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

HUAWEI TECHNOLOGIES CO. LTD.,

Plaintiff,

v.

VERIZON COMMUNICATIONS, INC., VERIZON BUSINESS NETWORK SERVICES, INC., VERIZON ENTERPRISE SOLUTIONS, LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, INC., VERIZON DATA SERVICES LLC, VERIZON BUSINESS GLOBAL LLC, VERIZON SERVICES CORP., AND VERIZON PATENT AND LICENSING INC.

Defendants.

C.A. 2:20-cv-00030

DEFENDANTS' FIRST AMENDED ANSWER AND COUNTERCLAIMS TO HUAWEI'S FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

JURY TRIAL DEMANDED

VERIZON BUSINESS NETWORK SERVICES, INC., CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, VERIZON DATA SERVICES LLC, VERIZON BUSINESS GLOBAL LLC, VERIZON SERVICES CORP., AND VERIZON PATENT AND LICENSING INC.

Counterclaim-Plaintiffs,

v.

HUAWEI TECHNOLOGIES CO. LTD., HUAWEI TECHNOLOGIES USA, INC., AND FUTUREWEI TECHNOLOGIES INC.

Counterclaim-Defendants.

DEFENDANTS' FIRST AMENDED ANSWER AND COUNTERCLAIMS TO HUAWEI'S FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Defendants Verizon Communications Inc. ("Verizon Communications")[1], Verizon Business Network Services, Inc. ("Verizon Business Network"), Verizon Enterprise Solutions, LLC ("Verizon Enterprise"), Cellco Partnership d/b/a Verizon Wireless ("Verizon Wireless"), Verizon Data Services LLC ("Verizon Data Services"), Verizon Business Global LLC ("Verizon Business Global"), Verizon Services Corp. ("Verizon Services"), and Verizon Patent and Licensing Inc. (collectively, "Verizon" or "Defendants"), by and through their undersigned attorneys, hereby submit this First Amended Answer, Affirmative Defenses, and Counterclaims in response to the First Amended Complaint filed by Plaintiff Huawei Technologies Co. ("Huawei" or "Plaintiff"), as set forth below.

Verizon is one of America's most innovative companies and a key portion of America's telecommunications infrastructure. Verizon offers industry-leading connectivity to its customers, connecting millions of people, companies and communities through its award-winning networks. RootMetrics, the United States' most rigorous and scientific network tester, ranked Verizon highest in overall network performance for a record-setting 13 consecutive years. For 12 consecutive years, J.D. Power awarded Verizon top honors in numerous wireless network performance categories. And Forbes ranked Verizon in the top 20 of its 2020 list of companies "doing right by America."

Much as it has led the way in 4G LTE network reliability and speeds, Verizon is innovating in 5G network technology. Verizon holds over seven thousand United States patents for its

[1] Verizon Communications is not a proper party to this lawsuit. Verizon Communications is a holding company.

inventions. Verizon's patented ideas are the technologies that fuel Verizon's networks– not the outdated and valueless techniques referenced in Huawei's First Amended Complaint.

Huawei has a long record of failing to play by the rules where intellectual property is concerned (as exemplified by the behavior set forth in its recent indictment by the United States government for intellectual property theft, among other crimes). Huawei's suit against Verizon is another example of an attempt by Huawei to take credit for American innovation. Huawei ignores Verizon's own substantial investment in research and development. Verizon will vigorously defend against Huawei's baseless claims of patent infringement. As explained herein, Huawei is using *Verizon's* technology—not the other way around.

Each paragraph of the Answer below responds to the corresponding numbered or lettered paragraph of the First Amended Complaint. All allegations not expressly admitted herein are denied by Verizon.

THE PARTIES[2]

1. On information and belief, Verizon admits that Plaintiff purports to be a Chinese corporation with its principal place of business at Bantian, Longgang District, Shenzhen, People's Republic of China.

2. Verizon admits the allegations in paragraph 2 of the First Amended First Amended Complaint.

3. Verizon admits that Verizon Business Network Services Inc. is a Delaware corporation and has designated CT Corporation, 1999 Bryan St., Suite 900, Dallas, Texas 75201 as its agent for service of process. Verizon otherwise denies the allegations in paragraph 3 of the First Amended Complaint.

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[2] Headings are provided for convenience only and are not an admission.

4. Verizon denies the allegations in paragraph 4 of the First Amended Complaint. Verizon Enterprise Solutions, LLC is not an active company.

5. Verizon admits the allegations in paragraph 5 of the First Amended Complaint.

6. Verizon admits the allegations in paragraph 6 of the First Amended Complaint.

7. Verizon admits that Verizon Business Global, LLC is a Delaware corporation and has designated Corporation Trust Company, Corporation Trust Company Center, 1209 Orange Street, Wilmington, Delaware 19801 as its agent for service of process. Verizon otherwise denies the allegations in paragraph 7 of the First Amended Complaint

8. Verizon admits that Verizon Services Corp. is a Delaware corporation and has designated CT Corporation, 1999 Bryan Street, Suite 900, Dallas, Texas 75201. Verizon otherwise denies the allegations in paragraph 8 of the First Amended Complaint.

9. Verizon admits the allegations in paragraph 9 of the First Amended Complaint.

10. Verizon admits that Verizon Business Network Services, Inc., Cellco Partnership d/b/a Verizon Wireless, Verizon Data Services LLC, Verizon Business Global, LLC, Verizon Services Inc., and Verizon Patent and Licensing Inc. are direct or indirect subsidiaries of Verizon Communications, and Verizon Enterprise Solutions, LLC was an indirect subsidiary of Verizon Communications. Verizon denies the remaining allegations of paragraph 10.

JURISDICTION AND VENUE

11. Verizon admits that Plaintiff purports to bring a claim for patent infringement under the United States Patent Laws, 35 U.S.C. § 271, *et. seq*. Verizon admits that the Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338.

12. Verizon admits that Plaintiff purports to bring declaratory judgment claims under the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq*. Verizon admits that the Court has subject matter jurisdiction over these claims under 28 U.S.C. §§ 1331, 1338, 2201, and 2202.

13. Paragraph 13 of the First Amended Complaint sets forth conclusions of law to which no response is required. To the extent a response is deemed to be required, Verizon denies the allegations of paragraph 13 of the First Amended Complaint, except that Verizon, for the purposes of this action only, does not contest that the Eastern District of Texas has personal jurisdiction over all defendants identified in the First Amended Complaint other than Verizon Communications and Verizon Enterprise in this action.

14. Paragraph 14 of the First Amended Complaint sets forth conclusions of law to which no response is required.

15. Verizon denies that the Eastern District of Texas is the most suitable or convenient venue for resolution of this case. The remaining portions of paragraph 15 of the First Amended Complaint sets forth conclusions of law to which no response is required.

ASSERTED PATENTS

16. Verizon admits that the title appearing on the face of U.S. Patent No. 8,270,433 ("the '433 patent") is "Sending Method, Receiving and Processing Method and Apparatus for Adapting Payload Bandwidth for Data Transmission," the '433 patent bears, on its face, an issue date of September 18, 2012, and that a purported copy of the '433 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 16 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

17. Verizon admits that the title appearing on the face of U.S. Patent No. 9,014,151 ("the '151 patent") is "Method and Apparatus for Transmitting Low-Rate Traffic Signal in Optical Transport Network," the '151 patent bears, on its face, an issue date of April 21, 2015, and that a purported copy of the '151 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 17 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

18. Verizon admits that the title appearing on the face of U.S. Patent No. 8,406,236 ("the '236 patent") is "Method and Apparatus for Transporting Client Signal in Optical Transport Network," the '236 patent bears, on its face, an issue date of March 26, 2013, and that a purported copy of the '236 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 18 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

19. Verizon admits that the title appearing on the face of U.S. Patent No. 8,824,505 ("the '505 patent") is "Method and Apparatus for Transporting Client Signals in an Optical Transport Network," the '505 patent bears, on its face, an issue date of September 2, 2014, and that a purported copy of the '505 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 19 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

20. Verizon admits that the title appearing on the face of U.S. Patent No. 9,312,982 ("the '982 patent") is "Method and Apparatus for Mapping and De-Mapping in an Optical

Transport Network," the '982 patent bears, on its face, an issue date of April 12, 2016, and that a purported copy of the '982 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 20 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

21. Verizon admits that the title appearing on the face of U.S. Patent No. 8,995,253 ("the '253 patent") is "Method, Apparatus and System for Ring Protection," the '253 patent bears, on its face, an issue date of March 31, 2015, and that a purported copy of the '253 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 21 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

22. Verizon admits that the title appearing on the face of U.S. Patent No. 9,270,485 ("the '485 patent") is "Method for Ethernet Ring Protection," the '485 patent bears, on its face, an issue date of February 23, 2016, and that a purported copy of the '485 patent was attached to the First Amended Complaint. Verizon is without knowledge or information sufficient to form a belief as to the truth of the remaining allegations set forth in paragraph 22 of the First Amended Complaint and therefore denies each and every remaining allegation set forth therein.

FACTUAL ALLEGATIONS

Huawei's Alleged Investment in Research and Development

23. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 23 and, on that basis, denies them.

24. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 24 and, on that basis, denies them.

25. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 25 and, on that basis, denies them.

26. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 26 and, on that basis, denies them.

27. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 27 and, on that basis, denies them.

28. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 28 and, on that basis, denies them.

29. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 29 and, on that basis, denies them.

30. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 30 and, on that basis, denies them.

31. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 31 and, on that basis, denies them.

Huawei's Alleged Development of Transport Network Technologies

32. Verizon admits that the Telecommunication Standardization Sector of the International Telecommunications Union ("ITU-T") includes the ITU-T's *G.709: Interfaces for the optical transport network* standard ("G.709" or "the G.709 Standard"). Verizon also admits that the G.709 Standard relates to optical transport networks and that the ITU-T G.709 defines the requirements of the optical transport network (OTN) interface signals of the optical transport network as set forth on page i of the G.709 Standard. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 32 and, on that basis, denies them.

33. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 33 and, on that basis, denies them.

34. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 34 and, on that basis, denies them.

35. Paragraph 35 of the First Amended Complaint sets forth conclusions of law, to which no response is required.

36. Verizon admits that the ITU-T publishes the ITU-T's *G.8032: Ethernet Ring Protection Switching* standard ("G.8032" or "the G.8032 Standard"). Verizon also admits that the G.8032 Standard relates to Ethernet ring protection and that paragraph 36 of the First Amended Complaint quotes text from the G.8032 Standard as set forth on page 1 of the G.8032 Standard. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 36 and, on that basis, denies them.

37. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 37 and, on that basis, denies them.

38. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 38 and, on that basis, denies them.

39. Paragraph 39 of the First Amended Complaint sets forth conclusions of law, to which no response is required.

The RAND Commitment

40. Verizon admits that the Transport Network technology encompasses a number of different standards. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 40 and, on that basis, denies them.

41. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 41 and, on that basis, denies them.

42. Verizon admits that paragraph 42 of the First Amended Complaint quotes the "Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary F/RAND Commitments" dated December 19, 2019. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 42 and, on that basis, denies them.

43. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 43 and, on that basis, denies them.

44. Verizon admits that paragraph 44 of the First Amended Complaint quotes the "Common Patent Policy for ITU-T/ITU-R/ISO/IEC." Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 44 and, on that basis, denies them.

45. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 45 and, on that basis, denies them.

46. Verizon admits that paragraph 46 of the First Amended Complaint includes excerpts from Huawei's ITU-T Licensing Declaration Form. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 46 and, on that basis, denies them.

Verizon's Alleged Use of Huawei's Transport Network Technologies

47. Verizon admits that Verizon's optical transport network systems include networks such as optical backbone network, metro fiber-optic network, mobile backhaul network, packet-optical network. Verizon admits that it provides services such as Wavelength Services, FiOS, Integrated Optical Service, Metro Private Line Wavelength Services, Optical Wave Service, Wavelength Service (Solution), US Private Line Wavelength Service, Ethernet Private Line Service, and Dedicated Internet Services. Verizon admits that Plaintiff accuses these networks and services of infringing Huawei's patents. Verizon admits that Plaintiff purports to use the term

"Accused G.709 Instrumentalities" in the First Amended Complaint to refer to networks and services sold by Verizon. To the extent that paragraph 47 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the remaining allegations in paragraph 47 and, on that basis, denies them, including as to what additional networks and services, if any, Plaintiff refers to by the phrase "Verizon's various types of networks" and "involved in providing services," and on that basis Verizon denies them.

48. Verizon admits that generically, Verizon's Ethernet network supports as an underlay to mobile backhaul network, Metro network, MPLS L2VPN network, packet-optical network, IP backbone network, and Enterprise private network. To the extent that paragraph 48 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the remaining allegations in paragraph 48 and, on that basis, denies them, including as to what specific networks and services, if any, Plaintiff refers to by the phrase "systems relying on or using Verizon's broadband internet access network," and on that basis Verizon denies them.

49. Verizon admits that it uses a variety of networking technologies in its networks and that certain features of the network transport technology are important to Verizon's business. Verizon lacks sufficient knowledge and information to form a belief about the truth of the remaining allegations in paragraph 49 and, on that basis, denies them.

50. Verizon admits that it has sold and continues to sell services such as Wavelength Services, FiOS, Integrated Optical Service, Metro Private Line Wavelength Services, Optical Wave Service, Wavelength Service (Solution), US Private Line Wavelength Service, Ethernet

Private Line Service, and Dedicated Internet Services, directly and/or indirectly, to third parties, customers, users, distributors, and/or resellers. Verizon admits that Plaintiff purports to use the term "downstream parties" to refer to third parties, customers, users, distributors, and/or resellers. To the extent that paragraph 50 of the First Amended Complaint sets forth conclusions of law, no response is required. Verizon lacks sufficient knowledge and information to form a belief about the truth of the remaining allegations in paragraph 50 and, on that basis, denies them.

51. To the extent that paragraph 51 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 51 and, on that basis, denies them.

52. To the extent that paragraph 52 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 52 and, on that basis, denies them.

Huawei's Negotiations with Verizon

53. To the extent that paragraph 53 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 53 and, on that basis, denies them.

54. Verizon admits that on February 7, 2019, Huawei contacted Verizon. Verizon admits that Huawei identified patents from its portfolio and services offered by Verizon. Except as expressly admitted, the allegations contained in paragraph 54 of the First Amended Complaint are denied.

55. Verizon admits that on March 28, 2019, Huawei representatives met in person with Verizon representatives. Verizon admits that Huawei representatives discussed certain Huawei patents. Except as expressly admitted, the allegations contained in paragraph 55 of the First Amended Complaint are denied.

56. Verizon admits that on March 29, 2019, Huawei provided claim charts to Verizon and that those charts included the ’433, the ’151, the ’236, the ’505, the ’982, the ’253, and ’485 patents. Except as expressly admitted, the allegations contained in paragraph 56 of the First Amended Complaint are denied.

57. Verizon admits that as of March 29, 2019, it was aware of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents. Except as expressly admitted, the allegations contained in paragraph 57 of the First Amended Complaint are denied.

58. Verizon admits that on June 4-5, 2019, Huawei representatives met in-person with representatives from Verizon in New York and discussed a small subset of the claim chart Huawei had provided. Verizon admits that Huawei verbally offered to license its patents, and that Verizon asked Huawei to provide more information on its proposal, including information on the patents Huawei identified and the charts Huawei provided. Except as expressly admitted, the allegations in paragraph 58 of the First Amended Complaint are denied.

59. Verizon admits that on June 18, 2019, Huawei representatives spoke with Verizon representatives via telephone and that Verizon advised it would identify more Huawei claim charts to be discussed at their next meeting. Verizon admits that it again asked Huawei to provide more information on its licensing proposal. Except as expressly admitted, the allegations contained in paragraph 59 of the First Amended Complaint are denied.

60. Verizon admits that on July 30-31, 2019; September 3-4, 2019; and November 21-22, 2019, Huawei representatives met in person with representatives from Verizon in New York. Verizon admits that those discussions included discussions of the '151 patent. Verizon admits that again asked Huawei to provide more information on its licensing proposal at these meetings, as Verizon and Huawei still had not discussed all of the patents and all of the charts Huawei decided to send Verizon. Except as expressly admitted, the allegations contained in paragraph 60 of the First Amended Complaint are denied.

61. Verizon admits that on December 19, 2019, Huawei provided an offer for a license via email. Except as expressly admitted, the allegations contained in paragraph 61 of the First Amended Complaint are denied.

62. Verizon admits that on January 21, 2020, Huawei representatives met in-person with representatives from Verizon in New York. Verizon admits that no license agreement was reached, and that Huawei did not ask for, and Verizon did not provide, information regarding Verizon's own patent portfolio, or otherwise discuss a proposal to respect the value of each company's intellectual property in a cross-licensing arrangement. Except as expressly admitted, the allegations contained in paragraph 62 of the First Amended Complaint are denied.

63. Verizon admits that no license with respect to Huawei's patent portfolio including the asserted patents in the First Amended Complaint was reached between the parties. Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 63 and, on that basis, denies them.

64. Verizon admits that Huawei filed suit against Verizon before the parties concluded their licensing negotiations—indeed, before the parties could discuss all of the patents and charts Huawei initially identified to Verizon, and before Verizon had any opportunity to present

Verizon's own patents to Huawei. Verizon admits that Huawei never asked for a proposal to use Verizon's patents and did not engage on terms for a cross-license before Huawei filed suit. Verizon admits that, because Huawei filed suit before Verizon could discuss its own patents with Huawei, Verizon it did not identify the '111 and '288 patents to Huawei prior to filing its Counterclaims on March 30, 2020. Except as expressly admitted, the allegations contained in paragraph 64 of the First Amended Complaint are denied.

65. To the extent that paragraph 65 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 65 of the First Amended Complaint.

66. To the extent that paragraph 66 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 66 of the First Amended Complaint.

67. To the extent that paragraph 67 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 67 of the First Amended Complaint.

COUNT ONE: ALLEGED INFRINGEMENT OF THE '433 PATENT

68. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

69. Verizon admits that the face of U.S. Patent No. 8,270,433 ("the '433 patent") contains the title "Sending Method, Receiving and Processing Method and Apparatus for Adapting Payload Bandwidth for Data Transmission." Verizon admits that the face of the '433 patent states the "Date of Patent" as "Sep. 18, 2012" and lists the "Inventor" as "Zhangzhen Jiang." Except as expressly admitted, the allegations contained in paragraph 69 of the First Amended Complaint are denied.

70. To the extent that paragraph 70 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 70 of the First Amended Complaint.

71. To the extent that paragraph 71 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 71 of the First Amended Complaint.

72. To the extent that paragraph 72 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 72 and, on that basis, denies them.

73. To the extent that paragraph 73 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 73 of the First Amended Complaint.

74. To the extent that paragraph 74 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 74 of the First Amended Complaint.

75. To the extent that paragraph 75 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 75 of the First Amended Complaint.

76. To the extent that paragraph 76 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 76 of the First Amended Complaint.

77. To the extent that paragraph 77 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 77 of the First Amended Complaint.

78. Verizon admits that the ’433 patent contains a claim 1. Verizon admits that paragraph 78 of the First Amended Complaint quotes claim 1 as recited in the ’433 patent. Except as expressly admitted, the allegations contained in paragraph 78 of the First Amended Complaint are denied.

79. To the extent that paragraph 79 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 79 of the First Amended Complaint.

80. To the extent that paragraph 80 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 80 of the First Amended Complaint.

81. To the extent that paragraph 81 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 81 of the First Amended Complaint.

82. To the extent that paragraph 82 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 82 of the First Amended Complaint.

83. To the extent that paragraph 83 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 83 of the First Amended Complaint.

84. To the extent that paragraph 84 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 84 of the First Amended Complaint.

85. To the extent that paragraph 85 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 85 of the First Amended Complaint.

86. To the extent that paragraph 86 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 86 of the First Amended Complaint.

87. To the extent that paragraph 87 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 87 of the First Amended Complaint.

88. To the extent that paragraph 88 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 88 of the First Amended Complaint.

89. To the extent that paragraph 89 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 89 of the First Amended Complaint.

90. To the extent that paragraph 90 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 90 of the First Amended Complaint.

91. To the extent that paragraph 91 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 91 of the First Amended Complaint.

92. To the extent that paragraph 92 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 92 of the First Amended Complaint.

93. To the extent that paragraph 93 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 93 of the First Amended Complaint.

94. To the extent that paragraph 94 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 94 of the First Amended Complaint.

95. To the extent that paragraph 95 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 95 of the First Amended Complaint.

96. To the extent that paragraph 96 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 96 of the First Amended Complaint.

COUNT TWO: ALLEGED INFRINGEMENT OF THE '151 PATENT

97. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

98. Verizon admits that the face of U.S. Patent No. 9,014,151 ("the '151 patent") contains the title "Method and Apparatus for Transmitting Low-Rate Traffic Signal in Optical Transport Network." Verizon admits that the face of the '151 patent states the "Date of Patent" as

"Apr. 21, 2015" and lists the "Inventor" as "Shimin Zou." Except as expressly admitted, the allegations contained in paragraph 98 of the First Amended Complaint are denied.

99. To the extent that paragraph 99 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 99 of the First Amended Complaint.

100. To the extent that paragraph 100 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 100 of the First Amended Complaint.

101. To the extent that paragraph 101 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 101 and, on that basis, denies them.

102. To the extent that paragraph 102 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 102 of the First Amended Complaint.

103. To the extent that paragraph 103 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 103 of the First Amended Complaint.

104. To the extent that paragraph 104 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 104 of the First Amended Complaint.

105. To the extent that paragraph 105 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 105 of the First Amended Complaint.

106. To the extent that paragraph 106 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 106 of the First Amended Complaint.

107. Verizon admits that the '151 patent contains a claim 1. Verizon admits that paragraph 107 of the First Amended Complaint quotes claim 1 as recited in the '151 patent. Except as expressly admitted, the allegations contained in paragraph 107 of the First Amended Complaint are denied.

108. To the extent that paragraph 108 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 108 of the First Amended Complaint.

109. To the extent that paragraph 109 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 109 of the First Amended Complaint.

110. To the extent that paragraph 110 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 110 of the First Amended Complaint.

111. To the extent that paragraph 111 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 111 of the First Amended Complaint.

112. To the extent that paragraph 112 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 112 of the First Amended Complaint.

113. To the extent that paragraph 113 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 113 of the First Amended Complaint.

114. To the extent that paragraph 114 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 114 of the First Amended Complaint.

115. To the extent that paragraph 115 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 115 of the First Amended Complaint.

116. To the extent that paragraph 116 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 116 of the First Amended Complaint.

117. To the extent that paragraph 117 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 117 of the First Amended Complaint.

118. To the extent that paragraph 118 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 118 of the First Amended Complaint.

119. To the extent that paragraph 119 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 119 of the First Amended Complaint.

120. To the extent that paragraph 120 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 120 of the First Amended Complaint.

121. To the extent that paragraph 121 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 121 of the First Amended Complaint.

122. To the extent that paragraph 122 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 122 of the First Amended Complaint.

123. To the extent that paragraph 123 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 123 of the First Amended Complaint.

124. To the extent that paragraph 124 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 124 of the First Amended Complaint.

125. To the extent that paragraph 125 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 125 of the First Amended Complaint.

126. To the extent that paragraph 126 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 126 of the First Amended Complaint.

127. To the extent that paragraph 127 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 127 of the First Amended Complaint.

128. To the extent that paragraph 128 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 128 of the First Amended Complaint.

129. To the extent that paragraph 129 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 129 of the First Amended Complaint.

COUNT THREE: ALLEGED INFRINGEMENT OF THE '236 PATENT

130. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

131. Verizon admits that the face of U.S. Patent No. 8,406,236 ("the '236 patent") contains the title "Method and Apparatus for Transporting Client Signal in Optical Transport Network." Verizon admits that the face of the '236 patent states the "Date of Patent" as "Mar. 26, 2013" and lists the "Inventors" as "Limin Dong" and "Qiuyou Wu." Except as expressly admitted, the allegations contained in paragraph 131 of the First Amended Complaint are denied.

132. To the extent that paragraph 132 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 132 of the First Amended Complaint.

133. To the extent that paragraph 133 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 133 of the First Amended Complaint.

134. To the extent that paragraph 134 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 134 and, on that basis, denies them.

135. To the extent that paragraph 135 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 135 of the First Amended Complaint.

136. To the extent that paragraph 136 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 136 of the First Amended Complaint.

137. To the extent that paragraph 137 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 137 of the First Amended Complaint.

138. To the extent that paragraph 138 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 138 of the First Amended Complaint.

139. To the extent that paragraph 139 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 139 of the First Amended Complaint.

140. Verizon admits that the ’236 patent contains a claim 1. Verizon admits that paragraph 140 of the First Amended Complaint quotes claim 1 as recited in the ’236 patent. Except as expressly admitted, the allegations contained in paragraph 140 of the First Amended Complaint are denied.

141. To the extent that paragraph 141 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 141 of the First Amended Complaint.

142. To the extent that paragraph 142 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 142 of the First Amended Complaint.

143. To the extent that paragraph 143 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 143 of the First Amended Complaint.

144. To the extent that paragraph 144 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 144 of the First Amended Complaint.

145. To the extent that paragraph 145 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 145 of the First Amended Complaint.

146. To the extent that paragraph 146 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 146 of the First Amended Complaint.

147. To the extent that paragraph 147 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 147 of the First Amended Complaint.

148. To the extent that paragraph 148 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 148 of the First Amended Complaint.

149. To the extent that paragraph 149 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 149 of the First Amended Complaint.

150. To the extent that paragraph 150 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 150 of the First Amended Complaint.

151. To the extent that paragraph 151 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 151 of the First Amended Complaint.

152. To the extent that paragraph 152 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 152 of the First Amended Complaint.

153. To the extent that paragraph 153 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 153 of the First Amended Complaint.

154. To the extent that paragraph 154 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 154 of the First Amended Complaint.

155. To the extent that paragraph 155 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 155 of the First Amended Complaint.

156. To the extent that paragraph 156 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 156 of the First Amended Complaint.

157. To the extent that paragraph 157 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 157 of the First Amended Complaint.

158. To the extent that paragraph 158 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 158 of the First Amended Complaint.

COUNT FOUR: ALLEGED INFRINGEMENT OF THE '505 PATENT

159. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

160. Verizon admits that the face of U.S. Patent No. 8,824,505 ("the '505 patent") contains the title "Method and Apparatus for Transporting Client Signals in an Optical Transport Network." Verizon admits that the face of the '505 patent states the "Date of Patent" as "Sep. 2, 2014" and lists the "Inventors" as "Limin Dong" and "Qiuyou Wu." Except as expressly admitted, the allegations contained in paragraph 160 of the First Amended Complaint are denied.

161. To the extent that paragraph 161 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 161 of the First Amended Complaint.

162. To the extent that paragraph 162 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 162 of the First Amended Complaint.

163. To the extent that paragraph 163 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 163 and, on that basis, denies them.

164. To the extent that paragraph 164 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 164 of the First Amended Complaint.

165. To the extent that paragraph 165 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 165 of the First Amended Complaint.

166. To the extent that paragraph 166 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 166 of the First Amended Complaint.

167. To the extent that paragraph 167 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 167 of the First Amended Complaint.

168. To the extent that paragraph 168 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 168 of the First Amended Complaint.

169. Verizon admits that the '505 patent contains a claim 1. Verizon admits that paragraph 169 of the First Amended Complaint quotes claim 1 as recited in the '505 patent. Except as expressly admitted, the allegations contained in paragraph 169 of the First Amended Complaint are denied.

170. To the extent that paragraph 170 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 170 of the First Amended Complaint.

171. To the extent that paragraph 171 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 171 of the First Amended Complaint.

172. To the extent that paragraph 172 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 172 of the First Amended Complaint.

173. To the extent that paragraph 173 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 173 of the First Amended Complaint.

174. To the extent that paragraph 174 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 174 of the First Amended Complaint.

175. To the extent that paragraph 175 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 175 of the First Amended Complaint.

176. To the extent that paragraph 176 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 176 of the First Amended Complaint.

177. To the extent that paragraph 177 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 177 of the First Amended Complaint.

178. To the extent that paragraph 178 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 178 of the First Amended Complaint.

179. To the extent that paragraph 179 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 179 of the First Amended Complaint.

180. To the extent that paragraph 180 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 180 of the First Amended Complaint.

181. To the extent that paragraph 181 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 181 of the First Amended Complaint.

182. To the extent that paragraph 182 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 182 of the First Amended Complaint.

183. To the extent that paragraph 183 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 183 of the First Amended Complaint.

184. To the extent that paragraph 184 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 184 of the First Amended Complaint.

185. To the extent that paragraph 185 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 185 of the First Amended Complaint.

186. To the extent that paragraph 186 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 186 of the First Amended Complaint.

187. To the extent that paragraph 187 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 187 of the First Amended Complaint.

188. To the extent that paragraph 188 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 188 of the First Amended Complaint.

189. To the extent that paragraph 189 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 189 of the First Amended Complaint.

COUNT FIVE: ALLEGED INFRINGEMENT OF THE '982 PATENT

190. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

191. Verizon admits that the face of U.S. Patent No. 9,312,982 ("the '982 patent") contains the title "Method and Apparatus for Mapping and De-Mapping in an Optical Transport Network." Verizon admits that the face of the '982 patent states the "Date of Patent" as "Apr. 12, 2016" and lists the "Inventors" as "Maarten Vissers," "Qiuyou Wu," "Xin Xiao" and "Wei Su." Except as expressly admitted, the allegations contained in paragraph 191 of the First Amended Complaint are denied.

192. To the extent that paragraph 192 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 192 of the First Amended Complaint.

193. To the extent that paragraph 193 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 193 of the First Amended Complaint.

194. To the extent that paragraph 194 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 194 and, on that basis, denies them.

195. To the extent that paragraph 195 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 195 of the First Amended Complaint.

196. To the extent that paragraph 196 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 196 of the First Amended Complaint.

197. To the extent that paragraph 197 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 197 of the First Amended Complaint.

198. To the extent that paragraph 198 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 198 of the First Amended Complaint.

199. To the extent that paragraph 199 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 199 of the First Amended Complaint.

200. Verizon admits that the ’982 patent contains a claim 1. Verizon admits that paragraph 200 of the First Amended Complaint quotes claim 1 as recited in the ’982 patent. Except as expressly admitted, the allegations contained in paragraph 200 of the First Amended Complaint are denied.

201. To the extent that paragraph 201 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 201 of the First Amended Complaint.

202. To the extent that paragraph 202 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 202 of the First Amended Complaint.

203. To the extent that paragraph 203 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 203 of the First Amended Complaint.

204. To the extent that paragraph 204 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 204 of the First Amended Complaint.

205. To the extent that paragraph 205 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 205 of the First Amended Complaint.

206. To the extent that paragraph 206 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 206 of the First Amended Complaint.

207. To the extent that paragraph 207 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 207 of the First Amended Complaint.

208. To the extent that paragraph 208 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 208 of the First Amended Complaint.

209. To the extent that paragraph 209 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 209 of the First Amended Complaint.

210. To the extent that paragraph 210 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 210 of the First Amended Complaint.

211. To the extent that paragraph 211 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 211 of the First Amended Complaint.

212. To the extent that paragraph 212 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 212 of the First Amended Complaint.

213. To the extent that paragraph 213 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 213 of the First Amended Complaint.

214. To the extent that paragraph 214 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 214 of the First Amended Complaint.

215. To the extent that paragraph 215 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 215 of the First Amended Complaint.

216. To the extent that paragraph 216 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 216 of the First Amended Complaint.

COUNT SIX: ALLEGED INFRINGEMENT OF THE '253 PATENT

217. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

218. Verizon admits that the face of U.S. Patent No. 8,995,253 ("the '253 patent") contains the title "Method, Apparatus and system for Ring Protection." Verizon admits that the face of the '253 patent states the "Date of Patent" as "Mar. 31, 2015" and lists the "Inventors" as "Hao Long" and "Yang Yang." Except as expressly admitted, the allegations contained in paragraph 218 of the First Amended Complaint are denied.

219. To the extent that paragraph 219 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 219 of the First Amended Complaint.

220. To the extent that paragraph 220 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 220 of the First Amended Complaint.

221. To the extent that paragraph 221 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 221 and, on that basis, denies them.

222. To the extent that paragraph 222 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 222 of the First Amended Complaint.

223. To the extent that paragraph 223 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 223 of the First Amended Complaint.

224. To the extent that paragraph 224 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 224 of the First Amended Complaint.

225. To the extent that paragraph 225 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 225 of the First Amended Complaint.

226. To the extent that paragraph 226 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 226 of the First Amended Complaint.

227. Verizon admits that the ’253 patent contains a claim 1. Verizon admits that paragraph 227 of the First Amended Complaint quotes claim 1 as recited in the ’253 patent. Except as expressly admitted, the allegations contained in paragraph 227 of the First Amended Complaint are denied.

228. To the extent that paragraph 228 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 228 of the First Amended Complaint.

229. To the extent that paragraph 229 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 229 of the First Amended Complaint.

230. To the extent that paragraph 230 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 230 of the First Amended Complaint.

231. To the extent that paragraph 231 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 231 of the First Amended Complaint.

232. To the extent that paragraph 232 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 232 of the First Amended Complaint.

233. To the extent that paragraph 233 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 233 of the First Amended Complaint.

234. To the extent that paragraph 234 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 234 of the First Amended Complaint.

235. To the extent that paragraph 235 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 235 of the First Amended Complaint.

236. To the extent that paragraph 236 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 236 of the First Amended Complaint.

237. To the extent that paragraph 237 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 237 of the First Amended Complaint.

238. To the extent that paragraph 238 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 238 of the First Amended Complaint.

239. To the extent that paragraph 239 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 239 of the First Amended Complaint.

240. To the extent that paragraph 240 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 240 of the First Amended Complaint.

241. To the extent that paragraph 241 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 241 of the First Amended Complaint.

242. To the extent that paragraph 242 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 242 of the First Amended Complaint.

243. To the extent that paragraph 243 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 243 of the First Amended Complaint.

COUNT SEVEN: ALLEGED INFRINGEMENT OF THE '485 PATENT

244. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

245. Verizon admits that the face of U.S. Patent No. 9,270,485 ("the '485 patent") contains the title "Method for Ethernet Ring Protection." Verizon admits that the face of the '485 patent states the "Date of Patent" as "Feb. 23, 2016" and lists the "Inventor" as "Hao Long." Except as expressly admitted, the allegations contained in paragraph 245 of the First Amended Complaint are denied.

246. To the extent that paragraph 246 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 246 of the First Amended Complaint.

247. To the extent that paragraph 247 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 247 of the First Amended Complaint.

248. To the extent that paragraph 248 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon lacks sufficient knowledge and information to form a belief about the truth of the allegations in paragraph 248 and, on that basis, denies them.

249. To the extent that paragraph 249 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 249 of the First Amended Complaint.

250. To the extent that paragraph 250 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 250 of the First Amended Complaint.

251. To the extent that paragraph 251 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 251 of the First Amended Complaint.

252. To the extent that paragraph 252 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 252 of the First Amended Complaint.

253. To the extent that paragraph 253 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 253 of the First Amended Complaint.

254. Verizon admits that the '485 patent contains a claim 1. Verizon admits that paragraph 254 of the First Amended Complaint quotes claim 1 as recited in the '485 patent. Except as expressly admitted, the allegations contained in paragraph 254 of the First Amended Complaint are denied.

255. To the extent that paragraph 255 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 255 of the First Amended Complaint.

256. To the extent that paragraph 256 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 256 of the First Amended Complaint.

257. To the extent that paragraph 257 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 257 of the First Amended Complaint.

258. To the extent that paragraph 258 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 258 of the First Amended Complaint.

259. To the extent that paragraph 259 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 259 of the First Amended Complaint.

260. To the extent that paragraph 260 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 260 of the First Amended Complaint.

261. To the extent that paragraph 261 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 261 of the First Amended Complaint.

262. To the extent that paragraph 262 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 262 of the First Amended Complaint.

263. To the extent that paragraph 263 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 263 of the First Amended Complaint.

264. To the extent that paragraph 264 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 264 of the First Amended Complaint.

265. To the extent that paragraph 265 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 265 of the First Amended Complaint.

266. To the extent that paragraph 266 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 266 of the First Amended Complaint.

267. To the extent that paragraph 267 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 267 of the First Amended Complaint.

268. To the extent that paragraph 268 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 268 of the First Amended Complaint.

269. To the extent that paragraph 269 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 269 of the First Amended Complaint.

COUNT EIGHT: DECLARATORY JUDGMENT THAT HUAWEI HAS NOT BREACHED ITS RAND COMMITMENT

270. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

271. To the extent that paragraph 271 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 271 of the First Amended Complaint.

272. Verizon admits that Huawei submitted declarations to the ITU-T declaring that Huawei would grant licenses to standards-essential patents on a nondiscriminatory basis and on

reasonable terms and conditions. Verizon lacks sufficient knowledge to form a belief about the truth of the allegations in paragraph 272 and, on that basis, denies them.

273. To the extent that paragraph 273 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 273 of the First Amended Complaint.

274. Verizon admits that a dispute exists between Huawei and Verizon concerning whether Huawei has complied with its RAND Commitment and as to whether Huawei's license offer to Verizon complied with Huawei's RAND Commitment. Except as expressly admitted, the allegations in paragraph 274 of the First Amended Complaint are denied.

275. Verizon admits that it alleges that Huawei failed to offer a license that satisfies Huawei's RAND obligation. To the extent the remaining allegations in paragraph 275 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 275 of the First Amended Complaint.

276. Verizon admits the allegations in paragraph 276 of the First Amended Complaint.

277. To the extent that paragraph 277 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 277 of the First Amended Complaint.

278. To the extent that paragraph 278 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 278 of the First Amended Complaint.

COUNT NINE: DECLARATORY JUDGMENT THAT VERIZON REJECTED, REPUDIATED, AND/OR FORFEITED ANY RIGHTS ASSOCIATED WITH HUAWEI'S RAND COMMITMENT

279. Verizon repeats its responses to each preceding paragraph as if fully set forth herein.

280. Verizon admits that Huawei submitted declarations to the ITU-T declaring that Huawei would grant licenses to standards-essential patents on a nondiscriminatory basis and on reasonable terms and conditions. To the extent that paragraph 280 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 280 of the First Amended Complaint.

281. To the extent that paragraph 281 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 281 of the First Amended Complaint.

282. To the extent that paragraph 282 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 282 of the First Amended Complaint.

283. To the extent that paragraph 283 of the First Amended Complaint sets forth conclusions of law, no response is required. To the extent a response is required, Verizon denies the allegations of paragraph 283 of the First Amended Complaint.

JURY DEMAND

Plaintiff's request for a jury trial includes no allegations and, therefore, no response is required.

ANSWER TO PLAINTIFF'S PRAYER FOR RELIEF

Verizon denies that Plaintiff is entitled to any of the relief requested in the section of the First Amended Complaint entitled "Prayer for Relief," or any relief in any form from either the

court or from Verizon. Verizon respectfully requests that the court enter judgment in its favor and against Plaintiff on all of Plaintiff's claims, deny each of Plaintiff's prayers for relief, and find this case exceptional and award Verizon its costs and attorneys' fees pursuant to 35 U.S.C. § 285, and award any other further relief as the Court deems appropriate.

GENERAL DENIAL

Verizon denies each and every allegation of the First Amended Complaint that is not specifically admitted herein.

AFFIRMATIVE AND OTHER DEFENSES

284. Subject to the responses above, Verizon alleges and asserts the following defenses in response to the allegations, undertaking the burden of proof only as to those defenses deemed affirmative defenses by law, regardless of how such defenses are denominated herein. In addition to the affirmative defenses described below, subject to its responses above, Verizon specifically reserves all rights to allege additional affirmative defenses that become known through the course of discovery or further investigation in this action.

FIRST AFFIRMATIVE DEFENSE
(Failure to State a Claim)

285. Plaintiff's First Amended Complaint fails to state a claim upon which relief can be granted.

SECOND AFFIRMATIVE DEFENSE
(Non-Infringement)

286. Verizon does not infringe and has not directly infringed (either literally, under the doctrine of equivalents, or under the reverse doctrine of equivalents), induced infringement of, or contributed to the infringement of any valid and enforceable claim of the '433, '151, '236, '505, '982, '253, and '485 patents.

THIRD DEFENSE
(Invalidity and Ineligibility)

287. The claims of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents are invalid under 35 U.S.C. § 101 because the claims are directed to abstract ideas or other non-statutory subject matter.

288. The claims of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents are invalid under 35 U.S.C. § 102 because the claims lack novelty, and are taught and suggested by the prior art.

289. The claims of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents are invalid under 35 U.S.C. § 103 because the claims are obvious in view of the prior art.

290. The claims of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents are invalid for failure satisfy the conditions set forth in 35 U.S.C. § 112, including failure of written description, lack of enablement, and claim indefiniteness.

FOURTH DEFENSE
(Prosecution History Estoppel and/or Disclaimer)

291. By reason of statements, representations, concessions, admissions, arguments, and/or amendments, whether explicit or implicit, made by or on behalf of the applicant during the prosecution of the patent applications that led to the issuance of the ’433, ’151, ’236, ’505, ’982, ’253, and ’485 patents, Plaintiff’s claims of patent infringement are barred, in whole or in part, by the doctrine of prosecution history estoppel. To the extent Plaintiff’s alleged claim for infringement of any of the asserted patents in the First Amended Complaint is based on the doctrine of equivalents, Plaintiff is barred under the doctrine of prosecution history estoppel and/or other limits to the doctrine of equivalents, and Plaintiff is estopped from claiming that the asserted patents cover any accused method, system, and/or product.

FIFTH DEFENSE
(Damages and Cost Limitation)

292. On information and belief, Plaintiff's claims for relief are limited or barred, in whole or in part, by 35 U.S.C. §§ 286, 287, and/or 288.

SIXTH DEFENSE
(Actions of Others)

293. On information and belief, Plaintiff's claims are barred, in whole or in part, because Verizon is not liable for the acts of others over whom it has no control.

SEVENTH DEFENSE
(Government Sales)

294. Plaintiff's claims for relief and prayer for damages are limited by 28 U.S.C. § 1498.

EIGHTH DEFENSE
(Failure to Mark)

295. Plaintiff is limited in its right to seek damages due to a failure to mark products covered by any of the asserted patents in the First Amended Complaint, including but not limited to products covered by any of the asserted patents in the First Amended Complaint made, used, offered for sale, or sold by Plaintiff, and prior and current assignees and licensees of any of the asserted patents in the First Amended Complaint.

NINTH DEFENSE
(Non-Compliance with SSO and Breach of FRAND/RAND Obligations)

296. Plaintiff's claims for relief are limited and/or barred, in whole or in part, by its undertakings and obligations to standards-setting organizations ("SSOs"). On information and belief, Plaintiff's claims for damages are limited or barred in whole or in part by obligations to license one or more of the asserted patents in the First Amended Complaint on fair, reasonable, and nondiscriminatory ("FRAND") or on reasonable and non-discriminatory ("RAND") terms and conditions.

297. SSOs are bodies organized to develop, coordinate, institute, and disseminate technical standards and specifications in various industries. SSOs in the communications and networking industries include, for example, the ITU Telecommunication Standardization Sector ("ITU-T").

298. Technical specifications and standards for communications technologies are often developed through the efforts of SSOs and their membership, which includes hardware manufacturers and service providers. One goal of the SSOs is to achieve agreement on specifications that allow for interconnectivity of devices in a particular technology. Today's communication networks, for example, are based on technologies and standards that have been developed through SSOs and adopted by key industry participants.

299. While each SSO maintains its own unique procedure, the SSOs produce global standards through a complex development process. For instance, each SSO may involve committees and working groups composed of technical experts from the SSO's member companies and organizations to develop and publish a relevant standard for the industry.

300. To ensure that industry participants are able to adopt and use established standards without risk of infringing on standard-essential intellectual property, SSOs promulgate policies and procedures that control the disclosure and licensing of patents held by their members and that may read on adopted standards and/or those being developed. These policies and procedures are set out in each SSO's intellectual property rights policies ("IPR policies") and/or in declarations pursuant to those policies. These policies and/or undertakings pursuant to those policies constitute contractual commitments to offer standard-essential patents in accordance with the terms of those policies.

301. SSO IPR policies and undertakings can include, inter alia, an obligation to license patents declared standard essential on FRAND/RAND terms. For instance, undertakings pursuant to ITU-T's IPR policy obligate members to grant irrevocable licenses to essential patents on fair, reasonable and non-discriminatory ("FRAND") terms and conditions.

302. On information and belief, Plaintiff participated in the development and implementation of industry standards through their membership and participation in SSOs, such as ITU-T. Plaintiff undertook specific obligations to the ITU-T to license its intellectual property on FRAND/RAND terms. Plaintiff, including their related entities, affiliates, and successors- and predecessors-in-interest, are obligated by these FRAND/RAND commitments.

303. During the process of adopting the ITU-T G.709 standards and before any recommendation to the standard was voted upon into the G.709 standards, Plaintiff and/or its predecessors made an irrevocable guarantee to the ITU-T on September 8, 2006: "The Patent Holder is prepared to grant—on the basis of reciprocity for the relevant ITU-T Recommendation(s)—a license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions to make, use and sell implementations of the relevant ITU-T Recommendation(s)." (*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T.) Plaintiff and/or its predecessors also made a similar irrevocable guarantee to the G.709 on December 10, 2008; December 23, 2011; April 23, 2012; and October 17, 2016. (*See* December 23, 2011 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd. ("The Patent Holder is prepared to grant a license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions to make, use and sell implementations of the above document.") (emphasis in original); *see also* December 10, 2008 Letter from Huawei Technologies Co., Ltd, Director of

Licensing, Intellectual Property Department; April 23, 2012 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; October 17, 2016 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.)

304. During the process of adopting the ITU-T G.8032 standards and before any recommendation to the standard was voted upon into the G.8032 standards, Plaintiff and/or its predecessors made an irrevocable guarantee to the ITU-T on September 8, 2006: "The Patent Holder is prepared to grant—on the basis of reciprocity for the relevant ITU-T Recommendation(s)—a license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions to make, use and sell implementations of the relevant ITU-T Recommendation(s)." (*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T.) Plaintiff and/or its predecessors also made a similar irrevocable guarantee to the G.8032 on, for example, July 12, 2011. (*See* July 12, 2011 Letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.)

305. As members of the public that would potentially implement the standards and specifications set forth by the ITU-T, Verizon, its vendors, and its customers are intended third-party beneficiaries of Plaintiff's contractual commitments to those SSOs.

306. Accordingly, to the extent that any of the claims of the asserted patents in the First Amended Complaint are deemed essential to implementation of any standard or specification set forth by the ITU-T, then Plaintiff is obligated to provide Verizon with a license to such claims on FRAND and/or RAND terms.

307. Plaintiff and/or its predecessors have engaged in standard-setting misconduct, including without limitation, Plaintiff's and its predecessors breach of its commitment to offer

FRAND and/or RAND license terms for the patents asserted in the First Amended Complaint and breach of their disclosure requirements or based on other circumstances.

TENTH DEFENSE
(License, Implied License, and/or Exhaustion)

308. To the extent Plaintiff has granted any of Verizon's suppliers a license or covenant not to sue or assert under any of the asserted patents in the First Amended Complaint, or to the extent any of Verizon's suppliers otherwise have a license or covenant not to sue or assert under any of the asserted patents in the First Amended Complaint, the relief sought by Plaintiff in relation to such patent is barred by license and/or under the doctrine of patent exhaustion.

309. If the claims of the asserted patents in the First Amended Complaint are infringed by the practice of the G.709 and/or G.8032 standards as alleged by Plaintiff (*see, e.g.*, First Amended Complaint at ¶46), Verizon has an implied license to the asserted patents because of the covenants and representations that Plaintiff's representatives made during the G.709 and G.8032 standards-setting process to license the asserted patents in the First Amended Complaint at FRAND rates.

310. Upon information and belief, Plaintiff and/or its predecessors have been and are members of ITU-T. Plaintiff and/or its predecessors made an irrevocable guarantee to the ITU-T as early as September 8, 2006. (*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T; *see also* December 23, 2011 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; December 10, 2008 Letter from Huawei Technologies Co., Ltd, Director of Licensing, Intellectual Property Department; April 23, 2012 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; October 17, 2016 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; *see also* July 12, 2011 Letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.)

311. Notwithstanding this commitment to the ITU-T that it would license the asserted patents in the First Amended Complaint on FRAND terms, Plaintiff has refused to offer a license on such terms, and has instead alleged that it will pursue "enhanced damages" among other damages set forth in the First Amended Complaint.

312. If the claims of the asserted patent in the First Amended Complaint are valid and infringed and are in fact essential to practice the G.709 and/or G.8032 standards as Plaintiff alleges, Plaintiff is breaching its agreement to license the asserted patents in the First Amended Complaint on FRAND terms to the extent that it seeks anything more than a FRAND rate from Verizon.

313. If the claims of the asserted patent in the First Amended Complaint are valid and infringed and are in fact essential to practice the G.709 and/or G.8032 standards as Plaintiff alleges, then Verizon would also understand a FRAND license to the asserted patents to the First Amended Complaint to be no more than any prior licensee of the asserted patents in the First Amended Complaint as paid for a license to the asserted patents.

314. To the extent Plaintiff seeks more from Verizon than its prior licensees paid, it is breaching Plaintiff's agreement to license the asserted patents in the First Amended Complaint to Verizon on FRAND terms and thus engaging in wrongful conduct that should render the asserted patents in the First Amended Complaint unenforceable and/or should estop Plaintiff from seeking anything other than FRAND rates.

ELEVENTH DEFENSE
(Unenforceability Due To Patent Ambush, Laches, Waiver, Implied Waiver, Acquiescence, Equitable Estoppel, Unclean Hands, Patent Misuse, Unfair Competition And/Or Fraud Based on Standards Activities)

315. Verizon incorporates herein as if set forth in full the foregoing paragraphs 1-29 of its Affirmative Defenses.

316. On information and belief, all or some of Plaintiff's claims for relief are barred and unenforceable, in whole or in part, by the doctrines of laches, waiver, implied waiver, acquiescence, equitable estoppel, unfair competition, patent misuse, unclean hands, unfair competition, fraud, and/or other equitable remedies.

317. To the extent that compliance with the G.709 and/or G.8032 standards constitutes infringement of the patents asserted in the First Amended Complaint, Plaintiff and/or its predecessors have engaged in standard-setting misconduct, including without limitation, Plaintiff's and/or predecessors breach of its commitment to offer FRAND license terms for the patents asserted in the First Amended Complaint and breach of their disclosure requirements or based on other circumstances.

318. Plaintiff alleges in the First Amended Complaint that the asserted patents in the First Amended Complaint are essential to the ITU-T G.709 and G.8032 standards. (*See, e.g.*, First Amended Complaint at 46 ("Huawei has offered to license its patents that are required to implement the G.709 Standard (including the Asserted Patents) to Verizon . . . .).) Each of the asserted patents in the First Amended Complaint are allegedly assigned to Plaintiff and/or Plaintiff's predecessors.

319. Upon information and belief, Plaintiff and its representatives participated in the ITU-T and the ITU-T Study Groups that developed the ITU-T G.709 Recommendations and ITU-T G.8032 Recommendations.

320. According to the ITU-T, its "main products" are "Recommendations (ITU-T Recs)," which are "standards defining how telecommunication networks operate and interwork."

321. ITU-T's standards (*i.e.*, the ITU-T Recommendations) "provide the technical backbone to global communications." (*See* https://www.itu.int/dms_pub/itu-t/opb/gen/T-GEN-

OVW-2014-PDF-E.pdf (las accessed March 19, 2020).) As the ITU-T explains it, without its standards: "You couldn't make a telephone call from one side of the world to the other"; "You wouldn't be able to surf the Internet"; and "Modern communications, as we know them, just wouldn't exist." (*Id.*)

322. ITU-T describes its strength as its "unique public-private partnership of members and contribution-led, consensus-driven approach to standards development. All countries and all companies, no matter how large or small, are afforded equal rights to influence the development of ITU-T Recommendations." (*Id.*)

323. Upon information and belief, Plaintiff and its representatives made "contributions" to the ITU-T G.709 Recommendations and ITU-T G.8032 Recommendations. Upon information and belief, at the same time that Plaintiff and its representatives made these contributions, it was filing patent applications and provisional patent applications on its contributions.

324. Upon information and belief, Plaintiff did not disclose to the ITU-T Study Groups that developed the ITU-T G.709 Recommendations and ITU-T G.8032 Recommendations or to the ITU-T in general the specific patent applications that Plaintiff was filing simultaneously with the Study Group contributions.

325. Plaintiff and its representatives' failure to disclose the patent applications that may have covered the subject matter of the contributions that were being made to the G.709 Recommendations and ITU-T G.8032 Recommendations was a clear violation of the ITU-T's patent policy.

326. Specifically, ITU-T's patent policy in effect as of July 10, 2004 stated that the "purpose" of the ITU-T Patent Policy is to "encourage the early disclosure and identification of patents and pending applications that may relate to Recommendations under development. In

doing so, greater efficiency in standards development is possible and potential patent rights problems can be avoided." (*See* July 10, 2004 Guidelines for Implementation of ITU-T Patent Policy.)

327. The July 10, 2004 Guidelines Document for Implementation of ITU-T Patent Policy noted that "[i]t is desirable that contributions (Contributions, delayed Contributions, contributions to Rapporteur meetings, etc.) identify whether the proposal contains any existing patents and/or pending patent applications of their own and/or any third party." (*Id*.)

328. The purpose of the disclosures described above, including the disclosures required of members making contributions for Recommendation development, was so that "potential patent rights problems can be avoided." (*Id*.)

329. In fact, the July 10, 2004 Guidelines encouraged that the "patent rights disclosures . . . should be disclosed as soon as possible, i.e. as soon as it is becoming clear that an evolving draft Recommendation will, in fact, fully or partly include patented elements protected by patent rights." (*Id*.)

330. Upon information and belief, ITU-T Study Groups issued in advance of every in-person meeting of the Study Group a Collective Letter that included a draft agenda for the forthcoming meeting which included "Intellectual Property Rights Inquiry" as an agenda item. In response to this inquiry at Study Group meetings, participants were expected to disclose intellectual property rights of which they were aware, including but not limited to patents covering their contributions.

331. Upon information and belief, patent issues were so paramount to the ITU-T that Recommendations often would not be approved by a Study Group until known patent issues could be resolved.

332. In light of the ITU-T patent policy in effect at the time Huawei and its representatives were making contributions to the draft G.709 Recommendation and ITU-T G.8032 Recommendation, in light of their knowledge of pending patent applications covering the same subject matter and in light of Plaintiff's allegations that the asserted patents in the First Amended Complaint are essential to practice the G.709 and G.8032 standards, Huawei and its representatives were under a duty to specifically disclose the asserted patents to the ITU-T, as well as other patents and/or applications to which the asserted patents claim priority.

333. Upon information and belief, Huawei and its representatives never disclosed to the ITU-T any specific patents or applications that they believed related to the ITU-T G.709 Recommendation and ITU-T G.8032 Recommendations. Instead, upon information and belief, Plaintiff and/or its predecessors only made a general commitment on September 8, 2006 to "license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions" to ITU-T. (*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T; *see also* December 23, 2011 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; December 10, 2008 Letter from Huawei Technologies Co., Ltd, Director of Licensing, Intellectual Property Department; April 23, 2012 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; October 17, 2016 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; *see also* July 12, 2011 Letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.)

334. Because Huawei contends that the asserted patents are essential to practice the G.709 Recommendations and ITU-T G.8032 Recommendations, such general statements were not sufficient to fulfill its disclosure obligations.

335. In light of the ITU-T's patent policy, which was published to the public and to the industry, entities like Verizon that offer G.709 and G.8032 standards compliant products and services continued to offer those products and services compliant with that Recommendation, as opposed to offering viable alternative technologies that were available during the standards-setting process. Verizon reasonable relied upon these commitments to the ITU-T. Verizon's reliance was reasonable and foreseeable, and Verizon was harmed as a result of that reliance.

336. Implementers of the G.709 Recommendation and ITU-T G.8032 Recommendation, and members of the consuming public that purchase products that implement the G.709 Recommendations and ITU-T G.8032 Recommendations, have also been materially prejudiced by their reliance on the ITU-T's standard-setting process and patent policy as set forth above. The implementers of G.709 and G.8032 have made very significant investments in designing, having manufactured, and selling products and services certified as compliant with the G.709 Recommendation and ITU-T G.8032 Recommendation.

337. Verizon, other members of ITU-T, and other companies implementing the relevant standards have reasonably relied on Huawei's FRAND commitments to: (a) grant licenses to those patents and patent applications that Huawei claims are essential on fair, reasonable, and non-discriminatory terms; and (b) not to seek to impose unfair, unreasonable, or discriminatory conditions on licensing, such as cross-licenses of patents covering proprietary technology that is not essential to any standard. In particular, Verizon and others have relied on Huawei's commitments that preclude Huawei from seeking to enjoin them from practicing the relevant standards, and that require Huawei to provide fair, reasonable and non-discriminatory royalties and other license terms that would permit efficient competitors such as Verizon profitably to offer

standards compliant products in competition with Huawei and other owners of purportedly essential patents.

338. Plaintiff and/or its predecessors and representatives knew or should have reasonably expected that the above-referenced nondisclosures and/or misrepresentations to the ITU-T, in violation of the ITU-T's requirements, would induce the ITU-T to adopt the G.709 Recommendation and ITU-T G.8032 Recommendation and that, thereafter, the purchasing public and companies like Verizon that offer services compliant with the G.709 Recommendations and ITU-T G.8032 Recommendations would rely upon the standard setting process, including nondisclosures as to Plaintiff's and its predecessors' specific intellectual property rights.

TWELFTH DEFENSE
(No Causation)

339. Plaintiff's claims against Verizon are barred because Plaintiff's damages, if any, were not caused by Verizon.

THIRTEENTH DEFENSE
(No Exceptional Case)

340. Plaintiff cannot prove that this is an exceptional case justifying an award of attorneys' fees against Verizon pursuant to 35 U.S.C. § 285.

FOURTEENTH DEFENSE
(No Willful Infringement)

341. Plaintiff is not entitled to enhanced damages under 35 U.S.C. § 284 because Plaintiff has failed to meet, and cannot meet as a matter of law, the requirements for willful infringement.

FIFTEENTH DEFENSE
(Unenforceability Due to Inequitable Conduct)

342. For the reasons set forth below, and upon information and belief, the '505, '236, '151, '982, '485, and '253 Patents are each unenforceable as a result of inequitable

conduct before the United States Patent and Trademark Office ("USPTO") during the examination of each of the above identified patents.

'505 Patent

343. On information and belief, the '505 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least the named inventors (Limin Dong and Qiuyou Wu) and the prosecuting attorneys (at least Franklin Han and John B. Conklin) (collectively, "the '505 Patent Applicants") in procuring the '505 Patent. The '505 Patent Applicants failed to disclose material information to the USPTO with the specific intent to withhold material prior art from the USPTO. The '505 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the '505 Patent.

344. On April 8, 2014, Huawei amended the pending patent application that led to the '505 Patent to cancel independent claim 1 and rewrite dependent claim 5 into independent form. Previously presented independent claim 23 contained identical subject matter as claim 5. These two claims recited, *inter alia*, "wherein the OPUk frame includes an overhead containing a tributary slot MultiFrame Indicator (MFI-TS) byte, which increases by 1 for every frame until its number is the same as the number of the OPUk TSs in the OPUk frame." After this amendment, the Examiner allowed the pending patent application to issue as the '505 Patent. Previously presented dependent claim 5 and independent claim 23 became independent claims 1 and 4, as issued. Because Huawei *cancelled* the independent claims and *amended* the dependent claims into independent form in response to the Examiner's rejection, Huawei admitted by way of prosecution history estoppel that the prior art of record during prosecution anticipated and/or rendered obvious the originally-filed independent claims (now cancelled).

345. The Examiner granted the patent application based on the mistaken belief that dependent claim 5 (and claim 23) contained allowable subject matter, which, upon information and belief, Huawei knew or should have known at the time was false. Huawei knew or should have known that the allegedly allowable subject matter was well known in the art. Specifically, before the priority date of the '505 Patent, the use of a "tributary slot MultiFrame Indicator" in a frame overhead as a frame counter was found in numerous prior art, including in Huawei's own patents and patent applications.

346. For example, in CN1744470A ("CN '470 Patent"), published in 2006, Huawei discussed the content of the "overhead position of … the VC4 frame" in the context of the ITU-G.707 Standard. (*See* CN '470 Patent at 10 (translated from Chinese).) The G.707 Standard (Network node interface for the synchronous digital hierarchy) is related to the G.709 Standard (Interfaces for the optical transport network), the standard to which Huawei claims the '505 Patent is essential. Both standards belong to the same series of standards by the ITU defining "digital terminal equipment." (*See*, *e.g.*, https://www.itu.int/itu-t/recommendations/index.aspx?ser=G.)

347. As disclosed in the CN '470 Patent, the VC4 frame overhead contains 9 bytes arranged in a column, shown in Figure 5 below. (*Id.*)

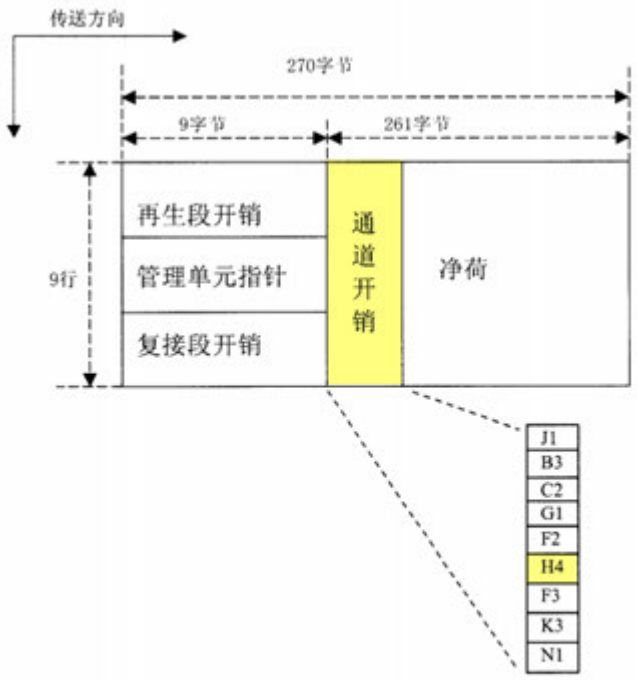


图5

348. In particular, the byte at row 6 (H4) represents a "TU (tributary unit) position indicator byte," which "indicates the location of the current tributary unit frame in a TU Multiframe." (Id. at 11 (translated from Chinese)). Therefore, the H4 byte as taught in Huawei's CN '470 Patent and in the then-existing G.707 standard shows or renders obvious the claimed "tributary slot Multiframe Indicator (MFI-TS) byte" that is found in the overhead of a frame, as claimed in the allegedly allowable subject matter of the '505 Patent.

349. Huawei further acknowledged in the CN '470 Patent that "for an SDH frame, an MFI (MultiFrame Indicator) is inserted into the overhead at byte H4, to indicate the relationship among the virtual concatenation sequencing over time." (*Id.* at 14 (translated from Chinese).) Therefore, on information and belief, the "MFI" inserted into the H4 byte "increases by 1 for every frame until its number is the same as the number of [tributary slots] in the . . . frame," as claimed in the allegedly allowable subject matter of the '505 Patent.

350. The disclosures found in Huawei's CN '470 Patent of the location and functionality of the "MFI" and "H4" byte are consistent with the disclosures in the ITU-T G.707 Standard, which was published by January of 2007, before the priority date of the '505 Patent. For example, the location of the H4 byte in the VC-4 overhead as defined in the G.707 Standard, shown below, is identical to the disclosures in the CN '470 Patent discussed above. (*See* G.707 standard at 115.). The H4 byte was also described as being a "multiframe indication byte," which is nearly identical to the term given by Huawei in its alleged invention. (*Id.* at 62.). The G.707 Standard shows that H4 is a "tributary slot Multiframe Indicator (MFI-TS) byte" that is found in the overhead of a frame, as claimed in the allegedly allowable subject matter of the '505 Patent.

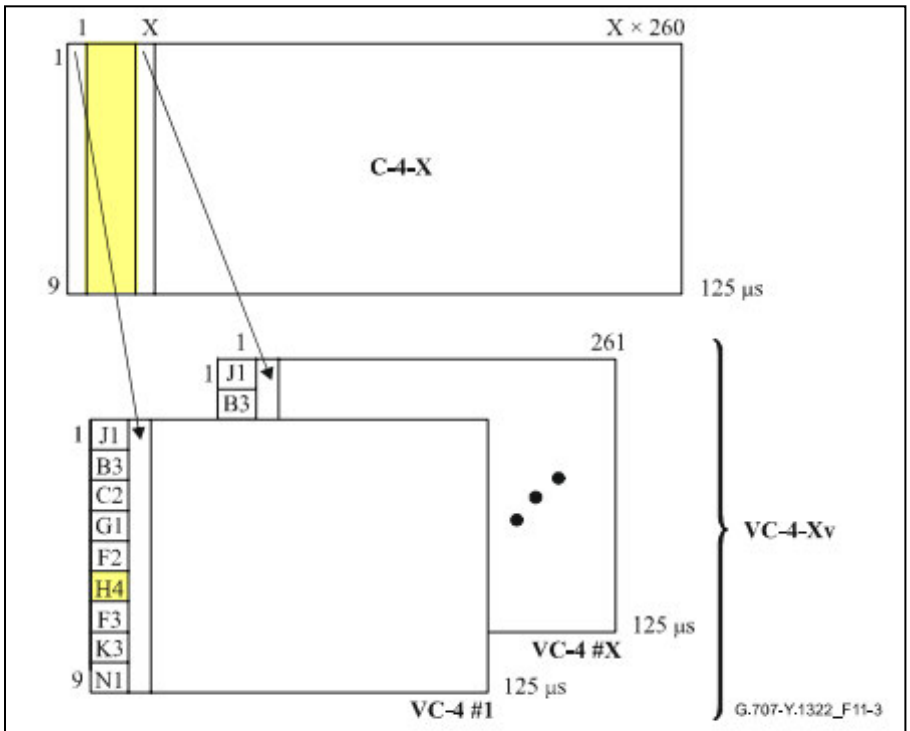


Figure 11-3 – VC-4-Xv structure

351. Furthermore, the G.707 Standard discloses that the H4 byte "provides a multiframe and sequence indicator for virtual VC-3/VC-4 concatenation and a generalized position indicator for payloads." (*Id.* at 80.) For example, the G.707 Standard shows that "H4 can be used as a

multiframe indicator for VC-2, VC-11 and VC-12 payload." (*Id.*) In particular, "H4, bits 5-8" are used by "the 4-bit multiframe indicator (MFI1)," which "is incremented every basic frame and counts from 0 to 15." (*Id.* at 115.) Likewise, "H4, bits 1-4" are used by MFI2, which is "incremented once every multiframe of the first stage and counts from 0 to 255." (*Id.*) Collectively, both MFI1 and MFI2 occupy the H4 byte and counts up to 4,096 frames in total, which is the total number of frames in the multiframe. These disclosures show that the MFI inserted into the H4 byte "increases by 1 for every frame until its number is the same as the number of [tributary slots] in the . . . frame," as claimed in the allegedly allowable subject matter of the '505 Patent.

352. Therefore, the disclosures in the CN '470 Patent and the ITU-T G.707 Standard each anticipate and/or render obvious the allegedly allowable subject matter of the '505 Patent and are each material to the patentability of at least independent claims 1 and 4 of the '505 Patent.

353. Huawei, the inventors of the '505 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys did not disclose either the CN '470 Patent or the ITU-T G.707 Standard to the USPTO during prosecution of the patent application that led to the '505 Patent. Had Huawei disclosed these references to the USPTO, the USPTO would not have allowed the '505 Patent to issue. Accordingly, the CN '470 Patent and the ITU G.707 Standard are each material to the patentability of the '505 Patent.

354. During the prosecution of the '505 Patent, neither the CN '470 Patent nor the G.707 Standard was cited in an Information Disclosure Statement or otherwise made available to the Examiner. On information and belief, Huawei, including each of the inventors of the '505 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys knew of these prior art references during the prosecution of the '505 patent, at least because Huawei owned and had been prosecuting

the CN ’470 Patent at the time, which cites both the G.707 and the G.709 Standards in its specification. (*See* CN ’470 Patent at 17 (translated from Chinese).) Further, Huawei was intimately familiar with the G.707 Standard because Huawei was a Member of ITU-T and participated in ITU-T Study Groups for the development of recommendations related to that standard. Moreover, before the alleged priority date of the ’505 Patent, Huawei filed over 30 patent applications referencing the G.707 Standard, and at least five of which also referenced the G.709 Standard, the standard to which Huawei claims the ’505 Patent is essential. (*See, e.g.*, https://patents.google.com/?q=%22G.707%22&assignee=huawei&before=priority:20070417; https://patents.google.com/?q=%22G.707%22&q=%22G.709%22&assignee=huawei&before=priority:20070417).

355. The ’505 Patent Applicants, including each of the inventors of the ’505 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose the CN ’470 Patent and the ITU G.707 Standard to the USPTO Examiner. But for the ’505 Patent Applicants’ misrepresentations and failure to disclose the CN ’470 Patent and ITU G.707 Standard during the prosecution of the ’505 Patent, at least independent claims 1 and 4 of the ’505 Patent would not have issued. The Examiner of the ’505 Patent allowed independent claims 1 and 4 based on limitations that the ’505 Patent Applicants argued did not exist in the prior art during the prosecution of the ’505 Patent, despite knowing that these limitations did in fact exist in the prior art and were neither novel nor non-obvious, as explained above.

356. As a result of the actions described above, all claims of the ’505 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to “a

single claim renders the entire patent unenforceable." *Regeneron Pharms., Inc. v. Merus N.V.*, 864 F.3d 1343, 1350 (Fed. Cir. 2017).

'236 Patent

357. On information and belief, the '236 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least the named inventors (Limin Dong and Qiuyou Wu) and the prosecuting attorneys (at least Franklin Han and Weiguo Chen) (collectively, "the '236 Patent Applicants") in procuring the '236 Patent. The '236 Patent Applicants failed to disclose material information to the USPTO with the specific intent to withhold material prior art from the USPTO. The '236 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the '236 Patent.

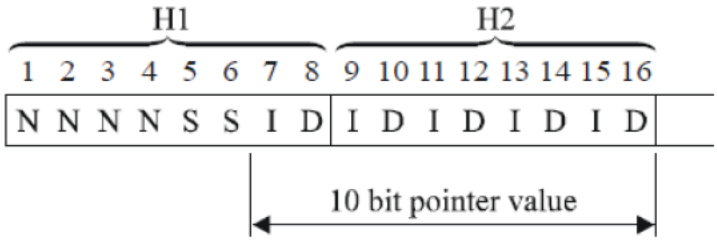
358. On February 13, 2013, the USPTO allowed the patent application that led to the '236 Patent. The limitations that apparently led to the allowance of the '236 Patent are: "if the Cn transported in the OTN frame needs to be increased, reversing, values of a first series of bit positions of a second area … and filling values of a second series of bit positions of the second area in the OPUk with a Cn filled in a previous OTN frame; if the Cn transported in the OTN frame needs to be decreased, reversing, values of the second series of bit positions of the second area … and filling values of the first series of bit positions of the second area in the OPUk with the Cn filled in the previous OTN frame," as recited in independent claim 1. Independent claims 4, 7, 10, and 15 recite similar subject matter.

359. In the same February 13, 2013 Notice of Allowance, the Examiner also stated the reason for allowance as "[i]f the Cn of the current OTN frame falls in a certain range, a predetermined area … is identified as normal and the Cn is filled in the OPUk overhead field of the current OTN frame." Similar subject matter is found in independent claims 13 and 14, as well as certain dependent claims.

360. The Examiner granted the patent application based on the mistaken belief that the claims of the '236 Patent contained allowable subject matter, which, upon information and belief, Huawei knew or should have known at the time was false. Huawei knew or should have known that the alleged allowable subject matter was well known in the art. Specifically, before the priority date of the '236 Patent, the use of different "series of bit positions" to indicate increment or decrement of an indicator like Cn, and whether said indicator is within a normal range was found in numerous prior art, including in Huawei's own patents and patent applications. Moreover, multiple Huawei employees, including at least Maarten Vissers, Huub van Helvoort, Qiuyou Wu, and Limin Dong, have publicly analogized the claimed techniques from the '236 Patent to these well-known prior art.

361. For example, as noted above, the G.707 Standard is related to the G.709 Standard (to which Huawei claims the '236 Patent is essential). Both standards belong to the same series of standards by the ITU defining "digital terminal equipment." (*See*, *e.g.*, https://www.itu.int/itu-t/recommendations/index.aspx?ser=G.). As disclosed in the G.707 Standard prior art, the AU-n/TU-3 pointer bytes can be encoded such that a first series of bit positions (i.e., the "I bits") indicate increment of the indicator value, and a second series of bit positions (i.e., the "D bits") indicate decrement of the indicator value. *Compare* disclosures from the December 2003 version of the G.707 Standard *with* the alleged invention disclosure of the '236 Patent:

G.707/Y.1322 (12/2003) at Figure 8-3



I Increment
D Decrement
N New data flag

New data flag

– Enabled when at least 3 out of 4 bits match "1001"
– Disabled when at least 3 out of 4 bits match "0110"
– Invalid with other codes

'236 Patent at Table 1 and 6:48-50, 7:62-67, 8:11-16

TABLE 1

Cbyte1 (row = 1)								Cbyte2 (row = 2)								Cbyte3 (row = 3)							
C	C	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D

1) It is assumed that a CC identifying position is set as "01", which represents that the normal Cn values are filled in the last 22 bit positions of the Cbyte.

2) If it intends to increase the client signal byte number (Cn) transported in the OTN frame, among the Cbyte field as shown in Table 1, 11 I bit positions of the second area are reversed. In the embodiment of the present disclosure, the mode of reversing I bit positions represents that the Cn value in the next OTN frame will be increased.

3) If it intends to decrease the client signal byte number (Cn) transported in the OTN frame, among the Cbyte field as shown in Table 1, 11 D bit positions of the second area are reversed. In the embodiment of the present disclosure, the mode of reversing D bit positions represents that the Cn value in the next OTN frame will be decreased.

362. Furthermore, Huawei's own patent applications filed before the priority date of the '236 Patent demonstrate it was well aware of the AU pointers and TU pointers disclosed in the G.707 Standard. For example, Chinese Patent Application No. 200410080817.0 was filed on October 9, 2004 and granted as Chinese Patent No. CN 100550716C (the "CN '16C Patent"). Among other things, the CN '16C Patent contains extensive discussions of AU and TU pointers (called "AU-PTR" and "TU-PTR," respectively). For example, Figure 2 of the CN '16C Patent

references AU-PTR and TU-PTR consistent with the teachings of this concept in the G.707 Standard:

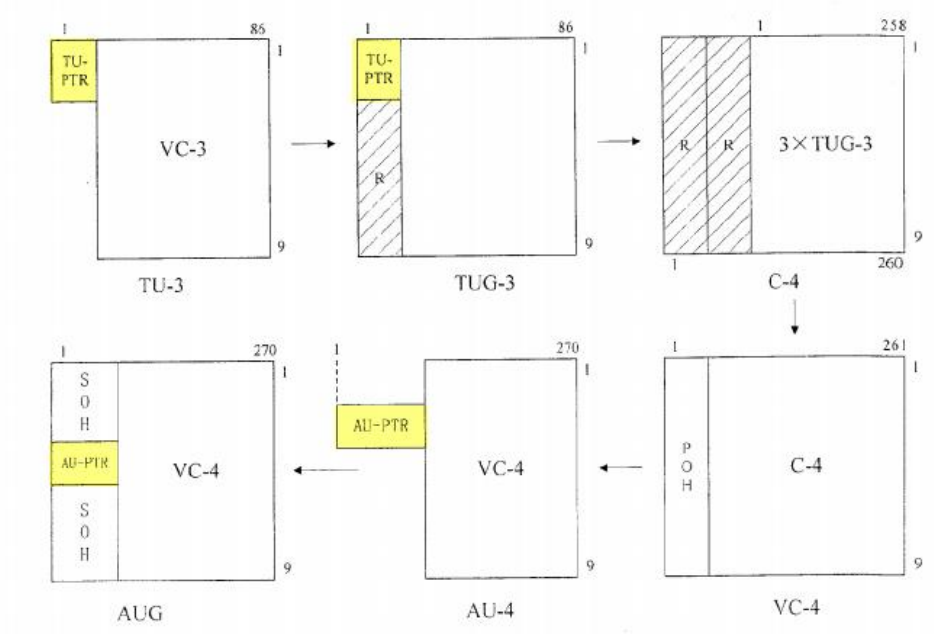


图 2

363. Therefore, the disclosures in the CN ’16C Patent and the ITU G.707 Standard each anticipate and/or render obvious the alleged allowable subject matter of the ’236 Patent and are each material to the patentability of at least independent claims 1, 4, 7, 10, and 13-15 of the ’236 Patent.

364. Huawei, the inventors of the ’236 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys did not disclose either the CN ’16C Patent or the ITU G.707 Standard to the USPTO during prosecution of the patent application that led to the ’236 Patent. Had Huawei disclosed these references to the USPTO, the USPTO would not have allowed at least the independent claims of the ’236 Patent to issue. Accordingly, the CN ’16C Patent and the ITU G.707 Standard are each material to the patentability of the ’236 Patent.

365. During the prosecution of the ’236 Patent, neither the CN ’16C Patent nor the G.707 Standard was cited in an Information Disclosure Statement or otherwise made available to the Examiner. On information and belief, Huawei, including each of the inventors of the ’505 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys knew of these prior art references during the prosecution of the ’236 Patent, at least because Huawei owned and had been prosecuting the CN ’16C Patent at the time, which cites the G.707 Standard in its Specification. Further, Huawei was intimately familiar with the G.707 Standard because Huawei was a Member of ITU-T and participated in ITU-T Study Groups for the development of recommendations related to that Standard. Moreover, before the alleged priority date of the ’236 Patent, Huawei filed over 30 patent applications referencing the G.707 Standard, and at least five of which also referenced the G.709 Standard, the standard to which Huawei claims the ’505 Patent is essential. *See, e.g.*, https://patents.google.com/?q=%22G.707%22&assignee=huawei&before=priority:20070615; https://patents.google.com/?q=%22G.707%22&q=%22G.709%22&assignee=huawei&before=priority:20070615.

366. Furthermore, in Huawei’s own contribution documents to the ITU-T G.709 Study Group proposing the alleged invention of the ’236 Patent for inclusion into the G.709 Standard, Huawei ***admitted*** to the similarity between its proposal and the AU/TU pointers of the G.707 Standard.

1) Similar behaviour to SDH AU pointer

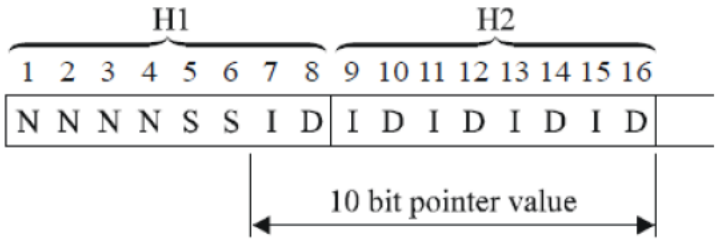
SDH AU pointer behavior is defined to provide high reliability for AU pointer transport that had been included in G.707. With further analysis on the Cn behaviour, we can find it is very similar to that of AU pointer, they are all the indication of payload status and both adjustable according to asynchronous clock tolerance. If we use the scheme of SDH AU pointer to improve the reliability of Cn transport, the following advantages are obvious:

- Uniform standardization style for BRA mapping
- Higher reliability (state machine mechanism and three frames judgment)
- SDH pointer function has been verified in industrial for many years

Detailed description is given in annex <Cn behaviour scheme similar to SDH AU pointer>.

VZ-HW-EDTX-0007741-46 (annotated). Tellingly, Huawei's proposal is almost identical to the G.707 Standard's disclosure of AU/TU pointers:

G.707/Y.1322 (12/2003) at Figure 8-3



I Increment
D Decrement
N New data flag

New data flag

– Enabled when at least 3 out of 4 bits match "1001"
– Disabled when at least 3 out of 4 bits match "0110"
– Invalid with other codes

Huawei's Proposal To Include Its Alleged '236 Invention Into The G.709 Standard

Table1: Cbyte field definition

Cbyte1(row=1)								Cbyte2(row=2)								Cbyte3(row=3)							
NCF		Cn value & inc/dec indication																					
C	C	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D

NCF(New Client Flag) indicates new client or normal client(NCF=01 normal client, NCF=10 new client)

22 bits indicate Cn value and increment/decrement operation, operation step is one

Inc operation: if the I-bits are inverted, inc operation is indicated, the previous Cn value shall be incremented by one

Dec operation: if the D-bits are inverted, dec operation is indicated, the previous Cn value shall be decremented by one

Normal operation: 22 bits indicate Cn value

367. The ’236 Patent Applicants, including each of the inventors of the ’505 Patent, Limin Dong and Qiuyou Wu, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose the CN ’16C Patent and the ITU G.707 Standard to the USPTO Examiner. But for the ’236 Patent Applicants’ misrepresentations and failure to disclose the CN ’16C Patent and ITU G.707 Standard during the prosecution of the ’236 Patent, at least independent claims 1, 4, 7, 10, and 13-15 of the ’236 Patent would not have issued. The Examiner of the ’236 Patent allowed issued independent claims 1, 4, 7, 10, and 13-15 based on limitations that the ’236 Patent Applicants knew to exist in the prior art, as explained above, but failed to disclose to the Examiner.

368. As a result of the actions described above, all claims of the ’236 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to “a single claim renders the entire patent unenforceable.” *Regeneron Pharms., Inc. v. Merus N.V.*, 864 F.3d 1343, 1350 (Fed. Cir. 2017).

’151 Patent

369. On information and belief, the ’151 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least Martin Vissers, the named inventor (Shimin Zou) and the prosecuting attorneys (at least Franklin Han, Wesley C. Rosander, Grant Rodolph, Jeffrey L. Clark, and John B. Conklin) (collectively, “the ’151 Patent Applicants”) in procuring the ’151 Patent. The ’151 Patent Applicants failed to disclose material information in an Information Disclosure Statement with the intent to withhold material prior art from the USPTO. The ’151 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the ’151 Patent.

370. The ’151 Patent is unenforceable for inequitable conduct by Huawei during prosecution based on its amendments of the claims to impermissibly cover the G.709 standard and incorporate material invented by others, including Maarten Vissers.

371. On March 10, 2009, the European Patent Office issued a search report on the validity of the pending claims in the ’151 Patent’s foreign counterpart application, European Patent Application No. EP09151024.8 (EP 2045934A1). In the search report, the European Patent Office identified the European Patent No. 1657839B1 that was filed on November 12, 2004, published on May 16, 2006, and issued as a patent on February 10, 2010 as an “E” category reference (because of an earlier filing date, but later publication date) that was “relevant to” all of the pending claims. The European Patent No. 1657839B1 was filed almost one year before the ’151 Patent’s effective filing date of August 11, 2005.

372. The inventors of European Patent No. 1657839B1 are Maarten Vissers and Günter Grüell of Alcatel Lucent. European Patent No. 1657839B1 has a U.S. counterpart, U.S. Patent No. 7,742,502, which was filed on October 21, 2005 and claims foreign priority to November 12,

2004. On information and belief, European Patent No. 1657839B1 and U.S. Patent No. 7,742,502 relate to Alcatel Lucent's proposal for G.709 that was implemented within the G.709 Section 17.

373. Maarten Vissers, one of the inventors of European Patent No. 1657839B1 and U.S. Patent No. 7,742,502, was hired by Huawei in April 2008. The '151 Patent was not examined by the U.S. Patent and Trademark Office until March 19, 2009, nearly one year after Maarten Vissers joined Huawei. Maarten Vissers was also the editor the ITU-T study group responsible for proposing and adopting new sections of the G.709 standard during this time.

374. During prosecution of the '151 Patent, the '151 Patent Applicants made a number of claim amendments that, on information and belief, were made to explicitly cover the bytes and bit rates required by the G.709 standard that were invented by Maarten Vissers and set forth in European Patent No. 1657839B1 and U.S. Patent No. 7,742,502. For example, on November 18, 2009, the '151 Patent Applicants amended the claims to require "low-rate traffic signal is in the ***rate rank of 1 G bps, adopting a 8B/10B coding mode***" and "***rate rank of 100M bps***, adopting the ***4B/5B coding mode***." This is required by the subsequent December 2009 Recommendation ITU-T G.709/Y.1331 Standard at Section 17.7.1, which required, *inter alia*, an "8B/10B coded" mode for low rate traffic signals. However, the currently pending claims did not include the "4 x 3,824 bytes with a bit rate of 1,244,160 Kbps± 20 ppm" that was subsequently adopted in the standard. Additionally, Maarten Vissers proposed the frame structure (size and rates), mappings, and multiplexing schemes that were claimed in the '151 Patent to the ITU-T study group on August 11, 2008. *See* VZ-HW-EDTX-0012467-73 (August 11, 2008 Question 11 Emails).

375. In December 2009, the ITU-T issued the December 2009 Recommendation ITU-T G.709/Y.1331 that included that the low rate traffic ODU has "4 x 3,824 bytes with a bit rate of 1,244,160 Kbps± 20 ppm." (ITU-T G.709 December 2009 Recommendation at Section 17.7.1.)

On April 19, 2010, the '151 Patent Applicants amended the claims to require the bytes and bit rates in the December 2009 G.709 Recommendation by including "low-rate traffic ODU has ***4 x 3,824 bytes with a bit rate of 1,244,160 Kbps± 20 ppm.***" On information and belief, each of these amendments by Huawei relied on Maarten Vissers' invention set forth in European Patent No. 1657839B1 and U.S. Patent No. 7,742,502 that he developed while at Alcatel Lucent and the proposals by others that resulted in the G.709 Section 17 standard.

376. The '151 Patent Applicants, including the inventor of the '151 Patent, Shimin Zou, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose Maarten Vissers' contributions to the final allowed claims of the '151 Patent, including Maarten Vissers' U.S. Patent No. 7,742,502 to the USPTO Examiner. But for the '151 Patent Applicants' misrepresentations and failure to disclose Maarten Vissers' contributions, including U.S. Patent No. 7,742,502, during the prosecution of the '151 Patent, the claims of the '151 Patent would not have issued. The Examiner of the '151 Patent allowed all claims based on limitations that the '151 Patent Applicants argued did not exist in the prior art during the prosecution of the '151 Patent, despite knowing that these limitations did in fact exist in the prior art and were invented by others, as explained above.

377. As a result of the actions described above, all claims of the '151 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to "a single claim renders the entire patent unenforceable." *Regeneron Pharms.*, 864 F.3d at 1350.

'982 Patent

378. On information and belief, the '982 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least the named inventors (Maarten Vissers, Qiuyou Wu, Xin Xiao, and Wei Su) and the prosecuting attorneys (at least John B. Conklin, Gerald T. Gray, and Mark Joy) (collectively, "the '982 Patent Applicants")

in procuring the ’982 Patent. The ’982 Patent Applicants failed to disclose material information in an Information Disclosure Statement with the intent to withhold material prior art from the USPTO. The ’982 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the ’982 Patent.

379. The ’982 Patent is unenforceable for inequitable conduct by Huawei during prosecution based on its misrepresentation of the applicable priority date of the claims.

380. On December 10, 2014, the ’982 Patent Applicants, including at least prosecuting attorney John B. Conklin, filed the application that resulted in the ’982 Patent as a continuation application of U.S. Patent Application No. 12/712,675 that was filed on February 25, 2010 and issued as U.S. Patent No. 8,948,205. During prosecution, the ’982 Applicants relied on the priority date to the continuation parent application to obtain the patent and the U.S. Patent Office did not issue any prior art rejections based on the allowance of the parent application.

381. The ’982 Patent Applicants, however, added new matter to the ’982 Patent when it filed the application in December 10, 2014 to, on information and belief, make the claims read on the standard. For example, the ’982 patent’s specification includes new language regarding a “tributary slot,” whereas its parent application refers to “time slots.” (*Compare, e.g.*, ’982 Patent at 3:20-22 (“FIG. 2 is a schematic illustration of dividing an HO OPU into eight 1.25 G **tributary slots**, according to an embodiment of the present invention.”) *with* ’205 Patent at 2:58-60 (“FIG. 2 is a structural schematic view illustrating dividing an HO OPU into eight 1.25 G **time slots** according to an embodiment of the present invention.”).) Nowhere in the parent application is the term “tributary slot” mentioned. “Time slot” and “tributary slots” are very different. For example, during prosecution of the parent application, the USPTO Examiner rejected the pending claims that included “time slots” as anticipated by U.S. Patent Application Publication No. 2009/0086767.

Specifically, the USPTO Examiner cited the following portion of the prior art reference as disclosing "time slots":

> Thus, the first write-control module may transmit the information on the positive justification byte and the negative justification byte in each ODTU0x frame to the second smooth-control module via a JC byte, and the second smooth-control module may respectively ***compute ratio value of the positive and negative justification for 4 time slots every 4 frames***, according to the information on the positive justification byte and the negative justification byte it receives during the demapping process, or respectively ***compute the ratio value of positive and negative justification for 16 time slots every 16 frames***, so that the second smooth-control module can ***set the clock gap position, according to the ratio values of positive and negative justification***. As a result, the clock gap may be smoothed as much as possible, and the influence of jitter caused by the positive justification byte and the negative justification byte in ODTU0x may be filtered.

(U.S. Patent Application Publication No. 2009/0086767 at ¶ 58 (emphasis added).) Based on this disclosure, "time slots" are used to determine timing information, such as clock gap. In contrast to "time slots," the term "tributary slots" are not limited to determining the time information. Instead, tributary slots is a coined term from the December 2009 G.709 standard and is defined in Section 19.1. Specifically, Section 19.1 discloses that

> The OPUk is divided into a number of tributary slots (TS) and these tributary slots are interleaved within the OPUk. A tributary slot includes a part of the OPUk OH area and a part of the OPUk payload area. The bytes of the ODUj frame are mapped into the ODTU payload area and the ODTU bytes are mapped into the OPUk Tributary Slot or Slots. The bytes of the ODTU justification overhead are mapped into the OPUk OH area.
>
> There are two types of tributary slots:
>
> > 1) ***Tributary slot with a bandwidth of approximately 2.5 Gbit/***s; an OPUk is divided into n tributary slots, numbered 1 to n.
> >
> > 2) ***Tributary slot with a bandwidth of approximately 1.25 Gbit/s***; an OPUk is divided into 2n tributary slots, numbered 1 to 2n.

(December 2009 G.709 Standard at Section 19.1 (emphasis added).) As is clear from the standard, "tributary slots" do not merely determine timing information like a time slot. Instead, they include

specific parts of the optical channel payload unit (OPU) including a part of the overhead (OH) and a part of the payload area and have a set bandwidth. On July 8, 2014, the USPTO Examiner allowed the claims of the parent application based on the Applicant's distinguishing of the prior art references disclosing time slots. However, after the USPTO Examiner issued a Notice of Allowance for the parent application, the Applicants filed an Information Disclosure Statement on August 26, 2014 disclosing, *inter alia*, the December 2009 G.709 Standard disclosing "tributary slots." The USPTO Examiner maintained the allowance and the claims were allowed.

382. On December 10, 2014, Huawei filed the application for the '982 Patent as a continuation of the allowed '205 Patent, on information and belief, to rely on the parent application's priority date to obtain allowance of claims requiring a "tributary slot" to explicitly read on Section 19.1 of the G.709 standard.

383. The '982 Patent Applicants, including each inventor of the '982 Patent, Maarten Vissers, Qiuyou Wu, Xin Xiao, and Wei Su, and the prosecuting attorneys, have a duty of candor to the USPTO and improperly identified the '982 Patent as a continuation of the '205 Patent even though it included new matter not disclosed in the '205 Patent. Specifically, Huawei failed disclose to the USPTO Examiner that "tributary slot" is different from "time slots" and use of "tributary slots" in the '982 Patent was new matter directed to the G.709 standard. But for the '982 Patent Applicants' misrepresentations and failure to disclose that the application that led to the '982 Patent could not claim priority to the earlier continuation application of U.S. Patent Application No. 12/712,675, the claims of the '982 Patent would not have issued. The Examiner of the '982 Patent allowed all claims based on limitations that the '982 Patent Applicants argued did not exist in the prior art during the prosecution of the '982 Patent, despite knowing that these limitations did in fact exist in the prior art, as explained above.

384. As a result of the actions described above, all claims of the ’982 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to “a single claim renders the entire patent unenforceable.” *Regeneron Pharms.*, 864 F.3d at 1350.

’485 Patent

385. On information and belief, the ’485 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least the named inventor (Hao Long) and the prosecuting attorneys (at least Franklin Han, Weigui Chen, and Robert D. McCutcheon) (collectively, “the ’485 Patent Applicants”) in procuring the ’485 Patent. The ’485 Patent Applicants failed to disclose information material to patentability to the USPTO with the intent to withhold that information from the USPTO. The ’485 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the ’485 Patent.

386. The ’485 Patent claims priority to Chinese Patent Application No. CN200710073029 (the “CN ’029 Application”), which was filed on January 23, 2007. The CN ’029 Application’s claims recited limitations that are similar to the limitations of the ’485 Patent claims asserted by Huawei in this case. For example, claim 7 of the CN ’029 Application was directed to an “Ethernet Ring Protection (ERP) method” wherein, when a link in an Ethernet ring network is faulty, the node that detects the faulty link judges whether it is the link where the “normally blocked port locates.” If the faulty link is one where the “normally blocked port locates,” the node that detected the fault sends a control message with a forwarding table non-clearing indication to other nodes on the ring network. Claim 8 of the ’485 Patent, which Huawei asserts in this case, contains similar limitations to claim 7 of the CN ’029 Application.

387. On January 8, 2010, the Chinese Patent Office issued a first office action in which it rejected the claims of the CN ’029 Application as invalid based on Chinese Patent Application

Publication No. CN1812361A (the "CN '361 Publication"). Verizon has obtained and produced a certified translation of the CN '361 Publication at VZ-HW-EDTX-0085898 - VZ-HW-EDTX-0085938. The CN '361 Publication is prior art to the '485 Patent and is cited in Verizon's Invalidity Contentions for the '485 Patent.

388. On information and belief, on September 13, 2010 Huawei submitted a response to the Chinese Patent Office's January 8, 2010 first office action in which Huawei amended the claims of the CN '029 Application. On May 25, 2011, the Chinese Patent Office issued another office action in which it rejected the amended claims of the CN '029 Application as invalid based on the CN '361 Publication.

389. On October 8, 2011, Huawei appealed the rejection of the CN '029 Application to the Chinese Patent Office's Patent Reexamination Board. On April 18, 2013, the Patent Reexamination Board upheld the rejection of the claims of the CN '029 Application as invalid based on the CN '361 Publication.

390. On May 16, 2013, Huawei responded to the Patent Reexamination Board's decision, again amending the claims in an attempt to distinguish the CN '361 Publication. On July 3, 2013, the Patent Reexamination Board again upheld the rejection of the amended claims of the CN '029 Application as invalid based on the CN '361 Publication.

391. On August 14, 2013, Huawei responded to the Patent Reexamination Board's July 3, 2013 decision and again amended the claims in another attempt to distinguish the CN '361 Publication. On May 14, 2014, the Patent Reexamination Board issued a final decision upholding the rejection of the claims of the CN '029 Application as invalid based on the CN '361 Publication. On information and belief, Huawei could have appealed the May 14, 2014 decision of the Patent

Reexamination Board regarding the CN ’029 Application to the Beijing First Intermediate Court, but did not do so.

392. The application that issued as the ’485 Patent—U.S. Patent Application No. 13/683,028 (the “’028 Application”)—was filed on November 21, 2012. On the same day the ’028 Application was filed, the ’485 Patent Applicants submitted an Information Disclosure Statement identifying the CN ’361 Publication that was the subject of the Chinese Patent Office’s previous rejections of the CN ’029 Application. The CN ’029 Application is a Chinese language reference, yet the ’485 Patent Applicants did not submit a full translation of the CN ’361 Publication with the November 21, 2012 IDS. Instead, the ’485 Patent Applicants submitted only an English translation of the Abstract.

393. The English language Abstract of the CN ’361 Publication that the ’485 Applicants provided with the November 21, 2012 IDS provided as follows:

> This invention discloses a kind of fast looped network protection method. It concludes: the fast looped network protection area is set up. Nodes are connected with each other through ports to form a loop. Each node is consisted with two ports that are connected with loop; master node sets the first port to retransmission mode and sets the second port to blocking mode; the link trouble is acquired through accessing control table, retransmission table entry or virtual local area network. The said virtual local area network retransmits data messages and protocol messages; when acquiring the link trouble, master node sets the second node to retransmission mode. The retransmission tables of master node and other nodes are refreshed. A special control VLAN aiming at protocol message does not need. Thus, it can save VLAN ID resource of each node.

394. The limited translation submitted by the ’485 Patent Applicants with the November 21, 2012 IDS did not include an English translation of the remainder of the CN ’361 Publication. For example, the submitted translation did not include an English translation of the following paragraph from page 12 of the CN ’361 Publication:

当主节点 4 检测到其主端口 41 的直连链路出现故障，则主节点 4 将副端口 42 恢复转发，并刷新主节点以及传输节点的转发表。当然，主节点 4 也可以检测其副端口 42 的直连链路的故障，但是由于副端口 42 原来就处于阻塞数据报文的状态，即数据报文的转发以及转发表的信息并没有受到影响，所以不需要将副端口 42 恢复转发，也不需要刷新主节点以及传输节点的转发表。对于主节点 4 的主端口 41 的链路故障，可以通过主节点 4 自行检测而获知，以便进一步提高环网自动保护的速度。当然，主端口 41 的链路故障，主节点也可以通过传输节点通知或者轮询环网状态而获知。

395. The Chinese Patent Office's rejection of the CN '029 Application relied, in part, on the above paragraph from page 12 of the CN '361 Publication. The English translation of the paragraph obtained by Verizon provides as follows:

> When the master node 4 detects that the direct link of its primary port 41 has failed, it resumes forwarding by the secondary port 42 and refreshes the forwarding databases of the master node and the transit nodes. Of course, the master node 4 can also detect the failure of the direct link of its secondary port 42, but the secondary port 42 is in the state of blocking data messages, that is, the forwarding of data messages and the information of the forwarding database are not affected. Therefore, there is no need to restore the secondary port 42 for forwarding, nor to refresh the forwarding databases of the master node and the transit nodes. In a link failure of the primary port 41 of the master node 4, the master node 4 can be informed by its own detection, so as to further improve the speed of the automatic protection of the ring network. Of course, in a link failure of the primary port 41, the master node can also be informed by the notifications of the transit nodes or by polling the ring network status.

396. Section (a)(3)(ii) of 37 C.F.R. 1.98 provides that "[a]ny information disclosure statement filed under § 1.97 shall include . . . [a] copy of the translation if a written English-language translation of a non-English-language document, or portion thereof, is within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c)."

397. When the '485 Patent Applicants submitted the incomplete translation of the CN '361 Publication with the November 12, 2012 IDS, the '485 Patent Applicants had within their possession, custody, or control, or had ready access to, a more complete translation of the CN '361

Publication. For example, on two previous occasions Huawei submitted more complete translations of the CN '361 Publication, to a different USPTO examiner from the examiner handling the '028 Application that issued as the '485 Patent, during prosecution of U.S. Patent Application No. 12/403,451 (the "'451 Application"). The '451 Application is the parent to the '253 Patent asserted by Huawei in this case, contains overlapping subject matter with the '485 Patent, and the named inventor of the '485 Patent is also a named inventor on the '451 Application.

398. Huawei first submitted a more complete translation of the CN '361 Publication during prosecution of the '451 Application in a May 27, 2010 Information Disclosure Statement. The translation Huawei submitted to the '451 Application examiner included the following translation of the content of page 12 of the CN '361 Publication:

> When the master node 4 detects that a failure occurs on the directly connected link of the master port 41 thereof, the master node 4 recovers forwarding of the slave port 42 and refreshes forwarding databases of the master node and the transmission nodes. Certainly, the master node 4 can also detect a failure of a directly connected link of the slave port 42 thereof. However, since the slave port 42 is originally in the state of blocking data packets, that is, the forwarding of data packets and information of the forwarding databases are not affected, the master node does not need to recover the forwarding of the slave port 42 or refresh the forwarding databases of the master node and the transmission nodes. A link failure of the master port 41 of the master node 4 can be known through detection of the master node 4 by itself, so as to further improve the speed of automatic ring protection. Certainly, the link failure of the master port 41 can also be known by the master node through notification of the transmission node or through polling a ring state.

399. Huawei again submitted a more complete translation of the CN '361 Publication during prosecution of the '451 Application in a December 30, 2010 Information Disclosure Statement. The translation Huawei submitted to the '451 Application examiner on this occasion

included an English translation of the content of page 12 of the CN ’361 Publication that is similar to that of the translation Huawei submitted with the May 12, 2010 IDS.

400. Different examiners at the USPTO handled the ’028 Application that matured into the ’485 Patent and the ’451 Application. The ’485 Patent Applicants, including the named inventor of the ’485 Patent, Hao Long, did not disclose to the examiner handling that application the translations of the CN ’361 Publication that Huawei submitted to the USPTO during prosecution of the ’451 Application.

401. Had the ’485 Patent Applicants disclosed these translations of the CN ’361 Publication to the USPTO examiner, the examiner would not have allowed the ’485 Patent to issue. Accordingly, the CN ’361 Publication is material to the patentability of the ’485 Patent. Further, the prosecution of the CN ’029 Application before the Chinese Patent Office made Huawei aware of the materiality of the CN ’361 Publication to the ’485 Patent and the fact that the most pertinent sections of that publication are not found in the Abstract, which is the only part of the publication for which Huawei submitted an English translation during prosecution of the ’485 Patent.

402. The ’485 Patent Applicants, including the named inventor of the ’485 Patent, Hao Long, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose a complete translation of the CN ’361 Publication to the USPTO examiner. Because the ’485 Patent Applicants had within their possession, custody, or control, or had ready access to, at least two more complete translations of the CN ’361 Publication, their failure to disclose those more complete translations to the USPTO during prosecution of the ’485 Patent violated Patent Office rules, including at least 37 C.F.R. § 1.98. But for the ’485 Patent Applicants’ failure to disclose a complete translation of the CN ’361 Publication during the prosecution of the ’485 Patent, the claims of the ’485 Patent would not have issued.

403. The November 21, 2012 IDS that the '485 Patent Applicants submitted to the USPTO disclosed the January 8, 2010 first office action from the Chinese Patent Office, in which it rejected the claims of the CN '029 Application. The November 12, 2012 IDS also disclosed the May 25, 2011 office action from the Chinese Patent Office in which it rejected the amended claims of the CN '029 Application. Partial translations of both of these documents were provided with the November 21, 2012 IDS.

404. On May 16, 2013, the '485 Patent Applicants submitted another IDS to the USPTO, disclosing the April 18, 2013 decision of the Chinese Patent Office's Reexamination Board in which it upheld the rejection of the claims of the CN '029 Application as invalid based on the CN '361 Publication. A partial translation of the April 18, 2013 decision of the Reexamination Board was provided with the May 16, 2013 IDS.

405. On September 19, 2013, the '485 Patent Applicants submitted another IDS to the USPTO, disclosing the July 3, 2013 decision of the Chinese Patent Office's Reexamination Board in which it upheld the rejection of the amended claims of the CN '029 Application as invalid based on the CN '361 Publication. A partial translation of the July 3, 2013 decision of the Reexamination Board was provided with the September 19, 2013 IDS.

406. On information and belief, the '485 Patent Applicants did not disclose or submitted an English translation of any part of the remaining documents relating to the prosecution of the CN '029 Application to the USPTO during prosecution of the '485 Patent. This includes at least:

- Huawei's September 13, 2010 response to the Chinese Patent Office's January 8, 2010 first office action.
- Huawei's October 8, 2011 appeal to the Chinese Patent Reexamination Board.

- Huawei's May 16, 2013 response to the Chinese Patent Reexamination Board's April 18, 2013 decision.
- Huawei's August 14, 2013 response to the Chinese Patent Reexamination Board's July 3, 2013 decision.
- The Chinese Patent Reexamination Board's May 14, 2014 final decision upholding the rejection of the claims of the CN '029 Application.

407. Had the '485 Patent Applicants disclosed these documents to the USPTO examiner during prosecution, the examiner would not have allowed the '485 Patent to issue. Accordingly, these documents are material to the patentability of the '485 Patent. Further, Huawei's disclosure of some documents relating to prosecution of the CN '029 Application to the USPTO shows that it was aware that its arguments presented in an attempt to overcome the CN '361 Publication and the Chinese Patent Reexamination Board's final rejection of those arguments were material to the '485 Patent.

408. The '485 Patent Applicants, including the named inventor of the '485 Patent, Hao Long, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose information relating to prosecution of the parent CN '029 Application to the USPTO Examiner. But for the '485 Patent Applicants' failure to disclose this information relating to its arguments presented to the Chinese Patent Office in an attempt to overcome the CN '361 Publication, and the Chinese Patent Reexamination Board's final rejection of those arguments during the prosecution of the '485 Patent, the claims of the '485 Patent would not have issued.

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420. The ’485 Patent Applicants have a duty of candor to the USPTO and failed to disclose RFC3619 or the Yip patent to the USPTO Examiner. But for the ’485 Patent Applicants’ failure to disclose RFC3619 or the Yip patent during the prosecution of the ’485 Patent, the claims of the ’485 Patent would not have issued.

421. During prosecution of the ’253 Patent and its parent, the ’451 Application, which contains overlapping subject matter and shares an inventor with the ’485 Patent, Huawei disclosed prior art references that were also material to the patentability of the ’485 Patent. Yet Huawei failed to disclose those other references to the USPTO during prosecution of the ’485 Patent.

422. For example, Huawei disclosed U.S. Patent Publication No. US2005/0207348A1 to Tsurumi et al. (“Tsurumi”) to the USPTO during prosecution of the ’253 Patent and ’451 Application. Tsurumi is prior art to the ’485 Patent and is cited in Verizon’s Invalidity Contentions for the ’485 Patent.

423. Tsurumi describes an Ethernet ring protection protocol in which, when nodes detect a link failure, they transmit “trap” packets which cause a master node to unblock a normally blocked port and change from a master node to a normal (transit) node. *See, e.g.,* Tsurumi at [0041]-[0043]. Tsurumi describes that nodes in the Ethernet ring network exchange control information that includes a “Status” field indicating the status of the ring. When the “Status” is set to 0 the ring is normal, when it is 1 a failure has occurred, and when a Status of 2 indicates that ring nodes should initiate a “MAC flash” operation which involves removal of “data transmission path information” that the nodes have learned. *See, e.g.,* Tsurumi at [0043], [0052], [0079]-[0082], [0099], [0101], Figs. 5-6. Tsurumi further describes that when a failure “occurs to a link which is connected to the node 1 a serving as the master node and which is connected to the port 2 a that is

originally logically blocked, the node 1 a does not perform the master node setting processing but keeps the port 2 a in the logically blocked state." *See, e.g.*, Tsurumi at [0048], Fig. 2.

424. Huawei disclosed U.S. Patent Publication No. 2005/0207348 A1 to Tsurumi et al. ("Tsurumi") to the USPTO during prosecution of the '451 Application in a September 22, 2009 Information Disclosure Statement. The USPTO examiner for the '451 Application relied on U.S. Patent No. 7,440,397 to Tsurumi et al., which is the patent that issued from the published Tsurumi application, in a rejection of the '451 Application claims on October 20, 2010.

425. Huawei again disclosed the Tsurumi reference to the USPTO during prosecution of the '253 Patent in an August 10, 2011 Information Disclosure Statement. The USPTO examiner for the '253 Patent relied on the Tsurumi reference in a rejection of the application claims on January 9, 2013. On February 8, 2013, Huawei submitted a response to the office action in which it presented arguments regarding the Tsurumi reference's disclosure in relation to the application claims. Huawei's representative then conducted an interview with the USPTO examiner for the '253 Patent on February 27, 2013, and the Tsurumi reference was discussed during that interview. On June 11, 2013, Huawei submitted a supplemental response in which it again addressed the Tsurumi reference.

426. The USPTO examiner handling the '485 Patent is different than the examiner that handled the '451 Application and '253 Patent. Yet the '485 Patent Applicants did not disclose the Tsurumi reference to the USPTO during prosecution of the patent application that led to the '485 Patent. Had the '485 Patent Applicants disclosed the Tsurumi reference to the USPTO examiner, the examiner would not have allowed the '485 Patent to issue. Accordingly, the Tsurumi reference is material to the patentability of the '485 Patent. Further, Huawei was aware of the materiality of Tsurumi to the alleged invention of the '485 Patent based at least on the extensive discussion of

the Tsurumi reference during prosecution of the ’253 Patent and ’451 Application, which contain closely related subject matter.

427. The ’485 Patent Applicants, including the named inventor of the ’485 Patent, Hao Long, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose Tsurumi to the USPTO Examiner. But for the ’485 Patent Applicants’ failure to disclose Tsurumi during the prosecution of the ’485 Patent, the claims of the ’485 Patent would not have issued.

428. As a result of the actions described above, all claims of the ’485 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to “a single claim renders the entire patent unenforceable.” *Regeneron Pharms., Inc. v. Merus N.V.*, 864 F.3d 1343, 1350 (Fed. Cir. 2017).

<u>’253 Patent</u>

429. On information and belief, the ’253 Patent is unenforceable due to the commission of inequitable conduct and violation of the provisions of 37 C.F.R. § 1.56 by at least the named inventors (Hao Long and Yang Yang) and the prosecuting attorneys (at least Weiguo Chen and Mark Joy) (collectively, “the ’253 Patent Applicants”) in procuring the ’253 Patent. The ’253 Patent Applicants failed to disclose information material to patentability to the USPTO with the intent to withhold that information from the USPTO. The ’253 Patent Applicants knew or should have known the USPTO would consider the information material to its decision to grant the ’253 Patent.

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445. The ’253 Patent Applicants, including the named inventors of the ’253 Patent, Hao Long and Yang Yang, and the prosecuting attorneys, have a duty of candor to the USPTO and failed to disclose the Nortel E-SPRing, NTT ERP, or Siemens solutions to the USPTO examiner. But for the ’253 Patent Applicants’ failure to disclose the Nortel E-SPRing, NTT ERP, or Siemens solutions during the prosecution of the ’253 Patent, the claims of the ’253 Patent would not have issued.

446. As a result of the actions described above, all claims of the ’253 Patent are unenforceable due to inequitable conduct. A finding of inequitable conduct with respect to “a single claim renders the entire patent unenforceable.” *Regeneron Pharms., Inc. v. Merus N.V.*, 864 F.3d 1343, 1350 (Fed. Cir. 2017).

* * * * *

RESERVATION OF DEFENSES

Discovery in this action is ongoing and Verizon continues to investigate the allegations set forth in the First Amended Complaint. Verizon hereby provides explicit notice to Plaintiff that it intends to rely upon such other defenses as may become available by law or in equity, or pursuant to statute, as discovery proceedings in this action, and hereby reserves the right to assert such additional defenses.

* * * * *

PRAYER FOR RELIEF

WHEREFORE, Verizon respectfully requests that the Court enter judgment in its favor and against Huawei on Huawei's First Amended Complaint, and grant the following relief:

1) Dismissing, with prejudice, Huawei's First Amended Complaint in its entirety against Verizon;

2) Denying all relief that Huawei seeks in its First Amended Complaint;

4) Declaring that Verizon does not now and has never infringed, induced the infringement of, or contributed to the infringement of any valid and enforceable claim of the asserted patents in the First Amended Complaint;

5) Declaring that the claims of the asserted patents in the First Amended Complaint are invalid;

6) Finding this case to be exceptional under 35 U.S.C. § 285 and awarding Verizon its costs and attorneys' fees;

7) Awarding Verizon its costs, expenses, disbursements, and attorneys' fees incurred in connection with this action; and

8) Awarding Verizon any other relief the Court deems just and equitable.

DEMAND FOR A JURY TRIAL

Verizon hereby demands a jury trial, pursuant to Fed. R. Civ. P. 38(b), as to all issues that may be tried by a jury.

* * * * *

COUNTERCLAIMS

In accordance with Rule 13 of the Federal Rules of Civil Procedure, Verizon hereby alleges and asserts the following Counterclaims against Huawei:

THE PARTIES

1. Counterclaim Plaintiff Verizon Business Network Services, Inc. is a Delaware corporation and has designated CT Corporation, 1999 Bryan St., Suite 900, Dallas, Texas 75201 as its agent for service of process.

2. Counterclaim Plaintiff Cellco Partnership d/b/a Verizon Wireless is a General Partnership with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920.

3. Counterclaim Plaintiff Verizon Data Services LLC is a Delaware limited liability company with its principal place of business at One East Telecom Parkway, B3E, Temple Terrace, Florida 33637.

4. Counterclaim Plaintiff Verizon Business Global, LLC is a Delaware corporation with a principal place of business at 899 Heathrow Park Lane, Lake Mary, Florida 32746.

5. Counterclaim Plaintiff Verizon Services Corp. is a Delaware corporation with its principal place of business at 22001 Loudoun County Parkway, Ashburn, Virginia 20146.

6. Counterclaim Plaintiff Verizon Patent and Licensing Inc. is a Delaware corporation with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920.

7. On information and belief, Counterclaim Defendant Huawei Technologies Co. Ltd. is a Chinese corporation with its principal place of business at Bantian, Longgang District, Shenzhen, People's Republic of China.

8. On information and belief, Counterclaim Defendant Huawei Technologies USA, Inc. is a Texas corporation with its principal place of business at 5700 Tennyson Parkway Suite 600, Plano, TX 75024.

9. On information and belief, Counterclaim Defendant Futurewei Technologies, Inc. is a Texas corporation with its principal place of business at 5340 Legacy Drive Suite 175, Plano, TX 75024.

JURISDICTION AND VENUE

10. Verizon's Counterclaims arise under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, and the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.* This Court has subject matter jurisdiction over Verizon's Counterclaims under 28 U.S.C. §§ 1331, 1338, 2201, and 2202. An actual controversy exists under the Declaratory Judgment Act, because Huawei has asserted and is asserting infringement of U.S. Patent Nos. 8,270,433 ("the '433 patent"); 9,014,151 ("the '151 patent"); 8,406,236 ("the '236 patent"); 8,824,505 ("the '505 patent"); and 9,312,982 ("the '982 patent") by Verizon and Verizon denies those allegations.

11. The court has personal jurisdiction over Huawei at least by virtue of Huawei's consent to the personal jurisdiction of this Court by filing of the Complaint against Verizon in this Court.

12. For the purposes of the Counterclaims set forth herein, and without waiving any defense of lack of venue or improper venue in connection with Huawei's Complaint and causes of action, venue is proper in this district at least because Huawei has submitted to personal jurisdiction in this Court and has consented to this venue by filing its Complaint here.

FACTUAL BACKGROUND

Asserted Patents

13. On February 21, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,121,111 ("the '111 patent"), entitled "Method and System for Measuring Latency." A true and correct copy of the '111 patent is attached as Exhibit A.

14. On March 17, 2015, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,983,288 ("the '288 patent"), entitled "Method and System for Measuring Latency." A copy of the '288 patent is attached as Exhibit B.

Accused Products

15. Upon information and belief, Huawei uses, sells, offers to sell, and/or imports equipment compatible with the ITU's Telecommunication Standardization Sector ("ITU-T"), including the ITU-T's G.709: Interfaces for the optical transport network standard ("G.709" or "the G.709 Standard"), including OTN products and equipment such as optical switching systems.

16. According to information published on the websites of Huawei and its subsidiaries, Huawei devices that are designed to operate in accordance with the G.709 Standard are compliant with the G.709 Standard include, but are not limited to, the following models: OptiX OSN 500, OptiX OSN 550, OptiX OSN 580, OptiX OSN 1500, OptiX OSN 1800, OptiX OSN 3500, OptiX OSN 3800, OptiX OSN 6800, OptiX OSN 7500, OptiX OSN 7500 II, OptiX OSN 8800, OptiX OSN 9560, and OptiX OSN 9800 series, which are multi-service OTN platforms ("Accused Huawei Products").

17. According to information published on the websites of Huawei and its subsidiaries, Huawei Technologies Co. Ltd., Huawei Technologies USA, Inc., and Futurewei Technologies, Inc. design, develop, and supply the Accused Huawei Products for use, sale, offers to sell, and/or importation.

Huawei's FRAND/RAND Obligations Arise From Its Participation in Standards Setting Organizations

18. Technical standards play a critical role in the development of optical networking. In general, technical standards—such as those for optical networking—have the potential to encourage innovation and promote competition among equipment suppliers and network providers in the optical networking industry.

19. The technical specifications for most standards are published and broadly available. Product designers and manufacturers are thus willing to invest heavily in the development of handsets or component parts because, so long as their products are compliant with the published technical standard, those products will operate effectively within the carrier networks and be compatible with other products from third parties.

20. Standards development also reduces costs for both suppliers and purchasers. For suppliers, standardization reduces the need in many instances to develop products to a particular purchaser's specifications. Accordingly, because a single product or product line may be sold to multiple purchasers and distributed more widely, manufacturing volumes increase and per unit of costs decrease. Purchasers benefit from increased price competition among suppliers. Because many suppliers make standard-compliant products, switching suppliers typically does not require a substantial redesign of one's products or a substantial technical transfer to enable the new supplier to produce compatible products. The lower "switching cost" intensifies competition among suppliers, leading to lower prices.

21. On the other hand, technical standardization also creates a "lock-in" effect and the risk of "patent hold-up." Although standards are the products of coordination and compromise among competitors, certain aspects of standards may be—and often are—claimed by patents. Before standardization, the royalty a patentee can earn from a patent license for its technology is constrained in part by the availability of alternative technical approaches to perform that function.

If a standard requires a designer to employ that patented technology, however, those other technological approaches are no longer available substitutes and no longer constrain the patentee's ability to demand royalties far in excess of what is warranted by the intrinsic value of the technology. Moreover, that some end consumers might be able to choose among equipment that practice different standards does nothing to mitigate the fact that a manufacturer is locked into the standard that its equipment practices.

22. This phenomenon is compounded because network providers, such as Verizon, invest great resources in developing its network that comply with the technical standard. Even if there were an alternative standard, the costs and disruption associated with switching are typically prohibitively expensive. The designer that implements a standard thus becomes "locked-in." Left unconstrained, owners of patents that purportedly cover certain features within the standard can take advantage of lock-in and demand exorbitant royalties and other terms from the designers, knowing that it would be less costly for the designer to pay the excessive royalty or capitulate to unreasonable terms rather than incur the cost of switching. This dynamic is often called "patent hold-up."

23. Accordingly, most SSOs have adopted IPR policies to address the problem of patent hold-up. These policies set forth requirements concerning, among other things: (a) disclosure of IPR that may claim any portion of the specification of the standard in development; and (b) whether and to what extent parties holding purported essential IPR must commit to licensing these IPR on FRAND terms and conditions.

24. Timely disclosure of purported essential IPR is critical to ensuring that those participating in standards development can evaluate technical proposals with knowledge of the potential licensing costs that designers may incur when developing standards-compliant products.

Optical Networks Implement Standards Published by Standards Setting Organizations

25. Optical networks have been implemented using several open standards, including the ITU-T, G.709 Standard. The ITU-T has adopted detailed IPR policies pertaining to the disclosure of IPR that may claim any portion of the specification of the standard in development and whether and to what extent parties holding purported essential IPR must commit to licensing these IPR on FRAND terms and conditions.

26. The ITU-T has developed a "code of practice" regarding IPR, entitled "Common Patent Policy for ITU-T/ITU-R/ISO/IEC." This code of practice requires any party participating in the work of the ITU-T to "draw the attention of the Director of ITU-TSB, the Director of ITU-BR, of the offices of the CEOs of ISO or IEC, respectively, to any known patent or to any known pending patent application, either their own or of other organizations." The code of practice also requires parties to provide a "written statement" regarding FRAND licensing. If a participating party is not willing to negotiate or grant a license to any such IPR on a "non-discriminatory basis on reasonable terms and conditions," then such IPR shall not be included in the ITU-T Recommendation and not included in any standard derived from the Recommendation. The ITU-T also publishes "Guidelines for Implementation of the Common Patent Policy" that "encourages the early disclosure and identification of Patents that may relate to Recommendations/Deliverables under development. In doing so, greater efficiency in standards development is possible and potential patent rights problems can be avoided."

Huawei's Non-Disclosure of IPR During the Standard-Setting Process

27. On information and belief, Huawei and its representatives to the ITU-T deliberately and deceptively failed to disclose the existence of its claimed IPR during the standard-setting process while advocating for adoption into the standard technologies that they believed were

covered by Huawei's asserted patents, all the time intentionally concealing that fact from the ITU-T and its members. Huawei personnel (including named inventors on applications for the concealed patents) frequently participated in the relevant Working Groups and steered the groups to adopt relevant technology into the standard. The reason for Huawei's intentional failures to disclose its IPR are clear: it knew that by doing so and by simultaneously and intentionally failing to disclose that it would not offer FRAND license terms for each respective asserted patent to all implementers of the standard, it would induce the ITU-T to adopt the technologies that it claims are covered by its asserted patents. On information and belief, for each of the asserted patents, Huawei and its representatives to the ITU-T intentionally failed to disclose its IPR.

a. Huawei asserts that the '505 Patent, which purports to claim a "method and apparatus for transporting client signals in optical transport network," is essential to Sections 7, 11, 12, 13, 19, 20 and Annex D of the G.709 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the '505 Patent, based on the filing date of a related Chinese patent application, is April 17, 2007. On May 24, 2007, the named inventors of the '505 Patent, Limin Dong and Qiuyou Wu, proposed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. On October 8, 2007, Huawei's representative to the ITU-T study group responsible for the G.709 standard, Huub van Helvoort, again proposed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. Specifically, the claimed limitations "wherein the OPUk frame includes an overhead containing a tributary slot MultiFrame Indicator (MFI-TS) byte" and "wherein the OPUk frame includes

an OPUk payload area that includes a total of 4 rows and 3808 columns," which the Examiner relied on to grant the '505 Patent, are expressly found in the Huawei proposals. Huawei contends that this particular technology was adopted into the G.709 standard in December 2009 in the aforementioned sections. The meetings during which Huawei's representatives, including Limin Dong, Qiuyou Wu, and Huub van Helvoort, submitted and/or advocated contributions directed to this technology included at least the following: SG15 Plenary Meeting, Geneva, Switzerland (June 4-15, 2007); Q11/15 Interim Meeting, Shenzhen, China (October 15-19, 2007); SG15 Plenary Meeting, Geneva, Switzerland (February 11-22, 2008); Q11/15 Interim Meeting, Sophia Antipolis, France (June 2-6, 2008); Q11/15 and Q9/15 Joint Meeting, Jeju Island, South Korea (September 22-26, 2008); SG15 Plenary Meeting, Geneva, Switzerland (December 1-12, 2008); Q11/15 Interim Meeting, Milpitas, California (March 16-20, 2009); Q11/15 Interim Meeting, Sophia Antipolis, France (May 25-29, 2009); SG15 Plenary Meeting, Geneva, Switzerland (September 28 – October 9, 2009). Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR during the above-identified meetings or in any other setting.

b. Huawei asserts that the '236 Patent, which purports to claim a "method and apparatus for transporting client signal in optical transport network," is essential to Sections 7, 19, 20 and Annex D of the G.709 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date of the '236 Patent, based on the filing date of a related Chinese patent application, is June 15, 2007.

On October 6, 2007, Huawei's representative to the ITU-T study group responsible for the G.709 standard, Huub van Helvoort, proposed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. On January 31, 2008, the named inventors of the '236 Patent, Limin Dong and Qiuyou Wu, also proposed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. Specifically, the claimed "first series of bit positions" and "second series of bit positions," which, on information and belief, the Examiner relied on to grant the '236 Patent, are expressly found in the Huawei proposals. Huawei contends that this particular technology was adopted into the G.709 standard in December 2009 in the aforementioned sections. The meetings during which Huawei's representatives, including Limin Dong, Qiuyou Wu, and Huub van Helvoort, submitted and/or advocated contributions directed to this technology included at least the following: SG15 Plenary Meeting, Geneva, Switzerland (June 4-15, 2007); Q11/15 Interim Meeting, Shenzhen, China (October 15-19, 2007); SG15 Plenary Meeting, Geneva, Switzerland (February 11-22, 2008); Q11/15 Interim Meeting, Sophia Antipolis, France (June 2-6, 2008); Q11/15 and Q9/15 Joint Meeting, Jeju Island, South Korea (September 22-26, 2008); SG15 Plenary Meeting, Geneva, Switzerland (December 1-12, 2008); Q11/15 Interim Meeting, Milpitas, California (March 16-20, 2009); Q11/15 Interim Meeting, Sophia Antipolis, France (May 25-29, 2009); SG15 Plenary Meeting, Geneva, Switzerland (September 28 – October 9, 2009). Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR during the above-identified meetings or in any other setting.

c. Huawei asserts that the ’151 Patent, which purports to claim a “method and apparatus for transmitting low-rate traffic signal in Optical Transport Network,” is essential to Sections 6, 7, 12, 15, 17, and 19 of the G.709 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the ’151 Patent, based on the filing date of a related Chinese patent application, is August 11, 2004. On June 2-6, 2008, Huawei’s representative to the ITU-T study group responsible for the G.709 standard and editor of the study group, Maarten Vissers participated in study group’s Q11/15 Interim Meeting in Sophia Antipolis and discussed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. On August 11, 2008, Huawei’s representative to the ITU-T study group responsible for the G.709 standard and editor of the study group, Maarten Vissers, proposed part of the technology and some of the specific limitations on which Huawei was pursuing a patent. Huawei contends that technology was included in the version of the standard adopted in December 2009. Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR.

d. Huawei asserts that the ’982 Patent, which purports to claim a “method and apparatus for mapping and de-mapping in an Optical Transport Network,” is essential to Section 19 of the G.709 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the ’982 patent, based on the filing date of a related Chinese patent application, is March 9, 2009. On March 16,

2009, the named inventors of the ’982 Patent proposed to the ITU-T study group responsible for the G.709 standard, in the Q11/15 Interim Meeting in Milpitas, California (USA) held March 16-20, 2009, part of the technology on which Huawei was pursuing a patent. Huawei contends that technology was included in the version of the standard adopted in December 2009. Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR.

e. Huawei asserts that the ’433 Patent, which purports to disclose a “sending method, receiving and processing method and apparatus for adapting payload bandwidth for data transmission” is essential to Sections 11, 17 and Annex B of the G.709 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the ’433 patent, based on the filing date of a related Chinese patent application, is June 21, 2007. On July 16-19 2007 and September 10-14 2007, Huawei contractors and/or employees attended IEEE Higher Speed Study Groups meetings located in San Francisco, CA and Seoul, Korea related to the alleged invention claimed in the ’433 Patent, and in January 2008, Huawei and its representatives to the ITU-T including Qiwen Zhong and the named inventor of the ’433 patent Zhangzhen Jiang submitted several contributions to the ITU-T listing Zhangzhen Jiangand building on part of the technology on which Huawei was pursuing a patent. Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR.

f. Huawei asserts that the ’253 Patent, which purports to claim a “method, apparatus and system for Ethernet Ring Protection (ERP),” is essential to Section 10 of the G.8032v2 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the ’253 Patent, based on the filing date of a related Chinese patent application, is January 23, 2007. In February 2007, and in multiple subsequent meetings through March 2010 when the G.8032v2 standard was approved, Huawei’s representatives to the ITU-T study group responsible for the G.8032 standard, including the named inventors (Hao Long and Yang Yang), submitted contributions directed to part of the technology on which Huawei was pursuing a patent and advocated for inclusion of those proposals into the standard. The meetings during which Huawei’s representatives, including Hao Long and Yang Yang, submitted and/or advocated contributions directed to this technology included at least the following: Q9/15 interim meeting, Sophia Antipolis (ETSI), France (February 12-16, 2007); Q9/15 interim meeting, Lisbon, Portugal (April 10-14, 2007); Q9/15 interim meeting, Ottawa, Canada (September 24-28, 2007); Q9/15 interim meeting, Madeira, Portugal (November 26 – 30, 2007); SG15 plenary meeting, Geneva, Switzerland (February 11-22, 2008); Q9/15 interim meeting, Miami, USA (April 28 – May 2, 2008); Q9/15 interim meeting, Galway, Ireland (August 4-8, 2008); Joint Q9/15 - Q11/15 interim meeting, Jeju, S. Korea (September 22-26, 2008); SG15 plenary meeting, Geneva, Switzerland (December 1-12, 2008); SG15 plenary meeting, Geneva, Switzerland (September 28 – October 9, 2009). Huawei and its representatives to the ITU-T, however, did not disclose

to the ITU-T the existence of its purported IPR during the above-identified meetings or in any other setting. The functionality that Huawei now accuses of infringement was included in version 2 of the G.8032 standard adopted in March 2010.

g. Huawei asserts that the '485 Patent, which purports to claim an "Ethernet Ring Protection (ERP) method," is essential to Appendix VIII and Table 10-2 of the G.8032v2 standard, yet Huawei and its representatives to the ITU-T concealed the existence of its IPR during the standard-setting process. In particular, the alleged claimed priority date for the '485 Patent, based on the filing date of a related Chinese patent application, is January 23, 2007. In February 2007, and in multiple subsequent meetings through June 2008 when the G.8032v1 standard was approved and March 2010 when the G.8032v2 standard was approved, Huawei's representatives to the ITU-T study group responsible for the G.8032 standard, including the named inventor (Hao Long) and Yang Yang, submitted contributions directed to part of the technology on which Huawei was pursuing a patent and advocated for inclusion of those proposals into the standard. The meetings during which Huawei's representatives, including Hao Long and Yang Yang, submitted and/or advocated contributions directed to this technology included at least the following: Q9/15 interim meeting, Sophia Antipolis (ETSI), France (February 12-16, 2007); Q9/15 interim meeting, Lisbon, Portugal (April 10-14, 2007); Q9/15 interim meeting, Ottawa, Canada (September 24-28, 2007); Q9/15 interim meeting, Madeira, Portugal (November 26 – 30, 2007); SG15 plenary meeting, Geneva, Switzerland (February 11-22, 2008); Q9/15 interim meeting, Miami, USA (April

28 – May 2, 2008); Q9/15 interim meeting, Galway, Ireland (August 4-8, 2008); Joint Q9/15 - Q11/15 interim meeting, Jeju, S. Korea (September 22-26, 2008); SG15 plenary meeting, Geneva, Switzerland (December 1-12, 2008); SG15 plenary meeting, Geneva, Switzerland (September 28 – October 9, 2009). Huawei and its representatives to the ITU-T, however, did not disclose to the ITU-T the existence of its purported IPR during the above-identified meetings or in any other setting. The functionality that Huawei now accuses of infringement was included in Appendix IV of version 1 of the G.8032 standard adopted in June 2008, and in Appendix VIII and Table 10-2 of version 2 of the G.8032 standard adopted in March 2010.

28. On information and belief, the non-disclosure by Huawei and its representatives to the ITU-T excluded viable alternative technologies from the relevant fiber optical networking and Ethernet markets. Had Huawei and its representatives to the ITU-T properly disclosed the existence of its IPR and its unwillingness to abide by FRAND obligations with respect to such IPR, the ITU-T would have decided to standardize an alternative technology to perform the relevant function. Alternatively, the ITU-T would have continued to leave the relevant function out of the standard, in which case implementers would have been free to choose various alternative technologies to perform that function and the ITU-T would have been free to continue to evaluate competing alternative technologies for potential standardization in future iterations of the standard. In either case, but for the non-disclosures or omissions by Huawei and its representatives to the ITU-T, alternative viable technologies would not have been excluded from the relevant fiber optical networking and Ethernet markets. For each of the asserted patents asserted here, the ITU-

T had multiple viable alternatives to standardizing the technology Huawei now claims is covered by the asserted patents

a. The ’505 Patent relates to a means for mapping and multiplexing client signals in an OTN. The ’505 Patent describes a method for multiplexing a client signal into tributary slots by way of an optical channel data tributary unit (ODTU) frame. The technology identified in the ’505 Patent was not the only available technology for multiplexing client signals using an ODTU frame. Instead, there were numerous alternative proposals presented to the ITU-T Study Group 15 (SG15) that were not subject to Huawei’s patent. For example, in September 2008, Cortina Systems Inc., Cisco Systems, and ZTE Corporation jointly submitted Working Document WD24 to the ITU-T SG15 that proposed an enhanced scheme for multiplexing client signals using ODTU frames. Additionally, in November 2008, Cortina Systems Inc., Ciena Corporation, and Cisco Systems jointed submitted Contribution C116 to the ITU-T SG15 that proposed a method for multiplexing client signals using ODTU frames. None of these proposals are covered by the ’505 Patent. Accordingly, there were viable alternatives the study group could have adopted.

b. The ’236 Patent relates to a means of mapping client signals in an OTN. The ’236 Patent describes a method for transmitting a client signal byte number (Cn) over the OTN to support such mapping. The technology identified in the ’236 Patent was not the only available technology for transmitting Cn. Instead, there were numerous alternative proposals presented to the ITU-T SG15 that were not subject to the ‘236 Patent. For example, as early as 2000 and 2001, Siemens AG submitted Working Document WD14 and Delayed Contribution D.306 to the ITU-T SG15

that proposed a "Generic, bit rate agnostic (BRA) mapping method for constant bit rate signals," disclosing a mapping of Cn over an OTN. Additionally, in September 2007, Alcatel-Lucent submitted Working Document WD11 to ITU-T SG15 that proposed a "Bit-rate Agnostic Mapping for Recommendation G.709," which discloses various mappings of Cn over an OTN. The term "bit-rate agnostic mapping" is later renamed "generic mapping procedure." As a further example, in November 2008, PMC-Sierra submitted Contribution C32 to ITU-T SG15 that proposed a "count byte definition for the Generic Mapping Procedure (GMP)," providing further options to the ITU-T SG15 to adopt with respect to the technology for transmitting Cn. None of the aforementioned proposals are covered by the '236 Patent. Accordingly, there were viable alternatives for the ITU-T to adopt.

c. The '151 Patent relates to a means of transmitting low rate traffic (less than 2.5 Gbps) signals in an OTN. The '151 Patent describes a method for transmitting Gigabit Ethernet (GE) or Fiber Connection (FC) signals with a rate of 1.06 Gbps in an OTN by defining an Optical channel Payload Unit (OPU) and Optical Channel Data Unit (ODU) for these low rate traffic signals. The technology identified in the '151 Patent was not the only available technology for transmitting low rate traffic in an OTN. Instead, there were numerous alternative proposals presented to the ITU-T SG15 that were not subject to the '151 Patent. For example, in October 2001, PMC-Sierra, Inc. submitted Delayed Contribution D.156 to ITU-T SG15 that proposed adding a 4B/5B ethernet mapping for transparent GFP in the standard to support low rate traffic in the OTN. Additionally, in August 2008, BT's representative to SG15, Anthony Flavin, proposed three different proposals for

transmitting a low rate traffic signal, like a Gigibit Ethernet signal, within an OTN. None of Anthony Flavin's proposals were subject to Huawei's patent. Moreover, in August 2008, Ciena's representative to SG15, Steve Surek, proposed multiple different options for transmitting a low rate traffic signal, like a Gigibit Ethernet signal, within an OTN, such as using different "muxing hierarchy be for ODU0," "mux ODU0 into any ODUk," "mux ODU0 into…just ODU1," or use either "2 or 16 timeslots per ODU1" to transmit the low rate traffic signal. None of Steve Surck's proposals are covered by the '151 Patent. Accordingly, there were viable alternatives the study group could have adopted.

d. The '982 Patent relates to a means of mapping a lower order Optical Channel Data Unit (ODU) signal into a higher order Optical Channel Payload Unit (OPU) signal in an OTN. The '982 Patent describes a method of: (1) mapping a lower order ODU into the payload area of an Optical Channel Data Tributary Unit (ODTU) signal in groups of bytes, where the number of bytes equals the number of tributary slots in the higher order OPU signal that the ODTU signal will occupy; and (2) multiplexing the ODTU signal into the higher order OPU. The technology identified in the '982 Patent was not the only available technology for mapping lower order ODU signals into higher order OPU signals. Instead, there were numerous alternative proposals presented to the ITU-T SG15 that were not subject to the '982 Patent. For example, in November 2008, PMC-Sierra, Lucent Technologies, AT&T, and Ciena submitted Contribution 34 to ITU-T SG15 that proposed two different solutions for mapping a lower order ODU signal into a higher order OPU signal. None of these proposed solutions were covered by the

’982 Patent. Additionally, in November 2008, PMC-Sierra submitted Contribution 35 to SG15 that proposed using bit-synchronous process (BMP) to map lower order ODU signals into higher order OPU signals. This proposal was not subject to the ‘982 Patent. Moreover, in November 2008, Lucent Technologies and PMC-Sierra submitted Contribution 51 to ITU-T SG15 that proposed using justification control for mapping a lower order ODU signal into a higher order OPU signal. This proposal was not covered by the ’982 Patent. Also in November 2008, Cortina Systems, Ciena Corporation, Cisco Systems submitted Contribution 116 to ITU-T SG15 that proposed using an “Enhanced OTN Mapping scheme” for mapping a lower order ODU signal into a higher order OPU signal. This proposal was also not covered by the ’982 Patent. Additionally, in November 2008, Fujitsu submitted Contribution 123 to ITU-T SG15 that proposed using an “Enhanced OTN Mapping [that] allows the asynchronous or synchronous mapping of a client signal of any rate into an OPUk (section 3) or ODTUjk (section 4) payload structure format. This is achieved by provisioning, in the mapper, the number of fixed stuff bytes and the number of justification bytes (PJOs); the number of fixed stuff bytes can be any number, up to the entire OTN container size.” This proposal was also not covered by the ’982 Patent. Accordingly, there were viable alternatives the study group could have adopted.

e. The ’433 Patent relates to an encoding/decoding scheme for fitting 40GbE data into an ODU3 signal in an OTN. The ’433 Patent describes a method of: (1) acquiring N 66B coding blocks each of which contains 64B; (2) encoding and sending the acquired N 66B coding blocks into a (64*N+1)B coding block, where encoding

includes decoding the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters; placing the control blocks into a control block buffer as a control block group, setting a first identifier to identify the control block group, setting a second identifier to identify a last control block in the control block group, and placing the data blocks, as a data block group, into a data block buffer; setting a third identifier by using four bits of each control block to identify a block type of each of the control blocks; and setting a fourth identifier by using a space smaller than or equal to three bits of each control block to identify positions of each of the control blocks in the N 66B coding blocks. The technology identified in the '433 Patent was not the only available technology for adapting 40GbE payload bandwidth into ODU3. Instead, there were numerous alternative proposals presented to the IEEE Higher Speed Study Group ("HSSG"), and to the ITU-T SG15 that were not subject to Huawei's patent. For example, in July 2007, Stephen Trowbridge at Alcatel-Lucent presented at the IEEE HSSG meeting in San Francisco on "How can 40 Gb Ethernet be designed to fit existing ODU3 transport?" and identified four options. In May 2007, NTT et al submitted Contribution 529 to ITU-T SG15, proposing two mapping schemes: "bit rate agnostic mapping" and "Rate adaptation with Inter-Frame-Stretch" applicable to both 100GbE and 40GbE mapping. In May 2007, NTT submitted Contribution 534 to ITU-T SG15, proposing to study Ethernet transparency over OTN, listing four different modes for mapping of Ethernet signals (e.g. 64B/66B code in 10GbE): asynchronous/bit-synchronous mapping and bit stream with/without octet timing mapping. In June 2007, Huawei filed

Chinese patent application CN200710129552.2, to which U.S. Patent No. 8,238,373 titled "Method and device for mapping ethernet code blocks to OTN for transmission," claimed priority. In the '373 patent, Huawei stated "specific solutions for mapping 40 G Ethernet code blocks having an encoding rate lower than a minimum payload bandwidth of the OPU3 to the OTN for transmission [are] provided." U.S. Patent No. 8,238,373 at Abstract. At the IEEE HSSG September 2007 IEEE interim meeting in Seoul, South Korea, Alcatel-Lucent (Stephen Trowbridge) presented on solutions for transcoding. In "OTN Compatibility for 40 Gb Ethernet," Trowbridge proposed 3 options for fitting 40GbE into standard ODU3. Also at the September 2007 IEEE interim meeting, Cisco presented on a "100GE and 40GE PCS Proposal." Cisco's PCS proposal included a 64B/66B based PCS, with 4 Lane MAC/PCS to PMA/PMD interface for 40GE. In relation to the October 2007 Shenzhen meeting of ITU-T working group 3/15, Stephen Trowbridge authored a document exploring the meaning of transparency for circuit service for 100 GbE and 40 GbE over OTN given that 100 GbE and 40 GbE LAN interfaces were expected to be parallel. Trowbridge concluded that Q11/15 should continue to monitor the progress of the IEEE 802.3ba task force and refine the set of candidate mapping options for 40 GbE and 100 GbE into OTN based on decisions made. As Steve Gorshe summarized in his 2011 white paper, "...since the OPU3 payload rate (40.150519 Gbit/s) is greater than 40 Gbit/s, there were more options for finding a solution that achieved full character-level and timing transparency without using an overclocked ODU3." In January 2008, NTT proposed ITU-T Contribution 786 related to 40 GbE error detection and correction

mechanisms, and in particular Mean Time To False Packet Acceptance ("MTTFPA") when using 512B/513B transcoding. In its appendix, NTT laid out examples of 512B/513B updates achieving the desired MTTFPA. In January 2008, Huawei submitted ITU-T Contribution 824 regarding independent transport of four 512/513b transcoded 10GbEs in standard ODU3. In its contribution, Huawei acknowledged "There are many solutions to do the Multiplexing and De-multiplexing at the Mapper/Demapper of the ODU3." Huawei in turn discussed two proposed GFP Frame encapsulation based approaches. Also in January 2008, Huawei submitted ITU-T Contribution 813 regarding "2048/2049B transcoded 10GbE in ODU2." In its contribution, Huawei acknowledged "many contributions were submitted for the ITU-T Q11/15 meeting in Shenzhen showing a possible way to map 4x10G Base-R into standard ODU3 using 512B/513B transcoding." Huawei also acknowledged "[t]he 512/513b Transcoding has been extensively discussed for enabling transport of 40GE and 4x10GE in an ODU3" and instead focused on how to carry 10GE in standard ODU2. None of these proposals are covered by the '433 Patent. Accordingly, there were viable alternatives the study group could have adopted.

f. The '253 Patent relates to an Ethernet ring protection (ERP) protocol in which nodes decide whether to trigger a forwarding table flush operation based on a comparison of fault identifiers in received fault alarm messages with stored fault identifier records. The technology identified in the '253 Patent was not the only available technology for triggering forwarding table flushes. Instead, there were numerous alternative proposals presented to the ITU-T SG15 that were not subject

to the '253 Patent. For example, Version 1 of the G.8032 standard, released in June 2008, does not contain the functionality Huawei accuses of infringing the '253 Patent. In February 2007, Nokia Siemens Networks submitted WD26, titled "Ethernet Rings – Definition and Model," to ITU-T SG15 that proposed an Ethernet ring protection scheme. This proposal was not subject to the '253 Patent. Nokia Siemens Networks submitted additional proposals in April 2007 (WD36, titled "Ethernet Ring Protection – Flush Optimization") and January 2008 (Contribution 870, titled "Inclusion of FDB flush operations in G.8032"), neither of which were subject to the '253 Patent. In September 2007, ZTE submitted WD8, titled "Ethernet Ring Protection – Flush Optimization," to ITU-T SG15 that proposed a forwarding database flush optimization scheme. ZTE subsequently submitted WD28, titled "FDB Flush in a single ring (G.8032)," in November 2007, Contribution 726, titled "Proposal for rules of flushing operation (G.8032)," in January 2008, and WD14, titled "Flush FDB based on area (G.8032)," in February 2009. None of these ZTE proposals were subject to the '253 Patent. In May 2007, ETRI submitted Contribution 607, titled "Managed- FDB APS scheme by selective deletion for Ethernet ring protection," to ITU-T SG15 and in September 2007 ETRI submitted WD47, titled "Ethernet ring protection mechanism by use of FDB flipping method." Neither of these ETRI proposals were covered by the '253 Patent. Accordingly, there were viable alternatives the study group could have adopted.

g. The '485 Patent relates to an Ethernet ring protection (ERP) protocol in which nodes detecting a failure in a link that is connected to a normally blocked port send

a control message to other nodes with a non-clearing indication, which indicates that a forwarding table is "not desired to be cleared by the other ring nodes." The technology identified in the '485 Patent was not the only available technology for controlling forwarding table flush operations. Instead, there were numerous alternative proposals presented to the ITU-T SG15 that were not subject to the '485 Patent. For example, Version 1 of the G.8032 standard, released in June 2008, does not contain the functionality Huawei accuses of infringing the '485 Patent (except in an Appendix that does not form an integral part of the standard). In February 2007, Nokia Siemens Networks submitted WD26, titled "Ethernet Rings – Definition and Model," to ITU-T SG15 that proposed an Ethernet ring protection scheme. This proposal was not subject to the '485 Patent. Nokia Siemens Networks submitted additional proposals in April 2007 (WD36, titled "Ethernet Ring Protection – Flush Optimization") and January 2008 (Contribution 870, titled "Inclusion of FDB flush operations in G.8032"), neither of which were subject to the '485 Patent. In September 2007, ZTE submitted WD8, titled "Ethernet Ring Protection – Flush Optimization," to ITU-T SG15 that proposed a forwarding database flush optimization scheme. ZTE subsequently submitted WD28, titled "FDB Flush in a single ring (G.8032)," in November 2007, Contribution 726, titled "Proposal for rules of flushing operation (G.8032)," in January 2008, and WD14, titled "Flush FDB based on area (G.8032)," in February 2009. None of these ZTE proposals were subject to the '485 Patent. In May 2007, ETRI submitted Contribution 607, titled "Managed- FDB APS scheme by selective deletion for Ethernet ring protection," to ITU-T SG15 and in September 2007 ETRI submitted

WD47, titled "Ethernet ring protection mechanism by use of FDB flipping method." Neither of these ETRI proposals were covered by the '485 Patent. Accordingly, there were viable alternatives the study group could have adopted.

Huawei's FRAND Commitments

29. Huawei has failed to offer Verizon any license on FRAND terms to any of the asserted patents in the Complaint.

30. Huawei submitted general licensing declarations to the ITU-T promising to grant licenses to any essential IPR on FRAND terms.

31. For instance, on information and belief, Huawei and/or its predecessors made the following declaration to the ITU-T on September 8, 2006:

> The Patent Holder is prepared to grant—on the basis of reciprocity for the relevant ITU-T Recommendation(s)—a license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions to make, use and sell implementations of the relevant ITU-T Recommendation(s).

(*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T.)

32. Huawei and/or its predecessors also made a similar irrevocable guarantee to the G.709 on December 10, 2008; December 23, 2011; April 23, 2012; and October 17, 2016:

> The Patent Holder is prepared to grant a license to an unrestricted number of applicants on a worldwide, non-discriminatory basis and on reasonable terms and conditions to make, use, and sell implementations of the above document.

(December 23, 2011 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; *see* December 10, 2008 Letter from Huawei Technologies Co., Ltd, Director of Licensing, Intellectual Property Department; April 23, 2012 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; October 17, 2016 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.)

Huawei's Refusal to Meet its FRAND Commitments

33. Huawei and its representatives to the ITU-T failed to inform the ITU-T that Huawei would not meet its FRAND commitments and, on information and belief, such failure was intentional and made with deceptive intent in order to induce the ITU-T to include in the relevant standards technologies that Huawei claims are covered by Huawei's asserted patents. Huawei's objective during the ITU-T's consideration of the relevant technologies was first to cause those technologies to be standardized through the advocacy of Huawei's representatives to the ITU-T for the adoption of the relevant technologies and simultaneous deceit as described above, and then to take advantage of the lock-in effect by demanding exorbitant royalties or other license terms that were unfair, unreasonable, and/or discriminatory, which objective was flatly inconsistent with its prior explicit FRAND undertaking to the ITU-T.

34. Combined with its advocacy for adoption of the subject technologies and the deliberate concealment of IPR for each of the asserted patents during the standardization process, Huawei's concealment of its true intention not to offer FRAND terms to all those implementing the standard—despite its prior written commitments to the contrary—induced the ITU-T to standardize each of the technologies that Huawei claims is covered by the asserted patents. Had Huawei disclosed its IPR and its true intention not to offer FRAND license terms for each of the asserted patents, the ITU-T would not have standardized the input technologies that Huawei now claims to be covered the asserted patents. Rather, the ITU-T would have decided either to standardize an alternative technology to perform the relevant function or continued to leave the relevant function out of the standard, in which case implementers would have been free to choose various alternative technologies to perform that function and the ITU-T would have been free to

continue to evaluative competing alternative technologies for potential standardization in future iterations of the standard.

35. Because, during the standardization process relevant to each of the input technologies that Huawei now claims to be covered by the asserted patents, on information and belief, Huawei intentionally concealed that it would not abide by its FRAND commitments (*See* September 8, 2006 letter from Yan Xin, IP Manager at Huawei Technologies Co., Ltd., to Director of ITU-T; *see also* December 23, 2011 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; December 10, 2008 Letter from Huawei Technologies Co., Ltd, Director of Licensing, Intellectual Property Department; April 23, 2012 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; October 17, 2016 letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.; *see also* July 12, 2011 Letter from Wei Kang, IP Manager at Huawei Technologies Co., Ltd.) and in fact intended not to offer FRAND terms, the ITU-T and its members relied on those commitments and Huawei's continuing obligations therein entertaining Huawei's technology proposals and in entertaining Huawei's promotion of its proposals for standardization.

36. Huawei's FRAND declarations falsely represented that Huawei would license its claimed essential patents on FRAND terms. None of Huawei's FRAND declarations covering any of the asserted patents disclosed that Huawei would take the position that parties practicing the relevant standard were not licensed or entitled to a FRAND license to its claimed essential patents, refuse to offer FRAND license terms to certain parties, or attempt to prevent parties from practicing the relevant standard.

37. Verizon, other members of the ITU-T, and other companies implementing the relevant standards have reasonably relied on Huawei and its representatives to the ITU-T's non-disclosures of Huawei's IPRs, as well as Huawei's FRAND commitments to (a) grant licenses to

those patents and patent applications that Huawei claims are essential on fair, reasonable, and non-discriminatory terms; and (b) not to seek to impose unfair, unreasonable, or discriminatory conditions on licensing, such as cross-licenses of patents covering proprietary technology that is not essential to any standard. Verizon and others have relied on Huawei's commitments that preclude Huawei from seeking to enjoin them from practicing the relevant standards (given that they are licensed as a resulting of Huawei's FRAND commitments), and that require Huawei to provide fair, reasonable, and non-discriminatory royalties and other license terms that would permit efficient competitors such as Verizon profitably to offer standards-compliant products in competition with Huawei and other owners of purportedly essential patents.

38. If Huawei, in fact, has patents covering technologies that have been incorporated into the relevant standards, it has the power to raise prices and exclude competition with respect to each of the technologies covered by its patents and incorporated in the relevant standard. And it acquired that power as a result of its misconduct in connection with the standard-setting process, including untimely disclosure of its IPR and/or false FRAND commitments. Barriers to entry into these markets are high because, among other reasons, the post-standardization lock-in effect means that other technologies are no longer viable substitutes for the technologies the standard specifies to perform functions included in the standard.

Huawei's Refusal to Offer FRAND License Terms for Its Asserted Patents

39. To date, Huawei has failed to offer Verizon a single license on FRAND terms for any of the asserted patents in the Complaint. Instead, Huawei filed this action for patent infringement against Verizon seeking damages in excess of FRAND terms in violation of its licensing declarations and FRAND obligations.

40. On information and belief, Huawei has not filed suit against any other implementers of optical networks from infringing any of the asserted patents, even though many such implementers do not have a license from Huawei to practice the asserted patents in the Complaint. Instead, Huawei is singling out Verizon on a discriminatory basis in violation of its licensing declarations and FRAND obligations.

41. As explained herein, even if Huawei's asserted patents are valid and essential to ITU-T standards, Huawei is in violation of its obligations to the ITU-T and to Verizon.

42. Moreover, Huawei's suit fails to acknowledge the technical contributions of other companies, including Verizon. On information and belief, Huawei is using significant technology developed by Verizon in Huawei's own products.

43. Since the commencement of licensing negotiations between Huawei and Verizon, Verizon has repeatedly asked Huawei to provide basic information necessary for Verizon to determine whether any rate that Huawei quotes is in fact fair, reasonable, and non-discriminatory, including (a) the royalty basis to which Huawei contends the FRAND royalty rate would apply, (b) any indication that other companies are also paying any royalty rate that Huawei would seek from Verizon, and (c) copies or summaries of license agreements with comparable companies.

44. The only offer that Huawei has made with respect to the asserted patents did not comply with its FRAND obligations. Despite repeated requests, Huawei refused to provide Verizon any information about any license agreements covering the asserted patents with other companies, which would allow Verizon to determine whether any future Huawei offers are in fact FRAND (no such information is necessary to determine that Huawei's only offer thus far is not FRAND).

45. Although Verizon believes that Huawei has entered into license agreements covering the asserted patents with other companies that implement the relevant standards, at the time of this filing, Huawei has refused to identify the terms and conditions of those licenses. Huawei has also repeatedly refused to provide copies, summaries, or any other information regarding license agreements between Huawei and other companies.

FIRST COUNT
(Infringement of U.S. Patent No. 8,121,111)

46. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

47. On February 21, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,121,111 ("the '111 patent"), entitled "Method and System for Measuring Latency." A true and correct copy of the '111 patent is attached as Exhibit A.

48. Verizon has owned the '111 patent since it was issued. Verizon owns all rights, title, and interest in the '111 patent, and holds all substantial rights pertinent to this suit, including the right to sue and recover for all past, current, and future infringement. Verizon Patent and Licensing Inc., which holds thousands of United States patents for its inventions, is the current assignee of the '111 patent.

49. The inventions set forth in the '111 patent relate to a system and method for measuring latency of an optical transport network and includes the generating of a time stamp, transmitting the time stamp in an optical transport network, and processing the time stamp to measure latency of the optical transport network.

50. As set forth in detail below (and the corresponding Exhibits thereto), the Accused Huawei Products comprise material parts of the claims in the '111 patent.

51. Because in part of the use of the G.709 Standard, the Accused Huawei Products infringe one or more of the claims of the ’111 patent, including, for example, claim 1.

Claim 1 of the ’111 patent recites:

> 1. A method, comprising:
>
> receiving a first time stamp associated with a first location at a second location, wherein the first time stamp is inserted in a first overhead of a first optical transport unit frame;
>
> extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network;
>
> generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp; and
>
> transmitting the second time stamp in a second overhead of a second transport unit frame to the first location wherein the second time stamp is used to measure the round trip delay of the network.

52. To the extent the preamble is considered to be limiting, the Accused Huawei Products meet the preamble of claim 1 of the ’111 patent. *See, e.g.*:

OTN-Side	Interface Type	OTU-1/OTU-2 (ITU-T G.709)
	Fiber Type	SMF (ITU-T G.652)/ DSF (ITU-T G.653)
	Plug	SFP/XFP
Topology		Point to point, chain, star, ring
Synchronization		2Mbit/s or 2MHz, SSM supported Ethernet Syn,1588V2

(Ex. C, Datasheet for the OSN 1800 Series; *see also* Exs. F, G, H, and I.)

53. The Accused Huawei Products meet the first element of claim 1 of the ’111 patent that recites “receiving a first time stamp associated with a first location at a second location,

wherein the first time stamp is inserted in a first overhead of a first optical transport unit frame."

See, e.g.:

OTUk, OTUCn, ODUk, ODUCn, OPUk and OPUCn overhead assignment: The assignment of an overhead in the optical transport/data/payload unit signal to each part is defined in Figure 5-1. OTUk, ODUk, OPUk contain one instance of OTU, ODU, OPU overhead. OTUCn, ODUCn and OPUCn contain n instances of OTU, ODU, OPU overhead, numbered 1 to n.

Interleaved versions of the OTU, ODU and OPU overhead may be present on OTUCn interfaces. This interleaving is interface specific and specified for OTN interfaces with standardized application codes in the interface specific Recommendations (ITU-T G.709.x series). Within the other clauses of this Recommendation an OTUCn, ODUCn and OPUCn are presented in an interface independent manner, by means of n OTUC, ODUC and OPUC instances that are marked #1 to #n.

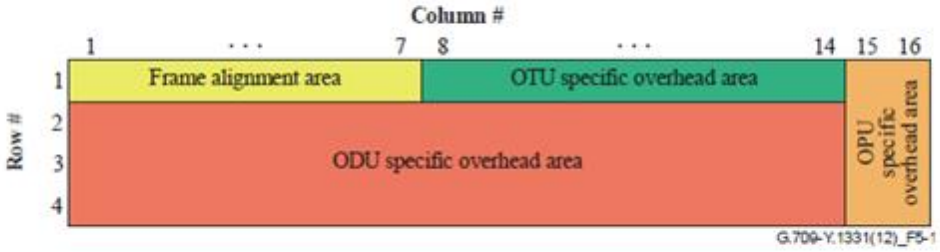


Figure 5-1 – OTU, ODU and OPU overhead

(Ex. D, G.709 Standard at p. 9.)

15.7.1 OTU overhead location

The OTU overhead location is shown in Figures 15-12 and 15-13.

The OTUk contains one instance of OTU overhead. The OTUCn contains n instances of OTU overhead, numbered 1 to n (OTU OH #1 to OTU OH #n).

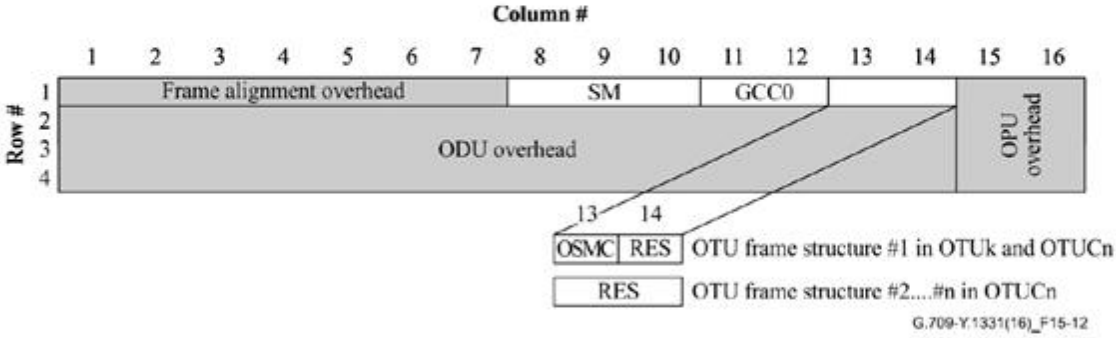


Figure 15-12 – OTU overhead

(*Id.* at p. 50.)

15.7.2.4 OTU OTN synchronisation message channel (OSMC)

For synchronisation purposes, one byte is defined in the OTU overhead as an OTN synchronisation message channel to transport SSM and PTP messages within SOTU and MOTU interfaces. The OSMC bandwidth is listed in Table 15-3.

(*Id.* at p. 54.)

15.7.2.4.1 Generation of event message timestamps

15.7.2.4.1.1 SOTU and MOTU interface event message timestamp point

The SOTU and MOTU interface message timestamp point [ITU-T G.8260] for a PTP event message transported over the OSMC shall be the X-frame multiframe event preceding the beginning of the GFP frame in which the PTP event message is carried. See Figure 15-16. Since the GFP frames may be longer than X-4 bytes, a frame may cross the X-frame multiframe boundary. The X-frame multiframe contains frames numbered 0, 1, .., X-1.

15.7.2.4.1.2 Event timestamp generation

All PTP event messages are timestamped on egress and ingress SOTU and MOTU interfaces. The timestamp shall be the time at which the event message timestamp point passes the reference plane [ITU-T G.8260] marking the boundary between the PTP node (i.e., OTN node) and the network.

(*Id.* at p. 55.)

6.5.2 Ordinary clocks

The model of an ordinary clock is illustrated in Figure 2.

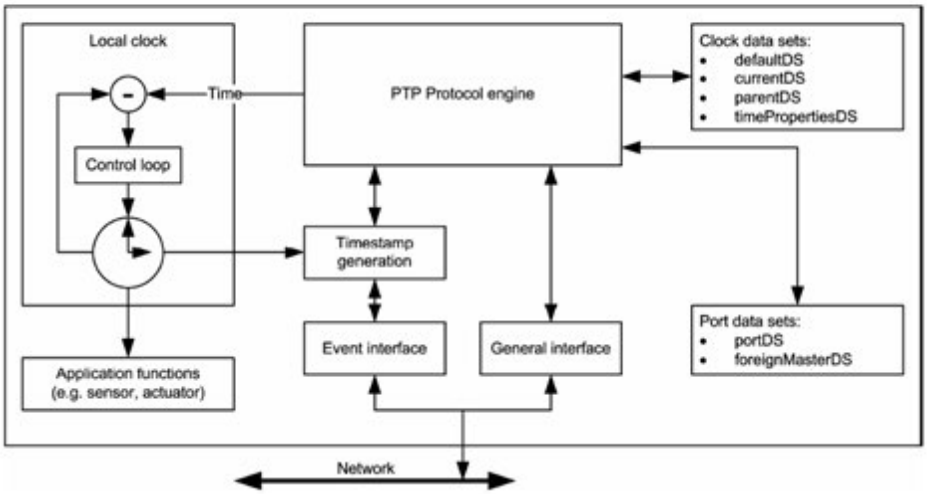


Figure 2—Model of an ordinary clock

An ordinary clock communicates with the network via two logical interfaces based on a single physical port. The event interface is used to send and receive event messages, which are timestamped by the timestamp generation block based on the value of the local clock. The general interface is used to send and

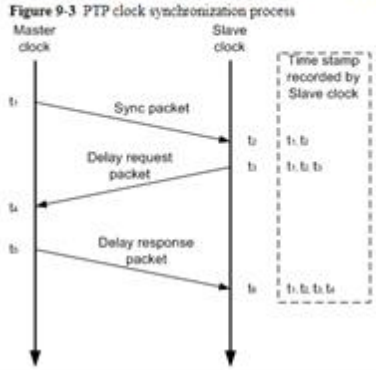
(Ex. E, IEEE-1588 V2 standard at p. 19.)

PTP Clock Synchronization Mechanism

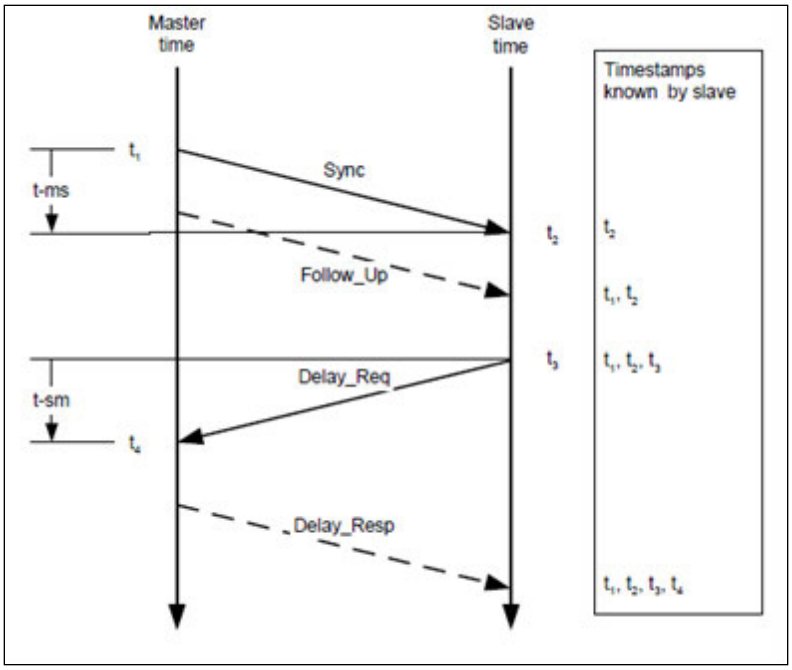
The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3; *see also* Ex. G, Product Overview for the OSN 6800 at § 3.9.)



The message exchange pattern is as follows:

a) The master sends a Sync message to the slave and notes the time t_1 at which it was sent.

b) The slave receives the Sync message and notes the time of reception t_2.

c) The master conveys to the slave the timestamp t_1 by:

1) Embedding the timestamp t_1 in the Sync message. This requires some sort of hardware processing for highest accuracy and precision.

2) Embedding the timestamp t_1 in a Follow_Up message.

d) The slave sends a Delay_Req message to the master and notes the time t_3 at which it was sent.

e) The master receives the Delay_Req message and notes the time of reception t_4.

f) The master conveys to the slave the timestamp t_4 by embedding it in a Delay_Resp message.

At the conclusion of this exchange of messages, the slave possesses all four timestamps. These timestamps may be used to compute the offset of the slave's clock with respect to the master and the mean propagation time of messages between the two clocks, which in Figure 12 is the mean of t-ms and t-sm.

(Ex. E, IEEE-1588 V2 standard at p. 34.)

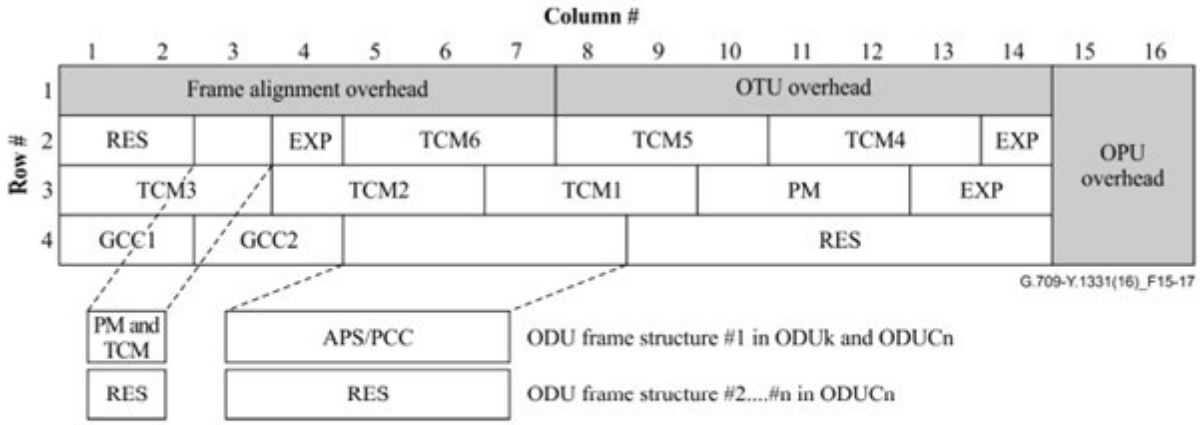


Figure 15-17 – ODU overhead

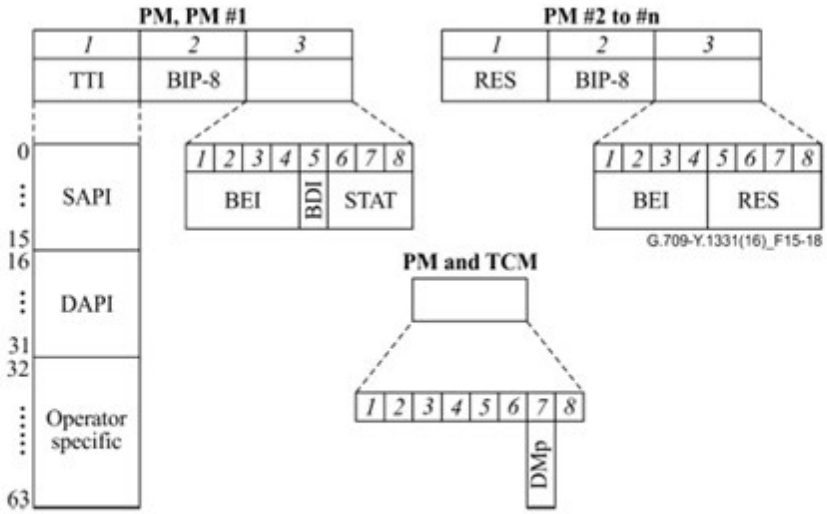


Figure 15-18 – ODU path monitoring overhead

(Ex. D, G.709 Standard at p. 57.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

(*Id.* at p. 60)

54. The Accused Huawei Products meet the second element of claim 1 of the '111 patent that recites "extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network." *See, e.g.*:

11.3.2 Delay request-response mechanism operational specifications

The actual value of the <meanPathDelay> shall be measured and computed as follows for each instance of a delay request-response measurement:

a) The master node prepares and issues a Sync message per 9.5.9. If the node is a two-step clock, it also prepares and issues a Follow_Up message per 9.5.9.4.

b) The slave node shall:

1) Upon receipt of the Sync message from the master generate timestamp t_2.

2) If asymmetry corrections are required, modify the correctionField of the received Sync message per 11.6.2.

3) If required to send a Delay_Req message based on the timing requirements of subclause 9.5.11.2:

i) Prepare a Delay_Req message with the correctionField (see 13.3.2.7) set to 0. The originTimestamp shall be set to 0 or an estimate no worse than ±1 s of the egress time of the Delay_Req message.

(Ex. E, IEEE-1588 V2 Standard at p. 111.)

Table 26—Sync and Delay_Req message fields

Bits								Octets	Offset
7	6	5	4	3	2	1	0		
header (see 13.3)								34	0
originTimestamp								10	34

(*Id.* at p. 130.)

13.3.1 General header specifications

The common header for all PTP messages shall be as specified in Table 18.

Table 18—Common message header

Bits								Octets	Offset
7	6	5	4	3	2	1	0		
transportSpecific				messageType				1	0
reserved				versionPTP				1	1
messageLength								2	2
domainNumber								1	4
reserved								1	5
flagField								2	6
correctionField								8	8
reserved								4	16
sourcePortIdentity								10	20
sequenceId								2	30
controlField								1	32
logMessageInterval								1	33

(*Id.* at 124)

c) Upon receipt of the Delay_Req message, the master node shall :

1) Generate timestamp t_4

2) Prepare a Delay_Resp message

3) Copy the sequenceId field from the Delay_Req message to the sequenceId field of the Delay_Resp message

4) Copy the sourcePortIdentity field from the Delay_Req message to the requestingPortIdentity field of the Delay_Resp message

5) Copy the domainNumber field from the Delay_Req message to the domainNumber field of the Delay_Resp message

6) Set the correctionField of the Delay_Resp message to 0

7) Add the correctionField of the Delay_Req message to the correctionField of the Delay_Resp message

(*Id.* at 111.)

9.1 Introduction to PTP Clock

A Precision Time Protocol (PTP) clock is compliant with the IEEE 1588 V2 protocol and can realize synchronization of frequency and time. Hence, the scheduled synchronization index of the entire network is greatly improved.

In a distributed system, clocks and time are usually applied to the following scenarios:

- Frequency-based application

  Frequency-based application is mainly used in the scenario where multiple control points of the distributed system need to be synchronized. Each control point needs to perform sampling, control algorithm, and control commands simultaneously.

- Time stamp-based application

  Time stamp is mainly used in the scenario where the absolute time value needs to be measured. After time stamps are appended to specific events, the sequence of the events can be determined if the time stamps have the same reference.

The key technology to realize the preceding applications is time synchronization. The purpose of time synchronization is to accurately and precisely transfer reference time to each control point.

The IEEE 1588 standard has made great progress in time precision. IEEE 1588 is usually referred to as PTP, that is, precision time protocol. A PTP clock can realize synchronization of frequency and time, and the precision of the PTP clock is accurate to within nanoseconds. Synchronization of frequency and time based on the IEEE 1588 protocol is one of the technical revolutions and innovations that carrier-class IP networks make for transformation. The equipment that has the PTP clock function can realize synchronization of frequency and time network-wide on the synchronous optical transmission network. Telecommunications network needs to carry services of different types. Certain services require time synchronization and high precision. For example, the CDMA system and orientation location service. The PTP clock is mainly used in the preceding scenarios and provides precise time synchronization to meet service requirements.

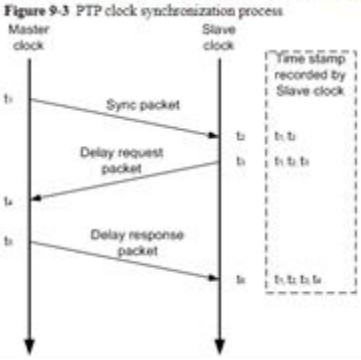
(Ex. F, OSN 9560 Feature Description at § 9.1; *see also* Ex. G, Product Overview for the OSN 6800 at § 3.9.)

PTP Clock Synchronization Mechanism

The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3.)

The method of calculating the time difference between the master and slave clocks and the link delay is as follows:

Because

$t_1 - t_2 = \text{Delay} - \text{Offset}$

$t_4 - t_3 = \text{Delay} + \text{Offset}$

Hence,

$\text{Offset} = [(t_4 - t_3) - (t_2 - t_1)]/2$

$\text{Delay} = [(t_4 - t_3) + (t_2 - t_1)]/2$

NOTE

- Offset: The time difference between the master and slave clocks.
- Delay: The delay time caused by network transmission.

(*Id.*)

Table 21—correctionField semantics

Message type	correctionField description
Sync	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.2), path delay in peer-to-peer clocks (see 11.4.5.1), and asymmetry corrections (see 11.6.2)
Delay_Req	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.3), and asymmetry corrections (see 11.6.3)
Pdelay_Req	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.4), and asymmetry corrections (see 11.6.4)
Pdelay_Resp	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.4), and asymmetry corrections (see 11.6.5)
Follow_Up	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.2), path delay in peer-to-peer clocks (see 11.4.5.1), and asymmetry corrections (see 11.6.2)
Delay_Resp	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.3), and asymmetry corrections (see 11.6.3)
Pdelay_Resp_Follow_Up	Corrections for fractional nanoseconds, residence time in transparent clocks (see 11.5.4), and asymmetry corrections (see 11.6.4 and 11.6.5)
Announce	Zero
Signaling	Zero
Management	Zero

(Ex. E, IEEE-1588 V2 Standard at p. 127.)

c) Upon receipt of the Delay_Req message, the master node shall :

1) Generate timestamp t_4

2) Prepare a Delay_Resp message

3) Copy the sequenceId field from the Delay_Req message to the sequenceId field of the Delay_Resp message

4) Copy the sourcePortIdentity field from the Delay_Req message to the requestingPortIdentity field of the Delay_Resp message

5) Copy the domainNumber field from the Delay_Req message to the domainNumber field of the Delay_Resp message

6) Set the correctionField of the Delay_Resp message to 0

7) Add the correctionField of the Delay_Req message to the correctionField of the Delay_Resp message

d) Upon receipt of the Delay_Resp message by the slave:

1) If the received Sync message indicated that a Follow_Up message will not be received, the <meanPathDelay> shall be computed as: <meanPathDelay> = [(t_2 - t_3) + (receiveTimestamp of Delay_Resp message – originTimestamp of Sync message) – correctionField of Sync message – correctionField of Delay_Resp message]/2.

2) If the received Sync message indicated that a Follow_Up message will be received, the <meanPathDelay> shall be computed as: <meanPathDelay> = [(t_2 - t_3) + (receiveTimestamp of Delay_Resp message – preciseOriginTimestamp of Follow_Up message) – correctionField of Sync message– correctionField of Follow_Up message – correctionField of Delay_Resp message]/2.

(*Id.* at p. 111-112.)

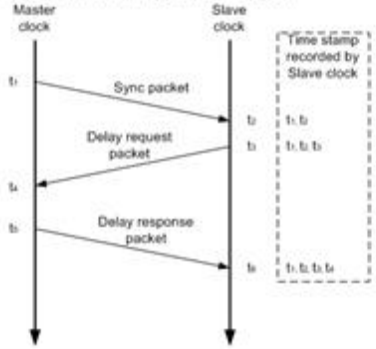
55. The Accused Huawei Products meet the third element of claim 1 of the ’111 patent that recites “generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp.” *See, e.g.*:

PTP Clock Synchronization Mechanism

The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3)

c) Upon receipt of the Delay_Req message, the master node shall :

1) Generate timestamp t_4

2) Prepare a Delay_Resp message

3) Copy the sequenceId field from the Delay_Req message to the sequenceId field of the Delay_Resp message

4) Copy the sourcePortIdentity field from the Delay_Req message to the requestingPortIdentity field of the Delay_Resp message

5) Copy the domainNumber field from the Delay_Req message to the domainNumber field of the Delay_Resp message

6) Set the correctionField of the Delay_Resp message to 0

7) Add the correctionField of the Delay_Req message to the correctionField of the Delay_Resp message

(Ex. E, IEEE-1588 V2 Standard at p. 111.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

This DMp signal is inserted by the DMp originating P-CMEP and sent to the far-end P-CMEP. This far-end P-CMEP loops back the DMp signal towards the originating P-CMEP. The originating P-CMEP measures the number of frame periods between the moment the DMp signal value is inverted and the moment this inverted DMp signal value is received back from the far-end P-CMEP.

(Ex. D, G.709 Standard at p. 60.)

56. The Accused Huawei Products meet the last element of claim 1 of the '111 patent that recites "transmitting the second time stamp in a second overhead of a second transport unit frame to the first location wherein the second time stamp is used to measure the round trip delay of the network." *See, e.g.*:

OTUk, OTUCn, ODUk, ODUCn, OPUk and OPUCn overhead assignment: The assignment of an overhead in the optical transport/data/payload unit signal to each part is defined in Figure 5-1. OTUk, ODUk, OPUk contain one instance of OTU, ODU, OPU overhead. OTUCn, ODUCn and OPUCn contain n instances of OTU, ODU, OPU overhead, numbered 1 to n.

Interleaved versions of the OTU, ODU and OPU overhead may be present on OTUCn interfaces. This interleaving is interface specific and specified for OTN interfaces with standardized application codes in the interface specific Recommendations (ITU-T G.709.x series). Within the other clauses of this Recommendation an OTUCn, ODUCn and OPUCn are presented in an interface independent manner, by means of n OTUC, ODUC and OPUC instances that are marked #1 to #n.

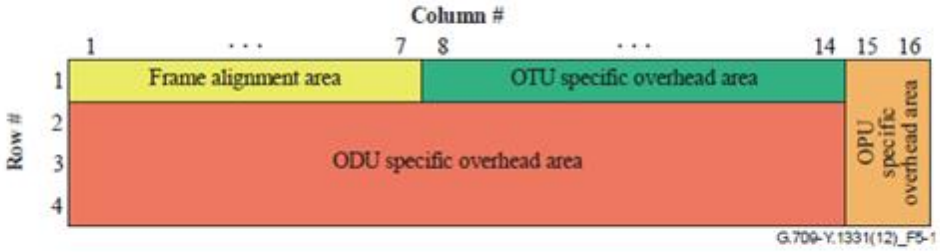


Figure 5-1 – OTU, ODU and OPU overhead

(*Id.* at p. 9.)

15.7.1 OTU overhead location

The OTU overhead location is shown in Figures 15-12 and 15-13.

The OTUk contains one instance of OTU overhead. The OTUCn contains n instances of OTU overhead, numbered 1 to n (OTU OH #1 to OTU OH #n).

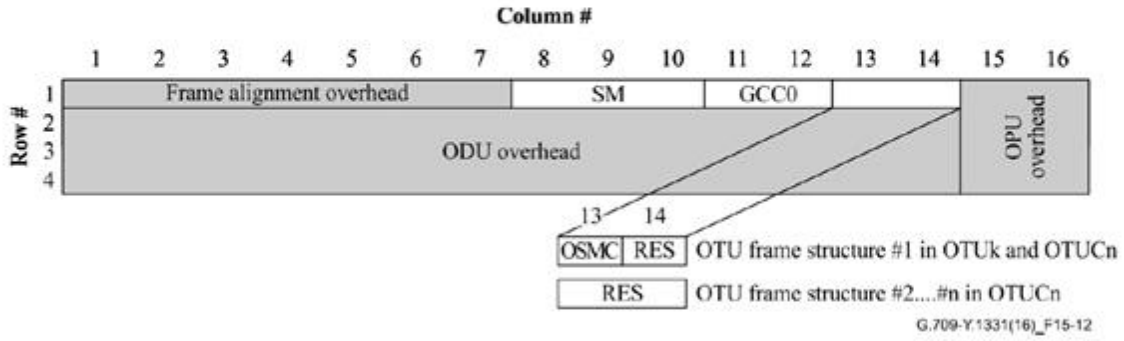


Figure 15-12 – OTU overhead

(*Id.* at p. 50.)

15.7.2.4 OTU OTN synchronisation message channel (OSMC)

For synchronisation purposes, one byte is defined in the OTU overhead as an OTN synchronisation message channel to transport SSM and PTP messages within SOTU and MOTU interfaces. The OSMC bandwidth is listed in Table 15-3.

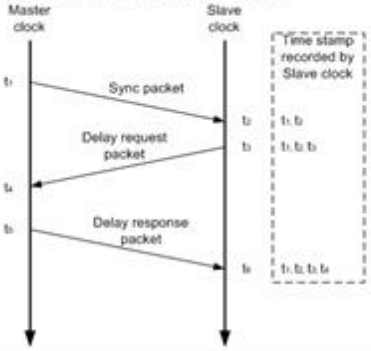
(*Id.* at p. 54.)

PTP Clock Synchronization Mechanism

The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

This DMp signal is inserted by the DMp originating P-CMEP and sent to the far-end P-CMEP. This far-end P-CMEP loops back the DMp signal towards the originating P-CMEP. The originating P-CMEP measures the number of frame periods between the moment the DMp signal value is inverted and the moment this inverted DMp signal value is received back from the far-end P-CMEP.

(Ex. D, G.709 Standard at p. 60.)

57. On information and belief, Huawei has directly infringed and continues to directly infringe at least claim 1 of the ’111 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by using, selling, offering to sell, and importing into the United States the Accused Huawei Products, on or after the issuance date of the patent.

58. Huawei has been, and currently is, indirectly infringing at least claim 1 of the ’111 patent by inducing infringement under 35 U.S.C. § 271(b) and as a contributory infringer under 35 U.S.C. § 271(c).

59. Huawei knew of the ’111 patent or should have known of the ’111 patent, at least because the ’111 patent, then published as U.S. Patent Publication No. 2008/0219661, was identified and cited during the prosecution of Huawei’s U.S. Patent No. 9,838,109. Huawei has had actual knowledge of the ’111 patent since at least the filing of these Counterclaims.

60. Huawei has provided the Accused Huawei Products to its customers and instructions to use the Accused Huawei Products in an infringing manner while being on notice of its infringement thereof. Therefore, Huawei knew or should have known of the ’111 patent and of its own infringing acts, or deliberately took steps to avoid learning of those facts.

61. Huawei knowingly and intentionally encourages and aids at least its end-user customers to directly infringe the ’111 patent.

62. On information and belief, Huawei provides the Accused Huawei Products, which are sold and specifically configured to infringe the ’111 patent as described above, to end-user customers so that such customers will use the Accused Huawei Products in an infringing manner.

63. Huawei actively instructs its customers on how to use the Accused Huawei Products, including through advertising, encouraging, installing devices for, providing support for, and/or operating the Accused Huawei Products for or on behalf its customers.

64. When used as instructed, Huawei’s customers use these products to practice the methods and use the apparatus of the ’111 patent and directly infringe at least claim 1 of the ’111 patent. Huawei induces such infringement by providing the Accused Huawei Products and instructions to enable and facilitate infringement, knowing of the existence of the ’111 patent. On information and belief, Huawei specifically intends that its actions will result in infringement of at least claim 1 of the ’111 patent, or subjectively believes that its actions will result in infringement of the ’111 patent but took deliberate actions to avoid learning of those facts, as set forth above.

65. Huawei contributorily infringes at least claim 1 of the ’111 patent by providing the Accused Huawei Products and/or software or hardware components thereof, that embody a material part of the claimed inventions of the ’111 patent, that are known by Huawei to be specifically made or adopted for use in an infringing manner, and are not staple articles with substantial non-infringing uses. The Accused Huawei Products are specifically designed to infringe at least claim 1 of the ’111 patent, and their accused components have no substantial non-infringing uses.

66. Huawei's infringement of the '111 patent has been and continues to be willful, and Huawei's conduct renders this case exceptional under 35 U.S.C. § 285.

67. Additional allegations regarding Huawei's knowledge of the '111 patent and willful infringement will likely have further evidentiary support after a reasonable opportunity for discovery.

68. Verizon is entitled to recover from Huawei all damages that Verizon has sustained as a result of Huawei's infringement of the '111 patent, including without limitation lost profits and no less than a reasonable royalty.

SECOND COUNT
(Infringement of U.S. Patent No. 8,983,288)

69. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

70. On March 17, 2015, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,983,288 ("the '288 patent"), entitled "Method and system for Measuring Latency." A copy of the '288 patent is attached as Exhibit B.

71. Verizon has owned the '288 patent since it was issued. Verizon owns all rights, title, and interest in the '288 patent, and holds all substantial rights pertinent to this suit, including the right to sue and recover for all past, current, and future infringement. Verizon Patent and Licensing Inc., which holds thousands of United States patents for its inventions, is the current assignee of the '288 patent.

72. The inventions set forth in the '288 patent relate to a system and method for measuring latency of an optical transport network and includes the generating of a time stamp, transmitting the time stamp in an optical transport network, and processing the time stamp to measure latency of the optical transport network.

73. As set forth in detail below (and the corresponding Exhibits thereto), the Accused Huawei Products comprise material parts of the claims in the ’288 patent.

74. Because in part of the use of the G.709 Standard and IEEE-1588 Standard, the Accused Huawei Products infringe one or more of the claims of the ’288 patent, including, for example, claim 1.

75. Claim 1 of the ’288 patent recites:

> 1. A method, comprising:
>
> a second location receiving a first time stamp associated with a first location, wherein the first time stamp was inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp, wherein the characteristic of the first time stamp is at least one of a size of the first time stamp, an amount of the first time stamp and a type of the first time stamp;
>
> extracting information of the first time stamp from the first overhead of the first optical transport unit frame;
>
> generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp; and
>
> transmitting the second time stamp in a second overhead of a second optical transport unit frame to the first location wherein the second time stamp is used to measure a round trip delay of a network.

76. To the extent the preamble is considered to be limiting, the Accused Huawei Products meet the preamble of claim 1 of the ’288 patent. *See, e.g.*:

OTN-Side	Interface Type	OTU-1/OTU-2 (ITU-T G.709)
	Fiber Type	SMF (ITU-T G.652)/ DSF (ITU-T G.653)
	Plug	SFP/XFP
Topology		Point to point, chain, star, ring
Synchronization		2Mbit/s or 2MHz, SSM supported Ethernet Syn,1588V2

(Ex. C, Product Specification for the OSN 1800 Series; *see also* Exs. F, G, H, and I.)

77. The Accused Huawei Products meet the first element of claim 1 of the '288 patent that recites "a second location receiving a first time stamp associated with a first location, wherein the first time stamp was inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp, wherein the characteristic of the first time stamp is at least one of a size of the first time stamp, an amount of the first time stamp and a type of the first time stamp." For example, at least the type of timestamp (*e.g.*, PTP or ODU PM delay measurement) determines whether the timestamp is inserted in the OTU (optical channel transporting unit) or ODU (optical channel data unit) overhead portions. *See, e.g.*:

OTUk, OTUCn, ODUk, ODUCn, OPUk and OPUCn overhead assignment: The assignment of an overhead in the optical transport/data/payload unit signal to each part is defined in Figure 5-1. OTUk, ODUk, OPUk contain one instance of OTU, ODU, OPU overhead. OTUCn, ODUCn and OPUCn contain n instances of OTU, ODU, OPU overhead, numbered 1 to n.

Interleaved versions of the OTU, ODU and OPU overhead may be present on OTUCn interfaces. This interleaving is interface specific and specified for OTN interfaces with standardized application codes in the interface specific Recommendations (ITU-T G.709.x series). Within the other clauses of this Recommendation an OTUCn, ODUCn and OPUCn are presented in an interface independent manner, by means of n OTUC, ODUC and OPUC instances that are marked #1 to #n.

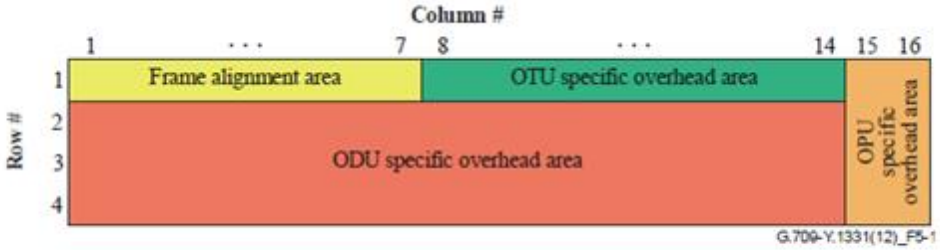


Figure 5-1 – OTU, ODU and OPU overhead

(Ex. D, G.709 Standard at p. 9)

15.7.1 OTU overhead location

The OTU overhead location is shown in Figures 15-12 and 15-13.

The OTUk contains one instance of OTU overhead. The OTUCn contains n instances of OTU overhead, numbered 1 to n (OTU OH #1 to OTU OH #n).

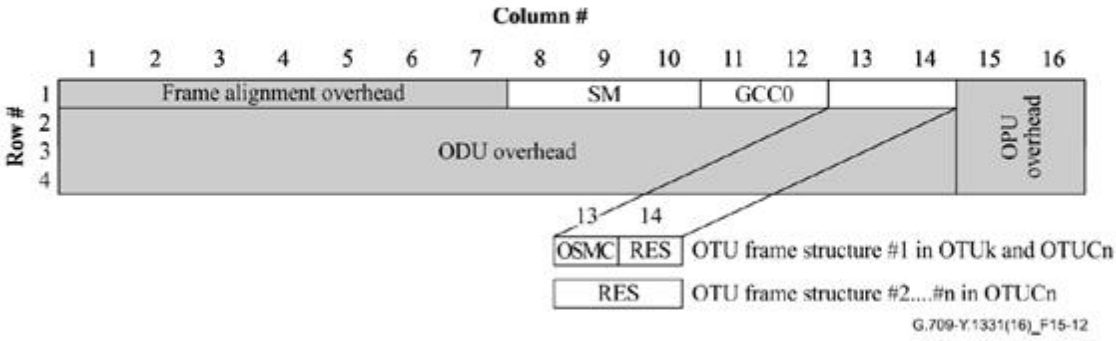


Figure 15-12 – OTU overhead

(*Id.* at 50.)

15.7.2.4 OTU OTN synchronisation message channel (OSMC)

For synchronisation purposes, one byte is defined in the OTU overhead as an OTN synchronisation message channel to transport SSM and PTP messages within SOTU and MOTU interfaces. The OSMC bandwidth is listed in Table 15-3.

(*Id.* at p. 54.)

15.7.2.4.1 Generation of event message timestamps

15.7.2.4.1.1 SOTU and MOTU interface event message timestamp point

The SOTU and MOTU interface message timestamp point [ITU-T G.8260] for a PTP event message transported over the OSMC shall be the X-frame multiframe event preceding the beginning of the GFP frame in which the PTP event message is carried. See Figure 15-16. Since the GFP frames may be longer than X-4 bytes, a frame may cross the X-frame multiframe boundary. The X-frame multiframe contains frames numbered 0, 1, .., X-1.

15.7.2.4.1.2 Event timestamp generation

All PTP event messages are timestamped on egress and ingress SOTU and MOTU interfaces. The timestamp shall be the time at which the event message timestamp point passes the reference plane [ITU-T G.8260] marking the boundary between the PTP node (i.e., OTN node) and the network.

(*Id.* at 55.)

6.5.2 Ordinary clocks

The model of an ordinary clock is illustrated in Figure 2.

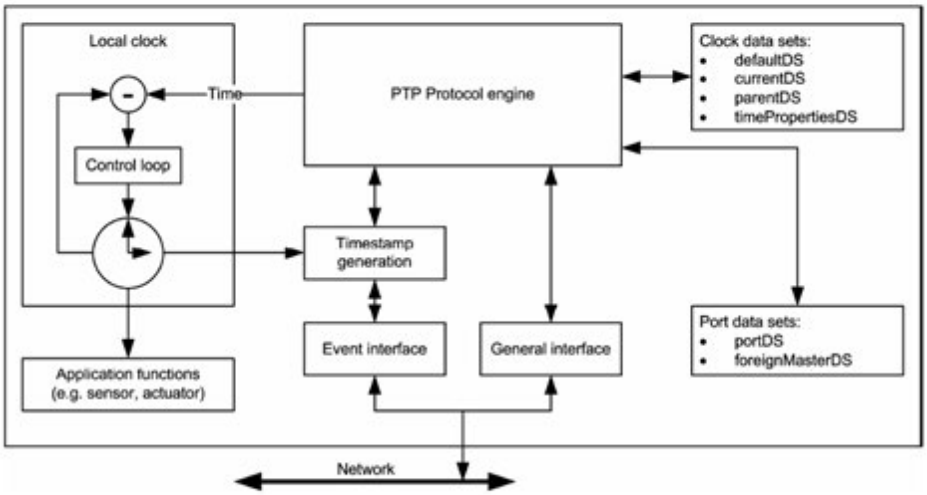
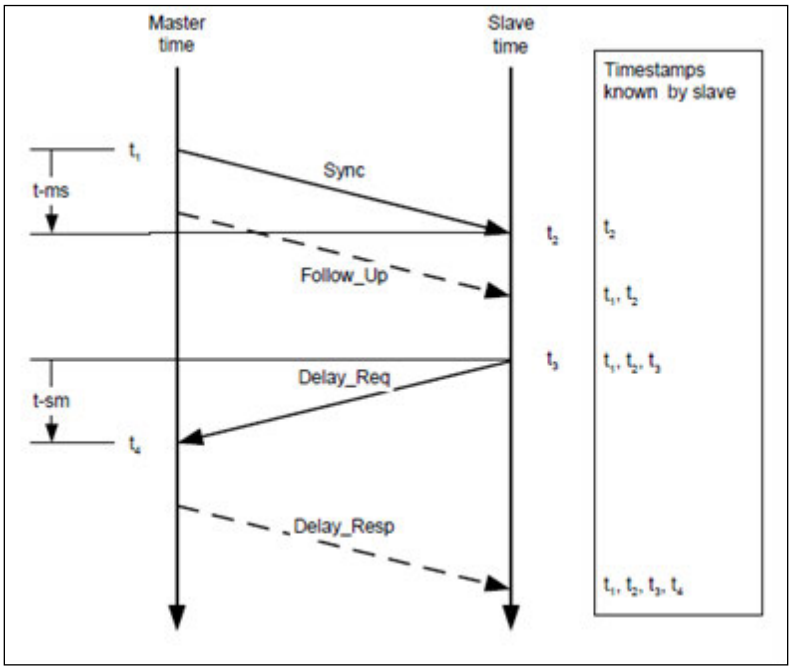


Figure 2—Model of an ordinary clock

An ordinary clock communicates with the network via two logical interfaces based on a single physical port. The event interface is used to send and receive event messages, which are timestamped by the timestamp generation block based on the value of the local clock. The general interface is used to send and

(Ex. E, IEEE-1588 V2 standard at p. 19.)



The message exchange pattern is as follows:

a) The master sends a Sync message to the slave and notes the time t_1 at which it was sent.

b) The slave receives the Sync message and notes the time of reception t_2.

c) The master conveys to the slave the timestamp t_1 by:

1) Embedding the timestamp t_1 in the Sync message. This requires some sort of hardware processing for highest accuracy and precision.

2) Embedding the timestamp t_1 in a Follow_Up message.

d) The slave sends a Delay_Req message to the master and notes the time t_3 at which it was sent.

e) The master receives the Delay_Req message and notes the time of reception t_4.

f) The master conveys to the slave the timestamp t_4 by embedding it in a Delay_Resp message.

At the conclusion of this exchange of messages, the slave possesses all four timestamps. These timestamps may be used to compute the offset of the slave's clock with respect to the master and the mean propagation time of messages between the two clocks, which in Figure 12 is the mean of t-ms and t-sm.

(*Id.* at p. 34.)

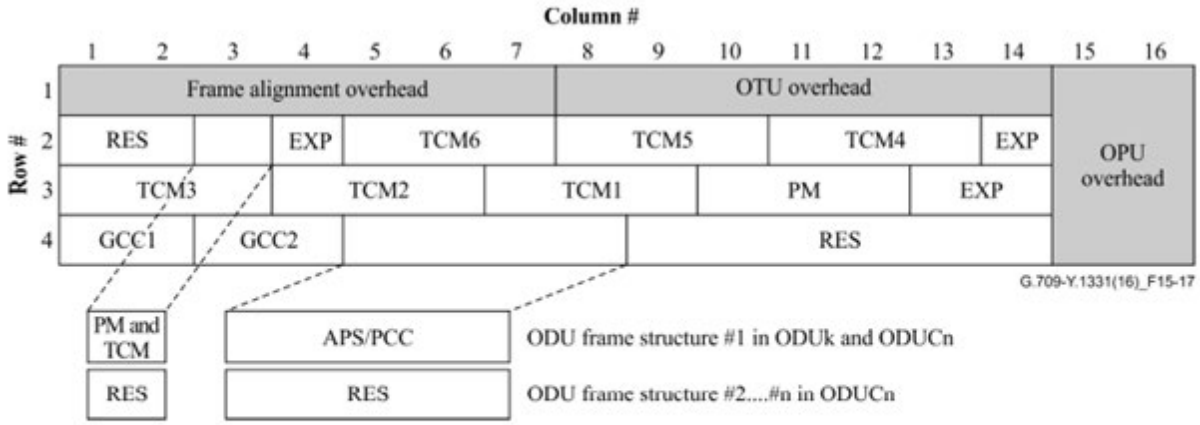


Figure 15-17 – ODU overhead

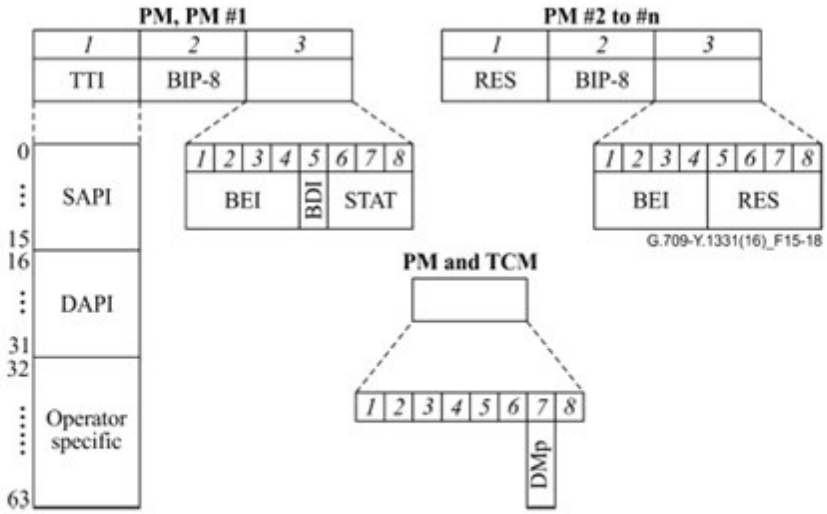


Figure 15-18 – ODU path monitoring overhead

(Ex. D, G.709 Standard at p. 57.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

(*Id.* at p. 60)

78. The Accused Huawei Products meet the second element of claim 1 of the '288 patent that recites "extracting information of the first time stamp from the first overhead of the first optical transport unit frame." *See, e.g.*:

11.3.2 Delay request-response mechanism operational specifications

The actual value of the <meanPathDelay> shall be measured and computed as follows for each instance of a delay request-response measurement:

a) The master node prepares and issues a Sync message per 9.5.9. If the node is a two-step clock, it also prepares and issues a Follow_Up message per 9.5.9.4.

b) The slave node shall:

1) Upon receipt of the Sync message from the master generate timestamp t_2.

2) If asymmetry corrections are required, modify the correctionField of the received Sync message per 11.6.2.

3) If required to send a Delay_Req message based on the timing requirements of subclause 9.5.11.2:

i) Prepare a Delay_Req message with the correctionField (see 13.3.2.7) set to 0. The originTimestamp shall be set to 0 or an estimate no worse than ±1 s of the egress time of the Delay_Req message.

(Ex. E, IEEE-1588 V2 Standard at p. 111.)

Table 26—Sync and Delay_Req message fields

Bits								Octets	Offset
7	6	5	4	3	2	1	0		
header (see 13.3)								34	0
originTimestamp								10	34

(*Id.* at p. 130.)

13.3.1 General header specifications

The common header for all PTP messages shall be as specified in Table 18.

Table 18—Common message header

Bits								Octets	Offset
7	6	5	4	3	2	1	0		
transportSpecific				messageType				1	0
reserved				versionPTP				1	1
messageLength								2	2
domainNumber								1	4
reserved								1	5
flagField								2	6
correctionField								8	8
reserved								4	16
sourcePortIdentity								10	20
sequenceId								2	30
controlField								1	32
logMessageInterval								1	33

(*Id*. at 124)

c) Upon receipt of the Delay_Req message, the master node shall :

1) Generate timestamp t_4

2) Prepare a Delay_Resp message

3) Copy the sequenceId field from the Delay_Req message to the sequenceId field of the Delay_Resp message

4) Copy the sourcePortIdentity field from the Delay_Req message to the requestingPortIdentity field of the Delay_Resp message

5) Copy the domainNumber field from the Delay_Req message to the domainNumber field of the Delay_Resp message

6) Set the correctionField of the Delay_Resp message to 0

7) Add the correctionField of the Delay_Req message to the correctionField of the Delay_Resp message

(*Id*. at 111)

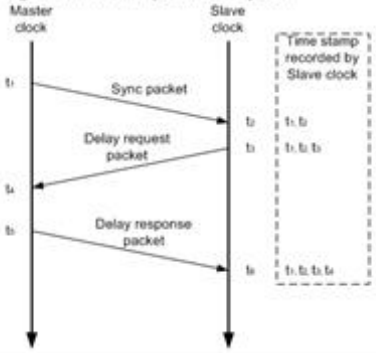
79. The Accused Huawei Products meet the third element of claim 1 of the ’288 patent that recites “generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp.” *See, e.g.*:

PTP Clock Synchronization Mechanism

The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3)

c) Upon receipt of the Delay_Req message, the master node shall :

1) Generate timestamp t_4

2) Prepare a Delay_Resp message

3) Copy the sequenceId field from the Delay_Req message to the sequenceId field of the Delay_Resp message

4) Copy the sourcePortIdentity field from the Delay_Req message to the requestingPortIdentity field of the Delay_Resp message

5) Copy the domainNumber field from the Delay_Req message to the domainNumber field of the Delay_Resp message

6) Set the correctionField of the Delay_Resp message to 0

7) Add the correctionField of the Delay_Req message to the correctionField of the Delay_Resp message

(Ex. E, IEEE-1588 V2 Standard at p. 111.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

This DMp signal is inserted by the DMp originating P-CMEP and sent to the far-end P-CMEP. This far-end P-CMEP loops back the DMp signal towards the originating P-CMEP. The originating P-CMEP measures the number of frame periods between the moment the DMp signal value is inverted and the moment this inverted DMp signal value is received back from the far-end P-CMEP.

(Ex. D, G.709 Standard at p. 60.)

80. The Accused Huawei Products meet the last element of claim 1 of the ’288 patent that recites “transmitting the second time stamp in a second overhead of a second transport unit frame to the first location wherein the second time stamp is used to measure the round trip delay of the network.” *See, e.g.*:

OTUk, OTUCn, ODUk, ODUCn, OPUk and OPUCn overhead assignment: The assignment of an overhead in the optical transport/data/payload unit signal to each part is defined in Figure 5-1. OTUk, ODUk, OPUk contain one instance of OTU, ODU, OPU overhead. OTUCn, ODUCn and OPUCn contain n instances of OTU, ODU, OPU overhead, numbered 1 to n.

Interleaved versions of the OTU, ODU and OPU overhead may be present on OTUCn interfaces. This interleaving is interface specific and specified for OTN interfaces with standardized application codes in the interface specific Recommendations (ITU-T G.709.x series). Within the other clauses of this Recommendation an OTUCn, ODUCn and OPUCn are presented in an interface independent manner, by means of n OTUC, ODUC and OPUC instances that are marked #1 to #n.

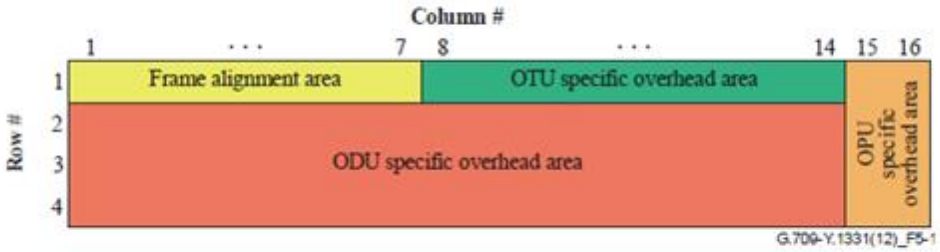


Figure 5-1 – OTU, ODU and OPU overhead

(*Id.* at p. 9)

15.7.1 OTU overhead location

The OTU overhead location is shown in Figures 15-12 and 15-13.

The OTUk contains one instance of OTU overhead. The OTUCn contains n instances of OTU overhead, numbered 1 to n (OTU OH #1 to OTU OH #n).

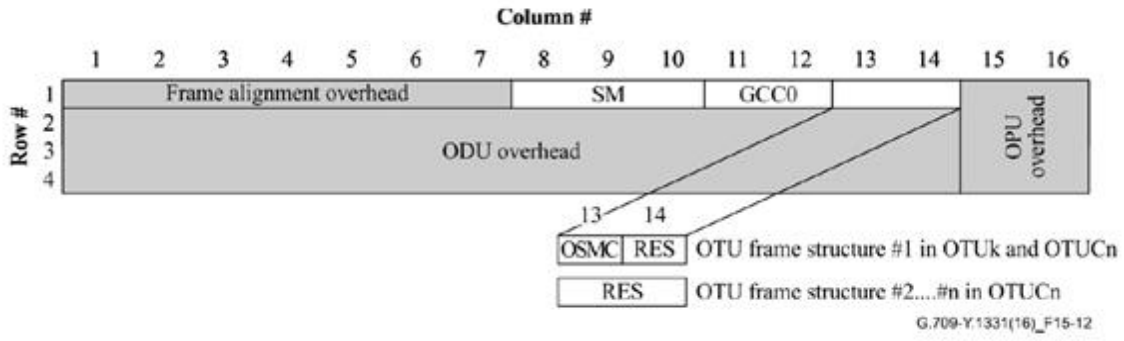


Figure 15-12 – OTU overhead

(*Id.* at 50.)

15.7.2.4 OTU OTN synchronisation message channel (OSMC)

For synchronisation purposes, one byte is defined in the OTU overhead as an OTN synchronisation message channel to transport SSM and PTP messages within SOTU and MOTU interfaces. The OSMC bandwidth is listed in Table 15-3.

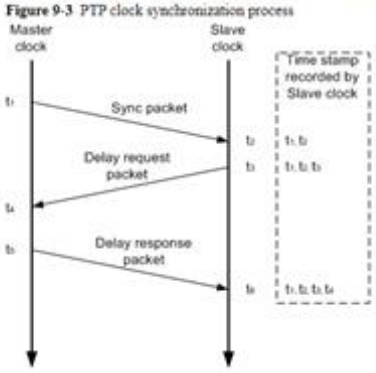
(*Id.* at p. 54.)

PTP Clock Synchronization Mechanism

The PTP protocol is based on the most accurate match time at which synchronous data packets are propagated and received. Each slave clock is synchronized with the master clock by exchanging the synchronous packets with the master clock.

The PTP clock synchronization process is shown in Figure 9-3.

Figure 9-3 PTP clock synchronization process



(Ex. F, OSN 9560 Feature Description at § 9.4.3.)

15.8.2.1.6 ODU PM delay measurement (DMp)

For ODU path monitoring, a one-bit path delay measurement (DMp) signal is defined to convey the start of the delay measurement test.

The ODUk and ODUCn contain one instance of ODU PM DMp overhead.

The DMp signal consists of a constant value (0 or 1) that is inverted at the beginning of a two-way delay measurement test. The transition from 0→1 in the sequence …0000011111…, or the transition from 1→0 in the sequence …1111100000… represents the path delay measurement start point. The new value of the DMp signal is maintained until the start of the next delay measurement test.

This DMp signal is inserted by the DMp originating P-CMEP and sent to the far-end P-CMEP. This far-end P-CMEP loops back the DMp signal towards the originating P-CMEP. The originating P-CMEP measures the number of frame periods between the moment the DMp signal value is inverted and the moment this inverted DMp signal value is received back from the far-end P-CMEP.

(Ex. D, G.709 Standard at p. 60.)

81. On information and belief, Huawei has directly infringed and continues to directly infringe at least claim 1 of the ’288 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by using, selling, offering to sell, and importing into the United States the Accused Huawei Products, on or after the issuance date of the patent.

82. Huawei has been, and currently is, indirectly infringing at least claim 1 of the ’288 patent by inducing infringement under 35 U.S.C. § 271(b) and as a contributory infringer under 35 U.S.C. § 271(c).

83. Huawei knew of the ’288 patent or should have known of the ’288 patent because the parent application of the ’288 patent, then published as U.S. Patent Publication No. 2008/0219661 and containing identical subject matter as the ’288 patent, was identified and cited during the prosecution of Huawei’s U.S. Patent No. 9,838,109. Huawei has had actual knowledge of the ’288 patent since at least the filing of these Counterclaims.

84. Huawei has provided the Accused Huawei Products to its customers and instructions to use the Accused Huawei Products in an infringing manner while being on notice of

its infringement thereof. Therefore, Huawei knew or should have known of the ’288 patent and of its own infringing acts, or deliberately took steps to avoid learning of those facts.

85. Huawei knowingly and intentionally encourages and aids at least its end-user customers to directly infringe the ’288 patent.

86. On information and belief, Huawei provides the Accused Huawei Products, which are sold and specifically configured to infringe the ’288 patent as described above, to end-user customers so that such customers will use the Accused Huawei Products in an infringing manner.

87. Huawei actively instructs its customers on how to use the Accused Huawei Products, including through advertising, encouraging, installing devices for, providing support for, and/or operating the Accused Huawei Products for or on behalf its customers.

88. When used as instructed, Huawei’s customers use these products to practice the methods and use the apparatus of the ’288 patent and directly infringe at least claim 1 of the ’288 patent. Huawei induces such infringement by providing the Accused Huawei Products and instructions to enable and facilitate infringement, knowing of the existence of the ’288 patent. On information and belief, Huawei specifically intends that its actions will result in infringement of at least claim 1 of the ’288 patent, or subjectively believes that its actions will result in infringement of the ’288 patent but took deliberate actions to avoid learning of those facts, as set forth above.

89. Huawei contributorily infringes at least claim 1 of the ’288 patent by providing the Accused Huawei Products and/or software or hardware components thereof, that embody a material part of the claimed inventions of the ’288 patent, that are known by Huawei to be specifically made or adopted for use in an infringing manner, and are not staple articles with substantial non-infringing uses. The Accused Huawei Products are specifically designed to

infringe at least claim 1 of the ’288 patent, and their accused components have no substantial non-infringing uses.

90. Huawei’s infringement of the ’288 patent has been and continues to be willful, and Huawei’s conduct renders this case exceptional under 35 U.S.C. § 285.

91. Additional allegations regarding Huawei’s knowledge of the ’288 patent and willful infringement will likely have further evidentiary support after a reasonable opportunity for discovery.

92. Verizon is entitled to recover from Huawei all damages that Verizon has sustained as a result of Huawei’s infringement of the ’288 patent, including without limitation lost profits and no less than a reasonable royalty.

THIRD COUNT
(Declaration of Obligation to License Standard Essential Patents on FRAND/RAND Terms)

93. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

94. On information and belief, Huawei, including their related entities, affiliates, and successors- and predecessors-in-interest, have participated in the development and implementation of industry standards through their membership and participation in standard setting organizations (“SSOs”), such as the ITU-T. Huawei submitted licensing declarations committing to license its intellectual property on FRAND/RAND terms. Accordingly, Huawei, including their related entities, affiliates, and successors- and predecessors-in-interest, is obligated by FRAND/RAND commitments of the ITU-T.

95. As members of the public that would potentially implement the standards and specifications set forth by the ITU-T, Verizon, its vendors and its customers, are intended third-

party beneficiaries of Huawei's contractual commitments and obligations to the ITU-T, including Huawei's general declarations as described above.

96. On information and belief, to the extent that any of the claims of the asserted patents in the Complaint are infringed by Verizon, that infringement is a result of implementing one or more standards promulgated by the ITU-T to which Huawei has contractual commitments to offer FRAND and/or RAND licenses.

97. Accordingly, to the extent that any of the claims of the asserted patents to the Complaint are deemed essential to implementation of any standard or specification set forth by the ITU-T, then Huawei is obligated to provide Verizon with a license to such claims on FRAND and/or RAND terms.

98. An actual, continuing and justiciable controversy exists between Huawei and Verizon as to Verizon's right to a license to the asserted patents in the Complaint on FRAND and/or RAND terms. Absent a declaration of Verizon's rights to such a license, Huawei will continue to wrongfully assert one or more of the asserted patents against Verizon, and continue to cause Verizon injury and damage.

99. Under the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.*, Verizon requests a judicial determination and declaration that Verizon is entitled to a license on FRAND and/or RAND terms to any one or more of the asserted patents deemed essential to an implementation of any standard or specification set forth by the ITU-T.

FOURTH COUNT
(Breach of Contract – FRAND)

100. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

101. As set forth above, through their participation, implementation and/or declarations, Huawei, including their related entities, affiliates, and successors- and predecessors-in-interest, has committed to license any patent essential to practice an ITU-T standard, to all implementers of those standards. On information and belief, as set forth above, Huawei is bound by the FRAND/RAND contractual commitments and obligations that it made and/or created, including with respect to each asserted patent to the extent necessary to practice an ITU-T standard

102. As an implementer of ITU-T standards, Verizon is an intended third-party beneficiary to and obtains the benefit of the contractual commitments and obligations of Huawei, including their related entities, affiliates, and successors- and predecessors-in-interest, with respect to each asserted patent to the extent necessary to practice an ITU-T standard.

103. As a member of the optical networking community and the public at large, Verizon is an intended third-party beneficiary to and obtains the benefit of the contractual commitments and obligations of Huawei, including their related entities, affiliates, and successors- and predecessors-in-interest, with respect to each asserted patent to the extent necessary to practice an ITU-T standard.

104. Huawei breached these contractual commitments and obligations by initiating this lawsuit without abiding by the terms of those commitments and obligations.

105. This breach includes Huawei's claims of infringement, notwithstanding that Verizon has a right to a FRAND and/or RAND license to those patents, to the extent that any of asserted patents are essential to the practice of an ITU-T standard.

106. This breach includes Huawei's failure to offer a license to Verizon on FRAND/RAND terms and initiating this suit prior to any offer to license on FRAND/RAND terms.

This suit places excessive pressure on Verizon to license the asserted patents at supra-competitive prices, and destroys the possibility of true FRAND/RAND negotiations.

107. As a result of these and other contractual breaches, Verizon has been injured in its business and property. Verizon has been forced to expend resources defending this case, including against Huawei's claim of infringement, and has suffered or faces the threat of increased costs, loss of profits, loss of customers or potential customers, loss of goodwill and product image, uncertainty in business planning, and uncertainty among customers and potential customers.

FIFTH COUNT
(Texas Unfair Competition Common Law)

108. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

109. Verizon and Huawei compete to sell systems and services to customers throughout the United States, including those operating and doing business in Texas.

110. Huawei and its representatives to the ITU-T failed to disclose material information to the ITU-T regarding Huawei's IPRs, and Huawei made material and false statements to the ITU-T. This has allowed Huawei to assert a monopoly in the relevant fiber optical networking and Ethernet markets and that constitute fraud on the ITU-T. These misstatements and omissions include Huawei's commitment to disclose relevant IPR as a member of the ITU-T, pursuant to its policies, and Huawei's commitment to license relevant patents on FRAND terms.

111. Huawei's conduct constitutes unlawful, unfair, and/or fraudulent business acts or practices and/or unfair, untrue, or misleading advertising, including but not limited to its business acts or practices that significantly threaten and harm competition in Texas and elsewhere, that violate its obligations to license its asserted patents on FRAND/RAND terms to the extent one or

more of its asserted patents are essential to the practice of an ITU-T standard, and that constitute false or misleading statement of fact in commercial business.

112. As a direct and proximate result of the foregoing, Verizon has lost business from its prospective customers, and has been injured in its business and property in an amount to be determined at trial.

113. Such harm further includes, but is not limited to, the financial cost of Huawei's tactics described herein, including Huawei's legal threats and patent infringement claims.

SIXTH COUNT
(Common Law Fraud)

114. Verizon realleges and incorporates by reference the allegations set forth in the foregoing paragraphs.

115. Huawei and its representatives to the ITU-T failed, despite numerous opportunities and its obligation to do so, to disclose relevant IPR to the ITU-T during the development of the relevant standards in the ITU-T meetings in which they were developed when those working groups met. Further, Huawei affirmatively misrepresented its intent to license its technologies on FRAND terms by, for example, not disclosing and concealing its IPR, and making false FRAND committments. Had Huawei properly disclosed its IPR in a timely manner and had Huawei disclosed its true intent to assert that parties implementing the standard were not licensed and should be enjoined from selling G.709 and G.8032 compliant products or required to pay exorbitant license fees and accept other non-FRAND terms, the ITU-T would have decided to standardize an alternative technology to perform the relevant function and Verizon would have utilized these alternative technologies. Alternatively, the ITU-T would have continued to leave the relevant function out of the standard, in which case implementers and users of the standard, such as Verizon, would have been free to choose various alternative technologies to perform that

function, and the ITU-T would have been free to continue to evaluate competing alternative technologies for potential standardization in future iterations of the standard.

116. Huawei's repeated non-disclosure and concealment of IPR were intended to induce the ITU-T and its members, including Verizon, to incorporate into the ITU-T standards technology over which Huawei planned to assert patent rights. Huawei's and its representatives to the ITUT's repeated non-disclosure and concealment of IPR were also intended to induce users of the standard, such as Verizon, to purchase and deploy networking equipment that allegedly implements Huawei's IPR.

117. Huawei's and its representatives to the ITU-T's non-disclosure and false FRAND commitments proximately resulted in incorporation into the standard of technology over which Huawei now claims patent rights. Huawei's non-disclosure and false FRAND commitments also induced implementers and users of the standard, such as Verizon, to incorporate certain functionality into their products that Huawei alleges infringes its IPR.

118. Huawei, as part of its efforts to have its patents declared essential, falsely committed to offer licenses on FRAND terms to the essential patents.

119. As members of the public that would potentially implement the standards and specifications set forth by the ITU-T, Verizon, its vendors, and its customers are intended third-party beneficiaries of Huawei's contractual commitments to the ITU-T.

120. Those commitments were misrepresentations that Huawei knew were false at the time they were made. And indeed, Huawei has subsequently refused to license its declared essential patents on FRAND terms, including by offering non-FRAND terms and by refusing to offer any terms whatsoever, and has otherwise attempted to use its declared essential patents as leverage in litigation.

121. Each of the above commitments and misrepresentations by Huawei and its representatives to the ITU-T were material and false, Huawei knew these commitments and representations were material and false, the false commitments and representations were intended to induce implementers and users of the relevant standards, such as Verizon, to continue to implement and use the relevant standards, and Verizon actually and justifiably relied on these commitments and misrepresentations, which caused injury. The injury included at least Verizon's ongoing use of networking equipment in its network that allegedly practices the relevant standards and the costs associated with defending claims for patent infringement. Had Verizon known the above commitments and misrepresentations by Huawei were false, Verizon would have used alternative technology or at least not expanded its usage of standards compliant equipment in its network that allegedly implements the technology Huawei alleges is covered by its IPR.

122. As a direct and proximate result of the foregoing, Verizon has lost business from its prospective customers, has had to defend a baseless patent infringement suit, and has been injured in its business and property in an amount to be determined at trial.

123. Such harm further includes, but is not limited to, the financial cost of Huawei's tactics described herein, including Huawei's legal threats and patent infringement claims.

PRAYER FOR RELIEF

For these reasons, Verizon respectfully prays for the following relief:

a) That the Court dismiss Huawei's claims in its Complaint against Verizon with prejudice, and enter judgment on the Complaint in favor of Verizon and against Huawei;

b) That the Court deny all relief from Verizon requested by Huawei in its Complaint;

c) That the Court enter judgment in favor of Verizon and against Huawei on Verizon's Counterclaims;

d) That the Court find and enter a declaratory judgment that Verizon is entitled to a FRAND and/or RAND license to the asserted patents in the Complaint;

e) That the Court find Huawei has breached its contractual obligations to license the asserted patents in the Complaint on FRAND and/or RAND terms, and award damages such as Verizon will prove at trial, and enter an order setting a FRAND and/or RAND rate for any asserted patent in the Complaint deemed essential to an ITU-T standard, and compelling specific performance of Huawei's obligations;

f) That the Court find that Huawei has willfully infringed Verizon's patents, awarding Verizon an amount of damages to be determined through trial by jury, together with pre-judgment and post-judgment interest;

g) That the Court grant Verizon ongoing royalties for all continued post-trial infringement by Huawei;

h) That the Court grant Verizon all reasonable attorneys' fees, experts' fees, and costs; and

i) That the Court grant Verizon such further relief as the Court deems proper and just.

DEMAND FOR JURY TRIAL

Counterclaim Plaintiff Verizon hereby demand trial by jury on all issues so triable raised by Huawei's Complaint or by Verizon's Answer, Affirmative Defenses, and Counterclaims.

Dated: October 2, 2020

Respectfully submitted,

By: */s/ Charles Verhoeven*

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CERTIFICATE OF SERVICE

The undersigned certifies that on this 2nd day of October, 2020, all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document through the Court's CM/ECF system under Local Rule CV-5(a)(3). Any other counsel of record will be served by a facsimile transmission and/or first class mail.

/s/ Patrick D. Curran
Patrick D. Curran

CERTIFICATE OF AUTHORIZATION TO FILE UNDER SEAL

Pursuant to Local Rule CV-5, the undersigned counsel hereby certifies that authorization for filing under seal has been previously granted by the Court in the Protective Order (Dkt. 41) entered in this case on June 18, 2020.

/s/ Patrick D. Curran
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