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

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| IARNACH TECHNOLOGIES LTD.,<br><br>Plaintiff,<br><br>v.<br><br>CHARTER COMMUNICATIONS, INC., CHARTER COMMUNICATIONS HOLDING COMPANY, LLC, CHARTER COMMUNICATIONS OPERATING, LLC, SPECTRUM MANAGEMENT HOLDING COMPANY, LLC, and SPECTRUM GULF COAST, LLC,<br><br>Defendants. | Civil Action No. 2:24-cv-00230<br><br>**JURY TRIAL DEMAND** |

**SECOND AMENDED COMPLAINT FOR PATENT INFRINGEMENT**

Iarnach Technologies Ltd. ("Iarnach" or "Plaintiff") hereby submits this Second Amended Complaint for patent infringement against Defendants Charter Communications, Inc., Charter Communications Holding Company, LLC, Charter Communications Operating, LLC, Spectrum Management Holding Company, LLC, and Spectrum Gulf Coast, LLC (collectively, "Charter" or "Defendants") and states as follows:

## THE PARTIES

1. Iarnach Technologies Ltd. is a company duly organized and existing under the laws of Ireland with its principal place of business at The Hyde Building, Suite 23, The Park, Carrickmines, Dublin 18, Ireland.

2. Charter Communications, Inc. is a company organized and existing under the laws of the state of Delaware, with a principal place of business at 400 Washington St., Stamford, Connecticut 06902. Charter Communications, Inc. may be served through its registered agent, Corporation Service Company d/b/a CSC - Lawyers Incorporating Service Company, located at 211 East 7th Street, Suite 620, Austin, Texas 78701.

3. Charter Communications Holding Company, LLC is a company organized and existing under the laws of the state of Delaware, with a principal place of business at 12405 Powerscourt Drive, Saint Louis, Missouri 63131. Charter Communications Holding Company, LLC may be served through its registered agent, Corporation Service Company d/b/a CSC - Lawyers Incorporating Service Company, located at 211 East 7th Street, Suite 620, Austin, Texas 78701.

4. Charter Communications Operating, LLC is a company organized and existing under the laws of the state of Delaware, with a principal place of business at 12405 Powerscourt Drive, Saint Louis, Missouri 63131. Charter Communications Operating, LLC may be served

through its registered agent, Corporation Service Company d/b/a CSC - Lawyers Incorporating Service Company, located at 211 East 7th Street, Suite 620, Austin, Texas 78701.

5. Spectrum Management Holding Company, LLC (formerly known as Time Warner Cable) is a company organized and existing under the laws of the state of Delaware, with a principal place of business at 12405 Powerscourt Drive, Saint Louis, Missouri 63131. Spectrum Management Holding Company, LLC may be served through its registered agent, Corporation Service Company, located at 251 Little Falls Dr., Wilmington, Delaware 19808.

6. Spectrum Gulf Coast, LLC is a company organized and existing under the laws of the state of Delaware, with a principal place of business at 12405 Powerscourt Drive, St. Louis, Missouri 63131. Spectrum Gulf Coast, LLC may be served through its registered agent, Corporation Service Company d/b/a CSC-Lawyers Incorporated, located at 211 E. 7th Street Suite 620 Austin, TX 78701.

7. Charter Communications, Inc., together with the other Defendants that are its controlled subsidiaries, is a broadband connectivity company and cable operator that provides networks and network services to subscribers under the Charter and Spectrum brands. According to its 2023 Annual Report, Charter Communications, Inc. "is a holding company whose principal asset is a controlling equity interest in Charter Communications Holdings, LLC, an indirect owner of Charter Communications Operating, LLC, under which substantially all of the operations reside." https://ir.charter.com/static-files/795d283f-706a-4678-8024-5e9cababeb9e at F-8. Further, Charter Communication, Inc. "is a party to management arrangements with its subsidiary, Spectrum Management Holding Company, LLC, and certain of their subsidiaries. [T]hese agreements [] provide management services for the cable systems owned or operated by their subsidiaries." *Id.* at F-32. Further, Spectrum Gulf Coast, LLC "provides [] services to customers

in the Eastern District of Texas." https://cafc.uscourts.gov/opinions-orders/23-136.ORDER.9-5-2023_2184816.pdf

8. As described above, Charter Communications, Inc. is the ultimate parent of all the other Defendants because the other Defendants are direct or indirect subsidiaries of Charter Communications, Inc. https://ir.charter.com/static-files/795d283f-706a-4678-8024-5e9cababeb9e at 3. Each of the Defendants form an interrelated group of companies that together comprise one of the world's largest providers of connectivity and communication services in the United States. The Defendants and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using the accused instrumentalities in the United States, including in the State of Texas generally and this judicial district in particular. The Defendants and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies. The Defendants regularly contract with customers regarding equipment or services that will be provided by their affiliates on their behalf.

9. For example, Charter Communications, Inc. owns or leases, and maintains and operates several stores in this district by and through subsidiary limited liability companies that it manages and controls, including Spectrum Gulf Coast LLC, and negotiates and signs agreements on Spectrum Gulf Coast's behalf.

10. For example, Charter Communications, Inc. is the corporate manager of its subsidiary LLCs that own or lease property in this district, that employ employees in this district, and that own, store, sell, demonstrate, and lease equipment in this district. Charter Communications, Inc. has the right to exercise near total control of each entity's operations through its LLC agreements with each entity. In each of those stores, Charter owns and stores equipment, including

the infringing equipment described below. Charter provides that equipment to Charter customers by and through subsidiary limited liability companies that it manages and controls.

11. Each of the Defendants control, participate in the commission of, and have a direct financial interest in the infringing acts set forth herein.

## NATURE OF THE ACTION

12. This is a civil action for infringement of U.S. Patent No. 8,942,378 ("the '378 Patent", Ex. A), U.S. Patent No. 9,674,035 ("the '035 Patent", Ex. B) and U.S. Patent No. 9,287,982 ("the '982 Patent", Ex. F) (collectively, the "Asserted Patents"), arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq*.

13. Iarnach holds all rights, title, and interest in and to the Asserted Patents, including the right to bring this suit and recover all past, present and future damages for infringement of the Asserted Patents. *See* Ex. C-E. Charter is not licensed to the Asserted Patents, either expressly or implicitly, nor does it enjoy or benefit from any other rights in or to the Asserted Patents whatsoever.

## JURISDICTION AND VENUE

14. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 101 *et seq.*

15. Charter is subject to personal jurisdiction under the provisions of the Texas Long Arm Statute, TEX. CIV. PRAC. & REM. CODE § 17.041 *et seq.*, by virtue of the fact that Charter has availed itself of the privilege of conducting and soliciting business within this State, including engaging in at least some of the infringing activities in this State, as well as by others acting as Charter's agents and/or representatives, such that it would be reasonable for this Court to exercise

jurisdiction consistent with principles underlying the U.S. Constitution, and the exercise of jurisdiction by this Court would not offend traditional notions of fair play and substantial justice.

16. Charter has established minimum contacts with this judicial district and regularly transacts and does business within this district, including advertising, promoting and selling products and/or services in its stores, over the internet, through intermediaries, representatives and/or agents located within this judicial district, that infringe the asserted patents. Charter has purposefully directed activities at citizens of this State including those located within this judicial district. Charter derives substantial revenue from the goods and services it provides to individuals in the state of Texas and in this judicial district.

17. Charter has purposefully and voluntarily placed its products and/or services into the stream of commerce with the expectation that they will be purchased and used by customers located in the State of Texas and the Eastern District of Texas. Charter's customers in the Eastern District of Texas have purchased and used and continue to purchase and use the accused instrumentalities.

18. This Court has general personal jurisdiction over Charter because Charter conducts systematic and regular business within the State of Texas by, *inter alia* providing cable television, internet, and phone services to businesses and residents throughout the State and this Judicial District.

19. Charter has a regular and established place of business in this Judicial District at 1414 Summit Ave., Plano, Texas 75074.

20. The Court has specific personal jurisdiction over Charter because it has committed acts of infringement within the State of Texas and this Judicial District through, for example, making infringing networks using the accused instrumentalities and using the accused instrumentalities to provide the Accused Services in the State of Texas and this Judicial District.

21. Upon information and belief, Charter, by itself and/or through its controlled subsidiaries, offers various communication services throughout the United States. Charter operates and maintains a nationwide television and data network through which Charter sells, leases, and offers for sale products and services, including the accused instrumentalities, to businesses, consumers, and government agencies. Through its subsidiaries, Charter offers to sell, sells, and provides Charter and Spectrum branded products and services to customers.

22. Upon information and belief, Charter by itself, and/or through its agents owns, and or operates its businesses through, *inter alia*, offices, Spectrum-branded storefronts, and/or other operational locations within the State of Texas and this Judicial District including, for example, at Spectrum stores located at 700 Alma Dr., Plano, Texas 75075; 2100 N. Dallas Pkwy, Plano, Texas 75075; and 4255-A Dowlen Rd., Beaumont, Texas 77706. Charter holds out these locations as its own through the use of its Spectrum branding on the locations themselves.

23. Each of the above locations features the Spectrum logo. According to Charter's website, https://corporate.charter.com/about-charter, this logo refers to "a suite of advanced broadband services offered by Charter Communications, Inc."

24. Upon information and belief, Charter, by itself, and/or through its agents own and/or lease the premises where these Spectrum stores are located.

25. Upon information and belief, these Spectrum stores are staffed by persons directly employed by Charter, many of whom live in this Judicial District.

26. Upon information and belief, Charter has engaged in regular and established business at physical places within this Judicial District, such as at these Spectrum stores.

27. Upon information and belief, Charter employs and/or contracts with persons and directs them to install, service, repair, and/or replace network equipment, as appropriate, in this Judicial District.

28. Upon information and belief, in each of these stores and/or service centers, Charter owns, stores, and demonstrates the accused instrumentalities to Charter customers.

29. Upon information and belief, Charter's regular and established places of business within this Judicial District are used to conduct Charter's business, *i.e.* the provision of "Charter/Spectrum" networks and network services (which includes the accused instrumentalities), and the maintenance and operation of those networks and network services within this Judicial District.

30. Venue in this Judicial District of the Eastern District of Texas ("District") is proper pursuant to 28 U.S.C. § 1400(b), because Charter has regular and established places of business in this Judicial District. *See supra.* Charter, by itself and/or through its agents, has committed acts of patent infringement within the State of Texas and in this Judicial District by making, importing, using, selling, offering for sale, and/or leasing the accused instrumentalities.

31. Defendants are properly joined under 35 U.S.C. § 299(a)(1) because, as set forth in greater detail below, on information and belief, Defendants commonly and/or jointly make, use, sell, offer to sell, and/or import the infringing instrumentalities, such that at least one right to relief is asserted against Defendants jointly, severally, and in the alternative with respect to the same transactions, occurrences, or series of transactions or occurrences relating to the making, using, selling, offering to sell, and/or importing into the United States the same accused instrumentalities, as set forth in greater detail herein.

32. Defendants are properly joined under 35 U.S.C. § 299(a)(2) because, as set forth in greater detail below, on information and belief, Defendants make, use, sell, offer to sell in, and/or import into the United States the same or similar accused instrumentalities, such that questions of fact that are common to all Defendants will arise in this action.

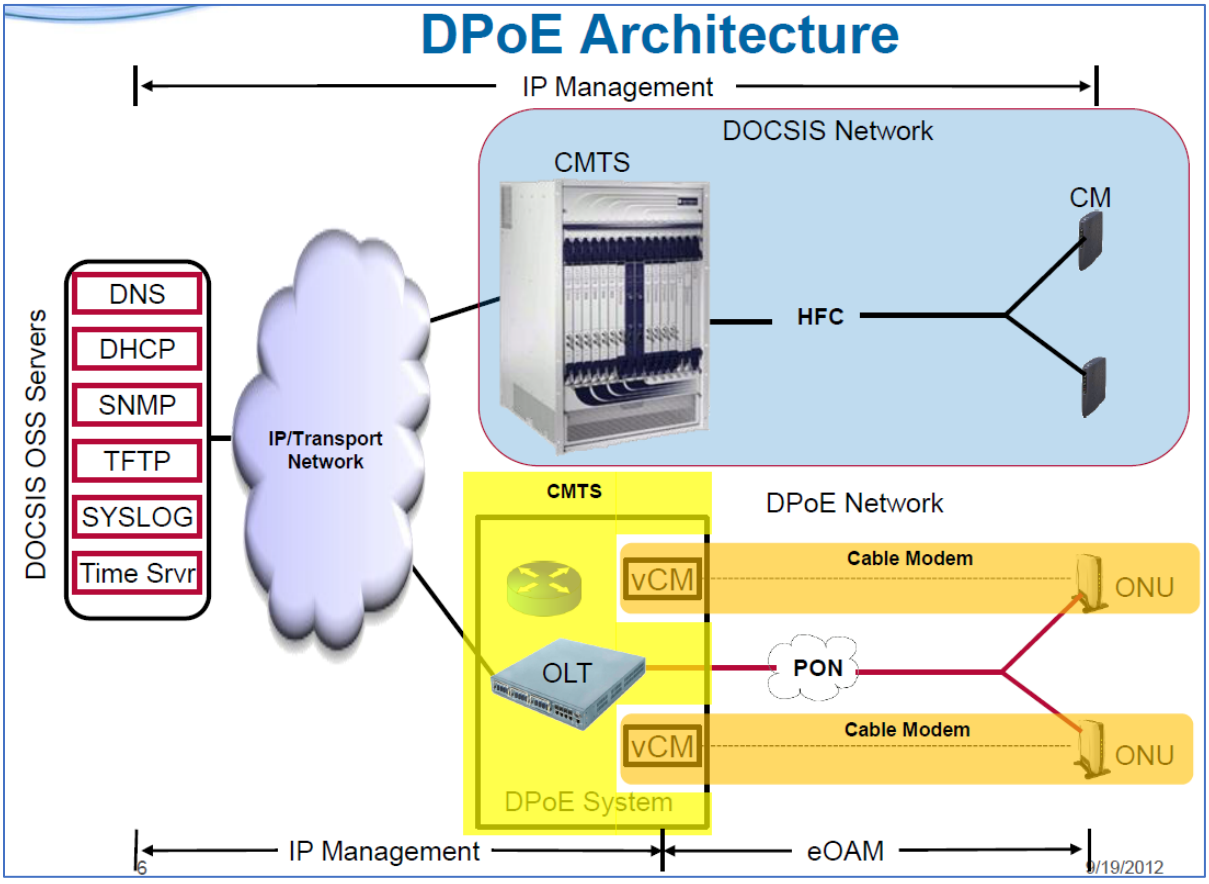
## BACKGROUND

33. Data Over Cable Service Interface Specification Provisioning of Ethernet Passive Optical Network or "DPoE" is a set of specifications developed by CableLabs. CableLabs acts as a research and development arm for its member companies—including Charter. ZTE, the initial assignee of the asserted patents, was also involved in the development of the DPoE specifications. https://www.businesswire.com/news/home/20110426006807/en/ZTE-Participates-in-CableLabs%C2%AE-DPoE%E2%84%A2-Interop.

34. The DPoE specifications create an architecture and serve as necessary specifications for enabling Ethernet Passive Optical Network (EPON) equipment to be provisioned using existing DOCSIS-based provisioning systems and policies, and to provide network services over EPON access networks to business customers. https://www.cablelabs.com/specifications-library/dpoe. Stated differently, DPoE makes EPON Optical Line Terminals and Optical Network Units act like a DOCSIS cable modem termination system and cable modems. https://www.commscope.com/blog/2015/commscope-definitions-what-is-dpoe/. For example, DPoE makes a EPON OLT look and act like a DOCSIS Cable Modem Termination System (CMTS). And once EPON equipment acts like a DOCSIS cable modem network, cable operators can use their existing DOCSIS based Operation and Support System ("OSS") to provision and scale EPON networks. *See* https://ieeexplore.ieee.org/document/4528533. This brings the mature systems and business processes of the DOCSIS OSS to EPON access networks. *See* CableLabs,

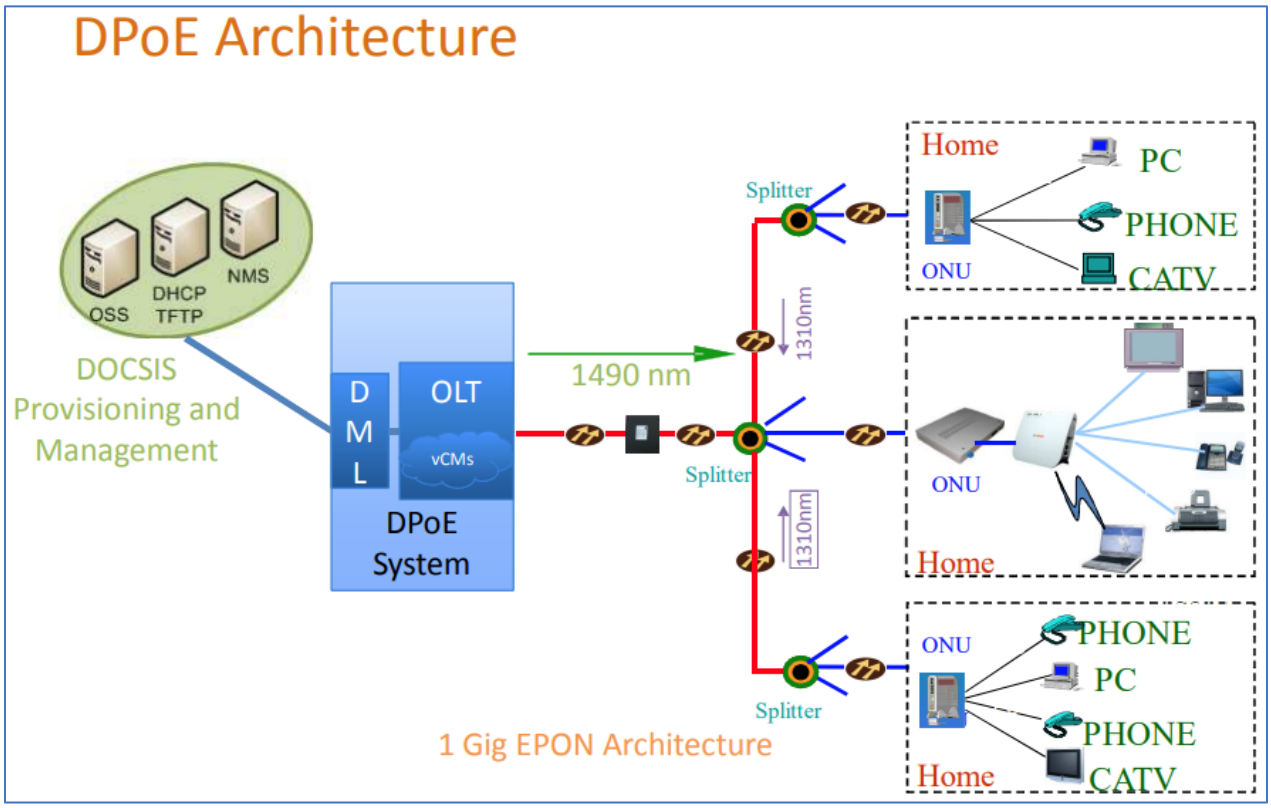
"DOCSIS Provisioning of EPON (DPOE): Architecture, Specifications, Qualifications" at slide 5, available at https://www.itu.int/dms_pub/itu-t/oth/06/5B/T065B0000320011PDFE.pdf.

35. The DPoE architecture is shown below. On the left are the traditional DOCSIS OSS servers. They connect via an IP/transport network to both: (A) a traditional DOCSIS Network containing traditional cable modem equipment (top right); and (B) a DPoE Network containing an EPON network that has implemented the DPoE specifications to mimic a DOCSIS network (bottom right). With respect to (B) the DPoE Network, the OLT includes virtual cable modems ("vCM") that make the ONUs appear as traditional cable modems from the DOCSIS OSS server's perspective. Thus, operators can use the existing DOCSIS based OSS server to provision not only (A) the traditional DOCSIS Network, but also (B) the EPON network.



CableLabs, "DOCSIS Provisioning of EPON (DPOE): Architecture, Specifications, Qualifications" at slide 6, available at https://www.itu.int/dms_pub/itu-t/oth/06/5B/T065B0000320011PDFE.pdf.

36. Here is another illustration of the DPoE Architecture:




ZTE, "DPoE in MSO Network" at slide 7, available at https://www.piedmontscte.org/resources/jul2012/DPoE-on-the-MSO-Network-v1.3.pdf.

37. The DPoE Specifications have three primary goals, to: (1) Facilitate multi-vendor interoperability—the DPoE specifications will provide a common foundation for vendors to build products that will not only interoperate with the DOCSIS back office servers, but with other vendor's equipment. As a result, DPoE Optical Network Unit (ONU) vendors can expect their product to interoperate with others who provide DPoE Systems; (2) Allow for use of DOCSIS provisioning—DOCSIS provisioning systems provide configuration information for millions of

DOCSIS devices. The DPoE specifications provide requirements for EPON equipment to be provisioned using the same DOCSIS servers; and (3) Provide Metro Ethernet services as defined by the Metro Ethernet Forum (MEF)—the DPoE specifications provide an architecture and requirements to support the Ethernet Private Line (EPL) service. https://www.cablelabs.com/specifications-library/dpoe.

38. The initial version of the DPoE specifications were first introduced in approximately early 2011. Those DPoE v1.0 specifications are available on the CableLabs' website: https://www.cablelabs.com/specifications/search?query=&category=DPOE&subcat=DPOE%201.0&doctype=&content=false&archives=false&currentPage=1.

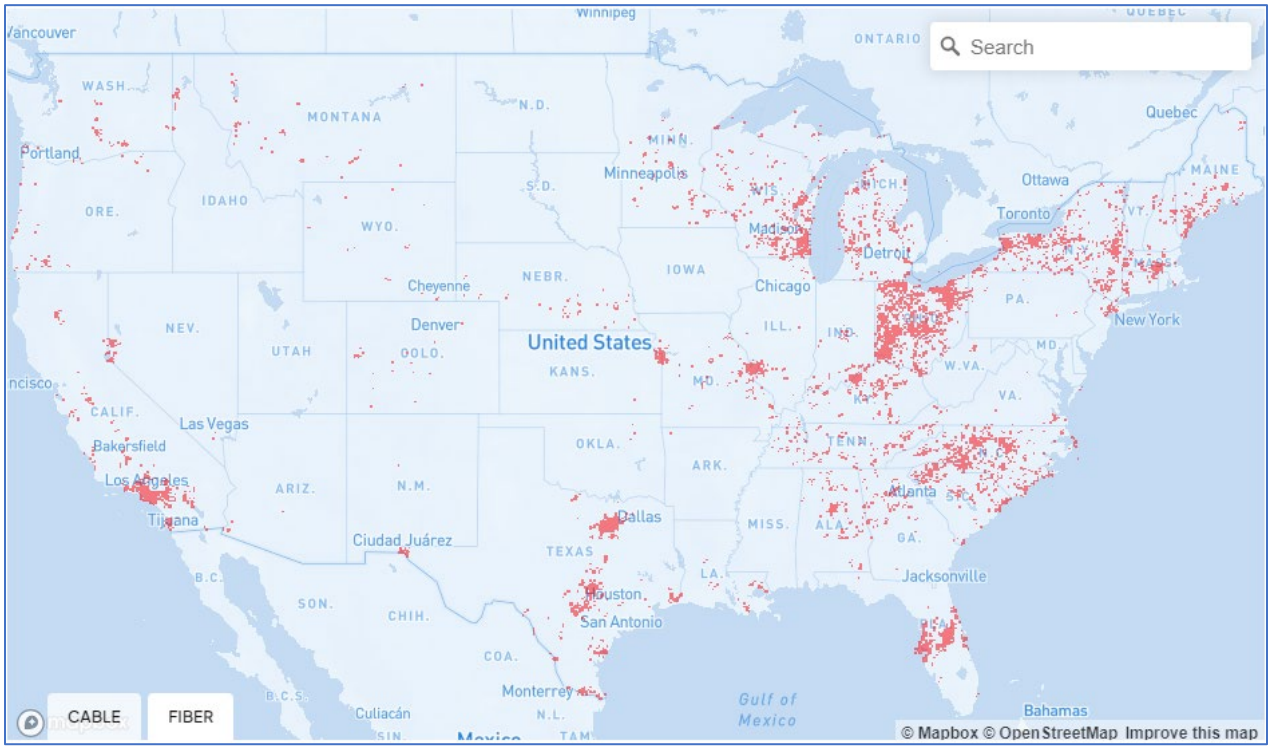
39. After the release of DPoE v1.0, CableLabs introduced version 2.0 of the DPoE specifications. The "DPoE v2.0 specifications augment the DPoE v1.0 specifications to provide requirements for additional service capabilities and corresponding provisioning and network management capabilities." DPoE v2.0 Architecture Specification at §1. Those DPoE v2.0 specifications are also available on the CableLabs website: https://www.cablelabs.com/specifications/search?query=&category=DPOE&subcat=DPOE%202.0&doctype=&content=false&archives=false&currentPage=1.

40. CableLabs has a program for certifying compliance with the DPoE specifications. https://www.cablelabs.com/certification. Many specifics of the certification program are in CableLabs' Certification Wave Requirements and Guidelines. https://www.cablelabs.com/wp-content/uploads/2014/01/CWGuidelines.pdf. Some of the devices that comply with the DPoE specifications are found here: https://www.cablelabs.com/wp-content/uploads/2013/10/cert_qual.xlsx.

## ACCUSED INSTRUMENTALITIES

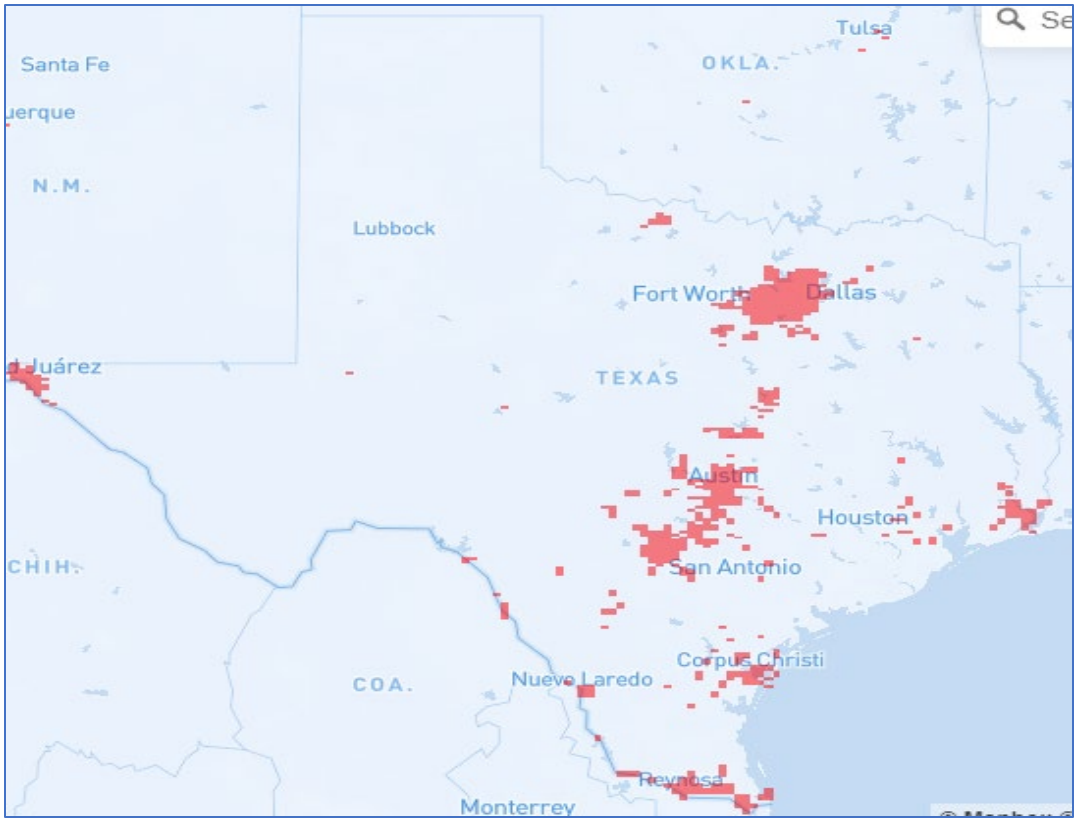
41. The Accused Instrumentalities include the functionality necessary for Charter to provide DPoE v2.0 compliant networks to its customers, including all hardware and software, optical line terminals (OLTs), optical network units (ONUs)/optical network terminals (ONTs), transport networks, and DOCSIS back office equipment (*e.g.*, the Operation Support System, OSS).

42. Charter provides DPoE v2.0 networks to customers throughout the United States. The following shows many of Charter's DPoE v2.0 networks:




https://broadbandnow.com/Spectrum-Internet.

43. Many of Charter's DPoE v2.0 networks are located in Texas, including in the Eastern District of Texas:




https://broadbandnow.com/Spectrum-Internet.

44. Charter has invested $1.3 billion to have a network that includes DPoE v2.0 in Texas. https://www.telecompetitor.com/charters-1-3b-texas-investment-will-use-a-mix-of-fiber-docsis/; https://www.datacenterdynamics.com/en/news/charter-communications-to-invest-13-billion-in-texas/. For example, Charter uses EPON with DPoE v2.0 in El Paso, TX. https://www.fiercetelecom.com/telecom/charter-walks-30000-miles-prep-poles-rdof-builds. Charter also uses a fiber network with DPoE v2.0 in Jefferson County, Texas. https://corporate.charter.com/newsroom/spectrum-launches-gigabit-broadband-in-jefferson-county-texas.

45. Charter has also invested $100 per location to upgrade its network to include DPoE v2.0. https://www.telecompetitor.com/multi-gig-broadband-charter-to-invest-100-per-location-to-

upgrade-entire-footprint-by-2025/; https://www.lightreading.com/cable-tech/charter-plots-big-multi-gig-network-wireless-upgrades/d/d-id/782333.

46. Charter uses at least the following fiber equipment in its DPoE network: (A) Spectrum ONU (SONU) Modem, 10G EPON DPoE Advanced Fiber Voice Modem; (B) Alcatel-Lucent XE-040G-A ONT, 10G EPON Bridging Optical Network Unit; (C) Commscope C1004, 10 G EPON Bridging Optical Network Unit; and (D) Adtran 1004W. https://www.spectrum.net/support/internet/modems-routers-wireless-adapters. Each of these devices complies with the DPoE specifications. *E.g.*, https://d15yx0mnc9teae.cloudfront.net/sites/default/files/C1004Datasheet.pdf ("CableLabs DPoE 1.0 and 2.0 compliant).

**COUNT 1: INFRINGEMENT OF U.S. PATENT NO. 8,942,378**

47. Iarnach hereby incorporates and re-alleges paragraphs 1 through 46 as if fully set forth herein.

48. On January 27, 2015, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 8,942,378 ("the '378 Patent"), titled "Method and Device for Encrypting Multicast Service in Passive Optical Network System."

49. The '378 Patent was originally assigned to ZTE Corporation. On January 9, 2023, the '378 Patent was assigned to Iarnach Technologies Limited. *See* Ex. C, USPTO Reel/frame 062320/0522.

50. The '378 Patent is generally directed to "encrypting multicast service data in [a] passive optical network (PON) system." '378 Patent at 1:9-10. Prior to the '378 Patent, there were encryption methods for unicast data in PON systems, but there was "no effective encryption mechanism" "for multicast data" in PON systems. *Id.* at 1:32-43. The '378 Patent's preferred

multicast encryption solution is that "the OLT generates a public key and uses the public key to encrypt the multicast service data in the bearer channel." *Id.* at 3:47-49. And all the multicast service data "in the same one bearer channel is encrypted with the same public key." *Id.* at 3:50-51. Importantly, the OLT then "sends the public key [only to each] ONU that is activated successfully and applies to receive said multicast service data via a management control channel." *Id.* at 3:51-54. Because not every OLT receives the public key, only the ONUs authorized to use the multicast service data can "us[e] the key to decrypt the multicast service data." *Id.* at 3:58-60. Figure 1 generally illustrates this approach:

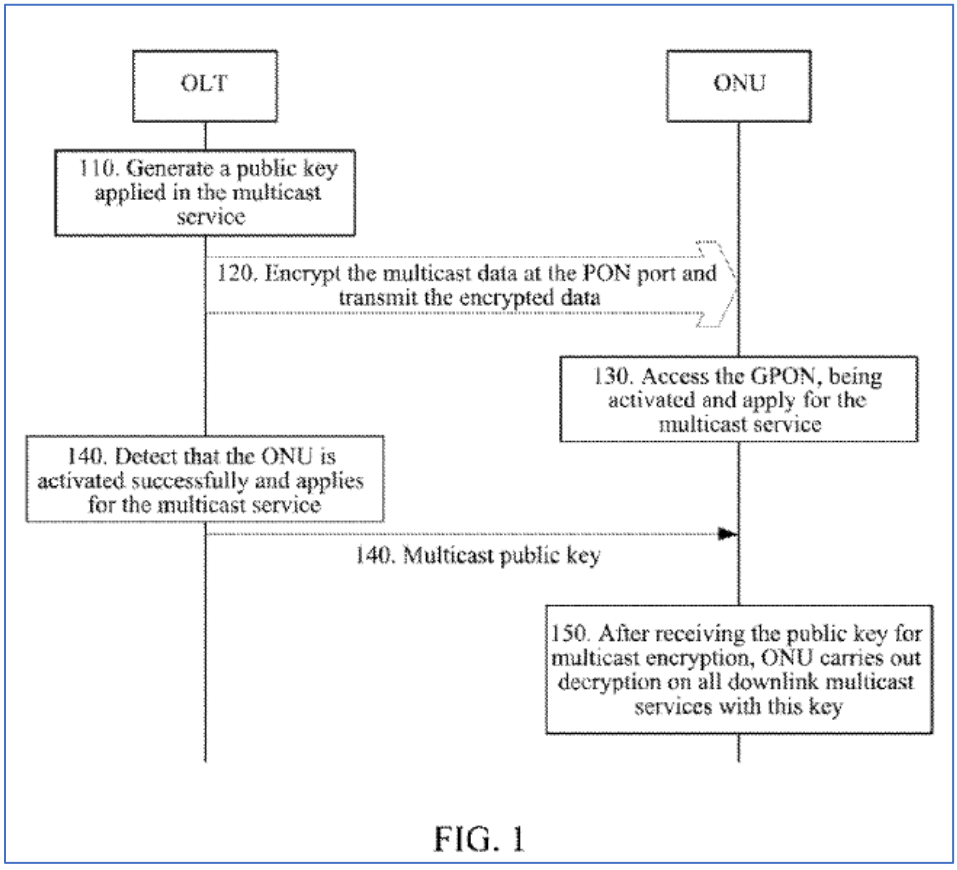



FIG. 1

51. The multicast encryption solution provided by '378 Patent provides several benefits for PON networks, including "reduc[ing] the complexities of the OLT encryption mechanism and the ONU decryption mechanism," and "improv[ing] the security of the multicast service content"

because "malicious users cannot acquire the key" so they cannot "steal[] the multicast service content." *Id.* at 7:41-58.

52. The '378 Patent is not directed to conventional or well-known optical network technology. Rather, the '378 Patent improves existing optical networks that did not provide multicast encryption. In this regard, the '378 Patent teaches:

> The inventive concept of the present invention is that: the OLT generates a public key and uses the public key to encrypt the multicast service data in the bearer channel and then sends the encrypted data, the data in the same one bearer channel is encrypted with the same public key; said OLT sends the public key applied in encrypting the multicast service data to the ONU that is activated successfully and applies to receive said multicast service data via a management control channel (such as the optical network terminal (ONT) management control interface (OMCI) or the operation administration maintenance (OAM)).
>
> After the ONU acquires the public key, it uses the key to decrypt the multicast service data that the ONU applies to receive in the bearer channel.
>
> Preferably, the OLT regularly maintains the public key, and generates the public key and sets an aging time (with a timer) for the public key, and after the aging time arrives, regenerates a public key and use the new public key to encrypt the multicast service data in the bearer channel, and sends the newly generated public key to the ONU that is activated successfully and applies to receive the multicast service data. The aging time for a plurality of public keys can be the same or different. Alternatively, the OLT can update the public key at anytime if needed.

'378 Patent at 3:46-4:3

53. The prosecution history of the '378 Patent further indicates that it differs from conventional networks. For example, the Examiner stated: "none of the prior art of record alone or in combination teaches using the common key to encrypt multicast service data of all different multicast services in a same bearer channel and then sending encrypted data, wherein the multicast service data of all different multicast services in the same one bearer channel use a same common key to carry out encryption." 11/17/14 Notice of Allowance at 3-4.

54. Iarnach holds all rights, title, and interest in and to the '378 Patent, including the right to bring this suit and recover all past, present and future damages for infringement of the '378

Patent. Charter is not licensed to the '378 Patent, either expressly or implicitly, nor does it enjoy or benefit from any other rights in or to the '378 Patent whatsoever. As such, Charter's infringement described below has injured, and continues to injure, Iarnach.

55. On information and belief, Charter has infringed directly and continues to infringe directly the '378 Patent in its implementation of its DPoE v2.0 networks and network services. The infringing activities include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products and/or services by Charter for operation on its DPoE v2.0 networks and network services.

56. For example, the Accused Instrumentalities practice and/or are capable of practicing claim 1 of the '378 Patent, which is directed to a method of encrypting multicast data in a PON. The following paragraphs provide details regarding one example of Charter's infringement, and only as to a single patent claim. Iarnach reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under any applicable scheduling order.

57. Claim 1 of the '378 Patent states:

> 1. A method for encrypting multicast service in a passive optical network system, the method comprising:
>
> an optical line terminal (OLT) generating a common key, and using the common key to encrypt multicast service data of all different multicast services in a same bearer channel and then sending encrypted data, wherein the multicast service data of all different multicast services in the same one bearer channel use a same common key to carry out encryption; and
>
> said OLT sending the common key applied in encrypting the multicast service data via a management control channel to an optical network unit (ONU) that is activated successfully and applies to receive said multicast service data.

'378 Patent at 7:61-8:7. The Accused Instrumentalities implement at least Claim 1 of the '378 Patent.

58. The Accused Instrumentalities practice the claimed "method for encrypting multicast service in a passive optical network system." For example, Charter's Accused Instrumentalities implement the DPoE v2.0 specification. Through the DPoE v2.0 specification, Charter "support[s] EPON technology using existing DOCSIS-based back office systems and processes. [And] Ethernet PON (EPON) is an [802.3] standard for a passive optical network (PON)." DPoE v2.0 Architecture Specification at §1.

59. The DPoE v2.0 specification provides a mechanism for encrypting multicast data in the PON. Specifically, the DPoE v2.0 specification details a 128-bit random bit string as an encryption key that will be used by the DPoE system to encrypt/decrypt multicast traffic. *See* DPoE v2.0 Security Specification at §7.4 ("The DPoE system generates a 128-bit random bit string to use as the new key. This key will be used by the DPoE system to encrypt traffic on the mLLID, and by the D-ONU to decrypt traffic on that mLLID."). And the DPoE v2.0 specification requires that the multicast encryption key is not sent to every ONU on the PON network, but only to those ONUs that had previously registered to receive the multicast data. *See id.* ("In order to preserve the security of the key, the DPoE System MUST send the key downstream on a previously registered and encrypted unicast LLID to each ONU.").

60. The Accused Instrumentalities include the claimed "optical line terminal (OLT) generating a common key, and using the common key to encrypt multicast service data of all different multicast services in a same bearer channel and then sending encrypted data, wherein the multicast service data of all different multicast services in the same one bearer channel use a same common key to carry out encryption." For example, the DPoE v2.0 specification requires that the "DPoE system generates a 128-bit random bit string to use as the new key [] to encrypt traffic on

the mLLID." DPoE v2.0 Security Specification at §7.4. And "all ONUs with the mLLID must have the same key." *Id.*

61. The Accused Instrumentalities also include the claimed "OLT sending the common key applied in encrypting the multicast service data via a management control channel to an optical network unit (ONU) that is activated successfully and applies to receive said multicast service data." For example, the DPoE v2.0 specification requires that "the DPoE System MUST send the key downstream on a previously registered and encrypted unicast LLID to each ONU." DPoE v2.0 Security Specification at §7.4. Further, "[t]he DPoE System sends a copy of the Key Exchange PDU to each D-ONU [] using an encrypted unicast LLID[.] Keys are not multicast on the mLLID itself." *Id.*

62. Based on the above and because of its conformance with the applicable DPoE v2.0 specifications, Charter directly infringes at least claim 1 of the '378 Patent.

63. In addition to direct infringement by making, using, and selling the Accused Instrumentalities, Charter also indirectly infringes the '378 Patent claims. Charter has knowledge of the '378 Patent at least as of the filing and service of the original Complaint (Dkt. 1) in this case (and before, as described in the Willfulness section below) and continues to make, use, sell, and/or offer for sale the Accused Instrumentalities. Where acts constituting direct infringement of the '378 Patent are not performed by Charter, such acts constituting direct infringement of the '378 Patent are performed by Charter's customers or end-users who act at the direction and/or control of Charter, with Charter's knowledge.

64. Iarnach is informed and believes, and on that basis alleges, that Charter indirectly infringes at least claim 1 of the '378 Patent by active inducement in violation of 35 U.S.C. § 271(b), by at least manufacturing, supplying, distributing, selling, and/or offering for sale the Accused

Instrumentalities to its customers with the knowledge and intent that use of those products would constitute direct infringement of the '378 Patent. For example, Charter provides its customers with instructions on how to use its products to implement the infringing DPoE v2.0 networks and methods. These instructions may be found as part of the packaging of Charter's DPoE v2.0 network equipment, as well as on Charter's website. *E.g.*, https://enterprise.spectrum.com/support/user-guides.html; https://enterprise.spectrum.com/support/faq/network/how-do-you-set-up-a-fiber-network.html; https://www.spectrum.net/support/general/equipment-manuals; https://enterprise.spectrum.com/support/faq/network/how-do-fiber-optic-networks-work.html. Charter also knows that the patents-in-suit read on the DPoE v2.0 standards.

65. Charter also indirectly infringes by contributing to the infringement of, and continuing to contribute to the infringement of, one or more claims of the '378 Patent under 35 U.S.C. § 271(c) and/or 271(f) by selling, offering for sale, and/or importing into the United States, the Accused Instrumentalities. Charter knows at least as of the date of the filing and service of the original Complaint (Dkt. 1) in this case that the accused products and/or services include hardware components and software instructions that work in concert to perform specific, intended functions. Such specific, intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '378 Patent and are not staple articles of commerce suitable for substantial non-infringing use.

66. The acts of infringement by Charter have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '378 Patent by Charter has damaged and will continue to damage Plaintiff.

**COUNT 2: INFRINGEMENT OF U.S. PATENT NO. 9,674,035**

67. Iarnach hereby incorporates and re-alleges paragraphs 1 through 66 as if fully set forth herein.

68. On June 6, 2017, the USPTO duly and legally issued United States Patent No. 9,674,035 ("the '035 Patent"), titled "Seamless Configuration Update for Optical Network Unit in Ethernet Passive Optical Network."

69. The '035 Patent was originally assigned to ZTE Corporation and ZTE Portugal-Projectos de Telecomunicações Unipessoal Lda. On January 8, 2023, ZTE Portugal-Projectos de Telecomunicações Unipessoal Lda assigned its interest in the '035 Patent to ZTE (H.K.) Limited. Ex. D, USPTO Reel/frame 063071/0975. Later that same day, ZTE (H.K.) Limited assigned its interest in the '035 Patent to ZTE Corporation. Ex. E. Finally, on January 9, 2023, ZTE Corporation assigned the entire interest in the '378 Patent to Iarnach Technologies Limited. *See* Ex. C, USPTO Reel/frame 062320/0522.

70. The '035 Patent is generally directed to "updating configuration of an optical network unit (ONU) in a communication network based on Data Over Cable Service Interface Specification (DOCSIS) provisioning over Ethernet passive optical network (EPON)." '035 Patent at 2:41-46. Prior to the '035 Patent, "in case of any changes to the DPoE ONU, service etc. configuration, the device ha[d] to be rebooted (power cycled) to go through the process of discovery and registration once again in order to restart the vCM and download the updated CM config file with new service-related parameters." *Id.* at 3:48-52. The '035 Patent teaches this "reboot process is disruptive to services and, when used to upgrade any of the existing and live services, can adversely affect services provisioned on the given DPoE ONU." *Id.* at 3:54-56. The '035 Patent's preferred embodiment solves this problem via a "seamless update of DPoE ONU configuration in

DPoE Networks without the need to reboot of the DPoE ON (D-ONU), once the DPoE ONU has been provisioned with the initial configuration file and remains in the operating state." *Id.* at 4:5-9. Accordingly, "the ONU configuration parameters [] may be changed without affecting other live services operating simultaneously on the ONU." *Id.* at 4:10-13. Figure 4 generally illustrates this approach (*see also* Fig. 7):

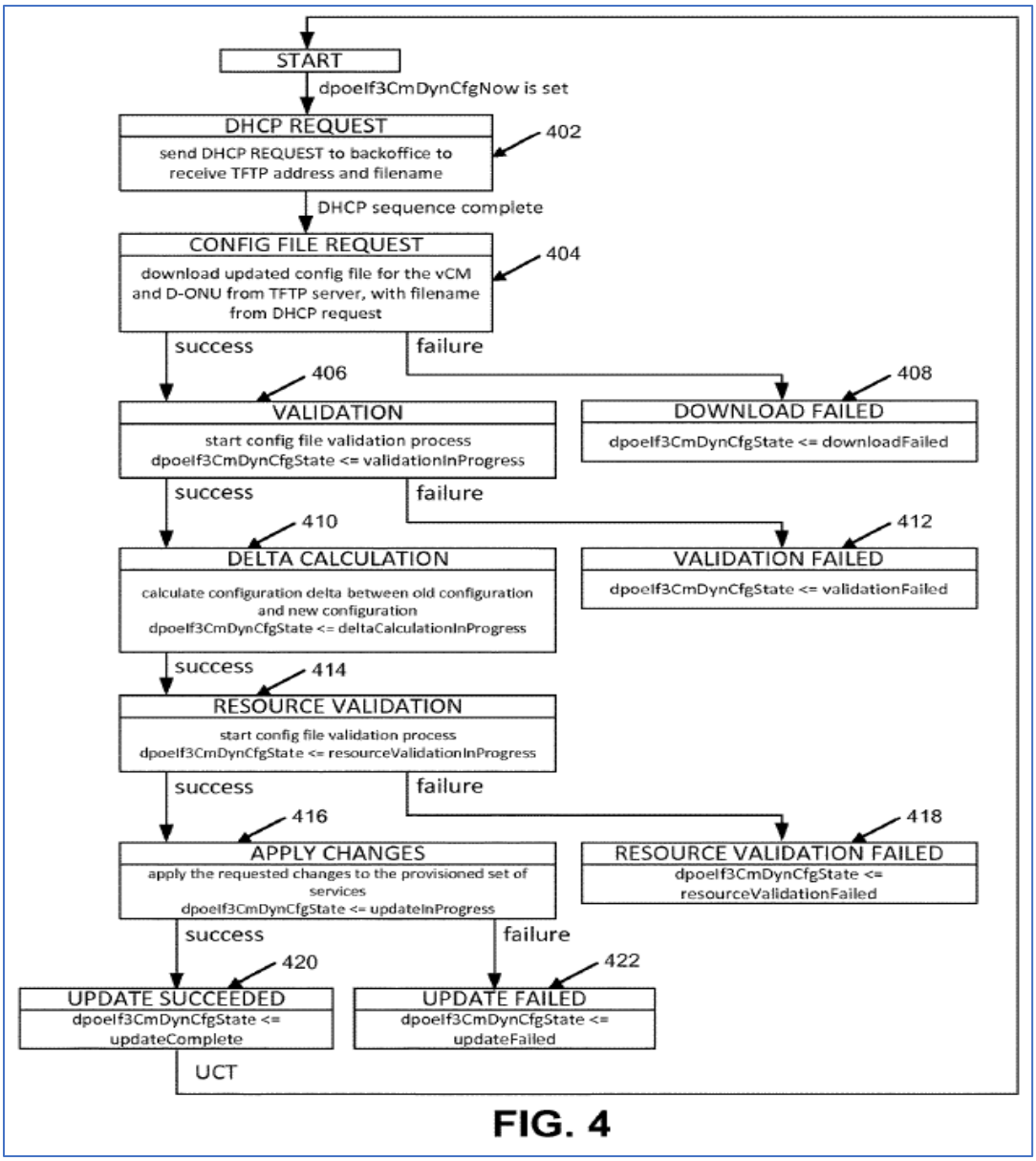



**FIG. 4**

71. The DPoE ONU seamless reconfiguration solution provided by '035 Patent provides several benefits for PON networks, including "introduc[ing] changes to the service and device

configuration on the fly" that is not disruptive and does not adversely affect provisioned services. *Id.* at 4:45-50; *see also id.* at 3:54-57. "This guarantees tighter control over what devices are connected to the network and what services are provisioned on specific devices." *Id.* at 3:62-65.

72. The '035 Patent is not directed to conventional or well-known optical network technology. Rather, the '035 Patent improves existing optical networks that did not provide seamless dynamic configuration, but rather were "disruptive to services, and when used to upgrade any of the existing and live services, can adversely affect services provisioned on the given DPoE ONU. '035 Patent at 3:54-57. In this regard, the '035 Patent teaches:

> The techniques provided in this document can be used to achieve seamless update of DPoE ONU configuration in DPoE Networks without the need to reboot of the DPoE ONU (D-ONU), once the DPoE ONU has been provisioned with the initial configuration file and remains in the operating state. Accordingly, in implementations as described in this document, the ONU configuration parameters, and especially parameters for any configured services, may be changed without affecting other live services operating simultaneously on the ONU. Therefore, the update described in this document is seamless update in the sense that an ONU continues its power and operation without interruption.
>
> Such seamless update can be important for local maintenance and customer support services, in cases where dynamic changes to the service configuration already provisioned on the DPoE ONU is needed. In one example, a service for the given customer might need to be temporarily blocked for any operational reasons while leaving services for other customers provided with the same DPoE ONU unaffected. In another example, service provisioned for a particular customer might need to be modified without affecting services provided for other customers on the same DPoE ONU—in certain business scenarios, bandwidth provided for the given customer might needed to be increased to accommodate expected demand spike, for which customer is charged extra.
>
> The present seamless update can be implemented in ways that the DPoE ONU configuration, and especially any elements of service configuration as provisioned on a DPoE ONU, may be modified from the OSS level without requiring the DPoE ONU to power cycle and go through the regular discovery and registration process as defined in DPoE I01 specifications. For example, the present seamless update can be implemented in a way that overcomes various limitations in dynamic configuration modification of the DPoE ONU devices in some deployment designs in which changes to their configuration, and specifically configuration of the services provided on these devices can require the DPoE ONUs to power cycle and go through the discovery and registration process. The present seamless update can,

> for example, introduce changes to the service and device configuration on the fly, whereas the default config files for the given DPoE ONU devices stored on the local (T)FTP server remain unchanged, providing a default fall back in case the DPoE ONU device is power cycled and needs to load the initial config file.

*Id.* at 4:4-50.

73. The prosecution history of the '378 Patent further indicates that it differs from conventional networks. For example, the Applicant explained that the prior art did not "notify[] a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU." 12/21/16 Amendment at 10 (underlining in original). The Examiner agreed. 2/1/17 Notice of Allowance at 2.

74. Iarnach holds all rights, title, and interest in and to the '035 Patent, including the right to bring this suit and recover all past, present and future damages for infringement of the '035 Patent. Charter is not licensed to the '035 Patent, either expressly or implicitly, nor does it enjoy or benefit from any other rights in or to the '035 Patent whatsoever. As such, Charter's infringement described below has injured, and continues to injure, Iarnach.

75. On information and belief, Charter has infringed directly and continues to infringe directly the '035 Patent in its implementation of its DPoE v2.0 networks and network services. The infringing activities include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products and/or services by Charter for operation on its DPoE v2.0 networks and network services.

76. For example, the Accused Instrumentalities practice and/or are capable of practicing claim 14 of the '035 Patent, which is directed to a method of seamlessly updating a DPoE ONU. The following paragraphs provide details regarding one example of Charter's infringement, and only as to a single patent claim. Iarnach reserves its right to provide greater detail and scope via its Infringement Contentions at the time required under any applicable scheduling order.

77. Claim 14 of the ’035 Patent states:

> 14. A method of updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the method comprising:
>
> receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;
>
> obtaining the updated configuration file;
>
> performing, using at least one computer, a first validation of the updated configuration file for structural errors;
>
> determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;
>
> performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and
>
> applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

’035 Patent at 11:47-64. The Accused Instrumentalities implement at least Claim 14 of the ’035 Patent.

78. The Accused Instrumentalities practice the claimed “method of updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON).” For example, Charter’s Accused Instrumentalities implement the DPoE v2.0 specification. Through the DPoE v2.0 specification, Charter “support[s] EPON technology using existing DOCSIS-based back office systems and processes. [And] Ethernet PON (EPON) is an [802.3] standard for a passive optical network (PON).” DPoE v2.0 Architecture Specification at §1. Further, “the objective of this [DPoE v2.0] specification is to document the requirements to support the automated provisioning of IP High Speed Data Services and Metro Ethernet services over EPON network using DOCSIS provisioning methods and backend servers.” DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §1.3.

79. The DPoE v2.0 specification details a "Dynamic D-ONU Configuration Update Mechanism" that Charter implements. *See id.* at §9.5. Figure 20 of the DPoE v2.0 specification generally shows this dynamic configuration update process (which is the same as Figure 4 from the '035 Patent):

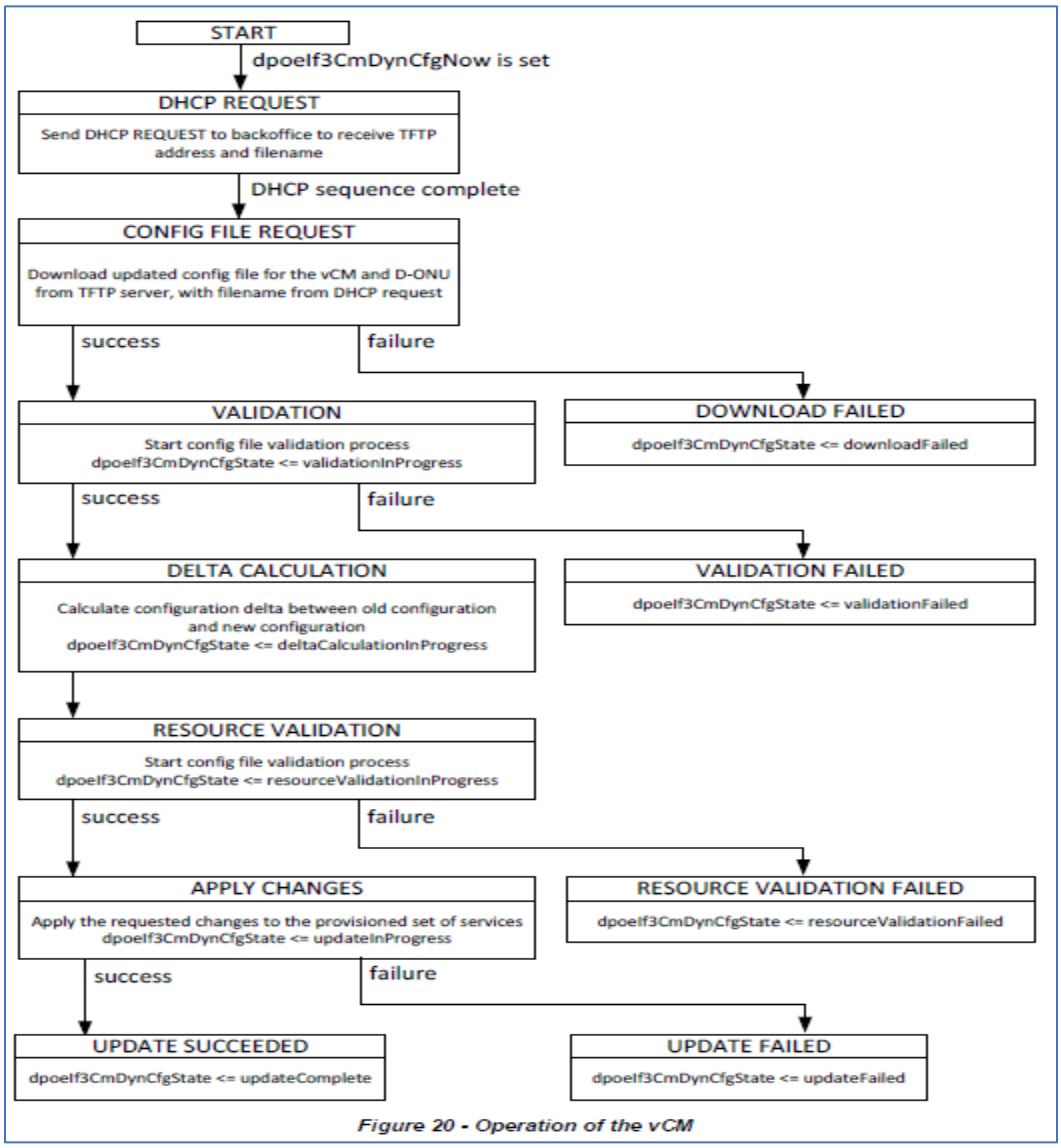



*Figure 20 - Operation of the vCM*

80. The Accused Instrumentalities include the claimed "receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file." For example, the DPoE v2.0 specification explains that the DPoE System

receives a "trigger [] to download the new DOCSIS CM configuration file" via "the 'dpoeVcmDynCgfNow' MIB object." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §9.5.1.

81. The Accused Instrumentalities include the claimed "obtaining the updated configuration file." For example, the DPoE v2.0 specification requires that, in response to receiving the trigger, the DPoE system "download[s] the new DOCSIS CM configuration file." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §9.5.1; *see also id* at §9.5.2.1 ("The vCM MUST initiate the configuration file download process when triggered by the 'dpoeVcmDynCfgNow' object."). More specifically, "the vCM obtains TFTP server and file name values via a DHCPREQUEST mechanism [and] downloads the new configuration file." *Id.* at §9.5.1.

82. The Accused Instrumentalities include the claimed "performing, using at least one computer, a first validation of the updated configuration file for structural errors." For example, the DPoE v2.0 specification requires that "the vCM first validates the configuration file integrity." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §9.5.1. More specifically, the DPoE v2.0 specification requires that "after the configuration file download completes successfully, the vCM MUST validate the correctness of the configuration file, as described in Section 9.1.5.6, CM Configuration File Processing." *Id.* at §9.5.2.2

83. The Accused Instrumentalities include the claimed "determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes." For example, the DPoE v2.0 specification requires that the vCM "compares the running configuration with the newly downloaded configuration file and identifies the differences to the services provisioned on the D-ONU." DPoE v2.0 MAC and Upper

Layer Protocols Interface Specification at §9.5.1; *see also id.* at §9.5.2.3 ("The vCM MUST calculate the differences between the currently active and newly downloaded configuration files, identifying the necessary changes to the D-ONU configuration in order to support the new/modified services as detailed in the new received configuration file. This difference is used to drive the D-ONU update process.").

84. The Accused Instrumentalities include the claimed "performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU." For example, the DPoE v2.0 specification requires that the vCM "verifies the resources available checking that the requested changes can be applied to the D-ONU under the current conditions" and confirms" the configuration feasibility for the delta configuration." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §9.5.1. More specifically, "the DPoE system makes sure that the DPoE System and the D-ONU have the needed resources to provision and support those services; it checks the DPoE System resources and capabilities and also ensures that the D-ONU capabilities can support the new/modified services." *Id.* at §9.5.2.3.

85. The Accused Instrumentalities include the claimed "applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU." For example, the DPoE v2.0 specification requires that "once the configuration feasibility for the delta configuration is confirmed, the vCM updates the D-ONU configuration, modifying the necessary parameters." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §9.5.1. More specifically, the DPoE system "uses the new validated configuration file to setup the services for the D-ONU." *Id.* at §9.5.2.4. "The set of configuration changes needed MUST be converted into a sequence of eOAM control message as defined in [DPoE-OAMv2.0], sent to the D-ONU to add/modify/delete specific service instances. The D-ONU SHOULD apply the requested

changes to the provisioned set of services without disrupting or affecting any other existing and operating services." *Id.* at §9.5.2.4.

86. Based on the above and because of its conformance with the applicable DPoE v2.0 specifications, Charter directly infringes at least claim 14 of the '035 Patent.

87. In addition to direct infringement by making, using, and selling the Accused Instrumentalities, Charter also indirectly infringes the '035 Patent claims. Charter has knowledge of the '035 Patent at least as of the filing and service of the original Complaint (Dkt. 1) in this case (and before, as described in the Willfulness section below) and continues to make, use, sell, and/or offer for sale the Accused Instrumentalities. Where acts constituting direct infringement of the '035 Patent are not performed by Charter, such acts constituting direct infringement of the '035 Patent are performed by Charter's customers or end-users who act at the direction and/or control of Charter, with Charter's knowledge.

88. Iarnach is informed and believes, and on that basis alleges, that Charter indirectly infringes at least one claim of the '035 Patent by active inducement in violation of 35 U.S.C. § 271(b), by at least manufacturing, supplying, distributing, selling, and/or offering for sale the Accused Instrumentalities to its customers with the knowledge and intent that use of those products would constitute direct infringement of the '035 Patent. For example, Charter provides its customers with instructions on how to use its products to implement the infringing DPoE v2.0 networks and methods. These instructions may be found as part of the packaging of Charter's DPoE v2.0 network equipment, as well as on Charter's website. *E.g.*, https://enterprise.spectrum.com/support/user-guides.html; https://enterprise.spectrum.com/support/faq/network/how-do-you-set-up-a-fiber-network.html; https://www.spectrum.net/support/general/equipment-manuals; https://enterprise.spectrum.com/support/faq/network/how-

do-fiber-optic-networks-work.html. Charter also knows that the patents-in-suit read on the DPoE v2.0 standards.

89. Charter also indirectly infringes by contributing to the infringement of, and continuing to contribute to the infringement of, one or more claims of the '035 Patent under 35 U.S.C. § 271(c) and/or 271(f) by selling, offering for sale, and/or importing into the United States, the Accused Instrumentalities. Charter knows at least as of the date of the filing and service of the original Complaint (Dkt. 1) in this case that the accused products and/or services include hardware components and software instructions that work in concert to perform specific, intended functions. Such specific, intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '035 Patent and are not staple articles of commerce suitable for substantial non-infringing use.

90. The acts of infringement by Charter have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '035 Patent by Charter has damaged and will continue to damage Plaintiff.

**COUNT 3: INFRINGEMENT OF U.S. PATENT NO. 9,287,982**

91. Iarnach hereby incorporates and re-alleges paragraphs 1 through 86 as if fully set forth herein.

92. On March 15, 2016, the USPTO duly and legally issued United States Patent No. 9,287,982 ("the '982 Patent"), titled "DPoE System and Service Auto-Configuration Method and Network Based Thereon."

93. The ’982 Patent was originally assigned to ZTE Corporation. On January 9, 2023, the ’982 Patent was assigned to Iarnach Technologies Limited. *See* Ex. C, USPTO Reel/frame 062320/0522.

94. The ’982 Patent is generally directed to a “service auto-configuration method of an Ethernet passive optical network system based on a data over cable service interface system (DOCSIS) back-office management system.” ’982 Patent at 1:9-12. According to the ’982 Patent, prior DPoE configuration methods first configured the ONU and then “perform[ed] the corresponding configuration on the OLT.” *Id.* at 1:57-60. And in those prior DPoE configuration methods, the subsequent “configuration on the OLT need[ed] to be performed by hand individually, or performed through a command line, or performed through a simple network management protocol (SNMP) interface between an Element Management System (EMS) and the OLT,” thereby resulting in “low configuration efficiency.” *Id.* at 1:60-64, 2:39-47. The ‘982 Patent’s preferred embodiment solves this problem with a DPoE “service auto-configuration method and network based on that system” that “configure[s] the relevant parameters of the OLT at the same time for the ONU opening these services” such that “the service [is] opened without performing further configuration to the OLT individually after the process of the ONU initialization is completed.” *Id.* at 2:1-2, 2:51-57. Figure 3 generally illustrates this approach:

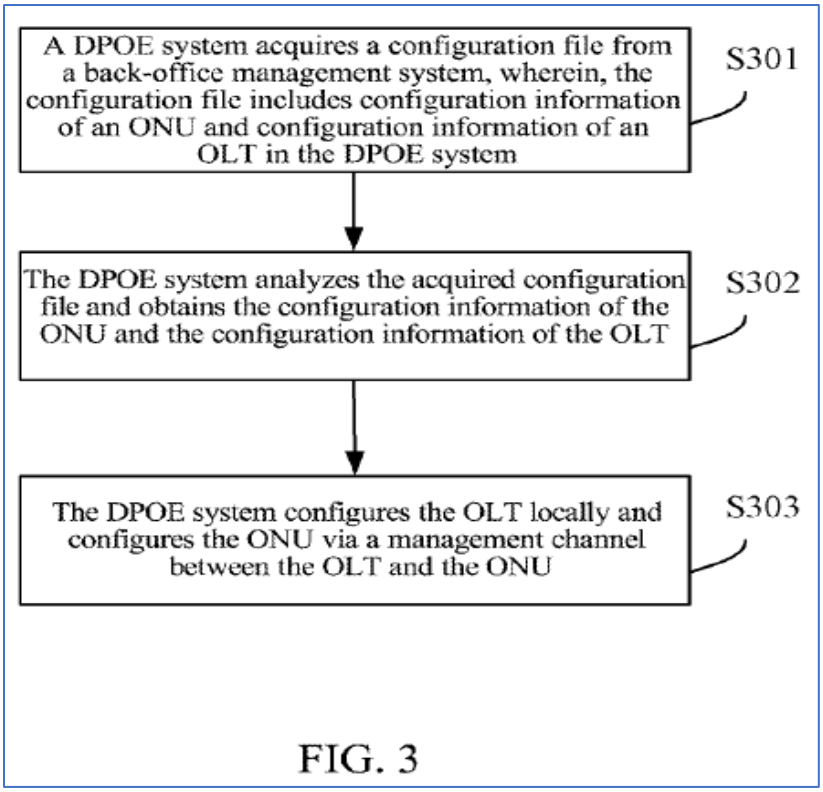



FIG. 3

95. The DPoE configuration solution provided by '982 Patent provides several benefits for PON networks, including "add[ing] the configuration information about the OLT of the DPoE system in the configuration and complet[ing] the automatic configuration on the OLT and the ONU at the same time," such that "after the process of the ONU initialization is completed, the service can be opened without performing further configuration to the OLT individually." *Id.* at 7:65-8:5. This "improve[s] the configuration of the whole system very well." *Id.* at 8:8-9.

96. The '982 Patent is not directed to conventional or well-known optical network technology. Rather, the '982 Patent improves existing optical networks that did not provide the ability to configure the entire DPoE system (both the OLT and ONU). *See* '982 Patent at 1:57-64, 2:51-58. In this regard, the '982 Patent teaches:

> It can be seen from the above-mentioned embodiments that, compared with the related art, the present document adds the configuration information about the OLT of the DPOE system in the configuration file, and completes the automatic configuration on the OLT and the ONU at the same time; after the process of the

> ONU initialization is completed, the service can be opened without performing further configuration to the OLT individually. Especially, when more complex configurations are needed to be performed on the OLT correspondingly for the key service operation on the ONU, it can improve the configuration efficiency of the whole system very well.

'982 Patent at 7:65-8:9.

97. The prosecution history of the '982 Patent further indicates that it differs from conventional networks. For example, the Applicant explained that, when analyzing the acquired configuration file, the prior art DPoE system did not "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." 12/11/15 Amendment at 2, 6. The Examiner agreed. 12/28/15 Notice of Allowance.

98. Iarnach holds all rights, title, and interest in and to the '982 Patent, including the right to bring this suit and recover all past, present and future damages for infringement of the '982 Patent. Charter is not licensed to the '982 Patent, either expressly or implicitly, nor does it enjoy or benefit from any other rights in or to the '982 Patent whatsoever. As such, Charter's infringement described below has injured, and continues to injure, Iarnach.

99. On information and belief, Charter has infringed directly and continues to infringe directly the '982 Patent in its implementation of its DPoE v2.0 networks and network services. The infringing activities include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products and/or services by Charter for operation on its DPoE v2.0 networks and network services.

100. For example, the Accused Instrumentalities practice and/or are capable of practicing claim 1 of the '982 Patent, which is directed to a method of auto-configuring an EPON using a DOCSIS back-office management system. The following paragraphs provide details regarding one example of Charter's infringement, and only as to a single patent claim. Iarnach reserves its right

to provide greater detail and scope via its Infringement Contentions at the time required under any applicable scheduling order.

101. Claim 1 of the ’982 Patent states:

> 1. A service auto-configuration method of a DOCSIS Provisioning Of EPON (DPOE) system, comprising:
>
> 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;
>
> 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
>
> the DPOE system configuring the OLT locally according to the configuration information of 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;
>
> wherein, the method is performed in a process of ONU initialization; and
>
> 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 converts the configuration information of the OLT into a message format which can be identified by the OLT.

’982 Patent at 8:33-57. The Accused Instrumentalities implement at least Claim 1 of the ’982 Patent.

102. The Accused Instrumentalities practice the claimed “service auto-configuration method of a DOCSIS Provisioning Of EPON (DPOE) system.” For example, Charter’s Accused Instrumentalities implement the DPoE v2.0 specification. Through the DPoE v2.0 specification, Charter “support[s] EPON technology using existing DOCSIS-based back office systems and processes.” DPoE v2.0 Architecture Specification at §1. And “the objective of this [DPoE v2.0] specification is to document the requirements to support the automated provisioning of IP High

Speed Data Services and Metro Ethernet services over EPON network using DOCSIS provisioning methods and backend servers." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §1.3.

103. The Accused Instrumentalities include the claimed "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." For example, the DPoE v2.0 specification requires that "the vCM MUST obtain [a] CM configuration file from the OSS provisioning systems, on behalf of the D-ONU, as part of the registration process." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §5.2.3.1. This CM configuration file contains configuration information for both the ONU and the OLT. *See id.* at 9.1.6.2 ("[T]he vCM MUST configure both itself and the D-ONU based on the TLVs specified in the CM configuration file."); *see also id.* at §5.2.3.1 ("The DPoE System validates the contents and configures the DPoE System and the D-ONU based on the service provisioning information in the CM configuration file.").

104. The Accused Instrumentalities also include the claimed "DPOE system analyzing the acquired configuration file, and obtaining both the configuration information of the ONU and the configuration information of the OLT." For example, the DPoE v2.0 specification requires analyzing the configuration file: "[T]he DPoE System process[es] the CM configuration file [and] validates the contents." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §5.2.3.1. The DPoE v2.0 specification also explains that, "after downloading the CM configuration file[,] the DPoE System (or vCM) performs several processing steps with the CM configuration file," including "perform[ing] operations to verify the validity of a CM configuration file." *Id.* at §9.1.5.6. As explained above, the configuration file includes configuration information for both the

ONU and OLT. *See id.* at §9.1.6.2 ("[T]he vCM MUST configure both itself and the D-ONU based on the TLVs specified in the CM configuration file."); *see also id.* at §5.2.3.1 ("The DPoE System validates the contents and configures the DPoE System and the D-ONU based on the service provisioning information in the CM configuration file.").

105. The Accused Instrumentalities also include the claimed "the DPOE system configuring the OLT locally according to the configuration information of 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." For example, the DPoE v2.0 specification explains that "[w]hen the DPoE System receives management requests destined to a vCM, it checks whether the given management request requires interaction with the D-ONU. If no interaction is needed the request is handled locally, but if the request requires an extended Operations Administration and Maintenance (eOAM) message exchange between the DPoE System and the D-ONU, it converts those requests into the appropriate eOAM messages, and sends the eOAM requests to the corresponding D-ONU as needed." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §5.2.3.1. The DPoE v2.0 specification further explains that "[d]uring registration, the vCM MUST configure both itself and the D-ONU based on the TLVs specified in the CM configuration file. The DPoE System MUST configure the D-ONU using the appropriate OAM messages." *Id.* at §9.1.6.2

106. The Accused Instrumentalities also include the claimed "wherein, the method is performed in a process of ONU initialization." For example, the DPoE v2.0 specification explains that the above configuration process is performed as part of initializing the ONU. *See* DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §5.2.3.1 ("During initialization, the D-ONU goes through a number of steps before becoming fully operational in the DPoE Network.").

107. The Accused Instrumentalities also include the claimed "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 converts the configuration information of the OLT into a message format which can be identified by the OLT." For example, the DPoE v2.0 specification states that for ONU configuration, the DPoE system "converts those [configuration] requests into the appropriate eOAM messages, and sends the eOAM requests to the corresponding D-ONU." DPoE v2.0 MAC and Upper Layer Protocols Interface Specification at §5.2.3.1. And for OLT configuration, the DPoE v2.0 specification converts the configuration requests "based on the TLVs specified in the CM configuration file." *Id.* at §9.1.6.2.

108. Based on the above and because of its conformance with the applicable DPoE v2.0 specifications, Charter directly infringes at least claim 1 of the '982 Patent.

109. In addition to direct infringement by making, using, and selling the Accused Instrumentalities, Charter also indirectly infringes the '982 Patent claims. Charter has knowledge of the '982 Patent at least as of the filing and service of the Amended Complaint (Dkt. 24) in this case (and before, as described in the Willfulness section below) and continues to make, use, sell, and/or offer for sale the Accused Instrumentalities. Where acts constituting direct infringement of the '982 Patent are not performed by Charter, such acts constituting direct infringement of the '982 Patent are performed by Charter's customers or end-users who act at the direction and/or control of Charter, with Charter's knowledge.

110. Iarnach is informed and believes, and on that basis alleges, that Charter indirectly infringes at least claim 1 of the '982 Patent by active inducement in violation of 35 U.S.C. § 271(b), by at least manufacturing, supplying, distributing, selling, and/or offering for sale the Accused Instrumentalities to its customers with the knowledge and intent that use of those products would

constitute direct infringement of the '982 Patent. For example, Charter provides its customers with instructions on how to use its products to implement the infringing DPoE v2.0 networks and methods. These instructions may be found as part of the packaging of Charter's DPoE v2.0 network equipment, as well as on Charter's website. *E.g.*, https://enterprise.spectrum.com/support/user-guides.html; https://enterprise.spectrum.com/support/faq/network/how-do-you-set-up-a-fiber-network.html; https://www.spectrum.net/support/general/equipment-manuals; https://enterprise.spectrum.com/support/faq/network/how-do-fiber-optic-networks-work.html. Charter also knows that the patents-in-suit read on the DPoE v2.0 standards.

111. Charter also indirectly infringes by contributing to the infringement of, and continuing to contribute to the infringement of, one or more claims of the '982 Patent under 35 U.S.C. § 271(c) and/or 271(f) by selling, offering for sale, and/or importing into the United States, the Accused Instrumentalities. Charter knows at least as of the date of the filing and service of the Amended Complaint (Dkt. 24) in this case that the accused products and/or services include hardware components and software instructions that work in concert to perform specific, intended functions. Such specific, intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '982 Patent and are not staple articles of commerce suitable for substantial non-infringing use.

112. The acts of infringement by Charter have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '982 Patent by Charter has damaged and will continue to damage Plaintiff.

**WILLFULNESS**

113. Charter willfully infringes these patents-in-suit, as described below.

114. Charter has known of the '035 Patent since at least October 22, 2018. On that date, Charter cited the '035 Patent to the Patent Office during prosecution of Charter's own U.S. Patent No. 11,159,365. Further, the inventor of that Charter patent, Marek Hajduczenia, is also one of the inventors of the '035 Patent.

115. Charter has known of the '982 Patent since at least September 21, 2018. On that date, Charter (through its membership with CableLabs) learned of published patent application no. 2014/0023366, which ultimately issued as the '982 Patent. Charter learned of the '982 published application during prosecution of CableLabs' U.S. Patent Application No. 14/788,653.

116. Charter has also known of the '982 Patent since at least November 23, 2020. On that date, CableLabs (of which Charter is a member) cited the '982 Patent to the Patent Office during prosecution of CableLabs' U.S. Patent No. 12,021,561. The '982 Patent was subsequently discussed extensively during the prosecution of that CableLabs patent, and was even referred to as "the closest prior art."

117. Upon information and belief, Charter also learned of the patents-in-suit as part of its involvement with CableLabs and developing the DPoE standards. Charter monitored the patent filings of the CableLabs members, including ZTE (the original assignee of the patents-in-suit), and learned of the patents-in-suit when they issued on January 27, 2015 ('378 Patent), March 15, 2016 ('982 Patent), and June 6, 2017 ('035 Patent).

118. At minimum, Charter learned of the patents-in-suit as of the April 5, 2024 filing date of the Original Complaint and the April 25, 2024 filing date of the First Amended Complaint.

119. Upon reviewing the patents-in-suit, as well as the pleadings in this case, Charter knew these patents-in-suit read on DPoE v2.0 networks, such as the ones employed by Charter.

120. Notwithstanding, and with full knowledge of the patents-in-suit and their applicability to DPoE v2.0 networks, Charter proceeded to wantonly and maliciously implement DPoE v2.0 networks. Charter's flagrant disregard of the patents-in-suit and failure to respect Iarnach's intellectual property rights makes Charter's infringement willful.

## JURY DEMAND

121. Plaintiff hereby demands a trial by jury on all issues.

## PRAYER FOR RELIEF

WHEREFORE, Plaintiff requests entry of judgment in its favor and against Charter as follows:

a) A declaration that Charter has infringed and is infringing one or more claims of the '378 Patent, either literally or under the doctrine of equivalents;

b) A declaration that Charter has infringed and is infringing one or more claims of the '035 Patent, either literally or under the doctrine of equivalents;

c) A declaration that Charter has infringed and is infringing one or more claims of the '982 Patent, either literally or under the doctrine of equivalents;

d) An award of damages pursuant to 35 U.S.C. §§ 284, 285, 286, and 287 adequate to compensate Iarnach for Charter's infringement of the Asserted Patents in an amount according to proof at trial (together with prejudgment and post-judgment interest), but no less than a reasonable royalty, including but not limited to a post-judgment running royalty;

e) A declaration that Charter's infringement is willful since at least the filing of the Original Complaint (April 5, 2024 *see* Dkt. No. 1) and enhancing damages pursuant to 35 U.S.C. § 284;

f) An award of costs and expenses pursuant to 35 U.S.C. § 284 or as otherwise permitted by law;

g) An award of attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law; and

h) Such other and further relief, whether legal, equitable, or otherwise, to which Plaintiff may be entitled or which this Court may order.

Dated: July 15, 2024

Respectfully submitted,

*/s/ Michael F. Heim*
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**ATTORNEYS FOR PLAINTIFF**
**IARNACH TECHNOLOGIES LTD.**

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that the foregoing document was served on all counsel who have consented to electronic service on July 15, 2024.

*/s/ Michael Heim*
Michael Heim