error rate (from subscriber's viewpoint)"), *id.* at 2941 (recognizing the motivation to implement coding schemes that prioritize throughput and successful transmission: "[o]ur performance metrics are throughput (ratio of the number of successfully transmitted information bits to the total number of transmitted bits) and packet error rate (ratio of the number of erroneous packets to the total number of transmitted packets)."); Cavers at 15 (recognizing that erroneous signals in a transmission system is "a problem which has received considerable attention since the early 1950's," underscoring the motivation to combine references to identify solutions); Coleman at 1:28-39 ("employing [certain error correction coding techniques can] reduce[] the rate at which data characters may be communicated over the transmission medium. Indeed, in some instances,

a desired [error correction coding] scheme may reduce the payload data rate of a transmission medium to an unacceptably low level. In such a situation, a less robust [error correction coding] scheme that consumes less bandwidth may be employed in lieu of the desired [error correction coding] scheme, or the data characters may be transmitted without [error correction coding] altogether. In either of the foregoing situations, greater transmission errors [may be] encountered as a result of not using the desired [error correction coding] scheme"); Morris at 2:20-24 ("[t]here thus is a need for a communications system that employs an FEC arrangement that among other things, maximizes the amount of bearer data transmitted between the central station and any given remote station at any given time, while still providing an acceptable error rate"); Starr at 1:22–39 (". . . telecommunications system providers generally strive to minimize latency throughout their systems while still utilizing interleaving to offset the adverse effects of errors. Thus, it is desirable to optimize the interleaving used such that only the degree of interleaving necessary to achieve a desired performance level is implemented.").

A POSITA would have likewise been motivated to combine the references to identify solutions that, while achieving the aforementioned enhanced performance benefits (*e.g.*, higher throughput, reduced transmission errors, reduced latency, and higher quality of service), also balanced these benefits against the drawbacks associated with the solutions (particularly in view of system requirements, depending on the proposed environment). *See, e.g.*, Agarwal at 2:32-34 (". . . if ATM based technology is to be implemented in wireless networks, it must achieve a more efficient use of bandwidth"); Cho at 2938 (recognizing the motivation to "design . . . error-control protocols [that] take into account the tolerance to packet losses . . . and [relevant] delay requirements."); Dyck at 1 (recognizing the motivation implement lightweight coding techniques that achieve reduction in network delays, including recognizing that "[n]etwork delays can cause

serious usability problems in synchronous groupware systems" and that "[d]elays can often be reduced by switching to lightweight protocols"); Morris at 2:20-24 ("[t]here thus is a need for a communications system that employs an FEC arrangement that among other things, maximizes the amount of bearer data transmitted between the central station and any given remote station at any given time, while still providing an acceptable error rate"); Starr at 1:22–39 (". . . telecommunications system providers generally strive to minimize latency throughout their systems while still utilizing interleaving to offset the adverse effects of errors. Thus, it is desirable to optimize the interleaving used such that only the degree of interleaving necessary to achieve a desired performance level is implemented.").

A would also have been motivated to combine the teachings in the references cited herein to achieve a more efficient and reliable use of computing, processing, channel, power and other resources. *See, e.g.*, Agarwal at 1:12-15 (acknowledging motivation to achieve "efficient and reliable transmission"); *id*. at 2:29-34 ("As a consequence of having been traditionally implemented in fiber optics networks, ATM based technology is not particularly efficient in its use of transmission bandwidth. Therefore, if ATM based technology is to be implemented in wireless networks, it must achieve a more efficient use of bandwidth."); Cavers at 15 ("[t]he simplest way of coping with [signal] fading is just to make the transmitter power large enough, or the bit rate low enough, that the error probability is satisfactory for some specified fraction of the time. Rather obvious inefficiencies are involved in this method*."); id*. at 22 (recognizing the advantage of power savings in alternative error correction solutions "in comparing adaptive systems to non-adaptive systems, finding that "with the same typical values of error probability, data rate, and bandwidth has shown that adaptive rate control can achieve an impressive 14-17-dB saving over [the most closely competing non-adaptive system]."); Cho at 2938 (recognizing

the need for coding schemes that achieve "[e]fficient error-control for a time-varying channel[s]," and further recognizing the advantage of error correction protocols with simple implementations: "[t]he advantages of [a proposed] channel estimation technique are the provision of QoS adaptability and simple implementation"); Dyck at 1 (recognizing that "[d]elays can often be reduced by switching to lightweight protocols," underscoring the motivation to implement lightweight error correction schemes that impose a lesser burden on available resources); *id.* (recognizing the motivation to implement an efficient coding scheme that avoids the "overhead of acknowledgements or retransmission").

A POSITA would also have been motivated to combine the teachings in the references cited herein, and/or to modify those teachings by solutions taught in other references, to obtain the benefit of solutions designed to alleviate problems in other transmission systems that may solve a new or related problem in another transmission system. *See, e.g.*, Agarwal at 2:16-23 ("In contrast, the bit error ratios associated with wireless communication are much higher (on the order of 10−3 to 10−8) and tend to fluctuate in accordance with atmospheric conditions. In addition, the errors associated with wireless communication tend to occur in longer bursts. Thus, a robust error correction scheme must be employed in a wireless network in which ATM based technology is to be implemented."); *id.* at 3:59-65 (recognizing the motivation to achieve, in some transmission systems, "improved throughput over a wide range of atmospheric conditions"); Cavers at 15 (recognizing that erroneous signals in a transmission system is "a problem which has received considerable attention since the early 1950's"); Cho at 2938 (recognizing that in some transmission systems "a reliable channel estimation scheme with an appropriate code selection technique is essential for adaptive error-control systems," which recognition demonstrates the motivation to try various channel estimation schemes in the art to

identify a viable solution for any given transmission system); Guha at 11:41-52 ("[i]t will be appreciated by those skilled in the art that such a communication network may be a frame relay communication network, an ATM communication network, or other similarly configured communication network."); *id*. at 14:13-18 ("It will be appreciated by those skilled in the art that either type of error correction coding can be used without departing from the scope and spirit of the present invention."); Klayman at 12:44-55 ("Although the preferred embodiment utilizes a poll/response protocol, the invention may also be applied to non-polled protocols, and may use the same or different signaling techniques for dynamically adapting the types of forward error correction and the forward error correction parameters. The invention could also be used where dial-up or other lines are used as the upstream channel. . . . Thus, the dynamic adaptive forward error correction could be used to improve throughput over such a dedicated channel."); *id.* at 13:7-12 ("[i]t will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the novel concept of the invention."); Morris at 14:27-31 ("Also, the present inventions are not limited to those wireless communications systems that employ a bilateral dynamic FEC arrangement as just described, but can also include wireless communications systems that employ a unilateral or asymmetric dynamic FEC arrangement"); *id.* at 23:24-29 ("The present inventions are not limited to the wireless communication system disclosed above and may include other types of wireless communications systems, such as, e.g., satellite based communications systems, or other types of wire-based systems, such as, e.g., LAN systems or fiber optic networks."); Starr at 2:40–53 ("While such a system is of particular importance with regard to digital subscriber lines, those skilled in the art will appreciate that it is applicable to any system that incorporates interleaving."); Starr at 3:27-36 ("Alternatively, the transmitter 30 can comprise a digital transmitter for use with any form of

transmission media as known to those skilled in the art. Alternatively, the transmitter 30 can comprise any transmitter for use with any form of transmission media as known to those skilled in the art.”).

A POSITA would also have known that by utilizing adaptive/flexible error correction schemes to monitor (at the receiver end) for transmission errors indicative of real time channel characteristics/variations, and then inform the transmitter end so that it could compensate for it in subsequent transmissions in the relevant timeframe, the POSITA could remedy the known problems associated with using static/non-adaptive error correction schemes (which generally operated less intelligently and operated using pre-set parameters/assumptions about the channel and anticipated errors). *See, e.g.*, Agarwal at 2:48-51, 3:59-65, 5:66-6:6, 7:43-50, 10:4-6 (“adaptive coding is employed in order to determine the proper amount of forward error-correction on a real-time basis in accordance with the number of bit errors detected in the receive link”; an “adaptive coding scheme [may] improve the communication link quality”; “adaptive coding scheme can be made to react more quickly to a deteriorating BER or more slowly to an improving BER”; “Although fixed [FEC] coding simplifies the design and implementation of a particular error correction scheme, it results in a severe loss of available bandwidth”; “adaptive coding scheme . . . provides improved throughput over a wide range of atmospheric conditions by adaptively controlling the forward error correction code”); Cavers at 22 (in comparing adaptive systems to non-adaptive systems, finding that “with the same typical values of error probability, data rate, and bandwidth has shown that adaptive rate control can achieve an impressive 14-17-dB saving over [the most closely competing non-adaptive system]”; “[i]t would appear that the adaptive rate control scheme, despite its complexity, is an excellent, method of improving communication system performance . . .); Cho at 2938 (recognizing that

years prior to the alleged invention, "Adaptive FEC (AFEC) schemes ha[d] been widely proposed for multimedia traffic with real-time constraints," and further recognizing that "[e]fficient error-control for a time-varying channel can be realized with an adaptive coding scheme," including those "in which the amount of redundant bits increases when the channel is bad, or decreases when the channel is good"); *id.* (recognizing the motivation to implement a scheme that addresses "two important issues in the transmission of real-time traffic . . . [1] Adaptability to channel conditions, through prompt reactions to channel variations and [2] QoS provision, especially throughput and packet error rate"); Dyck at 1 (recognizing the motivation to implement an adaptive coding scheme to address the problem of delays faced in transmission systems, while at the same time controlling reliability: "To address this problem, we investigate the use of adaptive forward error correction (AFEC) for groupware. Adaptive FEC is a technique that can maintain a predefined level of reliability while avoiding the overhead of acknowledgements or retransmission."); Klayman at 2:21-32 ("A need has remained for an apparatus and method to provide for adaptive and flexible error correction capability, providing sufficient error correction for accurate data reception while simultaneously providing for overhead minimization for increased data throughput, and for such an apparatus and method to respond and adapt to potentially changing and variable communication channel conditions."); Morris at 5:59-6:2 ("The processor 112 is also electrically coupled and transfers uplink control data (such as, e.g., status data informing the FEC dynamic central station 104), to the error detection encoder 116 . . . The error detection encoder 116 can, however, employ other types of error detection algorithms without straying from the principles taught by this invention."); Starr at 1:42–47 ("Adaptive interleavers are known to those skilled in the art. U.S. Pat. No. 4,901,319

describes an adaptive interleave system, including an adaptive interleaver, that attempts to correct errors that occur as a result of the fading characteristics of a radio channel.”).

A POSITA would also have been motivated to combine the teachings in the references cited herein, to modify those teachings by solutions taught in other references, and/or to implement the teachings of one reference into the transmission systems taught by another reference. This is at least because POSITAs at the time of the alleged invention of the ’996 Patent would have been familiar with standard protocols used in different transmission systems (including what they would allow and disallow) as well as the principles of operation of different types of transmission systems and how solutions in one system could be successfully applied within another. *See, e.g.*, Agarwal at 18:18-24 (“While the present invention has been explained for a cell-based transmission system such as ATM and a packet-based transmission system such as frame-relay, its application to other cell/packet systems such as ISDN/SS#7 and Internet systems would be apparent to one of ordinary skill in the art as the protocols for these systems are established by industry standards and are well known in the art.”); *id*. at 13:28-32 (“While the preferred embodiment of the interfaces are shown for an ATM implementation, it would be understood by one of ordinary skill in the art that the invention can be implemented for other cell- and packet-based systems, such as a frame relay system.”); Cho at 2938 (“Adaptive FEC (AFEC) schemes have been widely proposed for multimedia traffic with real-time constraints [1], [4], [8]”); Guha at 11:41-52 (“It will be appreciated by those skilled in the art that such a communication network may be a frame relay communication network, an ATM communication network, or other similarly configured communication network.”); *id*. at 3:61-4:3 (“As will be appreciated by those skilled in the art, communication networks (e.g., ATM) and their operations can be described according to the Open Systems Interconnection (OSI) model which includes

seven layers including an application, presentation, session, transport, network, link, and physical layer. The OSI model was developed by the International Organization for Standardization (ISO) and is described in "The Basics Book of OSI and Network Management" by Motorola Codex from Addison-Wesley Publishing Company, Inc., 1993 (First Printing September 1992).")

Defendant may rely on cited or uncited portions of the prior art, other documents, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the Asserted Claims invalid as obvious. In the event Plaintiff challenges the motivation to combine particular prior art references, Defendant reserves the right to supplement these contentions to further specify the motivation to combine the prior art to the extent necessary.

In addition to the specific examples provided above, Defendant reserves the right to rely on the disclosures of the references listed in Appendix A for additional motivation to combine. The examples of combinations provided herein are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendant reserves the right to contend that the motivations to combine provided herein apply to other combinations at the appropriate time, *e.g.*, in expert reports regarding invalidity. To the extent one or more of identified combinations is posed as a combination of only two references, it does not indicate that the two references that are being combined for one purpose could not be joined by a third reference (or more additional references) whose combination serves the same or a different purpose. Indeed, many of the features recited in the Asserted Claims are componentized features/functions whereby the feature could be implemented using teachings from another source while not interfering with additional

features. For that reason, a POSITA may have reasonably looked to and been motivated to combine three or more references to achieve a specific outcome.

As mentioned above, Defendant has not yet completed its search or discovery concerning additional prior art. Moreover, the exemplary combinations are provided based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. Further, a *Markman* Order has not yet been issued in this case. As such, Defendant's inclusion of exemplary combinations does not preclude it from identifying other invalidating combinations as appropriate, and Defendant reserves the right to identify additional specific combinations as well as to detail and explain such combinations.

2. The '398 Patent

The Asserted Claims of the '398 Patent are generally directed to selecting and communicating a policy based on network performance data. For example, claim 1 recites generic limitations directed to data collection, policies, algorithms, parameters, performance improvement, and communication. As the '398 Patent acknowledges, it was known at the time of the invention that in a communication system with "an access point (AP) 101 and one or more wireless stations 102," the "characteristics of the wireless channels and noise/interference [were] not constant and vary rapidly over time." '398 Patent, 1:30-32. It was also known to "adapt[] transmission strategies to enhance performance of the communication system," *i.e.*, using "time-varying and environment-change-dependent transmission or control strategies for a [communication system]." '398 Patent, 1:36-37. For example, "rate adaptation algorithm" was known at the time of the invention, that is, "the transmission rate of Institute of Electrical and Electronics Engineer (IEEE) 802.11g standard based WiFi communication system is rapidly

adapted between 6 Mbps and 54 Mbps depending on the link quality and the rate selection method (also known as the rate adaptation algorithm).” ’398 Patent, 1:44-49. It was also known that an algorithm could “use[] real-time data that are collected by the AP 101 of the WiFi communication system itself as an input to the adaptation algorithm 103, and a rate change in the link [would] occur[] when the real-time data meets a pre-defined criteria.” ’398 Patent, 1:50-54. Specifically, multiple rate adaption algorithms using rules, conditions, and/or parameters, such as transmission rate or number of packets that are successfully received, were known at the time of its invention:

> A possible rate adaptation algorithm 103 is to change transmission rate of signals by the AP 101 within the WiFi communication system when the measured RSSI (Received Signal Strength Indication) becomes too large or too small for the current rate in use. Another possible adaptation algorithm 103 is to increase the transmission rate of signals by the AP 101 whenever packets are successfully received by the AP 101 and/or the one or more stations 102 1-N for M (e.g., 3) times and decrease rate whenever packets are unsuccessfully received for P (e.g., 2) times. While such adaptation algorithms 103 are required for WiFi communication systems to function properly, the rules and thresholds used by the methods are decided by a system designer of the WiFi communication system. Furthermore, a specific adaptation algorithm 103 is included in the firmware and loaded to the WiFi communication system.

’398 Patent, 1:55-2:4. The ’398 Patent further acknowledges that it was known to solve the “Hidden Node problem” by “schedul[ing] the data transmission using Request to Send (RTS) and Clear to Send (CTS) mechanism,” which “incurs overhead in channel use, but prevents disastrous packet collisions by the two stations.” ’398 Patent, 17:31-36.

The references used in these contentions for the ’398 Patent also disclose the same or similar subject matter and technical objectives. For example, servers receiving network monitoring data, analyzing such data, and/or communicating policy to the network stations were well known in prior art, such as the Meraki Enterprise Cloud Controller, Cisco Wireless Control System, Ruckus ZoneDirector, Aruba Adaptive Radio Management, Extricom MultiSeries 1000

WLAN Switch, Aerohive Hive Manager, Trapeze Mobility Exchange controller, HP ProCurve Multiservice Mobility (MSM) controller. These prior art systems or apparatuses claim to provide various benefits and advantages. For example, the HP ProCurve MSM architecture claims to provide "operational advantages of centralized management and control with the scalability, efficiency and performance of distributed intelligence." ProCurve MSM WLAN Solution Overview at 2. As another example, Cisco Wireless Control System claims to provide "a powerful foundation that allows IT managers to design, control, and monitor enterprise wireless networks from a centralized location, simplifying operations and reducing total cost of ownership." As a further example, the Meraki Enterprise Cloud Controller claims to "let[] administrators build secure and scalable wireless networks quickly, easily, and at a lower cost." Further benefits of these known servers are described in detail in the claim charts for the '398 Patent. A POSITA would have appreciated the benefit of providing such a server and would have been motivated to combine the teachings of the references disclosed in these contentions in relation to the '398 Patent to achieve various benefits.

Furthermore, prior art references also disclose various algorithms that adjust parameter value such as transmission characteristics, transmission power, to improve performance of wireless communication devices including reducing interference, or to determine that that transmission signal would be lost regardless of rate selection. For example, Fast-Responsive link adaptation for IEEE 802.11 WLANs ("Qiao") discloses a link adaptation schedule that changes the transmission rate in real time for use in an 802.11 WLAN.

> The mechanism to select one out of multiple available transmission rates at a given time is referred to as link adaptation. The effectiveness of a link adaptation scheme depends on how fast it can respond to the wireless channel variation, and different link adaptation schemes may affect the system throughput performance significantly. Due to the conservative nature of the

link adaptation schemes implemented in most 802.11 devices, the current 802.11 systems are likely to show low bandwidth utilization.

Qiao at 1.

In this section, we present our link adaptation scheme from two fundamental aspects:

A. When to decrease the transmission rate?

In general, the transmitter station should switch to a lower rate to transmit when the wireless channel condition degrades, which is normally indicated by frame transmission failures. However, considering the contention nature of the 802.11 DCF (Distributed Coordination Function) and the binary exponential backoff scheme used to resolve collisions, it is very likely that a single frame transmission failure is due to collision, while multiple consecutive failures are due to the deteriorated channel condition. Therefore, similar to the mechanisms described in [11]–[13], our link adaptation scheme requires the transmitter station to decrease the rate upon two consecutive transmission failures, as opposed to decreasing the rate immediately after a single transmission failure.

Fig. 1 shows the pseudo-code of the simple algorithm used in our link adaptation scheme to direct the transmitter station's rate-decreasing actions. It starts/restarts whenever the station adjusts its transmission rate.

B. When to increase the transmission rate?

The key component of a link adaptation scheme is to determine when to increase the transmission rate. A fast responsive link adaption scheme shall react quickly to the improved wireless channel condition and make better use of the available bandwidth. Our objective is to direct the transmitter station's rate-increasing attempts in a controlled manner such that the responsiveness of the link adaptation scheme can be guaranteed with minimum number of rate increasing attempts, hence maximizing the throughput

Qiao at 2.

… Consider the following two example scenarios. In the first scenario, the wireless channel condition varies frequently every 10 ms, and the transmitter station reacts to the improved channel condition with 5 ms response delay (F = 0.5). In the second scenario, the wireless channel condition changes slowly every 100 ms, and the station also reacts with 5 ms response delay (F = 0.05). Although both scenarios have the same response delay, the first one is clearly much worse than the second, because the wireless channel is under-utilized — frames are transmitted at lower than the highest achievable rates — for more than 50% of the time in the first scenario comparing to 5% in the second scenario.

Qiao at 3.

> Fig. 3 shows the pseudo-code of the algorithm used in our link adaptation scheme to direct the transmitter station's rate-increasing attempts. It starts/restarts whenever the station adjusts its transmission rate — recorded as t0. tattempt represents the last-known time instance when the wireless channel remains the current condition, and it is initialized to t0 + xmit duration(rcurrent).

Qiao at 3.

> We simulate an infrastructure-based 802.11a system, where eight transmitter stations are evenly spaced on a circle around the AP (Access Point) with the radius of r meters, and all the stations are static. Each transmitter station transmits with 15 dBm transmit power, and the background noise level is set to -93 dBm. Note that multi-path fading can be observed even in the stationary WLAN environments due to movements of the surrounding objects

Qiao at 4.

In another example, Adaptive Transmit Power Control Based on Signal Strength and Frame Loss Measurements for WLANs ("Viswanathan") also describes a transmit power control algorithm based on parameters such as signal strength (RSSI) and frame loss rate (FLR) for use in a WLAN system.

> In the past few years, we witnessed a rapid penetration of Wireless Local Area Networks (WLANs) into the home and enterprise. Emerging technology such as the IEEE 802.11n radio, which is getting increasingly affordable, makes delivering multimedia content over wireless networks possible and this would drive the technology further into our daily life. As the number of available wireless channels in the unlicensed spectrum is limited (3 non-overlapping channels in 2.4GHz unlicensed band and up to 24 non-overlapping channels in 5GHz unlicensed band), they have to be shared by multiple WLANs consisting of Access Points (APs) and STAtions (STAs).
>
> In this thesis we propose an adaptive per-link Transmit Power Control (TPC) solution for WLANs. TPC can reduce interference, increase channel reuse, and eventually increase the overall capacity in dense 802.11 wireless networks. … From a detailed study of the previous efforts at power control, we observe that in order to make better decisions on transmit power; an AP needs to actively monitor several factors. Hence we develop a TPC algorithm based on both link margin estimation as well as frame loss rate measurement. Compared to previous solutions that adapt the transmit power based on measurement of a single parameter (either received signal strength or frame loss rate), the

> proposed power control mechanism can diagnose and take remedial action for hidden nodes and channel access asymmetry problems manifesting as frame losses. It is adaptive to mobility, complementary to any rate control algorithm and can also be incrementally deployed amidst non-cooperative nodes. We have implemented the algorithm as an application running on Atheros chipset-based 802.11n APs, taking practical system-level limitations into account. The proposed solution achieves significant transmit power reduction at the APs (to as low as 60% of the maximum power) for STAs as far as 70ft and over ∼60% increase in total network throughput through interference mitigation.

Viswanathan at 2.

> The objective of Transmit Power control (TPC) on a wireless device (AP or STA) is to use minimum transmit power while meeting the requirements for throughput and packet loss rate. TPC helps reduce interference with other devices, improve channel reuse, and eventually increase the overall capacity in wireless networks. Of course, TPC also helps conserve energy and improve battery life of mobile devices.

Viswanathan at 12.

> To determine the transmit power, an AP requests each of its associated clients (STAs) to measure its received signal strength and to report the received signal strength or its estimated link margin as well as the STA's current transmit power. The AP unicasts or multicasts TPC Request message to each of its associated STAs periodically (every Tm seconds, set to 100ms in our implementation). In addition, once a new STA is associated, the AP issues new TPC request to it. Fig.3.1 shows the AP TPC measurement operation. The requested STA will measure the received signal power, estimate the link margin for the down link, and report the received signal strength or the estimated link margin and its transmit power to the AP by sending a TPC Report message. Here the down link is the transmission link from the AP to the STA, and the uplink is the transmission link from the STA to the AP. The link margin estimation is described below.
>
> Based on the received signal strength or link margin measurement reported by the STAs, the AP determines its desired down link transmit power to each of them. The transmit power will meet the throughput and FLR requirements while generating the least interference to other devices in the neighborhood.
>
> The TPC algorithm is to control the transmit power as low as possible while maintaining a target data rate Rate and a target FLR. In our implementation of the algorithm, the target data rate is set to be the highest data rate, MCS15 supported by the 802.11n transmitter and receiver. The reason being the airtime will be the smallest to transmit a frame using the highest data rate so that the time that a transmitter interferes with other devices will be minimized.

Viswanathan at 25.

> The transmit power at the AP for STAs separated by larger distances or walls is relatively higher than the transmit power at the AP for closer STAs. This is because the decision to use a particular value of transmit power is made based on the perceived link quality (RSSI) as reported by the STA.

Viswanathan at 47.

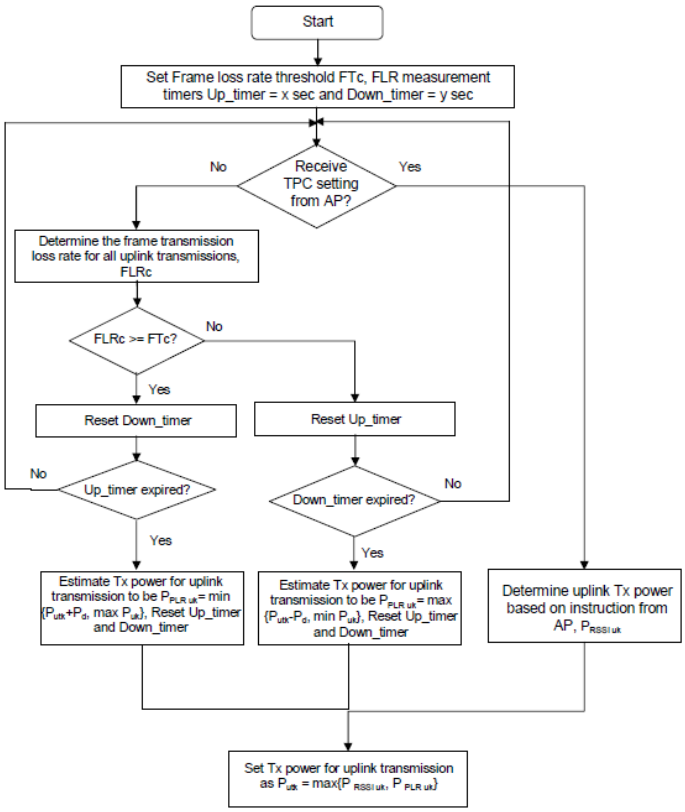

Figure 4.2: STA side TPC operation based on RSSI measurement and frame loss rate trigger

Viswanathan at 41.

As a further example, Robust Rate Adaptation for 802.11 Wireless Networks ("Wong") describes a rate adaption algorithm including discarding data transmission in case of interference regardless of transmission rate.

> We consider a practical 802.11-based wireless LAN or mesh network scenario. Both clients and access points (APs)/mesh routers use 802.11 a/b/g devices. The clients may roam but the APs/mesh routers are typically static. The physical layer operates at 2.4GHz for 802.11b/g or at 5Ghz for 802.11a, which

only has a limited number (e.g., 3 for 802.11b/g) of independent channels. Thus, multiple APs within a geographic locality may have to share one of these channels. This readily leads to hidden stations among APs and clients. In our campus building environment, we can easily sniff about 4∼10 APs and 50∼100 clients on any given 802.11 b/g Channel 1, 6, or 11 during regular office hours, and they may act as hidden stations among one another.

Wong at 2.

In this section, we present the design of RRAA, a Robust Rate Adaptation Algorithm for 802.11-based wireless networks. Overall, RRAA tries to maximize the aggregate throughput in the presence of various channel dynamics. Specifically, it seeks to achieve the following goals:

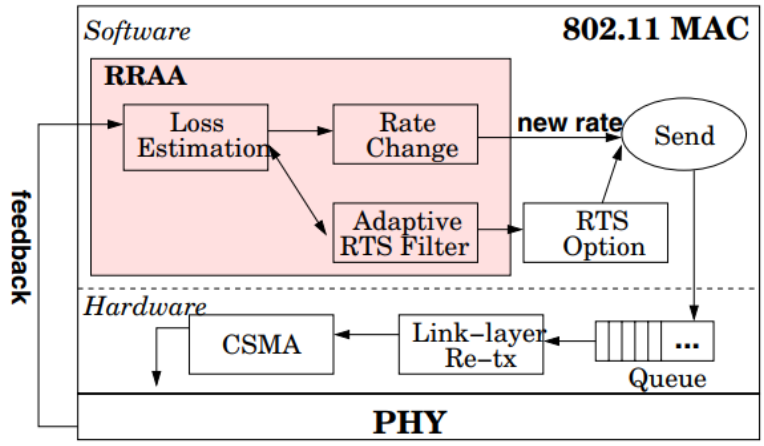

Figure 5: Modules and interactions in RRAA.

Wong at 6.

The algorithm should respond quickly to significant channel changes. Specifically, we want the design to be highly responsive in the following two scenarios: (a) The algorithm is able to quickly track the rate decrease/increase associated with the channel change, when the channel quality deteriorates/improves as a mobile user walks away/towards the AP. (b) The algorithm is able to respond properly in the presence of severe channel degradation induced by interfering sources, e.g., hidden terminals due to other 802.11 devices, and sources such as microwaves and cordless phones operating in the same frequency band.

Wong at 7.

6.5.3 Integrating RRAA-BASIC and A-RTS

> While RRAA-BASIC and A-RTS address channel fluctuations and hidden terminals respectively, one might think that a simple combination of both algorithms would suffice. However, their coherent integration is actually non-trivial because RTS frames may also be lost due to collisions with the hidden terminals.
>
> Such RTS losses have dual impacts on rate adaptation. First, when RTS fails, it is considered as a frame loss even though the data frame is not transmitted at all, which tends to over-estimate the loss ratio. Second, the RTS losses will trigger retries executed in the firmware of the Atheros/Agere chipset, which use rates lower than the one set by the software rate adaptation algorithm. Because an RTS frame is much smaller than a typical data frame, subsequent re-tries of RTS may still collide with the ongoing data transmission of a hidden terminal. In the worst case, the data frame is discarded or transmitted at the base rate during the last retry executed by the chipset firmware, regardless of the decisions made by the software rate adaptation. As shown in Figure 9, RRAA addresses these two issues by applying two checks in integrating RRAA-BASIC and A-RTS. First, a frame loss due to RTS failure is not counted toward the loss ratio estimation. Secondly, when RTSwnd in the A-RTS algorithm exceeds a threshold (3 in our experiments), which indicates severe collisions, we disable the firmware rate adaptation. That is, the firmware is informed to fix the rate in the re-transmissions as specified by the software rate adaptation module.

Wong at 9.

As a further example, Bit-rate Selection in Wireless Networks ("Bicket") discloses a bit rate selection algorithm:

> This thesis evaluates bit-rate selection techniques to maximize throughput over wireless links that are capable of multiple bit-rates. The key challenges in bit-rate selection are determining which bit-rate provides the most throughput and knowing when to switch to another bit-rate that would provide more throughput. This thesis presents the SampleRate bit-rate selection algorithm. SampleRate sends most data packets at the bit-rate it believes will provide the highest throughput. SampleRate periodically sends a data packet at some other bit-rate in order to update a record of that bit-rate's loss rate. SampleRate switches to a different bit-rate if the throughput estimate based on the other bit-rate's recorded loss rate is higher than the current bit-rate's throughput. Measuring the loss rate of each supported bit-rate would be inefficient because sending packets at lower bit-rates could waste transmission time, and because successive unicast losses are time-consuming for bit-rates that do not work. SampleRate addresses this problem by only sampling at bit-rates whose lossless throughput is better than the current bit-rate's throughput. SampleRate also stops probing at a bit-rate if it experiences several successive losses. This thesis presents measurements from indoor and outdoor wireless networks that

> demonstrate that SampleRate performs as well or better than other bit-rate selection algorithms. SampleRate performs better than other algorithms on links where all bit-rates suffer from significant loss."

Wong at 3.

As a further example, Self-Optimization of Radio Resources on IEEE 802.11 Networks ("Villegas") discloses various dynamic radio resource management mechanisms such as algorithms for rate selection, load balancing, frequency channel allocation, and power control (Villegas, Sections 1, 5, 6).

As a further example, Interference Management in Dense 802.11 Networks ("Ahmed") also discloses various algorithms for interference management in 802.11 networks:

> 4.8.1 Channel Assignment
>
> Channel assignment attempts to allocate orthogonal channels to nodes in the conflict graph that have an edge between them. Once completed, channels should be rarely changed because this disrupts service for clients. This is particularly important in the SMARTA architecture because legacy IEEE 802.11 clients cannot be instructed to change channels and are therefore disconnected if the AP changes its channel.
>
> To minimize channel changes, channel-assignment is done on the basic conflict graph that deals only with access-point conflicts. Of course, we still need some way to deal with client conflicts and this is done during construction of the annotated conflict graph. The algorithm to perform channel assignment is called Randomized One-point optimization (RanOp) and bears some similarity to the approach described in [90]. Note that we consider the cost of re-associating clients by minimizing the number of times the chan nel assignment algorithm is invoked. However, once invoked, the current channel assignment algorithm does not consider the re-association cost. An algorithm that does consider this cost can also be designed for the SMARTA system.
>
> The RanOp algorithm first assigns a random channel to each access point and computes the current total number of conflicts. Then, considering each access point (a_i) in turn it computes the gain in utility (in terms of reducing the total number of access-point conflicts) by switching that access point to a different channel. It computes the gain in utility for the access point on all channels and selects the channel C that yields the greatest gain for a_i. It then checks whether changing a_i to C yields an improvement in utility that is larger than the best utility gain seen in the iteration so far. If so, (a_i, C) is labeled as the best improvement seen so far. Because the algorithm performs this operation across

all access points, it selects the access point and channel change that yields the largest gain in overall utility. This process repeats until we reach a configuration where any further one-point alterations do not yield a gain in utility. Because the solution of the algorithm may depend on the initial assignment of channels to access points, we perform multiple runs of the algorithm and choose the best solution (in terms of utility) among them.

4.8.2 Channel Refinement

In the second phase of channel-assignment, we refine channel allocations as an optimization of the assignment we computed previously. Note, for channel refinement we only consider optimization of assignments that keep the number of inter-AP conflicts constant. Inter-AP conflicts are considered the most severe type of conflicts and those that are likely to persist over longer periods of time than conflicts involving clients. This is why we only consider them in the RanOp algorithm. For channel refinement, whenever we add a client to an AP (to construct the ACG), we try all other channels for that AP to see if we can reduce the total number of client conflicts, keeping the number of inter-AP conflicts constant. If such a channel is available (e.g., in the case of 802.11a), the access point is switched to that channel. If not, the access point remains on the same channel.

Algorithm 1 wIR Power Control Algorithm

```
A = {a_1, a_2, ..., a_i} /* set of access points */
while true do
    u = ComputeTotalUtility(A)
    θ = MaxConflictAP(A)
    Z = {z_i | neighbour(θ, z_i) = true}
    for i = 1 ... | Z | do
        AdjustWeight(θ, z_i)
    end for
    γ = MaxConflictEdgeAP(θ, Z)
    ReducePowerLevel(γ)
    if u > ComputeTotalUtility(A) then
        IncreasePowerLevel(γ)
        Terminate.
    end if
end while
```

4.8.3 Power Control

Power control can be done quickly, even on a per-packet basis. However, two constraints make the power control problem challenging. First, power control needs to ensure that clients do not lose service by reducing an AP's power level by too much. Second, every alteration to access-point power causes the underlying ACG to change. Therefore, we need to re-compute (or refine) the ACG for every change in access-point power.

> Our power control technique proceeds in two steps. First, we compute appropriate power levels for all access points, taking the change in the ACG into account. Second, we refine access point power-levels to allow the system to adapt to changes in the environment. The algorithm for computing optimal power-levels (called *weighted Iterative Reduction* (wIR) and shown as Algorithm 1) proceeds as follows. Initially, all access points are set to transmit at maximum power and we compute the total utility of this configuration (ComputeTotalUtility(A)). Note, the algorithm re-computes this utility in every iteration, before performing the steps outlined further. In each iteration, the algorithm finds the access point that has the greatest number of conflicts (MaxConflictAP(A)). This is the AP whose sum total number of conflicts on all incoming edges from neighbouring APs is the greatest. The algorithm then re-weights these incoming edges (AdjustWeight(θ, zi)) as follows: For each AP that interferes with the maximum conflict AP, the incoming conflict edge's weight is increased in proportion to the amount of utility that this AP provides to its clients (as shown in Figures 4.10 and 4.11). Thus, edge weights are adjusted by adding a U/E positive value to the original weight, where U and E are the aggregate client utility provided and the total number of access point conflicts caused by the AP from which the edge emanates. After edge re-weighting, the algorithm selects the access point which induces the greatest conflict on the maximum conflict AP (MaxConflictEdgeAP(θ, Z)), and instructs it to reduce its power level by one step (ReducePowerLevel()). This repeats in successive iterations until there is no further improvement that can be made and a decrease is detected in the overall utility, at which point the algorithm terminates (after reversing the last power alteration). This approach rewards APs that have more active clients, so that they are less likely to have their power reduced.

Ahmed at 54-57.

A POSITA would have found it obvious to combine a prior art reference discussed in Appendix B with one or more of the algorithms described above because they are in the same wireless network communication field such as WLAN communication and it would have been obvious to adopt the algorithms for achieving the communication optimization benefits as described above.

As another example, Plaintiff takes the position that various limitations of the '398 Patent Asserted Claims describe aspects of the WLAN or 802.11 standards, which were well known at the time of the invention. *First,* Plaintiff accuses "Beacon Reports" and other aspects of IEEE

802.11 such as "Beacon, Frame, Channel Load, Noise Histogram, STA Statistics, LCI [location configuration information], Neighbor Report, Link Measurement, Transmit Stream/Category Measurement, Measurement Pause, and Measurement Pilot" as meeting the limitation of "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." 2024-10-04 First Amended Infringement Contentions, Ex. B-1 at 28-34. *Second*, Plaintiff accuses determining "whether a communication unit should switch band or connect to a different access point" such as via "BSS Transition Management" mechanisms as meeting the limitation of "determining a policy for at least one of the two or more communication units." 2024-10-04 First Amended Infringement Contentions, Ex. B-1 at 41-45. *Third*, Plaintiff accuses receiving a "signal that a channel is unusable," such as a "Non-preferred Channel Report subelement" as meeting the limitation of "server . . . determining that packets will be lost regardless of rate selection." 2024-10-04 First Amended Infringement Contentions, Ex. B-1 at 49-51. *Fourth*, Plaintiff accuses "sending the current BSS Transition Management Request frame" mechanisms as meeting the limitation of "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." 2024-10-04 First Amended Infringement Contentions, Ex. B-1 at 41-45. These aspects were taught in WLAN and 802.11 standards well known at the time of the claimed invention of the '398 Patent, and it would have been obvious for a POSITA to combine the teachings of these references.

Moreover, to the extent any of these references includes a feature not expressly disclosed in one or more other references, a POSITA would have naturally looked to, and been motivated

to combine, any one of these references with one or more of the other references in order to better achieve their common goals of providing a product, system, or method for optimizing performance of a communication unit by a remote server.

In addition to the specific examples provided herein, Defendant reserves the right to rely on the disclosures of the references listed in Appendix B for additional motivation to combine. These examples of combinations are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendant reserves the right to contend that the motivations to combine provided herein apply to other combinations at the appropriate time, *e.g.*, in expert reports regarding invalidity. To the extent one or more of identified combinations is posed as a combination of only two references, it does not indicate that the two references that are being combined for one purpose could not be joined by a third reference (or more additional references) whose combination serves the same or a different purpose. Indeed, many of the features recited in the Asserted Claims are componentized features/functions whereby the feature could be implemented using teachings from another source while not interfering with additional features. For that reason, a POSITA may have reasonably looked to and been motivated to combine three or more references to achieve a specific outcome.

As mentioned above, Defendant has not yet completed its search or discovery concerning additional prior art. Moreover, the exemplary combinations are provided based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. Further, a *Markman* Order has not yet been issued in this case. As such, Defendant's inclusion of exemplary combinations does not preclude it from identifying other invalidating combinations as

appropriate, and Defendant reserves the right to identify additional specific combinations as well as to detail and explain such combinations.

3. The ’654 Patent

The ’654 Patent is generally directed to allegedly improving the performance of communication systems, and in particular purports to increase performance by providing “means for knowing performance data that can be used to intelligently assess and manage performance of the communication device and/or network connection.” ’654 Patent, 1:37-39. It claims to do this via a “downloadable agent [] executable on a computing device coupled to a LAN of a broadband subscriber.” ’654 Patent at Abstract. The “downloadable agent” “collect[s] WAN performance information” and then “transmit[s] the WAN performance information to a machine” which can then “store and analyze the performance information to generate an analysis result.” ’654 Patent at Abstract. The analysis is then reported “to at least one of the broadband subscriber and its service provider.” ’654 Patent at Abstract.

In general, the ’654 Patent recognizes that POSITAs at the time were highly motivated to enhance communication performance, and in particular the performance of communications systems with a LAN and a WAN. *See, e.g.*, ’654 Patent, 1:28-39 (“In current practice, Wide Area Network (WAN) and/or Local Area Network (LAN) performance information is not centrally analyzed by a communication device coupled to such networks to account for information such as topological information, geographical information, user’s network usage pattern, quality of network connection, time, throughput, etc. Accordingly, communication devices coupled to such networks may operate with lower performance than otherwise possible because the communication devices have no means for knowing performance data that can be used to intelligently assess and manage performance of the communication device and/or network

connection."); 2:25-30 ("One of the problems with current communication systems is that information about the communication device and communication device performance inside the local area network (LAN) is generally available to other devices on the LAN, however not available to machines outside the LAN; i.e., the wide area network (WAN), or the cloud."); 3:56-59 ("Such downloadable agent allows for customized enhancement of user experience with a communication device by enhancing the communication device's or link's performance."); *see also* 3:25-39.

In terms of the knowledge and capacity of POSITAs at the time of the alleged invention, the '654 Patent confirms that the POSITA's knowledge at the time was vast, and that the POSITA's capacity to implement a downloadable agent that enabled communication devices to intelligently assess and manage performance of the communication device and/or network connection with an expectation of success was robust. Indeed, the '654 Patent acknowledges that POSITAs had extensive knowledge of communication networks, WANs, LANs, and the mechanism needed to improve the performance of the communication systems. *See, e.g.*, '654 Patent, 3:25-39 ("The term 'performance' herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc[.] Improving performance of the communication system includes increasing throughput, reducing error rate and latency, improving (i.e., reducing) jitter, reducing power consumption, etc. for the communicating system. The term 'TCP' stands for Transmission Control Protocol. The term 'UDP' refers to User Datagram Protocol. The term 'successful' herein refers to an indication suggesting safe receipt of a packet that is often confirmed by ACK (acknowledge) message packet. In another embodiment, operational data such as error counts, retransmission counts, modulation, signal strength, etc. are used to estimate the performance and throughput of the

communications link."); 3:3-7 ("The term 'Local Area Network' (LAN) herein generally refers to a computer or communication network that interconnects computers or communication devices in a limited area such as a home, school, computer laboratory, or office building using network media."); 3:8-12 ("The term 'Wide Area Network' (WAN) herein generally refers to a telecommunication network that covers a broad area (i.e., any network that links across metropolitan, regional, or national boundaries) compared to the limited area covered be a LAN."). Moreover, the '654 Patent confirms that a POSITA would have understood block diagrams and figures to disclose teachings not explicitly depicted or referenced, based on the POSITA's understanding of the functionality and operation of communications systems more generally. *See, e.g.*, '654 Patent, 3:65-67 ("well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring embodiments of the present disclosure.").

Among the teachings and motivations in the prior art that a POSITA would have been familiar with, the '654 Patent also acknowledges that specific elements of its own claims would have been either "known" or "apparent" to a POSITA. *See, e.g.*, '654 Patent, 3:62-67 ("It will be ***apparent***, however, to one skilled in the art, that embodiments of the present disclosure may be practiced without these specific details. In other instances, ***well-known*** structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring embodiments of the present disclosure.") (emphasis added); 16:64-17:4 ("While the disclosure has been described in conjunction with specific embodiments thereof, many alternatives, modifications and variations of such embodiments will be ***apparent*** to those of ordinary skill in the art in light of the foregoing description. The embodiments of the disclosure are intended to embrace all such

alternatives, modifications, and variations as to fall within the broad scope of the appended claims.”) (emphasis added).

The ’654 Patent further acknowledges that the various types of performance information would have been known to a POSITA. *See, e.g.*, ’654 Patent, 3:25-39 (“The term ‘performance’ herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc[.] Improving performance of the communication system includes increasing throughput, reducing error rate and latency, improving (i.e., reducing) jitter, reducing power consumption, etc. for the communicating system.”); 5:65-6:8 (“collected date (sic) may include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.”); 10:45-54 (“the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, error information (link error rate), type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.”); 17:43-52 (same); 19:1-10 (same).

With such vast knowledge, and together with the recognized interest in the art to improve performance (e.g., network throughput, latency, jitter, connectivity, error rates, power consumption, transmit power, and the like), a POSITA at the time of the alleged invention of the

’654 Patent would have been motivated to combine one or more of the references cited herein, and/or to apply the teachings of one reference to modify the system in another reference, to try obvious variants of downloadable agents that improve performance methods and solutions that might achieve any one or more of the foregoing interests. Such motivations, including further specific motivations, are apparent from the prior art cited herein.

For example, as the prior art references confirm, a POSITA would have been motivated to combine these references to analyze and transmit WAN performance information to a broadband subscriber and/or service provider based on WAN performance information collected and transmitted by a downloadable agent executable on a computing device coupled to a LAN. *See, e.g.*, Phuah-720 at Abstract (“A system for and method of system for performing residential gateway diagnostics and corrective actions is presented. In one exemplary embodiment, the method may comprise running one or more diagnostic tests on a residential gateway using a module of the residential gateway, storing a diagnostic test result, analyzing the diagnostic test result, and performing one or more corrective actions in response to the diagnostic test result.”); *id.* at [0012] (“According to an exemplary embodiment, a residential gateway, a broadband router, or other network access device may include one or more of: a module, an agent, or a process for performing one or more diagnostic tests. The module, process, or agent may be configured to analyze data from the diagnostic test and perform one or more corrective actions in response to the analysis.”); *id.* at [0023] (“Network element 106 may administer an agent, process, or module on a residential gateway, a broadband home router, or other Customer Premise Equipment (CPE).”); *id.* at [0026] (“module 122 may perform one or more diagnostic tests, may store diagnostic test results, analyze one or more diagnostic test results, and may perform one or more corrective actions in response to a diagnostic test result. Module 122 may

include an agent or a process for performing diagnostic test results or corrective actions. According to some embodiments, module 122 may be executable software stored on electronic storage of network element 114 and executed by one or more processors of network element 114. Tests and corrective actions performed by module 122 may be performed in response to a request, such as a request from an equipment management system. Module 122 may also perform tests and corrective actions as a periodic scheduled event."); *id.* at [0028] ("Module 122 may transmit diagnostic test results or provide an interface to diagnostic test results. For example, module 122 may transmit diagnostic test results to network element 106 or be queried by network element 106."); Huang-370 at Abstract ("Described is a technology by which a content server downloads an active content measuring tool object to a client request for a page. When loaded, the measuring tool object makes network measurements, including by direct socket access, and return measurement results. As part of its operations, the measuring tool object may request measurement assignments from a central controller, and/or return those results to the central controller. Measurement assignments may be directed towards determining a round trip time/latency, measuring throughput, packet loss rate, detecting in-fight modification of content and/or detecting the presence of a middle box, including the presence of a caching proxy server middle box. The measurement results may be used to evaluate hypothetical deployment of a number of servers and/or geographic locations for those servers."); *id.* at [0019] ("In one implementation, the measurement tool comprises an object. When clients 1061-106n retrieve web pages from the servers' websites, an instance 1031-103n of the measurement tool object is loaded into each client 1061-106n."); *id.* at [0021] ("When the measurement tool object (e.g., 1032) runs on the client, it works with a central controller 110 (e.g., at another, control server website, such as a server admeasure.com) to retrieve measurement assignments from the

central controller 110. As described below, this allows measuring the round-trip-time (RTT) between a large number of clients and a target server under the system's control."); *id.* at [0039] ("Other what-if questions relate to whether additional infrastructure deployments can help the cloud service provider. The tool can provide such measurement methodologies by leveraging existing large-scale networks. For latency measurement, one described methodology uses CDN infrastructures. For throughput measurements, one described methodology uses a SpeedTest or similar network. For packet loss measurement, one methodology is to use abnormally large delay to infer packet loss."); *id.* at [0066] ("The logical connections depicted in FIG. 5 include one or more local area networks (LAN) 571 and one or more wide area networks (WAN) 573, but may also include other networks. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet."); Phuah-720 at Abstract ("A system for and method of system for performing residential gateway diagnostics and corrective actions is presented. In one exemplary embodiment, the method may comprise running one or more diagnostic tests on a residential gateway using a module of the residential gateway, storing a diagnostic test result, analyzing the diagnostic test result, and performing one or more corrective actions in response to the diagnostic test result."); Sistanizadeh-232 at Abstract ("An automated service level manager (SLM) provides operations support for wide-area data communication services offered via regional IP-Over Ethernet on fiber networks. The SLM comprises a suite of software components and associated hardware running the software, to communicate with agents throughout the networks, to accumulate various network operations data for reports and alarms and to provide instructions to control network operations. The SLM preferably offers a web server type user interface. This interface enables access by technical personnel of the carrier, for example from a network operations center. This interface also offers

access to customers having or seeking service through the network."); *id.* at 2:53-67 ("The inventive manager further includes a service level manager application, in communication with the persistence layer module and the user interface. The functions of this application include monitoring the operations of the extended-area data communications network, by analyzing semantic transparency or time transparency of data traffic through the network based on the data provided by the persistence layer module from the agents in the network. The application provides reports to users, via the user interface, of the monitored network operations with respect to specific network services. The application also interacts with elements of the extended-area data communications network to control service traffic through the network, for example to increase a customer's bandwidth upon request as input by the customer or by carrier staff."); *see also* Appendix C at limitations 1a-1e & claims 2-6, 8-12, 16, 18-22, 33, 34, and 36.

A POSITA would also have been motivated to combine these references to request a change of throughput or latency after receiving WAN performance information collected and transmitted by a downloadable agent executable on a computing device coupled to a LAN. *See, e.g.*, Phuah-720 at [0001] ("Residential gateway devices support a number of interfaces and devices. Configuration, maintenance, and diagnostics of residential gateway devices is too complex for many users. The inability of users to configure and troubleshoot residential gateway devices results in an increase of requests for technical support. The inability of users to configure and troubleshoot residential gateway devices also results in the return of a number of correctly operating residential gateway devices."); *id.* at [0034] ("Corrective actions module 206 may perform one or more corrective actions. Corrective actions may be performed in response to a received command, in response to a diagnostic test result, or as a scheduled event. Corrective actions performed by corrective actions module 206 may include resetting a network interface of

network access equipment such as a residential gateway or broadband home router. Corrective actions performed by corrective actions module 206 may also include rebooting a residential gateway, and resetting one or more parameters of the residential gateway to a default setting (e.g., a factory setting). Corrective actions to execute may be identified based on stored data associating a corrective action with a diagnostic test result. According to one or more embodiments, corrective actions for a particular test result may be prioritized indicating a first corrective action to try and one or more subsequent corrective actions to try if a fault or error persists. For example, the number of reboots of a piece of network access equipment may be counted. After a specified number of reboots (e.g., three) parameters of the network access equipment may be reset if the fault or error persists.”); *id.* at [0166] (“FIG. 4 illustrates an exemplary screen diagram of a system for performing residential gateway diagnostics and corrective actions according to an embodiment of the disclosure. One or more error conditions may be supported by a user interface. The user interface may provide a user of a network access device such as network element 114 with help information. Help information may include troubleshooting and error resolution information. Error conditions for which a user interface may include common errors such as, for example, when a WAN IP is unavailable. If applicable, based on the error condition, a user may be presented with help information (which may reside on the network access device) that may guide a user through a troubleshooting and error resolution process.”); *id.* at [0168] (“FIG. 5 illustrates an exemplary screen diagram of a system for performing residential gateway diagnostics and corrective actions, according to an embodiment of the disclosure. As illustrated in FIG. 5, another issue which may be addressed by an agent or module on a network access device may be a WAN connectivity issue. For example, a network access device may be unable to pass traffic through a WAN connection (Ethernet or MoCA) and

to the Internet. The problem may be due a faulty ONT (Optical Network Terminal) or due to other WAN networking issues, even though the network access device may be operating correctly with a LAN devices.”); *id.* at FIGs. 4-5; Huang-370 at [0028] (“FIG. 2 shows some of example steps taken by the central controller; this may be one server/site, or different servers/sites working together, e.g., one to distribute the objects to servers, another to handle client requests. Step 202 represents providing the measurement tool objects to the servers, with step 204 representing the configuration of policy or the like on the central controller to allow the measurement tool objects cross domain access when the clients have received them from the servers.”); *id.* at [0039] (“Other what-if questions relate to whether additional infrastructure deployments can help the cloud service provider. The tool can provide such measurement methodologies by leveraging existing large-scale networks. For latency measurement, one described methodology uses CDN infrastructures. For throughput measurements, one described methodology uses a SpeedTest or similar network. For packet loss measurement, one methodology is to use abnormally large delay to infer packet loss.”); *id.* at [0040] (“For the CDN latency methodology, the tool may be used to measure the latency between clients and a target CDN service provider using reflection pings. For example, consider that example.com maps to 192.168.0.1; if so, an HTTP request is constructed as: http://192.168.0.1/tiny.gif?rand, instead of http://example.com/tiny.gif?rand. Note that because the CDN server uses the hostname to associate a request with its customers (by examining the “Host” field in an HTTP request header), it cannot map http://192.168.0.1/tiny.gif?rand to any particular customer in this case. As a result, it denies such a request and sends back HTTP/1.x 400 Bad Request. In addition, the CDN server closes the connection after such a reply. Hence, each request (after the very first one) completes in exactly two RTTs (one for TCP establishment and the other for the

request/reply). The final RTT latency is calculated as half of the measured elapsed time."); *id.* at [0046] ("By using the above-described methodologies, the two CDN deployment philosophies may be compared. Then, for cloud services in general (including CDN providers), an answer as to the number of data centers that the service should provide, and where they should be located, may be provided. Using the technology described herein provides the answer without needing to predict by deploying servers in hundreds of potential locations, and then to measure latency and throughput performance from end-users to these servers, which is very expensive."); Sistanizedeh-323 at 21:15-29 ("The user interface also offers interactive options to change specific customer services. For example, if the customer selects an option to increase bandwidth, the web server 111 supplies a corresponding request message to the SLM application 107 (FIG. 6), that is to say to the provisioning service module 151 (FIG. 7). The request includes an identification of the customer. The provisioning service module 151 accesses the topology service 159 to determine the scope of that customer's service. The topology service 159 accesses the topology database 149 (FIG. 6), to obtain information about the customer's service. This information, for example, may include the identification of the customer's port, the current bandwidth provisioned on the port, the maximum port speed and bandwidth available for the particular type of service on the access ring serving the customer."); *id.* at 21:45-64 ("In response to the choice by the subscriber, the provisioning service module 151 instructs the management module 165 to allocate reserved resources to the particular customer's service. In response, the management module 165 instructs the agent(s) in the effected switch(es) to make the necessary configuration changes to provide the increased bandwidth service for the port(s) of the particular customer. For an upstream bandwidth allocation, this entails setting the subscriber profile for the customer's port to the new maximum bandwidth (50 Mb/s bandwidth in our example), in the E-

POP switch 33 serving the particular customer. For downstream bandwidth allocation, this entails setting the subscriber profile in the M-POP switches 43, 45 for the customer's address and the particular type of service (e.g. Internet service). The upstream bandwidth also may be limited by setting of the subscriber profile on the M-POP switches. Whether the SLM instructs the E-POP switch or the M-POP switch, etc., to assign certain parameters in the subscriber profiles depends on the scope of the customer's service as well as down vs up stream."); *id.* at 22:27-42 ("This may be pre-programmed to occur at set times. Alternatively, the customer can come in through the web server 111 and increase priority at the desired start time and decrease priority at the end of the file transfer interval. Each time that a change is made, the service level manager 107 knows the paths to/from the customer locations and the allocation of resources through the effected switch nodes. The service level manager 107 determines that it has the resources to satisfy the desired change in conditions, priority upgrade or downgrade; and it allocates the appropriate resources. Then the management module 165 provides instructions to the switches to implement the allocations, including any necessary changes in bandwidth reservations and the changes in priority status for the customer's traffic. The tables in the topology database are updated each time that the customer's service changes."); *see also* Appendix C at limitation 1f & claims 8, 18, 33.

Defendant may rely on cited or uncited portions of the prior art, other documents, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the Asserted Claims invalid as obvious. In the event Plaintiff challenges the motivation to combine particular prior art references, Defendant reserves the right to supplement these contentions to further specify the motivation to combine the prior art to the extent necessary.

In addition to the specific examples provided herein, Defendant reserves the right to rely on the disclosures of the references listed in Appendix C for additional motivation to combine. These examples of combinations are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendant reserves the right to contend that the motivations to combine provided herein apply to other combinations at the appropriate time, *e.g*., in expert reports regarding invalidity. To the extent one or more of identified combinations is posed as a combination of only two references, it does not indicate that the two references that are being combined for one purpose could not be joined by a third reference (or more additional references) whose combination serves the same or a different purpose. Indeed, many of the features recited in the Asserted Claims are componentized features/functions whereby the feature could be implemented using teachings from another source while not interfering with additional features. For that reason, a POSITA may have reasonably looked to and been motivated to combine three or more references to achieve a specific outcome.

As mentioned above, Defendant has not yet completed its search or discovery concerning additional prior art. Moreover, the exemplary combinations are provided based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. For example, Plaintiff appears to rely on an unduly broad interpretation of limitation 1f, in which network speed tests and web hyperlinks for purchasing faster Internet service or that offer home users troubleshooting isntructions are alleged to involve a downloadble agent's "sending an on-demand change request associated with at least one of throughput, or latency." *See, e.g.*, 2024-10-04 First Amended Infringement Contentions, Ex. C at 13-16, 24-33. Speed tests were well

known, routine, and conventional in the prior art, including as disclosed in the Speed of Me, PingTest, TestMyNet, and Ookla systems identified above and the prior art charted in Appendix C, and it was obvious to incorporate such functionality in network management tools. Moreover, applications and websites providing links to purchase faster Internet or troubleshooting instructions appear to be untethered to any reasonable interpretation of the claim language. Nonetheless, such links were conventional, as shown for example in at least the AT&T and Xfinity reference identified in Table 2-C above. Further, a *Markman* Order has not yet been issued in this case. As such, Defendant's inclusion of exemplary combinations does not preclude it from identifying other invalidating combinations as appropriate, and Defendant reserves the right to identify additional specific combinations as well as to detail and explain such combinations.

4. The '108 Patent

The '108 Patent is generally directed to allegedly optimizing WAN and LAN network communications. '108 Patent, 1:39-42. It claims to do this by "jointly monitoring, provisioning and optimizing WAN and LAN network communications . . . ." '108 Patent, 2:25-28. In short, the claims require a management device connected to both a local area network ("LAN") and a wide area network ("WAN," which may simply be the Internet), wherein the device collects LAN performance information and uses it to identify "operational conditions" within the WAN. *E.g.*, '108 Patent at claim 1.

In general, the '108 Patent recognizes that it was traditional for a LAN and WAN to be managed by different entities. For example, a WAN was "traditionally . . . controlled, managed and maintained by service providers" and the like, while a LAN was "typically managed and maintained by end users/customers, which may be residential users or commercial/business

customers." '108 Patent, 2:3-8; *see also* 2:58-3:35 (describing conventional network topologies, including those in which a service provider offers Internet bandwidth to end-users/customers, who in turn distribute network connectivity via a LAN). The speculative administrative boundaries between a WAN and a LAN are repeatedly discussed in the specification. *See, e.g.*, '108 Patent, 2:12-24 (noting that WAN operators may not have full control over management functionalities, and the means for controlling, monitoring, and provisioning LAN and WAN networks are "typically distinct and separate" even though the networks are connected); 17:25-35 ("It is noted that in the absence of the Management device 170, it is not possible to optimize or monitor the performance of the LAN, based on information from the WAN or to optimize or monitor the performance of the WAN, based on information from the LAN. This is because the control mechanisms and control channels on the two networks are distinct and separate. A Management device 170 as described herein addresses such a problem and enables such monitoring and optimizations which are not otherwise feasible."). The '108 Patent purports to break down the boundaries between a WAN and a LAN by "jointly monitoring, provisioning and optimizing WAN and LAN network communications." '108 Patent, 2:25-28; *see* 3:43-50.

A POSITA at the time of the alleged invention of the '108 Patent had strong motivation to optimize network communications. The '108 Patent does not suggest otherwise, but relies on the fact that different portions of a network were typically managed by different entities (*e.g.*, a LAN by an end user/business and a WAN by a service provider). Nonetheless, a POSITA had a strong motivation to optimize network communications in general—even if it were true (and it was not) that traditional systems separated the ability to control and optimize a LAN from the ability to control and optimize a WAN. Indeed, a POSITA would have been motivated to accurately assess network performance, diagnose any problems affecting performance, and take

corrective actions to fix those problems. The prior art cited herein shows this in detail, and more particularly shows that it was well known to collect and analyze network performance information in an effort to optimize network performance throughout the network without regard to arbitrary/administrative boundaries focused on by the ’108 Patent.

Likewise, the Asserted Claims of the ’108 Patent focus on identifying operational conditions within the WAN in a “different communication layer” as compared to the layer(s) from which LAN information was collected. To be clear, communication layers were admittedly well known. ’108 Patent, 16:62-17:4 (referring to the OSI model as a “commonly used model describing the different data processing layers” and referencing the TCP/IP model without even identifying its layers, thereby indicating that the model was so well known to a POSITA that it need not even be described). Indeed, development of the OSI and TCP/IP models can be traced back to the 1960s and both were well known by at least the 1980s. Even if that were not the case, the prior art cited herein shows that communication layers were well known. Additionally, the concept of collecting information from one layer and using that information to identify problems in a different layer was an arbitrary requirement that was added during prosecution of the ’108 Patent to avoid prior art—the ’108 Patent does not suggest any reason why there would be unexpected results or benefits associated with collecting information at one layer and using it to identify problems at another layer. Instead, this appears to be an arbitrary narrowing of a genus (devices that may collect information from any layer and use that information to infer operational conditions exist at any layer, whether the same or different) to a species (devices that cannot identify operational conditions at the same layer from which they collected performance information). In any event, the prior art cited herein shows that communication layers were well

known, as was the ability to collect information from one layer and use it to identify problems in a different layer.

A POSITA at the time of the alleged invention of the ’108 Patent would have been motivated to combine one or more of the references cited herein, and/or to apply the teachings of one reference to modify the system in another reference, to alleviate network performance problems. Such motivations, including further specific motivations, are apparent from the prior art cited herein.

For example, as the prior art references confirm, a POSITA would have been motivated to combine references to ensure that information may be collected from one layer in a LAN and used to identify operational conditions within a different layer in the WAN. *See, e.g.*, Kerpez at FIG. 10, Abstract (“Diagnosis, fault isolation, and even suggested reconfigurations are all automated in software.”); *id.* at 770 (“The entire process of DSL maintenance and operations can be greatly enhanced with an overall integrated test system, which can gather data from all network elements and test heads, analyze faults at all layers of the protocol stack, and integrate with other operations systems, including work-force administration.”); *id.* at 772-73 (“DSL modems often support remote management. Remote management must be enabled on the modem before it is shipped or be enabled by the customer later on. Proprietary Web-based control allows many settings to be changed, the modem to be rebooted, and some rudimentary line diagnostics, such as bit rate and margin, to be viewed. More recently, DSL modems and other customer premises equipment can report diagnostic data and configurations via the standardized DSL Forum TR-069 interface. This interface is becoming very popular, although standards conformance is still lacking. TR-069 can be used to read all modem configurations, DSL diagnostics, cell and packet error counts, and in-home LAN statistics. Misconfigurations

can be reset with TR-069."); Huang-370 at Abstract ("Described is a technology by which a content server downloads an active content measuring tool object to a client request for a page. When loaded, the measuring tool object makes network measurements, including by direct socket access, and return measurement results. As part of its operations, the measuring tool object may request measurement assignments from a central controller, and/or return those results to the central controller. Measurement assignments may be directed towards determining a round trip time/latency, measuring throughput, packet loss rate, detecting in-fight modification of content and/or detecting the presence of a middle box, including the presence of a caching proxy server middle box. The measurement results may be used to evaluate hypothetical deployment of a number of servers and/or geographic locations for those servers."); *id.* at 0039 ("Other what-if questions relate to whether additional infrastructure deployments can help the cloud service provider. The tool can provide such measurement methodologies by leveraging existing large-scale networks. For latency measurement, one described methodology uses CDN infrastructures. For throughput measurements, one described methodology uses a SpeedTest or similar network. For packet loss measurement, one methodology is to use abnormally large delay to infer packet loss."); *id.* at 0066 ("The logical connections depicted in FIG. 5 include one or more local area networks (LAN) 571 and one or more wide area networks (WAN) 573, but may also include other networks. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet."); Phuah-720 at Abstract ("A system for and method of system for performing residential gateway diagnostics and corrective actions is presented. In one exemplary embodiment, the method may comprise running one or more diagnostic tests on a residential gateway using a module of the residential gateway, storing a diagnostic test result, analyzing the diagnostic test result, and performing one or more

corrective actions in response to the diagnostic test result."); Werner-978 at 0025 ("Via analyzer 1460, information device 1400 can monitor and/or inspect traffic flowing through router 1300, and particularly traffic traveling between LAN 1600 and WAN 1700. A user interface 1440 for analyzer 1460 can be provided to a user 1420 of information device 1400. Analyzer 1460 can comprise a packet sniffer and/or other packet inspection mechanism and/or an interface to the WAN service provider's provisioning system."); *id.* at 0029 ("Analyzer 1460 can associate the packet traffic information with one or more WAN capacities, such as Class of Service levels, Class of Service profiles, Class of Service subscriptions, Quality of Service levels, and/or transport bandwidths, etc. Analyzer 1460 can provide one or more notifications when adequate capacity is not available on the WAN for at least a portion of the packet traffic, such as the packet traffic associated with a particular Class of Service level. When adequate capacity is not available on the WAN for at least a portion of the LAN-WAN packet traffic, analyzer 1460 can determine and/or request any one or more desired capacity (e.g., bandwidth and/or Class of Service level) and/or change in capacity."); Wiley-776 at 0035 ("One embodiment of a process for centrally controlling packet network communications may include communicating with at least one network communications device over a packet network to collect network performance information of node segments providing communications between the network communications devices on the packet network. Network performance information may be respectively stored in association with indicia representative of the node segments. Network communications over the node segments may be controlled by the network communications devices based on the stored network performance information."); *id.* at 0270-71 ("In one embodiment of the present invention, real-time transmission performance information acquired in the Data Link Layer 3104 is communicated into one or more of Physical Layer 3102, Network Layer 3106, Transport

Layer 3108, Session Layer 3110, Presentation Layer 3112, and Application Layer 3114. In another embodiment, the real-time transmission performance information acquired in the Data Link Layer 3104 may be communicated into other Data Link Layer protocols, such as ATM, MPLS, Frame Relay, or other protocols. This real-time transmission performance information may be used to provide real-time notification of the ETH Layer 3232. This real-time transmission performance information may also be used to complement existing protocols and capabilities to provide quicker response time to network changes identified to ETH Layer 3232. Data Link Layer 3104 from and to Physical Layer 3102. In one embodiment, real-time transmission performance information acquired in the Data Link Layer 3104 may be communicated to the Physical Layer 3102. In one embodiment, the degradation of a copper-based link due to induced noise or any other source of impairment, delay, or loss of data could limit the quantity of information that can be carried error-free across the link. The transmission performance information carried in the PIP packet is capable of identifying this degradation. This degradation may be reported to the Physical Layer 3102, where a protocol operating on the Physical Layer 3102 realizes the degradation and modifies the route to optimize throughput and overcome the impairment, such as rerouting the link to an alternative physical copper link or a reduction in the number of Quadrature Amplitude Modulation (QAM) windows or change to another transmission schema all together."); *see also* Appendix D at limitations 1e-1f.

A POSITA would also have been motivated to combine these references to provide a response regarding any operational conditions identified, including diagnostic reports, network provisioning requests, and other troubleshooting, management, and maintenance functionalities. *See, e.g.*, Kerpez at 780 ("The combination of measurements, data collection, analysis routines, and integrated work-force administration can greatly reduce time to repair and eliminate truck

rolls. The integrated DSL test [14] can pull in data from many sources and can analyze and correlate them to automatically diagnose the source of a difficult problem. The element that is causing a problem can be isolated: the loop, the noise, the modem, etc. The correct remediation (i.e., remove the bridged tap) can be analytically determined before expending effort in the field. The system can help to instruct an entry-level technician as to what needs to be done before dispatch or to entirely avoid dispatch. Costs are far less expensive than manual tests, and storing measurement data can avoid rework.”); Huang-370 at Abstract (“Measurement assignments may be directed towards determining a round trip time/latency, measuring throughput, packet loss rate, detecting in-fight modification of content and/or detecting the presence of a middle box, including the presence of a caching proxy server middle box. The measurement results may be used to evaluate hypothetical deployment of a number of servers and/or geographic locations for those servers.”); Phuah-720 at Abstract (“A system for and method of system for performing residential gateway diagnostics and corrective actions is presented. In one exemplary embodiment, the method may comprise running one or more diagnostic tests on a residential gateway using a module of the residential gateway, storing a diagnostic test result, analyzing the diagnostic test result, and performing one or more corrective actions in response to the diagnostic test result.”); Werner-978 at Abstract (“Certain exemplary embodiments comprise a method comprising a plurality of activities, comprising: based on an analysis of historical information regarding packet traffic conveyed on a local area network associated with a customer, the packet traffic also conveyed on a wide area network managed by a service provider and coupled to the local area network: receiving information relating to a requested change in capacity provisioned for packet traffic conveyed on the wide area network; and automatically changing the capacity provisioned for packet traffic conveyed on the wide area network.”); Wiley-776 at 0262

("Provisioning Entity The performance data manager may additionally use the network performance information that is collected from the packet network to provide provisioning functions. Provisioning may include a variety of functions, including (i) tracking path or element oversubscription rates and utilization prior to allowing network provisioning to occur, (i) managing network performance tracking by creating reports for newly created entities, (iii) dedicating or calculating failover, (iv) load balancing for re-routing of real-time or non-real-time content communications, (v) retrieving and presenting state information on network utilization and available resources to network managers in the form of reports and trend lines to determine where congestion is occurring, (vi) displaying locations where additional routers, gateways, or other network communications devices may be desired to alleviate congestion or provide safety valves for network communications devices that require higher bandwidth capacity during certain times of the day, or (vii) providing any other network management functionality based on the network performance information as described herein. In addition, the provisioning may enable automatic response to alerts or warnings that are detected by the performance data manager on a real-time or near real-time basis. For example, if an alert is created by a threshold for bandwidth capacity, the performance data manager may seek to re-route real-time or non-real-time content communications. Alternatively, if a spike in real-time content communications is occurring at a node that has non-real-time data being communicated at the same time, the performance data manager may notify the node to halt new provisioning or new communications sessions of the data packets including non-real-time content until the real-time content communications rate has decreased. The performance data manager 2714 may further be configured to direct one or more network nodes to change the bandwidth of a CODEC, close ports, send messages to other carriers to notify the other carrier of an overload or over-

usage condition coming from their network or perform any other provisioning function through the use of monitoring the network performance information, as provided."); *see also* Appendix D at claim 2.

As yet another example, a POSITA would have been motivated to combine these references to diagnose and fix problems associated with routine and conventional network issues, including link stability and quality, impulse noise protection, margin parameters, transmit power, forward error correction and errors more generally, latency, data rates, congestion, power consumption, bandwidth, and/or connection failures. *See, e.g.*, Kerpez at 774 ("Fig. 3 shows a layered approach to presenting DSL test results. Problems at lower layers often percolate up and cause higher layers to fail: • Layer 1: loss of signal, a high bit error rate, errored seconds, etc.; • Layer 2: cell loss, HEC errors, framing errors, etc.; • Layer 3: degraded throughput, corrupted packets, packet drops, IP routing, MPLS label switched paths, etc.; • Layer 4: lost sessions, increased transmission control protocol (TCP) connect times, TCP timeouts, TCP retransmissions, decreased throughput, QoS assignments, etc.; • Layer 7: application timeouts, dropped calls, call setup failures, distortion, etc."); Huang-370 at Abstract ("Described is a technology by which a content server downloads an active content measuring tool object to a client request for a page. When loaded, the measuring tool object makes network measurements, including by direct socket access, and return measurement results. As part of its operations, the measuring tool object may request measurement assignments from a central controller, and/or return those results to the central controller. Measurement assignments may be directed towards determining a round trip time/latency, measuring throughput, packet loss rate, detecting in-fight modification of content and/or detecting the presence of a middle box, including the presence of a caching proxy server middle box. The measurement results may be used to evaluate

hypothetical deployment of a number of servers and/or geographic locations for those servers.”); Phuah-720 at 0012 (“The administration of the agent in terms of activation, configuration, execution, and retrieval of test results may be performed via a network access device management system. For certain network access device error conditions, an end user of the device may be prompted with a supporting help user interface (e.g., web pages provided or served by the network access device) to assist in troubleshooting and fixing the error conditions.”); Werner-978 at 0010-12 (“CDPSS can comprise 1) automatic analysis and mapping of traffic to appropriate classes of service, and/or 2) dynamic correlation of traffic class settings and/or bandwidth to a service provider’s network transport provisioning system. These features can enable traffic types to be prioritized on-demand without client or service provider intervention and/or ensure that proper capacity is measured to reserve appropriate bandwidth for all data classes. CDPSS can comprise a configuration menu that can be utilized by the customer and/or service provider to modify the settings of CDPSS with the traffic classes offered by any service provider based on their specific implementation of the Differentiated Services Code Point (DSCP) traffic classification method. This feature can ensure end-to-end COS compatibility irregardless of the service provider selected by a customer. A bandwidth level for each COS priority level can be determined, such as via a predetermined factor applied to the application-aggregated peak bandwidth level for that COS priority level. The resulting information can ensure that the customer orders and/or is automatically provided adequate bandwidth for each COS priority level, which can prevent dropped packets. For example, in the case of VoIP, adequate bandwidth can prevent phone calls from having clipped voices. CDPSS can ensure that COS markings are properly invoked as new applications are added to the customer environment or adjustments can be made dynamically as application utilizations change over time.”); Wiley-

776 at 0308-09 ("The additional DSL network performance information improves repair resolution time, as network problems at a subscriber may be quickly identified. The DSL network performance information allows full monitoring and troubleshooting through a single network management system. In addition, dynamic configuration changes based on network performance may be made by the Network Management System 4508 to optimize circuit performance. For instance, if a DSL circuit 4502 suddenly experienced a peak or spike in impulse noise on the non-Ethernet segment, appropriate diagnostic information may be inserted into the Ethernet management stream and adjustments may be temporarily made by the network management system 4508 to the DSL Signal-to-Noise ratio to compensate for the interference and to ensure line stability. After a given timeframe or due to improving changes in captured performance data, the line could be re-provisioned by the management system to improve overall performance. This example is one of dozens of possible configuration changes that may be made in real-time to optimize DSL circuit performance. Other exemplary network performance information parameters that may be captured and inserted into the management stream include: near-end failures, far-end failures, last state transmitted (downstream and upstream), actual signal-to-noise ratio, maximum attainable data rate, actual power spectrum density, actual aggregate transmit power, xDSL profile, xDSL limit PSD mask and band-plan, xDSL Power Spectral Density mask, estimated upstream power back-off electrical loop length, trellis code use, actual cyclic extension, band number, line attenuation per band, signal attenuation per band, signal-to-noise ratio margin per band, actual data rate (downstream and upstream), previous data rate (downstream and upstream), actual interleave delay (downstream and upstream), actual impulse noise protection, impulse noise protection report, actual size of Reed-Solomon codeword, actual number of Reed-Solomon redundancy bytes, actual number of bits per second,

actual interleaving depth, actual interleaving block depth, actual latency path, interval number, interval status (valid and complete; invalid or incomplete), forward error correction seconds, errored seconds-line, severely errored seconds-line, loss of signal seconds-line, unavailable seconds-line, full initializations, failed full initializations, short initializations, failed short initializations, sync mode, or other capabilities identified in xDSL (e.g., ADSL1, ADSL2, ADSL2+, VDSL2, etc.).”); *see also* Appendix D at claim 3-4 & 7.

Defendant may rely on cited or uncited portions of the prior art, other documents, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the claims invalid as obvious. In the event Plaintiff challenges the motivation to combine particular prior art references, Defendant reserves the right to supplement these contentions to further specify the motivation to combine the prior art to the extent necessary.

In addition to the specific examples provided herein, Defendant reserves the right to rely on the disclosures of the references listed in Appendix D for additional motivation to combine. These examples of combinations are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendant reserves the right to contend that the motivations to combine provided herein apply to other combinations at the appropriate time, *e.g*., in expert reports regarding invalidity. To the extent one or more of identified combinations is posed as a combination of only two references, it does not indicate that the two references that are being combined for one purpose could not be joined by a third reference (or more additional references) whose combination serves the same or a different purpose. Indeed, many of the features recited in the Asserted Claims are componentized features/functions whereby the feature

could be implemented using teachings from another source while not interfering with additional features. For that reason, a POSITA may have reasonably looked to and been motivated to combine three or more references to achieve a specific outcome.

As mentioned above, Defendant has not yet completed its search or discovery concerning additional prior art. Moreover, the exemplary combinations are provided based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. Further, a *Markman* Order has not yet been issued in this case. As such, Defendant's inclusion of exemplary combinations does not preclude it from identifying other invalidating combinations as appropriate, and Defendant reserves the right to identify additional specific combinations as well as to detail and explain such combinations.

5. The '313 Patent

The '313 Patent is generally directed to selecting a policy based on observed performance data to improve performance. As the '313 Patent acknowledges, it was known at the time of the invention that in a communication system with "an access point (AP) 101 and one or more wireless stations 102," the "characteristics of the wireless channels and noise/interference [were] not constant and vary rapidly over time." '313 Patent, 1:30-32. It was also known to "adapt[] transmission strategies to enhance performance of the communication system," *i.e.*, using "time-varying and environment-change-dependent transmission or control strategies for a [communication system]." '313 Patent, 1:36-37. For example, "rate adaptation algorithm" was known at the time of the invention, that is, "the transmission rate of Institute of Electrical and Electronics Engineer (IEEE) 802.11g standard based WiFi communication system is rapidly adapted between 6 Mbps and 54 Mbps depending on the link quality and the rate selection

method (also known as the rate adaptation algorithm).” ’313 Patent, 1:44-49. It was also known that an algorithm could “use[] real-time data that are collected by the AP 101 of the WiFi communication system itself as an input to the adaptation algorithm 103, and a rate change in the link [would] occur[] when the real-time data meets a pre-defined criteria.” ’313 Patent, 1:50-54. Specifically, multiple rate adaption algorithms using rules, conditions, and/or parameters, such as transmission rate or number of packets that are successfully received, were known at the time of its invention:

> A possible rate adaptation algorithm 103 is to change transmission rate of signals by the AP 101 within the WiFi communication system when the measured RSSI (Received Signal Strength Indication) becomes too large or too small for the current rate in use. Another possible adaptation algorithm 103 is to increase the transmission rate of signals by the AP 101 whenever packets are successfully received by the AP 101 and/or the one or more stations 102 1-N for M (e.g., 3) times and decrease rate whenever packets are unsuccessfully received for P (e.g., 2) times. While such adaptation algorithms 103 are required for WiFi communication systems to function properly, the rules and thresholds used by the methods are decided by a system designer of the WiFi communication system. Furthermore, a specific adaptation algorithm 103 is included in the firmware and loaded to the WiFi communication system.

’313 Patent, 1:55-2:4. The ’313 Patent further acknowledges that it was known to solve the “Hidden Node problem” by “schedule[ing] the data transmission using Request to Send (RTS) and Clear to Send (CTS) mechanism,” which “incurs overhead in channel use, but prevents disastrous packet collisions by the two stations.” ’313 Patent, 17:31-36.

The references used in these contentions for the ’313 Patent also disclose the same or similar subject matter and technical objectives. For example, servers receiving network monitoring data, analyzing such data, and/or communicating policy to the network stations were well known in prior art, such as the Meraki Enterprise Cloud Controller, Cisco Wireless Control System, Ruckus ZoneDirector, Aruba Adaptive Radio Management, Extricom MultiSeries 1000 WLAN Switch, Aerohive Hive Manager, Trapeze Mobility Exchange controller, HP ProCurve

Multiservice Mobility (MSM) controller. These prior art products and systems or claim to provide various benefits and advantages. For example, the HP ProCurve MSM architecture claims to provide "operational advantages of centralized management and control with the scalability, efficiency and performance of distributed intelligence." ProCurve MSM WLAN Solution Overview at 2. As another example, Cisco Wireless Control System claims to provide "a powerful foundation that allows IT managers to design, control, and monitor enterprise wireless networks from a centralized location, simplifying operations and reducing total cost of ownership." As a further example, the Meraki Enterprise Cloud Controller claims to "let[] administrators build secure and scalable wireless networks quickly, easily, and at a lower cost." Further benefits of these known servers are described in detail in the claim charts for the '313 Patent. A POSITA would have appreciated the benefit of providing such a server and would have been motivated to combine the teachings of the references disclosed in these contentions in relation to the '313 Patent to achieve various benefits.

Furthermore, prior art references also disclose various algorithms that adjust parameter value such as transmission characteristics, transmission power, to improve performance of wireless communication devices including reducing interference, or to determine that that transmission signal would be lost regardless of rate selection. For example, Fast-Responsive link adaptation for IEEE 802.11 WLANs ("Qiao") discloses a link adaptation schedule that changes the transmission rate in real time for use in an 802.11 WLAN.

> The mechanism to select one out of multiple available transmission rates at a given time is referred to as link adaptation. The effectiveness of a link adaptation scheme depends on how fast it can respond to the wireless channel variation, and different link adaptation schemes may affect the system throughput performance significantly. Due to the conservative nature of the link adaptation schemes implemented in most 802.11 devices, the current 802.11 systems are likely to show low bandwidth utilization.

Qiao at 1.

In this section, we present our link adaptation scheme from two fundamental aspects:

A. When to decrease the transmission rate?

In general, the transmitter station should switch to a lower rate to transmit when the wireless channel condition degrades, which is normally indicated by frame transmission failures. However, considering the contention nature of the 802.11 DCF (Distributed Coordination Function) and the binary exponential backoff scheme used to resolve collisions, it is very likely that a single frame transmission failure is due to collision, while multiple consecutive failures are due to the deteriorated channel condition. Therefore, similar to the mechanisms described in [11]–[13], our link adaptation scheme requires the transmitter station to decrease the rate upon two consecutive transmission failures, as opposed to decreasing the rate immediately after a single transmission failure.

Fig. 1 shows the pseudo-code of the simple algorithm used in our link adaptation scheme to direct the transmitter station's rate-decreasing actions. It starts/restarts whenever the station adjusts its transmission rate.

B. When to increase the transmission rate?

The key component of a link adaptation scheme is to determine when to increase the transmission rate. A fast responsive link adaption scheme shall react quickly to the improved wireless channel condition and make better use of the available bandwidth. Our objective is to direct the transmitter station's rate-increasing attempts in a controlled manner such that the responsiveness of the link adaptation scheme can be guaranteed with minimum number of rate increasing attempts, hence maximizing the throughput

Qiao at 2.

… Consider the following two example scenarios. In the first scenario, the wireless channel condition varies frequently every 10 ms, and the transmitter station reacts to the improved channel condition with 5 ms response delay (F = 0.5). In the second scenario, the wireless channel condition changes slowly every 100 ms, and the station also reacts with 5 ms response delay (F = 0.05). Although both scenarios have the same response delay, the first one is clearly much worse than the second, because the wireless channel is under-utilized — frames are transmitted at lower than the highest achievable rates — for more than 50% of the time in the first scenario comparing to 5% in the second scenario.

Qiao at 3.

Fig. 3 shows the pseudo-code of the algorithm used in our link adaptation scheme to direct the transmitter station's rate-increasing attempts. It

> starts/restarts whenever the station adjusts its transmission rate — recorded as t0. tattempt represents the last-known time instance when the wireless channel remains the current condition, and it is initialized to t0 + xmit duration(rcurrent).

Qiao at 3.

> We simulate an infrastructure-based 802.11a system, where eight transmitter stations are evenly spaced on a circle around the AP (Access Point) with the radius of r meters, and all the stations are static. Each transmitter station transmits with 15 dBm transmit power, and the background noise level is set to -93 dBm. Note that multi-path fading can be observed even in the stationary WLAN environments due to movements of the surrounding objects

Qiao at 4.

In another example, Adaptive Transmit Power Control Based on Signal Strength and Frame Loss Measurements for WLANs ("Viswanathan") also describes a transmit power control algorithm based on parameters such as signal strength (RSSI) and frame loss rate (FLR) for use in a WLAN system.

> In the past few years, we witnessed a rapid penetration of Wireless Local Area Networks (WLANs) into the home and enterprise. Emerging technology such as the IEEE 802.11n radio, which is getting increasingly affordable, makes delivering multimedia content over wireless networks possible and this would drive the technology further into our daily life. As the number of available wireless channels in the unlicensed spectrum is limited (3 non-overlapping channels in 2.4GHz unlicensed band and up to 24 non-overlapping channels in 5GHz unlicensed band), they have to be shared by multiple WLANs consisting of Access Points (APs) and STAtions (STAs).
>
> In this thesis we propose an adaptive per-link Transmit Power Control (TPC) solution for WLANs. TPC can reduce interference, increase channel reuse, and eventually increase the overall capacity in dense 802.11 wireless networks. … From a detailed study of the previous efforts at power control, we observe that in order to make better decisions on transmit power; an AP needs to actively monitor several factors. Hence we develop a TPC algorithm based on both link margin estimation as well as frame loss rate measurement. Compared to previous solutions that adapt the transmit power based on measurement of a single parameter (either received signal strength or frame loss rate), the proposed power control mechanism can diagnose and take remedial action for hidden nodes and channel access asymmetry problems manifesting as frame losses. It is adaptive to mobility, complementary to any rate control algorithm and can also be incrementally deployed amidst non-cooperative nodes. We

> have implemented the algorithm as an application running on Atheros chipset-based 802.11n APs, taking practical system-level limitations into account. The proposed solution achieves significant transmit power reduction at the APs (to as low as 60% of the maximum power) for STAs as far as 70ft and over ∼60% increase in total network throughput through interference mitigation.

Viswanathan at 2.

> The objective of Transmit Power control (TPC) on a wireless device (AP or STA) is to use minimum transmit power while meeting the requirements for throughput and packet loss rate. TPC helps reduce interference with other devices, improve channel reuse, and eventually increase the overall capacity in wireless networks. Of course, TPC also helps conserve energy and improve battery life of mobile devices.

Viswanathan at 12.

> To determine the transmit power, an AP requests each of its associated clients (STAs) to measure its received signal strength and to report the received signal strength or its estimated link margin as well as the STA's current transmit power. The AP unicasts or multicasts TPC Request message to each of its associated STAs periodically (every Tm seconds, set to 100ms in our implementation). In addition, once a new STA is associated, the AP issues new TPC request to it. Fig.3.1 shows the AP TPC measurement operation. The requested STA will measure the received signal power, estimate the link margin for the down link, and report the received signal strength or the estimated link margin and its transmit power to the AP by sending a TPC Report message. Here the down link is the transmission link from the AP to the STA, and the uplink is the transmission link from the STA to the AP. The link margin estimation is described below.
>
> Based on the received signal strength or link margin measurement reported by the STAs, the AP determines its desired down link transmit power to each of them. The transmit power will meet the throughput and FLR requirements while generating the least interference to other devices in the neighborhood.
>
> The TPC algorithm is to control the transmit power as low as possible while maintaining a target data rate Rate and a target FLR. In our implementation of the algorithm, the target data rate is set to be the highest data rate, MCS15 supported by the 802.11n transmitter and receiver. The reason being the airtime will be the smallest to transmit a frame using the highest data rate so that the time that a transmitter interferes with other devices will be minimized.

Viswanathan at 25.

> The transmit power at the AP for STAs separated by larger distances or walls is relatively higher than the transmit power at the AP for closer STAs. This is

because the decision to use a particular value of transmit power is made based on the perceived link quality (RSSI) as reported by the STA.

Viswanathan at 47.

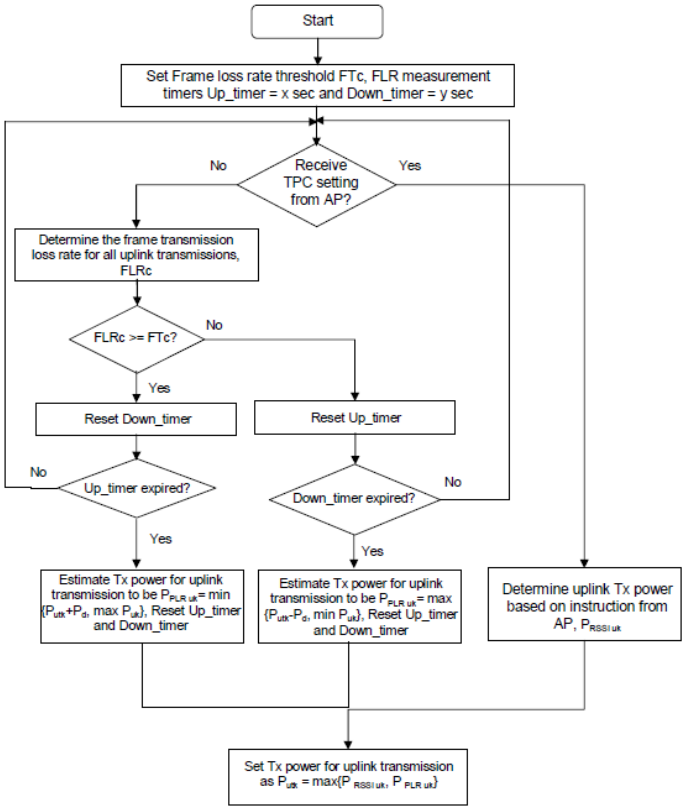

Figure 4.2: STA side TPC operation based on RSSI measurement and frame loss rate trigger

Viswanathan at 41.

As a further example, Robust Rate Adaptation for 802.11 Wireless Networks ("Wong") describes a rate adaption algorithm including discarding data transmission in case of interference regardless of transmission rate.

We consider a practical 802.11-based wireless LAN or mesh network scenario. Both clients and access points (APs)/mesh routers use 802.11 a/b/g devices. The clients may roam but the APs/mesh routers are typically static. The physical layer operates at 2.4GHz for 802.11b/g or at 5Ghz for 802.11a, which only has a limited number (e.g., 3 for 802.11b/g) of independent channels. Thus, multiple APs within a geographic locality may have to share one of these channels. This readily leads to hidden stations among APs and clients. In our campus building environment, we can easily sniff about 4~10 APs and

50~100 clients on any given 802.11 b/g Channel 1, 6, or 11 during regular office hours, and they may act as hidden stations among one another.

Wong at 2.

In this section, we present the design of RRAA, a Robust Rate Adaptation Algorithm for 802.11-based wireless networks. Overall, RRAA tries to maximize the aggregate throughput in the presence of various channel dynamics. Specifically, it seeks to achieve the following goals:

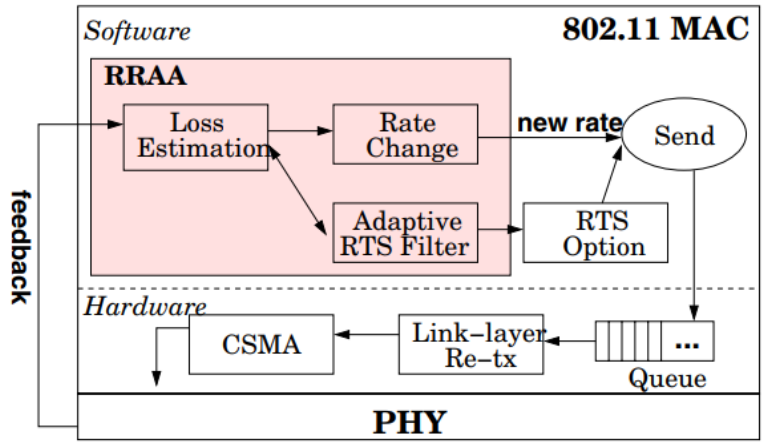

Figure 5: Modules and interactions in RRAA.

Wong at 6.

The algorithm should respond quickly to significant channel changes. Specifically, we want the design to be highly responsive in the following two scenarios: (a) The algorithm is able to quickly track the rate decrease/increase associated with the channel change, when the channel quality deteriorates/improves as a mobile user walks away/towards the AP. (b) The algorithm is able to respond properly in the presence of severe channel degradation induced by interfering sources, e.g., hidden terminals due to other 802.11 devices, and sources such as microwaves and cordless phones operating in the same frequency band.

Wong at 7.

6.5.3 Integrating RRAA-BASIC and A-RTS

While RRAA-BASIC and A-RTS address channel fluctuations and hidden terminals respectively, one might think that a simple combination of both algorithms would suffice. However, their coherent integration is actually non-trivial because RTS frames may also be lost due to collisions with the hidden terminals.

> Such RTS losses have dual impacts on rate adaptation. First, when RTS fails, it is considered as a frame loss even though the data frame is not transmitted at all, which tends to over-estimate the loss ratio. Second, the RTS losses will trigger retries executed in the firmware of the Atheros/Agere chipset, which use rates lower than the one set by the software rate adaptation algorithm. Because an RTS frame is much smaller than a typical data frame, subsequent re-tries of RTS may still collide with the ongoing data transmission of a hidden terminal. In the worst case, the data frame is discarded or transmitted at the base rate during the last retry executed by the chipset firmware, regardless of the decisions made by the software rate adaptation. As shown in Figure 9, RRAA addresses these two issues by applying two checks in integrating RRAA-BASIC and A-RTS. First, a frame loss due to RTS failure is not counted toward the loss ratio estimation. Secondly, when RTSwnd in the A-RTS algorithm exceeds a threshold (3 in our experiments), which indicates severe collisions, we disable the firmware rate adaptation. That is, the firmware is informed to fix the rate in the re-transmissions as specified by the software rate adaptation module.

Wong at 9.

As a further example, Bit-rate Selection in Wireless Networks ("Bicket") discloses a bit rate selection algorithm:

> This thesis evaluates bit-rate selection techniques to maximize throughput over wireless links that are capable of multiple bit-rates. The key challenges in bit-rate selection are determining which bit-rate provides the most throughput and knowing when to switch to another bit-rate that would provide more throughput. This thesis presents the SampleRate bit-rate selection algorithm. SampleRate sends most data packets at the bit-rate it believes will provide the highest throughput. SampleRate periodically sends a data packet at some other bit-rate in order to update a record of that bit-rate's loss rate. SampleRate switches to a different bit-rate if the throughput estimate based on the other bit-rate's recorded loss rate is higher than the current bit-rate's throughput. Measuring the loss rate of each supported bit-rate would be inefficient because sending packets at lower bit-rates could waste transmission time, and because successive unicast losses are time-consuming for bit-rates that do not work. SampleRate addresses this problem by only sampling at bit-rates whose lossless throughput is better than the current bit-rate's throughput. SampleRate also stops probing at a bit-rate if it experiences several successive losses. This thesis presents measurements from indoor and outdoor wireless networks that demonstrate that SampleRate performs as well or better than other bit-rate selection algorithms. SampleRate performs better than other algorithms on links where all bit-rates suffer from significant loss."

Wong at 3.

As a further example, Self-Optimization of Radio Resources on IEEE 802.11 Networks ("Villegas") discloses various dynamic radio resource management mechanisms such as algorithms for rate selection, load balancing, frequency channel allocation, and power control (Villegas, Sections 1, 5, 6).

As a further example, Interference Management in Dense 802.11 Networks ("Ahmed") also discloses various algorithms for interference management in 802.11 networks:

> 4.8.1 Channel Assignment
>
> Channel assignment attempts to allocate orthogonal channels to nodes in the conflict graph that have an edge between them. Once completed, channels should be rarely changed because this disrupts service for clients. This is particularly important in the SMARTA architecture because legacy IEEE 802.11 clients cannot be instructed to change channels and are therefore disconnected if the AP changes its channel.
>
> To minimize channel changes, channel-assignment is done on the basic conflict graph that deals only with access-point conflicts. Of course, we still need some way to deal with client conflicts and this is done during construction of the annotated conflict graph. The algorithm to perform channel assignment is called Randomized One-point optimization (RanOp) and bears some similarity to the approach described in [90]. Note that we consider the cost of re-associating clients by minimizing the number of times the chan nel assignment algorithm is invoked. However, once invoked, the current channel assignment algorithm does not consider the re-association cost. An algorithm that does consider this cost can also be designed for the SMARTA system.
>
> The RanOp algorithm first assigns a random channel to each access point and computes the current total number of conflicts. Then, considering each access point (a_i) in turn it computes the gain in utility (in terms of reducing the total number of access-point conflicts) by switching that access point to a different channel. It computes the gain in utility for the access point on all channels and selects the channel C that yields the greatest gain for a_i. It then checks whether changing a_i to C yields an improvement in utility that is larger than the best utility gain seen in the iteration so far. If so, (a_i, C) is labeled as the best improvement seen so far. Because the algorithm performs this operation across all access points, it selects the access point and channel change that yields the largest gain in overall utility. This process repeats until we reach a configuration where any further one-point alterations do not yield a gain in utility. Because the solution of the algorithm may depend on the initial assignment of channels to access points, we perform multiple runs of the algorithm and choose the best solution (in terms of utility) among them.

4.8.2 Channel Refinement

In the second phase of channel-assignment, we refine channel allocations as an optimization of the assignment we computed previously. Note, for channel refinement we only consider optimization of assignments that keep the number of inter-AP conflicts constant. Inter-AP conflicts are considered the most severe type of conflicts and those that are likely to persist over longer periods of time than conflicts involving clients. This is why we only consider them in the RanOp algorithm. For channel refinement, whenever we add a client to an AP (to construct the ACG), we try all other channels for that AP to see if we can reduce the total number of client conflicts, keeping the number of inter-AP conflicts constant. If such a channel is available (e.g., in the case of 802.11a), the access point is switched to that channel. If not, the access point remains on the same channel.

Algorithm 1 wIR Power Control Algorithm

```
A = {a_1, a_2, ..., a_i} /* set of access points */
while true do
    u = ComputeTotalUtility(A)
    θ = MaxConflictAP(A)
    Z = {z_i | neighbour(θ, z_i) = true}
    for i = 1 ... | Z | do
        AdjustWeight(θ, z_i)
    end for
    γ = MaxConflictEdgeAP(θ, Z)
    ReducePowerLevel(γ)
    if u > ComputeTotalUtility(A) then
        IncreasePowerLevel(γ)
        Terminate.
    end if
end while
```

4.8.3 Power Control

Power control can be done quickly, even on a per-packet basis. However, two constraints make the power control problem challenging. First, power control needs to ensure that clients do not lose service by reducing an AP's power level by too much. Second, every alteration to access-point power causes the underlying ACG to change. Therefore, we need to re-compute (or refine) the ACG for every change in access-point power.

Our power control technique proceeds in two steps. First, we compute appropriate power levels for all access points, taking the change in the ACG into account. Second, we refine access point power-levels to allow the system to adapt to changes in the environment. The algorithm for computing optimal power-levels (called *weighted Iterative Reduction* (wIR) and shown as Algorithm 1) proceeds as follows. Initially, all access points are set to transmit

> at maximum power and we compute the total utility of this configuration (ComputeTotalUtility(A)). Note, the algorithm re-computes this utility in every iteration, before performing the steps outlined further. In each iteration, the algorithm finds the access point that has the greatest number of conflicts (MaxConflictAP(A)). This is the AP whose sum total number of conflicts on all incoming edges from neighbouring APs is the greatest. The algorithm then re-weights these incoming edges (AdjustWeight(θ, zi)) as follows: For each AP that interferes with the maximum conflict AP, the incoming conflict edge's weight is increased in proportion to the amount of utility that this AP provides to its clients (as shown in Figures 4.10 and 4.11). Thus, edge weights are adjusted by adding a U/E positive value to the original weight, where U and E are the aggregate client utility provided and the total number of access point conflicts caused by the AP from which the edge emanates. After edge re-weighting, the algorithm selects the access point which induces the greatest conflict on the maximum conflict AP (MaxConflictEdgeAP(θ, Z)), and instructs it to reduce its power level by one step (ReducePowerLevel()). This repeats in successive iterations until there is no further improvement that can be made and a decrease is detected in the overall utility, at which point the algorithm terminates (after reversing the last power alteration). This approach rewards APs that have more active clients, so that they are less likely to have their power reduced.

Ahmed at 54-57.

A POSITA would have found it obvious to combine a prior art reference discussed in Appendix B with one or more of the algorithms described above because they are in the same wireless network communication field such as WLAN communication and it would have been obvious to adopt the algorithms for achieving the communication optimization benefits as described above.

As another example, Plaintiff takes the position that various limitations of the '313 Patent Asserted Claims describe aspects of the WLAN or 802.11 standards, which were well known at the time of the invention. *First*, Plaintiff accuses "Beacon Reports" and other aspects of IEEE 802.11 such as "Beacon, Frame, Channel Load, Noise Histogram, STA Statistics, LCI [location configuration information], Neighbor Report, Link Measurement, Transmit Stream/Category Measurement, Measurement Pause, and Measurement Pilot" as meeting the limitation of

"receiving, by a server, from network monitoring devices that monitor data associated with an operation of two or more communication units located in different geographical areas." 2024-06-08 Infringement Contentions, Ex. E-1 at 181-189. *Second*, Plaintiff accuses determining "whether a communication unit should switch band or connect to a different access point" such as via "BSS Transition Management" mechanisms as meeting the limitation of "determining a policy for at least one of the two or more communication units." 2024-06-08 Infringement Contentions, Ex. E-1 at 202-206. *Third*, Plaintiff accuses receiving a "Non-preferred Channel Report subelement" as meeting the limitation of "the server detecting a degradation of network performance in at least one network within the plurality of networks." 2024-06-08 Infringement Contentions, Ex. E-1 at 212-215. *Fourth*, Plaintiff accuses "sending the current BSS Transition Management Request frame" mechanisms as meeting the limitation of "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." 2024-06-08 Infringement Contentions, Ex. E-1 at 212-215. These aspects were taught in WLAN and 802.11 standards well known at the time of the invention, and it would have been obvious for a POSITA to combine the teachings of these references.

Moreover, to the extent any of these references includes a feature not expressly disclosed in one or more other references, a POSITA would have naturally looked to, and been motivated to combine, any one of these references with one or more of the other references to better achieve their common goals of providing a product, system, or method for optimizing performance of a communication unit by a remote server.

In addition to the specific examples provided herein, Defendant reserves the right to rely on the disclosures of the references listed in Appendix E for additional motivations to combine. These examples of combinations are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendant reserves the right to contend that the motivations to combine provided herein apply to other combinations at the appropriate time, *e.g*., in expert reports regarding invalidity. To the extent one or more of identified combinations is posed as a combination of only two references, it does not indicate that the two references that are being combined for one purpose could not be joined by a third reference (or more additional references) whose combination serves the same or a different purpose. Indeed, many of the features recited in the Asserted Claims are componentized features/functions whereby the feature could be implemented using teachings from another source while not interfering with additional features. For that reason, a POSITA may have reasonably looked to and been motivated to combine three or more references to achieve a specific outcome.

As mentioned above, Defendant has not yet completed its search or discovery concerning additional prior art. Moreover, the exemplary combinations are provided based on Defendant's current understanding of the Asserted Claims and Plaintiff's apparent view of the scope of those claims as shown, for example, in Plaintiff's Infringement Contentions. Further, a *Markman* Order has not yet been issued in this case. As such, Defendant's inclusion of exemplary combinations does not preclude it from identifying other invalidating combinations as appropriate, and Defendant reserves the right to identify additional specific combinations as well as to detail and explain such combinations.

VI. Patent Rule 3-3(c) – Claim Charts

As noted above and pursuant to Patent Rule 3-3(c), Defendant's invalidity claim charts, identifying disclosures in the references listed in Sections IV-V *supra*, are provided in attached Appendix A ('996 Patent), Appendix B ('398 Patent), Appendix C ('654 Patent), Appendix D ('108 Patent), and Appendix E ('313 Patent).

Defendant has identified relevant portions and/or features of the prior art. However, the identified prior art may contain additional descriptions of or alternative support for the claim limitations. Defendant may rely on uncited portions or features of the identified prior art, other documents, and expert testimony to provide context or to aid in understanding the identified prior art and the state of the art. Citations to a particular figure in a reference include the caption and description of the figure and any text relating to the figure. Similarly, citations to particular text referring to a figure include the figure and caption as well. Portions relevant to dependent claims incorporate by reference the citations to the chain of claims from which that dependent claim derives. Likewise, portions related to subsequent limitations that refer to claim elements identified, described, and/or cited to in earlier limitations may rely on the citations related to those portions of the claim chart that identify and/or describe these elements.

Throughout the invalidity claim charts in Appendices A–E, Defendant provides exemplary citations showing where references disclose subject matter recited in preambles of the Asserted Claims, regardless of whether the preambles limit the claims. Defendant reserves the right to argue that the preambles are or are not limitations. Further, where an entry in a claim chart corresponding to a given limitation refers back to the discussion of another claim, the entry incorporates all evidence cited for the other claim.

As noted above, the Asserted Claims have not yet been construed. Additional portions of the references may become relevant after claim construction. Further, to the extent any claim term is governed by 35 U.S.C. § 112(f), the claim charts identify, by the citations provided, the structures, acts, or materials in each reference performing the claimed function for each limitation of the Asserted Claims. Plaintiff's claim construction positions, expert analysis and testimony, and additional discovery could all inform which portions of the references disclose a limitation, including under 35 U.S.C. § 112(f), and whether any particular limitation is governed by 35 U.S.C. § 112(f). Defendant's contentions are based on the information presently available, and Defendant reserves all rights to provide its claim construction positions in accordance with the Docket Control Order in this case.

VII. Patent Rule 3-3(d) – Other Grounds for Invalidity

A. The '996 Patent

Pursuant to Patent Rule 3-3(d), Defendant hereby identifies grounds of invalidity for the '996 Patent based on lack of written description under 35 U.S.C. § 112(a); lack of enablement under 35 U.S.C. § 112(a); and indefiniteness under 35 U.S.C. § 112(b). These contentions shall not be construed as an admission that any claim construction advanced by Defendant in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendant from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Plaintiff's purported construction of the claim language or of other positions advanced by Plaintiff during this litigation. Defendant's invalidity contentions under 35 U.S.C. § 112 may depend, in part, on the Court's claim constructions, as well as Plaintiff's alleged scope

of the ’996 Patent Asserted Claims. Consequently, Defendant only identifies the issues under 35 U.S.C. § 112 of which it is presently aware.

1. Lack of Written Description and/or Enablement Under 35 U.S.C. § 112(a)

The ’996 Patent does not provide sufficient written description to establish that the inventors were in possession of the alleged inventions recited in the ’996 Patent Asserted Claims at the time the ’996 Patent was filed, at least as Plaintiff appears to be asserting those limitations. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id*. One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus and methods, at least as Plaintiff appears to be asserting the claims. For example, the claims of the ’996 Patent do not provide sufficient written description of the limitations listed below. One of ordinary skill in the art would not have understood the specification to provide a written description of a “retransmission overhead control signal.” As another example, one of ordinary skill in the art would not have understood the specification to provide a written description of “training and initializing” a “receiver/decoder.”

The specification of the ’996 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the ’996 Patent Asserted Claims without undue experimentation, at least as Plaintiff appears to be asserting those limitations. For example, the claims of the ’996 Patent fail to sufficiently enable the limitations listed below. One of ordinary skill in the art would not have understood the specification to enable “generat[ing] a retransmission overhead control signal for the transmitter in response to [an] input signal.” To

the extent the following limitations are definite (under 35 U.S.C. § 112(b)), the ’996 Patent fails to sufficiently describe or enable them as required by 35 U.S.C. § 112(a):

Term	Relevant Claim(s)
“retransmission overhead control signal”	20
“training and initializing on the receiver/decoder”	20

2. Invalidity Under 35 U.S.C. § 112(b)

“[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite.” *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (quotations and alterations omitted). “Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as his invention,” the claim is “invalid under § 112, paragraph 2.” *Id*. at 1349. Further, a single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under § 112, paragraph 2. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005). For example, claim 20 of the ’996 Patent combines an apparatus and a method of using that apparatus because it recites a system that also must periodically monitor transmissions after training and initialization.

Independently, under § 112(b), “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Claim 20 of the ’996 Patent is invalid as indefinite under § 112(b) because it fails to inform those skilled in the art about the scope of the invention with reasonable certainty and is indefinite.

The following limitations recited in the ’996 Patent Asserted Claim are indefinite in whole or in part:[10]

Term	Relevant Claim(s)
“A transmission system . . . wherein the transmission error values are periodically monitored after training and initialization”	20
“transmission error values indicative of impulse noise events on the transmission channel”	20
“periodically monitored after training and initialization on the receiver/decoder”	20
“the transmission error value monitor to further generate an input signal”	20
“periodically monitor”	20
“a controller coupled with the transmitter to receive the input signal”	20
“generate a retransmission overhead control signal for the transmitter in response to the input signal”	20
“a retransmission overhead control signal”	20
“data”	20
“the transmission error values”	20
“impulse noise events”	20
“selected from a group comprising: a bit error rate, errored seconds, errored minutes, code violations over a fixed period of time, Signal-to-Noise Ratio (SNR) measured at the receiver/decoder, and Transmission Control Protocol and Internet Protocol (TCP/IP) throughput”	20

B. The ’398 Patent

Pursuant to Patent Rule 3-3(d), Defendant hereby identifies grounds of invalidity for the ’398 Patent based on lack of written description under 35 U.S.C. § 112(a); lack of enablement under 35 U.S.C. § 112(a); and indefiniteness under 35 U.S.C. § 112(b). These contentions shall not be construed as an admission that any claim construction advanced by Defendant in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendant from advancing claim construction and/or non-infringement positions in lieu of, or in addition to,

[10] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Plaintiff's purported construction of the claim language or of other positions advanced by Plaintiff during this litigation. Defendant's invalidity contentions under 35 U.S.C. § 112 may depend, in part, on the Court's claim constructions, as well as Plaintiff's alleged scope of the '398 Patent Asserted Claims. Consequently, Defendant only identifies the issues under 35 U.S.C. § 112 of which it is presently aware.

1. Lack of Written Description and/or Enablement Under 35 U.S.C. § 112(a)

The '398 Patent does not provide sufficient written description to establish that the inventors were in possession of the alleged inventions recited in the '398 Patent Asserted Claims at the time the '398 Patent was filed, at least as Plaintiff appears to be asserting those limitations. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id*. One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus and methods, at least as Plaintiff appears to be asserting the claims. For example, the claims of the '398 Patent do not provide sufficient written description of the limitations listed below. One of ordinary skill in the art would not have understood the specification to provide a written description of "in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection." As another example, one of ordinary skill in the art would not have understood the specification to provide a written description of the "communicating the policy to at least one or more communication units that implement one or

more algorithms that use the parameters 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."

The specification of the '398 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the '398 Patent Asserted Claims without undue experimentation, at least as Plaintiff appears to be asserting those limitations. For example, the claims of the '398 Patent fail to sufficiently enable the limitations listed below. One of ordinary skill in the art would not have understood the specification to enable "in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection." To the extent the following limitations are definite (under 35 U.S.C. § 112(b)), the '398 Patent fails to sufficiently describe or enable them as required by 35 U.S.C. § 112(a):[11]

Term	Relevant Claim(s)
"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"	1
"processing, by the server, at least one of the data and historical data"	1
"determining a policy for at least one of the two or more communication units"	1
"in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection"	1
"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
"the data further comprises determining a received signal strength indication"	2
"based on a change in the operation, updating the policy"	3

[11] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

"wherein updating the policy comprises updating the parameter"	4

2. Invalidity Under 35 U.S.C. § 112(b)

"[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (quotations and alterations omitted). "Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as his invention," the claim is "invalid under § 112, paragraph 2." *Id*. at 1349.

Several of the '398 Patent Asserted Claims are invalid because it would be apparent to one of skill in the art, based on the specification, that the invention set forth in these claims are not what the patentee regarded as his invention, at least as the claims are being asserted by Plaintiff. *Id*. These claims are invalid under § 112 at least because they contain elements that differ from and/or conflict with the '398 Patent's written description of the invention, at least as the claim elements are being asserted by Plaintiff, or because they omit elements that one of skill in the art would have understood as part of the '398 Patent's alleged invention based on the specification: claims 1-4 and 6-10.

Independently, under § 112(b), "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Several of the '398 Patent Asserted Claims are also invalid as indefinite under § 112(b) because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite.

The following limitations recited in the ’398 Patent Asserted Claims are indefinite in whole or in part:[12]

Term	Relevant Claim(s)
“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”	1
“processing, by the server, at least one of the data and historical data”	1
“determining a policy for at least one of the two or more communication units”	1
“otherwise, in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection”	1
“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
“the data further comprises determining a received signal strength indication”	2
“based on a change in the operation, updating the policy”	3
“wherein updating the policy comprises updating the parameter”	4

C. The ’654 Patent

Pursuant to Patent Rule 3-3(d), Defendant hereby identifies grounds of invalidity for the ’654 Patent based on lack of written description under 35 U.S.C. § 112(a); lack of enablement under 35 U.S.C. § 112(a); and indefiniteness under 35 U.S.C. § 112(b). These contentions shall not be construed as an admission that any claim construction advanced by Defendant in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendant from advancing claim construction and/or non-infringement positions in lieu of, or in addition to,

[12] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Plaintiff's purported construction of the claim language or of other positions advanced by Plaintiff during this litigation. Defendant's invalidity contentions under 35 U.S.C. § 112 may depend, in part, on the Court's claim constructions, as well as Plaintiff's alleged scope of the '654 Patent Asserted Claims. Consequently, Defendant only identifies the issues under 35 U.S.C. § 112 of which it is presently aware.

1. Lack of Written Description and/or Enablement Under 35 U.S.C. § 112(a)

The '654 Patent does not provide sufficient written description to establish that the inventors were in possession of the alleged inventions recited in the '654 Patent Asserted Claims at the time the '654 Patent was filed, at least as Plaintiff appears to be asserting those limitations. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id*. One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus and methods, at least as Plaintiff appears to be asserting the claims. For example, the claims of the '654 Patent do not provide sufficient written description of the limitations listed below. One of ordinary skill in the art would not have understood the specification to provide a written description of "sending an on-demand change request associated with at least one of throughput, or latency."

The specification of the '654 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the '654 Patent Asserted Claims without undue experimentation, at least as Plaintiff appears to be asserting those limitations. For example, the claims of the '654 Patent fail to sufficiently enable the limitations listed below. One of ordinary

skill in the art would not have understood the specification to enable "sending an on-demand change request associated with at least one of throughput, or latency." To the extent the following limitations are definite (under 35 U.S.C. § 112(b)), the '654 Patent fails to sufficiently describe or enable them as required by 35 U.S.C. § 112(a):[13]

Term	Relevant Claim(s)
"sending an on-demand change request associated with at least one of throughput, or latency"	1
"wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN"	4
"wherein the downloadable agent is executable in a virtual machine on the computing device"	6
"a server that resides in a cloud"	9
"wherein the downloadable agent is executable on an Internet browser"	11
"wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system"	16
"receive an on-demand change request associated with at least one of: throughput, or latency"	18
"the server resides in a cloud"	19
"wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN"	21
"wherein the server is operable to collect WAN performance information by polling or by a scheduled based system"	36

2. Invalidity Under 35 U.S.C. § 112(b)

"[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (quotations and alterations omitted). "Where it would be apparent to one of skill in the art, based on the specification, that the

[13] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

invention set forth in a claim is not what the patentee regarded as his invention," the claim is "invalid under § 112, paragraph 2." *Id*. at 1349.

Several of the '654 Patent Asserted Claims are invalid because it would be apparent to one of skill in the art, based on the specification, that the invention set forth in these claims are not what the patentee regarded as his invention, at least as the claims are being asserted by Plaintiff. *Id*. These claims are invalid under § 112 at least because they contain elements that differ from and/or conflict with the '654 Patent's written description of the invention, at least as the claim elements are being asserted by Plaintiff, or because they omit elements that one of skill in the art would have understood as part of the '654 Patent's invention based on the specification: claims 1-6, 8-12, 16, 18-22, 33, 34, and 36.

Independently, under § 112(b), "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Several of the '654 Patent Asserted Claims are also invalid as indefinite under § 112(b) because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite.

The following limitations recited in the '654 Patent Asserted Claims are indefinite in whole or in part:[14]

Term	Relevant Claim(s)
"sending an on-demand change request associated with at least one of throughput, or latency"	1
"wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN"	4

[14] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

"wherein the downloadable agent is executable in a virtual machine on the computing device"	6
"a server that resides in a cloud"	9
"wherein the downloadable agent is executable on an Internet browser"	11
"wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system"	16
"receive an on-demand change request associated with at least one of: throughput, or latency"	18
"the server resides in a cloud"	19
"wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN"	21
"wherein the server is operable to collect WAN performance information by polling or by a scheduled based system"	36

D. The '108 Patent

Pursuant to Patent Rule 3-3(d), Defendant hereby identifies grounds of invalidity for the '108 Patent based on lack of written description under 35 U.S.C. § 112(a); lack of enablement under 35 U.S.C. § 112(a); and indefiniteness under 35 U.S.C. § 112(b). These contentions shall not be construed as an admission that any claim construction advanced by Defendant in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendant from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Plaintiff's purported construction of the claim language or of other positions advanced by Plaintiff during this litigation. Defendant's invalidity contentions under 35 U.S.C. § 112 may depend, in part, on the Court's claim constructions, as well as Plaintiff's alleged scope of the '108 Patent Asserted Claims. Consequently, Defendant only identifies the issues under 35 U.S.C. § 112 of which it is presently aware.

1. Lack of Written Description and/or Enablement Under 35 U.S.C. § 112(a)

The ’108 Patent does not provide sufficient written description to establish that the inventors were in possession of the alleged inventions recited in the ’108 Patent Asserted Claims at the time the ’108 Patent was filed, at least as Plaintiff appears to be asserting those limitations. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id*. One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus and methods, at least as Plaintiff appears to be asserting the claims. For example, the claims of the ’108 Patent do not provide sufficient written description of the limitations listed below. One of ordinary skill in the art would not have understood the specification to provide a written description of “identifying one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information.” As another example, one of ordinary skill in the art would not have understood the specification to provide a written description of “wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of Open Systems Interconnection (OSI) model” or “wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of TCP/IP model.”

The specification of the ’108 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the ’108 Patent Asserted Claims without undue experimentation, at least as Plaintiff appears to be asserting those limitations. For example, the claims of the ’108 Patent fail to sufficiently enable the limitations listed below. One of ordinary

skill in the art would not have understood the specification to enable "identifying one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information." To the extent the following limitations are definite (under 35 U.S.C. § 112(b)), the '108 Patent fails to sufficiently describe or enable them as required by 35 U.S.C. § 112(a):[15]

Term	Relevant Claim(s)
"identifying one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information"	1
"WAN rate"	3, 10, 17
"Impulse Noise Protection (INP) parameter settings"	3, 10, 17
"margin parameter settings"	3, 10, 17
"parameters affecting WAN forward error correction (FEC), WAN latency, WAN transmit power levels, and WAN data rate"	4, 11, 18
"modify an active profile or configuration settings based on at least identified network traffic related to the WAN"	4, 11, 18
"wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of Open Systems Interconnection (OSI) model"	5, 12, 19
"wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of TCP/IP model"	6, 13, 20
"wherein the one or more operational conditions identified within the WAN comprise at least one of: … performance measures on the WAN; quality of WAN connection"	7, 14
"identifying, at the management device, one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information"	8, 15

2. Invalidity Under 35 U.S.C. § 112(b)

"[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient

[15] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (quotations and alterations omitted). "Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as his invention," the claim is "invalid under § 112, paragraph 2." *Id*. at 1349.

Several of the '108 Patent Asserted Claims are invalid because it would have been be apparent to one of skill in the art, based on the specification, that the invention set forth in these claims are not what the patentee regarded as his invention, at least as the claims are being asserted by Plaintiff. *Id*. These claims are invalid under § 112 at least because they contain elements that differ from and/or conflict with the '108 Patent's written description of the invention, at least as the claim elements are being asserted by Plaintiff, or because they omit elements that one of skill in the art would have understood as part of the '108 Patent's invention based on the specification: claims 1-20.

Independently, under § 112(b), "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Several of the '108 Patent Asserted Claims are also invalid as indefinite under § 112(b) because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite.

The following limitations recited in the '108 Patent Asserted Claims are indefinite in whole or in part:[16]

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[16] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

Term	Relevant Claim(s)
"identifying one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information"	1
"WAN rate"	3, 10, 17
"Impulse Noise Protection (INP) parameter settings"	3, 10, 17
"margin parameter settings"	3, 10, 17
"parameters affecting WAN forward error correction (FEC), WAN latency, WAN transmit power levels, and WAN data rate"	4, 11, 18
"modify an active profile or configuration settings based on at least identified network traffic related to the WAN"	4, 1, 18
"wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of Open Systems Interconnection (OSI) model"	5, 12, 19
"wherein the one or more communication layers on the LAN and the different communication layer in the WAN are layers of TCP/IP model"	6, 13, 20
"wherein the one or more operational conditions identified within the WAN comprise at least one of: … performance measures on the WAN; quality of WAN connection"	7, 14
"identifying, at the management device, one or more operational conditions within the WAN in a different communication layer from the one or more communication layers on the LAN by analyzing at least the collected LAN information"	8, 15

E. The '313 Patent

Pursuant to Patent Rule 3-3(d), Defendant hereby identifies grounds of invalidity for the '313 Patent based on lack of written description under 35 U.S.C. § 112(a); lack of enablement under 35 U.S.C. § 112(a); and indefiniteness under 35 U.S.C. § 112(b). These contentions shall not be construed as an admission that any claim construction advanced by Defendant in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendant from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, invalidity positions. Further, these contentions shall not be construed as an admission of or acquiescence to Plaintiff's purported construction of the claim language or of other positions advanced by Plaintiff during this litigation. Defendant's invalidity contentions under 35 U.S.C. §

112 may depend, in part, on the Court's claim constructions, as well as Plaintiff's alleged scope of the '313 Patent Asserted Claims. Consequently, Defendant only identifies the issues under 35 U.S.C. § 112 of which it is presently aware.

1. Lack of Written Description and/or Enablement Under 35 U.S.C. § 112(a)

The '313 Patent does not provide sufficient written description to establish that the inventors were in possession of the alleged inventions recited in the '313 Patent Asserted Claims at the time the '313 Patent was filed, at least as Plaintiff appears to be asserting those limitations. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id*. One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus and methods, at least as Plaintiff appears to be asserting the claims. For example, the claims of the '313 Patent do not provide sufficient written description of the limitations listed below. One of ordinary skill in the art would not have understood the specification to provide a written description of "the processor generates at least one policy based at least in part on an analysis of the first and second sets of collected data." As another example, one of ordinary skill in the art would not have understood the specification to provide a written description of "the third interface transmits, in response to the processor determining a change in performance in at least one of the first network or the second network, the at least one policy to the first communication unit that makes a performance-related adjustment within the first network based on the at least one policy."

The specification of the '313 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the '313 Patent Asserted Claims without undue

experimentation, at least as Plaintiff appears to be asserting those limitations. For example, the claims of the ’313 Patent fail to sufficiently enable the limitations listed below. One of ordinary skill in the art would not have understood the specification to enable “wherein the adjustment within the first network is an implementation of an algorithm.” To the extent the following limitations are definite (under 35 U.S.C. § 112(b)), the ’313 Patent fails to sufficiently describe or enable them as required by 35 U.S.C. § 112(a):[17]

Term	Relevant Claim(s)
“the processor generates at least one policy based at least in part on an analysis of the first and second sets of collected data”	1
“the third interface transmits, in response to the processor determining a change in performance in at least one of the first network or the second network, the at least one policy to the first communication unit that makes a performance-related adjustment within the first network based on the at least one policy”	1
“wherein the adjustment within the first network is an implementation of an algorithm”	2
“where in the adjustment within the first network is a change in a parameter value”	3
“wherein the first communication unit reduces interference in the second network based on an implementation of the at least one policy within the first network”	4
“wherein the at least one policy adjusts channel transmission characteristics of at least one wireless channel within the first network”	5
“wherein the channel transmission characteristics comprise a modification to a transmission band across the at least one wireless channel within the first network”	6
“wherein the at least one policy adjusts a transmission rate of at least one channel within the first network”	15
“wherein the at least one policy adjusts a transmission power level across a first wireless channel within the plurality of wireless channels”	17
“wherein two interfaces within the first, second and third interfaces are the same interface”	18
“receiving, by a server, from network monitoring devices that monitor data associated with an operation of two or more	19

[17] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

communication units located in at least two networks within the plurality of networks, the data comprising a parameter"	
"based on the processed data, determining a policy for at least one of the two or more communication units"	19
"in response to the server detecting a degradation of network performance in at least one network within the plurality of networks, communicating the policy to at least one or more communication units that implement one or more algorithms that use the parameter and at least one rule or one condition for the one or more communication units to improve a performance of the one or more communication units"	19
"determining the policy comprises selecting the policy from a set of policies that are stored on the one or more communication units and wherein the communicated policy updates the one or more algorithms implemented on the one or more communication units"	20

2. Invalidity Under 35 U.S.C. § 112(b)

"[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (quotations and alterations omitted). "Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as his invention," the claim is "invalid under § 112, paragraph 2." *Id*. at 1349.

Several of the '313 Patent Asserted Claims are invalid because it would be apparent to one of skill in the art, based on the specification, that the invention set forth in these claims are not what the patentee regarded as his invention, at least as the claims are being asserted by Plaintiff. *Id*. These claims are invalid under § 112 at least because they contain elements that differ from and/or conflict with the '313 Patent's written description of the invention, at least as the claim elements are being asserted by Plaintiff, or because they omit elements that one of skill

in the art would have understood as part of the ’313 Patent’s invention based on the specification.

Independently, under § 112(b), “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Several of the ’313 Patent Asserted Claims are also invalid as indefinite under § 112(b) because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite.

The following limitations recited in the ’313 Patent Asserted Claims are indefinite in whole or in part:[18]

Term	Relevant Claim(s)
“the processor generates at least one policy based at least in part on an analysis of the first and second sets of collected data”	1
“the third interface transmits, in response to the processor determining a change in performance in at least one of the first network or the second network, the at least one policy to the first communication unit that makes a performance-related adjustment within the first network based on the at least one policy”	1
“wherein the adjustment within the first network is an implementation of an algorithm”	2
“where in the adjustment within the first network is a change in a parameter value”	3
“wherein the first communication unit reduces interference in the second network based on an implementation of the at least one policy within the first network”	4
“wherein the at least one policy adjusts channel transmission characteristics of at least one wireless channel within the first network”	5
“wherein the channel transmission characteristics comprise a modification to a transmission band across the at least one wireless channel within the first network”	6

[18] Listed claims also include all Asserted Claims dependent thereon, even if those claims are not individually listed.

"wherein the at least one policy adjusts a transmission rate of at least one channel within the first network"	15
"wherein the at least one policy adjusts a transmission power level across a first wireless channel within the plurality of wireless channels"	17
"wherein two interfaces within the first, second and third interfaces are the same interface"	18
"receiving, by a server, from network monitoring devices that monitor data associated with an operation of two or more communication units located in at least two networks within the plurality of networks, the data comprising a parameter"	19
"based on the processed data, determining a policy for at least one of the two or more communication units"	19
"in response to the server detecting a degradation of network performance in at least one network within the plurality of networks, communicating the policy to at least one or more communication units that implement one or more algorithms that use the parameter and at least one rule or one condition for the one or more communication units to improve a performance of the one or more communication units"	19
"determining the policy comprises selecting the policy from a set of policies that are stored on the one or more communication units and wherein the communicated policy updates the one or more algorithms implemented on the one or more communication units"	20

VIII. Subject Matter Eligibility

Pursuant to the Court's Standing Order, Defendant provides the following Eligibility Contentions. As described below, in Appendices F1 through F5 (collectively "Appendix F"), which are hereby incorporated by reference as if fully set forth herein, Defendant contends that the Asserted Claims are drawn to subject matter that is not patentable under 35 U.S.C. § 101. Pursuant to Section (a)(1) of the Order Regarding Eligibility, Appendix F contains a chart for each Asserted Patent identifying each exception to eligibility to which each Challenged Claim is directed and the factual and legal basis therefor. Pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, the Appendix F charts, read in conjunction with the discussion herein and together with the material described, referenced, and cited in the charts, further provide a description of the industry, at the relevant time, in which the Challenged Claims are alleged to be

well understood, routine, and conventional, and the factual and legal basis therefor. Further, pursuant to Sections (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, the Appendix F charts, read in conjunction with the discussion herein and together with the material described, referenced, and cited in the charts, further provide: (i) a description of how each element of each Asserted Claim, both individually and in combination with the other elements of that claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time and (ii) an identification of the factual or legal basis for how the Challenged Claims are otherwise ineligible for patent protection.

Additionally, pursuant to Section (b) of the Order Regarding Eligibility, Defendant is concurrently producing or making available for inspection and copying the materials on which Defendant presently seeks to rely for subject-matter eligibility purposes. These prior art references and other materials are cited herein or in Appendices A–F. For the avoidance of doubt, Defendant may rely on the materials identified in Section IV above. Without concession that expert testimony is necessary to resolve the subject matter eligibility of the Challenged Claims, Defendant reserves the right to further rely on expert testimony to be disclosed in accordance with the Docket Control Order. Defendant's search for prior art references, additional documentation, and/or corroborating evidence concerning prior art products and systems is ongoing. Accordingly, Defendant reserves the right to supplement its production as Defendant obtains additional prior art references, documentation, and/or corroborating evidence concerning subject matter eligibility during discovery.

Defendant reserves the right to supplement its document production pursuant to Section (b) of the Order Regarding Eligibility as authorized by the Patent Local Rules, the Order Regarding Eligibility, or any other order of the Court.

A. The ’996 Patent

Claim 20 of the ’996 Patent (the only asserted claim for this patent) is drawn to subject matter that is not patentable under 35 U.S.C. § 101. Claim 20 of the ’996 Patent is unpatentable for failure to recite patent eligible subject matter.

Under *Alice* Step 1, claim 20 is directed to an abstract idea and therefore not eligible subject matter under 35 U.S.C. § 101. *E.g.*, *Alice*, 573 U.S. at 217. For instance, claim 20 is generally directed to abstract ideas relating to detecting transmission errors and then generating a signal for the transmitter based on those detected errors. This is not an over-generalization of the claim language: Claim 20 recites generic limitations directed to monitoring for transmission errors and sending a signal back to the transmitter based on the detected errors:

> 20. A transmission system comprising:
>
> a transmission channel to carry data between a transmitter and a receiver/decoder, each communicatively interfaced with the transmission channel;
>
> a transmission error value monitor communicatively interfaced with the receiver/decoder to periodically monitor for transmission error values indicative of impulse noise events on the transmission channel, wherein the transmission error values are periodically monitored after training and initialization on the receiver/decoder, the transmission error values being selected from a group comprising: a bit error rate, errored seconds, errored minutes, code violations over a fixed period of time, Signal-to-Noise Ratio (SNR) measured at the receiver/ decoder, and Transmission Control Protocol and Inter net Protocol (TCP/IP) throughput, and wherein the transmission error value monitor to further generate an input signal based on the transmission error values monitored; and
>
> a controller coupled with the transmitter to receive the input signal from the transmission error value monitor and to further generate a retransmission overhead control signal for the transmitter in response to the input signal.

In plain English, claim 20 recites a system that can monitor transmission errors on a transmission channel and generate a signal in response for the transmitter. These elements are recited generically in the claim.

Step 1 of the *Alice* test requires the Court to look at the "focus of the claimed advance over the prior art to determine if the claim's character as a whole is directed to excluded subject matter." *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (quotation omitted). Here, the purported "advance" claimed in the '996 Patent is merely the abstract concept of generating a retransmission signal for a transmitter based on errors on a channel (*see* claim 20 ("generate a retransmission overhead control signal for the transmitter in response to [an] input signal" that is "indicative of impulse noise on the transmission channel")), which is not only an abstract idea, but was also well-known and conventional in the art, as shown in Step 2 below.

The purported advance over the prior art in claim 20 is not a technological advancement over the prior art. In fact, the background of the patent alleges that it would be an advancement to "permit adjustment of a communication system to compensate for changing channel and other conditions, including noise effects, while minimizing and/or preserving the latency characteristics of the system." '996 Patent, 3:51-56. But regardless of whether that would in fact be an advancement, claim 20 does not claim allowing for adjustments while preserving latency characteristics. Rather, the claim recites generating a "retransmission . . . signal for the transmitter in response to [an] input signal" that is "indicative of impulse noise on the transmission channel" in broad and generic terms. And the retransmission signal can be any signal for the transmitter and does not have to do anything or cause the transmitter to do anything at all. The patent simply states the natural result of routine and conventional efforts to detect errors during transmission, *i.e.*, generating a signal for the transmitter in response. *See Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 225 (2014). The following case, among others, support the abstract nature of this claim. *See, e.g., IPA Techs., Inc. v. Amazon.com, Inc.*, 307 F.

Supp. 3d 356, 367 (D. Del. 2018) (finding claims ineligible that were directed to the "performance of the basic building blocks of error correction in any context: evaluating performance, gathering additional data, and using that data to update performance"). Thus, claim 20, taken as a whole, including in view of the purported claimed "advancement," is directed to the abstract idea of detecting transmission errors and then generating a signal for the transmitter based on those detected errors.

Under *Alice* Step 2, claim 20 of the '996 Patent does not add an inventive step to the general abstract idea. In fact, the '996 Patent concedes that these steps were well-known and conventional. For example, as the patent explains, by the time of the alleged invention, transmission systems were well known, and the ability to optimize their performance with readily available and implementable modifications, variations, and other solutions in the art was commonplace. *See, e.g.,* '996 Patent at Abstract ("The present invention may be implemented in a transmission system in which a transmitter transmits data to a receiver via a transmission channel, such as a DSL system."); *id.* 1:47–49 (". . . coding technique commonly used to increase the performance of transmission systems by decreasing errors in the system."); *id.* 2:20–21 ("[i]n communications systems such as ADSL"); *id.* 4:46–48 ("A transmission system can implement the controller and/or utilize [disclosed methods] . . . , **as *will be appreciated by those skilled in the art***.") (emphasis added); *see also id.* 6:46–52; *id.* 6:66–7:3; *id.* 11:13–16; *id.* 20:36–38; *id.* 8:8–28. Moreover, the '996 Patent concedes that it was well known and conventional that a controller could receive signals generated elsewhere, including signals generated by a transmission error value monitor, and responsively use those signals as an input to generate a retransmission overhead control signal for the transmitter. *See, e.g., id.* at 6:22–25 ("The structure, programming and other specific features of a controller usable [to implement

disclosed features] . . . ***will be apparent to those skilled in the art*** . . .") (emphasis added); col. 10, ll. 15–16 ("[c]hanges to the CCR can be determined and implemented in various ways ***apparent to those skilled in the art***.") (emphasis added); col. 13, ll. 55–59 ("[o]ther various structures implementable [that] ***will be apparent to those skilled in the art***. For example, as suggested by the dashed line in FIG. 5, module 540 may be an external module that is accessed as necessary by controller 500") (emphasis added); col. 14, ll. 32–38 ("***[a]s also will be appreciated by those skilled in the art***, [the figure] tacitly assumes that the [controller] talks to the transmitter") (emphasis added); col. 14, ll. 62–65 (". . . means for receiving a multiple bit CCR adjustment control signal and means for adjusting the CCR in response to the CCR adjustment control signal, ***as will be known to those skilled in the art***.") (emphasis added); *id.* at 16:55–63 ("[t]he controller 640 preferably comprises means 642 for collecting and/or calculating one or more MEVs, means 644 for analyzing the MEV(s) (for example, by comparing the MEV(s) to the TEV(s)), and means 646 for providing CCR adjustment and interleave depth adjustment control signals. The means 642 preferably comprises a monitor for measuring, collecting and/or calculating one or more of the transmission error values mentioned above, ***as is known to those skilled in the art***.") (emphasis added); *see also id.* at 1:64–2:7; *id.* at 2:20–47; *id.* at 2:63–3:4; *id.* 3:40–47; *id.* at 4:46–48; *id.* at 14:65–15:1; *id.* at 15:4–8; *id.* at 15:8–11; *id.* at 15:13–2; *id.* at 15:24–27; *id.* at 17:11–16; *id.* at 17:39–44. These statements, among others, further show that claim 20 does not contain an inventive step. And again, the background of the patent alleges that it would be an advancement to "permit adjustment of a communication system to compensate for changing channel and other conditions, including noise effects, while minimizing and/or preserving the latency characteristics of the system." *Id.* at 3:51-56. But claim 20 does not claim allowing for adjustments while preserving latency characteristics. So even this,

were it an actual advancement, would not save claim 20 from being directed to an abstract idea because this purported advancement is not claimed. Further, claim 20 recites purely functional terms that fail to transform the claimed abstract idea beyond the conventional computer tasks. *Bot M8 LLC v. Sony Corp. of Am*., 465 F. Supp. 3d 1013, 1025 (N.D. Cal. 2020) ("Though given special names, each part remains a generic computer part invoked to effect the conventional computer task of gathering, manipulating, transmitting, and using data.").

The ordered combinations of the limitations in claim 20 also does not shelter it from ineligibility because the claim simply uses "conventional ordering of steps . . . with conventional technology to achieve its desired result." *Two-Way Media v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1339 (Fed. Cir. 2017). The combination of elements in the asserted claim does not result in an inventive concept because "the claim[] do[es] not recite particular features to yield" the advantages of any purported combination. *See Intell. Ventures I LLC v. Capital One Fin. Corp*., 850 F.3d 1332, 1342 (Fed. Cir. 2017). "[T]he claim language here provides only a result-oriented solution, with insufficient detail for how a computer accomplishes it." *Id.* Because it is altogether devoid of any "inventive concept," claim 20 of the '996 Patent is patent ineligible under Section 101. *See Alice*, 573 U.S. at 221.

Pursuant to Section (a)(1) of the Order Regarding Eligibility, Exhibit F-1 contains a chart identifying each exception to eligibility to which the Asserted Claim is directed and the factual and legal basis therefor. For avoidance of doubt, and as set forth above and in Exhibit F-1, claim 20 is directed to one or more abstract ideas and therefore is not directed to patent eligible subject matter. Also, pursuant to Section (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, Exhibit F-1, read in conjunction with the preceding paragraphs herein, provides: (i) a description of how each element of claim 20, both individually and in combination with the other elements of that

claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time, and (ii) an identification of the factual or legal basis for how the Asserted Claim is otherwise ineligible for patent protection.

Finally, pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, Defendant provides the following description of the relevant industry at the relevant time. As explained in more detail above and in Exhibit F-1, as of the alleged priority date for the ’996 Patent, the relevant industry was well-developed. Transmission errors and responsive signals had been around for over 60 years (*see, e.g.*, Hamming, Richard Wesley (April 1950), “Error Detecting and Error Correcting Codes,” Bell System Technical Journal. 29 (2), USA: AT&T: 147–160), and all individual elements disclosed and recited in the ’996 Patent were conventional, routine, and well known in the transmission systems industry. *See generally* Appendix A; Exhibit F-1, *see also supra*. These disclosures in the ’996 Patent also show that claim 20 is directed to a mere abstract concept because the ’996 Patent did not even attempt to claim advances over the prior art, and instead sought to broadly claim and preempt all uses of error detection and generation of responsive signals. Indeed, none of the claimed concepts were new or merely on the verge of development as of the alleged priority date of the ’996 Patent. Instead, these concepts had been known for years and were the subject of many published articles and/or patents from around the world. The ’996 Patent contributed nothing beyond what was already conventional, routine, and well-known technology as of the relevant time period.

Further detail regarding Defendant’s contentions that claim 20 does not qualify as patent-eligible subject matter is contained in Exhibit F-1.

B. The ’398 Patent

Each of the Challenged Claims of the ’398 Patent is drawn to subject matter that is not patentable under 35 U.S.C. § 101. The ’398 Patent Challenged Claims are unpatentable for failure to recite patent eligible subject matter.

Under *Alice* Step 1, the ’398 Patent Challenged Claims are directed to abstract ideas and therefore not eligible subject matter under 35 U.S.C. § 101. *E.g.*, *Alice*, 573 U.S. at 217. By way of example, the Challenged Claims of the ’398 Patent are generally directed to abstract ideas relating to selecting and communicating a policy based on network performance data. This is not an over-generalization of the claim language: the claims recite generic limitations directed to data collection, policies, algorithms, parameters, performance improvement, and communication. Claim 1 is representative:

> 1. A method for improving performance of one or more communication units, the method comprising:
>
> 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;
>
> processing, by the server, at least one of the data and historical data;
>
> based on the processed data, determining a policy for at least one of the two or more communication units; and
>
> in response to the server detecting interference or noise from nearby wireless channels, determining that packets will be lost regardless of rate selection and,
>
> 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.

In plain English, claim 1 recites a method involving the steps of (1) receiving data including a parameter, (2) processing the data, (3) choosing a policy based on that data, and (4) if it is not futile to apply the policy, telling one or more devices to use that policy (and, perhaps unrelatedly,

an algorithm, parameter, rule, and/or condition) to improve performance. All of these elements are recited generically in the claims.

The ’398 Patent also concedes that these steps were all well-known and conventional, including in view of the patent’s background discussion of the 802.11g standard. As the patent explains, prior to the ’398 Patent, the 802.11g standard implemented policies relating to rate adaptation that considered collected real-time data and applied an algorithm to change a transmission rate parameter based on rules or conditions to improve performance. ’398 Patent, 1:26-2:13. This statement shows that the Challenged Claims are directed to a mere abstract concept, because the claims do not even purport to require an advance over the admitted prior art 802.11g standard. Instead, the specification (and corresponding prosecution history) suggest that the prior art relied on static policies and lacked the ability to dynamically update a policy. However, no such dynamic policy generation is required in the claims—claim 5, for example, depends from claim 1 and allows the “determining the policy” step in claim 1 to be performed by “selecting the policy from a set of policies that are stored on the one or more communication units.” Selecting a policy from a list of policies does not confer any “dynamic” updates to any policy. Thus, under *Alice* Step 1, the ’398 Patent Challenged Claims are directed to one or more abstract ideas.

Under *Alice* Step 2, the ’398 Patent does not add an inventive step to the general abstract idea. Using generic policies and algorithms to improve a device’s performance is not patent-eligible, and cannot plausibly represent a technological advancement over the prior art. The ’398 Patent acknowledges that the 802.11g WiFi standard was known in the art and already implemented a rate adaptation algorithm to improve device performance, including the components and devices necessary to perform this rate adaptation algorithm. ’398 Patent at 1:26-

2:4. The ’398 Patent attempts to claim this concept at an even more generalized level, without offering any improvements or technological advancements to the prior art. *See, e.g.*, claim 1. Further, the Challenged Claims recite purely functional terms that fail to transform the claimed abstract idea beyond conventional computer tasks. *Bot M8 LLC v. Sony Corp. of Am.*, 465 F. Supp. 3d 1013, 1025 (N.D. Cal. 2020) (“Though given special names, each part remains a generic computer part invoked to effect the conventional computer task of gathering, manipulating, transmitting, and using data.”).

Pursuant to Section (a)(1) of the Order Regarding Eligibility, Exhibit F-2 contains a chart identifying each exception to eligibility to which each Asserted Claim of the ’398 Patent is directed and the factual and legal basis therefor. For avoidance of doubt, and as set forth above and in Exhibit F-2, each Asserted Claim of the ’398 Patent is directed to one or more abstract ideas and therefore is not directed to patent eligible subject matter. Exhibit F-2 also identifies claim 1 as representative of the other Challenged Claims for purposes of the eligibility inquiry. Also, pursuant to Section (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, Exhibit F-2, read in conjunction with the preceding paragraphs herein, provides: (i) a description of how each element of each Asserted Claim, both individually and in combination with the other elements of that claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time, and (ii) an identification of the factual or legal basis for how the Challenged Claims are otherwise ineligible for patent protection.

Finally, pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, Defendant provides the following description of the relevant industry at the relevant time. As of the alleged priority date for the ’398 Patent, the relevant industry was well-developed. The 802.11g standard, for example, had published many years before the ’398 Patent’s 2011 filling date, and

all individual elements disclosed and recited in the ’398 Patent were conventional, routine, and well known in the communications industry. *See generally* Appendix B. The ’398 Patent further explains that policies pertaining to rate adaptation algorithms were well known and conventional. ’398 Patent at 1:26-2:4. As noted above, the ’398 Patent’s background section acknowledges that such policies and algorithms were known from at least the 802.11g standard. *Id.* This acknowledgement also shows that the Challenged Claims are directed to a mere abstract concept, because the ’398 Patent did not even attempt to claim an advance over the prior art, and instead sought to broadly claim and preempt all uses of policies that employ data, algorithms, conditions, and/or rules to improve device performance. None of these concepts was new or merely on the verge of development as of the alleged priority date of the ’398 Patent. Instead, these concepts had been known for years and were the subject of many published articles and/or patents from around the world. The ’398 Patent contributed nothing beyond what was already conventional, routine, and well-known technology as of the relevant time period.

Further detail regarding Defendant’s contentions that the Challenged Claims of the ’398 Patent do not qualify as patent-eligible subject matter are contained in Exhibit F-2.

C. The ’654 Patent

Each of the Challenged Claims of the ’654 Patent is drawn to subject matter that is not patentable under 35 U.S.C. § 101. The ’654 Patent Challenged Claims are unpatentable for failure to recite patent eligible subject matter.

Under *Alice* Step 1, the ’654 Patent Challenged Claims are directed to abstract ideas and therefore not eligible subject matter under 35 U.S.C. § 101. *E.g.*, *Alice*, 573 U.S. at 217. By way of example, the Challenged Claims of the ’654 Patent are generally directed to the abstract idea of collecting, storing, and analyzing network performance information and reporting that

analysis. The limitations of the claims are specified at a high level of generality and merely rely on well-known and conventional elements. The independent claims, for example, require generic computing elements and networks: a wide area network ("WAN"), a local area network ("LAN"), a database, a server, and a "downloadable agent" to collect routine and conventional network performance information. Such agents were conventional for many years before the '654 Patent's asserted priority date of July 13, 2012. Thus, under *Alice* Step 1, the '654 Patent Challenged Claims' reliance on conventional networking elements and functionality recited at a high level of generality shows that the Challenged Claims are directed to one or more abstract ideas.

Under *Alice* Step 2, the '654 Patent does not add an inventive step to the general abstract idea. Indeed, during prosecution, the examiner allowed the claims after the "on-demand change request" limitations were added to the claims. The use of such a request is not patent-eligible and merely invokes unpatentable automation steps that could be performed by a human, for example, by picking up a phone and calling a network administrator. Automating such steps using generic computing elements is not a technological advancement over the prior art, and the '654 Patent does not otherwise offer any improvements or technological advancements to the prior art. Further, the Challenged Claims recite purely functional terms that fail to transform the claimed abstract ideas beyond the conventional computer tasks. *Bot M8 LLC v. Sony Corp. of Am.*, 465 F. Supp. 3d 1013, 1025 (N.D. Cal. 2020) ("Though given special names, each part remains a generic computer part invoked to effect the conventional computer task of gathering, manipulating, transmitting, and using data.").

Pursuant to Section (a)(1) of the Order Regarding Eligibility, Exhibit F-3 contains a chart identifying each exception to eligibility to which each Asserted Claim of the '654 Patent is

directed and the factual and legal basis therefor. For avoidance of doubt, and as set forth above and in Exhibit F-3, each Asserted Claim of the ’654 Patent is directed to one or more abstract ideas and therefore is not directed to patent eligible subject matter. Exhibit F-3 also identifies claim 1 as representative of the other Challenged Claims for purposes of the eligibility inquiry. Also, pursuant to Section (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, Exhibit F-3, read in conjunction with the preceding paragraphs herein, provides: (i) a description of how each element of each Asserted Claim, both individually and in combination with the other elements of that claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time, and (ii) an identification of the factual or legal basis for how the Challenged Claims are otherwise ineligible for patent protection.

Finally, pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, Defendant provides the following description of the relevant industry at the relevant time. As of the alleged priority date for the ’654 Patent, the relevant industry was well-developed. For example, downloadable agents used to monitor network performance in WAN and LAN environments had been around since at least the 1990s, and all individual elements disclosed and recited in the ’654 Patent were conventional, routine, and well known in the communications industry. *See generally* Appendix C. Indeed, none of the concepts recited in the claim limitations were new or merely on the verge of development as of the alleged priority date of the ’654 Patent. Instead, these concepts had been known for years and were the subject of many published articles and/or patents from around the world. *See generally* Appendix C. The ’654 Patent contributed nothing beyond what was already conventional, routine, and well-known technology as of the relevant time period.

Further detail regarding Defendant's contentions that the Challenged Claims of the '654 Patent do not qualify as patent-eligible subject matter are contained in Exhibit F-3.

D. The '108 Patent

Each of the Challenged Claims of the '108 Patent is drawn to subject matter that is not patentable under 35 U.S.C. § 101. The '108 Patent Challenged Claims are unpatentable for failure to recite patent eligible subject matter.

Under *Alice* Step 1, the '108 Patent Challenged Claims are directed to abstract ideas and therefore not eligible subject matter under 35 U.S.C. § 101. *E.g.*, *Alice*, 573 U.S. at 217. By way of example, the Challenged Claims of the '108 Patent are generally directed to the abstract idea of collecting performance information in one part of a system (a LAN) and using that information to identify operational conditions elsewhere (a WAN). The '108 Patent concedes that LANs were typically connected to the Internet (a WAN), but contends that WANs and LANs are typically managed by different parties (*e.g.*, Internet Service Providers and broadband users who subscribe to the Internet through such providers, respectively). '108 Patent at 1:37-2:28. This shows that the Challenged Claims are directed to a mere abstract concept, because the claimed advance over the prior art has nothing to do with a technological advance and instead relates to well-known administrative boundaries between LAN and WAN networks. Thus, under *Alice* Step 1, the '108 Patent Challenged Claims are directed to one or more abstract ideas.

Under *Alice* Step 2, the '108 Patent does not add an inventive step to the general abstract idea. During prosecution, for example, the applicant narrowed the claims (to overcome prior art) to require that identifying a problem in the WAN associated with a "different communication layer" from "one or more layers" at which LAN information was collected. The invocation of communication layers is not patent-eligible—indeed, dependent claims 5 and 6 confirm that

these layers may be OSI or TCP-IP layers, which are common models used to understand basic networking technology. Relying on layers (whether different or not) is not a technological advancement over the prior art, as the patent acknowledges that these models were commonly known and used in the art. The ’108 Patent does not teach or disclose any improvements or technological advancements to the prior art, and instead arbitrarily adds a requirement in the claims that the WAN and LAN layers be “different.” The Challenged Claims also recite these requirements in the claims in purely functional terms that fail to transform the claimed abstract idea beyond the conventional computer tasks. *Bot M8 LLC v. Sony Corp. of Am*., 465 F. Supp. 3d 1013, 1025 (N.D. Cal. 2020) (“Though given special names, each part remains a generic computer part invoked to effect the conventional computer task of gathering, manipulating, transmitting, and using data.”).

Pursuant to Section (a)(1) of the Order Regarding Eligibility, Exhibit F-4 contains a chart identifying each exception to eligibility to which each Asserted Claim of the ’108 Patent is directed and the factual and legal basis therefor. For avoidance of doubt, and as set forth above and in Exhibit F-4, each Asserted Claim of the ’108 Patent is directed to one or more abstract ideas and therefore is not directed to patent eligible subject matter. Exhibit F-4 also identifies claim 1 as representative of the other Challenged Claims for purposes of the eligibility inquiry. And pursuant to Section (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, Exhibit F-4, read in conjunction with the preceding paragraphs herein, provides: (i) a description of how each element of each Asserted Claim, both individually and in combination with the other elements of that claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time, and (ii) an identification of the factual or legal basis for how the Challenged Claims are otherwise ineligible for patent protection.

Finally, pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, Defendant provides the following description of the relevant industry at the relevant time. As of the alleged priority date for the ’108 Patent, the relevant industry was well-developed. LAN and WAN networks were decades old, as were the OSI and TCP-IP layer models that are used to characterize them. *E.g.*, Wiley-776 at 0004. Likewise, all individual elements disclosed and recited in the ’108 Patent were conventional, routine, and well known in the communications industry. *See generally* Appendix D. Indeed, none of these concepts was new or merely on the verge of development as of the alleged priority date of the ’108 Patent. Instead, these concepts had been known for years and were the subject of many published articles and/or patents from around the world. The ’108 Patent contributed nothing beyond what was already conventional, routine, and well-known technology as of the relevant time period.

Further detail regarding Defendant’s contentions that the Challenged Claims of the ’108 Patent do not qualify as patent-eligible subject matter are contained in Exhibit F-4.

E. The ’313 Patent

Each of the Challenged Claims of the ’313 Patent is drawn to subject matter that is not patentable under 35 U.S.C. § 101. The ’313 Patent Challenged Claims are unpatentable for failure to recite patent eligible subject matter. Indeed, the ’313 Patent is a continuation of the ’398 Patent, and recites patent ineligible subject matter for the reasons previously identified above regarding the ’398 Patent.

Under *Alice* Step 1, the ’313 Patent Challenged Claims are directed to abstract ideas and therefore not eligible subject matter under 35 U.S.C. § 101. *E.g.*, *Alice*, 573 U.S. at 217. By way of example, the Challenged Claims of the ’313 Patent (like those of the ’398 Patent) are generally directed to the abstract idea of selecting a policy based on observed performance data

and transmitting that policy. As discussed above with respect to the ’398 Patent, this characterization does not over-generalize the claims, which in some cases literally recite limitations that generically require “determining a policy” and “communicating the policy” to devices that “implement one or more algorithms that use the parameter and at least one rule or condition” to “improve a performance.”

The ’313 Patent and ’398 Patent share the same specification, and as such the ’313 Patent also acknowledges that the steps referenced above were well known and conventional, including in view of the patent’s background discussion of the 802.11g standard. ’313 Patent at 1:33-2:12. These admissions further show that the Challenged Claims are directed to a mere abstract concept, because the claims do not even purport to require an advance over the admitted prior art 802.11g standard. *See* § VII.B. Thus, under *Alice* Step 1, the ’313 Patent Challenged Claims are directed to one or more abstract ideas.

Under *Alice* Step 2, the ’313 Patent does not add an inventive step to the general abstract idea. Using generic policies and algorithms to improve a device’s performance is not patent-eligible, and does not represent a technological advancement over the prior art, as the patent acknowledges that the 802.11g WiFi standard was known in the art and already implemented a rate adaptation algorithm to improve device performance, including the components and devices necessary to perform this rate adaptation algorithm. ’313 Patent at 1:33-2:12. The ’313 Patent attempts to claim this concept at an even more generalized level, without offering any improvements or technological advancements to the prior art. Further, the Challenged Claims recite purely functional terms that fail to transform the claimed abstract idea beyond the conventional computer tasks. *Bot M8 LLC v. Sony Corp. of Am*., 465 F. Supp. 3d 1013, 1025 (N.D. Cal. 2020) (“Though given special names, each part remains a generic computer part

invoked to effect the conventional computer task of gathering, manipulating, transmitting, and using data.”).

Pursuant to Section (a)(1) of the Order Regarding Eligibility, Exhibit F-5 contains a chart identifying each exception to eligibility to which each Asserted Claim of the ’313 Patent is directed and the factual and legal basis therefor. For avoidance of doubt, and as set forth above and in Exhibit F-5, each Asserted Claim of the ’313 Patent is directed to one or more abstract ideas and therefore is not directed to patent eligible subject matter. Exhibit F-5 also identifies claims 1 and 19 as representative of the other Challenged Claims for purposes of the eligibility inquiry. And pursuant to Section (a)(2)(B) and (a)(3) of the Order Regarding Eligibility, Exhibit F-5, read in conjunction with the preceding paragraphs herein, provides: (i) a description of how each element of each Asserted Claim, both individually and in combination with the other elements of that claim, was well understood, routine, and/or conventional in the relevant industry at the relevant time, and (ii) an identification of the factual or legal basis for how the Challenged Claims are otherwise ineligible for patent protection.

Finally, pursuant to Section (a)(2)(A) of the Order Regarding Eligibility, Defendant provides the following description of the relevant industry at the relevant time. As of the alleged priority date for the ’313 Patent, the relevant industry was well-developed. The 802.11g standard, for example, had published many years before the ’313 Patent’s 2011 priority date, and all individual elements disclosed and recited in the ’313 Patent were conventional, routine, and well known in the communications industry. *See generally* Appendix E. The ’313 Patent further explains that policies pertaining to rate adaptation algorithms were well known and conventional. ’313 Patent at 1:33-2:12. As noted above, the ’313 Patent’s background section acknowledges that such policies and algorithms were known from at least the 802.11g standard. These

acknowledgements also show that the Challenged Claims are directed to a mere abstract concept, because the ’313 Patent did not even attempt to claim an advance over the prior art, and instead sought to broadly claim and preempt all uses of policies that use data, algorithms, conditions, and/or rules to improve device performance. None of these concepts was new or merely on the verge of development as of the alleged priority date of the ’313 Patent. Instead, these concepts had been known for years and were the subject of many published articles and/or patents from around the world. The ’313 Patent contributed nothing beyond what was already conventional, routine, and well-known technology as of the relevant time period.

Further detail regarding Defendant’s contentions that the Challenged Claims of the ’313 Patent do not qualify as patent-eligible subject matter are contained in Exhibit F-5.

IX. Other Issues

Defendant reserves the right to amend its Invalidity Contentions with additional prior art and/or with additional charts of the art if Plaintiff is permitted to change its positions in any manner.

X. Patent Rule 3-4 – Productions

Pursuant to Patent Rule 3-4(a), on October 7, 2024 Defendant produced and/or made available for inspection documents and other materials sufficient to show the operation of any aspects or elements of the Accused Instrumentalities identified by Plaintiff in its Patent Rule 3-1(c) charts, including Plaintiff’s amended Patent Rule 3-1(c) charts, to the extent such documents or materials are in Defendant’s possession, custody, or control.

Additionally, and pursuant to Patent Rule 3-4(b), Defendant is concurrently producing a copy of each item of prior art identified herein. These prior art references and corroborating evidence are cited in attached invalidity claim charts in Appendices A-E. Defendant will also

make available for inspection any prior art products or systems upon request to the extent Defendant acquires such products or systems. References that were cited during prosecution of the Asserted Patents may not be contained in Defendant's production as they are not required to be under the Local Patent Rules. Defendant's search for prior art references, additional documentation, and/or corroborating evidence concerning prior art products and systems is ongoing. Accordingly, Defendant reserves the right to supplement its production as Defendant obtains additional prior art references, documentation, and/or corroborating evidence concerning invalidity during discovery. Defendant reserves the right to supplement its Patent Rule 3-4 document production pursuant to the Local Patent Rules and the orders of the Court.

Date: November 1, 2024

/s/ David Eiseman

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CERTIFICATE OF SERVICE

The undersigned certifies that Plaintiff's counsel of record were served with a true and correct copy of the foregoing document by electronic mail on November 1, 2024.

/s/__*Trevor J. Quist*__