

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AT&T SERVICES INC., T-MOBILE USA, INC., CELLS CO PARTNERSHIP
D/B/A VERIZON WIRELESS, ERICSSON INC., AND NOKIA OF AMERICA
CORPORATION,
Petitioners

v.

INNOVATIVE SONIC LIMITED AND CELERITY IP, LLC.
Patent Owner.

Case IPR2024-1145
U.S. Patent No. 9,560,559

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,560,559**

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES	2
A.	Real Party-in-Interest Under 37 C.F.R. § 42.8(b)(1)	2
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2)	3
C.	Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)	3
D.	Service Information Under 37 C.F.R. § 42.8(b)(4).....	4
III.	FEES	5
IV.	CERTIFICATION OF STANDING	5
V.	OVERVIEW OF CHALLENGE AND RELIEF REQUESTED.....	5
A.	Prior Art.....	5
B.	Relief Requested.....	5
VI.	THE '559 PATENT.....	6
A.	Technical Background.....	6
B.	Overview of the '559 Patent.....	10
C.	Overview of the Prosecution History	12
D.	Level of Ordinary Skill in the Art.....	13
VII.	CLAIM CONSTRUCTION	13
VIII.	OVERVIEW OF PRIOR ART	13
A.	Centonza	13
B.	3GPP TS 36.331	14
C.	Siomina.....	16
IX.	SPECIFIC GROUNDS FOR PETITION	17
A.	Ground 1: Centonza Anticipates the Challenged Claims.....	17
1)	Centonza is Prior Art	17
2)	Claim 1	20
3)	Claim 2	37
4)	Claim 3	38
5)	Claim 7	40
6)	Claim 8	42

7)	Claim 9	42
8)	Claim 10	43
9)	Claim 11	43
B.	Ground 2: Centonza Combined With TS 36.331 Version 11.2.0 Renders Obvious the Challenged Claims.....	44
1)	Centonza and TS 36.331 Version 11.2.0 Are Prior Art	44
2)	Motivation to Combine Centonza and TS 36.331 Version 11.2.0	45
3)	Independent Claims	46
4)	Dependent Claims	48
C.	Ground 3: Centonza Combined With Siomina Renders Obvious the Challenged Claims.....	49
1)	Centonza and Siomina Are Prior Art.....	49
2)	Motivation to Combine Centonza and Siomina.....	49
3)	Claim 1	51
4)	Claim 2	58
5)	Claim 3	58
6)	Claim 7	59
7)	Claim 8	61
8)	Claim 9	62
9)	Claim 10	63
10)	Claim 11	64
D.	Ground 4: Centonza and Siomina Combined With TS 36.331 Version 11.2.0 Renders Obvious the Challenged Claims.....	64
X.	SECONDARY CONSIDERATIONS	65
XI.	INSTITUTION IS PROPER UNDER SECTIONS 314 AND 325	65
XII.	CONCLUSION.....	70

TABLE OF AUTHORITIES

	Page(s)
CASES	
<i>Advanced Bioinc, LLC v. Med-El Elektromedizinische Geräte GmbH</i> , IPR2019-01469 (P.T.A.B. Feb. 13, 2020).....	65
<i>Apple Inc. v. Fintiv, Inc.</i> , IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020).....	66, 67
<i>Apple, Inc. v. SEVEN Networks, LLC</i> , IPR2020-00156, Paper 10 (P.T.A.B. June 15, 2020)	69
<i>ASUS Technology Licensing Inc. et al. v. AT&T Inc. et al.</i> , Case No. 2-23-cv-00486-JRG-RSP (E.D. Tex. 2023).....	3
<i>ASUS Technology Licensing Inc. et al. v. T-Mobile USA, Inc.</i> , Case No. 2-23-cv-00487-JRG-RSP (E.D. Tex. 2023).....	3
<i>ASUS Technology Licensing Inc. et al. v. Verizon Communications Inc.</i> , Case No. 2-23-cv-00488-JRG-RSP (E.D. Tex. 2023).....	3
<i>Blue Calypso, LLC v. Groupon, Inc.</i> , 815 F.3d 1331 (Fed. Cir. 2016)	passim
<i>CommScope Techs. LLC v. Dali Wireless, Inc.</i> , IPR2022-01242, Paper 23 (P.T.A.B. Feb. 27, 2023).....	69
<i>CommScope Techs. LLC v. Dali Wireless, Inc.</i> , IPR2022-01242, Paper 24, 75 (P.T.A.B. Mar. 17, 2023).....	70
<i>Corning Optical Communications LLC v. Dali Wireless, Inc.</i> , IPR2021-00762, Paper 8 (P.T.A.B. Oct. 31, 2021).....	68
<i>CrowdStrike, Inc. v. Open Text Inc.</i> , IPR2023-00556, Paper 9 (P.T.A.B. Sept. 12, 2023).....	67
<i>Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.</i> , 800 F.3d 1375 (Fed. Cir. 2015)	17
<i>Ericsson Inc. v. Koninklijke KPN N.V.</i> , IPR2022-00069, Paper 9, 11-12 (P.T.A.B. May 25, 2022).....	68

<i>Ericsson Inc. v. Koninklijke KPN N.V.</i> , IPR2022-00079, Paper 9, 10-11 (P.T.A.B. May 25, 2022)	68
<i>General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha</i> , IPR2016-01357, Paper 19 (P.T.A.B. Sept. 6, 2017)	65
<i>Hulu LLC v. SITO Mobile R&D IP, LLC et al.</i> , IPR2021-00298, Paper 11 (P.T.A.B. May 19, 2021)	66, 68
<i>Husky Injection Molding Sys. Ltd. v. Athena Automation Ltd.</i> , 838 F.3d 1236 (Fed. Cir. 2016)	33
<i>Innovative Sonic Limited et al. v. AT&T Inc., et al.</i> , Case No. 2-23-cv-00489-JRG-RSP (E.D. Tex. 2023)	3
<i>Innovative Sonic Limited et al. v. T-Mobile USA, Inc.</i> , Case No. 2-23-cv-00490-JRG-RSP (E.D. Tex. 2023)	3
<i>Innovative Sonic Limited et al. v. Verizon Communications, Inc. et al.</i> , Case No. 2-23-cv-00491-JRG-RSP (E.D. Tex. 2023)	3
<i>Minton v. Nat’l Ass’n of Sec. Dealers, Inc.</i> , 336 F.3d 1373 (Fed. Cir. 2003)	36
<i>NetNut Ltd. v. Bright Data Ltd.</i> , IPR2021-01492, Paper 12 (P.T.A.B. Mar. 21, 2022)	66
<i>Ormco Corp. v. Align Tech., Inc.</i> , 463 F.3d 1299 (Fed. Cir. 2006)	64
<i>PEAG LLC v. Varta Microbattery GmbH</i> , IPR2020-01214, Paper 8 (P.T.A.B. Jan. 6, 2021)	67, 68
<i>Samsung Elecs. Co Ltd., v Dynamics Inc.</i> , IPR2020-00505, Paper 11, 15 (P.T.A.B. Aug. 12, 2020)	69
<i>Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC</i> , IPR2019-01393, Paper 24 (P.T.A.B. June 16, 2020)	69
<i>Verizon Business Network Services, Inc. v. Huawei Techs. Co.</i> , IPR2020-01141, Paper 12, 17 (P.T.A.B Jan. 14, 2021)	69

<i>VMWare, Inc. v. Intellectual Ventures I LLC</i> , IPR2020-00470, Paper 13 (P.T.A.B. Aug. 18, 2020).....	68
---	----

<i>Wyers v. Master Lock Co.</i> , 616 F.3d 1231 (Fed. Cir. 2010)	65
---	----

STATUTES

35 U.S.C. § 102	6, 17, 49, 64
-----------------------	---------------

35 U.S.C. § 103	6
-----------------------	---

35 U.S.C. § 314(a)	68, 70
--------------------------	--------

35 U.S.C. § 315(e)	3
--------------------------	---

OTHER AUTHORITIES

37 C.F.R. § 42.15(a).....	5
---------------------------	---

37 C.F.R. § 42.8(b)(1).....	2
-----------------------------	---

37 C.F.R. § 42.8(b)(2).....	3
-----------------------------	---

37 C.F.R. § 42.8(b)(3).....	3
-----------------------------	---

37 C.F.R. § 42.8(b)(4).....	4
-----------------------------	---

37 C.F.R. § 42.10(b)	4
----------------------------	---

37 C.F.R. § 42.104(a).....	5
----------------------------	---

MPEP § 2136(I) (9th ed. Rev. 10.2019, June 2020).....	17
---	----

MPEP § 2136.03(III).....	17
--------------------------	----

LIST OF EXHIBITS

Ex. Number	Title
1001	U.S. Patent No. 9,560,559 to Kuo et al. (“the ’559 Patent”)
1002	File History of U.S. Patent No. 9,560,559
1003	Declaration of Christopher Hansen, Ph.D.
1004	<i>Curriculum Vitae</i> of Christopher Hansen, Ph.D.
1005	U.S. Patent No. 9,479,973 (“Centonza”)
1006	U.S. Provisional Patent Application No. 61/678,722 (“Centonza Provisional”)
1007	World Intellectual Property Pub. App. No. WO2012064265A1 (“Siomina”)
1008	3GPP TS 36.331 V11.2.0 (2012-12)
1009	3GPP TS 36.331 V11.0.0 (2012-06)
1010	3GPP TR 36.932 V12.0.0 (2012-12)
1011	U.S. Pat. App. Pub. No. 20120315908A1
1012	U.S. Pat. App. Pub. No. 20120088516A1
1013	U.S. Pat. App. Pub. No. 20150017993A1
1014	Declaration of Craig Bishop
1015	3GPP TS 36.331 V8.1.0 (2008-03)
1016	June 21, 2022 Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings With Parallel District Court Litigation
1017	Docket Control Order
1018	Consolidation Order
1019	Order Granting Intervention

Petitioners AT&T Services Inc., T-Mobile USA, Inc., Cellco Partnership d/b/a Verizon Wireless, Ericsson Inc., and Nokia of America Corporation (collectively, “Petitioners”) request *Inter Partes* Review (“IPR”) of claims 1–3 and 7–11 (“the Challenged Claims”) of the ’559 Patent, owned by Innovative Sonic Ltd. and Celerity IP, LLC (collectively, “Patent Owner”). Petitioners respectfully request that the Challenged Claims be found unpatentable.

I. INTRODUCTION

The claims of the ’559 Patent combine two cellular concepts: dual connectivity (*e.g.*, having two base stations serve one mobile device); and utilizing measurement-gap configurations (*e.g.*, making sure a base station does not communicate with a mobile device during a “measurement gap,” which is when the device is taking measurements). Both of those concepts, however, were known before the ’559 Patent, which Patent Owner admitted in the specification and did not contest during prosecution.

This Petition focuses on two references that were not before the Patent Office during prosecution: Centonza and Siomina. These references disclose dual connectivity and, as part of that process, transmitting measurement-gap configurations between base stations so each base station can account for the UE’s measurement gaps. Petitioner thus respectfully requests the Board institute this Petition and find unpatentable the Challenged Claims of the ’559 Patent.

II. MANDATORY NOTICES

A. Real Party-in-Interest Under 37 C.F.R. § 42.8(b)(1)

The real parties in interest are AT&T Enterprises, LLC,¹ AT&T Mobility LLC, AT&T Mobility II LLC, AT&T Services Inc., Cellco Partnership d/b/a Verizon Wireless, Verizon Corporate Resources Group LLC, T-Mobile USA, Inc., Ericsson Inc., Telefonaktiebolaget LM Ericsson, and Nokia of America Corporation.²

¹ AT&T Corp. is a named defendant in the below identified related cases. AT&T Corp. has undergone a corporate transaction and is now merged and converted into AT&T Enterprises, LLC. Out of an abundance of caution, Petitioners are identifying AT&T Enterprises, LLC as a real party in interest in this IPR.

² Out of an abundance of caution, Petitioners identify all current defendants in the below identified cases as potential real parties in interest only for the purpose of this proceeding and only to the extent that Patent Owner contends that these separate legal entities should be named real parties in interest in this IPR. Petitioners do so to avoid the potential expenditure of resources to resolve such a challenge. Petitioners also acknowledge that each petitioner has a number of affiliates. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

The following are a list of related matters: *ASUS Technology Licensing Inc. et al. v. AT&T Inc. et al.*, Case No. 2-23-cv-00486-JRG-RSP (E.D. Tex. 2023) (Lead Case); *ASUS Technology Licensing Inc. et al. v. T-Mobile USA, Inc.*, Case No. 2-23-cv-00487-JRG-RSP (E.D. Tex. 2023); *ASUS Technology Licensing Inc. et al. v. Verizon Communications Inc.*, Case No. 2-23-cv-00488-JRG-RSP (E.D. Tex. 2023); *Innovative Sonic Limited et al. v. AT&T Inc., et al.*, Case No. 2-23-cv-00489-JRG-RSP (E.D. Tex. 2023); *Innovative Sonic Limited et al. v. T-Mobile USA, Inc.*, Case No. 2-23-cv-00490-JRG-RSP (E.D. Tex. 2023); *Innovative Sonic Limited et al. v. Verizon Communications, Inc. et al.*, Case No. 2-23-cv-00491-JRG-RSP (E.D. Tex. 2023).

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioners provides the following designation of counsel.

Lead Counsel	Backup Counsel
Scott W. Hejny Reg. No. 45,882 shejny@McKoolSmith.com McKool Smith, P.C.	Nicholas Mathews Reg. No. 66,067 nmathews@mckoolsmith.com McKool Smith, P.C.

Petition or Petitioners' participation in any resulting IPR. Petitioners are also not aware of any affiliate that would be barred from filing this Petition under 35 U.S.C. § 315(e).

Lead Counsel	Backup Counsel
300 Crescent Court, Suite 1500 Dallas, Texas 75201 Telephone: 214-978-4000 Fax: 214-978-4044	300 Crescent Court, Suite 1500 Dallas, Texas 75201 Telephone: 214-978-4000 Fax: 214-978-4044 Christian J. Hurt Reg. No. 63,659 churt@mckoolsmith.com McKool Smith, P.C. 300 Crescent Court, Suite 1500 Dallas, Texas 75201 Telephone: 214-978-4000 Fax: 214-978-4044

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

A copy of this entire Petition, including all Exhibits and a Power of Attorney, is being served via email and FEDERAL EXPRESS, costs prepaid, to the address of the attorney or agent of record at the USPTO:

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

Petitioners are also serving Patent Owner's litigation counsel of record, as reflected below on the Certificate of Service.

Petitioners consent to electronic service at the addresses provided above for lead and back-up counsel and at the following email address: Celerity_IPRs@mckoolsmith.com. A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b).

III. FEES

The Office is authorized to charge a fee under 37 C.F.R. 42.15(a) to Deposit Account No. DA-505723 and any additional fees that are due.

IV. CERTIFICATION OF STANDING

Petitioners certify pursuant to 37 C.F.R. §42.104(a) that the '559 Patent is available for IPR and that Petitioners are not barred or estopped from requesting an IPR of the Challenged Claims on the grounds identified herein.

V. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

A. Prior Art

This challenge is based on the following references: U.S. Patent No. 9,479,973 (“Centonza”) (Ex-1005 and Ex-1006); World Intellectual Property Pub. App. No. WO2012064265A1 (“Siomina”) (Ex-1007); and 3GPP TS 36.331 v11.2.0 (2012-12) (Ex-1008).³

B. Relief Requested

Petitioners request institution of IPR and cancellation of the Challenged Claims based on the following Grounds, supported by the Declaration of Christopher

³ This Petition, in Grounds #2 and #4, is based on Version 11.2.0 of TS 36.331. This version, for the purposes cited in this Petition, contains the same disclosure as Version 11.0.0 of TS 36.331, which was the version of TS 36.331 in existence at the time of the Centonza priority date. Ex-1003, ¶¶ 54, 139.

Hansen, Ph.D. (Ex-1003).

Ground	Basis	Challenged Claims	References
1	35 U.S.C. § 102 (Anticipation)	1–3, 7–11	Centonza
2	35 U.S.C. § 103 (Obviousness)	1–3, 7–11	Centonza + TS 36.331
3	35 U.S.C. § 103 (Obviousness)	1–3, 7–11	Centonza + Siomina
4	35 U.S.C. § 103 (Obviousness)	1–3, 7–11	Centonza + Siomina + TS 36.331

VI. THE '559 PATENT

A. Technical Background

The '559 Patent relates to “small cell enhancements” in cellular networks that utilize dual connectivity. Ex-1003, ¶ 30; Ex-1001 at (54). More specifically, the patent discloses providing a small cell with the measurement-gap configuration for a user equipment (“UE”), such as a smartphone. Ex-1003, ¶ 30. Next-generation cellular systems (such as LTE) utilize a network that includes base stations (“eNBs”) and a core network that contains components such as a Mobility Management Entity (“MME”) and a Serving Gateway (“SGW”), as shown below. *Id.*, ¶ 31; Ex-1001, 1:31–40, 2:18–30 (describing E-UTRAN); Ex-1006, 9 (Fig. 1).

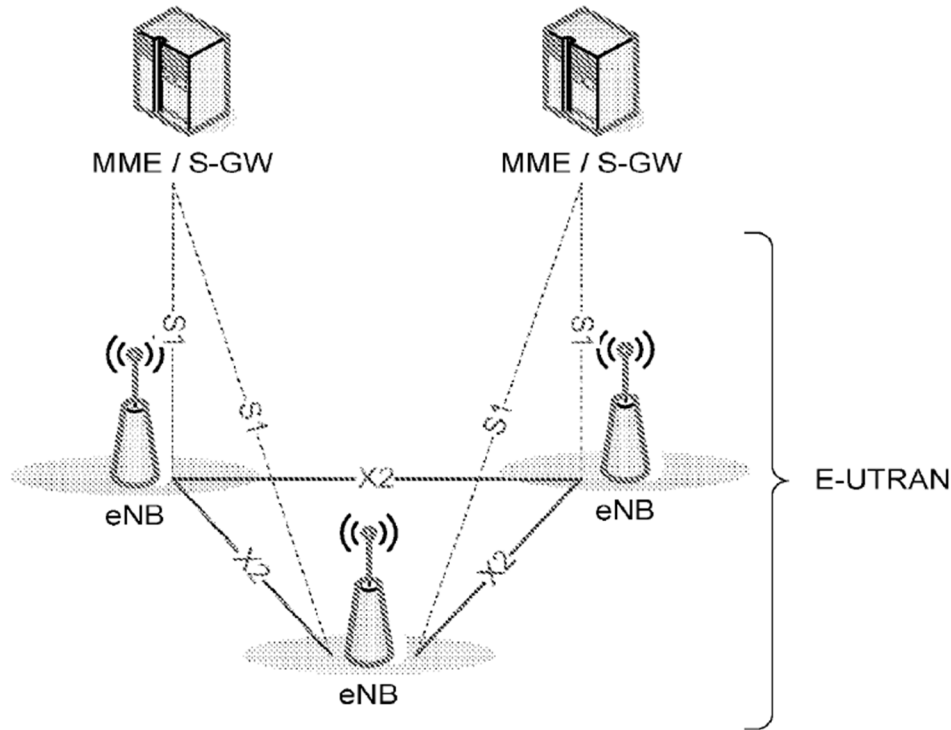


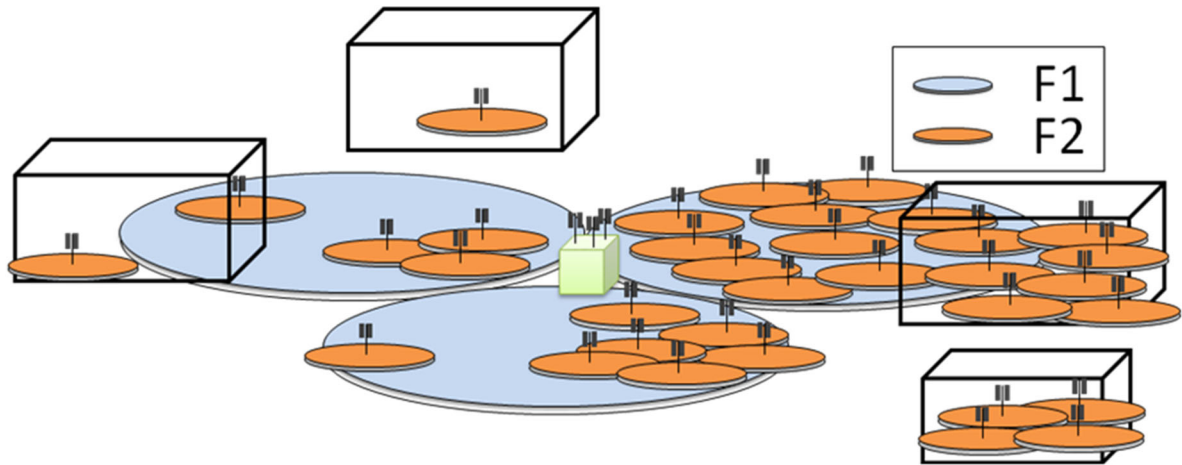
Figure 1: Overall E-UTRAN Architecture
Ex-1006, 9.

The eNBs can communicate over an X2 interface, and each eNB can communicate through core network devices (*e.g.*, the MME and SGW) over an S1 interface. Ex-1003, ¶ 32. The eNBs provide cellular service to a UE. *Id.*

In general, dual connectivity refers to the ability to two eNBs to serve a UE.⁴ Ex-1003, ¶¶ 32–35. Dual connectivity pre-dates the '559 Patent, which the patent specification admits. *Id.*; Ex-1001, 4:62–6:29 (describing 3GPP requirements, studies, and proposals relating to dual connectivity). For example, the '559 Patent

⁴ See, *e.g.*, Ex-1002, 37 (“dual connectivity (*i.e.*, a UE is served by two base stations at the same time”).

incorporates the December, 2012 version of Technical Report (“TR”) 36.932 (Ex-1001, 2:18–30) which describes a scenario that can provide dual connectivity. Ex-1003, ¶¶ 34–35; Ex-1001, 5:4–40 (describing 3GPP study under TR 36.932 “for the feasible scenario of dual connectivity”).



NOTE 1: F1 and F2 are the carrier frequency for macro layer and local-node layer, respectively

Figure 6.1-1: Deployment scenarios of small cell with/without macro coverage

Ex-1010, 7.

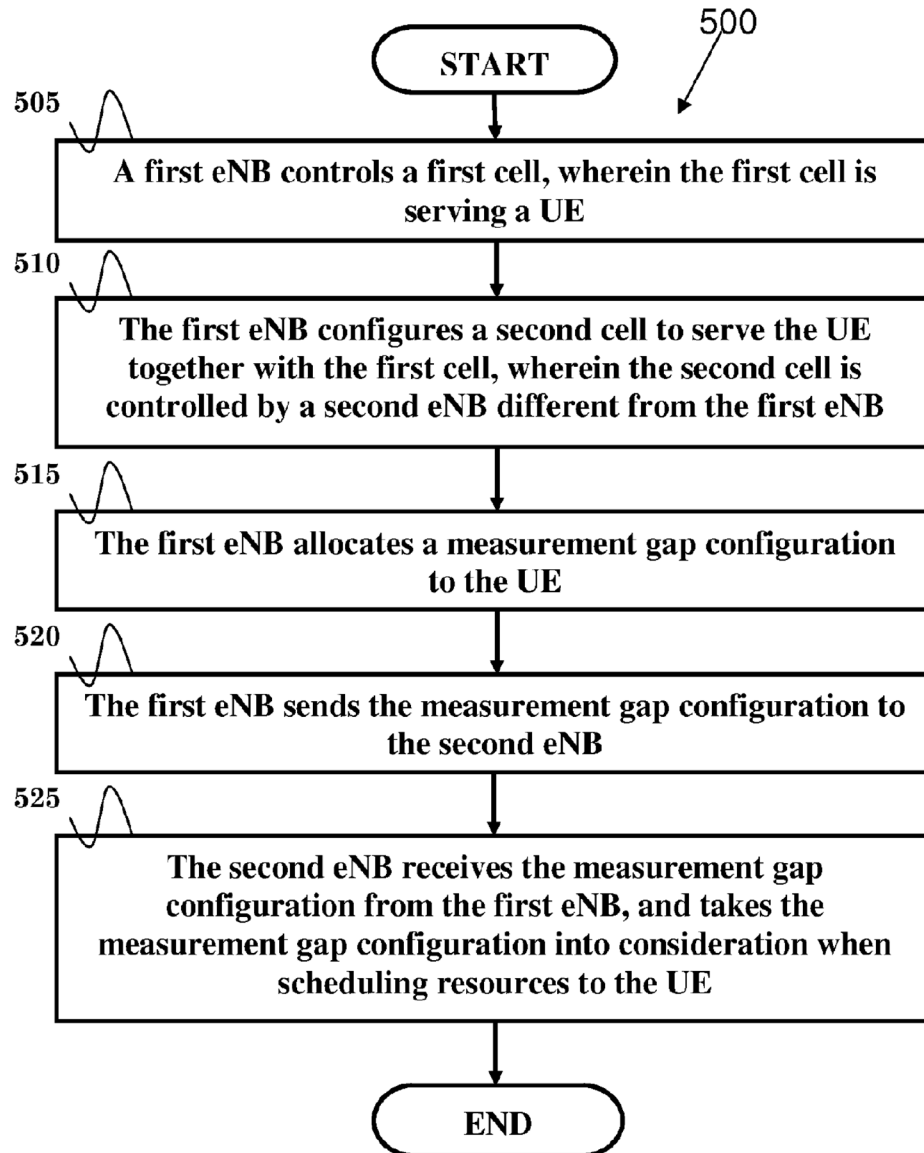
The image above shows many eNBs, including a macro eNB (in green) and pico eNBs (the antennas within each of the orange circles). Ex-1003, ¶ 35. A UE (not depicted) is associated with “cells” that are controlled by the eNBs, *e.g.*, a macro cell and a pico (or local) cell. *Id.* The macro eNB controls a macro cell layer (the layer represented in blue). *Id.* The pico eNBs control a local-node layer (represented in orange). *Id.* Utilizing dual connectivity, the macro eNB could serve the UE through a macro cell and a pico eNB would serve the UE through a local cell at the same time. *Id.*

As with dual connectivity, the patent specification admits that determining and providing measurement-gap configurations predates the '559 Patent. Ex-1003, ¶ 36; Ex-1001, 6:41–49. In general, a measurement gap refers to the time in which a UE cannot communicate (in either the uplink or downlink direction) because the UE is taking measurements. Ex-1003, ¶¶ 36–37 (explaining the purpose of providing measurement-gap configurations); Ex-1001, 6:46–49 (explaining that a UE “cannot transmit or receive any signal . . . during the measurement gaps”); Ex-1006, 19 (“Measurement gaps define time periods when no uplink or downlink transmissions will be scheduled, so that the UE may perform the measurements[.]”); Ex-1015, 98 (describing sending measurement-gap configuration in March 2008 version of TS 36.331).

The '559 Patent incorporates by reference 3GPP TS 36.331 V11.2.0 (2012-12) and explains that TS 36.331 discusses sending measurement-gap configurations. Ex-1001, 2:18–30, 6:41–49. TS 36.331 generally discusses the Radio Resource Control (“RRC”) protocol that is used to configure a UE. Ex-1008, 14. The reference describes two messages that include the measurement-gap configuration: (1) a message to configure the UE with a measurement gap (RRCConnectionReconfiguration); and (2) a message between eNBs to share a UE’s measurement-gap configuration (HandoverPreparationInformation). *Id.*, 140–142, 245–46, 294–95, 296–97; Ex-1003, ¶¶ 38–41 (describing information elements).

B. Overview of the '559 Patent

The '559 Patent generally combines the concepts of dual connectivity and sending a measurement-gap configuration between eNBs. Ex-1003, ¶¶ 42–43. The patent describes a five-step process, reproduced below.



Ex-1001, Fig. 5.

Claim 1 recites the steps from Figure 5 as follows:

1. A method for supporting dual connectivity in a wireless

communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity, comprising:

a first eNB controls a first cell, wherein the first cell is serving a UE (User Equipment); and;

the first eNB configures a second cell to serve the UE together with the first cell, wherein the second cell is controlled by a second eNB;

the first eNB allocates a measurement gap configuration to the UE; and

the first eNB sends the measurement gap configuration to the second eNB so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE.⁵

Ex-1001, claim 1.

⁵ Petitioners reserve the right to challenge the validity of the '559 Patent claims, including under Section 112, on the basis of written description, enablement, and definiteness.

C. Overview of the Prosecution History

During prosecution, the Examiner focused on three references that the Examiner found rendered the pending claims obvious: Li,⁶ Ji,⁷ and Ishii.⁸ Ex-1002, 13, 34–38, 46–50. In response, the Patent Owner did not dispute that dual connectivity and sending measurement-gap configurations from one base station to another existed before the '559 Patent. *Id.*; Ex-1003, ¶¶ 44–46.

The Patent Owner instead argued that the references failed to show that the eNB receiving a measurement gap configuration “is a serving base station” and that the UE is served by both the first and second eNB “at the same time.” Ex-1002, 35, 37 (emphases in original). While Patent Owner admitted that Ishii “addresses dual connectivity (i.e., a UE is served by two base stations at the same time),” it asserted it was improper to combine Ishii with Ji because Ji teaches that the UE “is served by a single base station.” *Id.*, 37. The Examiner then allowed the claims based on Patent Owner’s arguments. *Id.*, 13.

⁶ U.S. Pat. App. Pub. No. 20120315908A1 (Ex-1011).

⁷ U.S. Pat. App. Pub. No. 20120088516A1 (Ex-1012).

⁸ U.S. Pat. App. Pub. No. 20150017993A1 (Ex-1013).

Centonza and Siomina were not before the Patent Office during prosecution. Ex-1001, (56). They thus were not considered by the Examiner or cited as basis for rejecting the pending claims. The Examiner would not have allowed the claims of the '559 Patent to issue in view of Centonza or Siomina.

D. Level of Ordinary Skill in the Art

As of the earliest claimed priority date, a person of ordinary skill in the art at the time of the alleged invention of the '559 Patent ("POSITA") would have had a B.S. in Electrical Engineering or a related field with at least three years of experience designing, developing, and/or testing telecommunication systems. Ex-1003, ¶ 47. A POSITA would also have familiarity with the wireless standards and well-known protocols for accessing wireless networks. *Id.* More education may supplement practical experience or *vice versa*. *Id.*

VII. CLAIM CONSTRUCTION

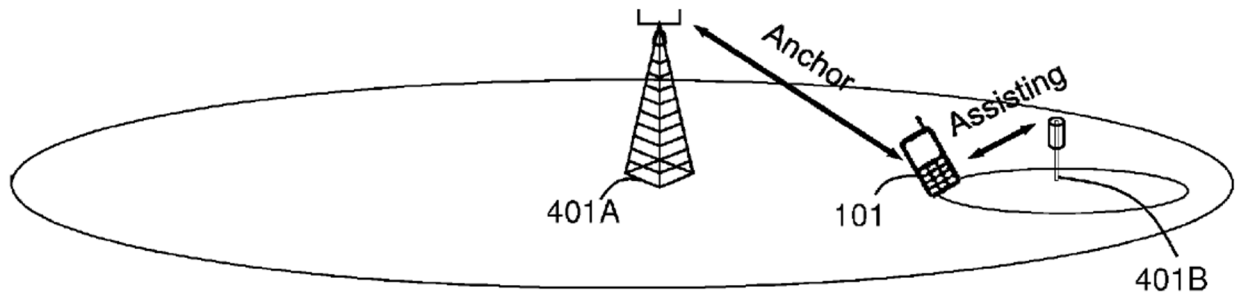
Petitioners submit that the Board does not need to expressly construe any terms to resolve the arguments presented herein. Petitioners submit that no terms need to be construed because the prior art in this Petition discloses all limitations under any plausible construction. Ex-1003, ¶ 48.

VIII. OVERVIEW OF PRIOR ART

A. Centonza

Centonza, a patent assigned to Telefonaktiebolaget LM Ericsson, discloses a process for managing dual connectivity using a partial handover technique. Ex-

1003, ¶¶ 50–51. It discloses that the two eNBs (e.g., a macro eNB that controls a macro cell and a pico eNB that controls a pico cell) serve a UE at the same time. *Id.*; Ex-1005, Fig. 1, 5:31–33.



Ex-1005, Fig. 1.

To manage dual connectivity, Centonza teaches that eNBs and UEs may communicate control information, including providing RRC protocol information. Ex-1003, ¶ 51. That information includes the measurement-gap configuration for a UE. *Id.*; Ex-1005, 10:63–11:44; Ex-1006, 18–19, 89–90, 138–139, 205–206.

B. 3GPP TS 36.331

The '559 Patent incorporates by reference TS 36.331. Ex-1001, 2:18–30. Centonza also discloses that 3GPP TS 36.331 describes the details of the RRC protocol. Ex-1005, 7:24–26; Ex-1006, 11. Centonza's Handover Request message includes an "RRC Context" information element, which refers to the RRC Handover Preparation Information message in sub-clause 10.2.2 of TS 36.331. Ex-1005, 17:6–35; Ex-1006, 150; Ex-1003, ¶¶ 38–41, 52–54.

Table 1: Example of enhanced HANDOVER REQUEST message

IE/Group Name	Presence	Range	Semantics description	Criticality	Assigned Criticality
>RRC Context	M		Comprises the RRC Handover Preparation Information message as defined in subclause 10.2.2 of TS 36.331 [9].	–	–

Ex-1006, 150 (cropped).

The Handover Preparation Information message includes a field (MeasGapConfig) that “specifies the measurement gap configuration and controls setup/ release of measurement gaps” (shown below from Version 11.2.0). Ex-1008, 245–47, 294–95, 296–97.

– *MeasGapConfig*

The IE *MeasGapConfig* specifies the measurement gap configuration and controls setup/ release of measurement gaps.

***MeasGapConfig* information element**

```
-- ASN1START
MeasGapConfig ::=
    CHOICE {
        release
        setup
        gapOffset
            gp0
            gp1
            ...
    }
}
-- ASN1STOP
```

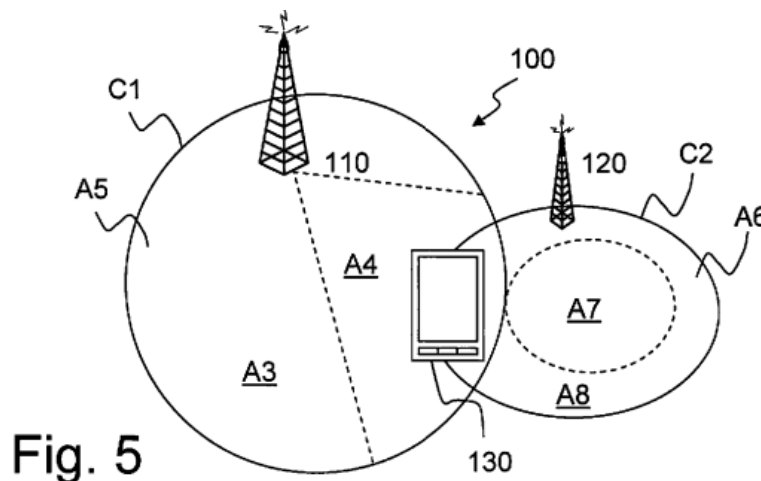
Ex-1008, 246.

Both version 11.0.0 and 11.2.0 of TS 36.331 disclose a Handover Preparation Information message that includes the MeasGapConfig field. Ex-1009, 216–217, 259–260, 262; Ex-1003, ¶¶ 54, 139. For the purposes of this Petition, there is no

material difference between version 11.2.0 (cited in the '559 Patent) and version 11.0.0 (available at the time of the Centonza provisional). *Id.*

C. Siomina

Siomina, a patent application also assigned to Telefonaktiebolaget LM Ericsson, discloses a heterogeneous network similar to Centonza. Ex-1003, ¶¶ 55–57. Siomina discloses, for example, a macro eNB (110) that controls a first cell (C1) and a pico eNB (120) that controls a second cell (C2). *Id.*, ¶ 55; Ex-1007, Figs 3, 5; *id.* 9:23–11:11, 17:13–18:14.



Ex-1007, Fig. 5.

Siomina also discloses that the macro eNB sends transmission and measurement patterns to the pico eNB, which can include measurement-gap patterns. Ex-1003, ¶ 57; Ex-1007, Figs. 6a and 7, 19:12–29, 24:5–16. The eNBs take the transmitted patterns into account with scheduling resources to the UE. *Id.*, Figs. 4 and 6a, 3:29–35, 5:18–36, 6:5–9, 13:20–30, 19:12–29, 31:22–32:27.

IX. SPECIFIC GROUNDS FOR PETITION

A. Ground 1: Centonza Anticipates the Challenged Claims

Centonza anticipates the Challenged Claims for the reasons below.

1) Centonza is Prior Art

Centonza qualifies as Section 102 prior art. Ex-1003, ¶¶ 60–66. It was filed on July 15, 2013, before the '559 Patent's January 29, 2014 filing date, and published on July 24, 2014. Centonza also is entitled to an August 2, 2012 priority date under Section 119(e) based on the Centonza Provisional, a date earlier than the earliest potential priority date of the '559 Patent (February 8, 2013). Ex-1005, (60). The Centonza Provisional discloses the subject matter of the Challenged Claims, as shown below, and provides Section 112 support for Centonza and its claims. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1381 (Fed. Cir. 2015); MPEP § 2136(I) (9th ed. Rev. 10.2019, June 2020); MPEP § 2136.03(III). Centonza and the Centonza Provisional contain virtually identical disclosures, including the specific disclosure related to measurement gap configuration. Ex-1003, ¶¶ 61–63; Ex-1005, Figs. 1–19; Ex-1006, 9–34 (Figs. 1–17), 61–62 (Figs. 18–19); Ex-1005, 10:63–11:44; Ex-1006, 18–19, 89–90, 138–139, 205–206. The chart below maps Centonza's claim 25 to corresponding support in the Centonza Provisional. Ex-1003, ¶ 65.

Centonza	Centonza Provisional
25. A method, in a target base station in a wireless communications network, for providing a handover for a sub-set of bearers associated with a wireless terminal being served by a source base station, said sub-set of bearers being less than or equal to all bearers associated with the wireless terminal, the method comprising:	The application utilizes a wireless communication network, which includes a source base station and a target base station. Ex-1006, 58–62. It discloses, in a target base station, providing a handover for a sub-set of bearers associated with a wireless terminal being served by a source base station, said sub-set of bearers being less than or equal to all bearers associated with the wireless terminal. <i>Id.</i>, 61–62 (showing handover of a “sub-set of bearers” and depicting “example operations which may be taken by the target base station ... in the providing a handover of at least a sub-set of bearers associated with a user equipment.”); <i>id.</i>, 47 (describing “a selective handover of only a subset of the UE bearers”); <i>id.</i>, 73–78 (describing embodiments where the target base station receives a selective handover request); <i>id.</i>, 73 (“41. A method, in a target base station, for providing a handover of at least a sub-set of bearers associated with a user equipment, the method comprising:”).
receiving, from the source based station, a handover request for the sub-set of bearers, wherein a least one bearer of the wireless terminal is to remain connected to the source base station	The application discloses, receiving, from the source based station, a handover request for the sub-set of bearers, wherein a least one bearer of the wireless terminal is to remain connected to the source base station. Ex-1006, 62 (showing the target base station “[r]eceive[s], from the source base station, a handover request for a sub-set of bearers”); <i>id.</i>, 73

Centonza	Centonza Provisional
	(“receiving (50), from a source base station, a handover request for the sub-set of bearers associated with the user equipment”); <i>id.</i>, 106 (explaining that “at least one bearer (which is not associated with the identified sub-set) remains connected to the base station” as part of handover procedure); <i>id.</i>, 112 (explaining that at least one bearer “remains connected to the base station”).
analyzing an admissibility of the sub-set of bearers with respect to the handover procedure	The application discloses analyzing an admissibility of the sub-set of bearers with respect to the handover procedure. Ex-1006, 62 (showing the target base station “[a]nalyze[s] a possibility of admitting the sub-set of bearers”); <i>id.</i>, 73 (“analyzing (52) suitability of possibility of admitting the sub-set of bearers comprises in the handover request”).
sending, to the source base station, a handover acknowledgement message comprising a result of the analyzed admissibility; and	The application discloses sending, to the source base station, a handover acknowledgement message comprising a result of the analyzed admissibility. Ex-1006, 61–62 (showing the target base station “send[s], to the source base station, a handover acknowledgement message”); <i>id.</i>, 74 (“sending (64), to the source base station, a handover request acknowledgement comprising a result of analyzing”).
receiving, from the source base station, at least one subsequent handover request, wherein each subsequent	The application discloses receiving, from the source base station, at least one subsequent handover request,

Centonza	Centonza Provisional
handover request is treated as a handover request for only a sub-set of bearers associated with the wireless terminal.	wherein each subsequent handover request is treated as a handover request for only a sub-set of bearers associated with the wireless terminal. Ex-1006, 50 (“In case the target eNB receives multiple selective handover requests concerning the same UE from the same source eNB, it shouldn’t be interpreted as an error, but rather as a request to selectively hand over even more bearers of the UE towards the target.”); <i>id.</i> , 74 (same); <i>id.</i> , 62 (showing target base station “[r]eceive[s], from the source base station, a handover request for a sub-set of bearers”); <i>id.</i> , 112 (explaining that at least one bearer “remains connected to the base station”).

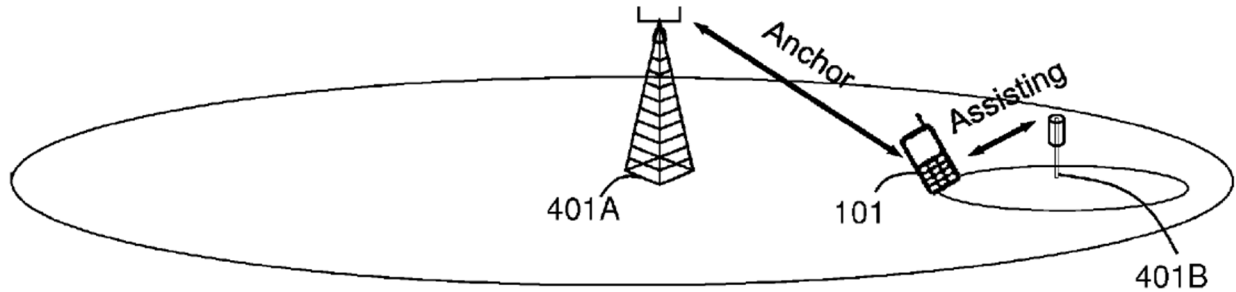
2) Claim 1

- a) *[1pre]: A method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity, comprising:*

To the extent the preamble is limiting, Centonza discloses the preamble. Ex-1003, ¶¶ 67–75. Centonza discloses supporting dual connectivity in a wireless communications system (*e.g.*, dual connectivity in cellular networks) in which two separate eNBs are used to support dual connectivity (*e.g.*, an eNB controlling a macro cell and an eNB controlling a pico cell). *Id.*; Ex-1005, Fig. 9, 12; Ex-1006, 16 (Fig. 8), 17 (Fig.11). Centonza discloses that the two eNBs are separate and that

each eNB has its own cell (*e.g.*, one eNB controls a macro cell and another eNB controls a pico cell). Ex-1003, ¶¶ 67–75; Ex-1005, 9:34–41, 16:57–62; Ex-1006, 15–16; *see also id.*, 26 (disclosing “dual connectivity”); Ex-1005, 10:34–40 (disclosing “dual connectivity”). Centonza also discloses that the two eNBs serve the UE at the same time—including depicting a “heterogeneous deployment with simultaneous anchor and assisting flows to a wireless terminal.” Ex-1003, ¶ 70; Ex-1005, Fig. 1, 5:31–33 (emphasis added).⁹

⁹ Patent Owner stated during prosecution that “dual connectivity” means that “a UE is served by two base stations at the same time.” Ex-1002, 37 (emphasis added). Centonza includes multiple disclosures of dual connectivity as defined by Patent Owner. *See, e.g.*, Ex-1005, 10:28–43 (“When both connections are active, the anchor flow may be used either for control signaling while the assisting flow is used for data. However, it will still be possible to send data also via the anchor flow.”); Ex-1006 (same); Ex-1005, 9:21–10:43 (describing a heterogeneous network in which a macro node and pico node transmit data and common signals and channels associated with a cell); Ex-1006, 15–16 (same); Ex-1005, 1:47–52 (explaining that Centonza addresses the challenges from “serving a user equipment (UE) from more than one eNB simultaneously”); Ex-1006, 8 (same); Ex-1005, 10:11–27 (describing



Ex-1005, Fig. 1.

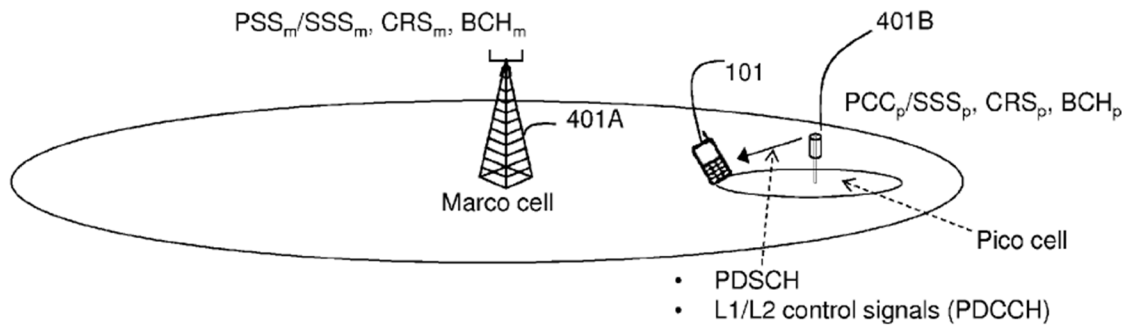
As one example, Centonza shows that a UE is served at the same time by two cells controlled by different eNBs (*e.g.*, a Cell A controlled by a macro eNB and a Cell B controlled by a pico eNB). Ex-1003, ¶ 73–74; Ex-1005, 19:25–21:54; Ex-1006, 52–54. Centonza teaches that each of the base stations (*e.g.*, the macro base station and the pico base station) are eNBs. Ex-1003, ¶ 72; Ex-1005, 1:53–57. For these reasons, Centonza discloses the preamble.

an embodiment in which “[i]n essence identical copies of the signals and channels necessary for a legacy terminal are transmitted simultaneously from the macro 401A and pico 401B nodes”); Ex-1006, 17 (same); *id.*, 145 (“Namely, the handover procedures involves the handing over of a subset of UE bearers to a target cell while some other UE bearers are kept active in the source cell, enabling bearer traffic transmission to the same UE from at least two different cells.”).

b) *[1b]: a first eNB controls a first cell, wherein the first cell is serving a UE (User Equipment); and*

Centonza discloses this limitation. Ex-1003, ¶¶ 76–79. Centonza discloses that the first eNB (*e.g.*, a Source eNB) controls a first cell (*e.g.*, a macro cell) that is serving a user equipment (UE), such as a mobile device. *Id.* Centonza discloses macro cells and pico cells (an anchor cell and a booster/assisting cell), including a “Primary serving cell” (a PCell) and a “secondary cell” (an SCell). Ex-1005, Figs. 8–12, 12:10–27; Ex-1006, 14–18, 20, 144; Ex-1003, ¶¶ 76–79. Thus, the Source eNB controls a first cell (such as a PCell macro cell). *Id.*, ¶ 76–77; Ex-1005, 5:46–48, 9:34–41; Ex-1006, 15, 16, 87.

Centonza also discloses that the first cell (such a PCell macro cell) is serving a UE. Ex-1003, ¶ 78; Ex-1005, 3:4–62 (describing a “wireless terminal being served by a source base station”); *id.*, 12:10–27 (describing a “Primary serving cell, PCell”); Ex-1006, 19–22 (similar). This disclosure includes, for example, a macro cell (part of 401A) serving a wireless terminal (101). *See, e.g.*, Ex-1005, Fig. 9, 12; Ex-1006, 16 (Fig. 8), 17 (Fig.11); *see also* Ex-1005, Fig. 1 (showing anchor and assisting flow through macro node and pico node).



Ex-1005, Fig. 9.

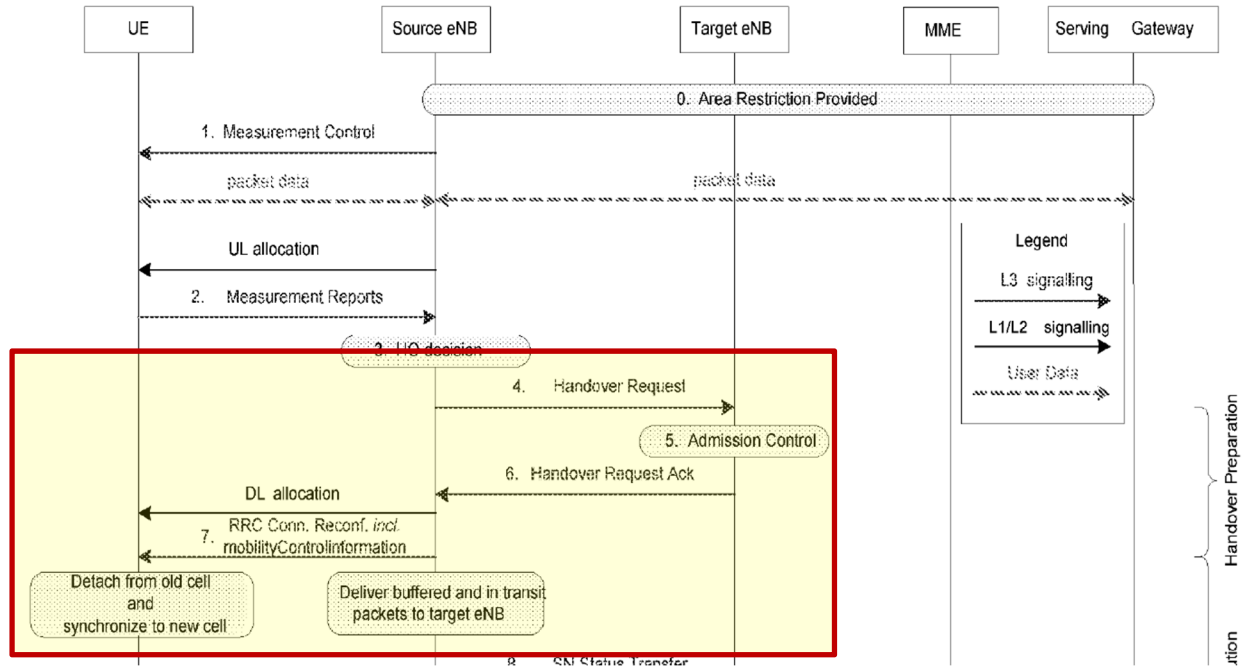
- c) [1c]: the first eNB configures a second cell to serve the UE together with the first cell, wherein the second cell is controlled by a second eNB;

Centonza discloses this limitation. Ex-1003, ¶¶ 80–95. Centonza teaches that the first eNB (e.g., the Source eNB) configures a second cell (e.g., a pico SCell) to serve the UE together with the first cell (e.g., the macro PCell). *Id.*

- (1) the first eNB configures a second cell to serve the UE together with the first cell...

Centonza teaches dual connectivity via a partial handover of bearers from one eNB (e.g., the Source eNB) to another eNB (e.g., the Target eNB). Ex-1003, ¶¶ 81–92. Centonza teaches that the Source eNB configures a second cell through the partial handover process. *Id.*; Ex-1006, 45 (Fig. 14); Ex-1005, Fig. 15.

The steps highlighted below (steps 4–7) show how Centonza's Source eNB configures a second cell (which the Target eNB controls) to serve the UE together with the first cell. Ex-1003, ¶¶ 82–92; Ex-1006, 45 (Fig. 14); Ex-1005, Fig. 15.



Ex-1006, 45 (Fig. 14) (cropped and annotated)

Per above, the Source eNB first sends a Handover Request to the Target eNB (step 4). Ex-1003, ¶¶ 84–85. That request includes a target cell identifier (the “Target Cell ID”) for an SCell that the Source eNB configures to serve together with the PCell via a list of the sub-set of radio bearers (called E-RABs¹⁰) to handover in an “E-RABs To Be Setup List.” *Id.*; Ex-1006, 50; Ex-1005, 17:5–18:24.

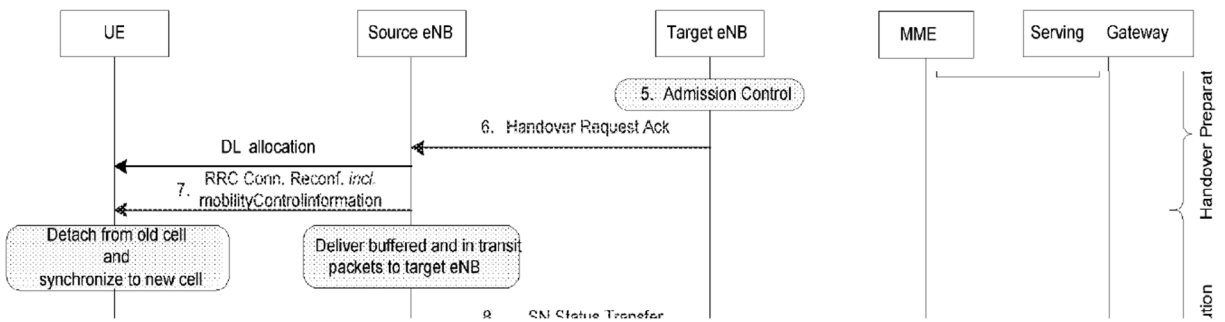
¹⁰ “E-RAB” is short for “E-UTRAN Radio Access Bearer.” Ex-1003, ¶ 85; Ex-1006, 47 (“[U]nless otherwise specified, by bearer it is meant a data radio bearer.”); *id.*, 11, 47, 49; Ex-1005, 4:13, 16:36–40, 17:5–18:24, 21:56–65, 27:56–58, 30:27–30.

X2 HANDOVER REQUEST message	
	Presence
IE/Group Name	
Message Type	M
Old eNB UE X2AP ID	M
Cause	M
Target Cell ID	M
GUMMEI	M
UE Context Information	
>MME UE S1AP ID	M
>UE Security Capabilities	M
>AS Security Information	M
>UE Aggregate Maximum Bit Rate	M
>Subscriber Profile ID for	O
RAT/Frequency priority	
>E-RABs To Be Setup List	
>>E-RABs To Be Setup Item	
>>>E-RAB ID	M
>>>E-RAB Level QoS Parameters	M
>>>DL Forwarding	O
>>>UL GTP Tunnel Endpoint	M
>RRC Context	M
>Handover Restriction List	O
>Location Reporting Information	O
>Management Based MDT Allowed	O
UE History Information	M
Trace Activation	O
SRVCC Operation Possible	O
CSG Membership Status	O

Ex-1005, 17:5–18:24 (annotated).

The Handover Request configures an SCell of the UE (the Target Cell) via handing over a subset of bearers (in the E-RABs To Be Setup List) “towards” the SCell. Ex-1003, ¶ 86; Ex-1006, 62 (Fig. 19); *id.*, 48, 66, 70 (disclosing handover “towards the pico node or cell”); *id.*, 52–54 (teaching selective handover for a UE from Anchor Cell A to Assisting Cell B); Ex-1005, 19:25–21:54 (same); *id.*, Fig. 19.

The Target eNB, after determining if it can admit the handed-over bearers (step 5), “[s]ends, to the source base station [the first eNB], a handover acknowledgement message” (step 6). Ex-1003, ¶ 87; Ex-1005, Fig. 19; Ex-1006, 62 (Fig. 19); Ex-1006, 54 (describing admissions control); *id.*, 54–55, 93 (describing HANDOVER REQUEST ACKNOWLEDGE); Ex-1005, 21:55–23:31 (same); Ex-1006, 45 (Fig. 14); Ex-1005, Fig. 15.



Ex-1006, 45 (Fig. 14) (cropped).

The Handover Request Acknowledge contains an E-RABs Admitted List and an E-RABs Not Admitted List, which informs the Source eNB of the E-RABs the Target eNB will accept and reject for the Target Cell. Ex-1006, 55; Ex-1005, 22:1–8; Ex-1003, ¶¶ 88–89. The Source eNB receives these lists and changes the data path of radio bearers based on the lists: “the source eNB decides to keep those bearers [on the Not Admitted List] with itself and hand over only the ones listed in the E-RABs Admitted List.” *Id.*; Ex-1006, 55; Ex-1005, 22:19–25.

The Source eNB then sends the downlink (“DL”) allocation and a RRC Connection Reconfiguration message to the UE (step 7). Ex-1003, ¶ 90. This

message, for the handed over bearers, detaches the bearers from the old cell (*e.g.*, the PCell) and synchronizes to the new cell (*e.g.*, the SCell, which was the Target Cell). *Id.*; Ex-1006, 94 (“After receiving the *RRCConnectionReconfiguration* message comprising the *mobilityControlInfo*, UE performs synchronisation to target eNB and accesses the target cell via RACH. . . . When the UE has successfully accessed the target cell, the UE sends the *RRCConnectionReconfigurationComplete* message to the target to confirm that the handover succeeded.”); *id.*, 99 (explaining that, upon receipt of the *RRCConnectionReconfiguration*, the UE “[s]tart[s] synchronizing to the downlink of the target cell”).

This RRC message is the same message that the ’559 Patent discloses as an example. Ex-1001, 6:55–58. Ex-1003, ¶ 90; Ex-1001, 6:55–58 (“[T]he second cell could be configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB.”).

Centonza’s process, as shown in element [1pre], configures the second cell (the SCell that is the target cell) to serve together with the first cell (the PCell). Ex-1003, ¶¶ 91–92. After the partial handover of bearers, the PCell continues to serve the UE through the E-RABs that were not handed over (*e.g.*, those E-RABs that were not listed in the Handover Request or those in the E-RABs Not Admitted List in the Handover Acknowledge). *Id.*; Ex-1006, 55; Ex-1005, 22:19–25. The second cell (the SCell that is the target cell) serves the UE through the E-RABs that were handed

over (*e.g.*, the E-RABs that were admitted). Ex-1003, ¶ 92; Ex-1006, 55; Ex-1005, 22:19–25. The SCell and PCell, including after the partial handover, serve the UE together, as detailed above in element [1pre]. Ex-1003, ¶ 92; Ex-1005, Fig. 1, 5:31–33 (disclosing “simultaneous anchor and assisting flows to a wireless terminal”); Ex-1006, 145 (“Namely, the handover procedures involves the handing over of a subset of UE bearers to a target cell while some other UE bearers are kept active in the source cell, enabling bearer traffic transmission to the same UE from at least two different cells.”); *see also id.*, 112 (explaining that even an empty bearer list still allows for “the possibility of transmitting future mobility signaling from both the serving and target cell”).

- (2) ...wherein the second cell is controlled by a second eNB;

The second eNB (the Target eNB) controls the second cell (the SCell). As shown above in [1pre], Centonza discloses that the second eNB (the Target eNB) controls the second cell (the SCell that is the target cell). Ex-1003, ¶¶ 93–94; Ex-1005, Fig. 9, 5:46–48 (depicting a deployment in which “the pico node corresponds to a cell of its own”); *id.*, 9:39–41 (“A pico node of a heterogeneous deployment may correspond to a cell of its own (a ‘pico cell’)[.]”); Ex-1005, Figs. 8–12, 12:10–27; Ex-1006, 15; *id.*, 16 (Fig. 8); 14–18, 20, 144.

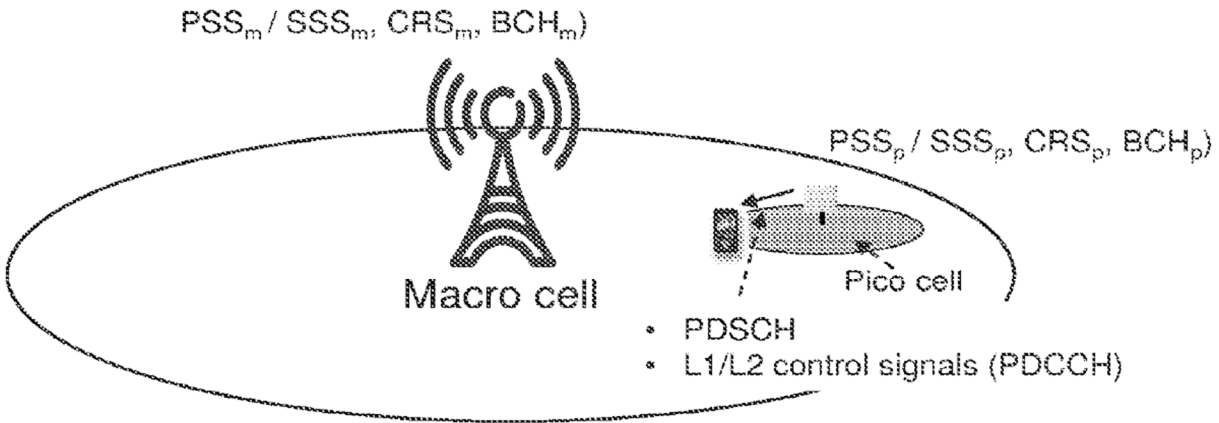


Figure 8: Heterogeneous deployment where the pico node corresponds to a cell of its own (a “pico cell”). The indices “p” and “m” indicate common signals/channels for the pico and macro cell respectively.

Ex-1006, 16 (Fig. 8).

The Target eNB thus controls an SCell (e.g., a pico node that corresponds to a pico cell of its own). Ex-1003, ¶¶ 93–94.

d) [1d]: the first eNB allocates a measurement gap configuration to the UE; and

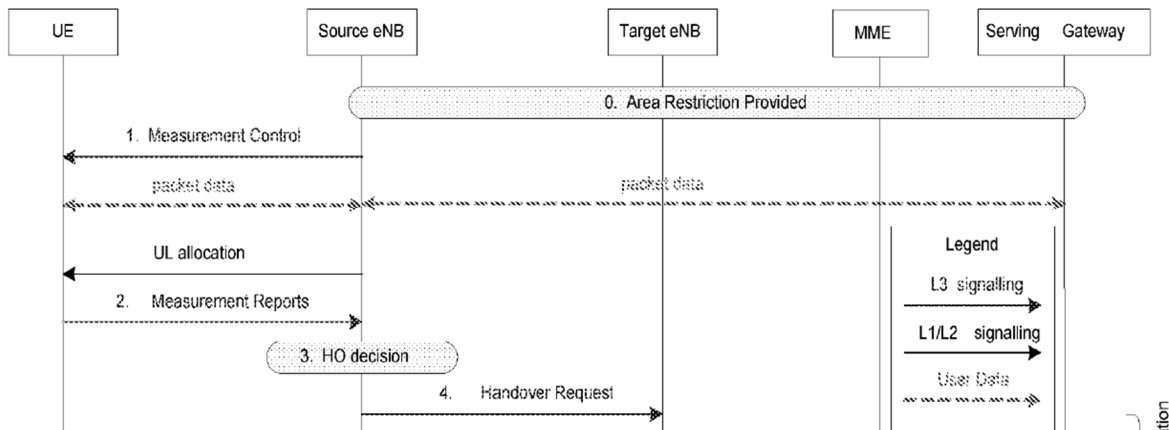
Centonza discloses this limitation. Ex-1003, ¶¶ 96–107. Centonza discloses that the first eNB (the Source eNB) allocates a measurement-gap configuration to the UE. *Id.* The references teaches that, in connection with Centonza’s selective handover procedure, the Source eNB allocates a measurement-gap configuration to the UE and then communicates that configuration to the Target eNB as part of the Handover Request message. *Id.* Centonza explains that one configuration an eNB can signal is a measurement gap configuration.

Various measurement configurations may be signaled to the user equipment. . . . Yet another example configuration is measurement gaps. Measurement gaps

define time periods when no uplink or downlink transmissions will be scheduled, so that the user equipment may perform the measurements, for example, inter-frequency measurements where the user equipment has only one TX/RX unit and supports only one frequency at a time. The measurement gaps configuration are common for all gap-assisted measurements.

Ex-1005, 10:63–11:44; Ex-1006, 18–19, 89–90, 138–139, 205–206.

Centonza discloses that first eNB (*e.g.*, the Source eNB) receives the measurement reports from the UE (step 2 below). Ex-1003, ¶¶ 98–101; Ex-1006, 45 (Fig. 14); Ex-1005, Fig. 15.



Ex-1006, 45 (Fig. 14) (cropped).

To provide those reports, the Source eNB first configures the UE to take measurements and provide measurement reports (such as in step 1, “Measurement Control” above), including via a RRCConnectionReconfiguration message. Ex-1003, ¶¶ 99–101; Ex-1005, 9:65–11:44; Ex-1006, 18–19, 89–90, 138–139, 205–206. The RRCConnectionReconfiguration message includes the MeasGapConfig

information element, which specifies the measurement-gap configuration for the UE. Ex-1003, ¶¶ 99–101.

Centonza’s allocation of a measurement-gap configuration for the UE is further shown in the Handover Request message that the Source eNB sends the Target eNB. Ex-1003, ¶¶ 102–106; Ex-1005, 17:6–35; Ex-1006, 150. The Handover Request message includes an RRC Context Information Element, which Centonza explains is “the RRC Handover Preparation Information message as defined in subclause 10.2.2 of TS 36.331.” *Id.*¹¹

Table 1: Example of enhanced HANDOVER REQUEST message

IE/Group Name	Presence	Range	Semantics description	Criticality	Assigned Criticality
>RRC Context	M		Comprises the RRC Handover Preparation Information message as defined in subclause 10.2.2 of TS 36.331 [9].	–	–

Ex-1006, 150 (cropped).

¹¹ Centonza further points to TS 36.311 as providing “[t]he details of the RRC protocol functionalities and procedures.” Ex-1005, 7:24–26; Ex-1006, 11; *see also* Ex-1005, 10:65-11:3 (“As specified in 3GPP TS 36.331, the E-UTRAN provides the measurement configuration applicable for a user equipment in RRC_CONNECTED by means of dedicated signaling, for example, using the RRCConnectionReconfiguration message.”); Ex-1006, 18 (same).

Centonza thus incorporates by reference TS 36.311, including subclause 10.2.2. Centonza specifically identifies with detailed particularity the RRC messaging protocol in that specification and clearly identifies where that material is found. That is sufficient under the law. *Husky Injection Molding Sys. Ltd. v. Athena Automation Ltd.*, 838 F.3d 1236, 1248 (Fed. Cir. 2016) (reciting legal standard).

TS 36.311 (both the version available at the time of the Centonza Provisional and the version incorporated into the '559 Patent) were publicly available by their respective publication dates (which are prior to February 8, 2013). Ex-1014, ¶¶ 58, 64; Ex-1003, ¶ 104. Both versions disclose that the Handover Preparation Information includes the MeasGapConfig element, which “specifies the measurement gap configuration and controls setup /release of measurement gaps.” *Id.*, ¶ 105; Ex-1009, 217; Ex-1008, 246–247.

— *MeasGapConfig*

The IE *MeasGapConfig* specifies the measurement gap configuration and controls setup/ release of measurement gaps.

***MeasGapConfig* information element**

```
-- ASN1START
MeasGapConfig ::=
    CHOICE {
        release
        setup
        gapOffset
            CHOICE {
                gp0
                gp1
                ...
            }
    }
-- ASN1STOP
```

<i>MeasGapConfig</i> field descriptions	
<i>gapOffset</i>	Value <i>gapOffset</i> of <i>gp0</i> corresponds to gap offset of Gap Pattern Id “0” with MGRP = 40ms, <i>gapOffset</i> of <i>gp1</i> corresponds to gap offset of Gap Pattern Id “1” with MGRP = 80ms. Also used to specify the measurement gap pattern to be applied, as defined in TS 36.133 [16].

Ex-1009, 217.

The Handover Preparation Information message includes the *MeasGapConfig* element within the AS-Config field. Ex-1003, ¶ 106; Ex-1009, 260; Ex-1008, 295. The AS-Config field contains information “about RRC configuration information in the source eNB which can be utilized by target eNB to determine the need to change the RRC configuration during the handover preparation phase.” Ex-1009, 261; Ex-1008, 298. That field includes the “measurement configuration in the source cell,” (sourceMeasConfig), Ex-1009, 262; Ex-1008, 297, which includes the *MeasGapConfig* element, Ex-1009, 216; Ex-1008, 245–246. Thus, Centonza discloses that the RRC Context information element includes the measurement-gap configuration that the Source eNB allocated for a UE. Ex-1003, ¶ 106.

This disclosure reinforces that the Source eNB allocated the measurement-gap configuration for the UE. The Source eNB then this configuration to the Target eNB as part of the Handover Request. Ex-1003, ¶ 107.

- e) *[1e]: the first eNB sends the measurement gap configuration to the second eNB so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE.*

Centonza discloses this limitation. Ex-1003, ¶¶ 108–113. Centonza discloses that, within the Handover Request, the first eNB (the Source eNB) sends the measurement gap configuration (e.g., the MeasGapConfig field within the RRC Context element) to the second eNB (the Target eNB), as discussed above in element [1d]. *Id.*; Ex-1006, 61–62 (Figs. 18 and 19) (“Send, to a target base station, a handover request....Receive, from the source base station, a handover request....”); Ex-1005, 3:12–16 (“sending, to a target base station, a handover request”); *id.*, 3:37–41 (“receiving, from the source base station, a handover request”); *id.*, Figs. 18 and 19 (“Send, to a target base station, a handover request....Receive, from the source base station, a handover request....”).

To the extent the purpose of this step—“so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE”—is

limiting (as opposed to the intended result),¹² Centonza discloses the purpose of sending the measurement-gap configuration to the second eNB. Ex-1003, ¶¶ 109–113. Centonza explains that “[m]easurement gaps define time periods when no uplink or downlink transmissions will be scheduled, so that the user equipment may perform the measurements[.]” Ex-1005, 11:37–44; Ex-1006, 19, 90, 139, 206; *see also* Ex-1009, 74 (defining measurement gap as “[p]eriods that the UE may use to perform measurements, i.e. no (UL, DL) transmissions are scheduled”); Ex-1008, 80 (same). This disclosure shows that the Source eNB transmits the measurement-gap configuration to ensure that uplink and downlink communications are scheduled around the measurement gaps. Ex-1003, ¶ 111. TS 36.331 also explains that the

¹² *See, e.g., Minton v. Nat’l Ass’n of Sec. Dealers, Inc.*, 336 F.3d 1373, 1381 (Fed. Cir. 2003) (explaining that a method-claim clause that “simply expresses the intended result of a process step positively recited” is not a limitation and holding that the term “whereby the security is traded efficiently” was non-limiting where it did not “inform the mechanics of how the trade is executed and “characterize[ed] the result of the executing step”).

Source eNB provides the MeasGapConfig information (as part of the AS-Config element) to the Target eNB so the Target eNB can “to determine the need to change the RRC configuration” (*e.g.*, the measurement-gap configuration) “during the handover preparation phase,” Ex-1009, 261; Ex-1008, 296 (same), and discloses scheduling uplink and downlink resources, Ex-1003, ¶ 111; Ex-1005, 9:60–63; Ex-1006, 15, 87, 94, 99, 136, 209. This means that, based on the received measurement-gap configuration, the Target eNB follows the current measurement-gap configuration when it schedules resources or reconfigures the UE. Ex-1003, ¶¶ 109–115. In either case, Centonza teaches that the natural result flowing from the Source eNB sending the measurement-gap configuration to the Target eNB is that the Target eNB will take the measurement gap into considering when scheduling resources to the UE. *Id.* Centonza thus teaches that the purpose of providing the measurement gap configuration to the Target eNB is so that the Target eNB can schedule resources to a UE to avoid the periods when the UE cannot transmit or receive data because it is taking measurements. *Id.*

3) Claim 2

a) [Preamble]: The method of claim 1, wherein

Centonza anticipates claim 1 for the reasons above.

- b) *[2b]: the measurement gap configuration indicates a measurement gap pattern to be applied in the UE for performing measurements.*

Centonza discloses this claim limitation. Ex-1003, ¶¶ 115–117. Centonza explains that the measurement gap configuration indicates a measurement gap pattern to be applied in the UE for performing measurements. *Id.* Centonza explains that “[m]easurement gaps define time periods when no uplink or downlink transmissions will be scheduled, so that the user equipment may perform the measurements[.]” Ex-1005, 11:37–44; Ex-1006, 19, 90, 139, 206. As discussed in element [1d], within the Handover Request, the first eNB (the Source eNB) sends the measurement gap configuration (*e.g.*, the MeasGapConfig field within the RRC Context element) to the second eNB (the Target eNB). Ex-1003, ¶ 116. The MeasGapConfig field includes the gapOffset field, which is used to “specify the measurement gap pattern to be applied[.]” Ex-1009, 217; Ex-1008, 247 (same)

<i>MeasGapConfig</i> field descriptions
gapOffset Value <i>gapOffset</i> of <i>gp0</i> corresponds to gap offset of Gap Pattern Id “0” with MGRP = 40ms, <i>gapOffset</i> of <i>gp1</i> corresponds to gap offset of Gap Pattern Id “1” with MGRP = 80ms. Also used to specify the measurement gap pattern to be applied, as defined in TS 36.133 [16].

Ex-1009, 217.

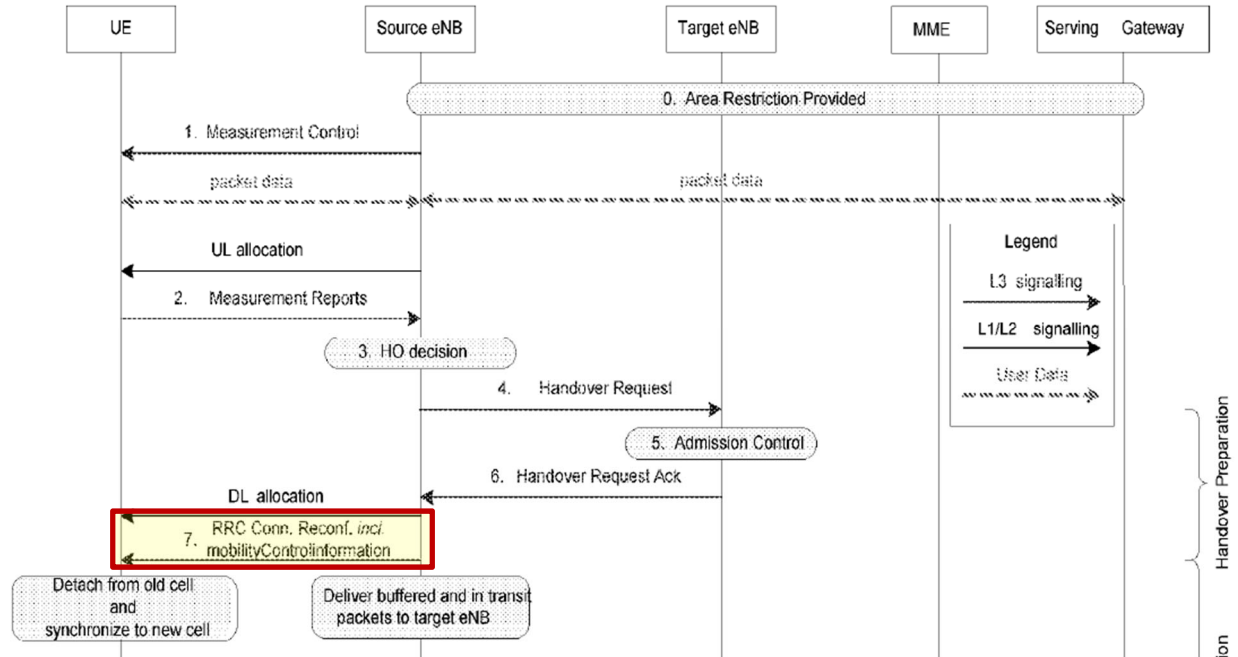
4) Claim 3

- a) *[Preamble]: The method of claim 1, wherein*

Centonza anticipates claim 1 for the reasons above.

- b) *[3b]: the second cell is configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB.*

Centonza discloses this claim limitation. Ex-1003, ¶¶ 119–122. Centonza teaches that the second cell (*e.g.*, the pico cell) is configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB (*e.g.*, the Source eNB). *Id.* Centonza shows that the Source eNB configures the SCell the UE through a RRC Connection Reconfiguration message, as shown below in step 7. *Id.*; Ex-1006, 46 (Fig. 14); Ex-1005, Fig. 15; *id.*, 10:63–11:3 (“[T]he E-UTRAN provides the measurement configuration applicable for a user equipment in RRC_CONNECTED by means of a dedicated signaling, for example, using the RRCConnectionReconfiguration message.”); Ex-1006, 18, 89 (same); *id.*, 92 (“The measurement configurations are sent to the UE by using the *measConfig* Information Element (IE) that is comprised in the *RRCConnectionReconfiguration* message.”); *id.*, 93 (explaining that main components of the *RRCConnectionReconfiguration* message including “[a]n optional measurement configuration (*measConfig* IE) to be used in the target cell”).



Ex-1006, 46 (Fig. 14) (cropped and annotated).

This disclosure matches the example RRC-based configuration disclosed in the '559 Patent. Ex-1001, 6:55–58. Centonza thus discloses this claim element.

5) Claim 7

- a) *[Preamble]: A method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity and a UE (User Equipment) is served by a first cell controlled by a first eNB, comprising:*

This limitation is a combination of elements [1pre] and [1b] above. As shown above, Centonza discloses “[a] method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity” for the reasons in element [1pre]. Section IX(A)(2)(a). Centonza similarly discloses “a UE (User Equipment) is served by a first cell

controlled by a first eNB” as described above for the parallel limitation in [1b] (“a first eNB controls a first cell, wherein the first cell is serving a UE (User Equipment)”). Section IX(A)(2)(b). Centonza thus discloses this limitation. Ex-1003, ¶¶ 123–125.

- b) [7b]: a second eNB controls a second cell, wherein the second cell is configured by the first eNB to serve the UE together with the first cell; and*

This limitation is a parallel limitation to element [1c], which recites “the first eNB configures a second cell to serve the UE together with the first cell, wherein the second cell is controlled by a second eNB.” As detailed above for element [1c], Centonza discloses this limitation. Section IX(A)(2)(c); Ex-1003, ¶ 126.

- c) [7c]: the second eNB receives a measurement gap configuration from the first eNB so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE, wherein the measurement gap configuration was allocated by the first eNB to the UE.*

This limitation is a combination of elements [1d] and [1e] above. The “wherein the measurement gap configuration was allocated by the first eNB to the UE” parallels element [1d], which recites “the first eNB allocates a measurement gap configuration to the UE.” As shown above for element [1d], Centonza discloses this limitation. Section IX(A)(2)(d); Ex-1003, ¶ 127. The “second eNB receives a measurement gap configuration from the first eNB” portion of this limitation mirrors the “the first eNB sends the measurement gap configuration to the second eNB” from

element [1e]. For the same reasons discussed above for element [1e], the second eNB (the Target eNB) receives from the first eNB (the Source eNB) measurement-gap information (e.g., via the MeasGapConfig field within the RRC Context element of the Handover Request). Section IX(A)(2)(e); Ex-1003, ¶ 127. Finally, the “second eNB could take measurement gaps into consideration when scheduling resources to the UE” portion of this limitation matches the same limitation in element [1e]. As shown above in the discussion of element [1e], Centonza discloses this limitation. Section IX(A)(2)(e); Ex-1003, ¶ 127.

6) Claim 8

a) [Preamble]: The method of claim 7, further comprises:

Centonza anticipates claim 7 for the reasons above.

b) [8b]: the second eNB takes the measurement gap configuration into consideration when scheduling resources to the UE.

Centonza discloses this claim limitation. Ex-1003, ¶ 129. As discussed in connection with elements [1e] and [7c], the second eNB (the Target eNB) receives the MeasGapConfig field within the RRC Context element of the Handover Request in order to schedule resources to the UE. Sections IX(A)(2)(e) and IX(A)(5)(c); Ex-1003, ¶ 129.

7) Claim 9

a) [Preamble]: The method of claim 8, wherein

Centonza anticipates claim 8 for the reasons above.

- b) [9b]: the resources contain downlink assignments and/or uplink grants.*

Centonza discloses this claim limitation. Ex-1003, ¶ 131. As discussed in connection with elements [1e], [7c], and [8b], the second eNB (the Target eNB) receives the MeasGapConfig field within the RRC Context element of the Handover Request in order to schedule resources to the UE. Ex-1003, ¶ 131; Sections IX(A)(2)(e), IX(A)(5)(c), and IX(A)(6)(b). That includes the uplink grants and downlink assignments, as the UE cannot transmit data in the uplink and downlink directions during the measurement gap period. *Id.*; Ex-1003, ¶ 131.

8) Claim 10

- a) [Preamble]: The method of claim 7, wherein*

Centonza anticipates claim 7 for the reasons above.

- b) [10b]: the measurement gap configuration indicates a measurement gap pattern to be applied in the UE for performing measurements.*

This limitation is the same as element [2b]. For the same reasons as element [2b], Centonza discloses this limitation. Section IX(A)(3)(b); Ex-1003, ¶ 133.

9) Claim 11

- a) [Preamble]: The method of claim 7*

Centonza anticipates claim 7 for the reasons above.

- b) *[11b]: wherein the second cell is configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB.*

This limitation is the same as element [3b]. For the same reasons as element [3b], Centonza discloses this limitation. Section IX(A)(4)(b); Ex-1003, ¶ 135.

B. Ground 2: Centonza Combined With TS 36.331 Version 11.2.0 Renders Obvious the Challenged Claims

Centonza anticipates the Challenged Claims. To the extent Centonza does not anticipate the claims, Centonza combined with TS 36.311 renders the claims obvious for the reasons below.

1) Centonza and TS 36.331 Version 11.2.0 Are Prior Art

Centonza is prior art. Section IX(A)(1); Ex-1003, ¶ 137. TS 36.331 is also prior art because it was publicly available before the February 8, 2013. *Id.*, ¶ 140; Ex-1014, ¶¶ 59–64 (showing that Version 11.2.0 was publicly available by December 2012); *id.*, ¶¶ 53–58 (showing that Version 11.0.0 was publicly available by June 2012). In addition, the '559 Patent incorporates by reference Version 11.2.0 of TS 36.331. Ex-1001, 2:18–30, 6:41–49. The Patent thus admits that TS 36.331 was publicly available before February 8, 2013 and is prior art. *See, e.g., Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1350 (Fed. Cir. 2016) (explaining that “a published article with an express citation to the potentially invalidating reference” provides “the necessary guidance” to show a reference was publicly available). The two versions of TS 36.331, which contain the same relevant

disclosure, were also publicly available through the 3GPPP website at or near the time of their respective publication dates and would have been found by a POSITA. Ex-1014, ¶¶ 53–64.

2) Motivation to Combine Centonza and TS 36.331 Version 11.2.0

To the extent Centonza does not incorporate TS 36.331 by reference, a POSITA would have been motivated to combine Centonza with TS 36.331 version 11.2.0 to arrive at the Challenged Claims. Ex-1003, ¶ 141. Centonza cites to TS 36.331 for RRC protocol including providing user equipment measurements (such as measurement-gap configurations) and states that the Handover Request includes the RRC context. Ex-1005, Fig. 5, 7:14–26, 10:64–11:3, 12:47–60, 16:66–17:4; Ex-1006, 11, 18, 146, 150, 152, 165, 166. Centonza’s teaching would have motivated a POSITA to combine Centonza with TS 36.331. Ex-1003, ¶ 141.

Centonza and TS 36.331 are in the same field. Ex-1003, ¶ 142. Both references relate to next-generation cellular networks, specifically building on E-UTRAN that existed in 2012 (*e.g.*, 4G/LTE networks). *Id.* TS 36.331 is a standardized protocol specification used in E-UTRAN, specifically a protocol “for the radio interface between UE and E-UTRAN[.]” Ex-1008, 14. Centonza likewise relates to improvements to E-UTRAN (including 4G/LTE). Ex-1005, 1:35–53, 2:24–36, 15:13–18 (explaining that Centonza improves upon “[t]he current legacy handover mechanisms” and describing “the use of an LTE based system as an

example”); *see also id.*, Figs. 2, 4, 5, 6:20–35, 6:61–7:47 (describing the Radio Protocol Architecture of E-UTRAN and explaining that “[t]he details of the RRC protocol functionalities and procedures may be found in 3GPP TS 36.331”); Ex-1006, 8, 11, 82 (similar).

A POSITA would have also had a reasonable expectation of success in combining Centonza and TS 36.311. Ex-1003, ¶ 143. Centonza discloses the architecture to transmit messages through the RRC protocol, and discloses that its Handover Request includes the RRC Context for selective handover (the RRC Handover Preparation Information message). *Id.*; Ex-1005, Figs. 4, 5, 6:61–7:46, 16:63–17:35; Ex-1006, 10–12, 49–50, 148, 150, 152. A POSITA thus would have understood that Centonza could implement the RRC protocol as described in TS 36.331 and the combination would be successful. *Id.* This is especially the case because the RRC protocol standardized in TS 36.331—explicitly mentioned in Centonza—was also well-established by 2013, including transmitting the MeasGapConfig element. *Id.*; Ex-1015, 98; Ex-1014, ¶¶ 47–52 (showing publication of TS 36.331 specification in March 2008).

3) Independent Claims

Centonza renders obvious claims 1 and 7. Ex-1003, ¶ 144. As shown above in Sections IX(A)(1) and IX(A)(5), Centonza discloses each element of these claims. To the extent Centonza—without the incorporation of TS 36.311—does not disclose

any of the claim elements, the combination of Centonza and TS 36.311 discloses each element as detailed in Ground #1.

In addition, to the extent the combination of Centonza and TS 36.311 does not disclose the purpose (elements [1e] and [7c]) of sending the measurement-gap configuration to the Target eNB, a POSITA would have found it obvious to modify the system such that the Target eNB takes the measurement-gap configuration into consideration when scheduling resources to the UE. Ex-1003, ¶¶ 145–146. Per Centonza, the measurement-gap configuration tells the Target eNB when the UE cannot communicate. *Id.* The entire purpose of transmitting this information is so the Target eNB can ensure it is not attempting to communicate with the UE during those outages. *Id.* It thus would have been obvious to a POSITA to modify Centonza and TS 36.331 to expressly take into consideration the measurement gaps when scheduling resources to the UE. *Id.* A POSITA would have been motivated to make this change to take advantage of the measurement-gap configuration provided the Target eNB and maximize the efficiency of communications with the UE. *Id.* And a POSITA would have had a reasonable expectation of success: the system would work better because the Target eNB would avoid transmitting data to the UE during the measurement gaps (as it would know that the UE would be unable to receive those transmissions). *Id.*

4) Dependent Claims

Centonza also renders obvious claims 2, 3, 8–11. Ex-1003, ¶¶ 147–148. As shown above in Sections IX(A)(3), IX(A)(4), IX(A)(6), IX(A)(7), IX(A)(8), and IX(A)(9), Centonza discloses each element of these claims. To the extent Centonza—without the incorporation of TS 36.311—does not disclose any of the claim elements, the combination of Centonza and TS 36.311 discloses each element as detailed in Ground #1. In addition, to the extent the combination of Centonza and TS 36.311 does not disclose the Target eNB “tak[ing] the measurement gap configuration into consideration when scheduling resources to the UE” (element [8b]) a POSITA would have found it obvious to modify the system for the reasons above. *Id.*; Section IX(A)(6)(b).

Similarly, to the extent the combination of Centonza and TS 36.311 does not explicitly disclose the scheduled resources include downlink assignments and/or uplink grants (as in element [9b]), a POSITA would have found it obvious to modify the system to schedule downlink assignments and uplink grants based on the measurement-gap configurations. Ex-1003, ¶¶ 149–150. A POSITA would have found such a change obvious for the reasons above. *Id.* During the measurement gaps, a UE cannot communicate in either the uplink or downlink directions. *Id.* It thus would have been obvious to a POSITA to modify Centonza and TS 36.331 to expressly take into consideration the measurement gaps when scheduling uplink

grants and downlink assignments. *Id.* A POSITA would have been motivated to make this change to take advantage of the measurement-gap configuration provided the Target eNB and maximize the throughput during periods of uplink and downlink transmissions (and minimize the amount of transmissions during the measurement gaps, which would require retransmission of the data). *Id.* And a POSITA would have had a reasonable expectation of success for the same reasons as above. *Id.*; Section IX(A)(7)(b).

C. Ground 3: Centonza Combined With Siomina Renders Obvious the Challenged Claims

1) Centonza and Siomina Are Prior Art

Centonza is prior art. Section IX(A)(1). Siomina is also prior art to the '559 Patent. Ex-1003, ¶ 151. It is a WIPO application that claims priority to a November 2010 provisional application, was filed in November 2011, and was published in May 2012, Ex-1007, (10), (22), (30), each of which occurred before the earliest priority date of the '559 Patent. It is thus prior art under Section 102.

2) Motivation to Combine Centonza and Siomina

A POSITA would have been motivated to combine Centonza and Siomina. Ex-1003, ¶¶ 152–154. The references are in the same field, as both relate to improving heterogonous network deployments in 4G/LTE networks. *Id.*; Ex-1005, Fig. 1, 1:35–62, 2:24–36; Ex-1006, 8, 14–16; Ex-1007, 1:24–2:30. Centonza, as discussed above, also teaches obtaining measurement-gap information and, via an

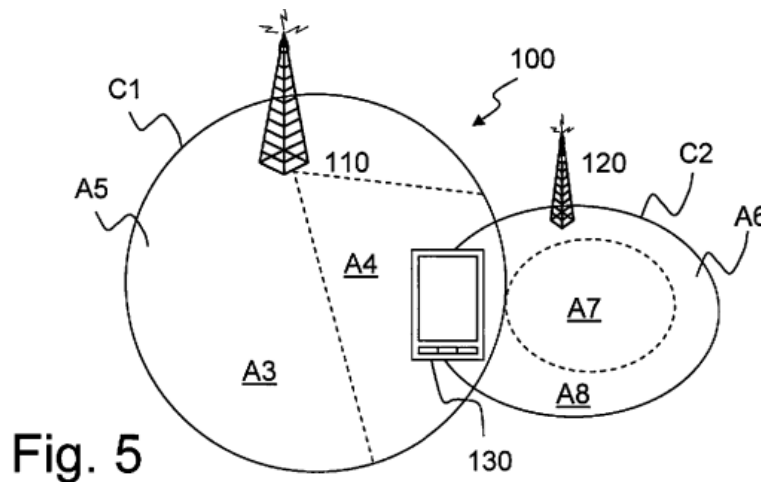
RRC message, transmitting that information to the Target eNB in a heterogeneous network that enables dual connectivity. Ex-1003, ¶¶ 152–153; Section IX(A)(2). A POSITA, looking at Centonza, would have been motivated to look for a more-detailed disclosure relating to transmitting measurement-gap configuration information between two eNBs in a heterogeneous network to manage communications with a UE. Ex-1003, ¶¶ 152–153. Siomina, also assigned to Telefonaktiebolaget LM Ericsson, provides additional details on transmitting patterns between two eNBs, including measurement-gap configurations, and scheduling resources based on those patterns. *Id.*; *E.g.*, Ex-1007, 3:29–35 (discussing how a pico cell “can prioritize scheduling of transmissions”).

A POSITA would also have a reasonable expectation of success in combining the references. Ex-1003, ¶ 154. Both references disclose the same type of heterogeneous network in LTE/4G systems (*e.g.*, macro eNBs and pico eNBs), using the same standardized X2 interface to send messages between eNBs, the same standardized RRC protocol, and the same measurement-gap concepts. *Id.*; Ex-1005, 6:20–35, 6:61–7:47, 11:37–44; Ex-1006, 8–9, 10–12, 18–19, 21; Ex-1007, 2:19–30, 5:4–6:15, 10:16–19, 33:21–22. A POSITA thus would have understood that the combined system, employing many of the same standards, would work for the purposes described in both references. *Id.*

3) **Claim 1**

- a) *[Preamble]: A method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity, comprising:*

To the extent the preamble is limiting, the combination of Centonza and Siomina render obvious the preamble. As shown above, Centonza discloses the preamble. Section IX(A)(2)(a); Ex-1003, ¶ 155. To the extent Centonza does not disclose the preamble, Siomina discloses the preamble because it shows a macro eNB (the first eNB) that controls a first cell (C1) and a pico eNB (a second eNB) that controls a second cell (C2). *Id.* ¶ 156; Ex-1007, Figs 3, 5; *id.* 9:23–11:11, 17:13–18:14.



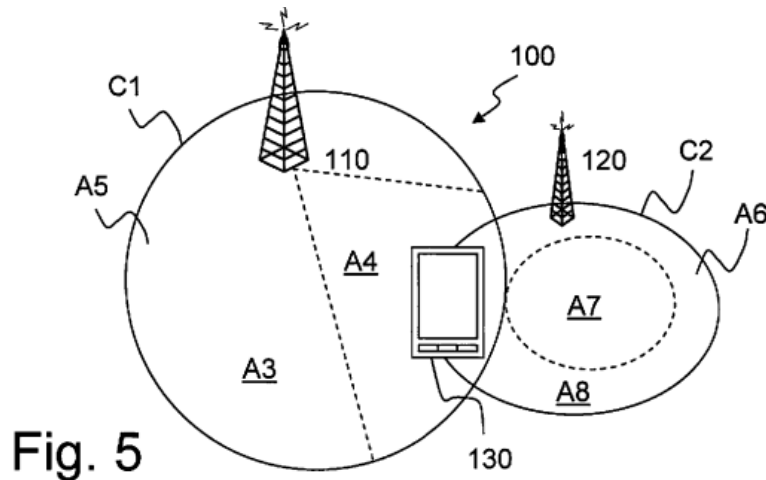
Siomina discloses, as shown above, that the two eNBs are separate and show a heterogeneous deployment in a wireless communication system. Ex-1003, ¶ 156. While Siomina does not expressly disclose the term “dual connectivity,” a POSITA would have understood, prior to February 2013, that heterogeneous networks—*e.g.*,

networks that contain macro eNBs and pico eNBs—like Siomina were typically used to support dual connectivity. *Id.*, ¶¶ 157–159. Centonza expressly discloses a heterogeneous network in which a UE “uses multiple flows, e.g. an anchor flow from the macro base station (or ‘anchor eNB’) **401A** and a[n] assisting flow from a pico base station (or a[n] ‘assisting eNB’) **401B**.”). *Id.*; Ex-1005, 1:53–62; *id.*, Fig. 1, 5:31–33 (“FIG. 1 is an illustrative example of a heterogeneous deployment with simultaneous anchor and assisting flows to a wireless terminal[.]”) (emphasis added).¹³

b) [1b]: a first eNB controls a first cell, wherein the first cell is serving a UE (User Equipment); and

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses element [1b]. Section IX(A)(2)(b); Ex-1003, ¶¶ 160–161. To the extent Centonza does not disclose this element, Siomina discloses that a first eNB (*e.g.*, a macro eNB) controls a first cell (*e.g.*, C1) that a serving a UE (*e.g.*, UE 130). *Id.*; Ex-1007, Figs 3, 5; *id.* 9:23–11:11, 17:13–18:14.

¹³ Patent Owner, as reproduced above, stated during prosecution that “dual connectivity” refers to “a UE is served by two base stations at the same time.” Ex-1002, 37 (emphasis added); Ex-1003, ¶ 159.



- c) [1c]: the first eNB configures a second cell to serve the UE together with the first cell, wherein the second cell is controlled by a second eNB;

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses [1c]. Section IX(A)(2)(c); Ex-1003, ¶ 162. To the extent Centonza does not disclose this element, Siomina also discloses that the first eNB (e.g., the macro eNB) configures a second cell (e.g., C2) to serve the UE (e.g., UE 130) together with the first cell (e.g., C1), wherein the second cell (e.g., C2) is controlled by a second eNB (e.g., the pico eNB). *Id.*; Ex-1007, Figs. 6a, 7, 7:11–35, 12:13–13:30, 18:8–20:5, 22:22–24:21. It discloses that the macro eNB configures cell C2 at the pico eNB through transmitting the patterns to be used in cell C2 at the pico base station. *Id.*

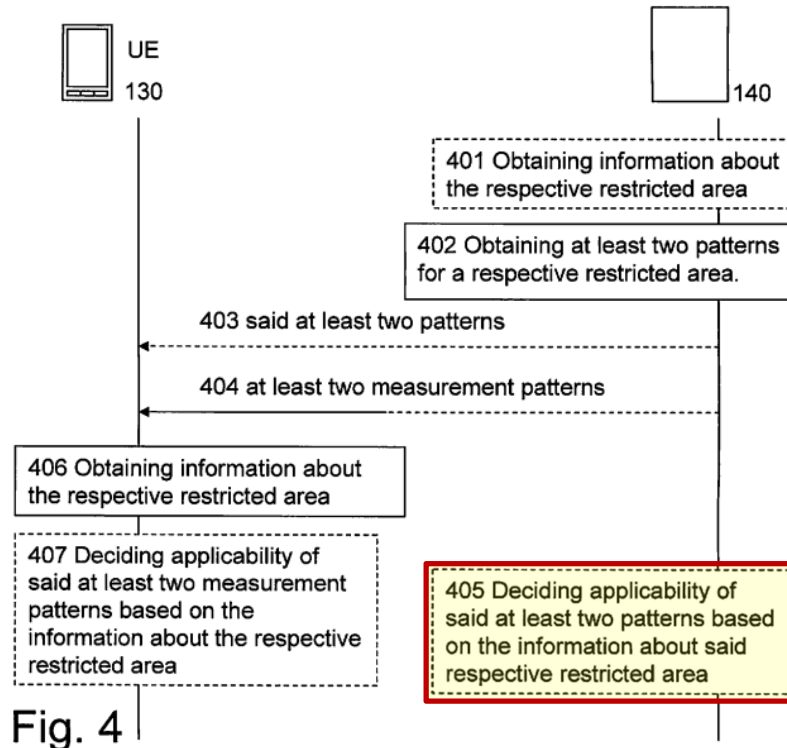
As explained above, to the extent Siomina does not disclose dual connectivity (e.g., “a second cell to serve the UE together with the first cell”), a POSITA would have understood that a heterogeneous network typically would be used for dual

connectivity. Ex-1003, ¶ 163. A POSITA would have reached this conclusion in view of Centonza’s express disclosure of using a heterogeneous network to provide dual connectivity in which a first and second cell serve a UE together (*e.g.*, the primary and secondary cells in Centonza) . *Id.*

d) [1d]: the first eNB allocates a measurement gap configuration to the UE; and

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses [1d]. Section IX(A)(2)(d); Ex-1003, ¶ 164. To the extent Centonza does not disclose this limitation, Siomina discloses that a first eNB allocates a measurement-gap configuration to the UE (*e.g.*, configuring a pattern¹⁴). *Id.*; Ex-1007, Figs. 4, 7, 11:14–17:10, 22:22–24:21.

¹⁴ The ’559 Patent teaches that “[i]n one embodiment, the measurement gap configuration could indicate a measurement gap pattern to be applied in the UE for performing measurements.” Ex-1001, 6:59–64.



Ex-1007, Fig. 4.

As shown above, for example, Siomina teaches that the network node 140 (such as the macro base station 110¹⁵) decides which configuration (a pattern) shall be applied to a UE (step 405). Ex-1003, ¶ 165; Ex-1007, Fig. 7 (“705 Deciding applicability of said at least two patterns based on the information about said respective restricted area”); *id.*, 24:18–21 (describing step 705 as “performed in a similar manner as action 405”); *id.*, 13:20–30 (“[T]he network node 140 determines which of the at least two patterns shall be applied when the user equipment 130 is

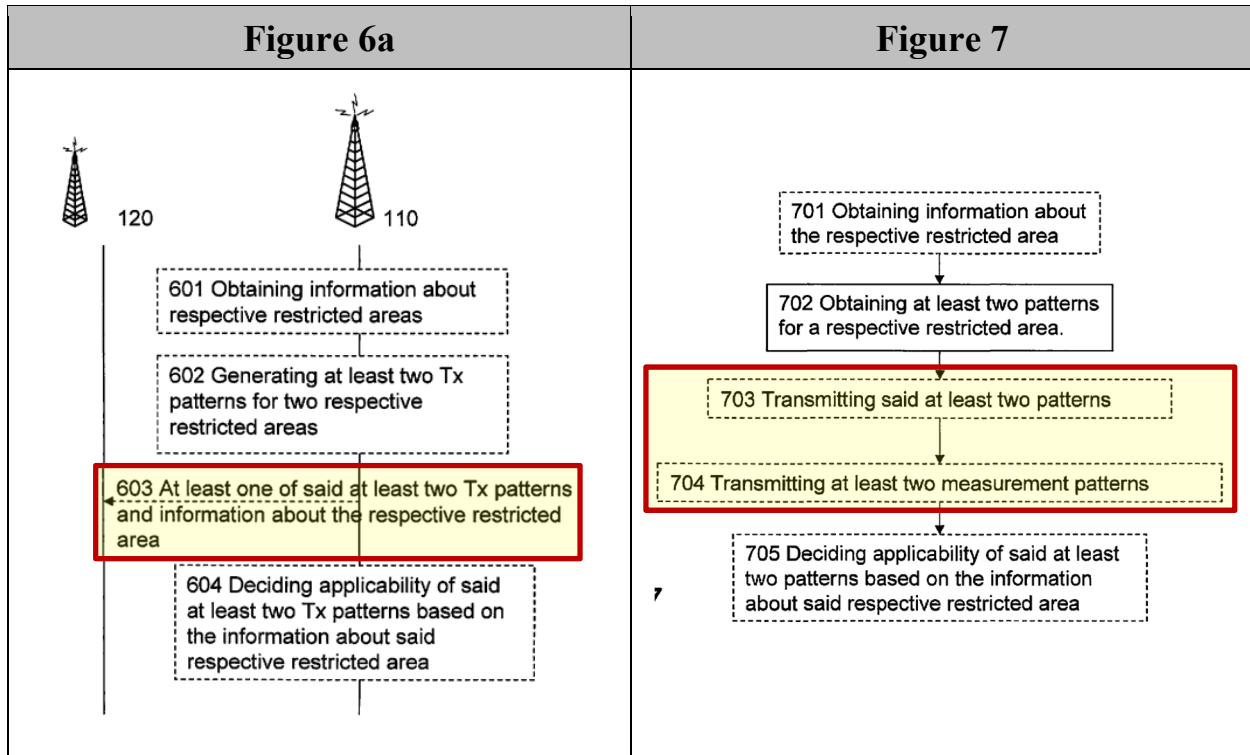
¹⁵ Siomina discloses that network node 140 may be “a macro eNodeB, pico eNodeB, micro eNodeB, home eNodeB, relay node, or the like.” Ex-1007, 9:29–33.

located in the respective restricted area.”); *id.* (“The network node 140 may further decide applicability of the at least two patterns based on available measurements relating to the user equipment such as position, current pre-coding, bandwidth used, etc.”); *id.*, 10:16–19 (“The first pattern may be intended for measurement gaps and the second pattern may be intended for measurements without measurement gaps.”).

- e) *[1e]: the first eNB sends the measurement gap configuration to the second eNB so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE.*

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses element [1e]. Section IX(A)(2)(e); Ex-1003, ¶ 167. To the extent Centonza does not disclose this limitation, Siomina also discloses that a first eNB (*e.g.*, macro base station) sends the measurement gap configuration (the pattern) to the second eNB (*e.g.*, pico base station) so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE (*e.g.*, UE 130). *Id.*; Ex-1007, Figs. 4, 6a, 7, 11:14–17:10, 18:17–20:5, 22:21–24:21.

Siomina discloses that the macro eNB sends the patterns to the pico eNB. In connection with Figures 6a and 7, for example, Siomina teaches that the macro eNB sends at least two patterns for the pico eNB in step 603 (in Figure 6a) and steps 703 and 704 (in Figure 7). Ex-1003, ¶¶ 168–169; Ex-1007, Figs. 6a and 7; *id.*, 19:12–29 (describing step 603); *id.*, 24:5–16 (describing steps 703 and 704).



Ex-1007, Figs. 6a and 7.

Siomina discloses that the second eNB (the pico eNB) receives the configuration (the pattern) and takes the pattern into consideration when it schedules resources to the UE, such as scheduling transmission activity to the UE. Ex-1003, ¶ 169; Ex-1007, Figs. 4, 6a; *id.*, 3:29–35 (discussing how a pico cell “can prioritize scheduling of transmissions”); *id.*, 5:18–36 (explaining that “the resources that can be used for measurements are indicated by patterns, such as an ABS [Almost Blank Subframe] pattern”); *id.*, 6:5–9 (“When determining the measurement pattern, the different ABS patterns will need to be taken into account.”); *id.*, 13:20–30 (disclosing that a network node, which may be a pico eNB, “determines which of the at least two patterns shall be applied when the user equipment 130 is located in the

respective restricted area”); *id.*, 19:12–29 (“[T]he pico radio base station 120 may determine its own ABS pattern while taking the second ABS pattern into account.”); *id.*, 31:22–32:27 (explaining that, in general, “a transmission activity pattern is a configuration of a transmission activity scheduled for a node over a certain period of time”).

4) Claim 2

a) [Preamble]: The method of claim 1, wherein

The combination of Centonza and Siomina renders obvious claim 1.

b) [2b]: the measurement gap configuration indicates a measurement gap pattern to be applied in the UE for performing measurements.

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses element [2b]. Section IX(A)(3)(b); Ex-1003, ¶ 172. To the extent Centonza does not disclose this element, Siomina discloses that the measurement-gap configuration indicates a measurement gap pattern to be applied to the UE for performing measurements (*e.g.*, the patterns identified above). *Id.*; Section IX(C)(3)(d), IX(C)(3)(e).

5) Claim 3

a) [Preamble]: The method of claim 1, wherein

The combination of Centonza and Siomina renders obvious claim 1.

- a) *[3b]: the second cell is configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB.*

The combination of Centonza and Siomina renders obvious this limitation. Centonza discloses element [3b]. Section IX(A)(4)(b); Ex-1003, ¶ 173. To the extent Centonza does not disclose this limitation, Siomina discloses that the first eNB configures the second cell to the UE via RRC signaling to UEs to configure cells. *Id.*; Ex-1007, 5:18–36, 32:8–33:29, 37:14–40:24. To the extent Siomina does not disclose this limitation, a POSITA would have found it obvious to use RRC signaling from the first eNB to the UE to configure the second cell, including as disclosed in Centonza. Ex-1003, ¶ 174. Both references disclose RRC signaling (which has been part of cellular standards before the '559 Patent) between an eNB and a UE, and configuring a cell to a UE via a RRC Connection Reconfiguration message was known in the art (as the '559 Patent admits through incorporating the RRC Protocol Specification). *Id.*; Ex-1001, 2:18–30 (incorporating TS 36.331); Ex-1008, 49–56 (describing RRC connection reconfiguration); Ex-1009, 46–52 (same).

6) Claim 7

- a) *[Preamble]: A method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity and a UE (User Equipment) is served by a first cell controlled by a first eNB, comprising:*

This limitation is a combination of elements [1pre] and [1b] above. As detailed above, the combination of Centonza and Siomina renders obvious “[a]

method for supporting dual connectivity in a wireless communication system, wherein separate eNBs (evolved Node B) are used to support dual connectivity” for the reasons in element [1pre]. Section IX(C)(3)(a). The combination similarly renders obvious this limitation “a UE (User Equipment) is served by a first cell controlled by a first eNB” as described above for the parallel limitation in element [1b] (“a first eNB controls a first cell, wherein the first cell is serving a UE (User Equipment)”). Section IX(C)(3)(b). The combination thus renders obvious this limitation. Ex-1003, ¶ 175.

- b) [7b]: a second eNB controls a second cell, wherein the second cell is configured by the first eNB to serve the UE together with the first cell; and*

This limitation is a parallel limitation to element [1c], which recites “the first eNB configures a second cell to serve the UE together with the first cell, wherein the second cell is controlled by a second eNB.” As discussed for element [1c], the combination of Siomina and Centonza renders obvious this limitation. Section IX(C)(3)(c); Ex-1003, ¶ 176.

- c) [7c]: the second eNB receives a measurement gap configuration from the first eNB so that the second eNB could take measurement gaps into consideration when scheduling resources to the UE, wherein the measurement gap configuration was allocated by the first eNB to the UE.*

This limitation is a combination of elements [1d] and [1e] above. The “wherein the measurement gap configuration was allocated by the first eNB to the

UE” parallels [1d], which recites “the first eNB allocates a measurement gap configuration to the UE.” As shown above for [1d], the combination of Siomina and Centonza renders obvious this limitation. Section IX(C)(3)(d); Ex-1003, ¶ 177. The “second eNB receives a measurement gap configuration from the first eNB” portion of this limitation mirrors the “the first eNB sends the measurement gap configuration to the second eNB” from element [1e]. For the same reasons as detailed above for element [1e], the second eNB (the Target eNB) receives from the first eNB (the Source eNB) measurement-gap information (e.g., via the MeasGapConfig field within the RRC Context element of the Handover Request in Centonza and the patterns disclosed in Siomina). Section IX(C)(3)(e); Ex-1003, ¶ 177. Finally, the “second eNB could take measurement gaps into consideration when scheduling resources to the UE” portion of this limitation matches the same limitation in [1e]. For the same reasons as above for element [1e], the combination of Siomina and Centonza discloses this limitation. Section IX(C)(3)(e); Ex-1003, ¶ 177.

7) Claim 8

a) [Preamble]: The method of claim 7, further comprises:

The combination of Centonza and Siomina renders obvious claim 7.

b) [8b]: the second eNB takes the measurement gap configuration into consideration when scheduling resources to the UE.

The combination of Siomina and Centonza renders obvious this claim limitation. Ex-1003, ¶ 179. As discussed in connection with element [1e], the

second eNB receives the MeasGapConfig field (in Centonza) or the transmitted patterns (in Siomina) in order to schedule resources to the UE. Section IX(C)(3)(e); Ex-1003, ¶ 179.

To the extent the combination of Siomina and Centonza do not teach this element, it would have been obvious to modify the system for the reasons above, including for Ground #2. Ex-1003, ¶ 180; Sections IX(B)(2) and IX(B)(4). The purpose of receiving the measurement-gap configuration is so the eNB can schedule resources to the UE around the measurement gaps, *i.e.*, to avoiding transmitting data with the UE when it is taking measurements and cannot transmit or receive data. Ex-1003, ¶ 180. It thus would have been obvious to a POSITA to have the second eNB use the measurement-gap configuration for the UE for that purpose, including to make the system more efficient and increase throughput. *Id.* Indeed, Siomina discloses that an eNB “can prioritize scheduling of transmissions,” which would further have motivated a POSITA to combine the references with an expectation that the combination would be successful. *Id.*; Ex-1007, 3:29–35.

8) Claim 9

a) [Preamble]: The method of claim 8, wherein

The combination of Centonza and Siomina renders obvious claim 8.

- b) [9b]: the resources contain downlink assignments and/or uplink grants.*

The combination of Siomina and Centonza renders obvious this claim limitation. Ex-1003, ¶ 182. As discussed in connection with elements [1e], [7c], and [8b], the second eNB receives the MeasGapConfig field (in Centonza) or the transmitted patterns (in Siomina) in order to schedule resources to the UE. Ex-1003, ¶ 182; Sections IX(C)(2)(e), IX(C)(5)(c), IX(C)(6)(b). Those resources include the uplink and downlink grants, as the UE cannot transmit data in the uplink and downlink directions during the measurement gap period. *Id.*; Ex-1003, ¶ 182. To the extent the combination of Siomina and Centonza do not teach this element, it would have been obvious to modify the system for the reasons above, including in element [8b] and Ground #2. *Id.*; Sections IX(B)(2), IX(B)(4), IX(C)(7(b)).

9) Claim 10

- a) [Preamble]: The method of claim 7, wherein*

The combination of Centonza and Siomina renders obvious claim 7.

- b) [10b]: the measurement gap configuration indicates a measurement gap pattern to be applied in the UE for performing measurements.*

This limitation is the same as [2b]. For the same reasons as discussed above for [2b], the combination of Siomina and Centonza renders obvious this limitation. Section IX(C)(2)(b); Ex-1003, ¶ 184.

10) Claim 11

a) [Preamble]: The method of claim 7

The combination of Centonza and Siomina renders obvious claim 7.

b) [11b]: wherein the second cell is configured to the UE via a Radio Resource Control (RRC) message (such as a RRC Connection Reconfiguration message) from the first eNB.

This limitation is the same as [3b]. For the same reasons as discussed above for [3b], the combination of Siomina and Centonza renders obvious this limitation.

Section IX(C)(3)(b); Ex-1003, ¶ 186.

D. Ground 4: Centonza and Siomina Combined With TS 36.331 Version 11.2.0 Renders Obvious the Challenged Claims

Similar to Ground #2, to the extent Centonza does not incorporate TS 36.331, Centonza combined with Siomina and TS 36.331 version 11.2.0 renders the claims obvious. Ex-1003, ¶¶ 187–188. Each of these references qualify as prior art under Section 102. In addition, for the same reasons above, a POSITA would have been motivated to combine Centonza, Siomina, and TS 36.311 to arrive at each of the Challenged Claims and would have had a reasonable expectation that the combination would be successful. Sections IX(B) and IX(C); Ex-1003, ¶¶ 187–188. Both Centonza and Siomina operate according to the 4G/LTE standards, including utilizing the RRC protocol defined in TS 36.331. *Id.* Both references refer to the RRC protocol, motivating a POSITA to look to TS 36.331 for how the RRC protocol was implemented. *Id.* The combination of Centonza, Siomina, and TS 36.331

teaches each element of the Challenged Claims for the reasons shown in Grounds #1, #2, and #3. *Id.*; Sections IX(A), IX(B), and IX(C).

X. SECONDARY CONSIDERATIONS

Petitioners are unaware of any evidence of secondary considerations that would support a finding of non-obviousness. *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311–12 (Fed. Cir. 2006). The asserted prior art cited herein demonstrates there is no evidence of failure by others and that the features recited in the Challenged Claims were readily available in the prior art. Ex-1003, ¶ 189. Even if secondary considerations did exist, they could not overcome the strong prima facie case of obviousness shown in this Petition. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010). Should Patent Owner attempt to meet its burden to show secondary considerations, Petitioners reserve the right to respond.

XI. INSTITUTION IS PROPER UNDER SECTIONS 314 AND 325

Petitioners have shown that there is a reasonable likelihood of prevailing with respect to at least one Challenged Claim. Petitioners have not filed a civil action challenging the validity of the '559 Patent that could bar review under Section 325. This is also the first and only petition challenging any of the '559 Patent's claims, which weighs in favor of institution under *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (P.T.A.B. Sept. 6, 2017). And the primary prior art relied upon here—Centonza and Siomina—were not before the

Patent Office during prosecution, which further weighs in favor of institution. *Advanced Bioinc, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469 (Paper No. 6) (P.T.A.B. Feb. 13, 2020) (precedential) (looking to “whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office”). While TS 36.331 is incorporated by reference into the ’559 patent, the reference was not discussed during prosecution and was not reviewed in light of Centonza or Siomina.

The factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (P.T.A.B. Mar. 20, 2020) (“*Fintiv*”) (precedential) also favor institution.

The **first factor** (stay) is neutral, because Petitioners have not yet moved for a stay. *See Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (P.T.A.B. May 19, 2021).

The **second factor** (proximity) is neutral. As the Director’s Interim Guidance explains, “[t]he PTAB will weigh this factor against exercising discretion to deny institution under *Fintiv* if the median time-to trial is around the same time or after the projected statutory deadline for the PTAB’s final written decision.” Ex-1016, 9. The Interim Guidance further explains that “[w]here the parties rely on time-to-trial statistics, the PTAB will also consider additional supporting factors such as the number of cases before the judge in the parallel litigation” *Id.*

Jury selection is scheduled to begin on July 21, 2025. Ex-1017, 1. With this Petition filed in July 2024, a final written decision may be expected by December 2025, not long after the trial date (and likely before any appealable post-trial decision). The Board has granted institution in cases where the final written decision issued a few months after the scheduled trial date when other factors favor institution. *See Hulu*, IPR2021-00298, Paper 11 at 11-18; *see also NetNut Ltd. v. Bright Data Ltd.*, IPR2021-01492, Paper 12 at 9-16 (P.T.A.B. Mar. 21, 2022) (instituting review with trial date six months before final written decision). Those same factors are present here. In the litigation, moreover, there are multiple defendants, and there will be separate trials. The cases are only consolidated for pretrial. Ex-1018. It is reasonable to expect that all trials will not be complete or through post-trial orders before the final written decision. In these circumstances, the Board treats this factor as neutral. *See CrowdStrike, Inc. v. Open Text Inc.*, IPR2023-00556, Paper 9 at 8 (P.T.A.B. Sept. 12, 2023).

The **third factor** (investment) weighs against denial. The district court litigation is in its early stages. Fact discovery remains in its infancy, and the parties have not engaged in expert discovery. Ex-1017, 3–5. The parties have not identified terms for claim construction. *Id.* Nor have there been any substantive orders in the case. The district court's investment is, therefore, minimal. *See PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8 at 17 (P.T.A.B. Jan. 6, 2021).

Petitioners diligently filed this Petition after they received Patent Owner’s infringement contentions that confirmed Petitioners’ technology is at the center of the district court litigation. The Court recently granted Petitioners Ericsson and Nokia motion to intervene (on June 30, 2024). Ex-1019. The Board has recognized that “it is often reasonable for a petitioner to wait to file its petition until it learns which claims are being asserted against it in the parallel proceeding.” *Fintiv*, IPR2020-00019, Paper 11 at 11. The Board has further found a petitioner acted diligently when filing its petition approximately four months after receiving the infringement contentions, which is approximately the six-month timeframe here, especially in view of the Court’s recent decision to allow intervention (Ex-1017, 6). *See Corning Optical Communications LLC v. Dali Wireless, Inc.*, IPR2021-00762, Paper 8 at 9-10 (P.T.A.B. Oct. 31, 2021); *see also Hulu*, IPR2021-00298, Paper 11 at 13-14; *Ericsson Inc. v. Koninklijke KPN N.V.*, IPR2022-00079, Paper 9, 10-11 (P.T.A.B. May 25, 2022) (finding petitioner “very diligent” in filing two months after receiving infringement contentions); *Ericsson Inc. v. Koninklijke KPN N.V.*, IPR2022-00069, Paper 9, 11-12 (P.T.A.B. May 25, 2022) (same).

Petitioners’ diligence in filing and the district court’s minimal investment tips this factor strongly in favor of institution. *PEAG*, IPR2020-01214, Paper 8 at 17-18.

The **fourth factor** (overlap) also weighs against denial. Petitioners hereby stipulate that, if trial is instituted, Petitioners will not pursue this IPR’s Grounds in

the district court litigation. This stipulation eliminates any risk of overlapping effort and results. The Board has confirmed that such a stipulation “mitigates any concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions.” *See VMWare, Inc. v. Intellectual Ventures I LLC*, IPR2020-00470, Paper 13 at 20 (P.T.A.B. Aug. 18, 2020) (“Thus, we find that this factor weighs in favor of not exercising discretion to deny institution under 35 U.S.C. § 314(a).”). “Instituting trial here serves overall system efficiency and integrity goals by not duplicating efforts and by resolving materially different patentability issues.” *Apple, Inc. v. SEVEN Networks, LLC*, IPR2020-00156, Paper 10 at 19 (P.T.A.B. June 15, 2020); *see also Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 12 (P.T.A.B. June 16, 2020). This factor, therefore, weighs against discretionary denial.

The **fifth factor** (parties) favors institution. Petitioners are either parties to the district court litigations or have sought to intervene. And that the Court recently granted Petitioners Ericsson and Nokia’s motions to intervene (Ex-1019), a “holistic view” of the factors likewise favors institution. *See Verizon Business Network Services, Inc. v. Huawei Techs. Co.*, IPR2020-01141, Paper 12, 17 (P.T.A.B Jan. 14, 2021); *Samsung Elecs. Co Ltd., v Dynamics Inc.*, IPR2020-00505, Paper 11, 15 (P.T.A.B. Aug. 12, 2020).

Even if the Board determines that the aforementioned factors favor denial, the Board should not discretionarily deny institution, because this Petition presents compelling merits (the **sixth factor**). *See CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4-5 (P.T.A.B. Feb. 27, 2023) (precedential). Patent Owner acceded during prosecution that the prior art taught dual connectivity and measurement-gap configurations—it argued that the prior art had failed to put the two concepts together in an obvious way. Centonza and Siomina—which were not before Patent Office—teach or suggest dual connectivity that utilizes measurement-gap configurations. This Petition thus presents compelling merits that plainly lead to the conclusion that at least one claim is unpatentable, and the Board should grant institution. *See CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 24, 75 (P.T.A.B. Mar. 17, 2023).

Due to Petitioners’ diligence, it would be premature at the time of this Petition to argue regarding the timing of respective milestones in the proceeding versus the litigation. Thus, if Patent Owner raises § 314(a) arguments in a Preliminary Response, Petitioners respectfully request the opportunity to reply before institution, to address, e.g., the expected schedules of the co-pending cases.

XII. CONCLUSION

Petitioners request institution of IPR and cancellation of the Challenged Claims.

Date: July 17, 2024

Respectfully submitted,

/ Scott W. Hejny /

Scott W. Hejny
Reg. No. 45,882
shejny@mckoolsmith.com
Nicholas Mathews
Reg. No. 66,067
nmathews@mckoolsmith.com
Christian J. Hurt
Reg. No. 63,659
churt@McKoolSmith.com
McKool Smith, P.C.
300 Crescent Court, Suite 1500
Dallas, Texas 75201
Telephone: 214-978-4000
Fax: 214-978-4044

*Attorneys for Petitioners AT&T Services
Inc., T-Mobile USA, Inc., Cellco Partnership
d/b/a Verizon Wireless, Ericsson Inc., and
Nokia of America Corporation.*

CERTIFICATION OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PETITION FOR INTER PARTES REVIEW** specified in 37 C.F.R. § 42.24 have 12,789 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). This word count was prepared using Microsoft Word 2010.

Respectfully submitted,

Date: July 17, 2024

/Scott W. Hejny /
Scott W. Hejny
Reg. No. 45,882

CERTIFICATION OF SERVICE

The undersigned hereby certifies that the above-captioned **PETITION FOR INTER PARTES REVIEW** is being served on counsel for patent owner via electronic mail and FEDERAL EXPRESS, costs prepaid, to the address of the attorney or agent of record at the USPTO: on July 17, 2024, in its entirety on the following counsel of record for Patent Owner:

Andrew Chen
Sang Dang
Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

Andrew Chen
achen@prosperalaw.com
Prospera Law, LLP
1901 Avenue of the Stars, Suite 480
Los Angeles, California 90067

Sang Dang
sdang@fortislaw.com
Fortis, LLP
650 Town Center Drive Suite 1530,
Costa Mesa, CA 92626

Jason Sheasby
California State Bar No. 205455
(pro hac vice to be filed)
jsheasby@irell.com

Hong (Annita) Zhong, PhD
California State Bar No. 266924
(pro hac vice to be filed)
hzhong@irell.com

Christopher Abernethy
California State Bar No. 275986
(pro hac vice to be filed)
cabernethy@irell.com

Tony Rowles
California State Bar No. 301209
(pro hac vice to be filed)
trowles@irell.com
IRELL & MANELLA LLP
1800 Avenue of the Stars, Suite 900
Los Angeles, CA 90067-4276
Tel: (310) 277-1010

/Scott W. Hejny /

Scott W. Hejny
Reg. No. 45,882
shejny@mckoolsmith.com
McKool Smith, P.C.
300 Crescent Court, Suite 1500
Dallas, Texas 75201
Telephone: 214-978-4000
Fax: 214-978-4044