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Attorneys for Plaintiff

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

SOUTHERN DIVISION

INTERNATIONAL LICENSE EXCHANGE OF AMERICA, LLC, Plaintiff, v. TP-LINK TECHNOLOGIES CO., LTD., and TP-LINK USA CORPORATION, Defendants.	Case No.: 8:20-cv-00759 **COMPLAINT FOR PATENT INFRINGEMENT** JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff International License Exchange of America, LLC ("ILEA" or "Plaintiff"), for its Complaint against Defendants TP-Link Technologies Co. Ltd. and TP-Link USA Corporation (collectively, "TP-Link" or "Defendants"), alleges the following:

NATURE OF THE ACTION

1. This is an action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq.*, seeking monetary damages and other relief against Defendants due to their infringement of United States Patent Nos. RE44,775 (the "'775 patent"), RE45,065 (the "'065 patent"), RE45,081 (the "'081 patent"), RE45,095 (the "'095 patent"), RE40,999 (the "'999 patent"), and 5,959,990 (the "'990 patent"), together the "patents in suit," in accordance with 35 U.S.C. § 271.

THE PARTIES

2. Plaintiff is a corporation organized under the laws of the State of Delaware with a place of business at 10 Balligomingo Rd., West Conshohocken, PA 19428.

3. On information and belief, Defendant TP-Link Technologies Co. Ltd. is a corporation duly organized and existing under the laws of China, with a principal place of business at South Building 5 Keyuan Road, Central Zone Science & Technology Park, Nanshan, Shenzhen, People's Republic of China, Postcode: 518057.

4. Upon information and belief, Defendant TP-Link USA Corporation is a corporation organized under the laws of California, with a place of business at 145 South State College Blvd., Suite 400, Brea, CA 92821, and can be served through its registered agent Deyi Shu, located at 145 South State College Blvd., Suite 400, Brea, CA 92821.

JURISDICTION AND VENUE

5. This is an action for patent infringement arising under the Patent Laws of the United States, Title 35 of the United States Code.

6. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

7. On information and belief, Defendants are subject to this Court's specific and general personal jurisdiction, pursuant to due process and the California long-arm statute, CAL. CODE OF CIVIL PROCEDURE § 410.10, due at least to its business in this forum, including at least a portion of the infringements alleged herein. Furthermore, Defendant TP-Link USA Corporation is subject to this Court's specific and general personal jurisdiction because Defendant is a California corporation.

8. Plaintiff's claims arise directly from Defendants' business contacts and other activities in the State of California and in the Central District of California: Defendants are present within or have minimum contacts within the State of California and the Central District of California; Defendants have purposefully availed themselves of the privileges of conducting business in the State of California and in the Central District of California; Defendants have sought protection and benefit from the laws of the State of California; and, Defendants regularly conduct business within the State of California and within the Central District of California.

9. Defendants directly or through intermediaries, make, use, offer for sale, import, sell, advertise or distribute products and services in the United States, the State of California, and the Central District of California. This Court also has personal jurisdiction over Defendants because Defendants have committed acts of patent infringement in California, including in this District.

10. Defendants have systematically and continuously harmed Plaintiff in this jurisdiction by infringing one or more claims of the patents in suit.

11. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(a) & (c), and 1400(b). On information and belief, Defendant TP-Link USA Corporation is a California corporation. On information and belief, Defendant TP-Link USA Corporation has committed acts of infringement in this district and has a place of business at 145 South State College Blvd., Suite 400, Brea, CA 92821 in this district.

12. Venue is further proper as to Defendant TP-Link Technologies Co. Ltd, which is organized under the laws of Taiwan, in light of 28 U.S.C. § 1391(c)(3) which provides that "a defendant not resident in the United States may be sued in any judicial district, and the joinder of such a defendant shall be disregarded in determining where the action may be brought with respect to other defendants."

COUNT I – INFRINGEMENT OF U.S. PATENT NO. 5,959,990

13. The allegations set forth in the foregoing paragraphs 1 through 12 are incorporated into this First Claim for Relief.

14. On September 28, 1999, U.S. Patent No. 5,959,990 (the "'990 patent"), entitled "VLAN Frame Format," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '990 patent is attached as Exhibit 1. The application leading to the '990 patent is the ultimate priority application for U.S. Pat. Nos. RE40999, RE44775, RE45065, RE45081, RE45095, RE45121, RE45521, RE45598, RE45708, each of which recites subject matter supported by the same written description.

15. The inventive embodiments of the '990 patent resolve technical problems related to virtual local area network ("VLAN") and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the '990 patent.

16. The claims of the '990 patent do not merely recite the performance of some business practice known from the pre-Internet world along with a requirement to perform it on the Internet. Instead, the claims of the '990 patent recite one or more inventive concepts that are rooted in computerized electronic data

communications networks, and an improved method to operate such networks and to maintain the interoperability of different physical configurations of such networks.

17. The claims of the '990 patent recite an invention that is not merely the routine or conventional use of electronic devices for communications. Instead, for example, the invention adds new features to integrate Ethernet and other protocols together on a shared network. The '990 patent claims thus include improvements for, for example, formatting data frames to yield a desired result.

18. The technology claimed in the '990 patent does not preempt all ways of using computerized devices or transmitting information over networks, nor preempt any other well-known or prior art technology.

19. Accordingly, each claim of the '990 patent recites a combination of elements sufficient to ensure that the claim in practice amounts to significantly more than a patent on an ineligible concept.

20. Plaintiff is the assignee and owner of the right, title and interest in and to the '990 patent, including the right to assert all causes of action arising under the patents and the right to any remedies for infringement of them.

21. Upon information and belief, TP-Link directly infringed at least claim 1 of the '990 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method to format a data frame in VLAN network devices; for example, depending on the physical configuration of a VLAN, the embodiments include a method to adjust the format of a data frame to reflect the characteristics of the particular physical configuration of the VLAN (the "'990 Accused Instrumentalities"). The '990 Accused Instrumentalities include at least the following products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

22. In particular, claim 1 of the '990 patent generally recites a method in a network device. The method includes transmitting, on a shared communications

medium coupled to the network device, a data frame associated with a virtual network, comprising the steps of: a) transmitting a data frame having a type field whose contents indicate the data frame comprises a virtual network identifier field; and, b) transmitting the virtual network identifier field whose contents indicate the virtual network associated with the data frame.

23. On information and belief, use of the '990 Accused Instrumentalities reads on and infringes at least claim 1 of the '990 patent. (*See, e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

24. On information and belief, the '990 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link's partners, clients, customers and end users across the country and in this District.

25. Plaintiff has been harmed by TP-Link's infringing activities.

COUNT II – INFRINGEMENT OF U.S. PATENT NO. RE40,999

26. The allegations set forth in the foregoing paragraphs 1 through 25 are incorporated into this Second Claim for Relief.

27. On November 24, 2009, U.S. Patent No. RE40,999 ("the '999 patent"), entitled "VLAN Frame Format," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '999 patent is attached as Exhibit 2. The '999 patent is part of a family of eleven U.S. patents stemming from U.S. Pat. No. 5,959,990.

28. The inventive embodiments of the '999 patent resolve technical problems related to virtual local area network ("VLAN") and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the '999 patent.

29. The claims of the '999 patent do not merely recite the performance of some business practice known from the pre-Internet world along with a requirement to perform it on the Internet. Instead, the claims of the '999 patent recite one or more inventive concepts that are rooted in computerized electronic data communications networks, and an improved method to operate such networks and to maintain the interoperability of different physical configurations of such networks.

30. The claims of the '999 patent recite an invention that is not merely the routine or conventional use of electronic devices for communications. Instead, among other things, the invention adds new features to integrate Ethernet and other protocols together on a shared network. The '999 patent claims thus include improvements for, for example, formatting data frames to yield a desired result.

31. The technology claimed in the '999 patent does not preempt all ways of using computerized devices or transmitting information over networks, nor preempt any other well-known or prior art technology.

32. Accordingly, each claim of the '999 patent recites a combination of elements sufficient to ensure that the claim in practice amounts to significantly more than a patent on an ineligible concept.

33. Plaintiff is the assignee and owner of the right, title and interest in and to the '999 patent, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

34. Upon information and belief, TP-Link had and continued to directly infringe at least claims 1 and 7 of the '999 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method of identifying a virtual network associated with a data frame in VLAN network devices (the "'999 Accused Instrumentalities"). The '999 Accused Instrumentalities include at least the following products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

35. In particular, claim 1 of the '999 patent generally recites a method of identifying a virtual network associated with a data frame when transmitting the data frame between a communications medium and a shared communications medium; where the method comprises: a) receiving the data frame from the communications medium, where the data frame includes a first type field and a data field; b) inserting a second type field at a location within the data frame preceding the first type field, a value of the second type field indicating the data frame include a virtual network identifier field, c) inserting the virtual network identifier field at a location between the second type field and the first type field; d) assigning a first value to the virtual network identifier field, the first value corresponding to the virtual network; and e) transmitting the data frame over the shared communications medium.

36. On information and belief, use of the '999 Accused Instrumentalities reads on and infringes at least claim 1 of the '999 patent. (*See, e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16,

2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

37. Claim 7 of the ’999 patent generally recites the method of identifying a virtual network associated with a data frame when transmitting the data frame between a communications medium and a shared communications medium, where the method comprises: a) receiving the data frame from the communications medium, the data frame including a length field and a data field; b) inserting a type field at a location within the data frame preceding the length field, a value of the type field indicating the data frame includes a virtual network identifier field; c) inserting the virtual network identifier field at a location between the type field and the length field, d) assigning a first value to the virtual network identifier field, the first value corresponding to the virtual network; and e) transmitting the data frame over the shared communications medium.

38. On information and belief, use of the ’999 Accused Instrumentalities reads on and infringes at least claim 7 of the ’999 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-

networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g*. p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g*. p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

39. On information and belief, the '999 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link's partners, clients, customers and end users across the country and in this District.

40. Plaintiff has been harmed by TP-Link's infringing activities.

COUNT III – INFRINGEMENT OF U.S. PATENT NO. RE44,775

41. The allegations set forth in the foregoing paragraphs 1 through 40 are incorporated into this Third Claim for Relief.

42. On February 25, 2014, U.S. Patent No. RE44,775 ("the '775 patent"), entitled "VLAN Frame Format," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '775 patent is attached as Exhibit 3. The '775 patent is part of a family of eleven U.S. patents stemming from U.S. Pat. No. 5,959,990.

43. The inventive embodiments of the '775 patent resolve technical problems related to virtual local area network ("VLAN") and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and

uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the '775 patent.

44. The claims of the '775 patent do not merely recite the performance of some business practice known from the pre-Internet world along with a requirement to perform it on the Internet. Instead, the claims of the '775 patent recite one or more inventive concepts that are rooted in computerized electronic data communications networks, and an improved method to operate such networks and to maintain the interoperability of different physical configurations of such networks.

45. The claims of the '775 patent recite an invention that is not merely the routine or conventional use of electronic devices for communications. Instead, among other things, the invention adds new features to integrate Ethernet and other protocols together on a shared network. The '775 patent claims thus include improvements for, for example, formatting data frames to yield a desired result.

46. The technology claimed in the '775 patent does not preempt all ways of using computerized devices or transmitting information over networks, nor preempt any other well-known or prior art technology.

47. Accordingly, each claim of the '775 patent recites a combination of elements sufficient to ensure that the claim in practice amounts to significantly more than a patent on an ineligible concept.

48. Plaintiff is the assignee and owner of the right, title and interest in and to the '775 patent, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

49. Upon information and belief, TP-Link had and continued to directly infringe at least claims 43, 44, 49, and 50 of the '775 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method of receiving a data frame in VLAN network devices (the "'775 Accused Instrumentalities"). The '775 Accused Instrumentalities include at least the following

products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

50. In particular, claim 43 of the '775 patent generally recites a method of receiving a data frame in a network device comprising a port coupled to a shared communications medium; where the method comprises: a) receiving destination and source media access control addresses; b) receiving a virtual network type field having a value indicating that a virtual network identifier field will be transmitted, and c) receiving the virtual network identifier field having a value including reading the virtual network identifier field in accordance with the virtual network type field value to determine the value.

51. On information and belief, use of the '775 Accused Instrumentalities reads on and infringes at least claim 43 of the '775 patent. (*See, e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

52. Claim 44 of the '775 patent depends from claim 43 and recites the added limitation wherein the receiving operations occur in an order of: receiving a destination media access control address, receiving a source media access control

address, receiving a virtual network type field, then receiving a virtual network identifier field.

53. On information and belief, use of the '775 Accused Instrumentalities reads on and infringes at least claim 44 of the '775 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

54. Claim 49 of the '775 patent depends from claim 43 and recites the added limitation wherein receiving destination and source media access control addresses, receiving a virtual network type field and receiving a virtual network identifier field comprises receiving a data frame comprising the destination and source media access control addresses, the virtual network type field and the virtual network identifier field, the method further comprising forwarding at least part of the received data frame on a port selected based at least in part on the value of the virtual network identifier field.

55. On information and belief, use of the '775 Accused Instrumentalities reads on and infringes at least claim 49 of the '775 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16,

2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

56. Claim 50 of the '775 patent depends from claim 49 and further recites wherein when the port selected based at least in part on the value of the virtual network identifier field is connected to a dedicated communications medium, forwarding at least part of the received data frame comprises: a) removing the virtual network type field and the virtual network identifier field from the data frame; and b) forwarding the data frame without the virtual network type field and without the virtual network identifier field on the selected port of the network device.

57. On information and belief, use of the '775 Accused Instrumentalities reads on and infringes at least claim 50 of the '775 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks,

IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

58. On information and belief, the '775 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link's partners, clients, customers and end users across the country and in this District.

59. Plaintiff has been harmed by TP-Link's infringing activities.

COUNT IV – INFRINGEMENT OF U.S. PATENT NO. RE45,081

60. The allegations set forth in the foregoing paragraphs 1 through 59 are incorporated into this Fourth Claim for Relief.

61. On August 19, 2014, U.S. Patent No. RE45,081 ("the '081 patent"), entitled "VLAN Frame Format," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '081 patent is attached as Exhibit 4. The '081 patent is part of a family of eleven U.S. patents stemming from U.S. Pat. No. 5,959,990.

62. The inventive embodiments of the '081 patent resolve technical problems related to virtual local area network ("VLAN") and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the '081 patent.

63. The claims of the '081 patent do not merely recite the performance of some business practice known from the pre-Internet world along with a requirement to

perform it on the Internet. Instead, the claims of the '081 patent recite one or more inventive concepts that are rooted in computerized electronic data communications networks, and an improved method to operate such networks and to maintain the interoperability of different physical configurations of such networks.

64. The claims of the '081 patent recite an invention that is not merely the routine or conventional use of electronic devices for communications. Instead, among other things, the invention adds new features to integrate Ethernet and other protocols together on a shared network. The '081 patent claims thus include improvements for, for example, formatting data frames to yield a desired result.

65. The technology claimed in the '081 patent does not preempt all ways of using computerized devices or transmitting information over networks, nor preempt any other well-known or prior art technology.

66. Accordingly, each claim of the '081 patent recites a combination of elements sufficient to ensure that the claim in practice amounts to significantly more than a patent on an ineligible concept.

67. Plaintiff is the assignee and owner of the right, title and interest in and to the '081 patent, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

68. Upon information and belief, TP-Link had and continued to directly infringe at least claims 17, 21, and 25 of the '081 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method to transmit a data frame associated with a virtual network in VLAN network devices (the "'081 Accused Instrumentalities"). The '081 Accused Instrumentalities include at least the following products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

69. In particular, claim 17 of the '081 patent recites a method of transmitting a data frame associated with a virtual network between a communications medium

and a shared communications medium; where the method comprises: at a first network device coupled to the shared communications medium, a) receiving the data frame from the communications medium, the data frame comprising a destination MAC address, a source MAC address and a data field; b) inserting a type field at a location within the data frame between the MAC addresses and the data field, a value of the type field indicating that the data frame comprises a virtual network identifier field; c) inserting the virtual network identifier field at a location between the type field and the data field; d) assigning a value to the virtual network identifier field, the value corresponding to the virtual network, and e) transmitting the data frame over the shared communications medium; and at a second network device comprising a port coupled to the shared communications medium: a) receiving the data frame, comprising: i) receiving the destination and source media access control addresses; ii) receiving the type field having the value indicating that the data frame comprises a virtual network identifier field; and iii) receiving the virtual network identifier field including reading the virtual network identifier field in accordance with the value of the type field to determine the value of the virtual network identifier field; and b) transmitting the data frame at least toward the virtual network corresponding to the value of the virtual network identifier field.

70. On information and belief, use of the ’081 Accused Instrumentalities reads on and infringes at least claim 17 of the ’081 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011

(*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

71. Claim 21 of the '081 patent recites a method of transmitting a data frame associated with a virtual network between a communications medium and a shared communications medium, where the method comprises: at a first network device coupled to the shared communications medium: a) receiving the data frame from the communications medium, the data frame comprising a destination MAC address, a source MAC address and a data field; b) inserting a type field at a location within the data frame between the MAC addresses and the data field, a value of the type field indicating that the data frame comprises a virtual network identifier field; c) inserting the virtual network identifier field at a location between the type field and the data field; d) assigning a value to the virtual network identifier field, the value corresponding to the virtual network; and e) transmitting the data frame over the shared communications medium; and at a second network device comprising a port coupled to the shared communications medium: a) receiving the data frame, comprising: i) receiving the destination and source media access control addresses; ii) receiving the type field having the value indicating that the data frame comprises the virtual network identifier field; and iii) receiving the virtual network identifier field having the value associated with the virtual network including reading the virtual network identifier field in accordance with the value of the type field to determine the value associated with the virtual network; and b) transmitting the data frame at least toward the virtual network corresponding to the value of the virtual network identifier field.

72. On information and belief, use of the '081 Accused Instrumentalities reads on and infringes at least claim 21 of the '081 patent. (*See, e.g.*, https://www.tp-

link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g*. p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g*. p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

73. Claim 25 of the ’081 patent recites a method of transmitting a data frame associated with a virtual network between a communications medium and a shared communications medium, where the method comprises: at a first network device coupled to the shared communications medium: a) receiving the data frame from the communications medium, the data frame comprising a destination MAC address, a source MAC address, an original type or length field and a data field; b) inserting a type field at a location within the data frame between the MAC addresses and the original type or length field, a value of the type field indicating that the data frame is associated with a virtual network, and that the data frame comprises a virtual network header including a virtual network identifier field and at least one other field, the virtual network identifier field having a value corresponding to the virtual network; c) inserting the virtual network header at a location between the type field and the data field; d) assigning a value to the virtual network identifier field, the value corresponding to the virtual network; and e) transmitting the data frame over the shared communications medium; and at a second network device coupled to the

shared communications medium: a) receiving the data frame, the data frame comprising the type field and the virtual network header; b) reading the type field and determining that the data frame is associated with a virtual network; c) in response to determining that the data frame is associated with a virtual network, reading the value of the virtual network identifier field to determine the virtual network with which the data frame is associated; and d) transmitting the data frame at least toward the virtual network corresponding to the value of the virtual network identifier field.

74. On information and belief, use of the '081 Accused Instrumentalities reads on and infringes at least claim 25 of the '081 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

75. On information and belief, the '081 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link's partners, clients, customers and end users across the country and in this District.

76. Plaintiff has been harmed by TP-Link's infringing activities.

COUNT V – INFRINGEMENT OF U.S. PATENT NO. RE45,065

77. The allegations set forth in the foregoing paragraphs 1 through 76 are incorporated into this Fifth Claim for Relief.

78. On August 5, 2014, U.S. Patent No. RE45,065 ("the '065 patent"), entitled "VLAN Frame Format," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '065 patent is attached as Exhibit 5. The '065 patent is part of a family of eleven U.S. patents stemming from U.S. Pat. No. 5,959,990.

79. The inventive embodiments of the '065 patent resolve technical problems related to virtual local area network ("VLAN") and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the '065 patent.

80. Plaintiff is the assignee and owner of the right, title and interest in and to the '065 patent, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

81. Upon information and belief, TP-Link had and continued to directly infringe at least claims 17 and 28 of the '065 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method to transmit a data frame associated with a virtual network in VLAN network devices (the "'065 Accused Instrumentalities"). The '065 Accused Instrumentalities include at least the following products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

82. In particular, claim 17 of the '065 patent recites a network device for transmitting a data frame to a virtual network associated with the data frame between a communications medium and a shared communications medium, where the network device comprises: at least one respective port connected to each of the communications medium and the shared communications medium; and a processing unit configured a) to receive the data frame, the data frame comprising a type field, and a virtual network header including a virtual network identifier field and at least one other field, the type field having a value indicating that the data frame is associated with a virtual network, and the virtual network identifier field having a virtual network identifier field value corresponding to the virtual network; b) to read the type field and determine that the data frame is associated with a virtual network; c) in response to determining that the data frame is associated with a virtual network, to read the virtual network identifier field value to determine the virtual network with which the data frame is associated; and d) to transmit the data frame at least toward the virtual network corresponding to the virtual network identifier field value.

83. On information and belief, use of the '065 Accused Instrumentalities reads on and infringes at least claim 17 of the '065 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019));

https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

84. Claim 28 of the '065 patent recites a network device for transmitting a data frame to a virtual network associated with the data frame between a communications medium and a shared communications medium, where the network device comprises: at least one respective port connected to each of the communications medium and the shared communications medium; and a processing unit configured: a) to receive the data frame, the data frame comprising a type field, and a virtual network header having an associated format and including a virtual network identifier field, the type field having a value indicating which of a plurality of formats the associated format is and that the data frame is associated with a virtual network, and the virtual network identifier field having a virtual network identifier field value corresponding to the virtual network; b) to read the type field and determine that the data frame is associated with a virtual network and determine the format; c) in response to determining that the data frame is associated with a virtual network and determining the format, to read the virtual network identifier field in accordance with the determined format to determine the virtual network with which the data frame is associated; and d) to transmit the data frame at least toward the virtual network corresponding to the virtual network identifier field value.

85. On information and belief, use of the '065 Accused Instrumentalities reads on and infringes at least claim 28 of the '065 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks,

IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g*. p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g*. p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

86. On information and belief, the ’065 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link’s partners, clients, customers and end users across the country and in this District.

87. Plaintiff has been harmed by TP-Link’s infringing activities.

COUNT VI – INFRINGEMENT OF U.S. PATENT NO. RE45,095

88. The allegations set forth in the foregoing paragraphs 1 through 87 are incorporated into this Sixth Claim for Relief.

89. On August 26, 2014, U.S. Patent No. RE45,095 (“the ’095 patent”), entitled “VLAN Frame Format,” was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the ’095 patent is attached as Exhibit 6. The ’095 patent is part of a family of eleven U.S. patents stemming from U.S. Pat. No. 5,959,990.

90. The inventive embodiments of the ’095 patent resolve technical problems related to virtual local area network (“VLAN”) and methods to format a data frame in VLAN network devices. Such technologies are a required part of the IEEE 802.1Q standard for VLAN tagging for ethernet frames and accompanying procedures used by networking equipment (such as bridges, switches, or routers) in handling VLAN-tagged frames. Thus, 802.1Q-certified local area networks and equipment, and uncertified equipment that nonetheless implements the mandatory features of the 802.1Q standard, necessarily meet the claim limitations of the ’095 patent.

91. The claims of the ’095 patent do not merely recite the performance of some business practice known from the pre-Internet world along with a requirement to

perform it on the Internet. Instead, the claims of the '095 patent recite one or more inventive concepts that are rooted in computerized electronic data communications networks, and an improved method to operate such networks and to maintain the interoperability of different physical configurations of such networks.

92. The claims of the '095 patent recite an invention that is not merely the routine or conventional use of electronic devices for communications. Instead, among other things, the invention adds new features to integrate Ethernet and other protocols together on a shared network. The '095 patent claims thus include improvements for, for example, formatting data frames to yield a desired result.

93. The technology claimed in the '095 patent does not preempt all ways of using computerized devices or transmitting information over networks, nor preempt any other well-known or prior art technology.

94. Accordingly, each claim of the '095 patent recites a combination of elements sufficient to ensure that the claim in practice amounts to significantly more than a patent on an ineligible concept.

95. Plaintiff is the assignee and owner of the right, title and interest in and to the '095 patent, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

96. Upon information and belief, TP-Link had and continued to directly infringe at least claim 17 of the '095 patent by having made, used, sold, imported and/or provided for use without authority within the United States, 802.1Q-compliant local area networks and equipment performing a method to transmit a data frame associated with a virtual network in VLAN network devices (the "'095 Accused Instrumentalities"). The '095 Accused Instrumentalities include at least the following products: TP-Link's Cable Gateways, Managed Switches, Smart Switches, and Easy Smart Switches.

97. In particular, claim 17 of the '095 patent recites a method of transmitting a virtual network identifier in a data frame transmitted on a shared communications

medium, where the method comprises: a) transmitting a destination address field containing a destination address for the data frame; b) transmitting a source address field containing a source address associated with the data frame; c) transmitting a virtual network type field having a value indicative that the data frame is associated with a virtual network; d) transmitting a virtual network identifier field having a value indicative of the virtual network with which the data frame is associated, the value being in one of a plurality of formats as indicated by the value of the virtual network type field; e) transmitting a length field having contents indicating a length of a data field; and f) transmitting the data field.

98. On information and belief, use of the '095 Accused Instrumentalities reads on and infringes at least claim 17 of the '095 patent. (*See*, *e.g.*, https://www.tp-link.com/us/home-networking/cable-gateway/tc-w7960/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/managed-switch/t2600g-28mps/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/smart-switch/t1700g-28tq/ (last accessed April 16, 2020); https://www.tp-link.com/us/business-networking/easy-smart-switch/tl-sg108pe/ (last accessed April 16, 2020); *see also* the IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, IEEE Std 802.1QTM-2011 (Revision of IEEE Std 802.1Q-2005), 31 August 2011 (*e.g.* p. 1, 23, 98, 103-105, 149-150, 1269); IEEE Std 802.1QTM-2014; IEEE Std 802.3TM-2012 (*e.g.* p. 53); IEEE 802.1Q VLAN Tutorial (Graham Shaw, *available at* http://www.microhowto.info/tutorials/802.1Q.html (last accessed June 11, 2019)); https://wiki.openwrt.org/doc/howto/wireless.security.8021x (last accessed June 11, 2019).)

99. On information and belief, the '095 Accused Instrumentalities are used, marketed, provided to, and/or used by or for each of TP-Link's partners, clients, customers and end users across the country and in this District.

100. Plaintiff has been harmed by TP-Link's infringing activities.

JURY DEMAND

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Plaintiff demands a trial by jury on all issues triable as such.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff demands judgment for itself and against TP-Link as follows:

A. An adjudication that TP-Link has infringed the '990, '999, '775, '081, '065, and '095 patents;

B. An award of damages to be paid by TP-Link adequate to compensate Plaintiff for TP-Link's past infringement of the '990, '999, '775, '081, '065, and '095 patents, including interest, costs, expenses and an accounting of all infringing acts including, but not limited to, those acts not presented at trial;

C. A declaration that this case is exceptional under 35 U.S.C. § 285, and an award of Plaintiff's reasonable attorneys' fees; and

D. An award to Plaintiff of such further relief at law or in equity as the Court deems just and proper.

Dated: April 17, 2020

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