

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CHARTER COMMUNICATIONS, INC.,

Petitioner,

v.

IARNACH TECHNOLOGIES LTD.,
Patent Owner.

IPR2024-XXXX
U.S. Patent No. 9,287,982

PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

(Claims 1-11)

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Ex. 1003	U.S. Patent Application Publication No: 2008/0069564 A1 (“Bernard”)
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Ex. 1005	Declaration of Paul Min, Ph.D., P.E.
Ex. 1006	U.S. 8,831,425 (“Bernstein”)
Ex. 1007	MEF Technical Specification, MEF 6.1, Ethernet Services Definitions – Phase 2, April 2008
Ex. 1008	U.S. 8,160,448 (“Tsuge”)
Ex. 1009	Docket Control Order, Iarnach Tech. Ltd. V. Charter Comms. Inc. et al, Civil Action No. 2:24-cv-00230 W.D. Tex. (Dkt. No. 55)

Claim Listing

Ref. #	Listing of Challenged Claims
1[preamble]	1. A service auto-configuration method of a DOCSIS Provisioning Of EPON (DPoE) system, comprising:
1[a]	the DPoE system acquiring a configuration file from a back-office management system, wherein the configuration file comprises both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal (OLT) in the DPoE system;
1[b]	the DPoE system analyzing the acquired configuration file, and obtaining both the configuration information of the ONU and the configuration information of the OLT; and
1[c]	the DPoE system configuring the OLT locally according to the configuration information of the OLT
1[d]	and meanwhile configuring the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU;
1[e]	wherein, the method is performed in a process of ONU initialization; and
1[f]	wherein, when analyzing the acquired configuration file, the DPoE system further converts the configuration information of the ONU into a message format which can be identified by the ONU, and
1[g]	converts the configuration information of the OLT into a message format which can be identified by the OLT.
2	2. The method according to claim 1, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.
3	3. The method according to claim 2, wherein, the services opened by the ONU comprise one or more of Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services; and the configuration information of the OLT comprises one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to the services opened by the ONU.
4[preamble]	4. A data over cable service interface system (DOCSIS) Provisioning Of EPON (DPoE) system, comprising

PETITIONER’S EXHIBIT LIST

(Continued)

Ref. #	Listing of Challenged Claims
4[a]	an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization,
4[b]	the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system;
4[c]	the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT; and
4[d]	the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.
5	5. The system according to claim 4, wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.
6[preamble]	6. A service auto-configuration network of a DOCSIS Provisioning Of EPON (DPoE) system, comprising
6[a]	a DPoE system, a back-office management system and a plurality of optical network units (ONUs);
6[b]	wherein, the DPoE system comprises an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization,
6[c]	the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system;

PETITIONER’S EXHIBIT LIST

(Continued)

Ref. #	Listing of Challenged Claims
6[d]	the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT; and
6[e]	the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU; and
6[f]	the back-office management system is configured to: save the configuration file, and download the configuration file to the DPoE system, wherein the configuration file comprises the configuration information of the ONU and the configuration information of the OLT in the DPoE system.
7	7. The network according to claim 6, wherein, the back-office management system comprises a trivial file transfer protocol (TFTP) server configured to: receive a TFTP request initiated by the DPoE system, respond to that TFTP request, and download the configuration file to the DPoE system.
8	8. The network according to claim 7, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.
9	9. The network according to claim 6, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.
10	10. The network according to claim 9, wherein, the services opened by the ONU comprise one or more of Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services; and the configuration information of the OLT comprises one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to the services opened by the ONU.

PETITIONER’S EXHIBIT LIST
(Continued)

Ref. #	Listing of Challenged Claims
11	11. The network according to claim 6, wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.

I. INTRODUCTION

Pursuant to 35 U.S.C. §§311, 314(a), and 37 C.F.R. §42.100, Charter Communications, Inc. (“Petitioner”) respectfully requests the Board review and cancel as unpatentable Claims 1-11 (“Challenged Claims”) of U.S. Patent No. 9,287,982 (“’982 Patent,” EX1001). This petition demonstrates a reasonable likelihood the challenged claims are unpatentable.

The ’982 Patent concerns cable systems. These challenged claims recite networks and communications methods with respect to cable systems including optical fiber as part of their network. Cable systems employing optical fiber for a portion of their transmissions are generally referred to as hybrid fiber cable (HFC) networks. EX1005, ¶32. Use of passive optical networks for this purpose is well-known. *Id.*

Originally, cable systems only distributed television and similar video programming to subscribers. *Id.*, ¶33. With the advent of the internet, cable systems evolved to carry data and digital voice communications (VoIP) in both downstream and upstream directions. *Id.* Typically, in these HFC cable networks, subscriber associated equipment, such as cable modems and optical network units (ONUs) or optical network terminals (ONTs), communicated with upstream equipment associated with the cable provider, such as Cable Modem Termination Systems (CMTSs) and optical line terminals (OLTs). *Id.*

To effect communications between these subscribers-associated and cable provider-associated devices, communications standards have been developed. For example, cable network communications have long been accomplished using Data Over Cable Service Interface Specification (DOCSIS). *Id.*, ¶34. To enable communications, both the subscriber-associated and provider-associated equipment must necessarily be configured with compatible parameters. *Id.*

The challenged claims of the '982 Patent are directed to obvious methods for contemporaneously configuring OLTs and ONUs in passive optical networks forming a portion of a cable system. All the claimed features were present in the prior art described in this Petition. None of the prior art discussed in this Petition was considered by the Patent Office. This Petition demonstrates the skilled person would have found the claimed subject matter obvious over this prior art. No secondary considerations of non-obviousness exist. The PTAB should cancel the challenged claims.

II. MANDATORY NOTICES

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

Petitioner certifies the real party-in-interest is Charter Communications, Inc.

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

The '982 Patent is involved in the following proceedings:

Case	Case Filed	Defendants/Petitioners	Court
Iarnach Technologies Ltd., v. Charter Communications, Inc., et al., 2:24-cv-00230 (E.D. Tex.)	04/5/2024	Charter Communica- tions, Inc., Charter Communications Hold- ing Company, LLC, Charter Communica- tions Operating, LLC, Spectrum Management Holding Company, LLC, Spectrum Gulf Coast, LLC	Eastern Dis- trict of Tex- as

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D. Fee Payment Authorization (37 C.F.R. §§42.103(a) and 42.15(a))

Payment of required fees is submitted herewith. The Patent Office is authorized to charge Deposit Account No. 13-2855 for all additional fees.

III. GROUNDS FOR STANDING (37 C.F.R. §42.104(A))

Petitioner certifies the '982 Patent is eligible for *inter partes* review and Petitioner is not barred or estopped.

IV. THE '982 PATENT

A. Effective Filing Date of '982 Patent

The '982 Patent issued from U.S. Patent Application No. 14/009,703 filed March 20, 2012, and claims priority to Chinese Patent Application 201100921130, filed April 13, 2011. Based on its claimed priority, the '982 Patent would be evaluated under the rules preceding the America Invents Acts.

B. Specification

The '982 Patent describes a method of using a conventional passive ethernet optical network (PON) as part of the deployment of conventional services using the Data Over Cable Service Interface Specification (DOCSIS), a system commonly known as DOCSIS Provisioning over Ethernet (DPoE).

The '982 Patent acknowledges that DPoE networks and systems were known. EX1001, 1:7-2:47. Cable systems employing DPoE included a back-office system that handled administrative functions, such as recording the identity of subscribers and the services to which they subscribed. These systems also employed a communication network transmitting and receiving packets of information via radio frequencies in accordance with the DOCSIS specifications. Additionally, these

networks employed fiber optic cables, together with devices at each end to translate these radio frequencies into optical wavelengths and back again.

PONs and DOCSIS, however, use different protocols, control messages and addressing methods for sending a data packet from one location to another. To bridge this divide, a *virtual* cable modem is established upstream of the optical fiber to receive DOCSIS communications from the CMTS and translate those signals into optical transmissions. Figure 1 of the '982 Patent illustrates a “typical DPoE network,” which includes three components: (1) a “back-office management system” [PURPLE] consisting of known DOCSIS technologies such as a Trivial File Transfer Protocol (TFTP); (2) a “DPoE system” [GREEN] including *inter alia* a software emulation of a traditional cable modem (CM) (*i.e.*, a virtual cable modem or vCM), an OLT [BLUE]; and (3) an ONU [ORANGE] connected to customer premise equipment:

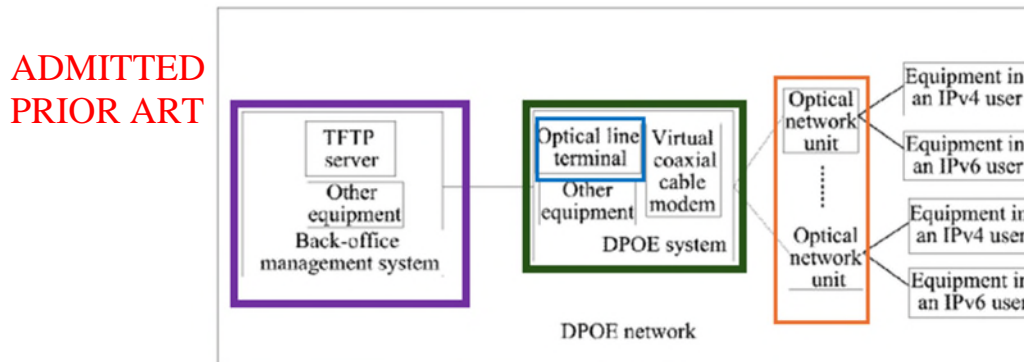


FIG. 1

Id., Fig. 1 (annotated); EX1005, ¶37.

When a subscriber associated ONU first connects to the DPoE network it must be registered, and both it and the OLT must be configured to provisions services appropriate to that subscriber. Figure 2 depicts the “typical” initialization process of an ONU component. First, an ONU powers on and registers with the DPoE system (step S201), and the DPoE system authenticates the ONU and completes registration (steps S202-S203) [GREEN]. EX1005, ¶38 (citing EX1001, 1:33-39). Next, the OLT and ONU are configured, beginning with issuance by a vCM of a request for configuration information from a back-office system. Specifically, the vCM issues a request to a trivial file transfer protocol (TFTP) server for a configuration file, which responds to the request by downloading the appropriate file to the DPoE system (steps S204-S205) [PURPLE]. *Id.*, citing EX1001, 1:43-47. The configuration file includes attributes and parameters about services to be provided to subscribers via the ONU. *Id.* (citing EX1001, 1:40-53). The vCM and OLT process the file (step S206) [DARK GREEN], using it to configure the OLT/ONU, by among other things, translating the configuration information into messages understandable by the ONU and communicating those messages to the ONU via an Operations and Management (OAM) channel (step S207) [ORANGE]. *Id.* (citing EX1001, 1:40-53).

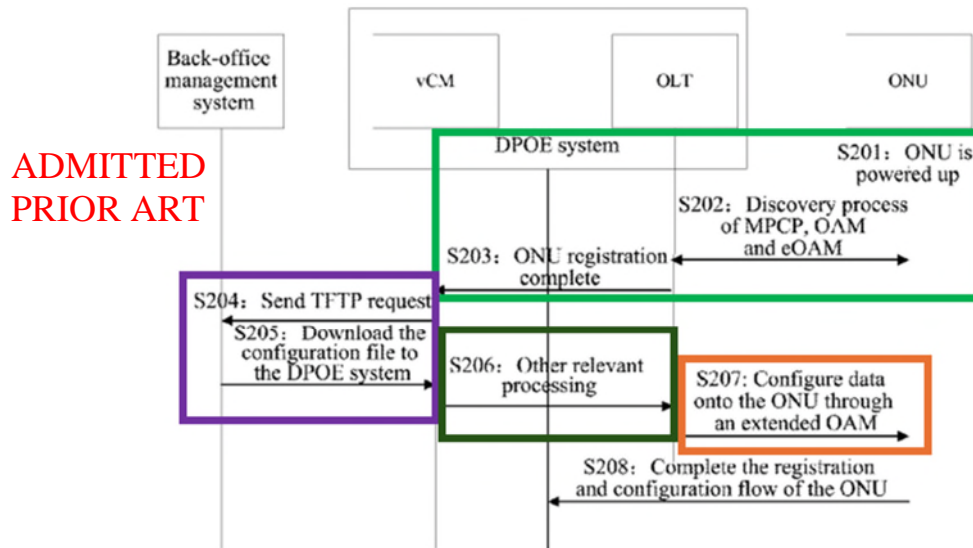


FIG. 2

Id. (citing EX1001, Fig. 2) (annotated).

In seeking to establish the novelty of its invention, the Applicant emphasized the invention automatically configured the OLT at the same time as the corresponding ONU. EX1005, ¶39 (citing 1:65-2:2). Applicant contended that previously, “generally speaking, the configuration on the OLT need [*sic*] to be performed by hand individually, or performed through a command line, or performed through a simple network management protocol (SNMP) interface between and Element Management System (EMS and the OLT).” *Id.* (citing EX1001 1:57-64).

In Figures 3 and 4, Applicants depicted its method for purportedly “auto-configuring” ONUs and OLTs. Applicants’ “auto-configuration” method, however, merely duplicates the prior art, where the DPoE system authenticates the

ONU (steps S401-S403) [LIGHT GREEN], a vCM requests and downloads a configuration file from a back-office management system (steps S406-S407) [PURPLE] and the vCM processes the file (step S408) [DARK GREEN], using information from the file to configure the ONU through a management channel (“extended OAM”) [ORANGE]. *Id.*, ¶40.

Applicant’s DPoE system purportedly expands the prior art process through inclusion in the configuration file of information used to also configure aspects of the OLT’s operation (Step 409 shown in BLUE) (noting if file contains “a configuration message for the OLT” then “configuration message is enabled to be effective in the OLT locally”). This so-called “expanded” process is shown in Figs. 3 and 4:

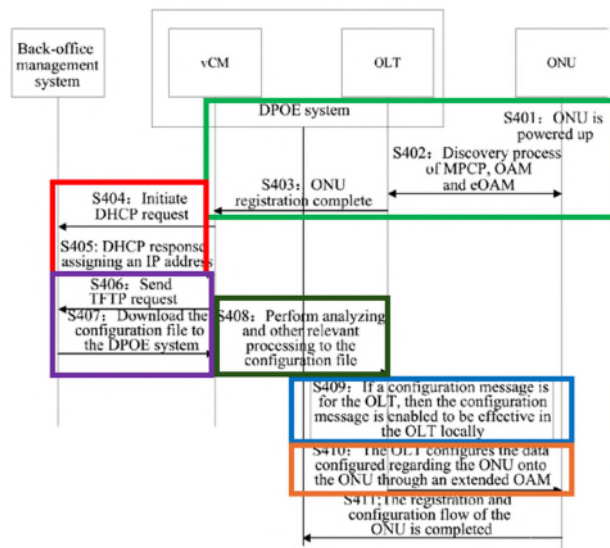


FIG. 4

Id., ¶41 (citing EX1001, Fig. 4) (annotated).¹

C. Prosecution History

During prosecution, the examiner rejected the claims as anticipated by CN 101997725 A to Wang (“Wang”). EX1002, CHARTER_198-203 and CHARTER_214-227. The examiner determined Wang disclosed an autoconfiguration method for a DPoE system. EX1002, CHARTER_201-202 and CHARTER_214. Specifically, among other things, Wang disclosed the acquisition of a configuration file by a DPoE system from a back-office management system. *Id.*, CHARTER_222. The configuration file comprised configuration information of an ONU and an OLT. *Id.*, CHARTER_222. Wang taught a DPoE system that analyzed the acquired configuration file to obtain configuration information of both the ONU and the OLT. *Id.*, CHARTER_222-24. Wang’s DPoE system thereafter configured the OLT locally, while configuring the ONU via an OAM management channel. *Id.*, CHARTER_223. Wang’s DPoE system also was found to convert the ONU configuration information into a message format that could be identified by the ONU, and which converted the configuration information of the OLT into a message format that could be identified by the OLT. *Id.* Wang taught performance of its method during ONU initialization. *Id.*, CHARTER_221-22.

¹ Fig. 4 also shows an unclaimed process by which the DPoE system requests an IP address for the ONU (shown in RED). *Id.*

Applicant did not expressly dispute the examiner's rejections. Instead, Applicant amended each pending independent claim, *inter alia*, to include requirements of a rejected dependent claim that the OLT is configured, and "meanwhile" the ONU is configured. *Id.*, CHARTER_273-276. While not recited in the claims, Applicant argued its amendment required both the OLT and ONU be configured "at the same time," a limitation Applicant argued was absent from Wang. *Id.*, CHARTER_281.

Ignoring the Applicant's purported distinction, the examiner issued a further, final rejection based on U.S. Patent Application Publication No: 2008/0069564 A1 ("Bernard"). *Id.*, CHARTER_288-293; EX1003. The examiner noted Bernard, like Wang, taught auto-configuring a DPoE system. The examiner declared Bernard disclosed the elements of Applicant's amended Claims 1-3. EX1002, CHARTER_290-91.

However, the examiner indicated he would allow Claim 4 if re-written in independent form. *Id.* Claim 4 merely recited the additional unremarkable conversion of the ONU/OLT configuration information contained in the configuration file into message formats that could be identified by those respective devices. *Id.*, CHARTER_274.² In response, the Applicant incorporated the limitations of Claim

² The examiner further allowed claims 6-13. *Id.*

4 into an independent claim, and the patent issued with 11 claims. *Id.*, 312-318; EX1001, Claims 1-11.

D. Level of Ordinary Skill

A person having ordinary skill in this art (“POSA”) would have at least a bachelor’s degree in electrical engineering, computer science or comparable degree or 2-3 years industry experience designing and/or maintaining back-end networking equipment.

E. Claim Construction (37 C.F.R. §§42.104(b)(1) and (b)(3))

Words in a claim are given their plain meaning, as understood by a POSA in view of the patent and file history. 37 C.F.R. § 42.100(b); 83 Fed. Reg. 197, 51340 (Oct. 11, 2018); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). For purposes of this Petition only, Petitioner proposes no claim language requires express construction to resolve the grounds herein. Petitioner reserves the right to propose additional/alternative claim constructions in this and other proceedings in response to arguments that may be advanced therein by PO.

V. DISCRETIONARY DENIAL IS INAPPROPRIATE

Discretionary denial is inappropriate under 35 U.S.C. §325(d). Neither the art nor arguments relied upon herein have been previously presented to the Office. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 8 (PTAB Feb. 13, 2020) (precedential).

Neither U.S. Patent No. 8,831,425 (“Bernstein”) nor U.S. 8,160,448 (“Tsuge”) were before the Examiner. The Examiner never evaluated these references, either alone or in combination with others. *See Advanced Bionics, LLC, id.*, 9 n.10 (discretionary denial dependent upon “the extent to which the asserted art was evaluated during examination”). The Board has consistently declined to exercise discretion under Section 325(d) when a reference was not disclosed during prosecution. *See, e.g., Demant Holding A/S v. Cochlear Ltd.*, IPR2019-00975, Paper 15 (PTAB Oct. 16, 2019 (precedential) (declining to deny institution due to uncited secondary reference even though primary reference was already considered by Examiner).

This Petition thus presents new arguments not previously addressed by the examiner. Denial is inappropriate under 35 U.S.C. §325(d).

Discretionary denial also is inappropriate under 35 U.S.C. §314. Under the Director’s Interim Procedure for Discretionary Denials, the PTAB will not deny institution based on *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) if there is compelling evidence of unpatentability. This Petition provides such evidence, and thus, concludes the *Fintiv* analysis. *Nokia of Am. Corp. v. TQ Delta*, IPR2022-00471, Paper 11 at 19-21 (Aug. 18, 2022).

Regardless, the *Fintiv* factors strongly favor institution.

1. Potential for Stay

Petitioner will seek a pre-institution stay, but without “specific evidence” how the court will rule, this factor is neutral. *Sand Revolution II v. Continental Intermodal Group–Trucking*, IPR2019-01393, Paper 24 at 7 (June 16, 2020) (informative).

2. Timing of Trial

Jury selection is scheduled to begin on February 9, 2026. EX1009, 1. A trial would thus likely occur about the same time as a final written decision would be expected 18 months from the filing of this petition. *Google, LLC v. Flypsi, Inc.*, IPR2023-00361, Paper 9 at 8-9 (PTAB July 31, 2023) (finding trial occurring at least two months *before* deadline only “slightly” favored institution).

Moreover, Petitioner filed this petition with diligence, filing three weeks after receiving patent owner’s list of asserted claims, and over eight months before the §315(b) deadline. Factor 2 thus is neutral or weighs against denial. *Fintiv*, Paper 11 at 11 (“expeditiously” filed petitions “weigh[] against [denial]”).

3. Litigation Investment

Other than preliminary infringement contentions, the parties have invested little in the litigation, weighing against denial. *Samsung Elecs. v. Netlist, Inc.*, IPR2022-00063, Paper 13 at 8 (May 5, 2022) (granting institution where no “claim construction and merits determinations” had occurred).

4. Issue Overlap

All 11 claims of the '982 patent are at issue in both proceedings, however Petitioner is or will be filing additional petitions of the two other patents asserted in the underlying litigation challenging all claims, including non-asserted claims, concurrently or soon hereafter. Collectively, these petitions will dispose of all issues raised in the underlying litigation and others not at issue. A combined trial here will address claims the district court will not address, which weighs against denial. *Markforged Inc. v. Continuous Composites, Inc.*, IPR2022-00679, Paper 7 at 32-33 (Oct. 25, 2022).

5. Litigation Parties

Petitioner is the defendant in district court, which is neutral. *Sand Revolution II*, Paper 24 at 12-13.

6. Other Considerations

The claims are being asserted against Charter's systems for complying with the DPoE v2.0 specification, so their cancelation will provide for the public good by removing this unnecessary encumbrance on the standard, weighing against denial. EX1004, ¶¶ 41-46 and 91-102 ("The Accused Instrumentalities include the functionality necessary for Charter to provide DPoE v2.0 compliant networks to its customers...").

VI. STATE OF ART AND PRIOR ART

A. Bernstein

U.S. Patent No. 8,831,425 (“Bernstein”) issued September 9, 2014, and is entitled “A Data Over Cable Service Interface Specifications (DOCSIS) Passive Optical Network (PON) system.” EX1006, Abstract. Bernstein issued from an application filed January 9, 2008. Bernstein is prior art pursuant to the applicable version of 35 U.S.C. §102(e). *Id.* Bernstein discloses PON networks, including Ethernet PON (EPON) networks. EX1005, ¶47 citing (EX1006, 1:66-2:29).

Figure 3 of Bernstein depicts a system consisting of a back-office management MSO network 16 [PURPLE], a DOCSIS PON system [GREEN] with OLT [BLUE], communicating with one or more ONUs [ORANGE].

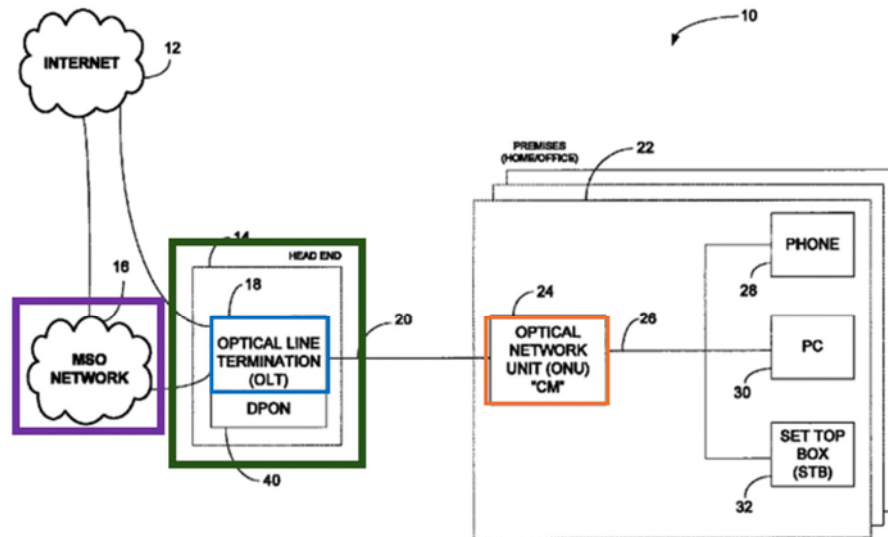


FIG. 1

Id., ¶48 (citing EX1006, Fig. 1) (annotated).

Bernstein's system uses software as a cable modem proxy (*i.e.*, virtual cable modem) to simulate the functionality of conventional DOCSIS CMTS and CM hardware components. *Id.*, ¶49 (citing EX1006, 3:37-63). In the embodiment shown in FIG.3, this software is executed on the OLT. *Id.* The cable modem proxy may communicate with any of the back-office MSO servers to “effectively allow any of the services normally supported in a cable network to also be used in PON 10.” *Id.*

Bernstein describes an initialization process beginning on ONU power-on and continuing through the opening of DOCSIS services between an ONU and OLT. A key aspect of the Bernstein DPoE system is its concurrent use of information from a single configuration file downloaded from a TFTP server to configure aspects of both the OLT's operation as well as that of the ONU. These aspects are illustrated in FIGS. 3, 7 and 8, which shows a method in which an ONU registers with a cable modem proxy [LIGHT GREEN], which in turn obtains an IP address for an ONU [RED], downloads a configuration from a back-office system [PURPLE], processes the single configuration file to extract configuration for the OLT and ONU [DARK GREEN], and uses the extracted configuration information to configure both the OLT [BLUE] and ONU [ORANGE] at the same time:

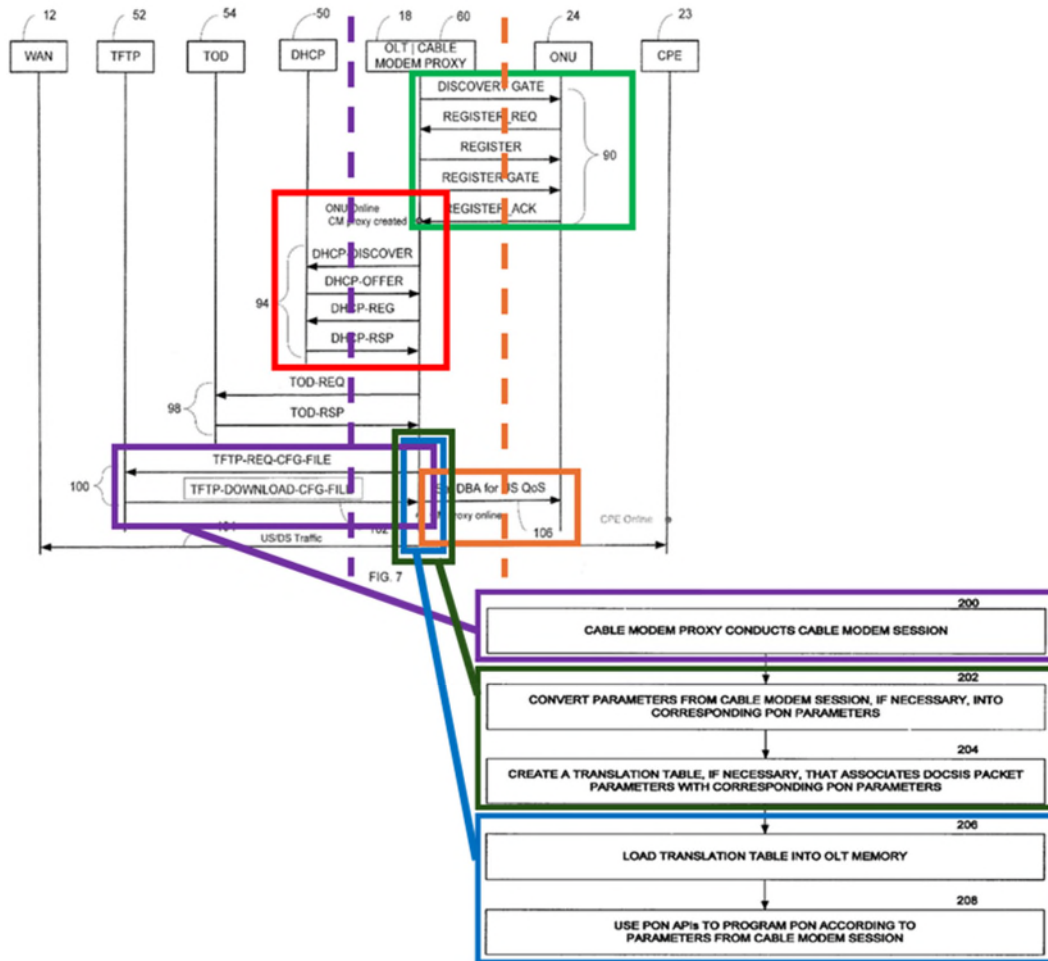


FIG. 8

Id., ¶50 (citing EX1006 Figs. 7 and 8) (annotated).

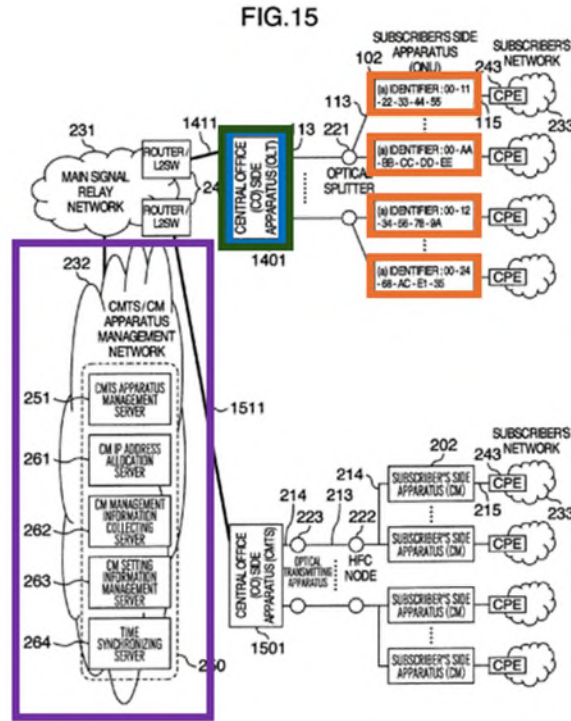
More specifically, a “DOCSIS-to-PON translator 84” processes the configuration file and convert[s] any of the parameters contained therein “into associated PON parameters 63 that can be used by the OLT 18 and ONU 24.” *Id.*, ¶51 (citing EX1006, 3:53-63). “[T]he ONU 24 gets programmed through the OAM channel,” or the Operation and Maintenance Channel [ORANGE]. *Id.* (citing EX1006, 5:49-58). Configuration file information relevant to the OLT (*e.g.*, bandwidth allocation

and service priority information) is converted into a format appropriate to the OLT [DARK GREEN] and loaded into and thereafter used by the OLT for communications with the ONU [BLUE].

B. Tsuge

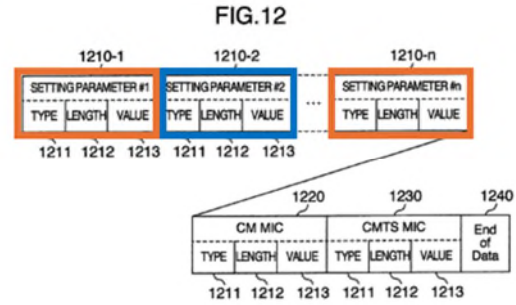
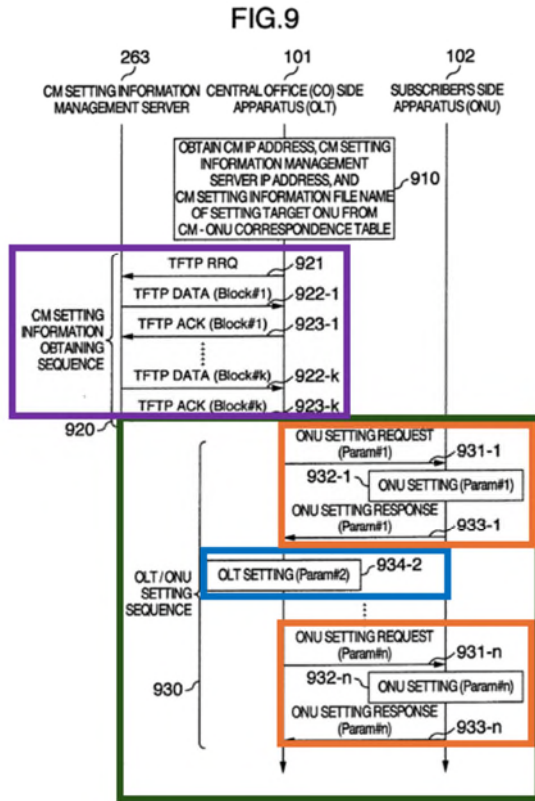
U.S. 8,160,448 (“Tsuge”) issued on April 17, 2012, and is entitled “Communication system using passive optical network and passive optical network.” prior art under § 102(e).EX1008, cover page. Tsuge issued from an application filed on March 17, 2009. Tsuge is prior art pursuant to the applicable version of 35 U.S.C. §102(e).

Tsuge discloses a DPoE system (illustrated in FIG. 15) including a “CMTS/CM Apparatus Management Network 232” comprising a conventional DOCSIS back-office management system [PURPLE] that, inter alia, stores and provides DOCSIS configuration files used for configuring communications between a DPoE System/OLT [DARK GREEN/BLUE] and one or more an ONU [ORANGE]:



Id., ¶53 (citing EX1008, FIG. 15) (annotated).

Tsuge explains the OLT sends a request to the back-office service (“CM setting information management server 263”), which [a]ccording to the DOCSIS standard ... is executed ... by the TFTP” and, in response, receives the configuration file (step 920 [PURPLE]). *Id.*, ¶54. The configuration file consists of both configuration information of an optical network unit (ONU) [ORANGE] and configuration information of an optical line terminal (OLT) [BLUE], as shown on the right side in the image below:



Id. (citing EX1008, FIG. 9, FIG. 12) (annotated).

As shown in the diagram’s left, Tsuge explains that “[t]he contents of the setting parameters are converted into the ONU setting information signal 543 or the settings to the OLT itself or into both of them In the case where they are converted into the settings to the OLT itself, the settings are reflected to the OLT (step 934) [BLUE]. In the case where they are converted into the ONU setting information signal 543, an ONU setting request message is transmitted to the ONU 102 as a setting target (step 931)” [ORANGE]. EX1005, ¶55 (citing EX1008, 15:5-9) (emphasis added).

C. MEF 6.1 Ethernet Services Specification

The Metro Ethernet Forum’s MEF 6.1, Ethernet Services Definitions - Phase 2 (“ESD”) was published in April 2008. EX1007, 1. The ESD is prior art pursuant to the applicable version of 35 U.S.C. §102(b). ESD discloses definitional frameworks for several types of generic Ethernet services that “Service Providers” may provide over a Metro Ethernet Network to “subscribers.” *Id.*, 7 and fn. 1. EX1005, ¶56.

The 2008 EDS discloses E-LINE, E-TREE and E-LAN services, described as “three generic service constructs called Ethernet Service types ... defined based on the service attributes that might appear in a Service Level Agreement (SLA) or Service Level Specification (SLS)” between data service providers and its subscribers. *Id.*, ¶57. EDS further notes these Ethernet services “are agnostic of the underlying network infrastructure” and are suitable for a variety of underlying networks technologies, including HFCs and PONs. *Id.*

VII. IDENTIFICATION OF CHALLENGE (37 C.F. R. §42.104(B))

A. Statutory Grounds (37 C.F.R. §42.104(b)(2))

The challenged claims concern systems for implementing DOCSIS technologies on an EPON network to configure and manage communications between equipment such as OLTs and ONUs. In this petition, the challenged claims are anticipated and/or obvious over combinations of Metro Ethernet Forum (MEF) Tech-

nical and Operations Committee, “MEF Technical Specification MEF 6.1, Ethernet Services Definitions – Phase 2” (Apr. 2008) (hereafter “MEF 6.1” or “ESD,” EX1007) and one of more of the following:

Exhibit	Patent No.	To	Filed	Issued
1006	8,831,425	Bernstein	Jan. 9, 2008	Sep. 9, 2014
1008	8,160,448	Tsuge	Mar. 17, 2009	Apr. 12, 2012

Each patent qualifies as prior art. *See* Sections VI(A) and (C), above.

The challenged claims are unpatentable based upon the following grounds:

Ground	Claims	Basis (Pre-AIA 35 U.S.C. §§ 102, 103)
1	1-2, 4-9 and 11	Obvious under 35 U.S.C. § 103 over U.S. Patent No. 8,831,425 alone or in combination with MEF 6.1 U.S. Patent No. 8,160,448
2	3 and 10	Obvious under 35 U.S.C. § 103 over U.S. Patent No. 8,831,425 in combination with MEF 6.1 and/or in U.S. Patent No. 8,160,448
3	1-2, 4-9 and 11	Obvious under 35 U.S.C. § 103 over U.S. Patent No. 8,160,448 alone or in combination with U.S. Patent No. 8,831,425
4	3 and 10	Obvious under 35 U.S.C. § 103 over U.S. Patent No. 8,160,448 in combination with MEF 6.1 and/or in U.S. Patent No. 8,831,425

Section VIII, below, further describes these grounds, citing the Declaration of Paul Min, Ph.D. EX1005.

Dr. Min has a formal education in electrical engineering and computer science. Since 1990, he has been teaching at Washington University in St. Louis. He currently serves as a Senior Professor in the Department of Electrical & Systems Engineering in the McKelvey School of Engineering. Before joining Washington University, Dr. Min spent three years at Bellcore (now Telcordia Technologies, Inc.), where he was a lead systems engineer for the Bell Operating Companies in transitioning from voice centric networks to multi-services capable networks suited for the Internet era and received an Outstanding Achievement Award for his contributions by Bellcore in 1989. His teaching and research specialty includes technologies used for switching, routing, performance control and/or security in communication networks. These and other experiences forming two startup companies, one of which won a best product award in 2002, qualify him to provide an opinion as to what a person having ordinary skill in this art (POSA) would have understood, known, or concluded as of the '982 patent's filing date. EX1005, ¶¶1-18. Accordingly, he is competent to testify in this proceeding.

VIII. DETAILED GROUNDS OF INVALIDITY

A. Ground 1: Claims 1-2, 4-9 and 11 are Obvious Over Bernstein In View of Tsuge And/Or The Knowledge In The Art

Bernstein discloses each and every limitation recited in Claims 1-2, 4-9 and 11 are thereby anticipates them. To the extent not anticipated by Bernstein, these

claims would have been obvious to a person of ordinary skill based upon the disclosures of Bernstein in view of Tsuge and in light of the knowledge of one of skill in the art.

1. Independent Claim 1

a. Preamble

1. A service auto-configuration method of a DOCSIS Provisioning Of EPON (DPoE) system, comprising:

To the extent the preamble is limiting, Bernstein discloses this element. Bernstein discloses “A Data Over Cable Service Interface Specifications (DOCSIS) Passive Optical Network (PON) system[.]” EX1005, ¶59 (citing EX1006, Abstract). Bernstein also explains that his system is implemented on an “Ethernet PON (EPON).” *Id.*, (citing EX1006, 2:2-5, 2:44-3:36). In Figure 3, Bernstein depicts a DPoE system comprising OLT 18 including DPON 40 and Cable Modem Proxy 60 (a virtual cable modem.) *Id.* (citing EX1006, 3:37-46).

b. Element 1[a]

the DPoE system acquiring a configuration file from a back-office management system, wherein the configuration file comprises both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal (OLT) in the DPoE system;

Bernstein discloses this element. As described above, Bernstein discloses a DPoE system at least because it discloses OLT 18 inclusive of DPON 40 and Cable Modem Proxy 60. EX1005, ¶60 (citing EX1006, Abstract, 2:2-5, 2:44-3:36).

Further, as shown in FIGS. 3 and 7, the Bernstein's DPoE system acquires a configuration file from a back-office management system. *Id.*

Bernstein's DPON 40 and its Cable Modem Proxy 60 may "conduct a Trivial File Transfer Protocol (TFTP) session with a TFTP provisioning server 52 to obtain different DOCSIS service definitions." *Id.*, ¶61 (citing EX1006, 3:18-20). The "TFTP server 52" is part of "A MSO network or 'back-office' 16" (shown in PURPLE).

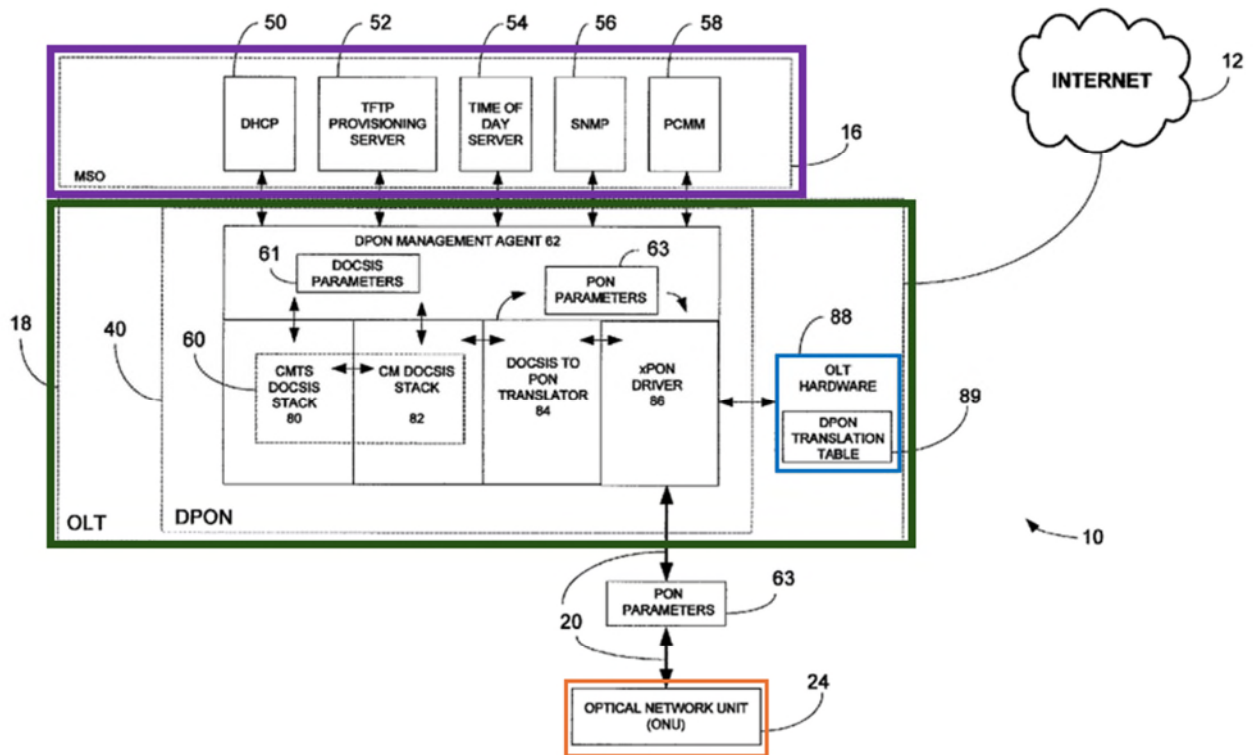


FIG. 3

Id., (citing EX1006, 2:44-3:36, FIG. 3) (annotated).

Cable Modem proxy 60 issues a request to the TFTP for a configuration file. *Id.*, ¶62 (citing EX1006, 5:31-32 (“[T]he CM proxy 60 may send a TFTP request for a DOCSIS configuration file download”) and FIG. 7 (100, “TFTP-REQ-CFG-FILE”). In response, the TFTP replies with the configuration file. *Id.* (citing EX1006, 5:32-34 (“The TFTP server 52 replies with a TFTP download configuration file 102”) and FIG. 7 (102, “TFTP-REQ-CFG-FILE”).

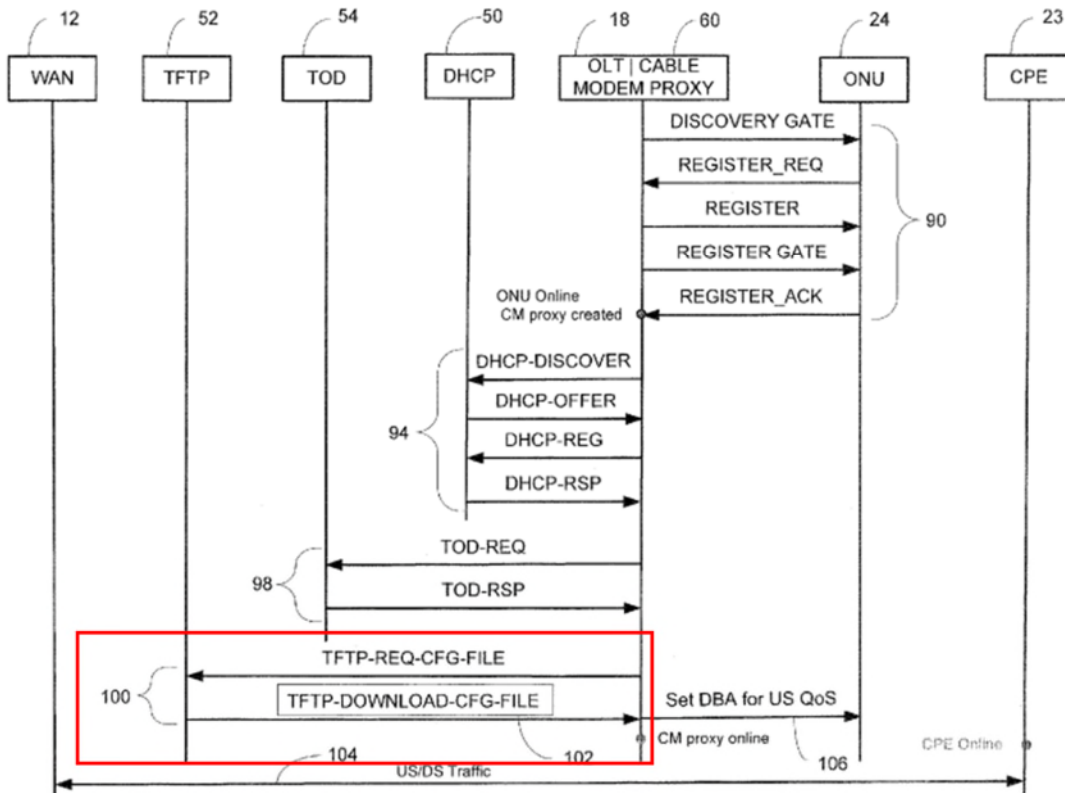


FIG. 7

Id. FIG. 7 (annotated).

The configuration file consists of both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal

(OLT). “The information in the TFTP file 102 is then translated and **used for configuring** schedulers/classifiers or other features on **the OLT 18 and ONU 24.**”) EX1005, ¶63 (citing EX1006, 5:31-40) (emphasis added). A “DOCSIS-to-PON translator 84” is used to convert parameters contained in the configuration file “into associated PON parameters 63 that can be used by **the OLT 18 and ONU 24.**” *Id.*, (citing EX1006, 3:53-63); *see also* EX1001, 2:8-38 (acknowledging service definitions include parameters for configuring both the OLT and the ONU, such as logical link (LLID) and/or virtual local area network (VLAN) information, and the like).

The configuration information included in file 102 concerns services opened by the ONU. For example, the information in TFTP configuration file 102 may be used to configure Dynamic Bandwidth Allocation (DBA) 106 for Upstream (US) Quality of Service (QoS) between the OLT 18 and ONU 24.” EX1006, 5:34-40; *see also* EX1005, ¶63 (citing EX1006, 3:49-52 (noting that the configuration of the OLT “*effectively allow[s] any of the services normally supported in a cable network to also be used in PON 10.*”)) “For example, certain DOCSIS QoS and security information may be used by the OLT 18 for transmitting or denying service for certain types of packet data received over Internet 12” *Id.* (citing EX1006, 4:6-9).

For the foregoing reasons, Bernstein discloses “the DPoE system acquiring a configuration file from a back-office management system, wherein the configura-

tion file comprises both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal (OLT) in the DPoE system.” EX1005, ¶65.

c. Element 1[b]

the DPoE system analyzing the acquired configuration file, and obtaining both the configuration information of the ONU and the configuration information of the OLT; and

Bernstein discloses that its DPoE system analyzes the acquired configuration file and obtains both configuration information for the ONU and configuration information for the OLT. Following downloading of the configuration file, Bernstein describes that DPON 40 includes a “DOCSIS-to-PON translator 84” that analyzes the configuration file, obtaining configuration information of both the OLT and ONU, that it then converts “into associated PON parameters 63 that can be used by the OLT 18 and ONU 24.” *Id.*, ¶66 (citing EX1006, 3:53-63).

Bernstein explains this information is used to configure both the ONU and OLT: “[s]ome of the translated PON parameters 63 are programmed into a PON driver 86 [of the OLT 18] for either communicating with the ONU 24 or sent over the optical cable 20 for configuring the ONU 24.” *Id.*, ¶67. Bernstein further explains that “[t]he translated PON parameters 63 may also be used for operating or configuring OLT hardware 88.” *Id.* Specific parameters used for configuring the

OLT and/or ONU relating to services requested to be opened by the ONU are further described below in elements 1[c]-[d].

For the foregoing reasons, Bernstein discloses “the DPoE system analyzing the acquired configuration file, and obtaining both the configuration information of the ONU and the configuration information of the OLT.” EX1005, ¶68.

d. Element 1[c]

the DPoE system configuring the OLT locally according to the configuration information of the OLT

The OLT in Bernstein is configured locally according to the configuration information of the OLT. Bernstein explains the PON parameters derived by Bernstein’s that DPON 40 using the DOCSIS-to-PON translator 84 are “programmed into a PON Driver 86” residing locally on the OLT 18. EX1005, ¶69 (citing EX1006, 3:53-59, Fig. 3). For example, in Figure 3 below, the PON Driver 86 [RED], OLT hardware 88 and the DPON translation table 89 [BLUE] are all shown residing on the OLT 18 [GREEN]:

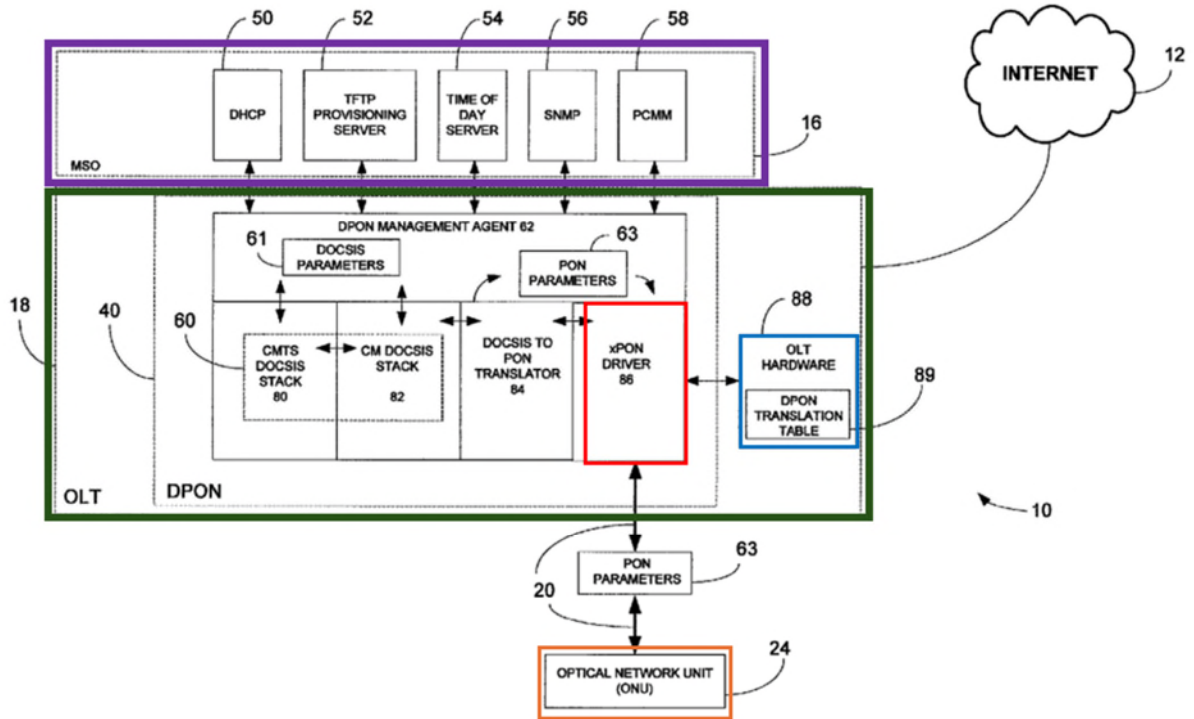


FIG. 3

Id. (citing EX1006, FIG. 3) (annotated).

These “translated PON parameters 63 may also be used for operating or configuring OLT hardware 88.” *Id.*, ¶70 (citing EX1006, 3:61-63). “The translator 84 in operation 208 uses PON Application Programmers Interfaces (APIs) to program the OLT 18 according to the different translated PON parameters 63.” *Id.* (citing EX1001 6:40-47). Figure 8 depicts loading these parameters into OLT Memory. Fig. 8 (step 206 “Load Translation Table int OLT Memory”). The OLT uses this translation table for handling packets directed to the ONU 24.

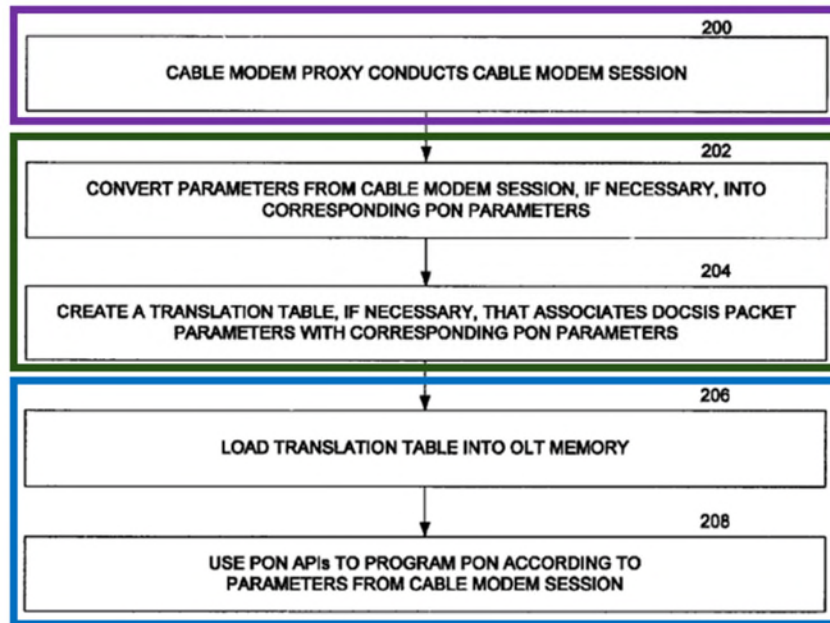


FIG. 8

Id., (citing EX1006, Fig. 8) (annotated).

For example, the embodiments shown in FIGs. 3, 7 and 8, show an OLT being configured locally with OLT configuration information from a downloaded configuration file. Bernstein explains that EPON systems use the conventional Ethernet model for managing quality of services requirement, such that instead of individual “pipes,” each service is assigned a “priority” within a shared “pipe.” EX1005, ¶71 (citing EX1006, 5:59-6:6). In one example, the downloaded configuration file “may contain a request for a video service at 10 million bits per second (Mbps), a voice service of 100 thousand bps (Kbps), and data service of 50 million bits per second (Mbps).” *Id.* (citing EX1006, 6:7-16). Bernstein’s system translates these requirements into an overall bandwidth requirement for the “pipe” to a given

ONU, along with priorities for each service. *Id.* (citing EX1006, 6:17-31). This information is formatted into the translation table referenced above and loaded into the OLT to be used when communicating with a given ONU. *Id.* (citing 6:32-57).

For the foregoing reasons, Bernstein discloses “the DPoE system configuring the OLT locally according to the configuration information of the OLT.” EX1005, ¶72.

e. Element 1[d]

and meanwhile configuring the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU;

Bernstein discloses that the ONU is meanwhile configured according to the configuration information of the ONU. For example, Bernstein explains that at the same time the OLT is configured locally by DPON 40 from PON parameters obtained by Proxy 60, the ONU 24 is also configured by DPON 40 using PON parameters 63 translated by the DOCSIS-to-PON translator 84 from the configuration file 102. EX1005, ¶73 (citing EX1006, 3:55-56 (“PON parameters 63 that can be **used by the OLT 18 and ONU 24.**”)) (emphasis added.)

FIG. 7 shows an ONU being configured at the same time as an OLT with information from the same downloaded configuration file. Bernstein explains “[t]he information in the TFTP file 102 is then translated and used for configuring schedulers/classifiers or other features on the OLT 18 and ONU 24. For example, the in-

formation in TFTP configuration file 102 may be used to configure Dynamic Bandwidth Allocation (DBA) 106 for Upstream (US) Quality of Service (QoS) between the OLT 18 and ONU 24[.]” *Id.*, ¶74 (citing EX1006 5:31-40).

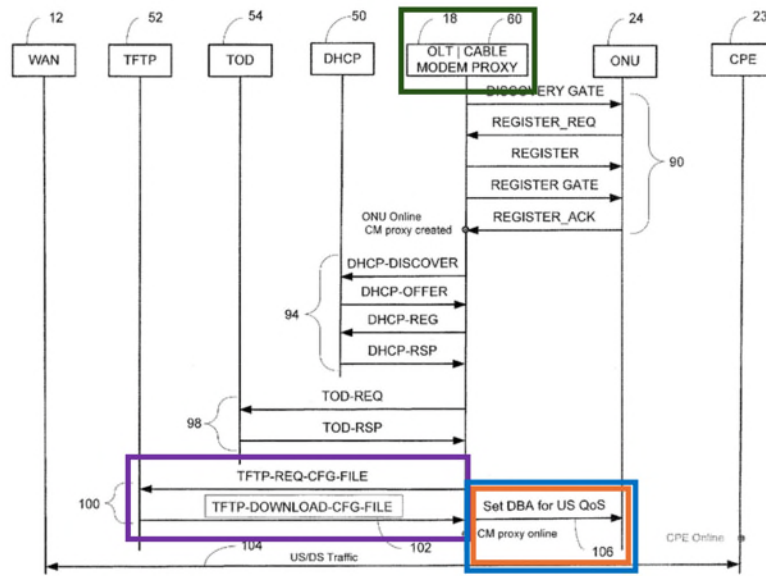


FIG. 7

Id. (citing FIG. 7) (annotated).

The single description in Figure 7 of “Set DBA for US QoS” requires configuration parameters be set on both the OLT and ONU in order to enable upstream communications between the two devices. The figure discloses this occurs as a single step. EX1005, ¶75 (citing EX1006, Fig. 7).

Bernstein elsewhere confirms that the ONU and OLT are configured at the same time. In describing the process illustrated in FIG. 8, Bernstein notes that a single file--configuration file “102”—is used to configure both the OLT and ONU. EX1005, ¶76 (citing EX1006, 6:7-28 (“Referring both to FIGS. 3 and 8, in opera-

tion 200, the CM proxy 60 participates in a **TFTP session 100 as described above in FIG. 7**. The CM proxy 60 **obtains a TFTP configuration file 102 (FIG. 7)** from the TFTP server 52 that contains DOCSIS parameters 61. ... The translator 84 may then assign different priorities for each of the different types of voice, video and data identified in **the TFTP file 102 (FIG. 7.)**”). *Id.*

Bernstein further explains that the ONU is configured via a management channel between the OLT and the ONU. Bernstein states “the ONU 24 gets programmed through the OAM channel,” or the Operation and Maintenance Channel between the OLT and ONU. EX1005, ¶77(citing EX1006, 5:49-58).

For the foregoing reasons, Bernstein discloses configuring the OLT “and meanwhile configuring the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.” EX1005, ¶78.

To the extent that this element is found to not be fully disclosed in Bernstein, it would have been obvious to a POSA at least as of April 13, 2011 to “meanwhile configure” the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU,” as claimed for the reasons set forth below. *Id.*, ¶79.

As shown above, Bernstein shows the contemporaneous configuration of both the ONU and the OLT with information from the same downloaded configuration file. A POSA would have been motivated to automatically configure both

the OLT and the ONU at the same time because to do so would have been more efficient given that the configuration information for each is acquired at the same time from the same file and translated from that file at the same time into a format suitable and immediately available for automatic configuration of both. EX1005, ¶80. In addition, the configuration information for both OLT and ONU is communicated to the OLT, which controls passing of that information via a management channel to the ONU, facilitating contemporaneous application of configuration information to both. *Id.* The alternative would require unnecessary storage of translated configuration information for the OLT and/or ONU for later application. *Id.*

In addition, as Bernstein notes, to provision services for a subscriber, and to enable corresponding communications between OLT and ONU, requires each be first configured appropriately. EX1005, ¶81. A POSA would have been motivated to eliminate delays in configuration each device, including those resulting from manual intervention, and to complete configurations simultaneously, or reasonably contemporaneously, so as to enable these services as soon as possible. *Id.*

A person of skill in the art would also have been motivated by Bernstein's description of an alternative embodiment shown in Figure 4 to automatically configure both OLT and ONU contemporaneously. *Id.*, ¶82. Bernstein explains that both the OLT and the ONU are configured in the same MSO registration session:

A first DOCSIS-to-PON translator 84A converts some of the DOCSIS parameters 61 obtained from the **MISO registration sessions** that are used by the OLT 18. For example, certain DOCSIS QoS and security information may be used by the OLT 18 for transmitting or denying service for certain types of packet data received over Internet 12. **These OLT related DOCSIS parameters 61 are sent to translator 84A and converted into PON parameters 63 that are then programmed into the OLT 18.** Accordingly, the OLT 18 operates according to these particular QoS and security parameters 63.

... **The MISO registration session may complete** with one or more DOCSIS parameters 61 being obtained by the CM DOCSIS stack 82. The DOCSIS parameters 61 are sent to a DOCSIS-to-PON translator 84B in ONU 24 for converting into corresponding ONU parameters. The converted ONU parameters are then programmed into the ONU 24 by translator 84B.

Id. (citing EX1006, 4:4-41).

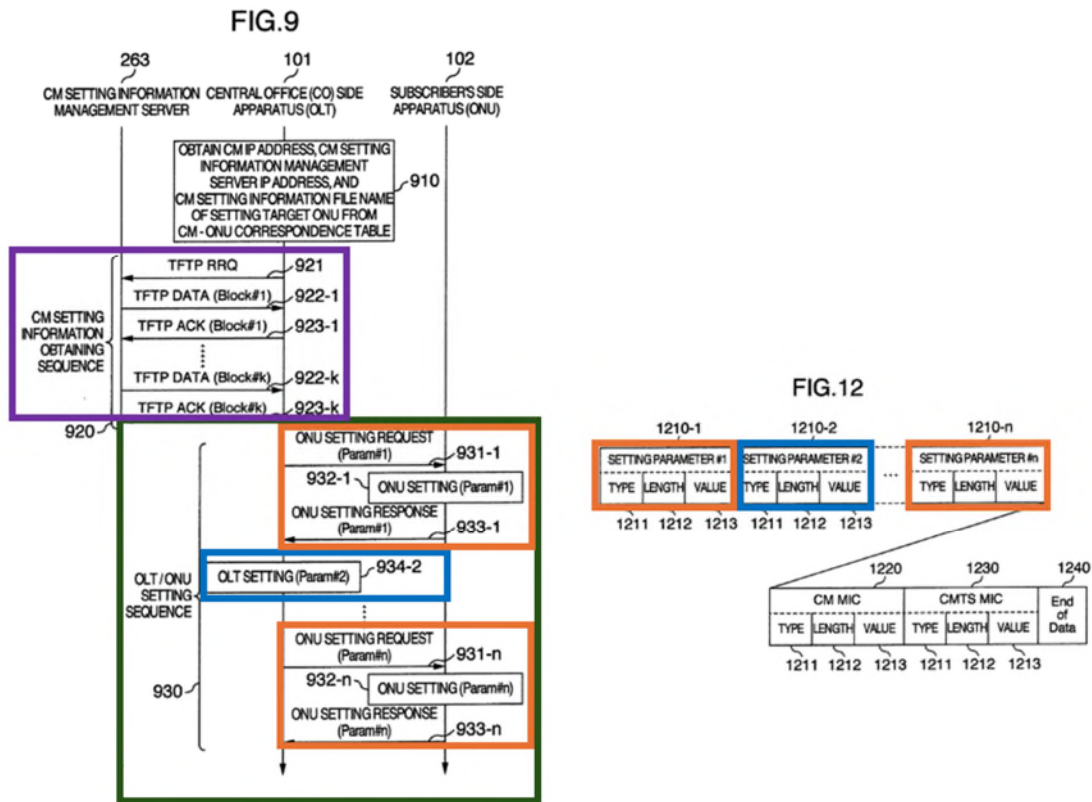
In addition, the disclosures in Tsuge would have motivated a POSA to automatically configure both OLT and ONU contemporaneously. *Id.*, ¶83. Tsuge is from the same field as Bernstein (DPoE networks and systems) and reasonable pertinent to the problem of configuring OLT and ONU devices for the provisioning of services in a DPoE network. *Id.* citing EX1008at 1:21-5:35.

Tsuge discloses the configuration of an optical network unit (ONU) and an optical line terminal (OLT) at the same time using information from a single downloaded DOCSIS configuration file. For example, Tsuge explains:

The contents of the setting parameters [*i.e.*, the unitary configuration file] are converted into the ONU setting information signal 543 or the settings to the OLT itself or into both of them In the case where

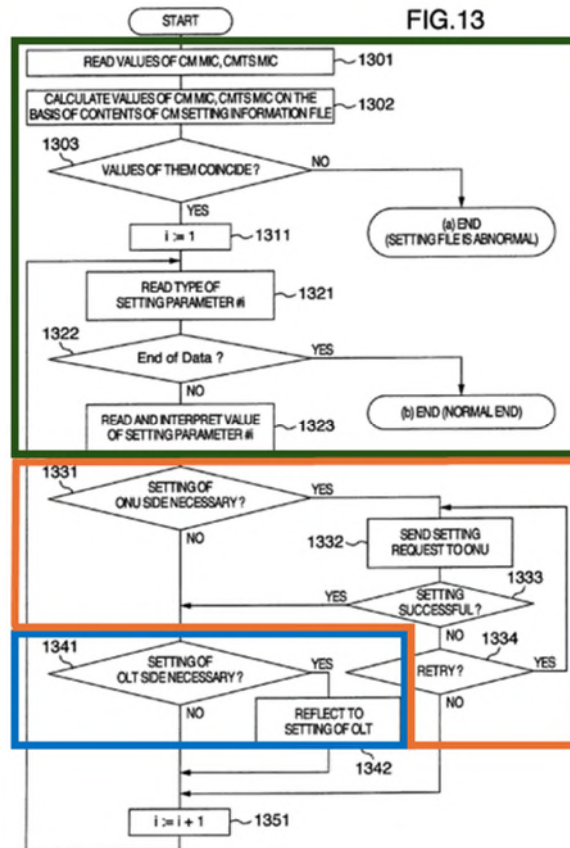
they are converted into the settings to the OLT itself, the settings are reflected to the OLT (step 934). In the case where they are converted into the ONU setting information signal 543, an ONU setting request message is transmitted to the ONU 102 as a setting target (step 931).”

EX1005, ¶82 (citing EX1008, 15:4-12) (emphasis added). As discussed more fully below in Ground 4, elements 1[c]-[d], Figure 9 of Tsuge teaches the contemporaneous setting of parameters in both OLT [BLUE] and ONU [ORANGE]:



After the “CM setting information file” (configuration file) is obtained, the system “sequentially read[s] the setting parameters” extracts each parameter specified in the file (steps 1311-1323 and 1351) and calls an appropriate subroutine to

change settings on the ONU (step 1332) or OLT (step 1342) based on the extracted parameter. *Id.*, ¶83 citing EX1008, 16:53-17:24. This sequential process is illustrated in Tsuge’s Figure 13:



Id. (citing EX1008, FIG. 13 (annotated)).

A POSA would have been motivated to utilize the contemporaneous ONU/OLT configuration suggested in Tsuge at least because both systems analyze a single DOCSIS configuration file containing configuration information for both the OLT and ONU to identify and translate those settings and parameters into configurations for both the OLT and ONU. EX1005, ¶86. A POSA would have recog-

nized that Tsuge’s approach had the advantages described above with respect to greater efficiency and faster opening of services. *Id.*

A POSA would have reasonably expected, as of April 13, 2011, that the OLT and ONU in Bernstein’s system could have been contemporaneously configured successfully. EX1005, ¶87.

For the foregoing reasons, it would have been obvious to configure the OLT “and meanwhile configuring the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.” EX1005, ¶88.

f. Element 1[e]

wherein, the method is performed in a process of ONU initialization; and

Bernstein’s method satisfies this element. The configuration of the OLT and ONU is performed as part of the ONU initialization process. Bernstein explains that the above configuration steps are performed “during registration” of the ONU. EX1005, ¶89 (citing EX1006, 3:31-34 (“A translation function shown in Fig. 3 then translates the information obtained by the cable modem proxy 60 **during the registration** or post registration sessions into corresponding PON parameters.”))

Figure 7 confirms the configuration of the OLT and ONU occurs as part of the process of initially registering the ONU on the DPoE system. The ONU 24 communicates a registration request to DPoE System [DARK GREEN] which re-

sponds with Register and Register Gate messages. EX1005, ¶90 (citing EX1006, 4:62-66; Fig. 7 (90) (shown in LIGHT GREEN)). The ONU 24 acknowledges these Registration messages, establishing a physical layer connection, following which address registration 94 (shown in RED) occurs through which an IP address is assigned to ONU 24 for the OLT's use when communicating with ONU 24. *Id.* (citing EX1006, 3:12-17). Next, services requested by the ONU are initialized using a process entailing acquisition of the configuration file 102 (step 100) [PURPLE] and programming of the OLT [BLUE] and ONU [ORANGE] (step 106). *Id.* (citing EX1006, 5:41-47 (noting that the operating parameters for communications links 104 are established between OLT 18 and ONU 24 during sessions 94, 98 **and 100.**))

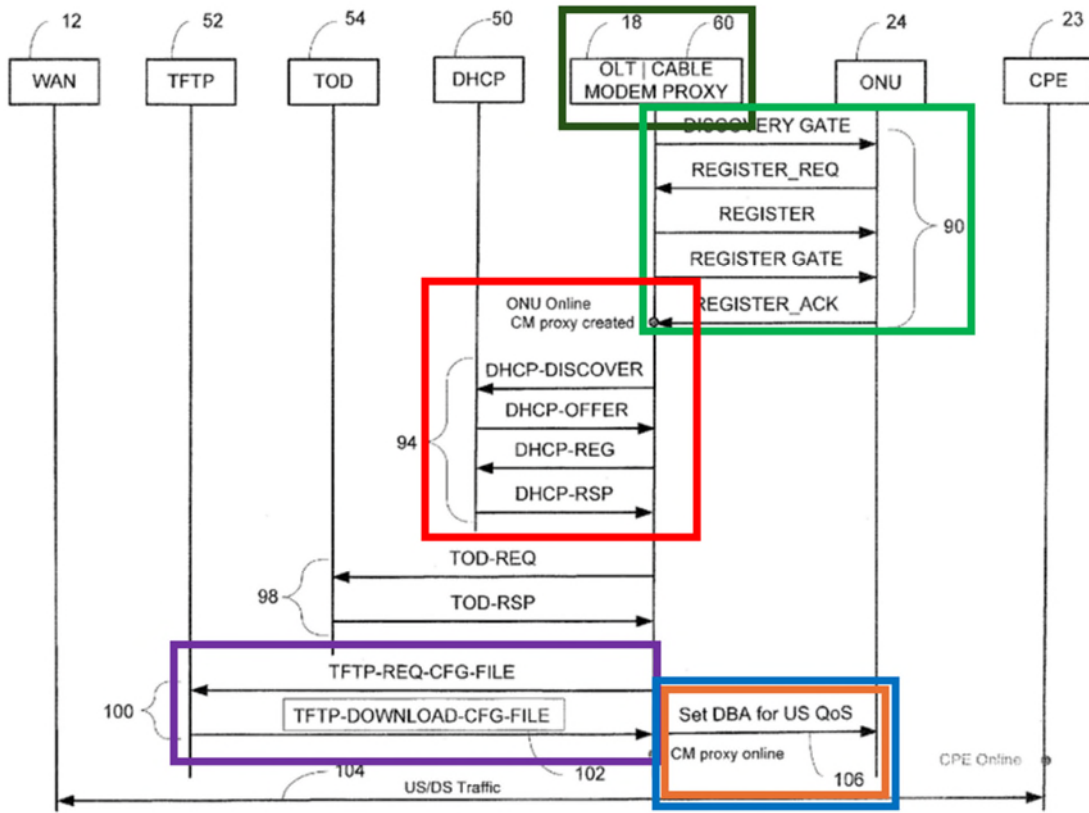


FIG. 7

Id., (citing EX1006, Fig. 7 (annotated)).

Bernstein’s process illustrated above fully encompasses the initialization process depicted in in FIG. 4 of the ’982 Patent, including phases for ONU initial registration [LIGHT GREEN], IP address registration [RED], configuration file downloading [PURPLE] and analysis by a DPoE system [DARK GREEN], and configuration of the OLT [BLUE] and ONU [ORANGE]:

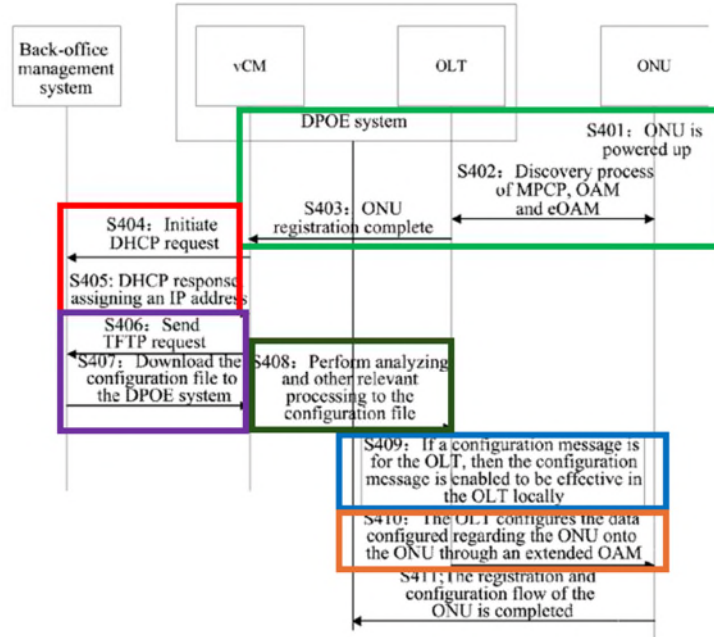


FIG. 4

EX1005, ¶91 (citing EX1001, Fig. 4) (annotated).

Bernstein’s method discloses the performance of the claimed method during the process of ONU initialization. EX1005, ¶92.

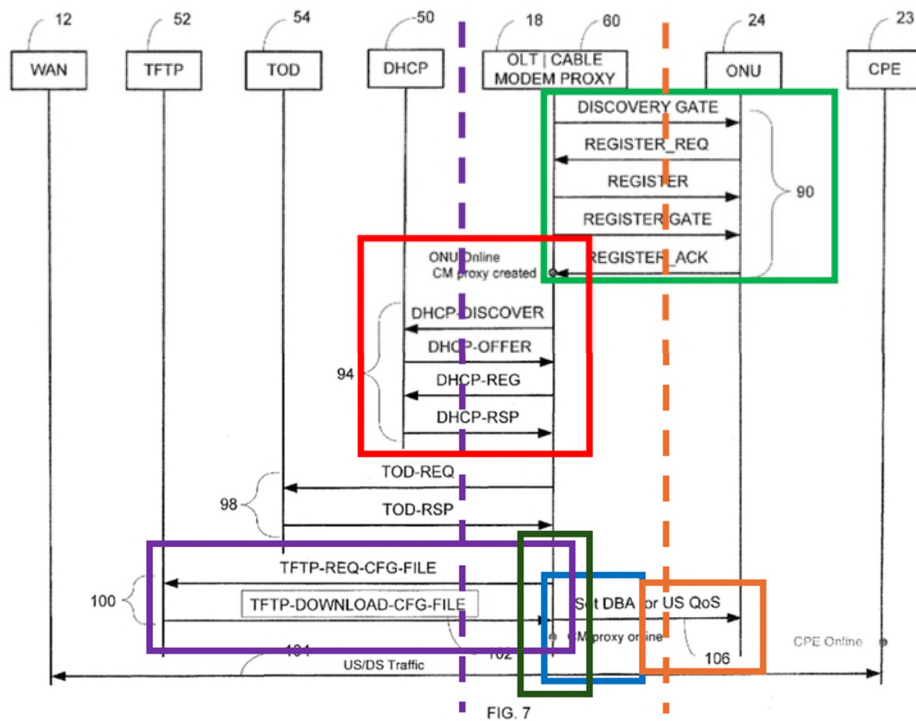
To the extent this element is found to not be fully disclosed by Bernstein, it would have been obvious to configure the OLT and ONU during an initialization process. A POSA would have desired to configure both the OLT and ONU for the provision of services, and corresponding communications needed to enable, at the earliest opportunity. *Id.*, ¶93.

For the foregoing reasons, it would have been obvious to configure the OLT and ONU “in a process of ONU initialization” in light of Bernstein. *Id.*, ¶94.

g. Element 1[f]

wherein, when analyzing the acquired configuration file, the DPoE system further converts the configuration information of the ONU into a message format which can be identified by the ONU, and

Bernstein’s method includes this element. Bernstein explains that the parameters extracted from its configuration file are converted into a message format understandable by an ONU: “The OLT implements a cable modem protocol stack . . . [that] translates [shown in DARK GREEN] the data retrieved by the CM proxy [shown in PURPLE] into Optical Network Unit (ONU) recognizable commands, and sends the translated data to the ONU [shown in ORANGE].” EX1005, ¶95 (citing EX1006, 1:52-57).



Bernstein’s method discloses the performance of the claimed method wherein, when analyzing the acquired configuration file, the DPoE system further converts the configuration information of the ONU into a message format which can be identified by the ONU. EX1005, ¶96

h. Element 1[g]

converts the configuration information of the OLT into a message format which can be identified by the OLT.

Bernstein’s system converts the configuration information of the OLT into a message format which can be identified by the OLT, or at least renders such a message format obvious, in that it translates information from DOCSIS configuration files into PON parameters understood by the OLT. EX1005, ¶97 (citing EX1006, 3:53-63 (“[t]he translated PON parameters 63 may also be used for operating or configuring OLT hardware 88.”))

Bernstein describes messages formatted for the OLT defining overall bandwidth and/or the relative priority of each service opened by the ONU. EX1005, ¶98 (citing EX1006, FIG. 8). For example, Bernstein describes configuring the OLT to provide a “pipe” to an ONU having a bit rate of 60.1 Mbps. *Id.*, (citing EX1006, 6:17-47). A “DPON translation table 89” associates different “services flows” of services opened by the ONU such that the OLT routes packets to the ONU according to the priority values in DPON translation table [DARK GREEN]. *Id.*, (citing

EX1006, 6:17-39). The format of this table is compatible with the OLT in light of Bernstein’s disclosure that it is “loaded into OLT memory [BLUE]” using “PON Application Programmers Interfaces (APIs) to program the OLT 18 according to different translated PON parameters.” *Id.*, (citing EX1006, 6:40-47 and Fig. 8 (below) (annotated))

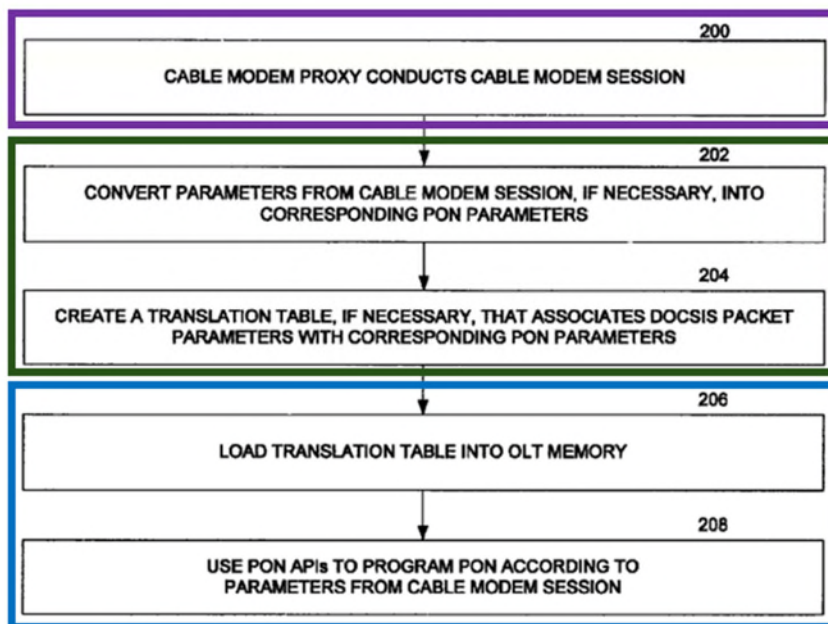


FIG. 8

Thus, Bernstein’s method discloses the performance of the claimed method, including converting the configuration information of the OLT into a message format which can be identified by the OLT. EX1005, ¶¶97-98.

To the extent the above functionality of Bernstein is determined to not fully disclose this limitation, it would have been obvious to a POSA to convert configuration information into a message format which can be identified by the OLT in

light of Bernstein at least because Bernstein’s DPoE system converts configuration into a form (*i.e.*, translation table and/or API call) understandable by the OLT. *Id.*

¶99. A POSA would have been motivated to use a “message” format instead of the translation table or API call formats of Bernstein in order to be compatible with OLTs configured to receive “message”-formatted data. *Id.*

2. Claim 2

2. The method according to claim 1, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.

Bernstein discloses that “the configuration information of the OLT is configuration information related to services opened by the ONU.” *See* element 1[c].

3. Independent Claim 4

a. Element 4[preamble]

4. A data over cable service interface system (DOCSIS) Provisioning Of EPON (DPoE) system, comprising

Bernstein discloses “A data over cable service interface system (DOCSIS) Provisioning Of EPON (DPoE) system.” *See* element 1[preamble] above.

b. Element 4[a]

an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization,

Bernstein discloses “an acquisition unit, an analyzing unit and a configuration unit” at least because it discloses a DPoE system comprising OLT 18 includ-

ing DPON 40 and Proxy 60. See element 1[preamble]-[a] and below aspects of Claim 4. EX1005, ¶103.

Specifically, Bernstein an acquisition unit by disclosing discloses a DPoE system comprising OLT 18, including DPON 40 and its “cable modem proxy 60,” comprising software and related hardware configured to acquire a configuration file from a back-office management system. *Id.*, ¶104 (citing EX1006, 3:18-20) (Cable Modem Proxy 60 may “conduct a Trivial File Transfer Protocol (TFTP) session with a TFTP provisioning server 52 to obtain different DOCSIS service definitions.”). See also, element 4[b] below.

Bernstein discloses an analyzing unit by disclosing a DPoE system comprising OLT 18, with DPON 40 and included “DOCSIS-to-PON translator 84,” comprising software and related hardware configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT. *Id.*, ¶105 (citing EX1006, 3:53-63). See also, element 4[c] below.

Bernstein discloses a configuration unit by disclosing a DPoE system comprising OLT 18, with DPON 40 and its incorporated “xPon Driver 86,” comprising software and related hardware configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel

between the OLT and the ONU. *Id.*, ¶106 (citing EX1006, 3:53-63, 5:49-58). See also, element 4[d]-[e] below.

Lastly, Bernstein also discloses that its acquisition unit, analyzing unit and configuration unit operate “during an [sic] process of an optical network unit (ONU) initialization” at least for the reasons set forth above with respect to element 1[e].

Bernstein discloses an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization. OLT. EX1005, ¶108.

c. Element 4[b]

the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system;

As noted above in element 1[a] and 4[a], Bernstein discloses an acquisition unit (DPON 40 and/or Cable Modem proxy 60) configured to acquire a configuration file from a back-office management system and that the acquired configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system. See element 1[a] and 4[a].

d. Element 4[c]

the analyzing unit is configured to analyze the acquired configuration file and

obtain both the configuration information of the ONU and the configuration information of the OLT; and

As noted above in element 1[b] and 4[a], Bernstein discloses an analyzing unit (DPON 40 and/or DOCDOCSIS-to-PON translator 84) configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT. *See also* element 1[b] and 4[a].

e. Element 4[d]

the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.

As noted above in elements 1[c]-[d] and 4[a], Bernstein discloses a configuration unit (DPON 40 and/or driver 86) that is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU. As noted in element 1[d], this configuration of the OLT and ONU occurs contemporaneously.

4. Claim 5

5. The system according to claim 4, wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.

Bernstein discloses, or at least renders obvious, that its “analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.” See elements 1[f]-[g] above, explaining how the cable modem proxy 60 (*i.e.*, analyzing unit) performs the recited functionality. EX1005, ¶112.

5. Independent Claim 6

a. Element 6[preamble]

6. A service auto-configuration network of a DOCSIS Provisioning Of EPON (DPoE) system, comprising

Bernstein discloses “A service auto-configuration network of a DOCSIS Provisioning Of EPON (DPoE) system.” See element 1[preamble]; EX1005, ¶113.

b. Element 6[a]

a DPoE system, a back-office management system and a plurality of optical network units (ONUs);

Bernstein discloses “a DPoE system, a back-office management system and a plurality of optical network units (ONUs).” See element 1[a] above. For example, Figure 1 shows a DPoE system that includes “an A MSO network or ‘back-office’ 16” (shown in PURPLE) and a plurality of ONUs (shown in ORANGE):

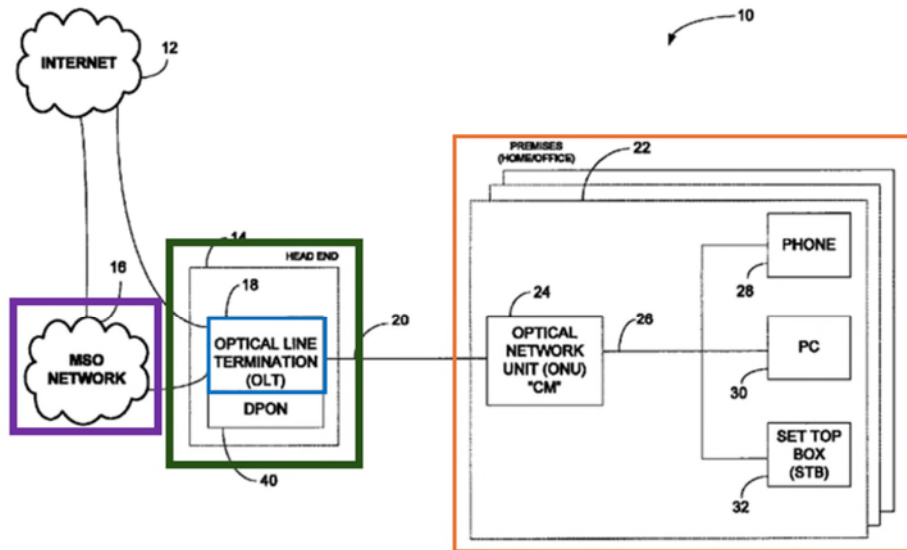


FIG. 1

EX1005, ¶114 (citing EX1006, FIG. 1) (annotated).

c. Element 6[b]

wherein, the DPoE system comprises an acquisition unit, an analyzing unit and a configuration unit;

Bernstein discloses “wherein, the DPoE system comprises an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization.” See element 4[a] above; EX1005, ¶115.

d. Element 6[c]

wherein, during a process of an optical network unit (ONU) initialization, the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system;

Bernstein discloses “the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system.” See element 4[b] and 4[e], above; EX1005, ¶116.

e. Element 6[d]

the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT; and

Bernstein discloses “the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT.” See element 4[c], above; EX1005, ¶117.

f. Element 6[e]

the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU; and

Bernstein discloses “the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.” See elements 1[c], 1[d], 4[d], above; EX1005, ¶118.

a. Element 6[f]

the back-office management system is configured to: save the configuration file, and download the configuration file to the DPoE system, wherein the configuration file comprises the configuration information of the ONU and the configuration information of the OLT in the DPoE system.

Bernstein discloses that “the back-office management system is configured to: save the configuration file, and download the configuration file to the DPoE system, wherein the configuration file comprises the configuration information of the ONU and the configuration information of the OLT in the DPoE system.” EX1005, ¶119. As explained in more detail above in element 1[a] above, Bernstein discloses a conventional DOCSIS back-office TFTP server that (1) saves configuration files that contain both configuration information of the ONU and of the OLT, and (2) downloads that file to the DPoE system in response to a request for the configuration file. See element 1[a] above. The ’982 Patent also is evidence of POSA’s knowledge that use of conventional DOCSIS TFTP servers to save and download configuration files was well known and applicant used the very same back-office systems. *Id.* (citing EX1001, 1:16-56 and Claims 1, 4 and 6 (claiming “DOCSIS Provisioning. . .”)).

6. Claim 7

7. The network according to claim 6, wherein, the back-office management system comprises a trivial file transfer protocol (TFTP) server configured to: receive a TFTP request initiated by the DPoE system, respond to that TFTP request, and download the configuration file to the DPoE system.

Bernstein discloses a network wherein “the back-office management system comprises a trivial file transfer protocol (TFTP) server configured to: receive a TFTP request initiated by the DPoE system, respond to that TFTP request, and download the configuration file to the DPoE system.” As explained in more detail above in element 1[a] above, Bernstein discloses a TFTP server that receives a TFTP request initiated by the DPoE system, responds to that TFTP request, and downloads the configuration file to the DPoE system. See element 1[a] above; EX1005, ¶120.

7. Claim 8

8. The network according to claim 7, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.

Bernstein discloses a network “wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.” See element 2 above; EX1005, ¶121.

8. Claim 9

9. The network according to claim 6, wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.

Bernstein discloses a network “wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.” See element 2 above; EX1005, ¶122.

9. Claim 11

11. The network according to claim 6, wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.

Bernstein discloses a network “wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.” See elements 1[f], 1[g], 5 above.

B. Ground 2: Claims 3 and 10 are Obvious over Bernstein in view of Tsuge and the knowledge of one of skill in the art and in further view of MEF 6.1

Claims 3 and 10 would have been obvious to one of skill in the art based upon the disclosures in over Bernstein in view of Tsuge and the knowledge of one of skill in the art and in further view of MEF 6.1.

1. Claim 3

3. The method according to claim 2, wherein, the services opened by the ONU comprise one or more of Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services; and the configuration information of the OLT comprises one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to the services opened by the ONU.

Claim 3 would have been obvious to one of skill in the art based upon the Bernstein’s disclosures alone or in view of Tsuge and the knowledge of one of skill

in the art, in further view of MEF 6.1. EX1005, ¶124. As noted above, the elements of Claim 2 would have been obvious to one of skill in the art. *See* Ground 2, Claim 2, above.

The disclosures in MEF 6.1 would have motivated a POSA to employ the systems and methods disclosed in Bernstein for Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services, and use of configuration information of the OLT comprising one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to these Ethernet services would have been obvious in light of those disclosures. MEF 6.1 is from the same field as Bernstein (Ethernet based optical network services) and reasonable pertinent to the problem of configuring such a network to provide for such services. EX1005, ¶125 (citing EX1007 12-14).

At the time of the invention, April 13, 2011, it was conventional to provide Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services. *Id.*, ¶126 (citing EX1007, 12-14).

For example, the MEF Technical Specification, MEF 6.1, Ethernet Services Definitions – Phase 2, published in April 2008, explained “Ethernet Service types are generic constructs used to create a broad range of services.” *Id.*, 7. MEF 6.1 defined Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) ser-

vices and Ethernet based LAN (E-LAN) services. *Id.*, ¶127 (citing EX1007, 12-21).

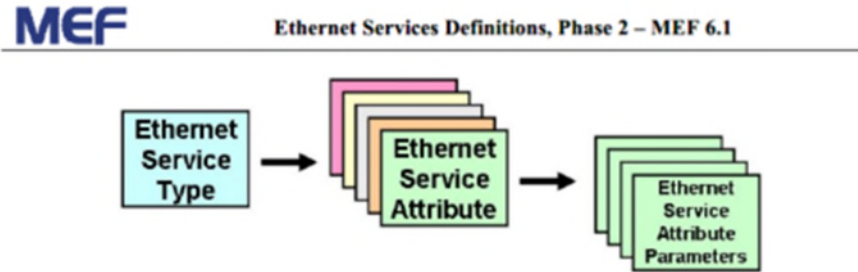


Figure 1: Ethernet Service Definition Framework

This document defines three Ethernet Service type generic constructs, namely, Ethernet Line (E-Line) Service type (refer to Section 6.1), Ethernet LAN (E-LAN) Service type (refer to Section 6.2) and Ethernet Tree (E-Tree) Service type (refer to Section 6.3), and their associated service attributes and parameters. The key differentiator is the type of connectivity provided, as indicated by the ‘EVC Type’ service attribute. The UNI and EVC service attributes and parameters are normatively defined in [2].

More than one Ethernet Service is defined for each of the three Ethernet Service types. These are differentiated by the method for service identification used at the UNIs. Services using All to One Bundling UNIs (port-based) are referred to as ‘Private’, while services using UNIs that are that are Service Multiplexed (VLAN-based), are referred to as ‘Virtual Private’. This relationship is shown in Table 2 below.

Service Type	Port-Based (All to One Bundling)	VLAN-Based (EVC identified by VLAN ID)
E-Line (point-to-point EVC)	Ethernet Private Line (EPL)	Ethernet Virtual Private Line (EVPL) ¹
E-LAN (multipoint-to-multipoint EVC)	Ethernet Private LAN (EP-LAN)	Ethernet Virtual Private LAN (EVP-LAN)
E-Tree (rooted multipoint EVC)	Ethernet Private Tree (EP-Tree)	Ethernet Virtual Private Tree (EVP-Tree)

Id., citing EX1007, 13. Specifically, E-LINE services are “any services based on Point-to-Point Ethernet Virtual Connection (EVC)” between devices, while E-LAN services relate to any service “based upon a Multipoint-to-Multipoint EVC” and E-TREE services are “based upon a Rooted-Multipoint” EVC. *Id.* (citing EX1007, 14-18).

It was equally well-known that the definitions for these services entailed user port information, virtual local area network information and user media access control (MAC) information. *Id.*, ¶128. As shown above, the definition of those services explicitly identified configuration parameters associated with those services to include a virtual local area network (VLAN), a user port and/or a user media access control (MAC) address of the OLT related to the services opened by the ONU. *Id.*, citing EX1007, 13-21.

Bernstein explains that his system may be used on an “Ethernet PON” and “ONUs 24 convert the optical signals into digital Ethernet packets that are sent over an Ethernet cable 26 to different Customer Premise Equipment (CPE).” *Id.*, ¶129 (citing EX1006, 1:66-2:29). It would have been obvious to a POSA at least as of April 13, 2011, to provide E-LINE, E-TREE and/or E-LAN services—as defined in the MEF 6.1 specification—over the DPoE system of Bernstein because Bernstein describes the use of Ethernet protocols to communicate with ONUs and the E-LINE, E-TREE and E-LAN services were conventional services specifically designed to provide protocols for Ethernet-based communications between devices. *Id.*

POSAs would have reasonably expected, at least as of April 13, 2011, that the conventional E-LINE, E-TREE and/or E-LAN services protocols would be suitable and successful for providing Ethernet communications between devices

because each of these services were long-established, widely utilized, off-the-shelf solutions for doing just that. *Id.*, ¶130 (citing EX1007, 12). For example, “With the introduction of Metro Ethernet services [in 2004], Service Providers started using this Ethernet ‘connectivity’ technology to provide Ethernet ‘services’” *Id.*, citing EX1007, 12 and fn. 1. In 2008, MEF introduced the claimed services, which were described as “three generic service constructs called Ethernet Service types and specifies their associated service attributes and parameters used to create Point-to-Point, Multipoint-to-Multipoint, and Rooted-Multipoint Ethernet services” “and are defined based on the service attributes that might appear in a Service Level Agreement (SLA) or Service Level Specification (SLS)” between data service providers and its subscribers. *Id.* A POSA would also understand the recited services “are agnostic of the underlying network infrastructure” and thus could be used on a variety of underlying networks technologies, such as HFCs, PONs and the like.

Thus, claims 3 would have been obvious to one of skill in the art based upon the disclosures in over Bernstein in view of Tsuge and the knowledge of one of skill in the art and in further view of MEF 6.1.

2. Claim 10

a. Element 10

10. The network according to claim 9, wherein, the services opened by the ONU comprise one or more of Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services; and the con-
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figuration information of the OLT comprises one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to the services opened by the ONU.

Claim 10 would have been obvious to one of skill in the art based upon the Bernstein's disclosures alone or in view of Tsuge and the knowledge of one of skill in the art, in further view of MEF 6.1. as noted above with respect to Claim 3. EX1005, ¶184; *see also* Ground 1, element 9.

C. Ground 3: Claims 1-2, 4-9 and 11 are Obvious over Tsuge in view of Bernstein and the knowledge of one of skill in the art

Claims 1-2, 4-9 and 11 are obvious over Tsuge in light of Bernstein and the knowledge of one of skill in the art.

1. Independent Claim 1

The combination of Tsuge, Bernstein, and/or the knowledge of one of skill in the art renders obvious Claim 1.

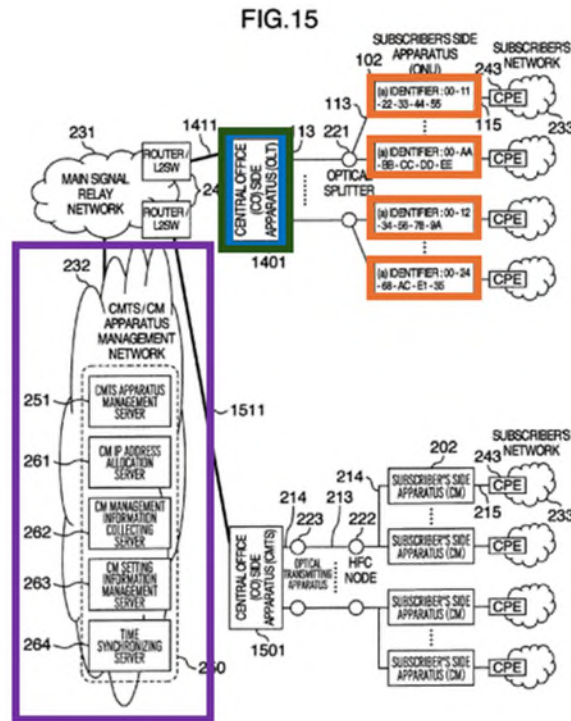
a. Preamble

To the extent the preamble is limiting, as discussed herein, Tsuge discloses an auto-configuration method of a DOCSIS Provisioning Of EPON (DPoE) system. Tsuge discloses a method for provisioning DOCSIS services on ONU/OLT hardware in a "GE-PON" (*i.e.*, Gigabyte Ethernet PON), or any other type of PON. EX1005, ¶132 (citing EX1008, 6:47-55 and 14:40-15:22).

b. Element 1[a]

Tsuge discloses a DPoE system acquiring a configuration file from a back-office management system, wherein the configuration file comprises both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal (OLT). EX1005, ¶1133.

Tsuge discloses a “CMTS/CM Apparatus Management Network 232” comprising a conventional DOCSIS back-office management system [PURPLE] that, *inter alia*, stores and provides DOCSIS configuration files:



Id., ¶134 (citing EX1008, FIG. 15) (annotated).

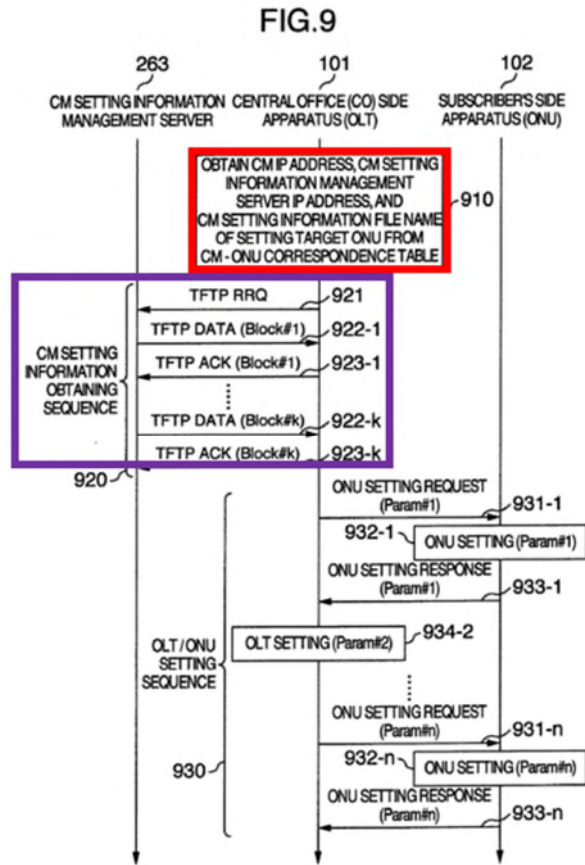
Tsuge’s DPoE System, OLT/DPON 1401 [DARK GREEN/BLUE] may request a configuration file in the form of a “CM setting information file” from the “CM setting information management server 263[.]” EX1005, ¶135 (citing EX1008, 14:40-61). Tsuge further explains, the OLT requests and obtains the file using “the TFTP” in accordance with the DOCSIS standard. *Id.* Tsuge’s OLT stores configuration file name [DARK GREEN] and back-office server address information [PURPLE] for each ONU [ORANGE] in a table, as shown in FIG. 11:

FIG. 11

551 1101 CM IP ADDRESS	1102 CM SETTING INFORMATION MANAGEMENT SERVER IP ADDRESS	1103 CM SETTING INFORMATION FILENAME	1104 ONU INTRINSIC IDENTIFIER
10.1.2.3	10.100.1.253	default.cm	00-11-22-33-44-55
10.1.2.4	10.100.1.253	default.cm	00-AA-BB-CC-DD-EE
10.1.2.129	10.100.1.253	premium.cm	00-12-34-56-78-9A
⋮	⋮	⋮	⋮

Id. (citing EX1008, 15:59-33).

Figure 9 illustrates this acquisition. The OLT constructs a request using information in “CM-ONU correspondence table 551” (step 910 [RED]). The OLT sends the request to the CM setting information management server 263, which “[a]ccording to the DOCSIS standard . . . is executed . . . by the TFTP” and, in response, receives the configuration file (step 920 [PURPLE]):



EX1005, ¶136 (citing EX1008, 14:20-61, FIG. 9 (annotated)).

The acquired configuration file consists of both configuration information of an optical network unit (ONU) and configuration information of an optical line terminal (OLT). Tsuge explains “[t]he contents of the setting parameters are converted into the ONU setting information signal 543 or the settings to the OLT itself or into both of them [.]” EX1005, ¶137 (citing EX1008, 15:1-4) (emphasis added).

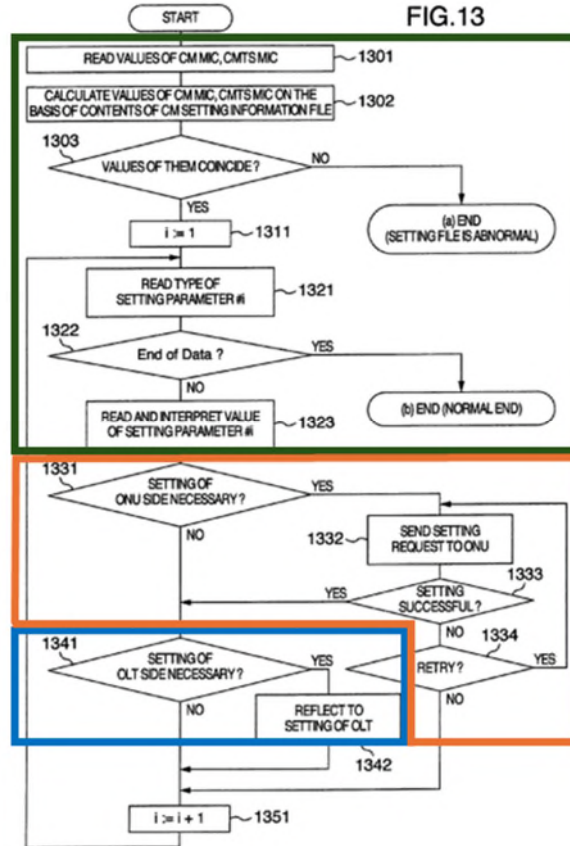
For the foregoing reasons, Tsuge discloses “the DPoE system acquiring a configuration file from a back-office management system, wherein the configuration file comprises both configuration information of an optical network unit

(ONU) and configuration information of an optical line terminal (OLT) in the DPoE system.” EX1005, ¶138.

c. Element 1[b]

Tsuge discloses its DPoE system analyzes the acquired configuration file and obtains both configuration information for the ONU and configuration information for the OLT. EX1005, ¶139.

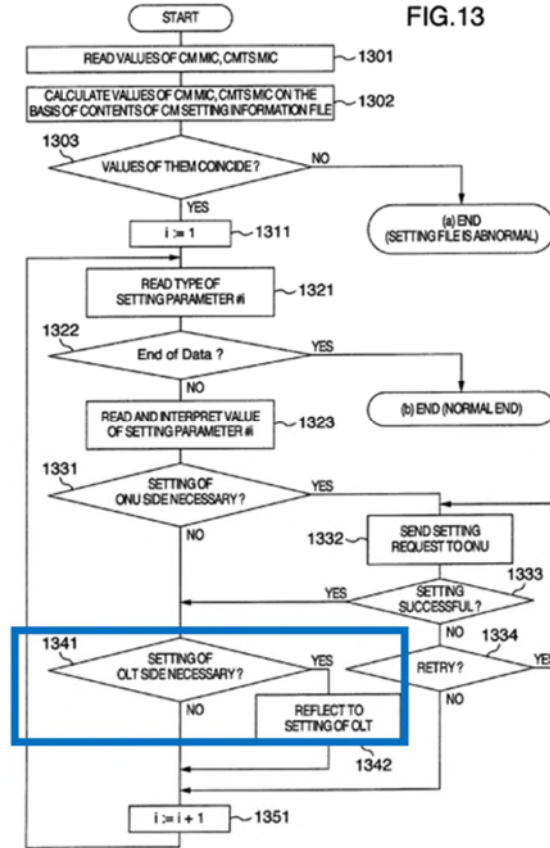
After the “CM setting information file” (configuration file) is obtained, the DPoE system’s OLT 101 performs “CM setting obtaining/converting function 503” in which it “searches for the parameters of the CM MIC [*i.e.*, ONU parameter] and the CMTS MIC [*i.e.*, OTL parameters] from the file and reads out their values (step 1301).” EX1005, ¶140 (citing EX1008, 10:60-11:3 and 16:39-52). The OLT loops through the CM setting information file, “sequentially read[ing] the setting parameters,” and “read[s] out” setting parameter values and “interprets” therefrom “what kind of settings are necessary in the PON[.]” *Id.* (citing EX1008, 16:53-17:24). This process is illustrated in Figure 13:



Id., (citing EX1008, Fig. 13) (annotated).

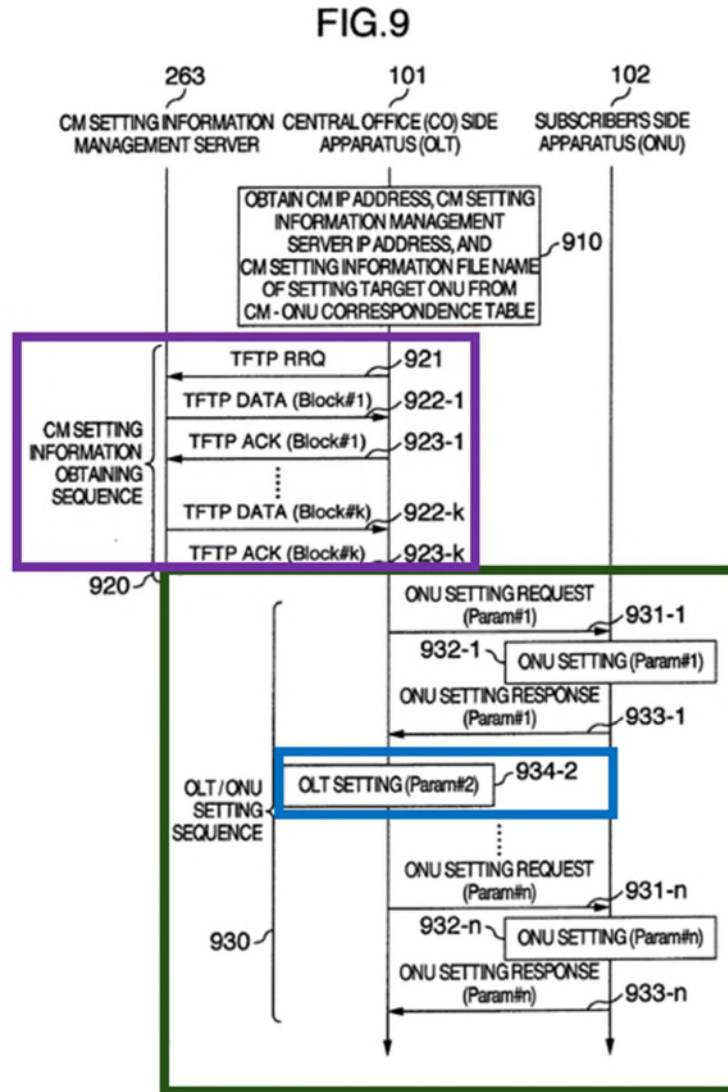
d. Element 1[c]

The OLT in Tsuge is configured locally according to the configuration information of the OLT. EX1005, ¶141. Tsuge discloses, as parameters are extracted from the configuration file, “if the setting on the OLT side is necessary [based on the parameter’s value], the setting is reflected to the OLT (step 1342) [BLUE]:



Id. (citing EX1008, 16:53-17:24, Fig. 13 (annotated)); *see also id.* (citing 14:62-15:22 (“In the case where they are converted into the settings to the OLT *itself*, the settings are reflected to the OLT (step 934).)”

Figure 9 depicts this process: following acquisition of the configuration file [PURPLE], OLT “Param#2” [DARK GREEN] is extracted, and the OLT is configured locally through the “OLT SETTING” function (step 934-2) [BLUE]:



Id., ¶142 (citing EX1008 FIG. 9) (annotated).

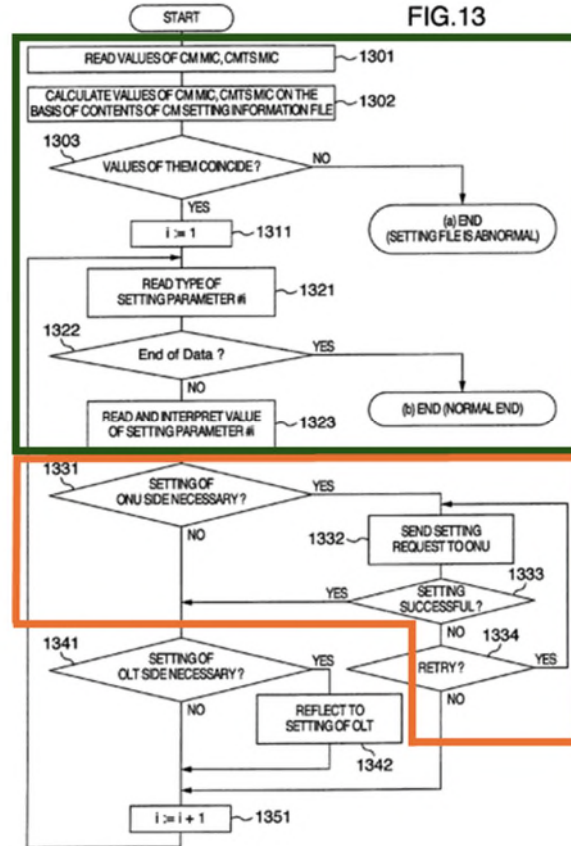
A POSA would understand step 934-2 is performed locally because, as shown, “OLT Setting” is conducted on OLT 101 without outside communications. EX1005, ¶143 (citing EX1008, Fig. 9) (annotated); *see also* EX1005, ¶143 (citing EX1008, 18:25-38 (“upstream communication bandwidth setting information is

stored as setting for the LLID into the OLT by the OLT-ONU setting sequence 930 shown in FIG. 9 (step 1810)[.]”, Fig. 18 (step 1810)).

For the foregoing reasons, Tsuge discloses “the DPoE system configuring the OLT locally according to the configuration information of the OLT.” EX1005, ¶144.

e. Element 1[d]

Tsuge discloses the ONU is meanwhile configured according to the configuration information of the ONU. EX1005, ¶145. Tsuge states “[i]f the setting of the ONU is necessary (step 1331) as a result of the interpretation in step 1323, the corresponding ONU setting request message is transmitted to the ONU (step 1332)[.]” *Id.* (citing EX1008, 16:64-17:10).

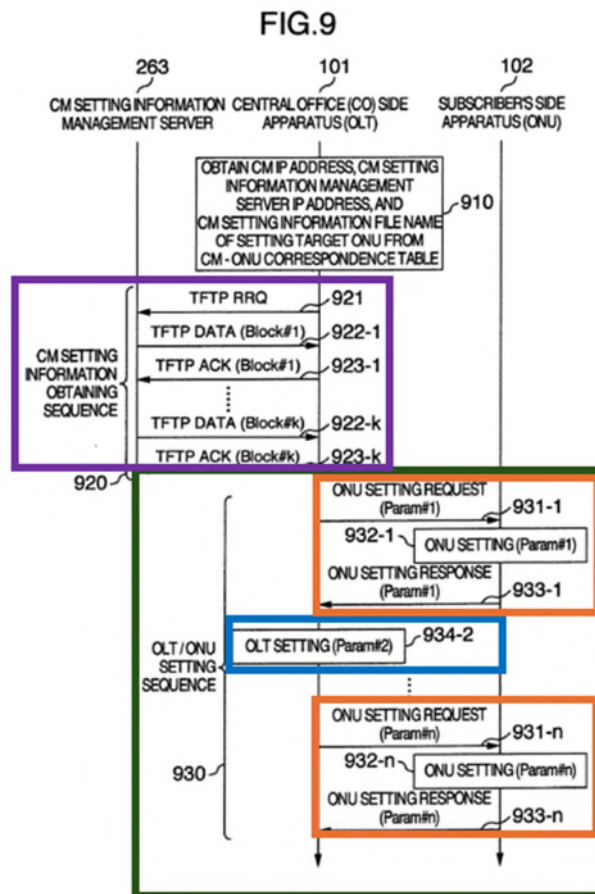


EX1008, Fig. 13.

Tsuge explains both the ONU and OLT are simultaneously configured in the course of the parsing of the configuration file. According to the algorithm shown in FIG. 13, “the OLT 101 sequentially interprets setting parameters included in the CM setting information file.” EX1005, ¶146 (citing EX1008, 14:62-67). As OLT 101 identifies each setting parameter, “the value of the setting parameter is read out and what kind of settings are necessary in the PON are interpreted together with the type value (step 1323).” *Id.* (citing EX1008, 16:60-63). “If the setting of the ONU is necessary (step 1331) as a result of the interpretation in step 1323, the

corresponding ONU setting request message is transmitted to the ONU (step 1332).” *Id.* (citing EX1008, 16:64-66). “If the setting on the OLT side is necessary, the setting is reflected to the OLT (step 1342).” *Id.* (citing EX1008, 17:16-17).

Figure 9 depicts the simultaneous application of configuration changes to both the OLT [BLUE] and the ONU [ORANGE] during the OLT-ONU setting sequence 930 [DARK GREEN]:



EX1005, ¶146 (citing EX1008, Fig. 9) (annotated).

Tsuge also teaches such configuring occurs via a management channel between the OLT and ONU. Tsuge explains its system uses “a specific protocol and a detailed message transmitting and receiving sequence ... for the ONU setting request message.... For example, in the case of in the GE-PON, the MPCP and the OAM sub-layer of IEEE 802.3ah standard.” EX1005, ¶147 (citing EX1008, 15:18-20). The '982 Patent confirms an OAM channel is a management channel. *Id.* (citing EX1001, 5:18-20).

For the foregoing reasons, Tsuge discloses configuring the OLT “and meanwhile configuring the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU.” EX1005, ¶148.

f. Element 1[e]

Tsuge teaches its method is performed part of the ONU initialization process. EX1005, ¶149. Tsuge explains its method may be employed during the *initial* setting of the ONU. *Id.* (citing EX1008, 4:46-56. (“the OLT receives the *initial setting information* of the CM by using the address information and the file name of the TFTP server obtained by the DHCP and *makes initial setting* corresponding to its contents to the ONU by using the protocol of the PON interval (or, reflects it to the setting of the OLT itself).”))

g. Element 1[f]

Tsuge explains, when analyzing the acquired configuration file, the OLT of its DPoE system further converts the configuration information of the ONU into a message format which can be identified by the ONU. EX1005, ¶150 (citing EX1008, 12:22-28 (“[i]f the PON is the GE-PON, the MPCP protocol of the IEEE 802.3ah standard is used for a part or all of the ... ONU setting information signal 543[.]”)); *see also id.* (citing EX1008, 4:46-50 (“the OLT ... makes initial setting corresponding to its contents to the ONU **by using the protocol of the PON interval[.]**”)) (emphasis added); *id.* (citing EX1008, 4:34-37 (“**The OLT converts the CM apparatus control signal received in the apparatus management interface into an ONU apparatus control signal** which is used in the PON interval and transmits toward the ONU.”))(emphasis added).

Moreover, it would have been obvious to a POSA to convert CM setting information into a message format would be understood by the ONU, because the setting information would otherwise be unusable. EX1005, ¶151. A POSA would have understood how to make such a conversion and would have had a reasonable expectation of success in doing so. *Id.*

h. Element 1[g]

Tsuge’s system converts the configuration information of the OLT into a message format which can be identified by the OLT. EX1005, ¶152. Tsuge ex-

plains the CM setting information is converted “into settings to the OLT itself[.]” *Id.* (citing EX1008, 4:46-51). Figure 9 depicts storage of upstream communication bandwidth setting information as a setting for the LLID in the OLT as part of the OLT-ONU setting sequence 930 (step 1810). *Id.* (citing EX1008, 18:25-36).

Moreover, it would have been obvious to a POSA, in light of their knowledge and/or in light of the teachings of Bernstein, to convert CM setting information into a message format would be understood by the OLT, because the setting information would otherwise be unusable. EX1005, ¶153; Ground 1, element 1[g]. A POSA would have understood how to make such a conversion and would have had a reasonable expectation of success in doing so. *Id.*

2. Claim 2

Claim 2 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge discloses “the configuration information of the OLT is configuration information related to services opened by the ONU.” EX1005, ¶154; *see* element 1[c].

3. Independent Claim 4

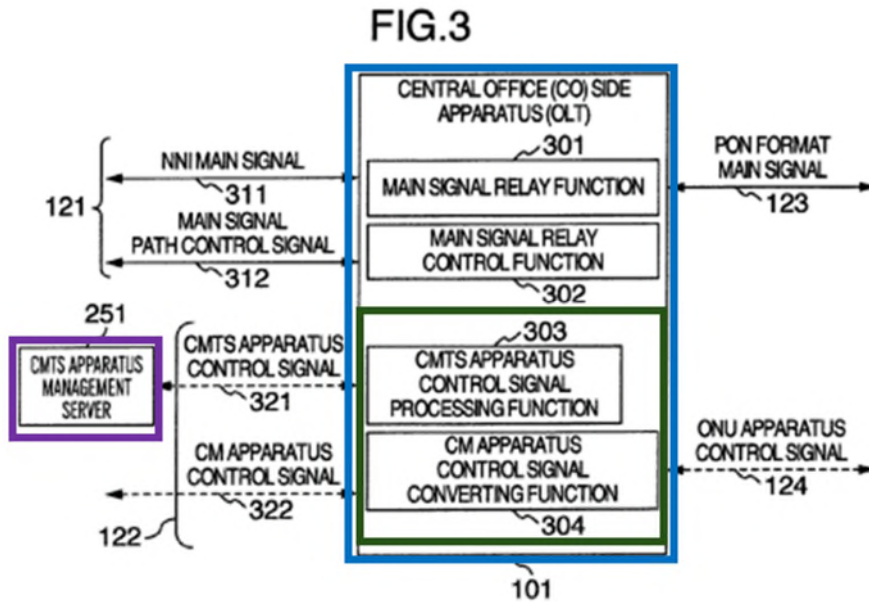
Claim 4 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art.

a. Element 4[preamble]

Tsuge discloses “A data over cable service interface system (DOCSIS) Provisioning Of EPON (DPoE) system.” EX1005, ¶155; *see* element 1[preamble] above.

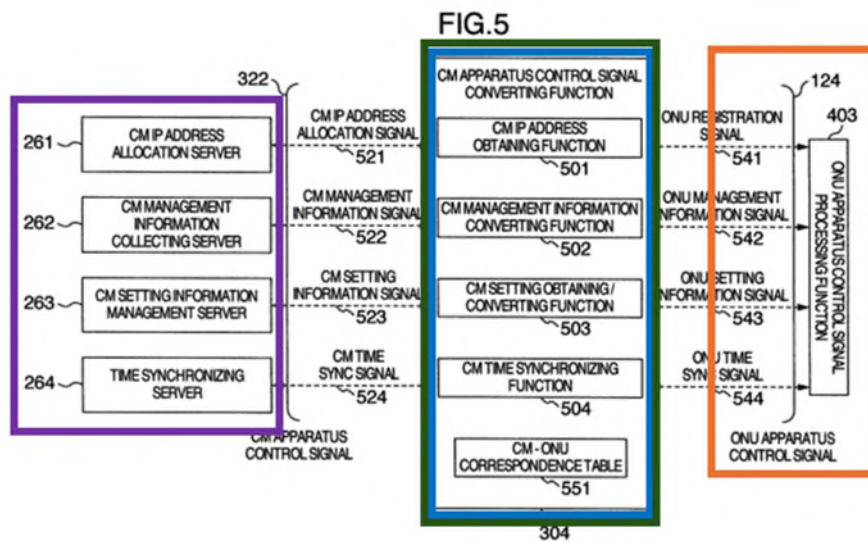
b. Element 4[a]

Tsuge discloses an acquisition unit, an analyzing unit and a configuration unit at least because it discloses a DPoE system comprising OLT 101 programmed with a CM Apparatus Control Signal Converting Function 304 (the equivalent of a virtual cable modem). EX1005, ¶156 (citing EX1008, 9:17-21 and 10:60-11:3, 11:57-12:2, Figs. 3); *see* elements 1[preamble], 1[a].



Specifically, Tsuge discloses an acquisition unit by disclosing a DPoE system comprising OLT 101 including software and related hardware, including CM

Apparatus Control Signal Converting Function 304 having CM Setting Obtaining/Converting Function 503 [BLUE], configured to “obtain[] a CM setting information signal 523” (*i.e.*, a configuration file) from a back-office management system [PURPLE] (*i.e.*, CM Setting Information Management Server 263). *Id.* at ¶157 (citing EX1008, 11:57-12:2). *See also* element 1[a], above, and 4[b], below.



EX1005, ¶157 (citing EX1008, Fig. 5 (annotated)).

Tsuge discloses an analyzing unit by disclosing a DPoE system comprising OLT 101 comprising software and related hardware, including CM Apparatus Control Signal Converting Function 304 having CM Setting Obtaining/Converting Function 503, configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the

OLT. EX1005, ¶158 (citing EX1008, 11:57-12:2); *see also* element 1[b], above and 4[c], below.

Tsuge discloses a configuration unit by disclosing a DPoE system comprising OLT 101 consisting of software and related hardware, including CM Apparatus Control Signal Converting Function 304 having CM Setting Obtaining/Converting Function 503, configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU. *Id.*, ¶159 (citing EX1008, 12:22-28); *see also* element 1[c]-[d], above and 4[d]-[e] below.

Lastly, Tsuge discloses its acquisition unit, analyzing unit and configuration unit operate “during an [sic] process of an optical network unit (ONU) initialization” at least for the reasons set forth above with respect to element 1[e].

c. Element 4[b]

Tsuge teaches the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of an optical line terminal (OLT) in the DPoE system. EX1005, ¶161; *see* elements 1[a] and 4[a] above.

d. Element 4[c]

Tsuge teaches the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT . EX1005, ¶162; *see* elements 1[b] and 4[a] above.

e. Element 4[d]

Tsuge teaches the configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU. EX1005, ¶163; *see* elements 1[c]-[d] and 4[a] above.

4. Claim 5

Claim 5 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge teaches the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT. EX1005, ¶164; *see* elements 1[f]-[g] and 4[a] above.

5. Independent Claim 6

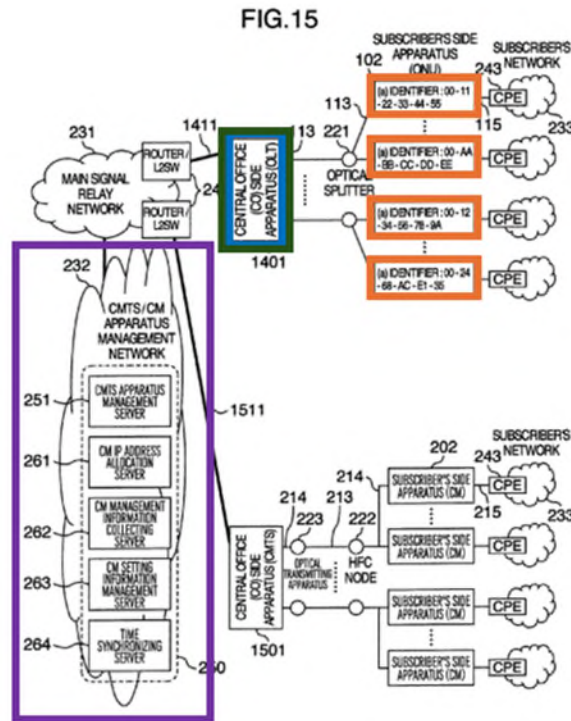
Claim 6 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art.

a. Element 6[preamble]

Tsuge discloses “A service auto-configuration network of a DOCSIS Provisioning Of EPON (DPoE) system.” EX1005, ¶165; *see* element 1[preamble] above.

b. Element 6[a]

Tsuge discloses “a DPoE system, a back-office management system and a plurality of optical network units (ONUs).” Figure 15 depicts a “CMTS/CM Apparatus Management Network 232” comprising a conventional DOCSIS back-office management system [PURPLE] and a plurality of ONUs [ORANGE]:



Id., ¶166 (citing EX1008, FIG. 15) (annotated).

c. Element 6[b]

Tsuge teaches the DPoE system comprises an acquisition unit, an analyzing unit and a configuration unit; wherein, during an process of an optical network unit (ONU) initialization. EX1005, ¶167; *see* element 4[a] above.

d. Element 6[c]

Tsuge teaches the acquisition unit is configured to acquire a configuration file from a back-office management system, wherein the configuration file comprises configuration both information of the ONU and configuration information of

an optical line terminal (OLT) in the DPoE system. EX1005, ¶168; *see* element 4[b] above.

e. Element 6[d]

Tsuge teaches the analyzing unit is configured to analyze the acquired configuration file and obtain both the configuration information of the ONU and the configuration information of the OLT . EX1005, ¶169; *see* element 4[c] above.

f. Element 6[e]

Tsuge teaches configuration unit is configured to configure the OLT locally according to the configuration information of the OLT and meanwhile configure the ONU according to the configuration information of the ONU via a management channel between the OLT and the ONU. EX1005, ¶170; *see* element 4[d] above.

g. Element 6[f]

Tsuge discloses “the back-office management system is configured to: save the configuration file, and download the configuration file to the DPoE system, wherein the configuration file comprises the configuration information of the ONU and the configuration information of the OLT in the DPoE system.” EX1005, ¶171. As explained in more detail above in element 1[a] above, Tsuge discloses a conventional DOCSIS back-office TFTP server [PURPLE] that saves configuration files [DARK GREEN] that contain both configuration information of the ONU

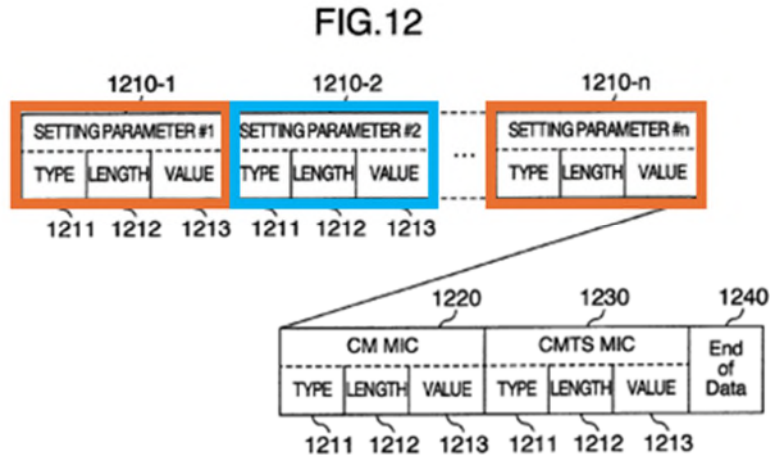
[ORANGE] and of the OLT, and download that file to the DPoE system in response to a request for a configuration file:

FIG. 11

551 1101 CM IP ADDRESS	1102 CM SETTING INFORMATION MANAGEMENT SERVER IP ADDRESS	1103 CM SETTING INFORMATION FILE NAME	1104 ONU INTRINSIC IDENTIFIER
10.1.2.3	10.100.1.253	default.cm	00-11-22-33-44-55
10.1.2.4	10.100.1.253	default.cm	00-AA-BB-CC-DD-EE
10.1.2.129	10.100.1.253	premium.cm	00-12-34-56-78-9A
⋮	⋮	⋮	⋮

Id., ¶171 (citing EX1008, 14:40-61, 15:59-62, Figs. 11 and 12 (annotated)). Tsuge further explains the OLT requests and obtains the file using “the TFTP” in accordance with DOCSIS. *Id.* See element 1[a] above.

Tsuge also explains the configuration file comprises the configuration information of the ONU and the configuration information of the OLT in the DPoE system. This is illustrated in Figure 12, which shows the structure of the configuration files having parameters for configuring ONUs [ORANGE] and OLTs [BLUE]:



EX1005, ¶172 (citing EX1008, Fig. 12)(annotated).

6. Claim 7

Claim 7 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge discloses “the back-office management system comprises a trivial file transfer protocol (TFTP) server configured to: receive a TFTP request initiated by the DPoE system, respond to that TFTP request, and download the configuration file to the DPoE system.” As explained in more detail above in element 1[a] above, Tsuge discloses the TFTP server saves configuration files containing both configuration information of the ONU and of the OLT, and downloads that file to the DPoE system in response to a request for a configuration file. EX1005, ¶173; *see* element 1[a].

7. Claim 8

Claim 8 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge discloses “wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.” EX1005, ¶174; *see* Claims 2 and 7.

8. Claim 9

Claim 9 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge discloses “wherein, the configuration information of the OLT is configuration information related to services opened by the ONU.” EX1005, ¶175; *see* Claims 2 and 6.

9. Claim 11

Claim 11 is obvious over Tsuge in view of Bernstein and/or the knowledge of one of skill in the art. Tsuge discloses “wherein, the analyzing unit is further configured to, when analyzing the acquired configuration file, convert the configuration information of the ONU into a message format which can be identified by the ONU and convert the configuration information of the OLT into a message format which can be identified by the OLT.” EX1005, ¶176; *see* Claims 5 and 6.

D. Ground 4: Claims 3 and 10 are Obvious over Tsuge in view of Bernstein and MEF 6.1

The combination of Tsuge, Bernstein, the MEF 6.1 Ethernet Services Definition specification and the knowledge of skill in the art render obvious Claims 3 and 10.

1. Claim 3

Claim 3 would have been obvious to one of skill in the art based upon the Tsuge's disclosures alone or in view of Bernstein and the knowledge of one of skill in the art, in further view of MEF 6.1. As noted above, the elements of Claim 2 would have been obvious to one of skill in the art. EX1005, ¶177; *see* Ground 3, Claim 2, above.

For the reasons stated above in Ground 2, it would have been further obvious to a POSA in view of MEF 6.1 that the services opened by the ONU would comprise one or more of Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services, and that the configuration information of the OLT comprises one or more of a virtual local area network (VLAN), a user port and a user media access control (MAC) address of the OLT related to the services opened by the ONU. EX1005, ¶178. At the time of the invention, April 13, 2011, it was conventional to provide Ethernet based line

(E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services. *Id.*, ¶179 (citing EX1007, 7-9, 12-14).

The MEF Technical Specification, MEF 6.1, Ethernet Services Definitions – Phase 2, published in April 2008, defined the Ethernet based line (E-LINE) services, Ethernet based tree (E-TREE) services and Ethernet based LAN (E-LAN) services. *Id.*, ¶180 (citing EX1007, 7-21). It was equally well-known that the definitions for these services entailed user port information, virtual local area network information and user media access control (MAC) information. *Id.*, ¶181 (citing EX1007 at 13-18); see Ground 2, Claim 3 above.

Tsuge explains his system is a GE-PON specified by IEEE 802.3ah which transmits “data packets” via Layer 2 of the Open Systems Interconnection (OSI) networking model. EX1005, ¶182 (citing EX1008, 9:23-39). The IEEE 802.3ah standard is an amendment to the base 802.3 Ethernet standard which extended the delivery of Ethernet services in access networks using -supported copper and fiber techniques. *Id.* Ethernet communications entail transmission of “data packets” via Layer 2 of the OSI. *Id.*

It would have been obvious to a POSA at least as of April 13, 2011, to provide E-LINE, E-TREE and/or E-LAN services—as defined in the MEF 6.1 specification—over the combined DPoE system of Tsuge and Bernstein because both Tsuge and Bernstein describes the use of Ethernet protocols to communicate with

ONUs and the E-LINE, E-TREE and E-LAN services were conventional services specifically designed to provide protocols for Ethernet-based communications between devices. *Id.*, ¶183.

For the reasons set for the above in Ground 2, Claim 3, POSAs would have reasonably expected, at least as of April 13, 2011, the conventional E-LINE, E-TREE and/or E-LAN services protocols would be suitable and successful for providing Ethernet communications between devices because each of these services were long-established, widely utilized, off-the-shelf solutions for doing just that. *Id.* (citing EX1007, 12). A POSA would also understand the recited services “are agnostic of the underlying network infrastructure” and thus could be used on a variety of underlying networks technologies, such as HFCs, PONs and the like. *Id.*; see Ground 2, Claim 3 above.

2. Claim 10

a. Element 10

Claim 10 would have been obvious to one of skill in the art based upon the Tsuge’s disclosures alone or in view of Bernstein and the knowledge of one of skill in the art, in further view of MEF 6.1. as noted above with respect to Claim 3, Ground 3, element 9. *Id.*, ¶184; See Claim 3 and Ground 3, element 9.

IX. CONCLUSION

For the reasons set forth above, there is a reasonable likelihood at least one of the challenged claims is unpatentable. Petitioner respectfully requests *inter partes* review of Claims 1-11 be instituted and those claims be cancelled.

Dated: August 9, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

I hereby certify that this petition complies with the type-volume limitations of 37 C.F.R. §42.24 because it contains 13,730 words (as determined by the Microsoft Word word-processing system used to prepare the petition), excluding the parts of the petition exempted by 37 C.F.R. §42.24.

Dated: August 9, 2024

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CERTIFICATE OF SERVICE

The undersigned certifies pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a) that on August 9, 2024, a true and correct copy of the foregoing “PETITION FOR *INTER PARTES* REVIEW” was served via UPS (Tracking No. 1Z0964W3NT94842159) on the Patent Owner at the following correspondence address of record as listed in the USPTO electronic filing system:

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1325 Avenue of the Americas
28th Floor
New York, NY 10019

and was served via electronic mail upon counsel of record for the Patent Owner in the litigation in the U.S. District Court for the Eastern District of Texas:

*Iarnach Technologies Ltd. v. Charter Communications, Inc., et al.,
Case No. 2:24-cv-00230*

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