

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

**In the Matter of**

**CERTAIN SUBSEA TELECOMMUNICATIONS  
SYSTEMS AND COMPONENTS THEREOF**

**INV. NO. 337-TA-1098**

**INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND  
RECOMMENDED DETERMINATION ON REMEDY AND BOND**

Administrative Law Judge Clark S. Cheney

(April 26, 2019)

**Appearances:**

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PUBLIC VERSION

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PUBLIC VERSION

Table of Contents

I. Introduction..... 2

    A. Procedural History ..... 2

    B. The Parties ..... 4

        1. Complainants (collectively “Xtera”) ..... 4

        2. The NEC Respondents (collectively “NEC”)..... 5

        3. The Nokia Respondents (collectively “Nokia”) ..... 5

    C. The Asserted Patents..... 6

        1. U.S. Patent No. 7,860,403 ..... 6

        2. U.S. Patent No. 8,351,798 ..... 7

    D. The Technology at Issue ..... 7

    E. The Accused Products..... 8

    F. The Domestic Industry Products..... 9

II. Jurisdiction & Importation..... 10

    A. Subject Matter Jurisdiction ..... 10

    B. Personal Jurisdiction ..... 10

    C. In Rem Jurisdiction..... 10

    D. Importation..... 11

III. Legal Principles ..... 15

    A. Claim Construction ..... 15

    B. Infringement..... 17

        1. Literal Infringement..... 17

        2. Doctrine of Equivalents ..... 18

    C. Validity ..... 18

        1. Anticipation ..... 19

        2. Obviousness..... 19

        3. Written Description and Enablement ..... 20

        4. Indefiniteness..... 22

    D. Domestic Industry ..... 22

        1. Economic Prong ..... 22

        2. Technical Prong..... 23

IV. U.S. Patent No. 7,860,403..... 24

    A. Level of Ordinary Skill in the Art..... 24

PUBLIC VERSION

B.	Claim Construction Disputes .....	24
1.	“A transmitter for producing” .....	24
2.	“means for producing” .....	26
3.	“the pulses” .....	33
C.	Infringement.....	39
1.	Literal Infringement.....	39
2.	No Infringement Under the Equitable Doctrine of Equivalent.....	53
3.	No Indirect Infringement .....	55
D.	The Technical Prong of the Domestic Industry Requirement Is Not Met .....	55
E.	Validity .....	55
1.	Indefiniteness.....	55
2.	Written Description .....	56
3.	Anticipation and Obviousness .....	58
V.	Domestic Industry – Economic Prong .....	67
A.	Investments in NuWave Optima with AC400 versus AC100 .....	68
B.	The Requirement for a Quantitative Analysis .....	75
C.	Xtera’s Belated Allocation Argument .....	76
D.	Xtera’s Evidence of Investments in Plant and Equipment.....	77
1.	Plant Investments.....	77
2.	Equipment Investments .....	81
E.	Xtera’s Evidence of Investments in Labor or Capital.....	85
F.	Conclusion on Economic Prong of Domestic Industry Requirement.....	86
VI.	Conclusions of Law .....	88
VII.	Recommended Determination on the Public Interest, Remedy, & Bond .....	89
A.	Public Interest .....	89
1.	Public Health and Welfare.....	90
2.	Competitive Conditions in the United States Economy .....	90
3.	Production of Like or Directly Competitive Articles in the United States.....	93
4.	United States Consumers.....	94
B.	Remedy & Bond .....	96
1.	Limited Exclusion Order .....	96
2.	Cease and Desist Order.....	98
3.	Bond During Presidential Review .....	101

VIII. Initial Determination..... 102

PUBLIC VERSION

TABLE OF ABBREVIATIONS

<b>CDX</b>	Complainant's demonstrative exhibit
<b>CIB</b>	Complainant's initial post-hearing brief
<b>CPB</b>	Complainant's pre-hearing brief
<b>CPX</b>	Complainant's physical exhibit
<b>CRB</b>	Complainant's reply post-hearing brief
<b>CX</b>	Complainant's exhibit
<b>Dep.</b>	Deposition
<b>JX</b>	Joint Exhibit
<b>RDX</b>	Respondent's demonstrative exhibit
<b>RIB</b>	Respondent's initial post-hearing brief
<b>RPX</b>	Respondent's physical exhibit
<b>RPB</b>	Respondent's Pre-hearing brief
<b>RRB</b>	Respondent's reply post-hearing brief
<b>RRX</b>	Respondent's rebuttal exhibit
<b>RX</b>	Respondent's exhibit
<b>SIB</b>	Staff's initial post-hearing brief
<b>SPB</b>	Staff's Pre-hearing brief
<b>SRB</b>	Staff's reply post-hearing brief
<b>Tr.</b>	Transcript

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Administrative Law Judge Clark S. Cheney

(April 26, 2019)

Pursuant to the Notice of Investigation, 83 Fed. Reg. 3770 (Jan. 26, 2018), this is the final Initial Determination in the matter of *Certain Subsea Telecommunications Systems and Components Thereof*, Investigation No. 337-TA-1098. 19 C.F.R. §§ 210.10(b), 210.42(a)(1)(i).

For the reasons stated herein, I have determined that no violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1330), has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain subsea telecommunication systems and components thereof alleged to infringe U.S. Patent No. 8,351,798 (“the ’798 Patent”) and U.S. Patent No. 7,860,403 (“the ’403 Patent”).

## I. INTRODUCTION

### A. Procedural History

On December 22, 2017, complainants Neptune Subsea Acquisitions Ltd. of the United Kingdom; Neptune Subsea IP Ltd. of the United Kingdom; and Xtera, Inc. of Allen, Texas (“Xtera”) filed a complaint alleging violations of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain subsea telecommunication systems and components thereof by reason of infringement of one or more of U.S. Patent No. 8,380,068 (“the ’068 Patent”); U.S. Patent No. 7,860,403 (“the ’403 Patent”); U.S. Patent No. 8,971,171 (“the ’171 Patent”); U.S. Patent No. 8,351,798 (“the ’798 Patent”); and U.S. Patent No. 8,406,637 (“the ’637 Patent”). 83 Fed. Reg. 3770 (Jan. 26, 2018).

On December 20, 2017, the Commission instituted this investigation to determine:

whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain subsea telecommunication systems and components thereof by reason of infringement of one or more of 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; and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

*Id.*

The named respondents were Nokia Corporation of Espoo, Finland; Nokia Solutions and Networks B.V. of Hoofddorp, The Netherlands; Nokia Solutions and Networks Oy of Espoo, Finland; Alcatel-Lucent Submarine Networks SAS of Boulogne Billancourt, France; Nokia Solutions and Networks US LLC of Phoenix, AZ; NEC Corporation of Tokyo, Japan; NEC Networks & System Integration Corporation of Tokyo, Japan; and NEC Corporation of America of Irving, TX. *Id.* The notice of investigation also named the Office of Unfair Import Investigations (“Staff”) as a party to this investigation. *Id.*

## PUBLIC VERSION

On February 12, 2018, the presiding administrative law judge set an 18-month target date of July 26, 2019. Order No. 6 (unreviewed). On March 19, 2018, I issued an initial determination granting Xtera's unopposed motion to (1) amend the Verified Complaint, Public Exhibits 17, 19, and 21, and Notice of Institution of Investigation to correct the name of respondent Alcatel-Lucent Submarine Networks SAS to Alcatel Submarine Networks, and (2) withdraw the complaint and thus terminate the investigation against respondents Nokia Solutions and Networks B.V.; Nokia Solutions and Networks Oy; and Nokia Solutions and Networks US LLC. Order No. 9 (unreviewed). On July 10, 2018, I issued an initial determination granting Xtera's unopposed motion to amend the Complaint and Notice of Investigation to reflect a corporate name change from Neptune Subsea Acquisitions Ltd. to Xtera Topco Ltd. Order No. 21 (unreviewed). On August 8, 2018, I issued an initial determination granting Xtera's unopposed motion for termination of the investigation with respect to the '637 patent. Order No. 22 (unreviewed). On August 27, 2018, I issued an initial determination amending the complaint and notice of investigation to add Nokia of America Corporation as a respondent. Order No. 30 (unreviewed).

On November 19, 2018, I issued an initial determination granting-in-part Respondents' motion for summary determination. *See* Order No. 46, *affirmed with modification*, Comm'n Opinion (Feb. 14, 2019) (public version). Particularly, I granted summary determination of no violation with respect to the '068 patent based on Xtera's failure to satisfy the domestic industry requirement with respect to that patent. *See* Order No. 46 at 15.

On November 20, 2018, I issued an initial determination granting-in-part Xtera's unopposed motion for termination of the investigation with respect to claims 3-5, 7, 10-11, and 14 of the '403 patent; claims 2-4 and 6-10 of the '171 patent; and claims 14, 16-18, and 20 of the '798. Order No. 47 (unreviewed). On December 6, 2018, I issued an initial determination granting

Xtera's unopposed motion for termination of the investigation with respect to claims 1 and 5 of the '171 patent and claims 1, 2, and 6 of the '403 patent. Order No. 52 (unreviewed).

An evidentiary hearing was held in this investigation from December 10 through December 14, 2018. The remaining disputed issues in this investigation are now ripe for determination.

**B. The Parties**

**1. Complainants (collectively "Xtera")**

**a) Xtera, Inc.**

Xtera, Inc., is a corporation located at 500 West Bethany Drive, Allen, TX 75013. CPBr. at 5-6. Xtera, Inc. is a wholly-owned subsidiary of Xtera Holdings Ltd., which in turn is a wholly-owned subsidiary of complainant Xtera Topco Ltd. *See, e.g., id.* Xtera, Inc., is the successor to Xtera Communications, Inc., and is "the primary operating arm for Xtera's optical networking solutions." *Id.*

**b) Xtera Topco Ltd. (formerly Neptune Subsea Acquisitions Ltd.)**

Complainant Xtera Topco Ltd. is located at Bates House, Church Road, Harold Wood, Essex, RM3 0SD, UK. *Id.* Complainant Xtera Topco Ltd. is the parent of complainant Xtera, Inc., and complainant Neptune Subsea IP Ltd. *Id.*

**c) Neptune Subsea IP Ltd.**

Complainant Neptune Subsea IP Ltd. is located at Bates House, Church Road, Harold Wood, Essex, RM3 0SD, UK. *Id.* Neptune Subsea IP Ltd. is a wholly-owned subsidiary of Xtera Holdings Ltd., which in turn is a wholly-owned subsidiary of complainant Xtera Topco Ltd. *Id.* Complainant Neptune Subsea IP Ltd. is a holding company for intellectual property assets owned by Xtera Holdings Ltd. *Id.*

**2. The NEC Respondents (collectively “NEC”)<sup>1</sup>**

**a) NEC Corporation (“NEC Corp.”)**

Respondent NEC Corporation is a Japanese corporation with its headquarters at 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001, Japan. *See* NEC Resp. to Compl. at ¶ 16 (EDIS Doc. ID 644640).

**b) NEC Networks & System Integration Corporation (“NESIC”)**

Respondent NESIC is a Japanese corporation with its headquarters at Iidabashi First Tower, 2-6-1 Koraku, Bunkyo-ku, Tokyo 112-8560, Japan. *Id.* at ¶ 17.

**c) NEC Corporation of America (“NECAM”)**

Respondent NECAM is a wholly-owned subsidiary of NEC Corporation. NECAM is a Nevada corporation with its principal place of business at 3929 W. John Carpenter Freeway, Irving, TX 75063-2909. *Id.* at ¶ 18.

**3. The Nokia Respondents (collectively “Nokia”)**

**a) Nokia Corporation (“Nokia Corp.”)**

Respondent Nokia Corp. is a company organized under the laws of Finland, with its principal place of business at Karaportti 3, 02610 Espoo, Finland. Nokia Resp. to Compl. at ¶ 20 (EDIS Doc. ID 640300).

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<sup>1</sup> This initial determination uses “Respondents” to refer collectively to all NEC and Nokia respondents.

**b) Alcatel Submarine Networks (“ASN”)**

Respondent ASN is an indirect wholly owned subsidiary of Nokia Corp. and is a company organized under the laws of the French Republic. *Id.* at ¶ 20. ASN manufactures and sells the 1620LM SLTE products. *Id.* at ¶ 21.

**c) Nokia of America Corporation (“NAC”)**

Respondent NAC is located at 600 Mountain Avenue New Providence, NJ 07974. *See* NAC Resp. to Compl. at 1 (EDIS Doc. ID 658815). NAC offers the 1830 product line for sale. *See, e.g.,* RPB. at 14.

**C. The Asserted Patents**

Of the patents that formed the basis for institution of this investigation, only two remain in dispute: U.S. Patent No. 7,860,403 (“the ’403 patent”) and U.S. Patent No. 8,351,798 (“the ’798 Patent”).

**1. U.S. Patent No. 7,860,403**

United States Patent Number 7,860,403, entitled “Data Format for High Bit Rate WDM Transmission,” issued to Turitsyn et al. on December 28, 2010. ‘403 Patent at cover page. The patent issued from Application Number 10/553,338, which is a national stage application arising from PCT No. PCT/GB2004/095752. *Id.* The ‘403 patent claims priority to GB 03089951.3, which was filed on April 17, 2003. The patent, on its face, is assigned to Xtera Communications Ltd. *Id.* Xtera asserts infringement of independent claim 8 and dependent claims 9, 12, and 13 of the ‘403 patent.

**2. U.S. Patent No. 8,351,798**

United States Patent Number 8,351,798, entitled “Phase Shift Keyed High Speed Signaling,” issued to Edirisinghe et al. on January 8, 2013. JX-0007 at cover page. The patent issued from Application Number 12/252,962, which was filed on October 16, 2008. The ’798 patent claims priority to GB 0720227.8, filed on October 16, 2007, and GB 0806826.4, filed on April 15, 2008. *Id.* The patent, on its face, is assigned to Xtera Communications Ltd. *Id.* Going into the evidentiary hearing, Xtera asserted infringement of independent claim 13 and dependent claims 15 and 19 of the ’798 patent. But Xtera produced no evidence to show a violation of section 337 based on infringement of those claims. *See generally* CIB; CRB (addressing only the ’403 patent). Accordingly, I find Xtera has not established a violation of section 337 based on infringement of the ’798 patent. The remainder of this determination is limited to the parties’ disputes in connection with the ’403 patent.

**D. The Technology at Issue**

The technology at issue relates to optical data transmission in a wavelength division multiplex (WDM) scheme. ’403 Patent at 1:6-8. In a WDM scheme, the capacity of a single transmitting fiber is increased by transmitting multiple channels, each at a different wavelength, over that fiber. *Id.* at 1:20-22. At the time the application giving rise to the ’403 patent was filed, the art recognized that because the bandwidth of such an optically amplified system is limited, the maximum rate at which information could be transferred over an optical fiber link would be roughly the same regardless of the bit rate. *See id.* at 1:25-29. This because as bit rate increases, so too does the bandwidth of each channel, and thus the total bandwidth of the system becomes a limiting factor on the number of useable channels. *See id.* Given that background, the object of the ’403 patent is to provide means to improve spectral efficiency over traditional data formats. *See id.* at 1:34-37.

Generally speaking, the '403 patent describes three steps to achieve greater spectral efficiency in a WDM system as compared to conventional return-to-zero or non-return-to-zero data formats. *See id.* at Abstract. First, a periodic series of optical pulses is generated, which defines a series of time slots with one pulse in each time slot. *See id.* Second, the pulses are filtered to produce carrier pulses that extend over more than one time slot. *See id.* Third, the pulses are modulated with data for transmission. *See id.* In the context of the '403 patent, both methods of performing these steps, and transmitter for performing these steps, are described.

**E. The Accused Products**

There exists some tension between the parties as to what exactly the accused products in this investigation are. Xtera's initial post-hearing brief never clearly identifies the accused products but instead relies on a table of abbreviations to define "Accused Products" as "Nokia 1830, ASN 1620, NEC T740SW." CIB at Table of Abbreviations and Defined Terms; *see also* CIB at 78 ("Xtera's Optima practices claim 8, establishing technical DI. Nokia's 1830 and 1620 products and NEC's T740SW product infringe claims 8, 9, and 12."). Respondents complain that Xtera's definition of accused products is overbroad. In Respondents' view, the accused NEC product is NEC's T740SW terminal with the XF200 line card and a [REDACTED], and the accused Nokia products are (1) ASN's 1620 series products with an XWAV line card containing an Acacia AC400 module and a [REDACTED] transponder containing an ADD2 chip; and (2) NAC's 1830 series products with PSI-2T or D5X500 transponders and [REDACTED] cards containing ADD3 chips, and also [REDACTED] [REDACTED] cards containing ADD2 chips. *See* RRB at 7.

From Staff's perspective, the NEC and Nokia accused products are NEC's NS Series product line, Nokia's 1620 product line, which Staff notes is manufactured by ASN, and Nokia's 1830 product line, which Staff notes is manufactured by NAC. *See* SIB at 13. Similar to

Respondents' position, Staff notes that each of the product lines it identifies includes, among other things, the components identified in Respondents' description of the accused products. *See id.* at 13-14. Staff's brief does not, however, suggest limiting the scope of the accused products to the specific components identified by Respondents. *See id.*

To the extent there is a disagreement between the parties about the proper characterization of the accused products in this investigation, it is ultimately Xtera's burden to show articles that infringe the '403 patent. As will be seen in my analysis of infringement, Xtera has failed to show any Nokia or NEC product infringes, largely rendering moot any dispute about which products are accused. For the background purposes of this section, it is sufficient to acknowledge that Xtera accused the Nokia 1830 product line, the ASN 1620 product line, and the NEC T740SW product line of infringing the asserted claims of the '403 patent.

#### **F. The Domestic Industry Products**

The parties also share some dispute over the identification of the alleged domestic industry products. Xtera defines the domestic product as the "Nu-Wave Optima," and Staff similarly characterizes that domestic industry product as Xtera's "New Wave Optima product line." CIB at Table of Abbreviations and Defined Terms; SIB at 14. Respondents characterize the domestic products as Nu-Wave Optima products that include a Flex-Rate line card containing the Acacia AC400 module, pointing to the evidence Xtera presented at the evidentiary hearing. As with infringement, it is Xtera's burden to establish a domestic industry for all of the domestic industry products it relies on. That issue is addressed *infra*. For the purpose of giving context to the disputes addressed in this determination, it is sufficient to acknowledge that Xtera relies on the Nu-Wave Optima to establish domestic industry.

## II. JURISDICTION & IMPORTATION

### A. Subject Matter Jurisdiction

Section 337 confers subject matter jurisdiction on the Commission to investigate, and if appropriate, to provide a remedy for, unfair acts and unfair methods of competition in the importation, the sale for importation, or the sale after importation of articles into the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B) and (a)(2). Xtera filed a complaint alleging a violation of section 337(a). Accordingly, the Commission has subject matter jurisdiction over this investigation under section 337 of the Tariff Act of 1930. *See Amgen, Inc. v. Int'l. Trade Comm'n*, 902 F.2d 1532, 1536 (Fed. Cir. 1990).

### B. Personal Jurisdiction

Respondents have appeared and participated in this investigation. The Commission therefore has personal jurisdiction over Respondents. *See, e.g., Certain Optical Disk Controller Chips & Chipsets & Prods. Containing Same, Including DVD Players & PC Optical Storage Devices*, Inv. No. 337-TA-506, ID at 4-5 (May 16, 2005) (unreviewed in relevant part).

### C. In Rem Jurisdiction

There is no dispute here that the Commission has *in rem* jurisdiction over the accused products that have been imported into the United States. Xtera has presented evidence in the form of a stipulation and discovery responses showing that the accused products have been imported into the United States. *See* Joint Stipulation Regarding Importation of NEC Corporation, NEC Networks & System Integration Corporation, and NEC Corporation of America (Nov. 14, 2018) (EDIS Doc. 662043); CX-2063C at 0508-21 (ASN responses to requests for admission); CX-2052C at 0020-0044 (ASN supplemental responses to interrogatories); CX-2064C at 0487 (NAC responses to requests for admission); CX-2057C at 0018-20 (NAC responses to interrogatories). Accordingly, I find that the Commission has *in rem* jurisdiction over the accused products in this

investigation. See *Sealed Air Corp. v. Int'l Trade Comm'n*, 645 F.2d 976, 985-86 (C.C.P.A. 1981) (noting that the Commission has jurisdiction over imported goods); *Certain Crawler Cranes and Components Thereof*, Inv. No. 337-TA-887, Comm'n Op. at 17 (May 6, 2015) (an article “sold for importation” can confer jurisdiction on the Commission for that article).

#### **D. Importation**

The parties' dispute over satisfaction of the importation requirement of section 337 is narrow. The parties agree that the importation requirement is satisfied as to all Respondents except Nokia Corporation. Relying on *Certain Rubber Resins*, Inv. No. 337-TA-849 (Feb. 26, 2014), Nokia argues that Nokia Corporation, the parent entity of the other Nokia respondents, “does not sell for importation, import, or sell after importation any accused products . . . .” RRB at 13 (quoting Comm'n Op. at 74-75 (“mere ownership is not enough to hold a parent corporation liable for the acts of its subsidiaries absent further showing.”)). Elaborating on that assertion, Nokia argues that “[a] parent entity does not itself meet the importation requirement based entirely on importations or sales of accused products by its subsidiaries;” that “mere ownership is not enough to hold a parent corporation liable for the acts of its subsidiaries absent further showing;” and that “[t]he mere fact that Nokia's subsidiaries market the product under the Nokia brand cannot be sufficient to overturn this clear case law [*Certain Rubber Resins*] because most complex corporations use similar branding across subsidiaries.” *Id.* Other than the Commission's opinion in *Certain Rubber Resins*, Respondents cite no other precedent or evidence in support of their position.

The Nokia respondents' position concerning Nokia Corporation is reminiscent of Nokia's misguided tactics addressed in Order No. 30 and is contrary to longstanding interpretation and application of the importation requirement of section 337. To determine whether the importation requirement is satisfied as to a particular respondent, the Commission does not blindly apply a set

PUBLIC VERSION

of context-agnostic rules. Rather, the Commission applies a fact-intensive inquiry as to the extent of a respondent's conduct in causing infringing articles to enter the United States. *See Certain Apparatus for the Continuous Prod. of Copper Rod*, Inv. No. 337-TA-52, Initial Determination, 1979 WL 61155, at \*13-14 (Aug. 13, 1979) (concluding that a respondent was an importer where it purchased equipment that it was aware was produced in Germany and the evidence on balance established that the respondent "put in motion the importation" of those articles), *not reviewed*, Comm'n Determination & Order (Nov. 23, 1979); *Certain Large Video Matrix Display Sys. & Components Thereof*, Inv. No. 337-TA-75, Order No. 14, 1980 WL 140805, at \*1-2 (June 30, 1980) (considering the "degree" of involvement in causing a scoreboard to enter the country, and concluding that the "direct nature of the involvement of the Brewers and the magnitude of their purchase" showed that the team was an "importer"), *not reviewed*, Comm'n Op. (June 19, 1981); *Certain Plastic-Capped Decorative Emblems*, Inv. No. 337-TA-121 (Oct. 1, 1982), Order No. 11, 1982 WL 213041, at \*1-2 (finding a respondent to be an importer where it purchased articles from a Canadian corporation "f.o.b. Buffalo"), *not reviewed*, Comm'n Action & Order (Dec. 1, 1982); *Certain Salinomycin Biomass & Preparations Containing Same*, Inv. No. 337-TA-370, Order No. 19, 1995 WL 945787, at \*1-3 (Sept. 18, 1995) (concluding, based on the evidence presented, that respondent Merck was not an importer because of the lack of its involvement in causing the goods to enter the country), *not reviewed*, Notice (Feb. 9, 1996); *Certain Cigarettes & Packaging Thereof*, Inv. No. 337-TA-643, Comm'n Op., 2009 WL 6751505, at \*4-6 (Oct. 1, 2009) (concluding, based on the evidence adduced at trial, that the respondent was an importer where its acts were "integral to the importation"); *Certain Digital Set-Top Boxes & Components Thereof*, Inv. No. 337-TA-712, Initial Determination, 2011 WL 2567284, at \*10-12 (May 20, 2011) (concluding, based on the record evidence, that "Cablevision was sufficiently involved in the

PUBLIC VERSION

manufacture and importation of the Cisco STBs to meet the importation requirement”), *not reviewed*, Notice (July 21, 2011).

In contrast to the fact-intensive approach to importation that the Commission has consistently applied for decades, the Nokia respondents misinterpret the guidance in *Certain Rubber Resins* to suggest that, because certain of its subsidiaries are responsible for the importation of the allegedly infringing articles, the importation requirement cannot be satisfied as to Nokia Corp. *Rubber Resins* does not support that conclusion. At best, the portion of *Rubber Resins* that Respondents rely on only indicates there is no bright-line rule as to when a subsidiary’s importation also evidences importation by the subsidiary’s corporate parent. *See Comm’n Op.* at 74-75 (“mere ownership is not enough to hold a parent corporation liable for the acts of its subsidiaries *absent further showing.*” (emphasis added)). In that respect, *Rubber Resins* is entirely consistent with the Commission’s longstanding fact-intensive approach to the importation requirement. Just as the Commission will not absolve an entity of its roll in importing allegedly infringing articles into the United States based solely on a corporate relationship, the Commission will also not find importation based solely on those grounds.

Following the Commission’s fact-intensive approach to determining importation, I find that the evidence presented by Xtera and Staff demonstrates that the importation requirement is satisfied as to Nokia Corporation. First, I find that Nokia Corporation, in its role as a common corporate parent to NAC and Bell Labs, was involved in causing NAC and Bell Labs to work together to test the Nokia 1830 products in the United States. *See Tr.* at 726:2-728:11. Particularly, Dr. Szilard Zsigmond, a product line manager of submarine products for Nokia, testified that Nokia Corporation was involved in the decision to have Bell Labs and NAC work together to test D5X500 transponders. *See id.* at 727:19-22. I also find that at least [REDACTED]

PUBLIC VERSION

transponders—which are components of the Nokia 1830 products—were imported for the Bell Labs and NAC test. *See* JX-0038C at 30:8-12; *see also* Tr. at 705:3-25.

Second, I find that Nokia’s approach to marketing subsea telecommunications systems demonstrates a coordinated effort by Nokia Corporation and NAC that weighs against the conclusion that NAC is solely responsible for causing the allegedly infringing articles to be imported into the United States. Particularly, Nokia Corporation’s marketing materials tout its status as an industry leader in the field of submarine networks based on the deployment of “more than 200 submarine systems.” CX-2068 at 0001; *see also* JX-0020C at 148:11-149:4. To support that statement, Nokia combined submarine system deployments throughout all of Nokia with those of ASN. *See* JX-0020C at 148:14-149:4. The fact that Nokia presents its submarine network business as a single cohesive unit for marketing purposes, despite the contributions of disparate subsidiaries, weighs against finding that Nokia Corporation’s involvement in the importation of the Nokia 1830 should can be severed from the involvement of NAC for the purposes of considering the importation requirement. Put another way, Nokia and NAC do not appear to operate with the clear separation that Respondents rely on to argue that Nokia Corp. has not satisfied the importation requirement. The facts simply do not support the narrative that Nokia Corp. had no part in the importation of the allegedly infringing articles at issue in this investigation.

Additional marketing evidence supports the conclusion that Nokia Corp. and NAC operated in conjunction to cause the importation of the Nokia 1830 products into the United States. For example, the [REDACTED] Subsea Deployment statement of work by Alcatel-Lucent USA Inc.—NAC’s predecessor—bears Nokia Corporation’s logo on every page. *See* CX-1688C. Similarly, Nokia’s response to a request for information on open line system transponders makes none of the distinctions between its subsidiary companies that Respondents attempt to rely on to distinguish

Nokia Corporation in the context of importation. *See* CX-1694C. Rather, Nokia's response touts its work with Bell Labs and its global reach as desirable traits in its pitch. *See id.* at .0006-.0007.

Considering the evidence of record in this investigation, I find that Nokia Corporation engaged in coordinated action with NAC to test and market the Nokia 1830 products, including coordinating the domestic testing of the D5X500 transponders by NAC and Bell Labs. On that basis, I find that Nokia Corporation is sufficiently responsible for causing the Nokia 1830 products to be imported into the United States that the importation requirement of section 337 is satisfied as to Nokia Corporation. Accordingly, I find that the importation requirement of section 337 is satisfied as to all respondents.

### **III. LEGAL PRINCIPLES**

#### **A. Claim Construction**

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*) (internal citations omitted), *aff'd*, 517 U.S. 370 (1996). Claim construction resolves legal disputes between the parties regarding claim scope. *See Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d at 1314, 1319 (Fed. Cir. 2016).

Evidence intrinsic to the application, prosecution, and issuance of a patent is the most significant source of the legally operative meaning of disputed claim language. *See Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *see also Markman*, 52 F.3d at 979. As the Federal Circuit explained in *Phillips*, courts must analyze each of these

PUBLIC VERSION

components to determine the “ordinary and customary meaning of a claim term” as understood by a person of ordinary skill in the art at the time of the invention. 415 F.3d at 1313.

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’ *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The patent claims themselves “provide substantial guidance as to the meaning of particular claim terms.” *Id.* at 1314; see *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (“In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to ‘particularly point[ ] out and distinctly claim[ ] the subject matter which the patentee regards as his invention.’”). The context in which a term is used in an asserted claim can be “highly instructive.” *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.*

The specification “is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptoronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.” *Id.* at 1316. “In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor.” *Id.* As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323. In the end, “[t]he construction that stays true to the claim language and most naturally aligns with the

patent's description of the invention will be . . . the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Id.* at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

## **B. Infringement**

In a section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *See Spansion*, 629 F.3d at 1349. This standard "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

### **1. Literal Infringement**

Literal infringement is a question of fact. *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). "Literal infringement requires the patentee to prove that the accused device contains each limitation of the asserted claim(s). If any claim limitation is absent, there is no literal infringement as a matter of law." *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

## 2. Doctrine of Equivalents

Where literal infringement is not found, infringement nevertheless can be found under the doctrine of equivalents. Determining infringement under the doctrine of equivalents “requires an intensely factual inquiry.” *Vehicular Tech. Corp. v. Titan Wheel Int’l, Inc.*, 212 F.3d 1377, 1381 (Fed. Cir. 2000). The Supreme Court has described the essential inquiry of the doctrine of equivalents analysis in terms of whether the accused product or process contains elements identical or equivalent to each claimed element of the patented invention. *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997).

The Federal Circuit applies two articulations of the test for equivalents, as one phrasing may be more suitable for particular fact patterns or technologies. Under the insubstantial differences test, “[a]n element in the accused device is equivalent to a claim limitation if the only differences between the two are insubstantial.” Alternatively, under the function-way-result test, an element in the accused device is equivalent to a claim limitation if it “performs substantially the same function in substantially the same way to obtain substantially the same result.” *Voda v. Cordis Corp.*, 536 F.3d 1311, 1326 (Fed. Cir. 2008) (citations omitted).

In *Warner-Jenkinson*, the Supreme Court noted that the doctrine of equivalents is subject to several limitations. *Warner-Jenkinson*, 520 U.S. at 29. The doctrine must be applied to individual elements of a claim and not to the invention as a whole. *Id.*

### C. Validity

A patent is presumed valid. *See* 35 U.S.C. § 282; *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 95 (2011). A respondent who has raised patent invalidity as an affirmative defense has the burden of overcoming this presumption by clear and convincing evidence. *See Microsoft*, 564 U.S. at 95.

**1. Anticipation**

Under 35 U.S.C. § 102, a claim is anticipated, and therefore invalid, when “the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.” *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000). To be considered anticipatory, the prior art reference must be enabling and describe the applicant’s claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *See Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000).

**2. Obviousness**

Under 35 U.S.C. § 103, a patent may be found invalid as obvious if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). Because obviousness is determined at the time of invention, rather than the date of litigation, “[t]he great challenge of the obviousness judgment is proceeding without any hint of hindsight.” *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1375 (Fed. Cir. 2011).

When a patent is challenged as obvious, the critical inquiry in determining the differences between the claimed invention and the prior art is whether there is an apparent reason to combine the known elements in the fashion claimed by the patent at issue. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417-418 (2007). Thus, based on a combination of several prior art references, “the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or

carry out the claimed process, and would have had a reasonable expectation of success in doing so.” *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) (citations omitted).

Obviousness is a determination of law based on underlying determinations of fact. *Star Scientific*, 655 F.3d at 1374. The factual determinations behind a finding of obviousness include: (1) the scope and content of the prior art, (2) the level and content of the prior art, (3) the differences between the claimed invention and the prior art, and (4) secondary considerations of non-obviousness. *KSR*, 550 U.S. at 399 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966)). These factual determinations are referred to collectively as the “*Graham* factors.” Secondary considerations of non-obviousness include commercial success, long felt but unresolved need, and the failure of others. *Id.* When present, secondary considerations “give light to the circumstances surrounding the origin of the subject matter sought to be patented,” but they are not dispositive on the issue of obviousness. *Geo. M. Martin Co. v. Alliance Mach. Sys. Int’l.*, 618 F.3d 1294, 1304-06 (Fed. Cir. 2010). For evidence of secondary considerations to be given substantial weight in the obviousness determination, its proponent must establish a nexus between the evidence and the merits of the claimed invention. *See W. Union Co. v. MoneyGram Payment Sys. Inc.*, 626 F.3d 1361, 1372-73 (Fed. Cir. 2010) (citing *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995)).

### **3. Written Description and Enablement**

The hallmark of the written description requirement is the disclosure of the invention. *See Ariad Pharm., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). The test for determining the sufficiency of the written description in a patent requires “an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that

PUBLIC VERSION

skilled artisan and show that the inventor actually invented the invention claimed.” *Id.* Compliance with the written description requirement is a question of fact and “the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.” *Id.*

To satisfy the enablement requirement a patent specification must “contain a written description of the invention . . . to enable any person skilled in the art . . . to make and use the same.” 35 U.S.C. §112, ¶ 1. The specification must enable a person of ordinary skill in the art to practice the claimed invention without undue experimentation. *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1305 (Fed. Cir. 2010). Although a specification need not disclose minor details that are well known in the art, this “rule” is “merely a rule of supplementation, not a substitute for a basic enabling disclosure.” *Auto. Tech. Int’l Inc., v. BMW of N. Am.*, 501 F.3d 1274, 1283 (Fed. Cir. 2007) (quoting *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997)). “It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement.” *Auto. Tech.*, 501 F.3d at 1283.

Enablement is a question of law with underlying questions of fact regarding undue experimentation. *Transocean*, 617 F.3d at 1305. The factors weighed by a court in determining whether a disclosure requires undue experimentation include: (1) the quantity of experimentation necessary, (2) the amount of direction provided, (3) the presence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability of the art, and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

#### 4. Indefiniteness

A claim must also be definite. Pursuant to 35 U.S.C. § 112, ¶ 2, a patent specification “shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” 35 U.S.C. § 112, ¶ 2. Section 112, ¶ 2 requires “that a patent’s claims, viewed in light of the specification and prosecution history inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). A patent claim that is indefinite is invalid. 35 U.S.C. § 282(b)(3)(A).

#### D. Domestic Industry

For a patent-based complaint, a violation of section 337 can be found “only if an industry in the United States, relating to the articles protected by the patent . . . concerned, exists or is in the process of being established.” 19 U.S.C. § 1337(a)(2). This domestic industry requirement of section 337 is often described as having an economic prong and a technical prong. *InterDigital Commc’ns, LLC v. Int’l Trade Comm’n*, 707 F.3d 1295, 1298 (Fed. Cir. 2013); *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm’n Op. at 12-14, USITC Pub. No. 4120, 2009 WL 5134139 (Dec. 2009). The complainant bears the burden of establishing that the domestic industry requirement is satisfied. *See Certain Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-454, ID at 294, 2002 WL 31556392 (June 21, 2002) (unreviewed by Commission in relevant part).

##### 1. Economic Prong

Section 337(a)(3) sets forth the following economic criteria for determining the existence of a domestic industry in such investigations:

PUBLIC VERSION

(3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned –

- (A) significant investment in plant and equipment;
- (B) significant employment of labor or capital; or
- (C) substantial investment in its exploitation, including engineering, research and development, or licensing.

Given that the statutory criteria are listed in the disjunctive, satisfaction of any one of them will be sufficient to meet the economic prong of the domestic industry requirement. *See Certain Variable Speed Wind Turbines and Components Thereof*, Inv. No. 337-TA-376, Comm'n Op. at 15, USITC Pub. 3003 (Nov. 1996).

**2. Technical Prong**

The technical prong of the domestic industry requirement is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. § 1337(a)(2) and (3); *Certain Microsphere Adhesives, Process for Making Same and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 8, 1996 WL 1056095 (Jan. 16, 1996). “The test for satisfying the ‘technical prong’ of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims.” *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). To prevail, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent. It is sufficient to show that the products practice any claim of that patent, not necessarily an asserted claim of that patent. *See Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Op. at 38 (Aug. 1, 2007).

**IV. U.S. PATENT NO. 7,860,403**

**A. Level of Ordinary Skill in the Art**

Xtera submits that a person of ordinary skill in the art “would have . . . an undergraduate degree in electrical engineering or equivalent, and they would have approximately two years of professional experience in optical data transmission systems or graduate work in optical data transmission systems.” CRB at 4. Respondents and Staff contend that a person of ordinary skill in the art “would have had either a Bachelor of Science in electrical engineering or a field related to fiber-optic communications and three to five years of experience in the design of fiber-optic communications systems.” RRB at 14; SIB at 37. While the parties propose different levels of ordinary skill in the art, the differences are not material and the parties agree that no issue I must decide turns on the level of ordinary skill. *See* RRB at 14-15; CRB at 4; SIB at 37; Tr. at 790:8-14, 979:9-19. Therefore, I need not resolve which of the two proposals is more correct to resolve the remaining disputes in this Investigation. I find that both proposals are suitably indicative of the level of ordinary skill in the relevant art.

**B. Claim Construction Disputes<sup>2</sup>**

**1. “A transmitter for producing”**

The phrase “[a] transmitter for producing” appears in the preamble of claim 8. Xtera, for the first time at the evidentiary hearing, argued that the preamble of claim 8 is limiting. Tr. at 274:19-275:1; CIB at 11-12; CRB at 8-9. Even if I were to excuse the untimeliness of Xtera’s argument, the argument is not persuasive. Generally, “a preamble limits the invention if it recites

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<sup>2</sup> While Xtera includes a section on the term “a filter having a spectral profile giving rise to carrier pulses” in the claim construction portion of its initial post-hearing brief, none of the parties actually propose any construction for this term. Thus, I address Xtera’s arguments about the filter when I compare the claims to the accused devices.

PUBLIC VERSION

essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). Furthermore, “a preamble is not limiting ‘where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.’” *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). Here, the preamble is non-limiting because it does not impart structure into the claims. Rather, the preamble merely describes the intended use (*i.e.*, “producing an optical data signal for transmission over a wavelength division multiplexer optical communication system”) for an otherwise structurally complete invention. *See* ’403 Patent at cl. 8; Tr. at 865:22-867:19.

I do not agree with Xtera’s contention that the preamble must be limiting because it provides antecedent basis for the terms “signal” and “transmitter” in dependent claims 10 and 11. First, as to the term “signal,” claim 10 recites “a signal path of the transmitter,” which provides the necessary antecedent basis for “the signal path of the transmitter” in claim 11. *See id.* at cl. 10, 11. Second, as to “a transmitter” in claim 8, which Xtera alleges provides antecedent basis for claim 10, the phrase merely gives a descriptive name to the set of limitations in the claim, but does not add limitations to the claim. *See IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434 (Fed. Cir. 2000). And contrary to Xtera’s assertion, it is not apparent that there was “clear reliance” on the preamble during prosecution to distinguish the claimed invention over the prior art. *See Catalina*, 289 F.3d at 808-09. Therefore, I decline to treat the preamble as a limitation of claim 8.

## 2. “means for producing”

Claim 8 recites a “means for producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot.” The parties agree that the “means for producing” term invokes the application of 35 U.S.C. § 112, sixth paragraph. The parties also agree that the function of the means is “producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot.”<sup>3</sup> CIB at 12; SIB at 39; RIB at 62. The parties dispute, however, the structure corresponding to that function. Xtera submits that the corresponding structure is “pulsed light sources, including active mode locked lasers, or CW lasers modulated to create a pulse stream, and equivalents thereof,” while Respondents and Staff submit that the corresponding structure is “pulsed laser light sources (e.g. an active mode locked laser) or equivalents thereof.” *Id.*

The parties appear to agree that the '403 patent clearly links the light source in Figure 2 to the function of the “means for producing a periodic series of optical pulses” recited in claim 8. *See* CIB at 25; RIB at 62; SIB at 39. The parties’ dispute centers on whether the specification of the '403 patent additionally clearly links or associates structures in Figure 1 and Figure 5 with the claimed function. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1352 (Fed. Cir. 2015) (citing *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997)) (“Structure disclosed in the specification qualifies as ‘corresponding structure’ if the intrinsic evidence clearly links or associates that structure to the function recited in the claim.”). Xtera wants to rely on both Figure 1 and Figure 5 to broaden the classes of corresponding structures beyond those shown in

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<sup>3</sup> While Xtera contends there is a dispute about the function of the “means for producing a series of pulses,” the parties all provided the same language for the claimed function in their briefing. Xtera’s arguments are therefore addressed when I compare the claims to the accused devices.

Figure 2; Respondents and Staff say the structures in Figure 1 and Figure 5 are not clearly linked to the relevant function. CIB at 19-25; RIB at 62-69; SIB at 40-42.

I begin my analysis with the undisputed point—that Figure 2 shows structure clearly linked to the function of “producing a periodic series of optical pulses.” I begin there because the applicant’s disclosures in connection with Figure 2 are so clearly linked to the function in question that they create a sharp contrast with the debated disclosures surrounding Figures 1 and 5.

The written description states, “FIG. 2 illustrates a transmitter in accordance with the present invention which provides a means for generating [an] optical signal with a narrow spectral width at a particular bit rate . . . “ ’403 Patent at 3:2-6. There is no dispute that the “means for generating [an] optical signal” identified in Figure 2 is the same as the “means for producing a periodic series of optical pulses” at issue in the claim 8.<sup>4</sup>

The written description goes on to explain that the pulsed laser light source 20 shown in Figure 2 is an “active mode locked laser” that can be made “to produce a series of narrow pulses at a particular bit rate.” *Id.* at 3:10-16. That language further links the active mode locked laser in Figure 2 to the function of producing a periodic series of optical pulses. The patent then identifies by manufacturer and model a specific active mode locked laser that is suited for use in the system shown in Figure 2. *Id.* at 3:12-16.

The prosecution history also clearly links structure in Figure 2 to the function of producing a periodic series of optical pulses. There the applicant stated that the “means for producing” limitation was illustrated by the “active mode lock laser” in Figure 2, which “generates such a

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<sup>4</sup> It is interesting to note that in the written description portion of the specification, the term “means” is not used in connection with any other structure in any other figure.

PUBLIC VERSION

series of narrow pulses at a particular bit rate.” *See* JX-0010 at JX-0010.0275 (discussion regarding Figure 2 and claim 6, which eventually became issued claim 8).

I find a sharp contrast between the clear language linking the structure in Figure 2 to the function at issue and the debatable disclosures surrounding Figure 1 and Figure 5 of the '403 patent. For example, with respect to Figure 1, the '403 patent states that figure depicts a “coherent light source 10, such as a CW laser, [that] produces an optical beam which is first modulated with an electrical clock signal using a first modulator 11.” '403 Patent at 2:44-47. The specification explains that the “first modulator 11 provides a series of pulses at a particular bit rate in accordance with the clock signal.” *Id.* at 2:51-52. At first blush, it might seem that because “modulator 11 provides a series of pulses at a particular bit rate,” it could be a structure that performs the agreed function of “producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot.” The problem is that the '403 patent includes additional teachings that cast doubt about whether the structures illustrated by Figure 1 are capable of performing the function in question consistently with the claimed invention.

Specifically, the '403 patent states multiple times that Figure 1 is prior art. *See* '403 Patent at Fig. 1; 2:29-30, 43-44. The '403 patent acknowledges that prior art structures illustrated by modulator 11 in Figure 1 have limitations when it comes to implementing the claimed invention. The specification states that although the system shown in Figure 1 “*might* be suitable for producing narrow pulses,” in order to produce the “required” narrow pulses, “the modulator 11 would have to be able to switch on and off very quickly.” '403 Patent at 4:32-37 (emphasis added). The patentee then admits that such rapidly switching modulators were unavailable at the time of the invention by adding, “Suitable modulators may be available in the near future.” *Id.* These statements are the opposite of a clear link between a structure and a claimed function of the

invention; they are expressions of doubt by the patentee that the structure of Figure 1 could perform the function of “producing a periodic series of optical pulses defining a series of time slots” in the manner required by the claimed invention. I therefore conclude that Figure 1 does not disclose structure clearly linked to the function of “producing a periodic series of optical pulses” as required by claim 8.

Turning to Figure 5, the specification states that “[a] coherent light source 50 provides an optical beam” that is “modulated using an MZ modulator 51 driven with RZ electrical data 51 [sic] at the required bit rate.” ’403 patent at 4:21-24. The patent then implies that this modulation results in “data pulses.” *Id.* at 4:24-26 (emphasis added). Xtera contends that this disclosure clearly links structures in Figure 5 to the claimed function of “producing a periodic series of optical pulses.” Xtera’s argument is not a model of clarity, but there appear to be three possible structures in Figure 5 for performing the function: (1) coherent light source 50, (2) MZ modulator 51, and (3) the combination of coherent light source 50 with MZ modulator 51. I will examine each in turn.

First, it is undisputed that coherent light source 50 produces an “optical beam” (’403 patent at 4:21-24) but does not produce optical pulses. As Xtera’s expert Dr. Ralph testified, light source 50 is a continuous wave source. Tr. at 285:22-286:24. Respondents’ expert Dr. Brandt-Pearce agreed. *Id.* at 921:7-12. It is undisputed that a continuous wave laser does not produce optical pulses. Tr. at 816:20-817:3 (Brandt-Pearce); 974:19-25 and 987:11-20 (Blumenthal), 362:25-363:6 (Ralph), 527:5-527:19 and 556:13-18 (Willner), 138:19-22 (Pelouch). I therefore find that the light source 50 in Figure 5 does not perform the function of “producing a periodic series of optical pulses.”

PUBLIC VERSION

Next, the record demonstrates that modulator 51 produces data pulses ('403 patent at 4:22-26), but not a *periodic* series of pulses. Respondents' expert Dr. Brandt-Pearce testified that "the output of 51 is optical data pulses," but the series of data pulses would not be periodic because "data is not periodic." Tr. at 809:14-19; *see also* 814:17-815:1, 839:16-23; 940:11-941:14. Xtera's expert Dr. Ralph did not dispute that data is not periodic. This evidence undermines a conclusion that modulator 51 is linked to the function of producing a periodic series of optical pulses. But even without the aid of expert testimony, I find nothing in the specification of the '403 patent itself that clearly links the modulator 51 in Figure 5 to the function of "producing a *periodic* series of optical pulses," which is the claimed function.

The final possibility is that coherent light source 50 in combination with modulator 51 performs the function of "producing a periodic series of optical pulses." Xtera appears to rely on this combination because the modulator 51 alone does not produce light and the coherent light source 50 alone does not produce pulses. But pointing to both structures together does not solve the fundamental problem: the '403 patent does not clearly link the structures, alone or in combination, to the claimed function.

To overcome the deficient disclosures surrounding Figure 5, Xtera points to testimony from its expert Dr. Ralph. *See* CIB at 20. Dr. Ralph testified that "one *can* modulate light" and "*perhaps* with a Mach-Zehnder modulator driven with *appropriate* electrical signaling" one could "produce a series of optical pulses." Tr. at 283:7-18 (emphasis added). But what one *could* do "is not the correct inquiry." *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1212 (Fed. Cir. 2003). The correct inquiry focuses on what the patentee actually said in the disclosure of the patent. *Id.* Expert testimony cannot "rewrite the patent's specification" to provide a link

PUBLIC VERSION

between a structure and a claimed function where the patentee did not clearly provide one. *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1332 (Fed. Cir. 2003).

Even with respect to what *could* be a “means for producing a periodic series of optical pulses,” Dr. Ralph’s testimony raised more questions than it answered. When asked on cross-examination whether the modulator shown in Figure 5 is capable of producing optical pulses in the manner required by claim 8, Dr. Ralph testified that he was “not sure if there’s a conclusive answer” to the question. *See* Tr. at 371:3-11. Dr. Ralph also admitted that his theory that the modulator in Figure 5 “simultaneously” creates a pulse and modulates that pulse with data was “not described” in the ’403 patent. *See id.* at 374:12-375:3. I give little weight to Dr. Ralph’s understanding of this term.

Xtera also argues that because claim 11, which depends on claim 8, recites an amplifier and Figure 5 is the only figure that depicts an amplifier, then claim 8 must cover structure in Figure 5. Xtera’s argument appears to rely on the unremarkable practice of genus-species claiming to supply linking disclosure between Figure 5 and the claimed function of producing a periodic series of optical pulses. The attempt is misguided. Even if claim 8 were construed as a genus that encompasses species of transmitters having an amplifier, so as to include the embodiment described in dependent claim 11, it does not follow that all structures that happen to be shown in the same figure as an amplifier are clearly linked to the “means for producing a periodic series of optical pulses.” The patentee still has a duty to clearly link structure with a claimed function in the written description. *Med. Instrumentation & Diagnostics Corp.*, 344 F.3d at 1211.

Xtera’s logic also ignores multiple alternative understandings of claim 11. For example, Xtera disregards the fact that “the claims of the patent need not encompass all disclosed embodiments.” *TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir.

2008). There is no requirement that claim 11 must encompass what the '403 patent calls the "alternative transmitter design" of Figure 5 ('403 Patent at 4:30). Xtera's argument overlooks the possibility that claim 11 best corresponds to Figure 2 because (a) the patentee clearly linked structure in Figure 2 to the function of the "means for producing a periodic series of optical pulses," which is included by reference in claim 11 and (b) a person of ordinary skill in the art would know how to implement the amplifier of claim 11 within the circuit shown in Figure 2. Alternatively, there may be no disclosed embodiment of the invention that corresponds with claim 11 and it is invalid. I need not resolve which of these various theories accounts for claim 11 because that claim is not asserted here (perhaps with good reason). It suffices for the present purpose to note that nothing in the specification clearly links any structure shown in Figure 5 to the function of the "means for producing a periodic series of optical pulses."

A patentee is free to use the convenience of means-plus-function claiming allowed under the sixth paragraph of § 112, but the price that must be paid for use of that convenience is that a tribunal will carefully limit the claim to only the means specified in the written description and equivalents thereof. *See O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). It is the duty of a patentee to clearly link or associate structure with the claimed function in the written description. *Med. Instrumentation & Diagnostics Corp.*, 344 F.3d at 1211. Here, the patentee clearly linked the function of "producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot" the structure shown in Figure 2. Accordingly, I construe the corresponding structure for the "means for producing" to be pulsed laser light sources (e.g., an active mode locked laser) or equivalents thereof.

### 3. “the pulses”

#### a) Indefiniteness

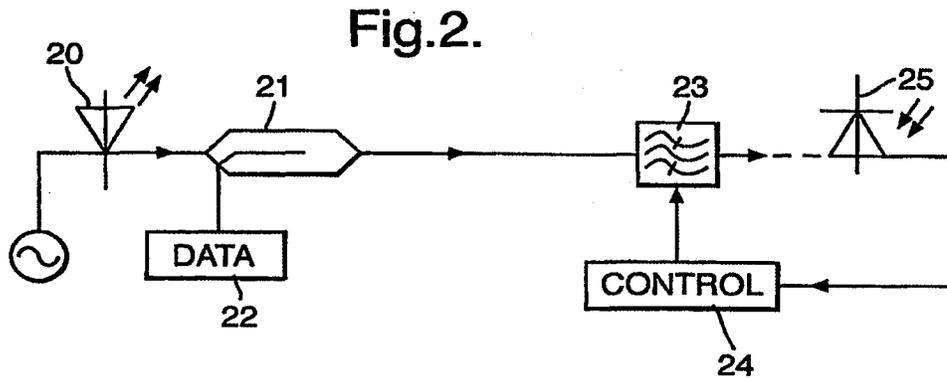
The term “the pulses” appears in independent claim 8 of the ’403 patent, and all other asserted claims depend from claim 8. Respondents argue that all asserted claims of the ’403 patent are invalid as indefinite because the meaning of the claim limitation “the pulses” is ambiguous. RIB at 3-8. Respondents assert that a person of ordinary skill in the art would not understand, with reasonable certainty, whether the antecedent of “the pulses” is “optical pulses” or “carrier pulses,” both of which appear earlier in claim 8. *Id.*

Under 35 U.S.C. § 112, ¶ 2, a patent must conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as the invention. A patent claim fails to satisfy this statutory requirement and, as a result, is invalid for indefiniteness if its language fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). “[T]he definiteness inquiry turns on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters *post hoc*.” *Id.* at 911. Indefiniteness is a question of law with factual underpinnings, and Respondents have the burden to establish indefiniteness by clear and convincing evidence. *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1363 (Fed. Cir. 2018); *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010).

The relevant portions of claim 8 are as follows: “A transmitter . . . comprising means for producing a periodic series of optical pulses . . . ; a filter having a spectral profile giving rise to carrier pulses . . . and; modulating means for modulating the pulses with data for transmission.” ’403 patent, cl. 8 (emphasis added).

The specification teaches a person of ordinary skill in the art where the “optical pulses” and “carrier pulses” exist within the transmitter system. As shown below in Figure 2 of the ’403

patent, a laser light source 20 produces a series of optical pulses that are “modulated with data using an electro-optic modulator 21” and then passed through filter 23, “which alters the spectral profile of the pulses” to “produce carrier pulses extending over more than one time slot.” ’403 patent, 1:49-50, 3:3-30. In other words, the “modulating means for modulating the pulses” (modulator 21) in the Figure 2 embodiment acts upon optical pulses produced by the laser 20, and the “carrier pulse” label is assigned to the optical pulses after they are filtered by filter 23.



The specification of the ’403 patent, however, contemplates another configuration of the modulator and the filter that is not illustrated in Figure 2. The patent teaches, “The step of modulating the pulses with data can be performed either before or after the filtering step, but is preferably performed before the filtering step.” *Id.*, 1:65-67. Thus, in this alternative embodiment, the modulator can act on pulses coming out of the filter.

The ’403 patent contains claims that are in accord with these two alternative embodiments. As has been noted, claim 8 describes a transmitter comprising a “*means for producing a periodic series of optical pulses . . . ; a filter having a spectral profile giving rise to carrier pulses . . . and; [a] modulating means for modulating the pulses with data for transmission.*” ’403 patent, cl. 8 (emphasis added). On its face, claim 8 does not limit where along the signal path the modulating means is placed; it could come before or after the filter. In contrast, claim 10, which depends from claim 8, does impose such a limitation. In claim 10, the “modulating means is placed before the

PUBLIC VERSION

filter in the signal path of the transmitter.” ’403 patent, cl. 10. Placing the modulating means before the filter is the only limitation that distinguishes claim 10 from claim 8. There is an especially strong presumption, therefore, that claim 8 covers both an arrangement with the modulating means before the filter and an arrangement with the modulating means after the filter in the signal path. *See SunRace Roots Enter. Co. v. SRAM Corp.*, 336 F.3d 1298, 1303 (Fed. Cir. 2003). Nothing in the ’403 patent specification or prosecution history rebuts the presumption established by the doctrine of claim differentiation. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1374 (Fed. Cir. 2014). Therefore, a person of ordinary skill in the art would understand that the modulating means in claim 8 (*e.g.*, modulator 21 shown in Figure 2) can be positioned either before or after filter 23 in the signal path of the transmitter shown in Figure 2. In the later positional arrangement, the modulator 21 will act upon the so-called carrier pulses that exit filter 23. Accordingly, the claims in view of the specification confirm that the “the pulses” appearing near the end of claim 8 can refer to either “optical pulses” without a carrier spectral profile as they leave the laser light source 20 as shown in Figure 2 or “carrier pulses” leaving filter 23 with a spectral profile.

Staff agrees with the analysis above and contends that “the pulses” term appearing at the end of claim 8 is not indefinite. According to Staff, the evidence shows that a person of ordinary skill in the art would understand with reasonable certainty that “the pulses” of claim 8 refers to “optical pulses” in the embodiment shown in Figure 2 and to “carrier pulses” in the inverse positional arrangement where modulator 21 is placed after filter 23. SIB at 69. Staff finds support for this position in the testimony of Respondents’ expert, Dr. Maité Brandt-Pearce, who admitted that the specification “teach[es] that you could modulate either the optical pulses or the carrier pulses.” *Id.* (quoting Tr. at 929:7-18 and citing *id.* at 290:16-24 (Complainant’s expert, Dr.

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Stephen Ralph), 310:16-311:10 (same), 547:20-548:5 (Complainant’s expert, Dr. Alan Willner), 944:6-11 (Dr. Brandt-Pearce)).

Respondents disagree with Staff. Respondents argue that a limitation with a “different meaning depending on the arrangement of the system purportedly infringing the alleged invention . . . is the essence of indefiniteness.” RIB at 6 (emphasis removed) (quoting *Halliburton Energy Servs. Inc. v. M-ILLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008)). Respondents’ citation to *Halliburton*, however, does not support its assertion. The patent claim in *Halliburton* recited a “fragile gel” used as lubrication in drilling oil wells. The patentee argued that a fragile gel was one that could easily transition between a gel state while at rest and a liquid state while drilling and, when in the gel state, suspend drill cuttings and weighting materials. The court determined an artisan would not know whether a certain drilling fluid was within the scope of the claims because a wide variety of oil well characteristics would influence how the gel would perform (e.g., geology, wellbore size, depth, angle, etc.). “In other words, a given fluid might be adequate to suspend drill cuttings in some formations and/or well configurations, whereas in others it would not be.” *Id.* at 1255. The court therefore found the claim to be indefinite. Here, unlike the many oil well characteristics influencing performance in *Halliburton*, there is only one factor at play—the location of the modulator in relation to the filter—and this factor by itself does not determine whether a transmission system is infringing or not. A circuit can infringe no matter whether the modulator comes before or after the filter.

And despite Respondents’ suggestion otherwise, the lack of an antecedent basis for a claim limitation does not automatically render a claim invalid as indefinite. In *Energizer Holdings, Inc. v. International Trade Commission*, for example, the “said zinc anode” limitation did not have an explicit antecedent basis, but the Federal Circuit held that the “anode gel” was “by implication the

PUBLIC VERSION

antecedent basis.” 435 F.3d 1366, 1370-71 (Fed. Cir. 2006). Likewise, in *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, the Federal Circuit held that the “condition code” limitation need not have a single antecedent basis in order to be definite because “the appropriate meaning of ‘condition code’ is readily apparent from each occurrence in context . . . the [asserted] patent used condition code to refer to a value or a storage location based on its context within the claims.” 520 F.3d 1367, 1376 (Fed. Cir. 2008) (also noting “the well-settled rule that claims are not necessarily invalid for a lack of antecedent basis”).

Xtera offers a different perspective than Staff in arguing that “the pulses” limitation is definite. According to Xtera, Respondents’ argument “is based on a false distinction—that ‘optical pulses’ and ‘carrier pulses’ are separate and distinct physical phenomena, rather than describing aspects of the same optical data signal.” CRB at 15. The essence of Xtera’s argument is that optical pulses can include carrier signals added by the filter, in which case they are labeled “carrier pulses,” but the optical pulses with carrier signals are still optical pulses. Xtera concludes, therefore, that “optical pulses” is always the antecedent of “the pulses” limitation such that the “modulating means for modulating the pulses with data for transmission” will always act upon optical pulses regardless of whether the modulator is placed before the filter or after the filter. CRB at 16.

Respondents argue that Xtera’s experts contradicted themselves and Xtera’s position, which highlights the ambiguity of the limitation. RIB at 7-8. For example, Dr. Ralph agreed that “the pulses can be either the optical pulses from the means for producing or the carrier pulses from the filter.” Tr. at 358:15-19. But Dr. Ralph clarified that “one can think of the [‘the pulses’ limitation] as . . . the optical pulses that are eventually created,” and there would be no “misunderstanding or confusion” if “the pulses” also referred to carrier pulses because “the optical

PUBLIC VERSION

pulses and the carrier pulses can be the same thing.” Tr. at 310:16-311:10, 357:2-9. Respondents also point out that Dr. Willner similarly testified that the “the pulses” limitation “can refer to either the optical pulses or the carrier pulses.” RIB at 8 (citing Tr. at 545:25-546:2). However, he also clarified that “[o]ne could view [‘the pulses’ limitation] as optical pulses or as carrier pulses” and that it is “fairly straightforward to have [‘the pulses’ limitation] be the optical pulses.” Tr. at 545:3-546:98; *see id.* at 550:3-7 (agreeing with Respondents’ counsel that “one of ordinary skill in the art wouldn’t be confused and they would read the [‘the pulses’ limitation] to refer to the optical pulses”).

The testimony of the expert witnesses is precise to a fault, and this precision may have led to Respondents’ confusion. The experts’ references to “carrier pulses” is not to the exclusion of “optical pulses,” as the testimony may indicate, because carrier pulses are simply optical pulses that have been filtered. Referring to the filtered optical pulses as carrier pulses is accurate and the experts were justified in using this terminology as it mimics the language of the ’403 patent, but the experts could have also referred to the carrier pulses as optical pulses for the purposes of explaining the “the pulses” limitation.

Accordingly, despite the lack of an antecedent basis, Respondents have not shown by clear and convincing evidence that a person of ordinary skill in the art would not understand, with reasonable certainty, that the “the pulses” limitation refers to optical pulses irrespective of whether those optical pulses are adorned with carrier signals. The claims and specification of the ’403 patent informs the ordinary artisan that claim 8 is agnostic as to the position of the modulating means in relation to the filter such that “the pulses” being modulated are always optical pulses, with or without carrier signals. The asserted claims are therefore not indefinite.

**b) Construction**

As has been explained above, claim 8 covers a configuration in which the modulating means modulates optical signals that have not yet been filtered as well as a configuration in which the modulating means modulates optical signals that have been filtered. Optical signals that have been filtered are “carrier pulses” that have passed through the filter. *See id.* at cl. 8. Those carrier pulses, however, are still optical pulses – they are optical pulses that have the claimed temporal profile. *See id.*; CIB at 67; RIB at 69. Therefore, regardless of the placement of the modulator with respect to the filter, the modulator will always be modulating optical pulses – either unfiltered optical pulses or filtered optical pulses (i.e., carrier pulses). *See, e.g.*, Tr. at 310:16-311:10, 356:24-357:9, 358:15-19, 544:23-546:19, 550:3-7, 812:2-4, 942:3-18, 946:18-948:4. I construe the term “the pulses” to mean optical pulses with the understanding that those pulses may or may not have been filtered.

**C. Infringement**

**1. Literal Infringement**

Xtera asserts that the Accused Products infringe claims 8, 9, and 12 of the '403 patent. CIB at 78. Claim 8 is an independent claim and claims 9 and 12 depend from claim 8. '403 Patent at Cl. 8, 9, 12.

**a) Claim 8 is not literally infringed**

Claim 8 of the '403 patent provides as follows:

[Preamble] 8. A transmitter for producing an optical data signal for transmission over a wavelength division multiplexer optical communication system comprising:

[8A] means for producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot;

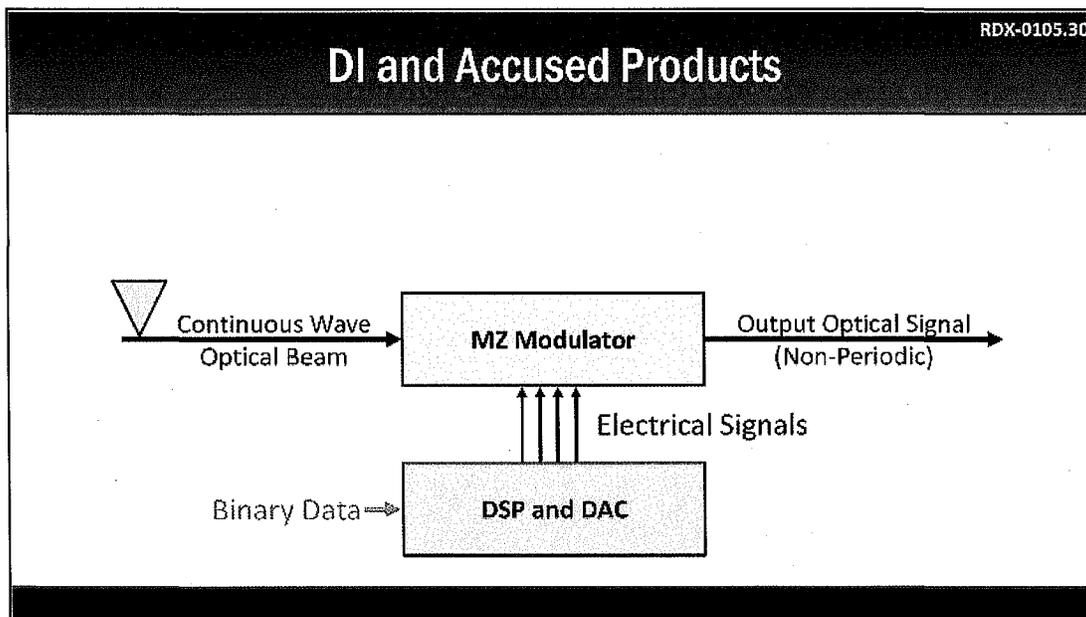
[8B] a filter having a spectral profile giving rise to carrier pulses,

[8C] each carrier pulse having a temporal profile extending over more than one time slot, the temporal profile having a minimum substantially in the center of each of the time slots adjacent to the time slot for that corresponding carrier pulse, the temporal profile of the corresponding carrier pulse further having an oscillating tail that extends from the minimum into at least one time slot that is even further from the time slot for the corresponding cg pulse; and

[8D] modulating means for modulating the pulses with data for transmission.

*Id.* at Cl. 8. Staff and Respondents organize their arguments by breaking the claim into four elements labeled 8A-8D above. I adopt the same convention.

In general, the parties agree that the Accused Products have three main components: (1) a continuous wave (CW) laser, (2) a Mach-Zehnder modulator (MZM), and (3) a digital signal processor (DSP), which includes a finite impulse response (FIR) filter, and a digital-to-analog converter (DAC). CIB at 78-79; RRB at 8-9; SIB at 14-15; Tr. at 59:4-15; RDX-0105.30 (reproduced below).



**(1) Element 8A – “means for producing a period series of optical pulses”**

Element 8A is means for producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot. Xtera points to the combined structure of the continuous wave (CW) laser and Mach-Zander (MZ) modulator in the Accused Products as satisfying this “means for producing” element. For a means-plus-function limitation, “[l]iteral infringement . . . requires that the relevant structure in the accused device perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification.” *Gen. Protecht Grp., Inc. v. Int’l Trade Comm’n*, 619 F.3d 1303, 1312 (Fed. Cir. 2010) (quoting *Applied Med. Res. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1333 (Fed. Cir. 2006)). Below I apply each part of this test to the CW laser/MZ modulator combination in the Accused Products. The bottom line, however, is that the Accused Products have no structure that produces a periodic series of optical pulses. The structure identified by Xtera therefore does not perform the identical function recited in element 8A. Additionally, the structure identified by Xtera is not identical to the corresponding structure in the ’403 patent specification for performing that function. Xtera also has not shown that the structure of the Accused Products is equivalent to the relevant corresponding structure disclosed in the ’403 patent.

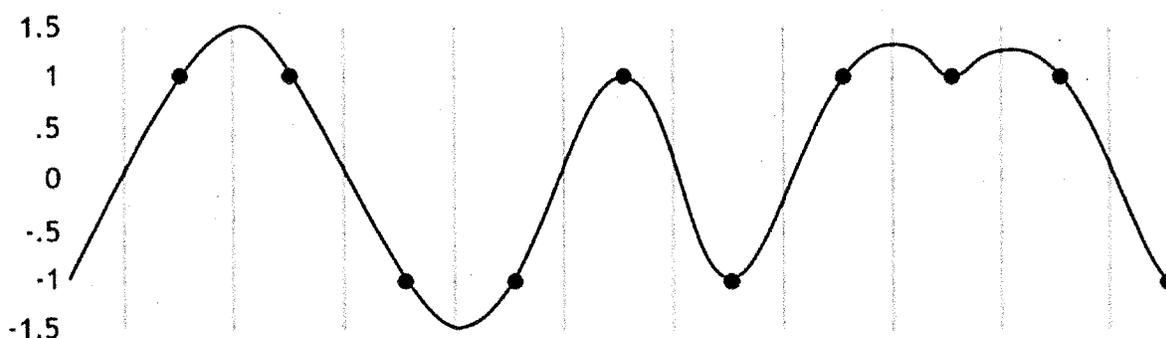
**(a) The structure in the Accused Products does not perform the identical function**

The first part of the means-plus-function test requires me to determine if the structure identified by Xtera performs “the identical function recited in the claim.” *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. The agreed function of the “means for producing” is “producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot.” CIB at 12; SIB at 39; RIB at 62. There are only two optical signals produced by the structure identified by Xtera as corresponding to this claim limitation: the optical beam coming out of the

CW laser and the optical output of the MZ modulator. Neither meets the requirements of element 8A.

With respect to the CW laser, there is no dispute that the optical beam coming out of the laser does not comprise optical pulses; it is a continuous waveform at a constant frequency. Tr. at 816:20-817:3 (Brandt-Pearce); 974:19-25 and 987:11-20 (Blumenthal), 362:25-363:6 (Ralph), 527:5-527:19 and 556:13-18 (Willner), 138:19-22 (Pelouch).

The only other structure that produces optical signals is the MZ modulator. The MZ modulator uses encoded electrical signals from a digital signal processor to modulate the incoming continuous laser beam with data at predetermined intervals. Xtera's expert illustrated what a representative optical signal output from the MX modulator would look like:



CDX-0103C.33<sup>5</sup>. Because the data impressed on the laser beam is not periodic, the resulting output optical signal from the MX modulator shown above also is not periodic. Tr. at 814:17-819:10, 826:3-5, 827:8-828:21, 970:6-14; RDX-0105C.49-51. I find as a factual matter that the record shows the MX modulator output optical signal has no regularly repeating pattern and is not periodic.

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<sup>5</sup> I am mindful that there are actually two optical signals output from the MZ modulator that are transmitted along each polarization, but each signal would generally have this profile. See RRB at 12; Tr. at 818:16-819:1.

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Notwithstanding the fact that no periodicity is “visible” in the MX modulator output optical signal, Xtera argues that a periodic series of optical pulses must still “exist” in the Accused Products in order for the signal to be properly decoded at the receiver. *See, e.g.*, CIB at 14-17, 20, 81. Xtera notes that a receiver used with the Accused Products will evaluate the signal at regular intervals shown by the black dots in the illustration above to decode the transmitted data. *See id.* CIB at 14-17. But the behavior of a receiver does not determine whether a signal is periodic. If periodicity just means evaluating a signal at equally spaced, predetermined points in time, any signal could be evaluated that way and could be determined to be periodic. Claim element 8A requires producing a periodic series of optical pulses, not decoding a signal at predetermined periodic intervals. Tr. at 822:4-823:19, 818:16-819:10 (Brandy-Pearce), 970:4-23 (Blumenthal).

Xtera also argues that the Accused Products operate at a “specific bit/ baud” rate, which is evidence of periodic signals produced in accordance with the claimed function of element 8A. CIB at 82. For example, in response to a question asking whether the Accused Products performed the function of producing a periodic series of optical pulses, Xtera’s expert stated “it must, because it’s part of a WDM system” and documentation of that system “explicitly that shows it has a specific Baud rate.” Tr. at 323:8-14. This evidence, however, does not mean that a particular structure in the Accused Products produces a periodic series of optical pulses. Baud rate is related to the rate at which data is being transmitted. *See id.* at 825:7-9. The fact that a certain amount of data is transmitted within a certain time does not mean that a structure within the Accused Products must have produced a periodic series of optical pulses in the manner required by element claim 8A.

I also find, as a factual matter, that the output optical signal from the MZ modulator (illustrated by Xtera in the figure from CDX-0103C.33 above) has no features sufficiently distinct

PUBLIC VERSION

to be called pulses. Xtera argues that individual pulse forms in the transmitted signal “exist and can be derived from the signal’s spectrum,” even if pulses are not visible in the optical signal output from the MZ modulator. *See, e.g.*, CIB at 81. The fact that pulses may be derived from an output signal or that mathematical functions may be performed on an output signal to break that signal down into periodic constituents does not prove that a structure in the Accused Products actually produces such pulses. It may be true that an output signal can be broken down into periodic signals which, summed together, equal the signal in question, but it also may be equally true that the same output signal can be broken down into a summation of non-periodic constituents. The kinds of mathematical operations that can be performed after the fact on a signal coming out of the structure identified by Xtera does not demonstrate that the structure *produced* a periodic series of optical pulses.

Xtera next claims that documentation for the Accused Products “repeatedly refers to the transmitter output as pulses.” *See* CIB at 96-98. I have examined the passages that Xtera cites and I find that those passages do not refer to the transmitter output optical signal as pulses. The passages in question refer to pulse-shaping attributes within various digital filters. *See* CX-0116C.0262 (describing a digital filter in the Acacia AC400 software specification); CX-1890C.0064 and CX-0304C.0064 (describing finite impulse response filters in an Alcatel-Lucent digital signal processor); CX-0010C.0018 and CX-0021C.0015 (describing pulse shaping attributes of a digital filter in a Nokia product); CX-0196C.0002 [REDACTED]. [REDACTED]. The pulse-shaping attribute of a digital filter is a characteristic of the filter, not a characteristic of the signal upon which the filter acts. *See* Tr. at 216:4-18; 806:12-18; 995:7-18. The documents cited by Xtera are not evidence that the accused CW laser and MZ modulator produce a pulsed signal.

PUBLIC VERSION

Additionally, I find that all of the filters described in the documents cited by Xtera at CIB 96-98 are implemented in the electrical digital domain; they are not filters acting on optical signals. Tr. at 38:1-11, 553:8-14. For this additional reason these passages are not evidence the CW laser and MZ modulator identified by Xtera produce *optical* pulses.

My findings are supported by the testimony of experts in the field. Dr. Blumenthal gave a detailed explanation as to why lines of NEC code cited by Xtera describe attributes of a filter and do not demonstrate the production of a periodic series of optical pulses in the accused NEC products. Tr. at 994:2-10. Similarly, Dr. Brandt-Pearce testified “[t]here is no pulse involved” in the accused modulation process. Tr. at 841:17-843:2.

Literal infringement requires that a structure in the Accused Products performs the identical function recited in the claim. *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. No structure in the Accused Products performs the claimed function of “producing a periodic series of optical pulses.” For at least this reason, there is no literal infringement of claim 8.

**(b) The structure in Accused Products is not identical to the corresponding structure in the '403 patent specification**

The next question I must answer for means-plus-function element 8A is whether the relevant structure in the Accused Products is “identical” to the corresponding structure in the specification. *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. That question is easily answered: the structure is not identical.

I have determined above that the only structure in the '403 patent disclosed as corresponding to the claimed function in element 8A is a pulsed laser light source such as an active mode locked laser. A pulsed laser light source has an element in its cavity that creates oscillation to produce a series of short optical pulses. Tr. at 295:11-23, 807:21-808:4, 843:3-10, 985:22-986:5.

The structure that Xtera identifies in the Accused Products as satisfying element 8A is the combination of a continuous wave (CW) laser and MZ modulator. The CW laser in the Accused Products produces an optical signal with a relatively constant amplitude that does not include any pulses. Tr. at 138:19-22, 249:2-9, 362:25-363:6, 376:25-377:2, 527:5-19, 816:15-817:3, 974:19-23. There is no element in the cavity of the accused CW laser that creates oscillations to produce short optical pulses. Thus, the accused CW laser is not identical to the pulsed laser structure disclosed in the '403 patent. The MZ modulator in the Accused Products also is not identical to the pulsed laser structure disclosed in the '403 patent. It has no element in its cavity that oscillates to create a series of short optical pulses. Finally, the combination of the CW laser and the MZ modulator also is not structure identical to the pulsed laser light source disclosed in the '403 patent. The structure in the '403 patent that is clearly linked to the function of element 8A is pulsed laser, not a combination of a CW laser and MZ modulator. The combination of the CW laser and MZ modulator does not form an identical structure to the structure of the pulsed laser disclosed in the '403 patent. Thus, Xtera has failed to identify any structure in the Accused Products that is identical to the structure in the '403 patent specification closely linked to the function of producing a periodic series of optical pulses.

**(c) The structure in Accused Products is not equivalent to the corresponding structure in the '403 patent specification**

The last question I must resolve with respect to means-plus-function limitation 8A is whether the structure Xtera points to in the Accused Products is “equivalent to the corresponding structure” in the '403 patent specification. *Gen. Protecht Grp.*, 619 F.3d at 1312. A structure constitutes an equivalent to the corresponding structure in the patent “only if the accused structure performs the identical function ‘in substantially the same way, with substantially the same result.’” *Id.* (quoting *Applied Med. Res.*, 448 F.3d at 1333).

PUBLIC VERSION

Starting with the “function” prong, a structure in the Accused Products can only be equivalent to the structure disclosed in the ’403 patent if it performs the identical function. *Id.* Here, the relevant function of element 8A is “producing a periodic series of optical pulses defining a series of time slots, wherein one pulse appears in each time slot.” I have already found that the CW laser and MZM combination in the Accused Products do not perform that function. Accordingly, the CW laser and MZM combination is not a structure equivalent to the relevant structure disclosed in the ’403 patent. Xtera’s argument of infringement based on equivalent structure under § 112 fails for at least that reason.

Turning to the question of whether the CW laser and MZ modulator combination function in the same way as the pulsed laser in the ’403 patent, Respondents’ experts Dr. Brandt-Pearce and Dr. Blumenthal explained how the pulsed laser in the ’403 patent produces optical pulses and how the continuous wave laser and MZ modulator in the Accused Products operate differently. For example, Dr. Brandt-Pearce explained a pulsed laser light source has an element in its cavity that creates oscillation, producing a series of short optical pulses. Tr. at 843:3-10, 985:22. In contrast, the combination identified by Xtera has an external modulator that does not create an oscillation. *Id.* Dr. Blumenthal agreed the structure Xtera identifies in the accused devices is not equivalent to the structure in the patent because the CW laser/MZ modulator combination operates in a different way. Tr. at 985:22-986:5 (“An active mode locked laser forms pulses by modulating inside the cavity . . . producing extremely short, very high quality pulses. And a CW laser is a completely different way of putting things together . . . . So they’re not equivalent”). These explanations were clear and cogent.

In contrast, Xtera’s expert Dr. Ralph could not clearly explain how the accused structures operate in the same way as the pulsed laser disclosed in the ’403 patent. He merely stated that “it

PUBLIC VERSION

involves an optical source” and “some way of identifying or having a clock of some presumably originating the electrical domain, to identify some periodicity and some way of modulating or creating pulses.” Tr. at 298:2-7. Xtera’s other expert, Dr. Willner, concluded that a CW laser plus modulator would “function in substantially the same way,” but he never explained how he reached that conclusion. Tr. at 428:1-9; 446:1-15. I find the testimony of Dr. Brandt-Pearce and Dr. Blumenthal more convincing on this point than the testimony of Xtera’s experts.

Xtera also asserts that a patent to Frankel teaches that continuous laser sources function in substantially the same manner as mode-locked lasers. *See* CIB at 87, citing RX-0651:6:23-29. Figure 7 of Frankel shows a system that uses mode-locked laser sources that produce optical pulses, while Figure 1 of Frankel shows a similar system that uses continuous laser sources.<sup>6</sup> But the specific passage in Frankel cited by Xtera does *not* state that continuous wave lasers function in the same way as mode-locked lasers that produce optical pulses. It is a summary statement that the “transmitting node” and “receiving node” of the system in Frankel Figure 7 “function in substantially the same manner” as the transmitting node and receiving node of Frankel Figure 1. *See* RX-0651:6:23-29.

Section 112, sixth paragraph, requires a much more discrete analysis than the holistic comparison in Frankel cited by Xtera. The relevant question here is whether the CW laser/MZ modulator combination in the Accused Products functions in the same way as a pulsed laser when it comes to “producing a periodic series of optical pulses.” Frankel does not answer that question. In contrast to the Frankel reference, the opinions of Dr. Brandt-Pearce and Dr. Blumenthal were made after examining the technology at issue in this investigation. I find the Frankel reference is

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<sup>6</sup> As I explain later, the Frankel reference discloses a system that anticipates the relevant claims of the ’403 patent.

therefore less relevant than the testimony I heard from experts that considered the actual technology at issue here. In sum, I find that the structure identified by Xtera does not function in the same way as the pulsed laser disclosed in the '403 patent. Xtera's argument of infringement based on equivalent structure under § 112 fails for this additional reason.

As to the "result" prong, I find that Xtera failed to show by a preponderance of the evidence that the CW laser and MZ modulator in the Accused Products produces substantially the same result as a pulsed laser light source. Xtera's expert, Dr. Ralph, concluded that a CW laser and MZ modulator would achieve substantially the same result as an active mode locked laser. Tr. at 298:12-20. He stated that the structures "both produce pulses" and are "both capable of producing a series of optical – of optical pulses." *Id.* at 328:19-329:4. As explained above, however, the CW laser/MZ modulator combination does not produce a periodic series of optical pulses. *Compare* Tr. at 807:18-808:4, *with* 819:2-10, 822:21-823:11, 825:4-18, 843:11-22. The structure identified by Xtera in the Accused Products therefore does not achieve substantially the same result as the pulsed laser light source disclosed in the '403 patent. Xtera's argument of infringement based on equivalent structure under § 112 fails again for this reason.

**(2) Elements 8B and 8C**

Claim 8 requires that the Accused Products have "a filter" (element 8B) that gives rise to "carrier pulses" having a specific temporal profile (element 8C). '403 patent at Cl. 8. While the parties generally agree that the Accused Products have a digital signal processor (DSP) that includes a finite impulse response (FIR) filter acting on electrical signals, the parties disagree whether the filter gives rise to "carrier pulses." *See* CIB at 101, 104-110; Tr. at 551:1-4; RRB at 38; SIB at 50-52.

## PUBLIC VERSION

As an initial matter, Xtera's infringement expert provided unclear testimony regarding the location of the "carrier pulses" in the Accused Products. In fact, he identified three possible locations for such "carrier pulses" – (i) the output of the MZ modulator, (ii) in between the DAC and the MZ modulator, and (iii) inside the DSP. Tr. at 550:8-555:9, 587:9-589:16; RDX-130. Further undermining his credibility, he had difficulty remembering which one of the three possible locations he was relying on for the purposes of his infringement analysis. Tr. at 554:3-555:6. As previously discussed with respect to claim construction, according to the '403 patent, "carrier pulses" are optical pulses that have been filtered. *See supra* at IV.B.3. Xtera, however, fails to explain how the signals coming out of the FIR filter in the DSP are optical pulses. Instead, I find that signals coming out of the DSP and digital-to-analog convertor (DAC) and going into the MZ modulator are electrical signals, not optical signals. Tr. at 347:10-17 (describing "carrier pulses" between DAC and MZ modulator as "electrical analog signals"), 850:17-22 (output of FIR filter is "a stream of digital samples"). Moreover, I find that those electrical signals do not include any pulses. Tr. at 822:21-823:11, 855:2-7, 970:6-23. Accordingly, I find that Xtera has failed to prove by a preponderance of the evidence that the Accused Products have the filter and carrier pulses required by claim elements 8B and 8C.

### **(3) Element 8D**

Element 8D is a "modulating means for modulating the pulses with data for transmission." As an initial matter, I note that Xtera's leading argument is that the Accused Products use a combination of a CW laser and an MZ modulator "to produce optical pulses while simultaneously modulating those optical pulses with data." CIB at 1. Consistent with that position, Xtera's expert Dr. Ralph testified that he did not interpret the "modulating means" of element 8D "to exclude the

ability to create the pulses and also put data on them at the same time.” Tr. at 543:25-544:6.<sup>7</sup> I reject that argument. Xtera’s position would rewrite claim 8 from requiring a structure for producing pulses and a structure for modulating those pulses into a claim requiring a structure for producing pulses modulated with data at the time of production. But claim 8 requires something different from Xtera’s rewrite. The plain language of claim element 8D requires a structure (the “modulating means”) to perform an action (“modulating”) on what is grammatically the object of the phrase (“the pulses”). The modulating means cannot perform the action on an object if that object does not yet exist. For at least that reason, Xtera’s argument about producing and modulating pulses simultaneously must be rejected.

A methodical examination of claim element 8D under § 112, sixth paragraph (which all parties agree applies), demonstrates that the Accused Products do not meet this claim limitation for additional reasons. Xtera points to the MZ modulator in the Accused Products as satisfying this limitation. Literal infringement of this means-plus-function limitation “requires that the relevant structure in the accused device perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification.” *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. Below I apply each part of this test to the MZ modulator in the Accused Products.

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<sup>7</sup> Under Xtera’s theory, the MZ modulator in the Accused Products is involved both in the “means for producing” optical pulses as well as the “modulating means.” While it is theoretically possible for one structure in an accused device to satisfy multiple limitations of a patent claim, that may only be the case when the patent claim does not require otherwise. *Compare, e.g., Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231-32 (Fed. Cir. 2011) *with Becton, Dickinson & Co. v. Tyco Healthcare Group*, 616 F.3d 1249, 1254 (Fed. Cir. 2010); *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004); *and Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404–05 (Fed. Cir. 1996). As I explain in this section, the patent claim at issue here requires a pulse to be produced before it may be modulated.

PUBLIC VERSION

**(a) The structure in the Accused Products does not perform the identical function**

The parties agree that the claimed function of element 8D is “modulating the pulses with data for transmission.” Xtera argues that the MZ modulator in the Accused Products performs the identical function of claim element 8D. Staff and Respondents disagree.

I have determined above that “the pulses” in this claim element are optical pulses. *See* section IV.B.3. Thus, the relevant function may be considered to be “modulating optical pulses with data for transmission.” But I have determined there is no periodic series of optical pulses in the Accused products. The MZ modulator in the Accused Products receives a continuous light beam from the CW laser. There are no pulses in a continuous light beam output from a CW laser. *See* Tr. at 362:25-363:6, 556:16-18, 810:7-9, 816:17-817:3, 974:16-25, 987:11-20. Without optical pulses, the MZ modulator structure cannot perform the claimed function of modulating optical pulses with data for transmission. Literal infringement requires that a structure in the Accused Products performs the identical function recited in the claim. *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. No structure in the Accused Products performs the claimed function of modulating the pulses with data for transmission. For at least this reason, there is no literal infringement of claim 8.

**(b) The structure in Accused Products is identical to the corresponding structure in the '403 patent specification, but it does not perform the same function**

The parties agree that the structure in the '403 patent specification clearly linked to performing the claimed modulating function in element 8D is “electro-optic modulators, including Mach-Zehnder modulators, and their equivalents.” CIB at 120; RRB at 58; SIB at 53. The parties also agree that the MZ modulator in the Accused Products is identical to the MZ modulator described as performing the claimed function in the '403 patent. *See* CIB at 1, 94; RRB at 8-9,

12; SIB at 15. This identity, however, is not enough to support Xtera's claim of infringement. As explained above, the MZ modulator in the Accused Products does not perform the identical function as claim element 8D, so the claim element is not satisfied. *Gen. Protecht Grp., Inc.*, 619 F.3d at 1312.

**(c) Equivalents to the corresponding structure in the '403 patent specification**

As noted above, the parties agree that the MZ modulator in the Accused Products is identical to the MZ modulator described as performing the claimed function in the '403 patent. *See* CIB at 1, 94; RRB at 8-9, 12; SIB at 15. Accordingly, I need not evaluate potential equivalents to the claimed structure. *See Gen. Protecht Grp., Inc.*, 619 F.3d at 1312. The MZ modulator in the Accused Products does not perform the identical function as claim element 8D, so even if it were equivalent to the claimed structure this limitation is not satisfied. *Id.*

**b) Claims 9 and 12 are not literally infringed**

Because the Accused Products do not literally infringe independent claim 8 of the '403 patent, they also cannot infringe claims 9 and 12, which depend from claim 8.

**2. No Infringement Under the Equitable Doctrine of Equivalents**

The equitable doctrine of equivalents analysis, which is theoretically distinct from the statutory doctrine of equivalent structures under § 112, sixth paragraph, considers whether an accused product contains elements identical or equivalent to each claimed element of the patented invention. *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997). To satisfy a means-plus-function limitation under the doctrine of equivalents, "the accused structure must perform substantially the same function, in substantially the same way, to achieve substantially the same result, as the disclosed structure." *Kemco Sales, Inc. v. Control Papers Co., Inc.*, 208 F.3d 1352,

PUBLIC VERSION

1364 (Fed. Cir. 2000). Furthermore, “[b]ecause the ‘way’ and ‘result’ prongs are the same under both the second 112, paragraph 6 and doctrine of equivalents tests, a structure failing the section 112, paragraph 6 test under either or both prongs must fail the doctrine of equivalents test for the same reason(s).” *Id.*

With respect to claim element 8A—the “means for producing a periodic series of optical pulses” I determined in my literal infringement analysis that the CW laser and MZ modulator combination in the Accused Products is not structure equivalent to the pulsed laser disclosed in the ’403 patent for performing that function. *See* section IV.C.1.a)(1)(c). In making that determination, I found that the accused CW laser/MZ modulator combination does not operate in the same way as the disclosed structure or produce the same result as is disclosed in the ’403 patent. Because the accused CW laser/MZ modulator combination fails both the “way” and “result” prongs of the § 112 equivalents analysis, that combination does not meet claim element 8A under the equitable doctrine of equivalents. There is no infringement of any patent claim under the doctrine of equivalents for at least this reason.

Xtera argues that to the extent that the filter limitation of claim element 8B is interpreted to require an optical filter, the Accused Products satisfy that limitation under the equitable doctrine of equivalents. *See* CIB at 91-93, 120. Because I do not need to resolve whether element 8B is limited to an optical filter to resolve the parties’ disputes, I need not address Xtera’s argument regarding doctrine of equivalence for the filter limitation in claim element 8B.

Xtera does not allege that the Accused Products practice any other claim element under the doctrine of equivalents. *See* CIB at 93-94, 120-22.

**3. No Indirect Infringement**

Xtera did not present any arguments in its post-hearing briefs regarding indirect infringement and thus, that contention is deemed withdrawn. Ground Rule 14.1 (“Any contentions for which a party has the burden of proof that are not set forth in detail in the post-hearing initial brief shall be deemed abandoned or withdrawn.”).

**D. The Technical Prong of the Domestic Industry Requirement Is Not Met**

Xtera asserts that its domestic industry product, the NuWave Optima with AC400 module, practices claim 8 of the ’403 patent, and thus satisfies the technical prong of the domestic industry requirement, in the same way that Nokia’s 1830 and 1620 products and NEC’s T740SW product practice 8, namely, with a CW laser and MZ modulator producing optical signals and with a filter that acts on electrical signals inside a digital signal processor. CIB at 78-79; *see also* RRB at 63 (“Xtera has not argued any meaningful differences between the Accused and DI Products.”); SIB at 58 (“The evidence shows that the AC400 in the Nu-Wave Optima is the same as the AC400 in Nokia’s 1620 products with XWAV line card”). Indeed, Xtera’s arguments with respect to the technical prong of the domestic industry requirement are coextensive with those directed to infringement. *See* CIB at 78-94. In the infringement analysis above I explained why the CW laser/MZ modulator/DSP electrical signal filter configuration does not meet claim 8 and therefore cannot satisfy the other asserted claims. For those same reasons, I find that Xtera has failed to satisfy the technical prong of the domestic industry requirement.

**E. Validity**

**1. Indefiniteness**

As discussed in section IV.B.3.a), I have determined that the phrase “the pulses” is not indefinite. Respondents have therefore failed to prove the asserted claims of the ’403 patent are invalid on that basis.

## 2. Written Description

Claim 8 of the '403 patent describes “a filter having a spectral profile giving rise to carrier pulses.” Respondents argue that such language is broad enough to cover optical and digital filters but the specification of the '403 patent only describes optical filters, not digital filters. Respondents contend that claim 8 is invalid for lack of written description. RIB at 8-11.

Under 35 U.S.C. § 112, ¶ 1, every patent must “contain a written description of the invention, and of the manner and process or making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same.” Whether a specification complies with the written description requirement is a question of fact judged from the perspective of a person of ordinary skill. *Falkner v. Inglis*, 448 F.3d 1357, 1363 (Fed. Cir. 2006). Respondents must establish lack of written description by clear and convincing evidence. *Invitrogen Corp. v. Clontech Labs.*, 429 F.3d 1052, 1072 (Fed. Cir. 2005).

The parties appear to be in agreement that the specification of the '403 patent does not have an express example of a digital filter. RIB at 9-10 (citing Complainant’s witnesses at Tr. at 209:4-211:13 (Dr. Wayne Pelouch, Xtera’s corporate witness regarding inventorship of the '403 patent), 373:25-375:5 (Dr. Ralph), 581:20-583:18 (Dr. Willner); JX-0041C at 209:16-19, 211:6-13 (deposition transcript of Dr. Peloch)); CRB at 21. This in itself is not a problem under 35 U.S.C. § 112, ¶ 1, because the law does not require the specification to contain embodiments “explicitly covering the full scope of the claim language.” *Falkner*, 448 F.3d at 1366. “[T]he written description requirement does not demand either examples or an actual reduction to practice; a constructive reduction to practice’ may be sufficient if it ‘identifies the claimed invention’ and does so ‘in a definite way.’” *Centrak, Inc. v. Sonitor Techs., Inc.*, 915 F.3d 1360, 1367 (Fed. Cir. 2019) (quoting *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc)).

PUBLIC VERSION

Xtera counters Respondents' criticism of the lack of a digital filter embodiment by asserting that "the '403 patent describes the invention with respect to the use of a Nyquist pulse shaping filter in a WDM transmitter" without requiring the Nyquist pulse shaping filter to be optical or digital. CRB at 23. But Xtera fails to cite any evidence to support its assertion.

Staff, however, discusses convincing portions of the '403 patent and evidence that shows that a person of ordinary skill in the art would have understood that the claimed pulse shapes could have been created using either an optical or a digital filter at the time of the invention. SIB at 67-68. The specification describes modulating pulsed light with data using an "electro-optic modulator 21," and more specifically that "[e]lectrical NRZ data is written onto the pulsed light stream using a Mach Zehnder modulator driven by an electrical NRZ data source 22 . . . ." '403 patent, 3:17-21. The parties and witnesses appear to equate "electrical" with "digital," such that a person of ordinary skill in the art could have interpreted the electrical disclosures of the specification as relating to a digital filter. *See* RIB at 9 ("The output of a DSP is an electrical signal . . . ."); *id.* (discussing "an electronic filter implemented with a DSP" and arguing that the "specification does not teach how to implement an electronic filter"); CRB at 24. Staff further refers to U.S. Patent Number 6,628,728, which was filed on April 28, 1999, as teaching that a "Nyquist filter can be used as a matched filter in a digital communications system." RX-0786 at Abstract. Dr. Brandt-Pearce confirmed that the filter described in U.S. Patent Number 6,628,728 could be used to achieve the claimed temporal profile. Tr. at 871:16-872:25. She also confirmed that "a person of ordinary skill in the art would have known of both digital filters and optical filters that could create [Nyquist pulse shapes]." *Id.* at 949:5-11.

I find Respondents did not prove by clear and convincing evidence that a person of ordinary skill in the art would understand the inventors were not in possession of an embodiment of the invention of claim 8 that utilizes a digital filter.

### 3. Anticipation and Obviousness

Respondents contend that “it is undisputed that both the problem and solution described in the ’403 patent were well known in the prior art.” RIB at 14. Respondents posit that the “’403 patent is directed to alleviating the problem of intersymbol interference (ISI),” which “was a well-known problem in optical transmission systems. *Id.* at 12 (citing Dr. Willner at Tr. at 1086:24-1087:2, 1101:4-17, 1099:25-1100:3, 1101:18-1102:5, 1099:24, 1099:25-1100:3). Given this problem, Respondents posit that “a person of ordinary skill would have considered mechanisms for reducing the effects of ISI when designing an optical transmission system.” *Id.* (citing Tr. at 797:18-800:23 (Dr. Brandt-Pearce), 899:7-900:8 (same), 1126:10-11 (Dr. Willner); RX-0882 at 228-30 (textbook co-authored in 1996 by Dr. Willner); RX-0790 at 15-17; RX-0786 at 1:50-60, 4:45-50, Figs. 3a, 3b). Respondents explain that root-raised-cosine filters and raised-cosine Nyquist filters are two mechanisms for reducing ISI that “meet the requirements of claim 8 and were taught in prior art textbooks.” *Id.* at 12-13 (citing Tr. at 131:16-19 (Dr. Pelouch), 196:11-198:14 (Dr. Jones), 305:5-306:11 (Dr. Ralph), 896:16-899:6 (Dr. Brandt-Pearce); RX-0790 at 17; RX-0882 at 229; CX-0378 at 56-57). Respondents also put forth one patent, referred to as Frankel (RX-0651), as anticipating the asserted claims. *Id.* at 14-28. Respondents further contend that the asserted claims are rendered obvious in view of Frankel by itself, in view of Frankel in combination with a textbook referred to as Proakis, in view of another patent referred to as McCarty, and in view of McCarty in combination with a textbook referred to as Kaminow. *Id.* at 14-57.

PUBLIC VERSION

Xtera, of course, disputes that the problem and solution described in the '403 patent were well known in the prior art, and Xtera disagrees with Respondents' contentions of anticipation and obviousness. CRB at 27-73. Xtera also proposes that the "[c]ommercial success of WDM systems with over 100 channels demonstrates non-obviousness." *Id.* at 74-80.

Staff agrees with Respondents that Frankel anticipates asserted claims 8 and 12, but disagrees that Frankel anticipates claim 9 or renders claim 9 obvious by itself or in combination with Proakis. SIB at 59. Staff also agrees with Respondents that the asserted claims are invalid as obvious in view of McCarty under Xtera's interpretation of the claims, but otherwise disagrees if Xtera's interpretation of the claims is not adopted. *Id.*

A patent is presumed valid. 35 U.S.C. § 282; *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 100 (2011). A respondent who has raised patent invalidity as an affirmative defense has the burden of overcoming this presumption by clear and convincing evidence. *See Microsoft*, 564 U.S. at 101-114. "Although not susceptible to precise definition, clear and convincing evidence has been described as evidence which produces in the mind of the trier of fact an abiding conviction that the truth of [the] factual contentions are highly probable." *Buildex Inc. v. Kason Indus., Inc.*, 849 F.2d 1461, 1463 (Fed. Cir. 1988) (internal quotations and citations omitted).

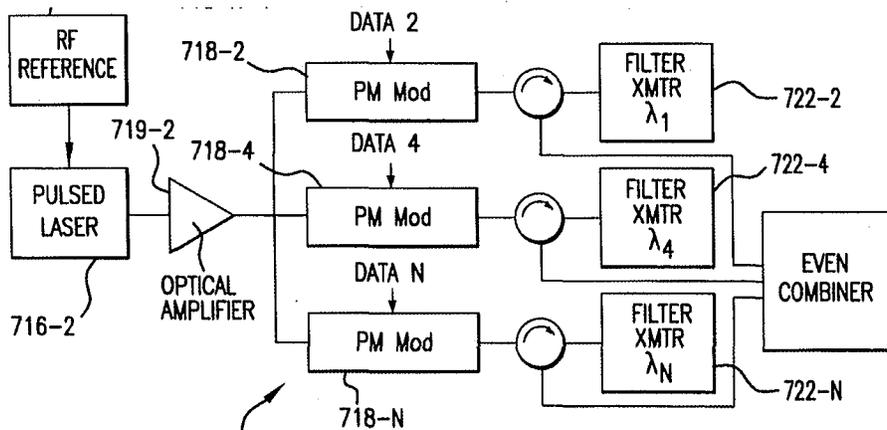
Based on the evidence and arguments of the parties set forth in detail in the following subsections, I find that Respondents have met their burden to prove by clear and convincing evidence that the asserted claims of the '403 patent are invalid as anticipated by Frankel.

**a) The Frankel patent anticipates the asserted claims.**

U.S. Patent Number 6,430,336 ("Frankel") was filed on December 18, 2000, and issued on August 6, 2002, to Michael Y. Frankel. RX-0651 at cover page. Xtera does not contend that Frankel was considered by the Patent Office during the prosecution of the '403 patent. *See* '403

patent at cover page. Xtera also does not contest that Frankel qualifies as prior art to the '403 patent under the relevant provisions of 35 U.S.C. § 102. *See* Tr. at 1102:14-17 (Dr. Willner).

According to Respondents, Frankel describes “a device and method for minimizing optical channel drift in a wavelength division multiplexed communication system” and “provid[ing] high channel density, i.e., spectral efficiency, and excellent signal transmission performance in multi-wavelength optical communication systems.” RIB at 15 (quoting RX-0651 at 1:5-8, 2:16-22). Respondents refer to an excerpt of Figure 7 of Frankel, embedded below, to explain that Frankel teaches a pulsed laser light source (labeled “PULSED LASER”), a Mach-Zehnder modulator (labeled “PM Mod”), and a super-Gaussian filter (labeled “FILTER XMTR”) in the same arrangement as Figure 2 of the '403 patent. RIB at 15-16 (embedding RDX-0105 at 92 and citing Tr. at 894:24-896:25 (Dr. Brandt-Pearce), 1108:1-5 (Dr. Willner); RX-0651 at 4:24-35, 8:47-59).



Xtera does not dispute that Frankel “discloses a pulsed laser light source such as a mode locked laser [or] . . . a modulator for modulating data onto a pulsed laser light source,” and Respondents provided sufficient evidence on this point. Tr. at 1102:24-1103:6 (Dr. Willner); *see* RIB at 16-17, 25-28 (citing RX-0651 at 1:54-64, 6:23-47, 7:6-17, Figure 7; Tr. at 358:15-19, 538:22-541:17, 544:23-545:10, 884:2-19, 893:25-894:23, 896:11-15, 1077:24-1086:3, 1102:24-1103:6); SIB at 60 (citing Tr. at 862:4-21, 863:10-21, 882:4-896:15). Xtera also does not dispute

PUBLIC VERSION

that Frankel discloses a filter having a spectral profile giving rise to carrier pulses, and the evidence is in accord. *See* RIB at 17 (citing RX-0651 at 4:24-35, 6:47-59, Figure 7; Tr. at 884:20-886:25). Xtera only contends that Respondents failed to show, for claim 8, that the filter disclosed in Frankel produces the required “temporal shape.” Tr. at 1103:7-21 (Dr. Willner); *see* CRB at 29-48; SIB at 60. As to claim 9, Xtera contends that Respondents failed to show that the filter disclosed in Frankel produces a “substantially flat top spectral profile,” which is part of claim element 8C. CRB at 48-50.

The “temporal shape” or “temporal profile” is described within claim element 8C as follows:

a filter having a spectral profile giving rise to carrier pulses, each carrier pulse having a temporal profile extending over more than one time slot, the temporal profile having a minimum substantially in the center of each of the time slots adjacent to the time slot for that corresponding carrier pulse, the temporal profile of the corresponding carrier pulse further having an oscillating tail that extends from the minimum into at least one time slot that is even further from the time slot for the corresponding cg pulse . . . .

Respondents contend that Frankel discloses the claimed temporal profile. RIB at 19. Respondents point out that “Frankel’s transmitter filter has, indisputably, a super-Gaussian spectral profile” and that the claimed temporal profile is present “in the mathematical nature of the super-Gaussian filter itself.” *Id.* (citing RX-0651 at 5:43-51, claim 7; Tr. at 886:19-25 (Dr. Brandt-Pearce), 1103:22-1105:2 (Dr. Willner)); *see* SIB at 60 (citing RX-0651 at 4:24-42, 5:43-51; Tr. at 1108:5-1 (Dr. Willner)). Xtera admits that a “super-Gaussian filter of the sixth order would provide an impulse response that meets Claim 8’s filter limitations,” but Xtera asserts that “[a]nything less than a sixth order would require specific analysis of that particular super-Gaussian order to determine whether it would meet Claim 8’s temporal profile.” CRB at 32 (citing Tr. at 1079:4-22 (Dr. Willner), 1103:15-1104:8 (same), 1127:22-1128:22 (same)).

PUBLIC VERSION

Xtera's response to Respondents' super-Gaussian argument requires an impermissibly narrow reading of Frankel. Frankel specifically describes a 2.3 order super-Gaussian filter, but it is not limited to any specific order. For example, as shown below, claim 8 of Frankel is limited to a 2.3-order super-Gaussian filter, but claim 7 of Frankel allows any super-Gaussian filter. RX-0651 at 8:1-9; Tr. at 895:21-896:10 (Dr. Brandt-Pearce), 1103:22-1106:3 (Dr. Willner testifying: "I'm certainly willing to agree to [Frankel is] not limiting it to any particular super-Gaussian [filter].").

7. An optical device according to claim 2, wherein each said filter exhibits an amplitude response defined by a Super Gaussian function.

8. An optical device according to claim 2, wherein each said filter exhibits a reflectance characteristic in accordance with:

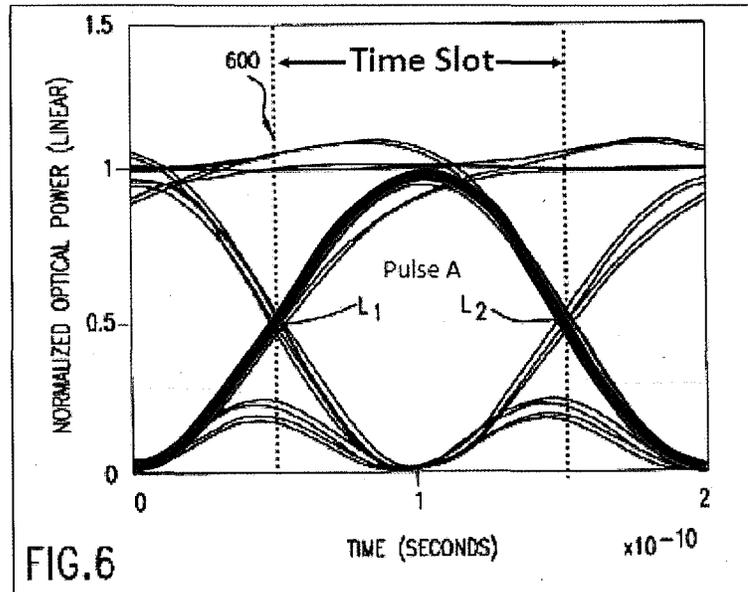
$$r = 0.65 \cdot e^{\left(\frac{f}{6.9 \cdot 10^9}\right)^{2.3}}$$

That Frankel is not limited to a specific super-Gaussian filter is important because, as Xtera's expert, Dr. Willner, admitted, a sixth order super-Gaussian filter "would provide an impulse response that meets Claim 8's filter limitations" and would have the required oscillating tails. Tr. at 1079:4-22, 1103:15-1107:25. He testified that "spectral filters with flat tops and steep sides would have been more difficult, complex, and expensive to implement than filters without spectral profiles having flat tops and steep sides," but he never suggested that a person of ordinary skill in the art would not have understood Frankel as disclosing a sixth order super-Gaussian filter. Tr. at 1091:15-1092:15. Respondents' expert, Dr. Brandt-Pearce, testified that a person of ordinary skill in the art would know that "a super-Gaussian filter of really any order higher than 2 . . . would have one or more visible bumps, oscillating tails." *Id.* at 887:6-23, 890:6-17; *see id.* at 1103:22-1104:8 (Dr. Willner agreeing that higher-order super-Gaussian filters can have oscillating tails, but equivocating that "not necessarily all of them" do). She also testified that that a person

PUBLIC VERSION

of ordinary skill in the art would know to “pick the order that suits [their] needs.” Tr. at 890:15-17, 896:3-10. The evidence therefore shows that Frankel discloses to a person of ordinary skill in the art the “temporal profile of the corresponding carrier pulse further having an oscillating tail” limitation either through the 2.3 super-Gaussian filter embodiment of Frankel or a higher-order super-Gaussian filter, such as a sixth-order super-Gaussian filter, that a person of ordinary skill in the art would have understood as disclosed in Frankel.

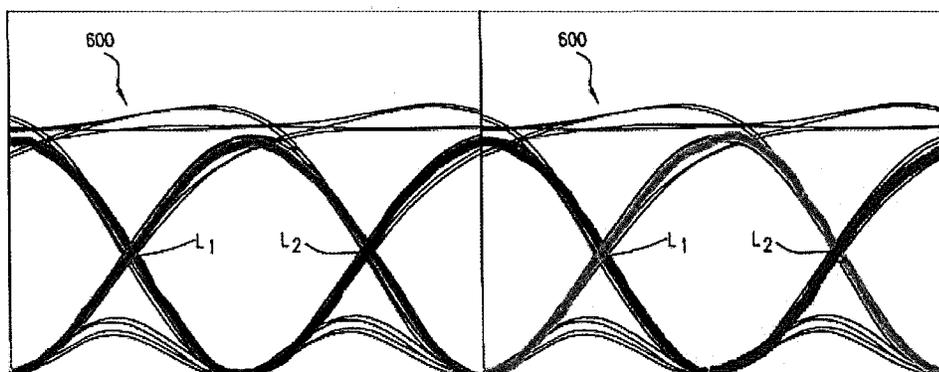
The only other limitation that Xtera challenges is whether the oscillating-tail super-Gaussian filter in Frankel also has a “temporal profile having a minimum substantially in the center of each of the time slots adjacent to the time slot for that corresponding carrier pulse.” Respondents’ expert, Dr. Brandt-Pearce, testified that this limitation is met by the nature of super-Gaussian filters and a person of ordinary skill in the art would know how to “pick the right parameters for your super-Gaussian filter” to satisfy the claim 8 requirements. Tr. at 887:19-23, 890:15-17. She also testified that Figure 6 of Frankel, referred to the parties as the “eye diagram,” shows the “required minimum and oscillating tails.” RIB at 20 (citing Tr. at 886-892:3). Regardless of whether Figure 6 shows oscillating tails, it clearly shows the pulse “minimum substantially in the center of each of the time slots adjacent to the time slot.” Shown below is Figure 6 of Frankel that Dr. Brandt-Pearce annotated for this disputed limitation.



RDX-0105.87 (embedding RX-0651 at Figure (annotated)). Dr. Brandt-Pearce first confirmed that Figure 6 is “consistent with my knowledge of what the impulse response of a super-Gaussian filter looks like.” Tr. at 888:23-889:12. She then explained that she annotated the time slot with dotted vertical blue lines. Tr. at 889:21-890:4. She also annotated “Pulse A” with a thick solid red line and explained that this pulse “is centered in that time slot” and extends into the previous and subsequent time slots. *Id.* As can be seen in Figure 6 of Frankel, only half of the previous and subsequent time slots are shown, and the “Pulse A” minimum is “substantially in the center of each of the time slots” as required by claim 8 of the ’403 patent. RX-0651 at Figure 6; *see* Tr. at 890:21-891:4.

Xtera’s evidence to the contrary is weak. Xtera only points to the testimony of its expert, Dr. Willner, that he does not “believe that necessarily all [super-Gaussian filters] would have a minimum substantially in the center of a neighboring time slot.” CRB at 31 (quoting Tr. at 1127:22-1128:4). But his testimony says nothing about whether the super-Gaussian filters relied on by Respondents would or would not have minimums substantially in the center of a neighboring time slots.

Xtera's attack on Respondents' evidence is similarly unavailing. Xtera asserts that an eye diagram should not be used to determine complex pulse shapes because an "eye diagram superimposes pulses in multiple time slots carrying pseudo-random bits as if they all appear in the same time slot." CRB at 38 (citing Tr. at 891:5-11; JX-0010 at 298). However, Xtera then quotes from Frankel an admission that the "limited uses" of an eye diagram include the crossing points, useable eye width, and usable eye height which is consistent with Respondents' use of the eye diagram to show pulse minimums. *Id.* at 39 (citing RX-0651 at 6:1-8). Xtera focuses its attack on eye diagrams in the context of whether or not they show oscillating tails, but in doing so Xtera illustrates how the eye diagram shows the required pulse minimums. *See* CRB at 43. Specifically, Xtera takes a demonstrative first created by Dr. Brandt-Pearce (RDX-0105 at 89) in which she extended the signal in Figure 6 of Frankel and outlines in bold colors what it believes are the pulse shapes shown. This image in its brief, embedded below, clearly shows that the pulse minimums are "substantially in the center of each of the time slots adjacent to the time slot for that corresponding carrier pulse." CRB at 44.



Xtera also attacks the eye diagram of Frankel by complaining that it represents the "signal at the receiver after the signal had been influenced by multiple filters" instead of the signal at the filter of the transmitter as required by claim 8 of the '403 patent. CRB at 45-48. Frankel, however, states that "receiver filters" may "have a configuration substantially identical to the transmitter

PUBLIC VERSION

filters,” and both “are configured to reflect optical channels within a reflectance band” and “attenuate[]” all other channels. RX-0651 at 5:17-27. Therefore, although the eye diagram in Frankel is not direct evidence of the pulse shape as it exits the transmitter filter, it is certainly persuasive circumstantial evidence. *See* Tr. at 892:19-893:24 (Dr. Brandt-Pearce).

As to the additional limitation of claim 9 that the pulses have “a substantially flat top spectral profile,” Respondent points to evidence showing that a sixth-order super-Gaussian filter meets this limitation. RIB at 27 (citing ‘403 Patent at 3:25-38). Xtera does not dispute this fact. CRB at 48-50. As discussed above, the evidence shows that a person of ordinary skill in the art would have understood Frankel as disclosing higher-order super-Gaussian filters, and such a person would have known to select a sixth-order super-Gaussian filter to use with Frankel’s system. *See* Tr. at 890:15-17, 896:3-10.

Accordingly, Respondents have shown by clear and convincing evidence that Frankel anticipates claims 8 and 9 of the ‘403 patent. Respondents have also shown by clear and convincing evidence that Frankel anticipates claim 12, which depends on claim 8, as Xtera does not dispute Respondents’ evidence that Frankel discloses the required Mach Zehnder modulator. As Frankel anticipates the asserted claims, analysis of whether Frankel alone or in combination with the Digital Communications book authored by John G. Proakis (RX-0790) is not necessary.

**b) Respondents do not assert that McCarty (U.S. Patent Number 6,628,728) invalidates the asserted claims under the proper construction of the claims.**

U.S. Patent Number 6,628,728 (“McCarty”) was filed on April 28, 1999, and issued on September 30, 2003, to Robert Joseph McCarty, Jr. RX-0786 at cover page. Xtera does not contend that McCarty was considered by the Patent Office during the prosecution of the ‘403

PUBLIC VERSION

patent. *See* '403 patent at cover page. Xtera also does not contest that McCarty qualifies as prior art to the '403 patent under the relevant provisions of 35 U.S.C. § 102.

Respondents assert that McCarty renders the asserted claims of the '403 patent as obvious “under the interpretation of the claims used by Xtera for its infringement theory.” RIB at 35. As discussed above, I do not adopt the interpretation of the claims used by Xtera for its infringement theory. Accordingly, Respondents fail to show that the asserted claims, when properly construed, are invalid as obvious in view of McCarty, or in view of McCarty combined with the Optical Fiber Telecommunications IVB book co-authored by Kaminow (RX-0787).

**V. DOMESTIC INDUSTRY – ECONOMIC PRONG**

Xtera attempts to show a domestic industry under both sections 337(a)(3)(A) and (B), i.e., through significant investment in plant and equipment and through significant employment of labor or capital. Xtera presents no argument or evidence under section 337(a)(3)(C), which requires substantial investment in exploitation of the patent, including engineering, research and development, or licensing. Staff joins Xtera in its ultimate conclusion that, should the Commission find that the domestic industry products practice the '403 patent, the economic prong of the domestic industry requirement is satisfied. *See* SIB at 74-75.

Respondents raise multiple issues with Xtera's approach to the economic prong of the domestic industry requirement. The most prevalent of those issues is the assertion that Xtera counted investments in a version of the NuWave Optima product that does not practice the '403 patent in order to show a domestic industry with respect to a version of the NuWave Optima product that does allegedly practice the '403 patent. To put it succinctly: Respondents accuse Xtera of padding its domestic industry numbers by counting investments in articles that are not protected by the '403 patent. Further, Respondents assert that Xtera has abandoned any argument allocating its investments in the NuWave Optima system between protected and unprotected

version by failing to disclose that argument in its prehearing brief or during the evidentiary hearing. Finally, Respondents attack as unreliable certain evidence that Xtera relies on to establish its domestic industry investments. I address each issue in turn.

**A. Investments in NuWave Optima with AC400 versus AC100**

The thrust of Respondents' allocation argument is that Xtera has lumped together investments in a version of the NuWave Optima product that utilizes the AC400 module with versions of the NuWave Optima product that utilize the different AC100 module. *See* RRB at 65. Because there is no dispute that NuWave Optima products utilizing only the AC100 modules do not practice the '403 patent, Respondents contend that Xtera cannot rely on investments in NuWave Optima systems with AC100 modules to satisfy the economic prong of the domestic industry requirement. *See id.* Respondents also contend that Xtera's failure to allocate its investments between the NuWave Optima system with the AC400 module and other iterations of the NuWave Optima system is fatal to Xtera's domestic industry case. *See id.*

Xtera does not dispute that it did not attempt to allocate its investments in plant, equipment, labor, or capital between NuWave Optima systems with AC400 modules and NuWave Optima systems with AC100 modules. Instead, Xtera takes the position that no allocation is required. First, Xtera asserts that, as of 2015, NuWave Optima systems with the AC400 module became Xtera's only product, which if true, would mean that there is no allocation to perform, at least for the period beginning in 2015. *See* CIB at 123 ("As of 2015, Optima is Xtera's only product *and includes the '403 patent-practicing AC400.*" (emphasis added)). However, the Xtera relies on in support of that assertion paint a far less straightforward picture.

For instance, the transcript excerpts Xtera relies on to support that assertion establish only that NuWave Optima is Xtera's only product. The excerpts are silent as to whether Xtera deals exclusively in NuWave Optima products with the AC400 module. *See* Tr. at 596:9-14, 137:6-13;

PUBLIC VERSION

CIB at 123 (citing same). Further, Xtera asserts that “[i]n late 2014, Xtera began marketing Optima with Acacia’s AC400 module,” CIB at 123 (citing CX-0336C at 0011), that it began “focusing on AC400 upgrades in 2016 to 2017,” *id.* at 124 (citing JX-0039C at 114:24-115:3, 119:8-11; Tr. at 98:17-99, 111:20-24, 603:9-604:12), and by late 2017, “customers could no longer order AC100 cards to add capacity,” *id.* at 124-25 (citing Tr. at 601:19-602:4). Rather than an abrupt transition from NuWave Optima systems with AC100 modules to NuWave Optima systems with AC400 modules in 2015, Xtera’s own timeline shows a gradual transition, over a period of years, from NuWave Optima systems utilizing AC100 modules to systems utilizing AC400 modules. Further, by their own admission, Xtera made at least four system capacity upgrades in the 2017-2018 time period that did not include the AC400 module. *See* CIB at 125. Moreover, testimony from multiple witnesses, from both sides of this investigation, confirms that Xtera deals in NuWave Optima systems that utilize AC400 modules as well as NuWave Optima systems that use other modules. *See* Tr. at 142:16-18, 688:24-689:17, 1023:20-24; *see also* CX-380C (spreadsheet showing transactions broken down by module for the 2017-2018 period).

Based on the record before me, I do not find substantial evidence to support Xtera’s contention that NuWave Optima systems with the AC400 module were Xtera’s only product during the 2015 through 2017 time period in which it attempts to establish a domestic industry. Accordingly, Xtera cannot excuse the absence of any allocation of its investments between the NuWave Optima with the AC100 module versus the NuWave Optima with the AC400 module on the basis that NuWave Optima utilized only the AC400 module from 2015 onward.

I note that Xtera attempts to frame the allocation issue raised by Respondents as a question of whether its investments must be restricted to particular NuWave Optima components, or instead may encompass investments in the entire NuWave Optima system. *See* CIB at 125-26. Xtera’s

PUBLIC VERSION

argument is misplaced. Xtera need not confine its domestic industry investments to specific NuWave Optima components, such as the Acacia AC400 module. *See* RRB at 68-69 (“While is it true that the AC400 is but one component in a bigger system, Respondents have not attempted to limit expenditures only to the AC400 module or to the transponder containing it as opposed to the entire Optima system.”). As such, Xtera’s reliance on the initial determination in *Certain Windshield Wipers*, Inv. 337-TA-928/937, is inapposite. *See* CIB at 126 (citing *Certain Windshield Wipers*, Inv. 337-TA-928/937, Initial Determination at 15-17). The issue here is not that Xtera failed to limit its domestic industry evidence to a specific component within the NuWave Optima system; the issue is that Xtera has included investments in an indisputably unprotected version of the NuWave Optima system along with an allegedly protected version of the product for the purposes of establishing a domestic industry. Such an approach is not permitted by the plain language of the statute, which requires that the investments in plant and equipment or labor or capital relied upon to establish a domestic industry must be investments “with respect to the articles protected by the patent . . . .” 19 U.S.C. § 1337(a)(3).

Xtera also argues that it is appropriate in this instance to combine investments in NuWave Optima systems based on the realities of the marketplace. CIB at 138. It is true that the Commission “does not adhere to any rigid formula in determining the scope of the domestic industry as it is not precisely defined in the statute, but will examine each case in light of the realities of the marketplace.” *Certain Double-Sided Floppy Disk Drives and Components Thereof*, Inv. No. 337-TA-215, Comm’n Op. at p. 23 (Nov. 1985); *see also Certain Video Game Systems and Wireless Controllers and Components Thereof*, Inv. No. 337-TA-770, Comm’n Op. at p. 66 (Oct. 28, 2013) (“[t]he Commission has held that in certain circumstances, the realities of the marketplace require a modification of the principle that the domestic industry is defined by the

patented article.”). But, it is not true that Xtera has established facts sufficient to show that the realities of the marketplace require the inclusion of investments in NuWave Optima systems that utilize AC100 modules along with investments in NuWave Optima systems utilizing AC400 modules.

First, Xtera argues that no allocation between investments in NuWave Optima systems with AC400 modules versus AC100 modules is required because of “the market’s view of the DI/accused product offerings as telecommunication systems, not individual components within them.” CIB at 138. This facet of Xtera’s “realities of the marketplace” argument is merely a recycling of its earlier argument about counting investments in the entire NuWave Optima system as opposed to components of that system. As noted *supra*, however, no party is arguing that Xtera must allocate investments to a single component of the NuWave Optima system. Rather, the dispute is whether investments in a version of the NuWave Optima system that does not practice the ’403 patent can be combined with a version that does practice the ’403 patent.

Expanding on its “realities of the marketplace” argument, Xtera attempt to analogize their domestic industry products to those at issue in *Certain Magnetic Tape Cartridges*, where investments in tape drives were counted along with investments in tape cartridges because it was undisputed that the patented tape cartridges could not be used except with a particular tape drive. CIB at 138 (citing *Certain Magnetic Tape Cartridges*, Inv. No. 337-TA-1058, ID at 207 (Aug. 17, 2018) (“*Magnetic Tapes*”), *affirmed with modified reasoning*, Comm’n Op. at 47-57). However, the issue in *Magnetic Tapes* is not analogous to the issue here. In *Magnetic Tapes*, the evidence showed that a tape cartridge that practiced the asserted patent could only be used with a specific corresponding tape drive. *See Magnetic Tapes*, Initial Determination at 208. Based on that corresponding relationship, *Magnetic Tapes* found it appropriate to consider investments in the

PUBLIC VERSION

tape drives, even though it was undisputed that the tape drives did not practice the patent. *Id.* at 208-09. *Magnetic Tapes* did not present the issue, as here, of whether investments in a version of a product that is not protected by the asserted patent can be combined with investments in a version that allegedly is protected by the asserted patent. The analogous situation in the context of *Magnetic Tapes* would be if there were two versions of the tape cartridge—one allegedly protected by the patent and the other indisputably not—and one tape drive capable of playing both. Had that been the situation presented in *Magnetic Tapes*, it is not clear that the complainants would have been entitled to rely on *all* of the investments in the tape drives.

While the Commission has credited investments in articles that do not themselves practice an asserted patent when fact evidence about the realities of the marketplace supported such an approach, the doctrine is not unlimited in scope, and the Commission has, in prior investigations, limited consideration of investments in unprotected articles where the connection was too attenuated. For example, in *Certain Video Game Systems and Wireless Controller and Components Thereof* (“*Video Game Systems*”), the complainant urged the Commission to credit investments in a “live-action attraction called ‘MagiQuest,’” which included a number of components including “the physical space, the various themes and effects that make up the play environment . . . the wand, other toys such as a compass that can be used to enhance the player’s experience, and various other electronic items such as ‘Quest Station’ computers that train players on how to play the game.” Inv. No. 337-TA-770, Comm’n Op. at 56-57 (Oct. 28, 2013) (public version) (omission redacted in original). Noting that the asserted patents in *Video Game Systems* involved “a wand having certain transmitter and motion-sensitive circuitries that interact wirelessly with receivers or actuators distributed throughout the play facility,” the Commission found that the complainant had not produced evidence sufficient to show that the realities of the

PUBLIC VERSION

marketplace required the entire MagiQuest attraction to exploit that patented toy wand. *Id.* at 67-68. Accordingly, the Commission declined to extend the articles protected by the asserted patents to cover the entire MagiQuest attraction because the complainant failed to show that “the physical space and the various design themes, physical props, peripheral attractions, and retail personnel that make up the play environment” had “any effect on the interactive capabilities of the wand.” *Id.* at 68.

Additionally, in *Certain Digital Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-712 (“*Set-Top Boxes*”), in considering what investment to credit towards the complainant’s domestic industry, the Administrative Law Judge noted that “the FiOS network is used for other communications services beyond those technologies described in the asserted patents. Therefore, not all expenditures by Verizon in building its FiOS network should be counted toward a domestic industry.” *Set-Top Boxes*, Order No. 33 at 15 (Jan. 11, 2011) (public version); *affirmed on other grounds*, Notice of Commission Determination Not to Review Final ID and Affirming in Part Summary Determination of Economic Prong of the Domestic Industry Requirement (July 21, 2011).

The present investigation presents essentially the same situation as the Commission addressed in *Video Game Systems* and *Set-Top Boxes*. There is no dispute that the whole NuWave Optima system is necessary to exploit the patented technology of the ’403 patent, and, on that basis, Xtera is not limited only to their investments in the AC400 module. However, given that the NuWave Optima system is also used with AC100 modules that are not protected by the ’403 patent, Xtera is not entitled to count all of its investments in all versions of the NuWave Optima system. The contrary approach would capture investments with no connection to the ’403 patent, in contravention of the statutory text of section 337. The operative question then is how much of

PUBLIC VERSION

Xtera's investments in NuWave Optima are attributable to its domestic industry in the patented technology.

However, Xtera did not present evidence sufficient to answer that question in this investigation. Instead, in an attempt to justify reliance on all of their investments in the NuWave Optima product, Xtera emphasizes that, around 2015, it took steps to ensure that the integration of AC400 modules into existing systems would be as seamless and interruption-free as possible for its customers. CIB at 139 (citing Tr. at 597:4-25, 134:21-137:5, 598:1-11; CX-0309C). Xtera also asserts that it planned to transition its customers from the AC100 module to the AC400 module gradually as the customers required additional capacity. *See id.* (citing Tr. at 599:15-17). And, Xtera points out that some NuWave Optima products may utilize both AC100 and AC400 modules. *See id.* (citing Tr. at 599:18-600:10). I note that Staff relies on substantially similar portions of the record to justify its conclusion that "at minimum, Xtera's investments in the LTE of its Nu-Wave Optima product after the first deployment of the AC400, in 2016, are investments in articles allegedly protected by the '403 patent." SIB at 72, n.18. Neither Xtera nor Staff point to precedent though that supports the conclusion that investments in a patent-practicing version of NuWave Optima can be combined with investments in non-practicing versions simply because Xtera is in the process of transitioning from one version to the other.

At bottom, Xtera's approach to allocating investments in its domestic industry product requires accepting that, since 2015, Xtera dealt only in the NuWave Optima with the AC400 module or accepting that the realities of the marketplace require treating all investments in NuWave Optima the same regardless of the module incorporated therein. I accept neither assertion. In the 2015 to 2017 time period that Xtera relies on to establish their domestic industry, the record shows that Xtera dealt in both NuWave Optima with the AC400 module and the

NuWave Optima with the AC100 module. Further, neither the record evidence nor Commission precedent support crediting Xtera's investments in NuWave Optima systems utilizing the AC100 module based on the realities of the marketplace. In sum, I find that Xtera's reliance on 100% of its investments in NuWave Optima systems is inconsistent with section 337's requirement that a domestic industry exist with respect to "articles protected by the patent." 19 U.S.C. § 1337(a)(2); *see also Certain Dimmable Compact Fluorescent Lamps*, Inv. No. 337-TA-830, Initial Determination at 63 (Feb. 27, 2013) (criticizing complainant for "includ[ing] expenses of non-domestic industry products in its investments allocated under prongs A and B."); *Certain Forensic Devices*, Inv. No. 337-TA-799, Initial Determination at 10 (Nov. 27, 2012) (public version) (criticizing complainant for aggregating investments in unrelated products where only one of the products practiced a given asserted patent), *unreviewed*, Notice of Comm'n Determination Not to Review the Final Initial Determination of the Administrative Law Judge (Dec. 21, 2012)..

**B. The Requirement for a Quantitative Analysis**

I note that one portion of Xtera's posthearing brief addressing the economic prong of the domestic industry appears to suggest that I may find Xtera's investments to be significant based solely on a qualitatively analysis. *See* CIB at 126-128. Particularly, Xtera's brief suggests that *Lelo, Inc. vs. ITC*, 786 F.3d 879 (Fed. Cir. 2015), supports the proposition that a quantitative analysis is not necessarily required to determine whether a domestic industry exists in articles protected by the patent. *See* CIB at 128 ("As in *Lelo, Inc. vs. ITC*, a quantitative analysis can also be required. 786 F.3d 879, 883-85 (Fed. Cir. 2015)."). I do not read *Lelo* as providing support for that proposition. Indeed, the holding of *Lelo* is "that qualitative factors alone are insufficient to show 'significant investment in plant and equipment' and 'significant employment of labor or capital' under prongs (A) and (B) of the § 337 domestic industry requirements." *Lelo*, 786 F.3d at

885. Thus, in view of *Lelo*, Xtera cannot, as its brief suggests, establish a domestic industry in the technology of the '403 patent based only on a showing of qualitative significance.

**C. Xtera's Belated Allocation Argument**

As explained above, Xtera's domestic industry showing is flawed because it combines investments in NuWave Optima systems utilizing the AC100 module, which do not practice the '403 patent, with investments in NuWave Optima systems utilizing the AC400 module, which allegedly do practice the '403 patent. In possible recognition of that failure, Xtera does include a section in their post-hearing brief that presents an allocation of their investments in plant and equipment and labor or capital between systems using the AC400 module and those not using that module. *See* CIB at 141-45. This argument, however, appears nowhere in the nearly 1500 pages of Xtera's prehearing brief, and is therefore deemed abandoned in accordance with Ground Rule 11.2. *See* CPB at 1301-1317; Order No. 11 (Amending Ground Rules). I will not credit an argument made for the first time after the close of the evidentiary hearing, when Respondents have no ability to seek expert economic analysis of that argument, or any ability to test the veracity of that argument through cross-examination of Xtera's economics expert. Moreover, I note that Xtera's last-minute allocation argument relies on assertions for which there is no evidentiary support. For example, Xtera asserts that, from the beginning of 2017 through September 2018, "[o]nly two upgrades used AC100 exclusively (the GTMO lines, accounting for at most ■ AC100 cards sold to DISA, including AC100 cards from the DISA-1 deployment predating AC400, CX-0379C)—the rest include AC400." CIB at 144. Other than the reference to CX-0379C in that assertion, no supporting citation is offered. Accordingly, at best, I can speculate that the assertion is based on attorney-argument interpreting CX-0379C. CX-0379C, which is a spreadsheet providing little in the way of internal explanation, is not so clear on its face that I can determine whether Xtera's interpretation is accurate.

The assertion that appears to reference CX-0379C is exemplary of the other assertions in this section of Xtera's brief, all of which consist primarily of attorney argument. Thus, even if Xtera's last minute allocation argument had not been abandoned, I would nonetheless be compelled to find that Xtera's proffered allocation lacked the support of substantial evidence.

**D. Xtera's Evidence of Investments in Plant and Equipment**

As explained *supra*, Xtera's domestic industry allegations are flawed inasmuch as they do not distinguish between investments in NuWave Optima systems utilizing AC400 module versus the AC100 module. Nonetheless, should the Commission determine to consider Xtera's investments as presented, I make the following findings regarding the evidence presented in support of a domestic industry based on investments in plant and equipment and labor or capital.

**1. Plant Investments**

With respect to investments in plant, Xtera points to its headquarters in Allen, Texas—a roughly 38,000ft<sup>2</sup> facility that Xtera leases for about \$450,000 per year. *See* Tr. at 609:3-6, 609:15-17, 648:18-649:13; CX-0329C; CX-0331C. Xtera asserts that it paid about \$1.2 million in rent for the Allen, Texas facility between 2015 and 2017. Tr. at 648:18-649:13. Relying on the testimony of their expert, Mr. Schoettelkotte, Xtera applies a 44% allocation factor to arrive at a total of \$540,815 of plant expenditures in connection with the Allen, Texas facility allocable to the domestic industry product. *See* Tr. at 648:18-650:8. Mr. Schoettelkotte's testimony provides little explanation about his labor-based allocation, except that it "was based on Mr. Higginbotham's experience working at the facility," and that his understanding, through Mr. Higginbotham, was that more than one third of Xtera's employees dedicate 100% of their time to the domestic industry product, while other employees spend less than 100%, but still significant amounts of their time on the domestic industry product. Tr. at 649:2-5; *see also* Tr. at 650:2-8.

What is clear, however, from Mr. Schoettelkotte’s testimony, is that he did not attempt to allocate Xtera’s investments in plant to the versions of the NuWave Optima system that actually practice the ’403 patent, i.e., those with the AC400 module. Indeed, Mr. Schoettelkotte’s understanding of the domestic industry product is significantly broader, as demonstrated by his description of the domestic industry product as “the LTE or line terminal equipment.” *Id.* at 649:23-650:1. Mr. Schoettelkotte’s allocation is summarized in the following demonstrative:

**Xtera Rent Expenditures - Allen Facility (38,778 Square Feet)**

Description	2015	2016	2017	Total
Total Rent	\$303,761	\$461,297	\$465,336	\$1,230,394
Labor-Based Allocation to DI Product*	40.3%	40.3%	49.9%	44.0%†
Total Rent Allocated to DI Product	\$122,453	\$185,960	\$232,402	\$540,815

\* Labor relating to technical support and customer care, R&D, and/or deployment of the DI Product.  
 † Total facility square footage allocated to DI Product - 38,778 square feet x 44.0% = 17,045 square feet.

Source: CDX-107C.8; CX-0323C; CX-0326C; CX-0328C; CX-0329C; CX-0331C; CX-0409C; CX-0411C; CX-0412C CDX-0107.7

CDX-0107 at 0007. As CDX-0107 shows, Xtera, through Mr. Shoettelkotte, asserts that from 2015-2017, it invested \$540,815 in plant via rent expenditures at their Allen, Texas facility allocable to the “DI Product.” *See* CDX-0107. I note that the yearly breakdown shows both an increase in total rent paid, as well as an increase in the amount of rent that Mr. Shoettelkotte allocated to the domestic industry product as he understood it. *See id.* However, as explained *supra*, Mr. Schoettelkotte’s allocation is flawed inasmuch as it is based on the assumption that any line terminal equipment produced by Xtera is a qualifying domestic industry product, i.e., one that

## PUBLIC VERSION

practices the '403 patent. Accordingly, Mr. Schoettelkotte's allocation does not provide substantial evidence that Xtera has made significant investments in plant via their rent payments for the Allen, Texas facility between 2015 and 2017.

In addition to the Allen, Texas facility, Xtera points to the rent expenditures of MC Assembly ("MCA"), the company with which Xtera contracts to manufacture the domestic industry product. *See* Tr. at 612:5-16. MCA is located in Melbourne, Florida. *See id.* The evidence shows that approximately 5000-6000ft<sup>2</sup> of space at MCA is dedicated to manufacturing for Xtera. Tr. at 613:10-12. Accordingly, Mr. Schoettelkotte derived a 3.9% allocation factor for investments in rent made by MCA by comparing the 5300ft<sup>2</sup> of MCA's facility space dedicated to Xtera products to the total 134,900ft<sup>2</sup> of facility space at MCA's Melbourne, Florida facility. Tr. at 652:20-653:13. Applying that allocation factor to MCA's rent expenses for the period of March 2015 through 2017 yields \$117,053 in MCA rent expenditures that Mr. Schoettelkotte attributes to Xtera's line terminal equipment. *See id.*; *see also* CX-0136C. Mr. Schoettelkotte also performed a similar calculation for the time period of March 2015 through July 2018 to arrive at \$142,012 in MCA rent expenditures attributable to Xtera's Nu-Wave Optima product. These numbers are summarized in the following demonstrative exhibit:

**MC Assembly Rent Expenditures - Melbourne Facility (134,900 Square Feet)**

Description	2015 (March - December)	2016	2017	2018 (through July)
Total Rent	\$859,988	\$1,049,185	\$1,070,168	\$635,259
Xtera Cell as a % of Total*	3.9%	3.9%	3.9%	3.9%
<b>Rent Attributable to Xtera Cell</b>	<b>\$33,788</b>	<b>\$41,221</b>	<b>\$42,045</b>	<b>\$24,958</b>

	2015 - 2017	2015 - 2018
Total Rent	\$2,979,341	\$3,614,600
<b>Rent Attributable to Xtera Cell</b>	<b>\$117,053</b>	<b>\$142,012</b>

\* 5,300 Xtera Cell Square Feet / 134,900 Total Facility Square Feet = 3.9%

Source: CX-0173C; CX-0177C; CX-0179C; AX-0136C; CX-0416C

CDX-0107C, 10

CDX-0107C at 0010.

Xtera explains that MCA’s rent expenditures should be counted towards its investments in plant because “MCA takes costs associated with ‘payroll, overhead facilities, rent, maintenance’ and ‘roll[s] them into the product cost for the products that Xtera is buying.’” CIB at 130 (citing Tr. at 616:14-617:10; CX-0357C). In other words, Xtera pays MCA based on the products MCA manufactures for them—not based on the amount of floor space MCA dedicates to manufacturing their products. Thus, in order to address the investments in plant contemplated by section 337(a)(3)(A), Xtera proffers the above allocation of MCA’s rent expenditures as a means of capturing additional indirect investments in plant for the purposes of showing the existence of a domestic industry under 337(a)(3)(A). Neither Respondents nor staff challenge Xtera’s approach to indirect investments in their posthearing briefs.

Here again, the evidence presented by Xtera does not reflect any attempt to separate investment in versions of the NuWave Optima system that do not practice the ’403 patent from

those that do. Rather, Mr. Schoettelkotte's allocation assumes that every purchase order to MCA is directed to NuWave Optima systems utilizing the AC400 module, and thus all of MCA's rent expenditures that are attributable to Xtera are also attributable to a domestic industry product that practices the patent. However, Xtera's brief stops short of asserting that MCA only worked on NuWave Optima systems utilizing the AC400 module between 2015 and 2017, instead stating only that "Optima with AC400 was manufactured and tested," during that time period. CIB at 129. Similarly, the evidence Xtera relies on does not establish that MCA manufactured only NuWave Optima systems utilizing the AC400 module between 2015 and 2017. *See* CX-0136C; CX-0357C; Tr. at 612:5-16. Accordingly, as with the Allen, Texas facility, Mr. Schoettelkotte's allocation does not provide substantial evidence that Xtera has made significant indirect investments in plant via its purchase order payments to MCA between 2015 and 2017.

## **2. Equipment Investments**

With respect to investments in equipment, Xtera points to investments in custom built test stands—common electrical test stands ("CETS") and common optical test stands ("COTS")—for testing the Nu-Wave Optima as qualifying investment in equipment under section 337(a)(3)(A). CIB at 130-131. Xtera emphasizes that CETS and COTS are specialized equipment, not available off-the-shelf, that require particular code and software to be integrated such that the stands are specifically tailored to each piece of equipment they will be used to test. *See id.* (citing Tr. at 617:11-619:10). To quantify its investments in CETS and COTS, Xtera presents a replacement cost for the stands based entirely on estimations given during the testimony of Xtera's employee, Mr. Higginbotham. CIB at 131 (citing Tr. at 618:16-18, 619:11-621:13). For CETS, the replacement cost estimate is \$75,000 to \$100,000, while for COTS it is \$200,000 to \$250,000. Tr. at 619:16-620:9. Mr. Higginbotham testified that there is one CETS and one COTS at Xtera's

PUBLIC VERSION

Allen, Texas facility, and six CETS and six COTS at MCA's Melbourne, Florida facility. Tr. at 620:10-21.

From Mr. Higginbotham's estimates, Mr. Schoettelkotte posited that Xtera had invested between \$775,000 and \$1.3 million in lab equipment at the Allen, Texas facility associated with the Nu-Wave Optima., and between \$1.6 million and \$2.1 million in lab equipment at MCA's Melbourne, Florida facility. Tr. at 650:19-25, 654:6-14. I note that there is a discrepancy between what Mr. Schoettelkotte calculated in terms of lab equipment at the Allen, Texas facility and what Xtera's brief identifies to show qualifying investments in equipment under 337(a)(3)(A). Particularly, Mr. Schoettelkotte considered an additional piece of lab equipment—an optical spectrum analyzer (“OSA”)—in tabulating equipment expenses at the Allen, Texas facility. Tr. at 650:19-25. Xtera does not discuss or purport to rely on the OSAs as qualifying investments in equipment in their brief, and instead assert that Mr. Schoettelkotte's analysis reflects \$775,000-\$1,350,000 in replacement value attributable to the CETS and COTS. *See* CIB at 131. However, Mr. Schoettelkotte's demonstrative, CDX-0107C, shows that the OSAs account for a majority of the \$775,000-\$1,350,000 that Xtera claims as equipment investments:

**Laboratory Equipment for DI Product - Xtera (TX)**

Equipment Type	Units	Replacement Cost per Unit (Materials Only)	Total Replacement Cost (Materials Only)
Common Electrical Test Stand (CETS)	1	\$75,000 - \$100,000	\$75,000 - \$100,000
Common Optical Test Stand (COTS)	1	\$200,000 - \$250,000	\$200,000 - \$250,000
Optical Spectrum Analyzer (OSA)	10	\$50,000 - \$100,000	\$500,000 - \$1,000,000
<b>Total</b>			<b>\$775,000 - \$1,350,000</b>

NOX-0107C; CX-0127B; CX-0127C; CX-0128B; CX-0129C; CX-0311C; CX-0409C; CX-0410C; CX-0411C; CX-0412C

CDX-0107C.8

CDX-0107C at 8. Subtracting the value of the OSAs from Mr. Schoettelkotte's tabulation yields a value of between \$275,000 and \$350,000 attributable solely to CETS and COTS at the Allen, Texas facility. Mr. Schoettelkotte's calculations for MCA lab equipment do not appear to include OSAs, and thus no modification of his values are needed for those investments. *See* CIB at 132.

I find that Xtera has not provided substantial evidence to support the conclusion that a domestic industry exists for the NuWave Optima with AC400 module based on its investments in CETS and COTS. Particularly, I find that the replacement values given to that equipment by Mr. Higginbotham lack sufficient indicia of reliability. The evidence in support of the replacement values posited by Xtera consists entirely of the conclusory testimony of Xtera's employee, Mr. Higginbotham. *See* CIB at 131 (citing Tr. at 618:16-18, 619:11-0621:13). Upon reviewing Mr. Higginbotham's testimony, I find there to be very little to indicate that his estimations of replacement costs for CETS and COTS are reliable. Indeed, Mr. Higginbotham's testimony simply presents as fact that it would take about 6 months and \$75,000-\$100,000 to replace a CETS,

PUBLIC VERSION

and about 6-12 months and \$200,000-\$250,000 to replace a COTS. *See* Tr. at 619:11-620:9. Moreover, there can be no dispute that, at bottom, Mr. Higginbotham's estimate is speculative. No evidence has been presented that any of the CETS or COTS have been replaced, and thus Xtera's reliance on replacement costs for that equipment is akin to reliance on hypothetical investments. In the absence of any additional evidence corroborating the value of Xtera's investments in the COTS and CETS, such as for example evidence showing the original cost of fabricating the CETS and COTS, or even the value of the main components that would be used to replace the CETS or COTS, I do not find Mr. Higginbotham's replacement cost estimates to rise to the level of substantial evidence of Xtera's investments in the CETS and COTS.<sup>8</sup>

In addition to the CETS and COTS, Xtera relies on surface mount technology ("SMT") used by MCA—though not exclusively in connection with Xtera's products—as an investment in equipment that should be credited towards their domestic industry. CIB at 132. Acknowledging that MCA has many customers, of which Xtera is only one, Mr. Schoettelkotte derived a 5.2% allocation factor based on the ratio of MCA production revenue attributable to Xtera over MCA's total production revenue. Tr. at 655:7-22. Applying that factor to the \$4.4 million value of the SMT line equipment yields a value of \$228,000, which Mr. Schoettelkotte asserts is attributable to Xtera's domestic industry investments in equipment. Tr. at 655:14-22. Finally, Xtera points to \$45,000 of investments in infrastructure to their manufacturing area at MCA, and a \$45,783 thermal chamber that MCA uses exclusively to test Xtera's Nu-Wave Optima product.

As with its evidence of investments in plant, Xtera's evidence of investments in equipment is marred by the fact that their expert, Mr. Shoettelkotte, employed an overly broad definition of

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<sup>8</sup> I note that my finding in this regard is specific to the evidence before me. I decline to find that testimony of a complainant's employee will never be reliable evidence of domestic industry investments absent additional corroborating evidence.



## PUBLIC VERSION

the domestic industry product—“line terminal equipment”—and in doing so captured investments in versions of NuWave Optima that do not practice the '403 patent along with those that do. Accordingly, I find that Mr. Schoettelkotte's allocations of equipment investments do not provide substantial evidence that Xtera has made significant investments in equipment, either through direct investment in COTS and CETS, or through indirect investment in equipment used by MCA.

Consistent with my findings above, I find that Xtera has not satisfied the economic prong of the domestic industry requirement via section 337(a)(3)(A) through evidence of investments in plant and equipment.

### **E. Xtera's Evidence of Investments in Labor or Capital**

As with plant and equipment, Xtera points to its own direct investments in labor or capital via its own employees' salaries, as well as indirect investments in labor from MCA's employees. With respect to its own employees, Xtera relies on its witness, Mr. Higginbotham, to identify the percentage of each employee's time that was dedicated to the Nu-Wave Optima product. CIB at 134-135 (citing Tr. at 605:15-608:6; CX-0149; CX-0150; CX-0151). Mr. Higginbotham's allocation of each employee's time dedicated to Nu-Wave Optima is represented in three exhibits: CX-0149 for the year 2018; CX-0150 for the year 2017; and CX-0151 for the year 2016. Mr. Higginbotham testified that he took a “conservative” approach to allocating employee time to Nu-Wave Optima—excluding sales, marketing, and IT services, and also excluding any employee whose work assignment he could not precisely recall. See Tr. at 606:18-608:6. Based on Mr. Higginbotham's data, Xtera's expert, Mr. Schoettelkotte, used a labor-based allocation to posit that Xtera had invested \$6.2 million in labor allocable to the domestic industry products between 2016 and 2018. Tr. at 651:4-652:6.

Xtera employs a similar approach to calculating qualifying labor investments from MCA with respect to the domestic industry product. Particularly, Mr. Schoettelkotte relied on a

## PUBLIC VERSION

declaration from MCA's CEO regarding the percentage of time each MCA employee spent on Xtera's projects to allocate labor investments based on those MCA employees' salaries. *See* CX-0136C. For the period of 2016 to 2017, Mr. Schoettelkotte's calculations yield \$278,000 of MCA labor investments allocable to the domestic industry product, and \$217,000 for 2018 alone. *Tr.* at 658:10-659:19.

Here again, Xtera's evidence of its investments is flawed inasmuch as investments in labor related to NuWave Optima systems utilizing the AC400 module, which allegedly practice the '403 patent, were not separated from investments in labor related to NuWave Optima systems utilizing other modules, which do not practice the '403 patent. In describing the three exhibits that form the basis of Mr. Schoettelkotte's labor-based allocation, Mr. Higginbotham made no distinction between the versions of the NuWave Optima product. *See Tr.* at 605:15-608:6 (describing CX-0149C: "this is a listing of the 2018 Xtera employees, job titles, salaries and a time allocation related to the Nu-Wave Optima product."). Because Mr. Schoettelkotte relied exclusively on Mr. Higginbotham's allocations of employee time to NuWave Optima products, all of Mr. Schoettelkotte's calculations are flawed. Accordingly, I find that Mr. Schoettelkotte's allocations of Xtera's labor investments do not provide substantial evidence that Xtera has made significant investments in labor with respect to the domestic industry product.

Consistent with my findings above, I find that Xtera has not satisfied the economic prong of the domestic industry requirement via section 337(a)(3)(B) through evidence of investments in labor or capital.

### **F. Conclusion on Economic Prong of Domestic Industry Requirement**

Based on the foregoing, I find that Xtera has failed to satisfy the economic prong of the domestic industry requirement for the '403 patent. Particularly, I find that Xtera improperly relies on 100% of its investments in the NuWave Optima product even though versions of the product

## PUBLIC VERSION

that do not utilize the AC400 module are not protected by the '403 patent. Moreover, Xtera failed to timely offer an allocation of its investments in the version of the NuWave Optima that incorporated the AC400 card, and the untimely allocation they offered for the first time in posthearing briefing is not supported by substantial evidence. Accordingly, Xtera has not satisfied the economic prong of the domestic industry requirement.

**VI. CONCLUSIONS OF LAW**

1. The Commission has personal jurisdiction over the parties, subject-matter jurisdiction over the investigation, and *in rem* jurisdiction over the accused products.
2. The importation requirement of section 337 is satisfied as to all respondents.
3. Respondents do not infringe, directly or indirectly, any asserted claim of U.S. Patent No. 7,860,403.
4. The asserted claims of U.S. Patent No. 7,860,403 are not invalid as indefinite or for lack of written description.
5. The asserted claims of U.S. Patent No. 7,860,403 are invalid as anticipated by Frankel (U.S. Patent Number 6,430,336).
6. The technical prong of the domestic industry requirement for U.S. Patent No. 7,860,403 has not been satisfied.
7. The economic prong of the domestic industry requirement for U.S. Patent No. 7,860,403 has not been satisfied.
8. No violation of section 337 has occurred based on alleged infringement of the asserted claims of U.S. Patent No. 7,860,403.
9. No violation of section 337 has occurred based on alleged infringement of the asserted claims of U.S. Patent No. 8,351,798.

**VII. RECOMMENDED DETERMINATION ON THE PUBLIC INTEREST, REMEDY, & BOND**

The Commission's Rules provide that the administrative law judge shall issue a recommended determination concerning the appropriate remedy in the event that the Commission finds a violation of section 337, and the amount of bond to be posted by Respondents during Presidential review of the Commission action under section 337(j). *See* 19 C.F.R. § 210.42(a)(1)(ii).

**A. Public Interest**

In connection with this Recommended Determination, and pursuant to Commission Rule 210.50(b)(1), 19 C.F.R. § 210.50(b)(1), the Commission ordered that the presiding administrative law judge

shall take evidence or other information and hear arguments from the parties or other interested persons with respect to the public interest in this investigation, as appropriate, and provide the Commission with findings of fact and a recommended determination on this issue, which shall be limited to the statutory public interest factors set forth in 19 U.S.C. §§ 1337(d)(1), (f)(1), (g)(1).

83 Fed. Reg. 3770 (Jan. 26, 2018).

Before issuing a remedy for a violation of section 337, the Commission must consider the effect of the remedy on the following public interest factors: (1) the public health and welfare; (2) competitive conditions in the U.S. economy; (3) the U.S. production of articles that are like or directly competitive with those that are the subject of the investigation; and (4) U.S. consumers. *See* 19 U.S.C. §§ 1337(d)(1), (f)(1). The Commission begins this analysis with the understanding that the public interest favors the protection of intellectual property rights by excluding infringing products. *See, e.g., Certain Two-Handle Centerset Faucets & Escutcheons & Components Thereof*, Inc. No. 337-TA-422, Comm'n Op. at 9 (July 21, 2000). It is rare for the Commission to determine that the public interest considerations outweigh the patent holder's rights. *See Spansion*

## PUBLIC VERSION

*Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1360 (Fed. Cir. 2010). The Commission can, however, tailor the remedy to minimize the impact on the public interest. *See e.g., Certain Personal Data and Mobile Commc'ns Devices & Related Software*, Inv. No. 337-TA-710, Comm'n Op. at 83 (delaying the effective date of an exclusion order based on competitive conditions in the U.S. economy).

### **1. Public Health and Welfare**

I find that no evidence has been produced in this investigation that indicates an exclusion order would adversely affect the public health and welfare in the United States. Respondents make a number of broad and conclusory assertions that the public health and welfare would be negatively affected, but I find no support for those assertions in the few record citations offered in Respondents' briefing. *See* RIB at 72-73 (citing Tr. at 744:3-13, 747:3-748:14). Neither Xtera nor Staff argue that an exclusion order would adversely affect the public health or welfare in the United States. *See* SIB at 76; CRB at 80-81. Accordingly, I find that the public health and welfare does not support the denial or tailoring of any exclusion orders in this investigation.

### **2. Competitive Conditions in the United States Economy**

Respondents make several arguments that appear to fall under the broad umbrella of competitive conditions in the United States economy. First, Respondents assert that NEC and Nokia's products perform better than Xtera's, and that Xtera thus has no competitive products that could replace those made by Respondents. RIB at 73-74 (citing Tr. at 744:8-13, 105:8-18). Similarly, Respondents argue that Xtera has not presented evidence to show that other competitors could provide products to replace NEC and Nokia's should an exclusion order issue. *See id.* (citing Tr. at 748:7-9, 754:5-12, 758:2-12, 715:18-716:4). Second, Respondents argue that Nokia and NEC's products could not be replaced in a reasonable timeframe. RIB at 74 (citing Xtera Public

PUBLIC VERSION

Interest Statement at 5 (Dec. 22, 2017) (EDIS Doc. ID 632352); Xtera Public Interest Replay at 4; CX-269C at 0012, 0096). Third, Respondents argue that an exclusion order “could also result in higher prices to Respondents’ customers,” and that “Xtera has provided no indication or data suggesting it could meet the large demand that would be caused by any proposed remedial orders.” RIB at 74-75 (citing Tr. at 744:11-13, 104:1-5).

I find none of these arguments to be supported by record evidence. As an initial matter, Respondents’ repeated criticism of Xtera for failing to present evidence that it could replace Nokia and NEC’s products in the marketplace erroneously places an evidentiary burden on Xtera to show that the public interest will not be harmed if an exclusion order issues. No such burden exists, and placing one on Xtera would be contrary to the Commission’s general approach of favoring the protection of intellectual property rights by excluding infringing products. *See, e.g., Certain Two-Handle Centerset Faucets & Escutcheons & Components Thereof, Inc. No. 337-TA-422, Comm’n Op. at 9* (July 21, 2000). If Respondents believe evidence exists that shows the Commission should depart from its general approach by withholding or tailoring its remedial orders, it behooves Respondents to present that evidence.

With the foregoing in mind, I have reviewed all of the evidence cited by Respondents in the portion of their brief addressing competitive conditions in the United States economy, and I find that none of it persuasively establishes any of the supposed harms that Respondents posit in the context of competitive conditions. I particularly note that Respondents continue to cite the same few lines of the transcript for all manner of disparate assertions in the public interest section of their brief. *See* RIB at 70-71 (citing Tr. at 744:3-7 for the proposition that NEC’s products “allow U.S. public and private entities to communicate domestically and internationally with other private and public entities, such as government agencies and hospitals.”); RIB at 72 (citing Tr. at 744:11-

PUBLIC VERSION

13 for the proposition that “NEC and Nokia are two of the top three industry providers” of subsea telecommunications systems); RIB at 72 (citing Tr. at 3-13 for the proposition that the “accused products accelerate a vast range of industries and research that benefit public health and welfare, and exclusion of these products without adequate substitutes would frustrate the efficient functioning of such industries.”); RIB at 73 (citing Tr. at 744:8-13 for the proposition that “NEC’s and Nokia’s experience and capabilities with submarine telecommunications have allowed them to develop products whose capabilities exceed those of its competitors.”); RIB at 75 (citing Tr. at 744:11-13 for the proposition that “Nokia and NEC are two of the three major competitors for such products (along with TE SubCom).”); RIB at 75 (citing Tr. at 744:3-13 for the proposition that exclusion of Nokia and NEC’s systems “would lead to both a decrease in critical telecommunications services relied upon by U.S. consumers and an increase in prices paid by U.S. consumers for those critical telecommunications services as fewer competitors would be offering fewer products.”); RIB at 76 (citing Tr. at 744:11-13 for the proposition that “removing Nokia and NEC from the market would eliminate two of the major market participants, which may have adverse market implications for consumers.”). The portion of the transcript Respondents repeatedly cite actually reads:

Q How would you describe NEC's main field of business?

A The businesses we conduct at NEC are to provide solutions for the good of society and in particular, we have an emphasis on information communication.

Q Would it be fair to characterize NEC as a global leader in the IT industry?

A Yes, it would.

Q What is NEC's position in the submarine telecommunications industry?

A We are in the top three in the world.

## PUBLIC VERSION

Tr. at 744:3-13. While this testimony may be generously described as somewhat related to the assertions Respondents make in the public interest section of their brief, it is hardly persuasive evidence that the Commission should tailor or withhold an exclusion order on the basis of harm to the public interest. I do not find the few pieces of other evidence cited by Respondents to be particularly more persuasive. Accordingly, I find that Respondents have not shown that competitive conditions in the United States will be adversely affected by an exclusion order.

Separate from Respondents, I note that Staff asserts that competitive conditions in the United States economy do support “tailoring the requested remedial orders to exempt installing, servicing, and/or repairing subsea telecommunications systems that were purchased prior to the order’s effective date.” SIB at 76-77. I understand Staff’s argument in this regard to be largely coextensive with its reasoning that United States consumers would be harmed by an exclusion order to the extent customers who purchased an accused system prior to the effective date of the exclusion would experience difficulty receiving replacement parts and service for their systems. *See* SIB at 78 (cross-referencing Staff’s arguments on competitive conditions). As explained in the following section of this initial determination, I agree with Staff that the any exclusion order should be tailored to provide an exception for the service and repair of accused systems that were purchased prior to the effective date of any exclusion orders.

### **3. Production of Like or Directly Competitive Articles in the United States**

I find that no evidence has been produced in this investigation that indicates an exclusion order would adversely affect the production of like or directly competitive articles in the United States. Indeed, no party presented any briefing arguing otherwise in this investigation. *See* RIB at 70-76; CRB at 85; SRB at 17-18. Accordingly, I find that the production of like or directly

competitive articles in the United States does not support the denial or tailoring of any exclusion orders in this investigation.

#### **4. United States Consumers**

Respondents argue that an exclusion order would adversely affect United States consumers in two places in their brief. RIB at 71, 75-76. In the first instance, Respondents focus on the harm an exclusion order would cause to customers of Nokia and NEC's products in need of obtaining repair services and replacement parts. *Id.* at 71. Staff is in accord with this aspect of Respondents' argument, but submits that the adverse effects can be mitigated through tailoring of any exclusion order. SIB at 78-79. Respondents' second argument is not well focused and meanders among a number of points, some of which address different public interest factors. RIB at 75-76. Respondents generically assert that the absence of Nokia and NEC's products from the domestic market would lead to a decrease in services and increase in prices for telecommunications services. *See* RIB at 75 (citing Tr. at 744:3-13). Respondents then recycle their competitive conditions argument by asserting that "[b]ecause Xtera and other competitors cannot adequately supply and meet the demand of the U.S. market, or at a minimum would be unable to meet that demand quickly enough to match the rapid growth in data consumption," consumer would be adversely affected. RIB at 75-76. Finally, Respondents rehash their repair and warranty argument a second time. RIB at 76. Xtera opposes both of Respondents' arguments about the impact on United States consumers. CRB at 85-88.

With respect to the first argument, Respondents point to record evidence to establish that their customers who purchase subsea line terminal equipment receive spare parts and warranty obligations from NEC or Nokia. *See* RRB at 77 (citing CX-0269C at 27-30; JX-0033C at 95:20-96:16, 130:6-25; 133:7-15; JX-0029 at 95:14-99:4; CX-447C at 0028; CX-1716C at 0006, 0023-

PUBLIC VERSION

0024; Tr. at 759:10-760:5; Tr. at 720:3-722:15). This evidence undercuts Xtera's counter-argument that the "Commission has denied exceptions for repair parts when Respondents failed to present supporting evidence." CRB at 86. Indeed, Xtera relies on *Certain Magnetic Data Storage and Tapes and Cartridges Containing the Same (II)* ("Magnetic Tapes II"), Inv. No. 337-TA-1076, but there the respondents presented, quite literally, no evidence to support a warranty and repair exception, relying instead on the Commission's determinations from an earlier related investigation. *See id.*, Initial Determination at 174 (Nov. 19, 2018) (public version) ("Accordingly, in the absence of any evidence from Sony or its customers about warranty and repair services related to the LTO tapes at issue in this investigation, I do not recommend incorporating Sony's fourth exception into any limited exclusion order.")..

Here, the evidence shows that the accused articles are complex systems that require substantial investments of time and money to procure and install. *See* Tr. at 637:3-7; JX-0015C at 23; CX-0269C at 16-17. Moreover, the evidence shows that, without access to replacement parts from Nokia or NEC, third parties that had invested in Respondents' systems would have limited ability to service those systems short of purchasing a new set of SLTE. *See* Tr. at 748:7-9, 754:5-17; JX-0039C at 116:21-117:6. Accordingly, I agree with Respondents and Staff that any exclusion order should be tailored to allow for warranty and repair services to protect the interests of third-parties that have invested substantially in the accused SLTE prior to the issuance of any exclusion order.

With respect to the second facet of Respondents' public interest argument about the effect an exclusion order would have on United States consumers, I do not find that Respondents have presented evidence sufficient to support their argument. By way of example, the portion of the transcript Respondents cite to support the assertion that exclusion of the accused systems "would

lead to both a decrease in critical telecommunications services relied upon by U.S. consumers and an increase in prices paid by U.S. consumers for those critical telecommunications services as fewer competitors would be offering fewer products,” appears unrelated to that assertion. *See* RIB at 75 (citing Tr. at 744:3-13s). To the extent this portion of Respondents’ domestic industry arguments does have evidentiary support, that support appears to be coextensive with the evidence supporting Respondents’ repair and replacement parts argument. *See, e.g.*, RIB at 76 (citing Tr. at 622:18-623:25, 748:7-9, 754:5-17; JX-0039C at 116:21-117:6, 116:6-20). Accordingly, Respondents’ additional arguments on the effect an exclusion order would have on United States consumers adds nothing beyond its arguments regarding repair and replacement parts for its customers.

**B. Remedy & Bond**

**1. Limited Exclusion Order**

Under section 337(d), the Commission may issue a limited exclusion order directed to a respondent’s infringing products. *See* 19 U.S.C. § 1337(d). A limited exclusion order instructs the U.S. Customs Service to exclude from entry all articles that are covered by the patent at issue that originate from a named respondent in the investigation. *See Fuji Photo Film Co. Ltd. v. Int’l Trade Comm’n*, 474 F.3d 1281, 1286 (2007).

There is no dispute that, should the Commission find a violation, a limited exclusion order directed to the infringing articles upon which such a violation is predicated should issue. *See* CIB at 145; RRB at 75; SIB at 80. Respondents, however, seek to have any limited exclusion order tailored in a number of different ways. *See* RRB at 75. Particularly, Respondents request that any limited exclusion order “(i) exclude wet plant equipment, (ii) exclude terrestrial products, (iii) be limited to the specific components that contain the functionality found to infringe, (iv) contain an

## PUBLIC VERSION

exception to permit replacements and repairs for existing customers to avoid substantial harm to third-parties, and (v) contain a certification provision.” *Id.*

The first three (*i-iii*) of Respondents’ proposed limitations on any exclusion order all essentially amount an argument that any limited exclusion order should be limited to products actually found to infringe. Succinctly, Respondents assert that “[n]o evidence was presented during the hearing concerning alleged infringement by any wet plant equipment,” RRB at 75, that this investigation is limited to subsea products and therefore terrestrial products should not be included in any exclusion order, *see id.*, and because the accused product lines—the ASN 1620 system, NAC 1830 system, and NS Series (Submarine Repeated Subsea Systems)—have many different configurations, any exclusion order should be specific in identifying the infringing configurations. As noted *supra*, I have not found infringement or a violation of section 337 in this investigation. However, should the Commission find a violation of section 337, it is the Commission’s regular practice phrase limited exclusion orders in terms of articles that infringe asserted claims. *See, e.g., Magnetic Tapes*, Inv. No. 337-TA-1058, Limited Exclusion Order at 2 (Mar. 25, 2019) (EDIS Doc. ID 671163) (issuing limited exclusion order to “[m]agnetic tape cartridges and components thereof that infringe . . . .”); *see also* SIB at 80 n.21 (concurring that the Commission’s standard exclusion order language is appropriate). Infringing articles should be excluded, whether or not they have been adjudicated in this proceeding. If Respondents have questions about whether products not adjudicated in this proceeding infringe, they may seek an advisory decision from the Commission or a determination from U.S. Customs and Border Patrol.

As to Respondents’ fourth (*iv*) request, an exception for warranty and repair services to existing customers, Staff joins Respondents’ request, arguing that “the statutory public interest factors support tailoring the LEO to exempt installing, servicing, and/or repairing subsea

## PUBLIC VERSION

telecommunications systems that were purchased prior to the order's effective date." SIB at 81. Consistent with the reasoning in the section of this initial determination addressing the effect an exclusion order would have on United States consumers, I agree with Respondents and Staff that an exemption for warranty and repair services should be incorporated into any limited exclusion order.

Respondents' fifth (v) point seeks a certification provision in any exclusion order. There appears to be no dispute that such a provision would be appropriate. Moreover, the Commission routinely includes such provisions in its exclusion orders. *See Magnetic Tapes*, Inv. No. 337-TA-1058, Limited Exclusion Order at 3 (Mar. 25, 2019) (EDIS Doc. ID 671163). Accordingly, I recommend the inclusion of such a provision.

Consistent with the foregoing, should the Commission find a violation, I recommend that an appropriate limited exclusion order issue.

### **2. Cease and Desist Order**

Under section 337(f)(1), the Commission may issue a cease and desist order in addition to, or instead of, an exclusion order. *See* 19 U.S.C. § 1337(f)(1). The Commission generally issues a cease and desist order directed to a domestic respondent when there is a "commercially significant" amount of infringing, imported product in the United States that could be sold, thereby undercutting the remedy provided by an exclusion order. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest and Bonding at 37-42 (June 1991); *Certain Condensers, Parts Thereof and Prods. Containing Same, Including Air Conditioners for Automobiles ("Condensers")*, Inv. No. 337-TA-334 (Remand), Comm'n Op. at 26-28, 1997 WL 817767, at \*11-12 (U.S.I.T.C. Sept. 10, 1997).

## PUBLIC VERSION

Here, Xtera seeks a cease and desist order only as to Nokia based on an allegedly commercially significant inventory of 1830 products. CIB at 145-46. Particularly, Xtera relies on CX-2632C, which is a table summarizing NAC's domestic transponder inventory based on Xtera's interrogatory responses, to establish that NAC had [REDACTED] transponders that incorporated accused digital signal processors in its domestic inventory as of November 2018. *See* CIB at 146 (citing same). Xtera also relies on the testimony of their expert, Mr. Schoettelkotte, to support the characterization of that volume as "significant." *See* Tr. at 665:12-666:4.

Respondents do not challenge the accuracy of the information in CX-2632C, and indeed acknowledge in the responsive posthearing brief that NAC has [REDACTED] transponders in its domestic inventory. RRB at 78. Respondents argue, however, that only two of those transponders are subsea-specific, while the others are non-subsea-specific. *Id.* With respect to the two subsea-specific transponder, Respondents argue that they "are earmarked for a specific project for a specific customer and are not commercially saleable units to another customer." *Id.* On that basis, Respondents assert that those two units do not represent a commercially significant inventory of subsea products sufficient to support imposition of a cease and desist order to NAC. *Id.*

The primary dispute here is a familiar one, and it revolves around whether particular of NAC's transponders are "subsea" or not. NAC admits to holding [REDACTED] transponders in domestic inventory, but NAC contends those transponders are not subsea components and therefore not within the scope of the investigation. NAC concedes that if [REDACTED] transponders are within the scope of the investigation they would constitute commercially significant inventory. *Id.*

Respondents base their position on the testimony of Mr. Szilard Zsigmond, who is a product line manager of submarine products for Nokia. Tr. at 697:16-19. Particularly, Respondents rely on Mr. Zsigmond's testimony to establish that its terrestrial transponders are not

PUBLIC VERSION

sold for subsea applications, and that there are hardware differences between Nokia's terrestrial and subsea transponders. *See* Tr. at 702:18-24, 703:21-704:10, 716:22-717:11.

The problem with Respondents' position is that Mr. Zsigmond also testified that prior to developing its submarine product line, Nokia offered its terrestrial transponder for sale in subsea applications. Tr. at 704:17-705:6. Mr. Zsigmond also testified that Nokia eventually marketed the interchangeability of its 1830 product for terrestrial and subsea application. Tr. at 707:11-18. And, Mr. Zsigmond acknowledged that terrestrial transponders have been used in subsea field trials. Tr. at 705:21-25. Additionally, both Xtera and Staff argue that Mr. Zsigmond's definition of "subsea" is unduly restrictive inasmuch as it requires the use of repeaters. *See* SIB at 82; CIB at 146.

Recognizing that the "well-established purpose of cease and desist orders is to ensure complete relief to complainants when infringing goods are held in inventory in the United States and, therefore, beyond the reach of an exclusion order," I recommend that a cease and desist order issue as to NAC should the Commission find a violation of section 337 has occurred in this investigation. *Condensers*, Inv. No. 337-TA-334 (Remand), Comm'n Op. at 27 (Sep. 10, 1997). In support of that recommendation, I find that NAC maintains a commercially significant inventory of allegedly infringing transponders in the United States that could be sold for use in subsea applications and thus undercut any exclusion order. I do not agree with Respondents that ■ of the allegedly infringing transponders should be exempt from the analysis of commercially significant inventory because NAC has labeled them as terrestrial transponders. Mr. Zsigmond's testimony supports the conclusion that those terrestrial transponders could be used in subsea applications, *see* Tr. at 704:17-705:6, 705:21-25, 707:11-18, and thus would allow NAC an avenue to undercut any exclusion order and prevent Xtera from receiving complete relief.

## PUBLIC VERSION

Finally, I note that Xtera has presented no evidence to support issuing a cease and desist order to any respondent other than NAC. Accordingly, I do not recommend issuance of a cease and desist order to any other respondent in this investigation.

### **3. Bond During Presidential Review**

Pursuant to section 337(j)(3), the Administrative Law Judge and the Commission must determine the amount of bond to be required of a respondent during the 60-day Presidential review period following the issuance of permanent relief, in the event that the Commission determines to issue a remedy. *See* 19 U.S.C. §1337(j)(3). The purpose of the bond is to protect the complainant from any injury. *See* 19 C.F.R. § 210.42(a)(1)(ii), § 210.50(a)(3).

When reliable price information is available, the Commission has often set the bond by eliminating the differential between the domestic product and the imported, infringing product. *See Microsphere Adhesives, Processes for Making Same, and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, USITC Pub. 2949, Comm'n Op. at 24 (Dec. 8, 1995). In other cases, the Commission has turned to alternative approaches, especially when the level of a reasonable royalty rate could be ascertained. *See, e.g., Certain Integrated Circuit Telecomm. Chips and Prods. Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, Comm'n Op. at 41, 1993 WL 13033517, at \*24 (U.S.I.T.C. June 22, 1993). A 100 percent bond has been required when no effective alternative existed. *See, e.g., Certain Flash Memory Circuits and Prods. Containing Same*, Inv. No. 337-TA-382, USITC Pub. No. 3046, Comm'n Op. at 26-27 (July 1997) (imposing a 100% bond when price comparison was not practical because the parties sold products at different levels of commerce, and the proposed royalty rate appeared to be *de minimus* and without adequate support in the record).

## PUBLIC VERSION

Here, Xtera does not address bond in either their initial or responsive posthearing briefs. When a complainant “fail[s] to satisfy [its] burden to support a 100% bond or to properly explain why a reasonable royalty or price differential would be impractical,” the Commission has set a zero bond during the Presidential review period. *Certain L-Tryptophan, L-Tryptophan Products, and their Methods of Production*, Inv. No. 337-TA-1005, Comm’n Op. at 53 (Jan. 11, 2018) (public version). Such a result follows from the fact that “[t]he complainant has the burden of supporting any bond amount it proposes.” *Id.* at 52 (citing *Certain Rubber Antidegradants, Components Thereof and Products Containing Same*, Inv. No. 337-TA-533, Comm’n Op. at 40 (July 21, 2006)). Accordingly, because Xtera has failed to present evidence in support of any bond rate, I recommend that the Commission impose a 0% bond should it find a violation of section 337 has occurred in this investigation.

### VIII. INITIAL DETERMINATION

Based on the foregoing, I have determined that no violation of section 337 of the Tariff Act of 1930, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain subsea telecommunication systems and components thereof alleged to infringe U.S. Patent No. 8,351,798 and U.S. Patent No. 7,860,403.

I hereby certify to the Commission this Initial Determination and the Recommended Determination.

The Secretary shall serve the confidential version of this Initial Determination upon counsel who are signatories to the Protective Order (Order No. 1) issued in this investigation. A public version will be served at a later date upon all parties of record.

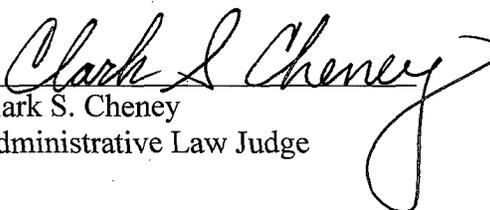
Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R.

PUBLIC VERSION

§ 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

Within seven days of the date of this document, each party shall submit a statement to Cheney337@ustic.gov stating whether or not it seeks to have any portion of this document redacted from the public version. Any party seeking to have any portion of this document redacted from the public version thereof shall attach a copy of this document with red brackets indicating any portion asserted to contain confidential business information.<sup>9</sup> The parties' submissions concerning the public version of this document should not be filed with the Commission Secretary.

**SO ORDERED.**

  
Clark S. Cheney  
Administrative Law Judge

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<sup>9</sup> If the parties submit excessive redactions, they may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, justifying each proposed redaction and specifically explaining why the information sought to be redacted meets the definition for confidential business information set forth in Commission Rule 201.6(a). 19 C.F.R. § 201.6(a).

**PUBLIC CERTIFICATE OF SERVICE**

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Cortney Hoercherl, Esq.**, and the following parties as indicated, on **May 14, 2019**.



Lisa R. Barton, Secretary  
U.S. International Trade Commission  
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