

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of:

**CERTAIN SUBSEA
TELECOMMUNICATION SYSTEMS
AND COMPONENTS THEREOF**

Inv. No. 337-TA-

**COMPLAINT UNDER SECTION 337
OF THE TARIFF ACT OF 1930, AS AMENDED**

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EXHIBIT LIST

Exhibit No.	Description
1	Certified Copy of U.S. Patent No. 8,380,068
2	Certified Assignment Records for U.S. Patent No. 8,380,068
3	Certified Copy of U.S. Patent No. 7,860,403
4	Certified Assignment Records for U.S. Patent No. 7,860,403
5	Certified Copy of U.S. Patent No. 8,971,171
6	Certified Assignment Records for U.S. Patent No. 8,971,171
7	Certified Copy of U.S. Patent No. 8,351,798
8	Certified Assignment Records for U.S. Patent No. 8,351,798
9	Certified Copy of U.S. Patent No. 8,406,637
10	Certified Assignment Records for U.S. Patent No. 8,406,637
11	List of Foreign Counterparts
12	NEC: Representative Infringement Claim Chart for U.S. Patent No. 8,380,068
13	NEC: Representative Infringement Claim Chart for U.S. Patent No. 7,860,403
14	NEC: Representative Infringement Claim Chart for U.S. Patent No. 8,971,171
15	NEC: Representative Infringement Claim Chart for U.S. Patent No. 8,351,798
16	NEC: Representative Infringement Claim Chart for U.S. Patent No. 8,406,637
17	Nokia: Representative Infringement Claim Chart for U.S. Patent No. 8,380,068
18	Nokia: Representative Infringement Claim Chart for U.S. Patent No. 7,860,403
19	Nokia: Representative Infringement Claim Chart for U.S. Patent No. 8,971,171
20	Nokia: Representative Infringement Claim Chart for U.S. Patent No. 8,351,798
21	Nokia: Representative Infringement Claim Chart for U.S. Patent No. 8,406,637
22C	Confidential Representative Domestic Industry Claim Chart for U.S. Patent No. 8,380,068
23C	Confidential Representative Domestic Industry Claim Chart for U.S. Patent No. 7,860,403
24C	Confidential Representative Domestic Industry Claim Chart for U.S. Patent No. 8,971,171
25C	Confidential Representative Domestic Industry Claim Chart for U.S. Patent No. 8,351,798

Exhibit No.	Description
26C	Confidential Representative Domestic Industry Claim Chart for U.S. Patent No. 8,406,637
27C	Confidential Declaration of Jayesh Pankhania
28C	Confidential Foreign, Contract-Specific Limited License
29	Screenshots of Xtera Subsea Systems
30C	Confidential Collection of Documents Relating to Xtera and Its Products
31	Screenshots of NEC Subsea Systems
32	NEC Supply Records
33	Screenshots of Nokia Subsea Systems
34	Collection of Nokia/Alcatel-Lucent Articles
35	Collection of NEC Articles
36	NEC 2017 Annual Report
37	Nokia's 2016 Annual Report
38	Compilation of webpages by NEC
39	Declaration of Alan Willner, Ph.D.
40C	Confidential Declaration of Dylan Higginbotham

* Certified copies have been ordered, and once received, the certified copies will be substituted for the included non-certified copies.

APPENDIX LIST

Appendices	Description
A	Certified Prosecution History of U.S. Patent No. 8,380,068
B	Patents and Applicable Pages of Technical References Mentioned in the Prosecution History of U.S. Patent No. 8,380,068
C	Certified Prosecution History of U.S. Patent No. 7,860,403
D	Patents and Applicable Pages of Technical References Mentioned in the Prosecution History of U.S. Patent No. 7,860,403
E	Certified Prosecution History of U.S. Patent No. 8,971,171
F	Patents and Applicable Pages of Technical References Mentioned in the Prosecution History of U.S. Patent No. 8,971,171
G	Certified Prosecution History of U.S. Patent No. 8,351,798
H	Patents and Applicable Pages of Technical References Mentioned in the Prosecution History of U.S. Patent No. 8,351,798
I	Certified Prosecution History of U.S. Patent No. 8,406,637
J	Patents and Applicable Pages of Technical References Mentioned in the Prosecution History of U.S. Patent No. 8,406,637

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I. INTRODUCTION

1. Complainants Neptune Subsea Acquisitions Ltd. (“Neptune Acquisitions”), and the wholly owned subsidiaries of Neptune Acquisitions’ wholly owned subsidiary, Neptune Subsea Holdings Ltd., Neptune Subsea IP Ltd. and Xtera, Inc. (collectively, “Xtera”) respectfully file this Complaint under Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 (“Section 337”), based on proposed Respondents Nokia Corporation (“Nokia Corp.”), Nokia Solutions and Networks B.V. (“Nokia B.V.”), Nokia Solutions and Networks Oy (“Nokia Solutions”), Nokia Solutions and Networks US LLC (“Nokia US”) and Alcatel-Lucent Submarine Networks SAS (“Alcatel-Lucent Submarine Networks”) (collectively, “Nokia”); and NEC Corporation (“NEC JP”), NEC Networks & System Integration Corporation (“NEC Networks”), and NEC Corporation of America (“NEC US”) (collectively “NEC”) (Nokia and NEC collectively, “Respondents”) unlawful importation into the United States, sale for importation into the United States, and/or sale within the United States after importation of certain subsea telecommunication systems and components thereof.

2. This Complaint is directed to certain of proposed Respondents’ imported subsea telecommunication systems and components thereof that infringe at least the following claims of the following patents (collectively, the “Asserted Patents”), either literally or under the doctrine of equivalents:

- Claims 1–15 of U.S. Patent No. 8,380,068 (“the ’068 patent”);
- Claims 1–14 of U.S. Patent No. 7,860,403 (“the ’403 patent”);
- Claims 1–10 of U.S. Patent No. 8,971,171 (“the ’171 patent”);
- Claims 13–20 of U.S. Patent No. 8,351,798 (“the ’798 patent”),
- Claims 1–6 of U.S. Patent No. 8,406,637 (“the ’637 patent”); and

3. Such products (collectively, the “Accused Products”) include at least:

- Proposed Respondent Nokia’s Systems utilizing Photonic Service Engine 2 Super Coherent Technology and/or Nokia’s Systems utilizing 1620LM Submarine Line Terminal Equipment (SLTE) (collectively, the “Nokia Accused Products”); and
- Proposed Respondent NEC’s NS Series – Submarine Repeatered Subsea Systems (the “NEC Accused Products”).

4. The following table provides a summary of the asserted claims of the Asserted Patents (independent claims in bold):

U.S. Patent No.	Asserted Claims
8,380,068	1–11, 12–15
7,860,403	1–7, 8–14
8,971,171	1–10
8,351,798	13–20
8,406,637	1–5, 6

5. Certified copies of Xtera’s Asserted Patents are included as Exhibits 1, 3, 5, 7, and 9. Xtera owns all rights, title, and interest in each of the Asserted Patents, including the right to sue for infringement. Certified copies of the assignment records of the Asserted Patents are included as Exhibits 2, 4, 6, 8 and 10.

6. A domestic industry as required by 19 U.S.C. § 1337(a)(2) and (3) exists in the United States relating to articles protected by Xtera’s Asserted Patents. Xtera’s domestic industry includes significant investments in plant and equipment, significant employment of labor and capital, and substantial investments in the exploitation of the inventions claimed in Xtera’s Asserted Patents, including through engineering, research, and development.

7. Xtera seeks a permanent limited exclusion order under 19 U.S.C. § 1337(d)(1) barring from entry into the United States certain subsea telecommunication systems and components thereof, of proposed Respondents NEC and Nokia that infringe, or are intended to be deployed in subsea telecommunication systems that infringe the Asserted Patents, and are imported into the United States, sold for importation into the United States, and/or sold in the United States after importation by or on behalf of any of the proposed Respondents.

8. Xtera further seeks a permanent cease and desist order under 19 U.S.C. § 1337(f) prohibiting proposed Respondents, their domestic subsidiaries, related companies, and agents from engaging in the importation, sale for importation, marketing and/or advertising, distribution, offering for sale, sale, use after importation, sale after importation, deployment, installation and other transfer within the United States of subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents.

9. Xtera further seeks the imposition of a bond upon importation of certain subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents, during the 60-day Presidential review period pursuant to 19 U.S.C. § 1337(j) to further prevent injury to Xtera's domestic industry relating to the Asserted Patents.

II. COMPLAINANT

10. Complainant Neptune Subsea Acquisition Ltd. is a UK corporation with its headquarters at Bates House, Church Road, Harold Wood, Essex, RM3 0SD, England. Complainant Neptune Subsea IP Ltd. is a wholly-owned subsidiary of Neptune Subsea Holdings Ltd., which in turn is a wholly owned subsidiary of Complainant Neptune Subsea Acquisition Ltd., and is also a UK corporation with its headquarters at Bates House, Church Road, Harold Wood, Essex, RM3 0SD, England. Neptune Subsea IP Ltd. is a holding company for intellectual property assets owned by Neptune Subsea Holdings Ltd. and its subsidiaries.

11. Complainant Xtera, Inc. ("Xtera U.S.") is a wholly-owned subsidiary of Neptune Subsea Holdings Ltd, which in turn is a wholly owned subsidiary of Complainant Neptune Subsea Acquisition Ltd. Xtera U.S. is the successor to Xtera Communications, Inc. ("Xtera Communications"), which was founded in 1998.

12. Xtera has a substantial United States presence through its wholly-owned subsidiary Xtera U.S. Xtera U.S. is Neptune Subsea Acquisitions's primary operating arm for its optical networking solutions, including its subsea telecommunication systems. Xtera U.S. sells its optical networking solutions directly or indirectly to telecommunications service providers, content service providers, enterprises, and government entities worldwide to support deployments of submarine fiber-optic networks. Xtera U.S.'s subsea telecommunication products include unrepeatered systems, repeatered systems, end-to-end turnkey solutions, and submarine system upgrades. Xtera U.S.'s subsea telecommunication systems are deployed in five continents and sixty countries across the globe.

13. Xtera Communications pioneered the use of all-Raman optical amplification to improve the capacity and reach of long span terrestrial and subsea telecommunication networks, deploying the first such system in 2004. Through development of advanced optical amplifiers, repeaters, remote monitoring and control equipment, and other subsea optical networking components, Xtera U.S. has become an industry leader in subsea telecommunication systems, and offers disruptive and industry leading solutions that optimize the performance and reduce the cost of deploying, upgrading, and managing subsea telecommunication systems.

14. Xtera U.S. has employees across the globe, including in the United States. Its domestic employees provide manufacturing and operation support, sales and marketing, technical support and customer care, research and development, and general and administrative functions. Research and development for Xtera U.S.'s subsea telecommunication systems occurs

in its Allen, Texas headquarters and in its England offices. *See, e.g.*, Ex. 40C at ¶5; Ex. 27C at ¶¶6-7.

15. Xtera U.S.'s subsea telecommunication systems and components thereof are primarily manufactured in the United States by MC Assembly in Melbourne, Florida. In the instances where a subsea telecommunication system includes repeaters, the repeaters are manufactured by Surface Technology International Ltd. in the United Kingdom under the direction and control of Xtera U.S. Xtera U.S.'s focus on research and development drives its domestic industry and is at the core of its subsea telecommunication systems. Through its continued technological innovation, Xtera U.S., itself and through its predecessor Xtera Communications, has obtained more than 120 patents worldwide, many directed to foundational subsea optical networking technologies involved in this investigation. Xtera Subsea IP Ltd. is the assignee of Xtera Communications' Asserted Patents, with the right to sue for infringement of those patents.

III. THE PROPOSED RESPONDENTS

A. NEC

16. On information and belief, proposed Respondent NEC JP is a Japanese corporation with its headquarters at 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan. On information and belief, NEC JP, alone or in concert with others, manufactures the NEC Accused Products outside the United States in locations such as Japan, sells them for importation into the United States, imports them into the United States, and/or sells them after importation into the United States.

17. On information and belief, proposed Respondent NEC Networks is a Japanese corporation with its headquarters at Iidabashi First Tower, 2-6-1 Koraku, Bunkyo-ku, Tokyo 112-8560, Japan. Further on information and belief, NEC Networks has no majority investors,

but NEC JP presently owns approximately 38% and NEC Corporation Retirement Trust presently owns approximately 13%. On information and belief NEC Networks manufactures, installs, configures, maintains, and operates a wide range of communications infrastructures, including subsea communications systems, both in Japan and internationally. *See* Ex. 38 at 16. On information and belief, NEC Networks manufactures, installs, configures, maintains, and operates the NEC Accused Products.

18. On information and belief, proposed Respondent NEC US is a wholly-owned subsidiary of NEC JP. NEC US is a Nevada corporation with its principal place of business at 3929 W. John Carpenter Freeway, Irving, TX 75063-2909. On information and belief, NEC US is part of a consortium of entities that is building a trans-pacific subsea telecommunication system connecting Southeast Asia to the United States. *See id.* at 4. On information and belief, NEC US manufactures, installs, configures, maintains, and operates the NEC Accused Products.

19. Proposed Respondent NEC develops, manufactures, installs, configures, imports, sells for importation into the United States, sells after importation into the United States, and/or uses after importation into the United States the NEC Accused Products, which includes at least its NEC's NS Series – Submarine Repeatered Subsea Systems. As set forth in Section VIII.A, NEC's Accused Products are manufactured abroad in locations such as Japan, and are imported for sale into the United States. NEC's Accused Products incorporate—without license from Xtera—many technologies developed by Xtera U.S. and protected by patents assigned to Xtera.

B. Nokia

20. On information and belief, proposed respondent Nokia Corp. is a company organized under the laws of Finland, with its principal place of business at Karaportti 3, 02610 Espoo, Finland. Proposed Respondent Nokia B.V. is a Dutch corporation with its headquarters in Karaportti 3 02610 Espoo, Finland. On information and belief, proposed Respondent Nokia

B.V. is a wholly-owned subsidiary of Nokia Finance International B.V., which is a wholly-owned subsidiary of Nokia Corp. On information and belief, through Nokia's acquisition of Alcatel-Lucent in 2016, proposed Respondent Alcatel-Lucent Submarine Networks SAS is a wholly owned subsidiary of Nokia B.V., and is incorporated in France with its principal place of business at 148 Route De La Reine, 148 AU 152, 92100 Boulogne Billancourt, France.

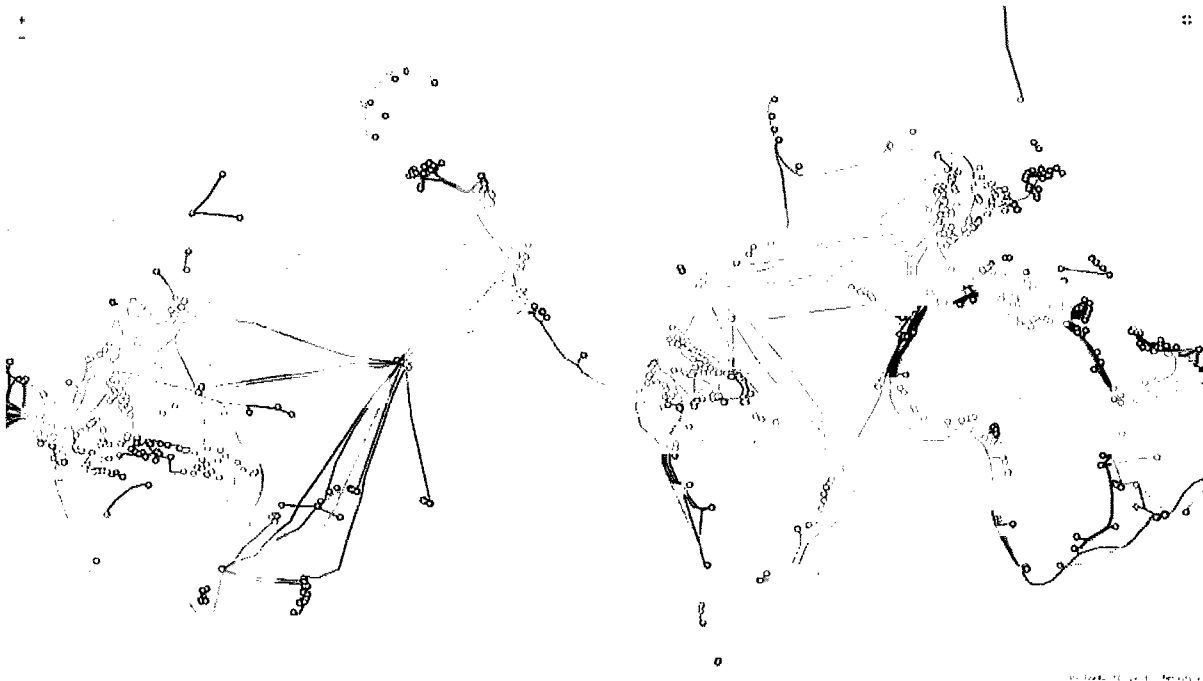
Alcatel-Lucent's submarine networks are managed by Nokia B.V. as a separate business. *See* Ex. 37 at 4. On information and belief, since Nokia's acquisition of Alcatel-Lucent, Alcatel-Lucent has incorporated technology built by Nokia's research and development subsidiary, Nokia Bell Labs, to its subsea telecommunication systems. *See* Ex. 37 at 33. On information and belief, Alcatel-Lucent, alone or in concert with others, manufactures the Nokia Accused Products outside the United States, sells them for importation into the United States, imports them into the United States, and/or sells them after importation into the United States.

21. Proposed Respondent Nokia develops, manufactures, installs, configures, imports into the United States, sells for importation into the United States, sells after importation into the United States, and/or uses after importation into the United States the Nokia Accused Products, including at least the Nokia Systems utilizing Photonic Service Engine 2 Super Coherent Technology and/or Nokia Systems utilizing 1620LM SLTE. As set forth in Section VIII.B, Nokia's Accused Products are manufactured abroad in locations such as France and the United Kingdom, and are imported for sale and/or use into the United States. Nokia's Accused Products incorporate—without license from the Xtera—many technologies developed by Xtera U.S. and protected by patents assigned to Xtera.

IV. THE TECHNOLOGY AND PRODUCTS AT ISSUE

22. The technologies at issue generally relate to certain subsea telecommunication systems and components thereof that are used to carry digital data, such as telephone, Internet and private data traffic, across the ocean.

23. Subsea telecommunication systems connect terrestrial data networks across bodies of water, allowing the transmission of data between continents. As shown below, dozens of state- and privately-owned submarine networks span every major ocean, connecting data networks across the globe. *See generally*, Telegeography's Submarine Cable Map, *available at* <http://www.submarinecablemap.com>.



24. Subsea telecommunication systems are designed to address the challenge of transmitting data signals across thousands of miles of ocean waters, where installation, operating conditions, and maintenance present difficulties not necessarily present for terrestrial data networks. To address these challenges, subsea communication systems rely on specialized

equipment and components, such as: (i) optical “repeaters,” which boost the intensity of light signals traveling through the fiber optic cable at certain intervals so that the signals do not become too attenuated, or faint, before they reach their destination, (ii) submarine line terminal equipment, which amplify the optical signals that are transmitting across the fiber optic cable using high-powered lasers, provide optical signal control, monitoring, and other functionality, and connect the subsea telecommunication systems to terrestrial data networks, and (iii) reinforced fiber optic cable, which can transmit light waves containing data across great distances at high speeds and withstand the tremendous atmospheric pressures present at ocean floor depths.

25. The products at issue are the systems and components of these long-haul subsea telecommunication systems that transmit, receive, and transport data along the ocean floor to connect terrestrial data networks across the globe. One important component of these subsea telecommunication systems is the optical amplifiers contained within the submarine line terminal equipment that boost the intensity of the optical signal so that it can be transported across thousands of miles of fiber optic cable. The line terminal equipment is also a critical component of these subsea systems, as they allow the monitoring of signals containing data transmitted around the world.

26. At a high level, optical amplifiers make long-haul data transmission possible by boosting the intensity of light, *i.e.*, increasing the gain of an optical signal. This allows an optical signal to travel longer distances over fiber optic cable before it needs to be boosted again by an optical repeater, or “repeatered.” Traditional optical amplifiers increase the gain of an optical signal by combining the signal with beams from high-powered lasers and sending the combined signal through a section of erbium-doped fiber optic cable. These erbium doped fiber amplifiers (“EDFAs”) were introduced in the mid-1980s and are still used in optical networks today.

27. In the 1990's, researchers began focusing on amplifying optical signals with stimulated Raman scattering, which takes advantage of the effects of scattering photons from molecules. Groundbreaking research at the University of Michigan by Xtera Communications founder demonstrated that Raman amplification could increase the gain of a larger spectrum of light over longer distances than traditional EDFAs. Xtera U.S. was founded on this groundbreaking Raman amplifier research.

A. Xtera Communications' and/or Xtera U.S.'s Subsea Telecommunication Systems

28. Xtera Communications deployed its first commercial all-Raman optical network in 2004, a terrestrial network in Europe. At the time, the network was the highest capacity and longest distance all-optical network in Europe. Xtera Communications then expanded its offerings from terrestrial to submarine networks, introducing its Nu-Wave NXT SLTE (submarine line terminal equipment) in 2007, which provided a dedicated platform for long-haul subsea telecommunication systems.

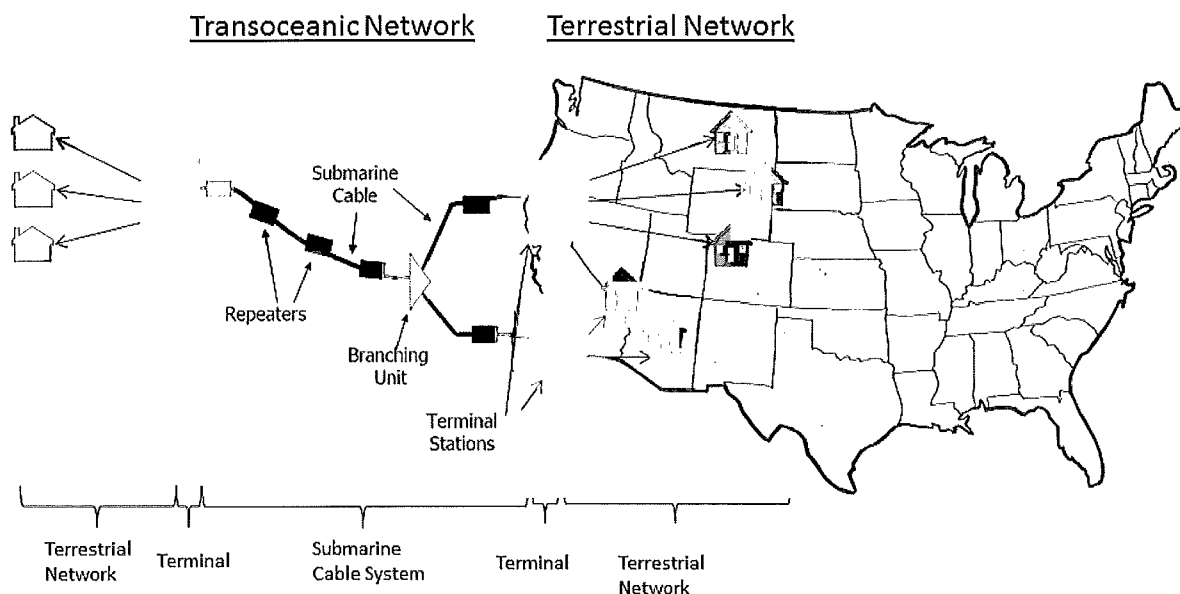
29. Xtera Communications introduced its current generation of products designed to improve the performance of subsea telecommunication systems, the Nu-Wave Optima platform, in October 2010, with its first deployment in early 2011. The Nu-Wave Optima platform can be configured with combinations of discrete and distributed Raman amplifiers and can be used to power and extend both terrestrial and submarine optical networks. The Nu-Wave Optima platform provides almost three times the capacity and twice the reach of its competitors for 100 Gb/s optical networks.

30. Xtera U.S. sells and has sold its subsea telecommunication systems, including its Nu-Wave Optima platform, directly or indirectly to telecommunications service providers, content service providers, data center operators, enterprises, and government entities worldwide.

Xtera U.S. has deployed its Nu-Wave optical networking platforms in more than fifty optical networks including: GlobeNet, ECFS, Americus 1- Columbus 2, Project Aqua, and ARCOS in the United States and around the world—spanning sixty countries and five continents. *See* Exs. 29–30.

B. Proposed Respondents' Accused Products

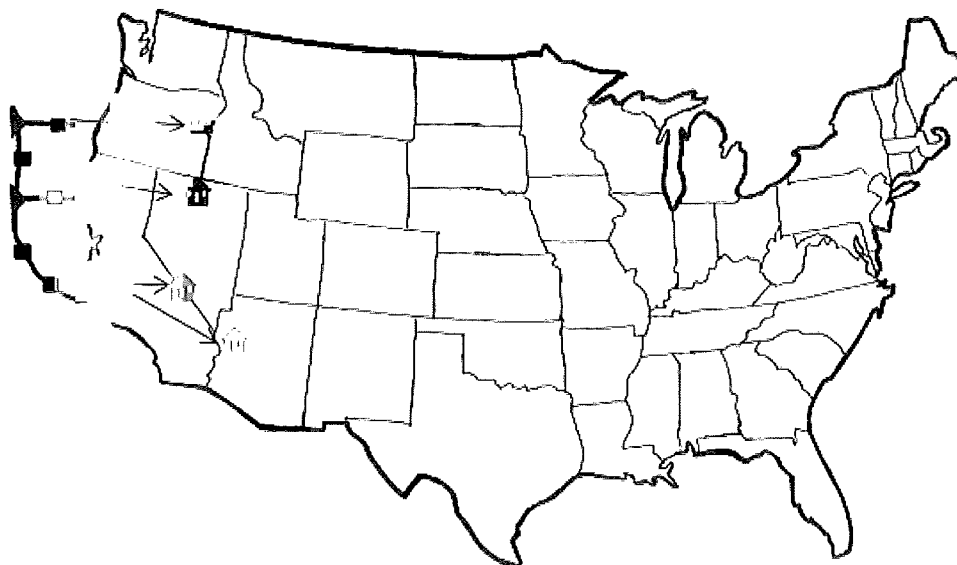
31. Pursuant to 19 C.F.R § 210.12(a)(12), Xtera provides a clear statement in plain English of the category of products accused. The certain subsea telecommunication systems and components thereof at issue in this investigation include terminals, also known as dry plants because of their placement on dry land typically near the ocean. As shown in the annotated figures below, the terminals (green) connect terrestrial networks (orange) separated by great distances such as across the ocean and across the U.S. coastline.



Coastal Network

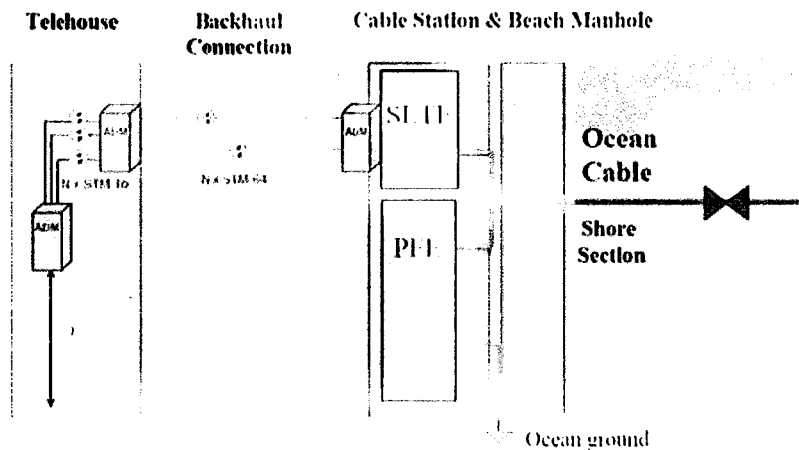
Using the same elements

Terrestrial Network



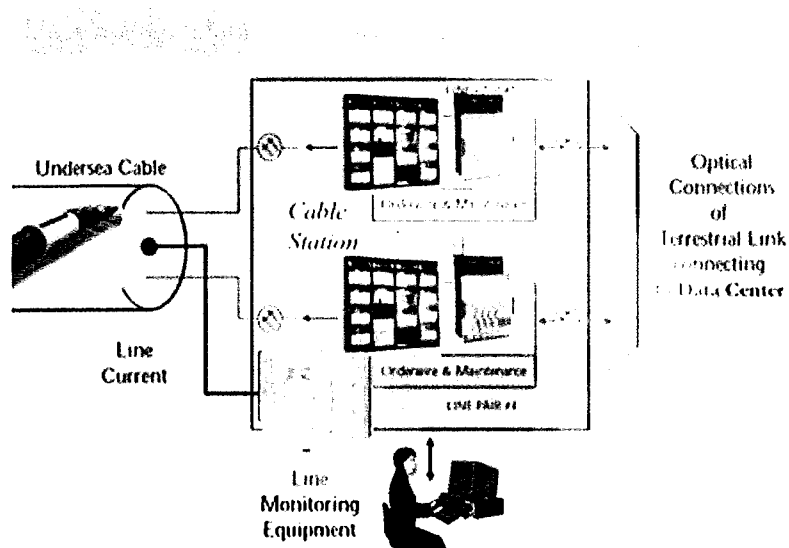
See, e.g., Adam Markow, *Summary of Undersea Fiber Optic Network Technology and Systems*, 3 (last accessed on Dec. 20, 2017), http://www.hmorell.com/sub_cable/documents/Basics%20of%20Submarine%20System%20Installation%20and%20Operation.pdf. A terminal is able to send and receive large amounts of data to other terminals. For example, when a terminal sends data, it combines terrestrial network data signals from various sources, e.g., internet data from homes and businesses, into an optical data signal that is sent over a fiber optic cable to another terminal. Similarly, when a terminal receives an optical data signal sent from another terminal, it splits apart the optical data signal into constituent data signals that are then passed onto a terrestrial network and directed toward their destination. Terminals typically provide, among other things, a variety of functionalities that aid in signal processing, such as error correction, avoidance of cross talk, improvement or boosting of the strength of signals to avoid signal dissipation and other performance- related monitoring benefits.

32. The annotated figures below illustrate the relationship between a terminal and its corresponding terrestrial network and fiber optic cable. Specifically, the back end of the terminal (green) is connected to a terrestrial network (orange) and the front end of the terminal (green) is connected to a fiber optic cable (blue) that connects the terminal to other terminals.



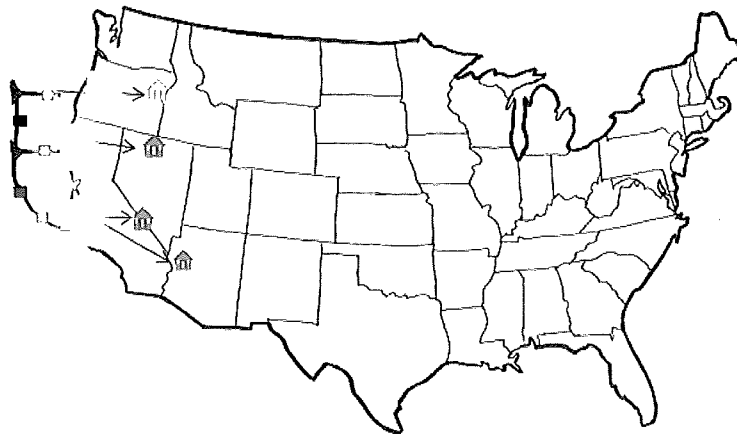
SLTE – Submarine Line Termination Equipment.
PFE – Power Feed Equipment (pushes constant current of ~1.5 A across undersea cable link from CS to CS)

Id. at 5.



Id. at 7. In effect, terminals are used for connecting terrestrial networks that are typically separated by large bodies of water, such as the ocean, or large amounts of land as shown in the annotated figure below.

Coastal Network Terrestrial Network
Using the same elements



Id. at 3.

33. Given the vast distances between terminals, the optical data signal sent by one terminal attenuates or becomes weaker during transit to another terminal. High-powered lasers are used to address this issue and strengthen the optical data signal so that it reaches its destination intact. A terminal monitors and adjusts the strength of an optical data signal as needed to ensure arrival at its intended location with sufficient strength. In systems covering vast distances, such as between Asia and North America or Northern and Southern California, “repeaters” at various points along the fiber-optic cable boost the optical data signal so that it reaches its destination terminal with sufficient strength to recover the data carried by the signal that is passed on to the terrestrial network. *See id.* (showing repeaters as red squares).

34. The Accused Products are terminals provided by the proposed Respondents. The proposed Respondents’ Accused Products include a number of features for improving and

optimizing the performance of subsea telecommunication systems. For example, relevant to this Complaint, proposed Respondents' Accused Products are designed for coherent optical transmission, dense wavelength-division multiplexing ("DWDM"), control of wavelength channel spacing, and multiple modulation schemes. This allows the Accused Products to increase the capacity of the subsea telecommunication systems by fitting more separate wavelength signals into a single optical signal transmitted between terminals. The Accused Products also provide automatic wavelength dispersion compensation, which, among other things, allows the Accused Products to transmit optical signals over increased distances. Proposed Respondents' Accused Products also implement forward error correction, which can improve the performance and reliability of their subsea telecommunication systems. All of these features greatly improve the capacity and technical capabilities of subsea telecommunication systems, thus enhancing data distribution over telecommunication networks in the United States and throughout the world.

V. THE PATENTS-IN-SUIT¹

35. Xtera U.S.'s breakthrough technologies enjoy significant intellectual property protections, including over 67 issued United States patents and over 55 issued foreign patents along with around 40 pending United States and foreign patent applications. As set forth below, Xtera owns by assignment the entire right, title, and interest in and to each of the Asserted Patents. *See* Exs. 2, 4, 6, 8 and 10.

¹ All non-technical descriptions of the patents herein are presented to give a general background of those patents. These statements are not intended to be used nor should they be used for purposes of patent claim construction. Xtera presents these statements subject to and without waiver of its right to argue that claim terms should be construed in a particular way under claim interpretation jurisprudence and the relevant evidence.

36. Each of the patents described below is, to the best of Xtera's knowledge, information and belief, directly infringed by proposed Respondents' certain subsea telecommunication systems and components thereof.

37. Pursuant to Commission Rule 210.12(c), copies of the certified prosecution histories of each of the Asserted Patents have been submitted with this Complaint as Appendices A, C, E, G, and I, and the cited references for each of the Asserted Patents have been submitted with this Complaint as Appendices B, D, F, H, and J.

A. The '068 Patent

1. Identification of the Patent and Ownership by Xtera

38. Xtera owns by assignment the entire right, title, and interest in United States Patent No. 8,380,068 ("the '068 patent") and is entitled "Distinct Dispersion Compensation for Coherent Channels."

39. A certified copy of the '068 patent is attached as Exhibit 1. Pursuant to Commission Rule 210.12(a)(9)(ii), a certified copy of the recorded assignment of the '068 patent to Xtera is attached as Exhibit 2. Pursuant to Commission Rule 210.12(c), a certified copy and three additional copies of the prosecution history of the '068 patent and four copies of each technical reference mentioned in the '068 patent's prosecution file history are attached as Appendices A and B, respectively.

2. Foreign Counterparts to the '068 Patent

40. Exhibit 11 lists each foreign patent and each pending foreign patent application (not already issued as a patent), and each foreign patent application that has been denied, abandoned or withdrawn, corresponding to the '068 patent, with an indication of the prosecution status of each such patent application. No other foreign patents or patent applications corresponding to the '068 patent have been filed, abandoned, withdrawn, or rejected.

3. Non-Technical Description of the Patented Invention

41. The '068 patent issued on February 19, 2013, and lists Do-II Chang and Wayne S. Pelouch as its inventors. The '068 patent was filed on September 30, 2010. It contains eighteen claims, of which three are independent. Xtera asserts that the Accused Products infringe at least claims 1–15 of the '068 patent, directly or indirectly, either literally or under the doctrine of equivalents.

42. The '068 patent is related to dispersion compensation in an optical fiber communication system. The most familiar example of light dispersion is a rainbow, in which dispersion separates light into different wavelengths or colors. According to the '068 patent, conventional long-haul fiber-optic communication networks, e.g., networks spanning great distances such as across the ocean, typically transmit optical signals on separate channels over a single optical fiber. Each channel typically corresponds to a distinct wavelength or color of light. Transmitting optical signals on separate channels over long distances presents technical challenges, especially at high bit rates in the gigabits per second per channel range.

43. The '068 patent addresses these technical challenges by applying different dispersion compensation to types of channels, such as coherent and non-coherent channels. A coherent channel is a channel where the light has a predictable light wave phase at a given location or time. In contrast, a non-coherent channel is a channel where the light wave phase is random and therefore unpredictable. In the '068 patent, coherent channels may be subject to non-dispersion compensation and non-coherent channels may be subject to dispersion compensation. By separating and applying a different dispersion to coherent and non-coherent channels, the overall performance of all channels is improved.

B. The '403 Patent

1. Identification of the Patent and Ownership by Xtera

44. Xtera owns by assignment the entire right, title, and interest in United States Patent No. 7,860,403 ("the '403 patent"), which is entitled "Data format for high bit rate WDM transmission."

45. A certified copy of the '403 patent is attached as Exhibit 3. Pursuant to Commission Rule 210.12(a)(9)(ii), a certified copy of the recorded assignment of the '403 patent to Xtera is attached as Exhibit 4. Pursuant to Commission Rule 210.12(c), a certified copy and three additional copies of the prosecution history of the '403 patent and four copies of each technical reference mentioned in the '403 patent's prosecution file history are attached as Appendices C and D, respectively.

2. Foreign Counterparts to the '403 Patent

46. Exhibit 11 lists each foreign patent and each pending foreign patent application (not already issued as a patent), and each foreign patent application that has been denied, abandoned or withdrawn, corresponding to the '403 patent, with an indication of the prosecution status of each such patent application. No other foreign patents or patent applications corresponding to the '403 patent have been filed, abandoned, withdrawn, or rejected.

3. Non-Technical Description of the Patented Invention

47. The '403 patent issued on December 28, 2010, and lists Sergei Turitsyn, Mickail Fedoruk, and Elena G. Shapiro as its inventors. The '403 patent was filed on April 16, 2004. It contains twenty claims, of which three are independent. Xtera asserts that the Accused Products infringe at least claims 1–14 of the '403 patent, directly or indirectly, either literally or under the doctrine of equivalents.

48. According to the '403 patent, wavelength division multiplex ("WDM") schemes increase fiber capacity by permitting transmission on multiple channels, each at different wavelengths, over a single fiber. However, optically amplified systems have a limited useable bandwidth. Transmitting optical data at a higher bit rate on a channel requires a larger bandwidth, which reduces the number of channels which can be used. As a result, a bit rate of 40 Gb/s offers no advantage over a lower bit rate of, e.g., 10 Gb/s because the maximum amount of information that can be transmitted over an optical fiber link at each rate is approximately the same.

49. The '403 patent generally relates to optically encoding data for transmission over a WDM optical communications system. The '403 patent discloses modulating with data a periodic series of optical pulses that define a series of time slots each containing one pulse that extends over more than one time slot. The pulse portion extending over to an adjacent time slot has a minimum in the center of the time slot for that corresponding carrier pulse and the adjacent time slot. The overlap between the neighboring bits allows greater spectral efficiency in a wavelength-division multiplexing (WDM) transmission scheme. Greater spectral efficiency helps to avoid cross talk as well as improving the overall performance of all channels in the system.

C. The '171 Patent

1. Identification of the Patent and Ownership by Xtera

50. Xtera owns by assignment the entire right, title, and interest in United States Patent No. 8,971,171 ("the '171 patent"), which is entitled "Reduced FEC overhead in an optical transmission system."

51. A certified copy of the '171 patent is attached as Exhibit 5. Pursuant to Commission Rule 210.12(a)(9)(ii), a certified copy of the recorded assignment of the '171 patent

to Xtera is attached as Exhibit 6. Pursuant to Commission Rule 210.12(c), a certified copy and three additional copies of the prosecution history of the '171 patent and four copies of each technical reference mentioned in the '171 patent's prosecution file history are attached as Appendices E and F, respectively.

2. Foreign Counterparts to the '171 Patent

52. Exhibit 11 lists each foreign patent and each pending foreign patent application (not already issued as a patent), and each foreign patent application that has been denied, abandoned or withdrawn, corresponding to the '171 patent, with an indication of the prosecution status of each such patent application. No other foreign patents or patent applications corresponding to the '171 patent have been filed, abandoned, withdrawn, or rejected.

3. Non-Technical Description of the Patented Invention

53. The '171 patent issued on March 3, 2015, and lists Stuart Barnes, Martin Chown and Stephen M. Webb as inventors. The '171 patent was filed on April 14, 2003. It contains thirteen claims, of which three are independent. Xtera asserts that the Accused Products infringe at least claims 1–10 of the '171 patent, directly or indirectly, either literally or under the doctrine of equivalents.

54. According to the '171 patent, errors may be introduced into transmitted data in conventional long distance DWDM submarine systems because of noise in the system. Longer transmission distances increase the likelihood of introducing noise errors into the data. As more data is transmitted within a defined bandwidth more noise is created in the system increasing the rate of errors. Computer systems and other electronic equipment are intolerant to such errors in transmitted data. Using error correcting codes wastes available bandwidth in the channel that could otherwise be used for transmitting data, slowing down data transmission.

55. The '171 patent generally relates to improving the transmission of optical signals over long distances by dividing an encoded sequence between two or more separate channels. This division permits a reduction in the bit rate on each channel, while enabling the coding overhead to be more efficient, thus minimizing the problems associated with noise in the system.

D. The '798 Patent

1. Identification of the Patent and Ownership by Xtera

56. Xtera owns by assignment the entire right, title, and interest in United States Patent No. 8,351,798 ("the '798 patent"), which is entitled "Phase Shift Keyed High Speed Signaling."

57. A certified copy of the '798 patent is attached as Exhibit 7. Pursuant to Commission Rule 210.12(a)(9)(ii), a certified copy of the recorded assignment of the '798 patent to Xtera is attached as Exhibit 8. Pursuant to Commission Rule 210.12(c), a certified copy and three additional copies of the prosecution history of the '798 patent and four copies of each technical reference mentioned in the '798 patent's prosecution file history are attached as Appendices G and H, respectively.

2. Foreign Counterparts to the '798 Patent

58. Exhibit 11 lists each foreign patent and each pending foreign patent application (not already issued as a patent), and each foreign patent application that has been denied, abandoned or withdrawn, corresponding to the '798 patent, with an indication of the prosecution status of each such patent application. No other foreign patents or patent applications corresponding to the '798 patent have been filed, abandoned, withdrawn, or rejected.

3. Non-Technical Description of the Patented Invention

59. The '798 patent issued on January 8, 2013, and lists Sumudu Geethika Edirisinghe, Jorg Erich Schwatz and Wai Mun Wong as its inventors. The '798 patent was filed

on October 16, 2008. It contains twenty claims, of which two are independent. Xtera asserts that the Accused Products infringe at least claims 13–20 of the '798 patent, directly or indirectly, either literally or under the doctrine of equivalents.

60. According to the '798 patent, conventional submarine fiber-optic links use single-mode fiber in which the primary dispersion mechanism is called chromatic dispersion. Chromatic dispersion occurs because optics of different wavelengths tend to travel through the optical fiber at slightly different speeds. Without adequate compensation, this can result in distortion and eventual loss of the signal over the long length of the optical fiber. Conventionally, “positive dispersion” and “negative dispersion” fibers were mixed to largely (but not completely) cancel out the dispersion. But submarine fiber optic links are sensitive to non-cancelled dispersion. Therefore, conventional submarine fiber-optic systems often employ post-compensation chromatic dispersion or optimize the post-compensation only if some pre-compensation is applied to obtain best performance.

61. The '798 patent generally relates to addressing these issues by causing the minimum accumulated dispersion to occur approximately halfway along the intended transmission distance. As a result, the technology disclosed in the '798 patent may reduce bit error rates at high bit rates over even very long haul (e.g., trans-oceanic submarine or long terrestrial) optical fiber links, and for all channels.

E. The '637 Patent

1. Identification of the Patent and Ownership by Xtera

62. Xtera owns by assignment the entire right, title, and interest in United States Patent No. 8,406,637 (“the '637 patent”), which is entitled “Automatic Pre-Emphasis.”

63. A certified copy of the '637 patent is attached as Exhibit 9. Pursuant to Commission Rule 210.12(a)(9)(ii), a certified copy of the recorded assignment of the '637 patent

to Xtera is attached as Exhibit 10. Pursuant to Commission Rule 210.12(c), a certified copy and three additional copies of the prosecution history of the '637 patent and four copies of each technical reference mentioned in the '637 patent's prosecution file history are attached as Appendices I and J, respectively.

2. Foreign Counterparts to the '637 Patent

64. Exhibit 11 lists each foreign patent and each pending foreign patent application (not already issued as a patent), and each foreign patent application that has been denied, abandoned or withdrawn, corresponding to the '637 patent, with an indication of the prosecution status of each such patent application. No other foreign patents or patent applications corresponding to the '637 patent have been filed, abandoned, withdrawn, or rejected.

3. Non-Technical Description of the Patented Invention

65. The '637 patent issued on March 26, 2013, and lists Stephen Michael Webb, David Winterburn and Stephen Debruslais as its inventors. The '637 patent was filed on May 27, 2008. It contains seventeen claims, of which four are independent. Xtera asserts that the Accused Products infringe at least claims 1–6 of the '637 patent, directly or indirectly, either literally or under the doctrine of equivalents.

66. According to the '637 patent, adding components, such as amplifiers, reduces the signal quality of the channels. For instance, even if all wavelengths in the WDM system are launched with the same power levels, the power levels at the receivers will be different. This problem was conventionally addressed by varying the degree of pre-emphasis applied to equalize channel optical signal to noise ratios ("OSNRs") at the receivers, or more usefully, equalize the transmission quality of the wavelengths. This approach, however, is only useful if the wavelength pre-emphasis is continuously adjusted throughout the life of a transmission system. Conventional systems are often slow to react to changes in the system.

67. The '637 patent generally relates to improving the quality and effectiveness of the entire communication system. To achieve these improvements, the '637 patent discloses applying a centralization signal to one or more transmitters in a given band to maintain an average drive power for that band and using band gain amplifiers configured to compensate for the effect of the centralization signal.

VI. LICENSES

68. Xtera Communications granted a limited, non-exclusive, non-assignable license to patents that include the Asserted Patents in October 2016. This license grants the permission to repair a defective product or manufacture a replacement for a defective product from Xtera Communications as part of construction and maintenance of a subsea telecommunication system between terminals outside of the United States. *See Confidential Ex. 28C.*

VII. UNLAWFUL AND UNFAIR ACTS OF PROPOSED RESPONDENTS

69. Proposed Respondents have engaged in unlawful and unfair acts including the sale for importation into the United States, importation into the United States, sale within the United States after importation, and/or use within the United States after importation of Accused Products that infringe one or more claims of the Asserted Patents.

70. Based on information discovered through investigation, the proposed Respondents directly and/or indirectly infringe, literally and/or under the doctrine of equivalents, claims of the Asserted Patents under 35 U.S.C. §§ 271(a), (b), (c), and/or (g).

A. Infringement of the '068, '403, '171, '798, and '637 Patents by Proposed Respondent NEC

71. On information and belief, proposed Respondent NEC, imports, sells for importation, sells after importation into the United States, and/or uses after importation the NEC Accused Products that directly and/or indirectly infringe at least claims 1–15 of the '068 patent,

claims 1–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent.

72. The NEC Accused Products satisfy all limitations of at least claims 1–11 of the '068 patent, 8–14 of the '403 patent, claims 1–10 of the '171 patent, and claims 1–6 of the '637 patent at the time of importation into the United States, and thus NEC directly infringes these claims by importing, selling for importation, selling after importation, and/or using after importation the NEC Accused Products. On information and belief, NEC tests, demonstrates, or otherwise operates the Accused Products in the United States, thereby performing the methods and/or using the systems of claims 12–15 of the '068 patent, claims 1–7 of the '403 patent, and claims 13–20 of the '798 patent, and directly infringing any asserted claims of the Asserted Patents requiring operation of the NEC Accused Products.

73. On information and belief, NEC also actively induces the infringement of at least claims 1–15 of the '068 patent, claims 1–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent by others, including purchasers and end users who deploy and make routine use of the NEC Accused Products. NEC has had knowledge of the Asserted Patents and knowledge of its purchasers' and end users' infringement of the Asserted Patents at least since service of this Complaint. NEC actively induces infringement of the Asserted Claims by encouraging, instructing, and aiding end users to use one or more of the NEC Accused Products and/or by selling after importation in the United States the NEC Accused Products. NEC induces such infringement by, at a minimum, providing manuals, white papers, training, and/or other technical support with specific intent to induce purchasers and end users of the NEC Accused Products to perform acts intended by NEC to cause direct infringement of the Asserted Claims in the United States.

74. NEC also contributes to infringement of at least claims 1–15 of the '068 patent, claims 8–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent by selling for importation into the United States, importing into the United States, and/or selling within the United States after importation non-staple components of the NEC Accused Products which constitute a material part of the inventions claimed by the Asserted Patents, and are specially made or adapted for use in the infringement of the Asserted Patents. NEC has had knowledge of the Asserted Patents at least since service of this Complaint. NEC has knowledge that the imported components of the NEC Accused Products are specially made or adapted for use in the infringement of the Asserted Patents and are not staple articles of commerce suitable for noninfringing use. Due to their specific designs, the NEC Accused Products and components thereof do not have any substantial noninfringing uses.

75. Attached as Exhibits 12–16 are charts showing infringement of representative claims of the Asserted Patents by exemplary NEC Accused Products.

B. Infringement of the '068, '403, '171, '798, and '637 Patents by Proposed Respondent Nokia

76. On information and belief, proposed Respondent Nokia, through its entity Alcatel-Lucent, imports, sells for importation, sells after importation into the United States, and/or uses after importation the Nokia Accused Products that directly and/or indirectly infringe at least claims 1–15 of the '068 patent, claims 1–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent literally and/or under the doctrine of equivalents.

77. The Nokia Accused Products satisfy all limitations of at least claims 1–11 of the '068 patent, 8–14 of the '403 patent, claims 1–10 of the '171 patent, and claims 1–6 of the '637

patent at the time of importation into the United States, and thus Nokia directly infringes these claims by importing, selling for importation, selling after importation, and/or using after importation the Nokia Accused Products. On information and belief, Nokia tests, demonstrates, or otherwise operates the Nokia Accused Products in the United States, thereby performing the methods and/or using the systems of claims 12–15 of the '068 patent, claims 1–7 of the '403 patent, and claims 13–20 of the '798 patent, and directly infringing any asserted claims of the Asserted Patents requiring operation of the Nokia Accused Products.

78. On information and belief, Nokia also actively induces the infringement of at least claims 1–15 of the '068 patent, claims 1–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent by others, including purchasers and end users who deploy and make routine use of the Nokia Accused Products. On information and belief, Nokia had knowledge of the Asserted Patents and knowledge of its purchasers' and end users' infringement of the Asserted Patents before the filing of this Complaint, and at least since service of this Complaint. For example, prior to filing this Complaint, Xtera Communications approached Nokia with an offer to license the Asserted Patents. Nokia evaluated the Asserted Patents at that time, but did not accept Xtera Communications' offer, and continued to use the inventions recited by the claims of the Asserted Patents. Nokia knowingly and actively induces infringement of the Asserted Claims by encouraging, instructing, and aiding end users to use one or more of the Nokia Accused Products and/or by selling after importation in the United States the Nokia Accused Products. Nokia induces such infringement by, at a minimum, providing manuals, white papers, training, and/or other technical support with specific intent to induce purchasers and end users of the Nokia Accused Products to perform acts intended by Nokia to cause direct infringement of the Asserted Claims in the United States.

79. Nokia also contributes to infringement of at least claims 1–15 of the '068 patent, claims 1–14 of the '403 patent, claims 1–10 of the '171 patent, claims 13–20 of the '798 patent, and claims 1–6 of the '637 patent by selling for importation into the United States, importing into the United States, and/or selling within the United States after importation non-staple components of the Nokia Accused Products which constitute a material part of the inventions claimed by the Asserted Patents, and are specially made or adapted for use in the infringement of the Asserted Patents. As discussed above, on information and belief, Nokia has had knowledge of the Asserted Patents before the filing of this Complaint, and at least since service of this Complaint. Nokia has had knowledge that the imported components of the Nokia Accused Products were specially made or adapted for use in the infringement of the Asserted Patents and were not staple articles of commerce suitable for noninfringing use. Due to their specific designs, the Nokia Accused Products and components thereof do not have any substantial noninfringing uses.

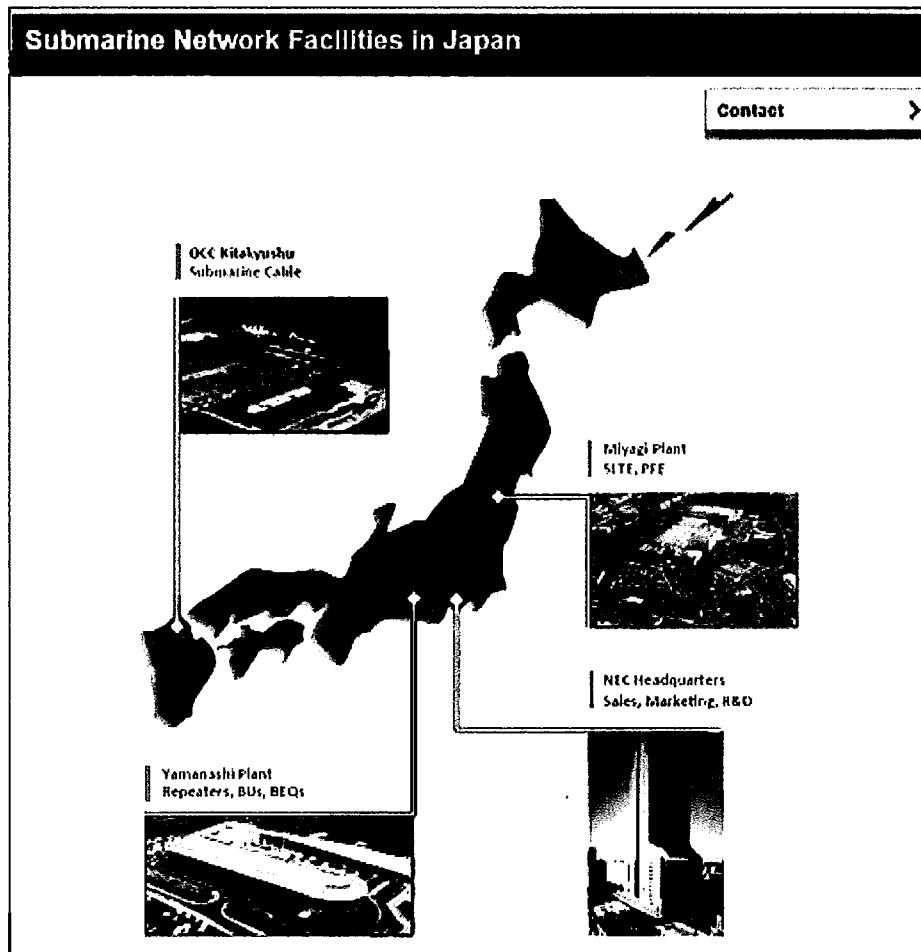
80. Attached as Exhibits 17–21 are charts showing infringement of representative claims of the Asserted Patents by exemplary Nokia Accused Products.

VIII. SPECIFIC INSTANCES OF UNFAIR IMPORTATION AND SALE

81. On information and belief, proposed Respondents, either themselves or through subsidiaries or third parties acting on their behalf, sell for importation into the United States, import into the United States, sell after importation into the United States, and/or use within the United States after importation the Accused Products, which are manufactured abroad and imported for sale into the United States. The specific instances of importation of certain subsea telecommunication systems and components thereof, are illustrative and non-exhaustive examples of the proposed Respondents' unlawful importation of infringing Accused Products.

A. NEC

82. Upon information and belief, substantially all of the NEC Accused Devices in the United States are manufactured by NEC Japan. For example, NEC's website states that all components for the Accused Devices are manufactured in Japan:



(screenshot of <http://www.nec.com/en/global/prod/nw/submarine/aboutus/facilities.html>).

Additionally, NEC's presentation entitled "NEC's Submarine Cable System" similarly states that

all Accused Devices are manufactured in Japan:

4-4. Company Overview for OCC



OCC

Operations	Subsea Cable: Design, Manufacture and Sales of Communication purpose Submarine Cable and Surveillance cables. Terrestrial Cable: Manufacture and Sales of Communication purpose Terrestrial Cables.
Offices	Head Office : Yokohama, Japan Plants: Submarine Cable (City of Kita-Kyushu) Terrestrial Cable (Kaminokawa Township)
Founded	June 1935
Capital	2.255 Billion Yen (as of March 2008)
Sales	17.46 Billion Yen (for year ending March 2008)
Director	Yoshihisa Okada, President and CEO
Employees	Approx. 221 pax. (not including directors and temp.staff)
Shareholders	OCC Holdings (100%)

(screenshot of http://www.nec.com/en/global/ir/pdf/library/081205/081205_01.pdf).

83. Additionally, NEC's website includes a link to purchasing NEC's products, including the ones accused of infringement in this Complaint. Specifically, NEC's website includes a "Find a Dealer: Reseller" link, shown at the following links:

<https://www.necam.com/HowToBuy/FindaDealer/> and

<https://www.necam.com/HowToBuy/FindADealer/Request/?d=2>.

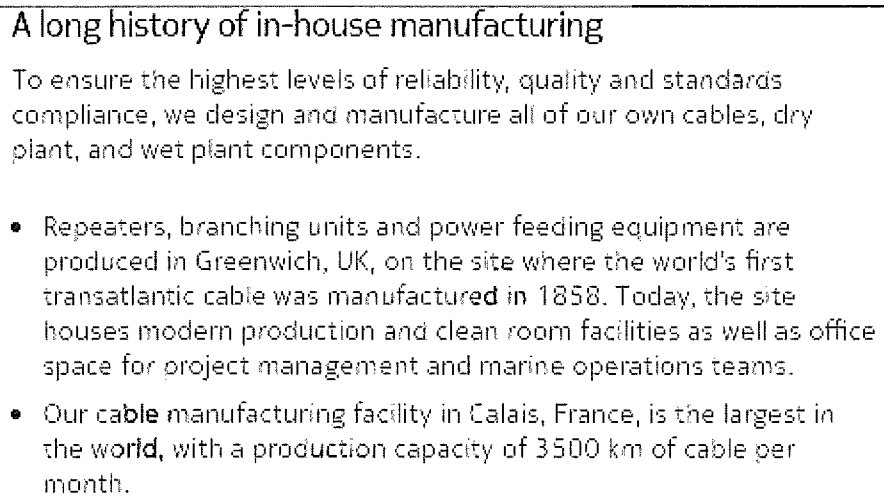
84. NEC imported the Accused Devices into the United States through the manufacture, deployment, upgrade, and continued service of subsea networks that are part of the United States. For example, NEC US was part "of a consortium to build a trans-pacific

submarine cable system.” *See, e.g.*, <https://www.necam.com/branding/?t=OrchestratingABrighterWorld>. Furthermore, NEC US has a laboratory that works specifically in the field of Optical & Wireless Network (*see, e.g.*, <https://www.necam.com/WhyNEC/>). Additionally, NEC’s supply records state that NEC has built at least the following submarine systems, all of which have Accused Devices in the United States: Alaska United West, Pacific Crossing-1, Trans-Pacific Express (TPE) Cable System, FASTER, Asia-America Gateway (AAG) Cable System, and Unity/EAC-Pacific. *See* Exs. 31–32. For example, in the Alaska United West subsea telecommunication system, NEC installed its Accused Products in Seward, Alaska and Warrenton, Oregon. *See* Ex. 31 at 1. In the Pacific Crossing-1 subsea telecommunication system, NEC installed the Accused Products in Grover Beach, California and Harbour Point, Washington. *See id.* at 4. In the Trans-Pacific Express (TPE) Cable System subsea telecommunication system, NEC installed the Accused Products in Nedonna Beach, Oregon. *See id.* at 5. In the FASTER subsea telecommunication system, NEC installed the Accused Products in Bandon, Oregon. *See id.* at 3. In the Asia-America Gateway (AAG) Cable System subsea telecommunication system, NEC installed the Accused Products in San Luis Obispo, California and Keawaula, Hawaii. *See id.* at 2. In the Unity/EAC-Pacific subsea telecommunication system, NEC installed the Accused Products in Redondo Beach, California. *See id.* at 6.

85. On information and belief, NEC Japan imports and/or has imported its products to NEC US and resellers who then distribute the NEC Accused Products throughout the United States. Additionally, NEC has deployed subsea networks in the United States that include Accused Devices.

B. Nokia

86. Upon information and belief, substantially all of the Accused Devices in the United States are manufactured by Nokia outside the United States. For example, Nokia's website states the Accused Products are manufactured in Greenwich, UK and Calais, France:



(screenshot of <https://networks.nokia.com/solutions/submarine-networks#marine>).

87. Additionally, Nokia's website includes a link to purchasing Nokia's products, including the ones accused of infringement in this Complaint. Specifically, Nokia's website (*see* <https://networks.nokia.com/how-to-buy>) includes a "How to buy" link. Moreover, Nokia's entity Alcatel-Lucent is involved with sales in the United States. *See* Ex. 37 at 202.

88. Nokia imported the Accused Devices into the United States through the manufacture, deployment, upgrade, and continued service of subsea networks that are part of the United States. For example, Nokia has built at least the following submarine systems that include Accused Devices in the United States: SEA-US, American Samoa-Hawaii (ASH), Apollo and South America Pacific Link (SAPL), and Southern Cross Cable Network (SCCN). *See* Exs. 33–34. In the SEA-US subsea telecommunication system, Nokia installed its Accused Products in Hermosa Beach, California and Makaha, Hawaii. *See* Ex. 33 at 4. In the America

Samoa-Hawaii (ASH) subsea telecommunication system, Nokia installed its Accused Products in Keawaula, Hawaii and Pago Pago American Samoa. *See id.* at 1. In the South America Pacific Link (SAPL) subsea telecommunication system, Nokia installed its Accused Products in Jacksonville, Florida and Makaha, Hawaii. *See id.* at 5. In the Southern Cross Cable Network (SCCN) subsea telecommunication system, Nokia installed its Accused Products in Hillsboro, Oregon, Morro Bay, California, Kahe Point, Hawaii, and Spencer Beach, Hawaii. *See id.* at 6.

89. On information and belief, through its U.S. entity Nokia Solutions US, Nokia's net sales to customers located in the United States include net sales from the Nokia Accused Products that were manufactured outside the United States in the United Kingdom and France, and imported into the United States.

IX. HARMONIZED TARIFF SCHEDULE NUMBERS

90. The Accused Products are classified under at least the following subheadings of the Harmonized Tariff Schedule of the United States: 9013.80.90. *See, e.g.,* Protest 5501-94-100368, HQ 957966 (Cust. B. & Dec. Oct. 31, 1995), *available* at <https://rulings.cbp.gov/index.asp?ru=957966&qu=9013%2E80%2E9000&vw=detail>. This classification is exemplary in nature and not intended to restrict the scope of any exclusion order or other remedy ordered by the Commission.

X. RELATED LITIGATION

91. The proposed Respondents' alleged unfair methods of competition and unfair acts, or the subject matter thereof, have not been the subject of any court or agency litigation.

XI. DOMESTIC INDUSTRY

92. An industry as required by Section 337(a)(2) and defined by Section 337(a)(3) exists in the United States. Xtera has made, and will continue to make, significant investments in plant, equipment, labor and capital, and has made, and will continue to make, substantial

investments in engineering, research and development related to products protected by the Asserted Patents.

93. Xtera uses the inventions claimed in the Asserted Patents in its products, as set forth in Confidential Exhibits 22C – 26C. For example, Xtera U.S. has sold and sells in the United States its Nu-Wave Optima platform that practices at least one claim of the '068, '403, '171, '798, and '637 patents. Xtera U.S.'s predecessor, Xtera Communications, has sold in the United States the Nu-Wave Optima platform that practices at least one claim of the '068, '403, '171, '798, and '637 patents and Xtera U.S. continues to provide maintenance and support for these products through service contracts with these customers. These products collectively practice each of the Asserted Patents ("the Domestic Industry Products"). Xtera U.S.'s investments and expenditures in its domestic industries for the Asserted Patents are significant, substantial, continuous, and ongoing.

A. Technical Prong

94. The chart below sets forth exemplary Domestic Industry Products that are protected by at least one claim of each of the Asserted Patents:

Patent No.	Domestic Industry Products and Components
8,380,068	Xtera NuWave Optima platform
7,860,403	Xtera NuWave Optima platform
8,971,171	Xtera NuWave Optima platform
8,351,798	Xtera NuWave Optima platform
8,406,637	Xtera NuWave Optima platform

95. Claim charts applying a representative claim of each Asserted Patent to a representative Domestic Industry Product are attached as Confidential Exhibits 22C – 26C.²

B. Economic Prong

96. Xtera satisfies the requirements of 19 U.S.C. § 1337(a)(3) through the activities of Xtera U.S., and/or Xtera U.S.’s predecessor Xtera Communications. This domestic industry comprises: (1) significant investments by Xtera Communications that have continued by Xtera U.S. in the United States in plant and equipment; (2) significant employment by Xtera Communications that have continued by Xtera U.S. in the United States of labor and capital; and (3) substantial investment by Xtera Communications that have continued by Xtera U.S. in the United States in exploitation of the Asserted Patents, including through Xtera U.S.’s engineering, research and development, and/or licensing activities. Specific, non-limiting examples of such investments are set forth below and in Confidential Exhibits 27C and 40C.

1. Domestic Industry under 19 U.S.C. § 1337(a)(3)(A)

97. There is a domestic industry as defined under subsection (a)(3)(A) at least because Xtera, through Xtera U.S. and/or Xtera U.S.’s predecessor Xtera Communications, have made and Xtera U.S. continues to make significant investment in plant and equipment in the United States with respect to the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶¶2-10; Ex. 40C at ¶¶2-4.

98. Xtera U.S. maintains its headquarters at 500 W. Bethany Dr., Ste. 100, Allen, TX 75013 (“the Allen Facility”). The Allen Facility is primarily responsible for the sale, deployment, maintenance and support of the Domestic Industry Products, originally developed by Xtera Communications starting in 2007, and first deployed in 2011. *See, e.g.*, Ex. 27C at ¶¶2-

² The Domestic Industry Products are protected by additional claims of the Asserted Patents, and Xtera may establish the technical prong of the domestic industry requirement through claims other than those explicitly charted in Confidential Exhibits 22C–26C.

3; Ex. 40C at ¶¶2-3. Since the first deployment of the Domestic Industry Products in 2011, the percentage of business operations of Xtera U.S. dedicated to the Domestic Industry Products has continued to increase. *See, e.g.*, Ex. 27C at ¶4; Ex. 40C at ¶3. Since approximately the beginning of 2014, the entirety of the business operations for Xtera Communications, and now Xtera U.S., in the United States has been dedicated to the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶4; Ex. 40C at ¶3.

99. Xtera U.S. continues to conduct research and development for the Domestic Industry Products at this location in the United States, where it has employees dedicated to research and development activities. Xtera U.S.'s activities include engineering design, research, development, distribution, customer service and administration of warranty and repair activity related to the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶¶7, 12-13; Ex. 40C at ¶5.

100. In addition, Xtera Communications has made, and Xtera U.S. continues to make, significant expenditures associated with manufacturing the Domestic Industry Products in the United States. Since Xtera Communications originally deployed the Domestic Industry Products in approximately 2011, significant expenditures have been made to two U.S. based manufacturers. These two U.S. based manufacturers have manufactured approximately all of the Domestic Industry Products for Xtera Communications' and Xtera U.S.'s customers since the Domestic Industry Products were first deployed in 2011. *See, e.g.*, Ex. 27C at ¶¶8-10; Ex. 40C at ¶4. The expenditures associated with manufacturing the Domestic Industry Products in the United States with these two manufacturers has been in excess of tens of millions of dollars and significant. *See, e.g.*, Ex. 27C at ¶¶8-10; Ex. 40C at ¶4.

2. Domestic Industry under 19 U.S.C. § 1337(a)(3)(B)

101. There is a domestic industry as defined under subsection (a)(3)(B) at least because Xtera, through Xtera U.S., and/or Xtera U.S.'s predecessor, Xtera Communications, have made

significant investments of labor and capital in the United States with respect to the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶¶11-14; Ex. 40C at ¶5.

102. For example, all of Xtera U.S.'s employees are in the United States, with the majority working in the Allen, TX Facility. In 2017, Xtera U.S. will have made significant investments in compensation for its U.S.-based employees. More than half of Xtera's U.S. employees are involved in providing technical support and customer care, research and development and/or deployment relating to the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶12. The majority of Xtera U.S.'s employees were former employees of Xtera Communications, and subsequently rehired by Xtera U.S. *See, e.g., id.* Similarly, in 2016, approximately half of Xtera Communications' U.S.-based employees were involved in providing technical support and customer care, research and development and/or deployment relating to the Domestic Industry Products. *See, e.g., id.* at 13. Both Xtera Communications and Xtera U.S. have made significant investments in labor and capital in the United States with respect to the Domestic Industry Products. *See, e.g., id.* at ¶12-14.

3. Domestic Industry under 19 U.S.C. § 1337(a)(3)(C)

103. There is also a domestic industry as defined under subsection (a)(3)(C) at least because Xtera, through Xtera U.S., and/or Xtera U.S.'s predecessor Xtera Communications, has also made substantial United States investments in exploitation of the Asserted Patents through the Domestic Industry Products, including investments in engineering, research, and development. *See, e.g., id.* at ¶15-23.

104. Xtera U.S. and Xtera U.S.'s predecessor, Xtera Communications, have made substantial investments in the research and development of the Domestic Industry Products in the United States. For example, Xtera Communications made substantial investments in its Allen, Texas headquarters to provide state-of-the-art laboratory, testing, and design facilities. *See, e.g.,*

id. at ¶16. Xtera U.S. subsequently purchased the equipment from the state-of-the-art laboratory, testing, and design facilities from Xtera Communications, and has continued the lease for the Allen Facility which includes the state-of-the-art laboratory, testing, and design facilities. *See, e.g., id.*

105. Xtera Communications made substantial investments in research and development of the Domestic Industry Products. For example, from 2013-2016, Xtera Communications invested tens of millions of dollars in research and development expenses in the United States related to the Domestic Industry Products. *See, e.g., id.* at ¶17.

106. Xtera U.S. has made and will continue these substantial investments by Xtera Communications. For example, these substantial investments include continuing to employ United States-based employees who provide technical support to Xtera U.S.'s customers in the United States who have purchased Xtera U.S.'s products or deployed systems that include Xtera U.S.'s products. *See, e.g., id.* at ¶18.

107. Additionally, Xtera U.S. continues to deploy the Domestic Industry Products, where there is also a domestic industry as defined under subsection (a)(3)(C) because the customers of Xtera U.S., and Xtera U.S.'s predecessor Xtera Communications, have also made substantial United States investments in exploitation of the Asserted Patents through their investments in the Domestic Industry Products. *See, e.g., id.* at ¶¶19-23.

108. For example, Xtera Communications has entered into contracts with GlobeNet Cabos Submarinos America, Inc. and other affiliate entities ("GlobeNet") to deploy the Domestic Industry Products, including in the United States. Xtera U.S. has continued to deploy Domestic Industry Products deployed for GlobeNet, in addition to continuing to provide maintenance and support for Domestic Industry Products deployed for GlobeNet. The contracts and related

investments in the United States to deploy the Domestic Industry Products for GlobeNet have been substantial. *See, e.g., id.* at ¶19.

109. Additional examples of substantial investments made by customers of Xtera Communications, and now Xtera U.S., include the Defense Information Systems Agency (“DISA”), an agency of the United States Department of Defense, to deploy its Domestic Industry Products in regional submarine networks linking Guantanamo, Cuba to Puerto Rico. *See, e.g., id.* at ¶¶20-22.

110. Xtera’s customers having Domestic Industry Products may further contract with other third parties (*e.g.*, internet companies in the United States) who use the Domestic Industry Products. *See, e.g.*, Ex. 27C at ¶3; Ex. 40C at ¶2. On information and belief, the substantial investments of these other third parties provide additional evidence of a domestic industry as defined under subsection (a)(3)(C) through the exploitation of the Asserted Patents through their investments in the Domestic Industry Products in the United States.

111. Xtera’s investments and activities in the United States, including through Xtera U.S. and its predecessor, Xtera Communications, have been and will continue to be significant and substantial through research, development, manufacturing, deployment, maintenance, and support for the Domestic Industry Products as Xtera U.S., for example, fulfills its current contracts with customers, and continues to provide services, maintenance and support for already deployed Domestic Industry Products to customers, including those identified in Confidential Exhibit 27C. *See, e.g.*, Ex. 27C at ¶¶20-23.

XII. RELIEF REQUESTED

112. WHEREFORE, by reason of the foregoing, Xtera respectfully requests that the Commission:

(a) Institute an immediate investigation pursuant to Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, with respect to proposed Respondents' violations of that section arising from the importation into the United States, sale for importation, and/or the sale within the United States after importation of their subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents;

(b) Schedule and conduct a hearing pursuant to Section 337(c) for the purposes of (i) receiving evidence and hearing argument concerning whether there has been a violation of Section 337, and (ii) following the hearing, determining that there has been a violation of Section 337;

(c) Issue a permanent limited exclusion order directed to products manufactured by or on behalf of proposed Respondents, their subsidiaries, related companies, and agents pursuant to 19 U.S.C. § 1337(d) excluding entry into the United States of their subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents;

(d) Issue a permanent cease and desist order pursuant to 19 U.S.C. § 1337(f) prohibiting proposed Respondents, their domestic subsidiaries, related companies, and agents from engaging in the importation, sale for importation, marketing and/or advertising, distribution, offering for sale, sale, use after importation, sale after importation, deployment, installation and other transfer within the United States of subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents;

(e) Impose a bond upon importation of proposed Respondents' subsea telecommunication systems and components thereof that infringe one or more claims of the Asserted Patents during the sixty-day Presidential review period pursuant to 19 U.S.C. § 1337(j); and

(f) Grant such other and further relief as the Commission deems just and proper under the law, based on the facts determined by the investigation and the authority of the Commission.

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Respectfully submitted,



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