

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

**Before the Honorable MaryJoan McNamara
Administrative Law Judge**

In the Matter of

**CERTAIN MOBILE PHONES,
COMPONENTS THEREOF, AND
PRODUCTS CONTAINING SAME**

Inv. No. 337-TA-1375

COMMISSION INVESTIGATIVE STAFF'S POST-HEARING REPLY BRIEF

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CONTENTS

I.	Introduction.....	1
II.	U.S. Patent No. 10,425,817.....	1
A.	Level of Ordinary Skill in the Art.....	1
B.	Patentable Subject Matter under 35 U.S.C. § 101.....	2
C.	Obviousness under 35 U.S.C. § 103.....	4
1.	Scope and Content of the Prior Art	4
2.	Ground 1: Nair In Combination With Forsberg, Togawa, and 5G -Ensure	5
3.	Ground 2: Forsberg In Combination With Togawa and 5G-Ensure	9
4.	Secondary Considerations	11
III.	U.S. Patent No. 10,306,669.....	12
A.	Level of Ordinary Skill in the Art.....	12
B.	Anticipation and Obviousness under 35 U.S.C. §§ 102 and 103	13
1.	Scope and Content of the Prior Art	14
2.	Ground 1: Claim 8 is not anticipated or rendered obvious by Ahn.....	14
3.	Grounds 2 and 3: Ahn in view of Park '389 or 3GPP-Intel	18
4.	Secondary Considerations	23
IV.	U.S. Patent No. 11,317,342.....	24
V.	U.S. Patent No. 11,515,893.....	25
A.	Level of Ordinary Skill in the Art.....	25
B.	Patentable Subject Matter under 35 U.S.C. § 101.....	26
C.	Obviousness under 35 U.S.C. § 103.....	28
1.	Scope and Content of the Prior Art	28
2.	Obviousness Jayasinghe in view of Yue and/or Chiu	28
3.	Secondary considerations	30
D.	Infringement and Domestic Industry.....	31
1.	Non-infringement of Claim 1	31
2.	Infringement of Claim 4	32
VI.	Public Interest	34
A.	The evidence does not reflect any FRAND-related public interest concerns	34
1.	Ericsson's FRAND obligations	34

2. Lenovo has not demonstrated that Ericsson conducted its licensing negotiations in bad faith	35
3. Seeking exclusion orders or injunctions is not inconsistent with FRAND	36
4. Whether Lenovo is engaging in reverse holdup	37
5. Lenovo’s requests for denial or delay of remedial orders due to the UK Actions should be rejected	39
B. The recommended remedy does not conflict with any of the public interest factors.....	40
VII. Remedy and Bonding.....	41
VIII. Conclusion	42

TABLE OF AUTHORITIES

Cases

<i>Aatrix Software, Inc. v. Green Shares Software, Inc.</i> , 882 F.3d 1121 (Fed. Cir. 2018)	28
<i>BSG Tech LLC v. BuySeasons, Inc.</i> , 899 F.3d 1281 (Fed. Cir. 2018)	3
<i>California Institute of Technology v. Broadcom Ltd.</i> , 25 F.4th 976 (Fed. Cir. 2022)	27
<i>CardioNet LLC v. InfoBionic, Inc.</i> , 955 F.3d 1358 (Fed. Cir. 2020).....	3, 27
<i>Checkpoint Sys., Inc. v. United States Int’l Trade Comm’n</i> , 54 F.3d 756 (Fed. Cir. 1995)	1, 25
<i>eBay Inc. v. MercExchange, L.L.C.</i> , 547 U.S. 388 (2006).....	37
<i>Enfish, LLC v. Microsoft Corp.</i> , 822 F.3d 1327 (Fed. Cir. 2016).....	2, 3, 26, 27
<i>Finjan, Inc. v. Blue Coat Sys., Inc.</i> , 879 F.3d 1299 (Fed. Cir. 2018)	27
<i>Harris Corp. v. Fed. Exp. Corp.</i> , 502 F. App’x 957 (Fed. Cir. January 17, 2013).....	32
<i>In re GPAC Inc.</i> , 57 F.3d 1573, 1580 (Fed.Cir.1995)	24, 30
<i>In re Stepan Co.</i> , 868 F.3d 1342 (Fed. Cir. 2017)	29
<i>Motionless Keyboard Co. v. Microsoft Corp.</i> , 486 F.3d 1376 (Fed. Cir. 2007)	30
<i>Net MoneyIN, Inc. v. VeriSign, Inc.</i> , 545 F.3d 1359 (Fed. Cir. 2008)	17
<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.</i> , 851 F.3d 1270 (Fed. Cir. 2017)	14
<i>Nidec Motor Corporation v. Zhongshan Broad Ocean Motor Co. Ltd.</i> , 851 F.3d 1270 (Fed. Cir. 2017)	16
<i>Solutran, inc. v. Elavon, Inc.</i> , 931 F.3d 1161 (Fed. Cir. 2019).....	2
<i>Spansion, Inc. v. International Trade Comm’n</i> , 629 F.3d 1331 (Fed. Cir. 2010).....	37
<i>Synopsys, Inc. v. Mentory Graphics Corp.</i> , 839 F.3d 1138 (Fed. Cir. 2016)	2
<i>TecSec, Inc. v. Adobe Inc.</i> , 978 F.3d 1278 (Fed. Cir. 2020)	2
<i>Visual Memory LLC v. NVIDIA Corp.</i> , 867 F.3d 1253 (Fed. Cir. 2017).....	28

Other Authorities

<i>Certain Fitness Devices, Streaming Components Thereof and Systems Containing Same</i> , Inv. No. 337-TA-1265, Comm’n Op. (March 23, 2023)	41
<i>Certain LTE- and 3G- Compliant Cellular Communication Devices</i> , Inv. No. 337-TA-1138, Recommended Determination (Mar. 9, 2020)	40
<i>Certain LTE- and 3G-Compliant Cellular Communications Devices</i> , Inv. No. 337-TA-1138, Initial Determination (February 18, 2020).....	35
<i>Certain Mobile Devices, Associated Software, and Components Thereof</i> , Inv. No. 337-TA-744, Comm. Op. (June 5, 2012).....	42
<i>Certain Unmanned Aerial Vehicles & Components Thereof</i> , Inv. No. 337-TA-1133, Comm’n Op. (Sept. 8, 2020).....	40
<i>Certain Wireless Devices with 3G Capabilities and Components Thereof</i> , Inv. No. 337-TA-800, Initial Determination (July 29, 2013).....	35

ABBREVIATIONS

Compl.	Complaint
Resp.	Response of Lenovo to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
CPBr.	Complainant's Pre-Hearing Brief
CBr.	Complainant's Initial Post-Hearing Brief
CRBr.	Complainant's Post-Hearing Reply Brief
CPSt.	Complainant's Pre-Hearing Statement
RPBr.	Respondents' Pre-Hearing Brief
RBr.	Respondents' Initial Post-Hearing Brief
RRBr.	Respondents' Post-Hearing Reply Brief
RPSt.	Respondents' Pre-Hearing Statement
SPBr.	Staff's Pre-Hearing Brief
SBr.	Staff's Initial Post-Hearing Brief
SRBr.	Staff's Pre-Hearing Reply Brief
SPSt.	Staff's Pre-Hearing Statement
Tr.	Hearing Transcript (Witness Name)
Dep. Tr.	Deposition Transcript
COMBr.	Complainant's Opening Markman Brief
ROMBr.	Respondents' Opening Markman Brief
SOMBr.	Staff's Opening Markman Brief

I. INTRODUCTION

Pursuant to the procedural schedule (Order No. 7) and Ground Rule 10.2, the Commission Investigative Staff (“Staff”) respectfully submits this post-hearing reply brief.

II. U.S. PATENT NO. 10,425,817

Lenovo contends that the asserted claims of the ’817 patent are invalid under 35 U.S.C. § 101 as being drawn to ineligible subject matter. *See* RBr. at 34-36. Lenovo also contends that all asserted claims are rendered obvious under 35 U.S.C. § 103 by certain combinations of prior art. RBr. at 10-13. The asserted patent is presumed to be valid. *See* 35 U.S.C. § 282. Although Ericsson bears the burden of proving a violation of Section 337, it can rely upon the presumption of validity, which Lenovo must overcome by clear and convincing evidence. *See, e.g., Checkpoint Sys., Inc. v. United States Int’l Trade Comm’n*, 54 F.3d 756, 671 (Fed. Cir. 1995). In the Staff’s view, Lenovo has failed to show by clear and convincing evidence that any asserted claim of the ’817 patent is invalid.

A. Level of Ordinary Skill in the Art

The private parties propose the following definition for a person of ordinary skill in the art.

Ericsson	Lenovo
A person of ordinary skill in the art would have a bachelor’s degree in electrical engineering, computer engineering, or computer science with (1) at least three years of experience in the field of telecommunications or wireless systems; and/or (2) an advanced degree in electrical engineering, computer engineering, or computer science in the field of telecommunications or wireless systems. CBr. at 25-26.	A person of skill in the art would have “a master’s degree in electrical engineering, computer engineering, or computer science, or equivalent and at least three years of experience in the field of telecommunications or wireless systems.” RBr. at 10.

Although the difference in proposals does not appear to affect any of the substantive issues in this investigation, the Staff is of the view that Ericsson's broader definition should be adopted. *See* Tr. (Mahon) at 1488:3-5 (stating that the difference in the parties' definitions do not affect his opinions).

B. Patentable Subject Matter under 35 U.S.C. § 101

The Staff is of the view that Lenovo has not presented clear and convincing evidence that the asserted claims of the '817 patent are directed to patent-ineligible subject matter.

Step One. Courts have approached the first step by “asking what the patent asserts to be the focus of the claimed advance over the prior art.” *See TecSec, Inc. v. Adobe Inc.*, 978 F.3d 1278, 1292 (Fed. Cir. 2020) (internal quotations removed), quoting *Solutran, inc. v. Elavon, Inc.*, 931 F.3d 1161, 1168 (Fed. Cir. 2019). The focus of the inquiry is “on the language of the Asserted Claims themselves, considered in light of the specification.” *TecSec*, 978 F.3d at 1292 (internal quotations and citations removed), quoting *Synopsys, Inc. v. Mentory Graphics Corp.*, 839 F.3d 1138, 1149 (Fed. Cir. 2016) and *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016).

Here, the asserted claims of the '817 patent are not directed to abstract ideas or other ineligible subject matter. The asserted claims are directed to a specific way to improve security in communications networks using a SUCI with clear text and encrypted parts. *See* JX-0001 ('817 patent) at claims 10 and 15; Tr. (Mahon) at 177:21-178:14. The claims recite specific technical improvements that overcome deficiencies of conventional architecture for encrypting subscriber information. *See* JX-0001 ('817 patent) at claims 10 and 15; Tr. (Mahon) at 1488:18-1489:12.

Lenovo's argument is based on an oversimplification of the claims. The claims are not merely directed to "concealing a subscription permanent identifier," as Dr. Bims testified. RBr. at 34; Tr. (Bims) at 1293:7-16. Instead, Ericsson's expert, Dr. Mahon, testified that the '817 patent "discloses a particular structure and the SUCI is transmitted in a particular way." Tr. (Mahon) at 1495:1-20; *see also* JX-0001 at claims 10 and 15. Therefore, the Staff is of the view that Lenovo has not presented clear and convincing evidence that the asserted claims of the '817 patent are directed to an abstract idea under *Alice* step one.

Step Two. Because *Alice* step one demonstrates that the asserted claims are drawn to patentable-subject matter, it is not necessary to consider *Alice* step two. *See CardioNet LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1371 (Fed. Cir. 2020); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016). If, however, the asserted claims are found to be patent-ineligible under *Alice* step one, those claims would still be directed to patentable subject matter under *Alice* step two because they are not simply applying conventional and well-understood techniques to the claimed concept. *See BSG Tech LLC v. BuySeasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018). The evidence shows that the combination of limitations of the asserted claims supply an inventive concept that is sufficient to transform the nature of the claim to patent-eligible subject matter. *See id.*

In particular, the asserted claims recite a specific clear text and encrypted parts to be transmitted by the UE. JX-0001 ('817 patent) at claims 10 and 15. The technical advance enables a "future proof" design which allows the network and UE to update the encryption scheme identifier. Tr. (Mahon) at 488:18-1489:12. The asserted claims are not directed to the effect of concealing a subscription identifier. *See* JX-0001 at claims 10 and 15. Dr. Mahon testified that the claims of the '817 patent could not have been implemented on then existing UEs in 2017

because the UE would not know how to calculate it. Tr. (Mahon) at 1496:1-7. Accordingly, Lenovo has not presented clear and convincing evidence that the asserted claims are directed to patent-ineligible subject matter under *Alice* step two.

C. Obviousness under 35 U.S.C. § 103

1. Scope and Content of the Prior Art

There are four pieces of prior art that Lenovo relies on for obviousness.

Nair (RX-0828). U.S. Patent Publication No. 2018/0324585 to Nair et al. (RX-0832), entitled “Privacy Indicators for Controlling Authentication Requests,” is a patent publication stemming from a provisional application No. 62/502,266, filed on May 5, 2017. Lenovo states that it is only relying on the disclosure in the provisional application (“Nair”) for obviousness. While there was a dispute as to whether the Nair publication was prior art, the parties do not dispute that the Nair Provisional is prior art to the ’817 patent. Joint Statement at § III.C.

Forsberg (RX-0830). U.S. Pat. Appl. Publ. No. 2013/003971 (“Forsberg”) was filed on September 13, 2012 and published on January 3, 2013. RX-0830 (Forsberg). The parties do not dispute that Forsberg is prior art. Joint Statement at § III.C. Forsberg was disclosed to the examiner during prosecution of the ’817 patent.

Togawa (RX-0834). U.S. Pat. No. 8,005,219 (“Togawa”) was filed on June 23, 2007 and issued on August 23, 2011. The parties do not dispute that Togawa is prior art. Joint Statement at § III.C.

5G-Ensure (RX-0806). 5G-Ensure Deliverable D3.1, “5G-PPP security enablers technical roadmap” (early version) (“5G-Ensure”) published on November 3, 2016. The parties do not dispute that 5G-Ensure is prior art to the ’817 patent. Joint Statement at § III.C.

2. Ground 1: Nair In Combination With Forsberg, Togawa, and 5G - Ensure

Nair does not disclose (1) an “encryption scheme identifier” and (2) a “public key identifier” recited in claim elements [10.B] and [15.C]. To fill these deficiencies, Lenovo relies on Togawa for the “encryption scheme identifier.”

a) Claim Element [10.B] / [15.C]

Claim 10	Claim 15
[10.B] the UE generating a subscription concealed identifier (SUCI) which comprises an encrypted part and a clear-text part, wherein a) the encrypted part of the SUCI generated by the UE comprises the subscription identifier identifying the subscription within a home network, but the encrypted part of the SUCI generated by the UE does not include the home network identifier and b) the clear-text part of the SUCI generated by the UE comprises i) the home network identifier, ii) an encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier in the SUCI, and iii) a public key identifier for a public key of the home network, but the clear-text part of the SUCI generated by the UE does not comprise the subscription identifier; and	[15.C] generate a subscription concealed identifier (SUCI) which comprises an encrypted part and a clear-text part, wherein a) the encrypted part of the SUCI generated by the UE comprises the subscription identifier identifying the subscription within a home network, but the encrypted part of the SUCI generated by the UE does not include the home network identifier and b) the clear-text part of the SUCI generated by the UE comprises i) the home network identifier, ii) an encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier in the SUCI, and iii) a public key identifier for a public key of the home network, but the clear-text part of the SUCI generated by the UE does not comprise the subscription identifier; and

Nair does not disclose or suggest (1) an “encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier in the SUCI” and (2) a “public key identifier” as recited claim elements [10.B] and [15.C]. Tr. (Mahon) at 1497:23-1498:10; Tr. (Bims) at 1317:12-18. To fill these deficiencies, Lenovo relies on Togawa for the claimed “encryption scheme identifier” and Forsberg for the claimed “public key identifier.” RBr. at 15.

The claimed “encryption scheme identifier.” It is undisputed that Nair does not disclose the claimed “encryption scheme identifier.” RBr. at 15. Lenovo argues that “Nair in combination with Togawa” teaches the claimed clear-text encryption scheme identifier. RBr. at 16. The parties generally agree that Nair’s “privacy indicator” indicates whether encryption is turned on. Tr. (Mahon) at 1498:6-10 (testifying that the privacy indicator indicates “either yes or no, encrypted or not.”); Tr. (Bims) at 1278:23-1280:14; RBr. at 16.

The parties dispute whether a person of ordinary skill in the art would need to know what type of encryption scheme is being used to modify Nair with Togawa’s “encryption method ID.” See RBr. at 14-15; CRBr. at 16. Ericsson’s expert, Dr. Mahon’s opinion is supported by the express disclosure of Nair.

Nair Disclosed a Simple Approach Without Encryption Scheme Identifiers and Public Key Identifiers



In a first illustrative embodiment, the 5G UE, if it wants to protect its privacy, adds an identity privacy flag (i.e., privacy indicator) to indicate that the MSIN is provided encrypted.

It could be suggested that the HSS or SLF, even without this privacy indicator, will figure out after the first attempt to solve the request and, if encrypted, to attempt the decryption. But one key reason to have such an indication specified is that this saves processing time and less resources are needed. Thus, in this first illustrative embodiment, the SLF can make the decision on the processing by looking at this flag. If not set, the SLF will assume the provided IMSI is unencrypted, will do the IMSI-to-HSS resolution, and will forward to the correct HSS/UDM, i.e., compatibility with 4G operation is maintained. If the flag is set, the SLF will recognise that the provided IMSI is encrypted and use the network private key to decrypt the MSIN part to form the real unencrypted IMSI, perform the IMSI-to-HSS resolution and then forward the Authentication Request to the correct HSS/UDM. If no SLF is used, the same principle can be used by the HSS/UDM. That is, HSS/UDM has to check whether the 5G UE has set a flag and then decide whether decryption is needed.

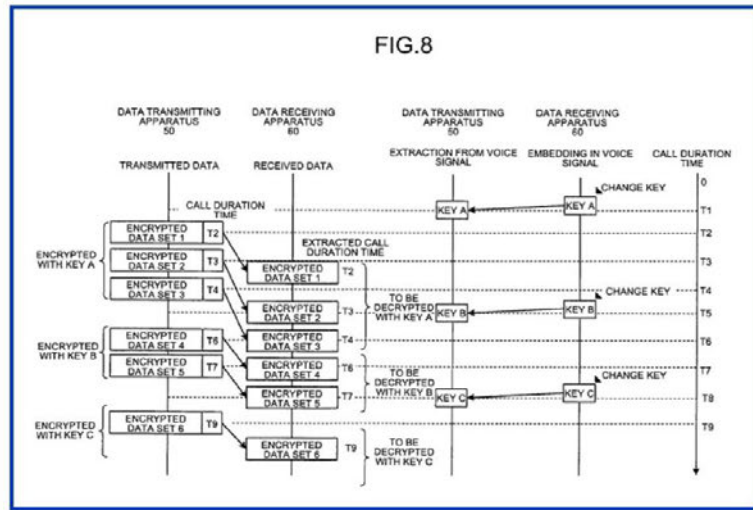
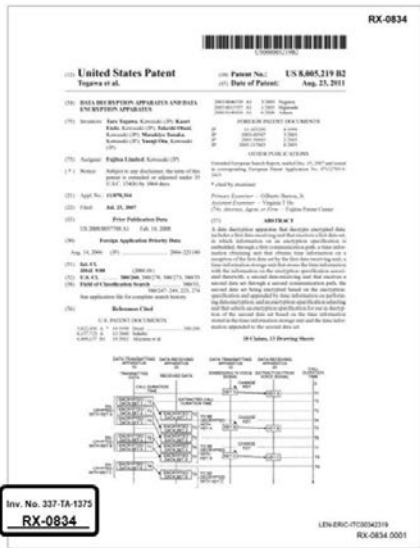
Source: RX-0828 at 6:17-30
CDX-21.10

CDX-0021.10 citing RX-0828 (Nair) at 6:17-30. Based on this portion of Nair, Dr. Mahon explained that Nair does not contemplate or have any need for an encryption scheme identifier because it “assumes that both the UE and the network know what the encryption scheme is.” Tr.

(Mahon) at 1498:6-10, 1499:24-1500:1. Lenovo’s expert, Dr. Bims, did not address this portion of Nair. Dr. Bims opines that Nair’s disclosure of “multiple privacy indicators imply to a [person of ordinary skill in the art] that an encryption scheme is being used when privacy is enabled,” but “Nair does not disclose what [type of] encryption scheme is used when privacy is enabled.” RBr. at 16. Dr. Mahon testified that Nair expressly discloses that the UE and network know the encryption scheme. Tr. (Mahon) at 1498:6-10, 1499:24-1500:1. Dr. Bims has not pointed to anything in Nair that expresses a need to know the encryption scheme associated with the privacy indicator. RBr. at 17-18.

Further, the Staff is of the view that Lenovo has not shown by clear and convincing evidence that a person of ordinary skill in the art would have combined Nair with Togawa. Togawa is directed to sending “voice signals” during a call. Tr. (Mahon) at 1503:15-23. For example, Togawa discloses sending encrypted voice signal data with an encryption key. In order to provide additional security, the encryption is changed during the call, so the encryption key is switched. Tr. (Mahon) at 1505:10-1506:3.

Togawa is About Voice Signals



Source: RX-0834

CDX-21.20

CDX-21.20. Dr. Mahon explained that the sending of voice signals is “a very different construct from what happens during authentication,” where the network is trying to determine whether the UE is a valid user to attach to the network. Tr. (Mahon) at 1505:24-1506:3.

Therefore, the Staff is of the view that Lenovo has not presented clear and convincing evidence that a person of ordinary skill in the art would have modified Nair to include the encryption method ID of Togawa.

The claimed “public key identifier.” As discussed above, Lenovo does not dispute that Nair does not disclose a “public key identifier,” and relies on Forsberg for this limitation. RBr. at 16. Lenovo’s expert, Dr. Bims testified to the following:

Q. So what is it about Nair’s disclosure of a public-key-based solution that would provide reason and motivation to one of skill in the art to combine Forsberg’s public key identifier with Nair?

A. So a person of ordinary skill reading Nair would understand that, when a home operator is providing its public key to all of its home network subscribers, that a public key ID would be involved. But a person of ordinary skill would have to consider multiple ways of involving a public key ID. Forsberg solves that problem by

expressly disclosing a public key identifier that is provided along with the encrypted IMSI as a solution to that problem.

Q. Would one of skill in the art have a reasonable expectation of success in combining Forsberg with Nair for the public key identifier?

A. Yes.

While Ericsson’s expert, Dr. Mahon, did not provide specific testimony combining Nair with Forsberg in the way Dr. Bims opines, the Staff is of the view that Dr. Bims’ testimony does not provide any meaningful explanation for why one of ordinary skill in the art would be motivated to combine these references at the time of the invention. As shown above, Dr. Bims testified that “a person of ordinary skill would have to consider *multiple ways* of involving a public key ID.” But Dr. Bims does not explain why the reference in the particular way claimed by the ’817 patent.

Therefore, the Staff is of the view that Lenovo has not carried its burden in establishing that a person of ordinary skill would have been motivated to combine Nair with Togawa and Forsberg.

3. Ground 2: Forsberg In Combination With Togawa and 5G-Ensure

Forsberg does not disclose (1) an “encryption scheme identifier,” recited in claim elements [10.B] and [15.C]; and (2) that the UE “transmit[s] the SUCI to an authentication server for forwarding of the SUCI to a de-concealing server capable of decrypting the SUPIM” as recited in claim elements [10.C] and [15.D]. To fill these deficiencies, Lenovo relies on Togawa for the “encryption scheme identifier.”

a) Claim Element [10.B] / [15.C]

Claim 10	Claim 15
[10.B] the UE generating a subscription concealed identifier (SUCI) which comprises	[15.C] generate a subscription concealed identifier (SUCI) which comprises an

an encrypted part and a clear-text part, wherein a) the encrypted part of the SUCI generated by the UE comprises the subscription identifier identifying the subscription within a home network, but the encrypted part of the SUCI generated by the UE does not include the home network identifier and b) the clear-text part of the SUCI generated by the UE comprises i) the home network identifier, ii) an encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier in the SUCI, and iii) a public key identifier for a public key of the home network, but the clear-text part of the SUCI generated by the UE does not comprise the subscription identifier; and	encrypted part and a clear-text part, wherein a) the encrypted part of the SUCI generated by the UE comprises the subscription identifier identifying the subscription within a home network, but the encrypted part of the SUCI generated by the UE does not include the home network identifier and b) the clear-text part of the SUCI generated by the UE comprises i) the home network identifier, ii) an encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier in the SUCI, and iii) a public key identifier for a public key of the home network, but the clear-text part of the SUCI generated by the UE does not comprise the subscription identifier; and
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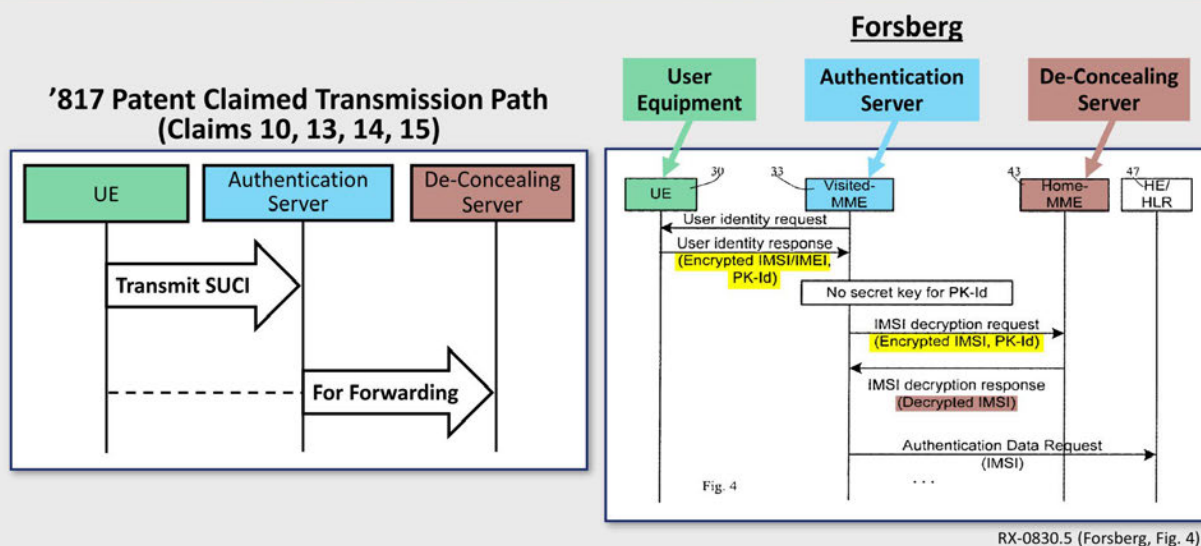
The parties do not dispute that Forsberg does not disclose the claimed “encryption scheme identifier.” RBr. at 25. For the same reasons as discussed above, the Staff is of the view that Lenovo has not presented clear and convincing evidence that a person of ordinary skill in the art would combine Forsberg, which is directed to authentication, with Togawa, which is directed to voice signals. *See supra* Section II.2.a.

b) Claim Element [10.C] / [15.D]

Claim 10	Claim 15
[10.C] the UE transmitting the SUCI to an authentication server for forwarding of the SUCI to a de-concealing server capable of decrypting the encrypted part.	[15.D] transmit the SUCI to an authentication server for forwarding of the SUCI to a de-concealing server capable of decrypting the SUPI.

Lenovo identifies the “Visited-MME” (blue) as the claimed “authentication server,” and the “Home-MME” (brown) as the claimed “deconcealing server.”

Forsberg Discloses Claimed Transmission Path



RDX-0002.49

RDX-0002.49. Ericsson’s expert, Dr. Mahon testified, referencing Figure 2 of Forsberg, that the Visited MME will try to decrypt the identifier and will decrypt it if it can. Tr. (Mahon) at 1501:12-1502:3. In the Staff’s view, Forsberg does not disclose where the UE “transmit[s] the SUCI to an authentication server for forwarding to a de-concealing server” because the Visited MME (the identified “authentication server”) attempts to decrypt the IMSI. Rather, the UE transmits to the Visited MME (the identified “authentication server”) for decryption and then, if the Visited MME cannot decrypt the IMSI, then it forwards the IMSI to the Home MME.

4. Secondary Considerations

As discussed below, the Staff believes that there is some evidence of secondary considerations that would weigh in favor of patentability.

Industry praise. Ericsson argues that the paper “Security in 5G Networks – How 5G Networks Help Mitigate Location Tracking Vulnerability” by Ohio State University researchers shows industry praise for the claimed invention. CRBr. at 25; *see also* Tr. (Mahon) at 1490:6-22.

The Staff is of the view that the paper is evidence of recognition of the claimed invention that weighs in favor of nonobviousness.

III. U.S. PATENT NO. 10,306,669

The Staff is of the view that Lenovo has not met its burden in showing that the asserted claims of the '669 patent are invalid.

Regarding infringement and the technical prong of domestic industry, Lenovo did not agree that claim elements [6.H], [6.J], [6.K], [11.E], [1.F], [1.G], and [1.H] were undisputed (*see* Joint Statement at IV.C). In its initial post-hearing brief, it appears that Lenovo only argued that claim elements [1.H], [6.J], and [11.H] would not be met under a certain reading of the prior art. In its reply post-hearing brief, Lenovo did not provide any arguments regarding why any claim element was not satisfied. RRB. at 77. As discussed in the Staff's opening post-hearing brief, the Staff is of the view that Ericsson has met its burden in showing that the asserted claims of the '669 patent are met.

A. Level of Ordinary Skill in the Art

The private parties propose the following definition for a person of ordinary skill in the art.

Ericsson	Lenovo
A person of ordinary skill in the art would have a bachelor's degree in electrical engineering, computer engineering, or computer science with (1) at least three years of experience in the field of telecommunications or wireless systems; and/or (2) an advanced degree in electrical engineering, computer engineering, or computer science in the field of telecommunications or wireless systems. CBr. at 25-26.	A person of ordinary skill in the art would have had a master's degree in electrical engineering, computer engineering, or computer science, or similar and at least three years of experience in the field of telecommunications or wireless systems. RBr. at 39-40.

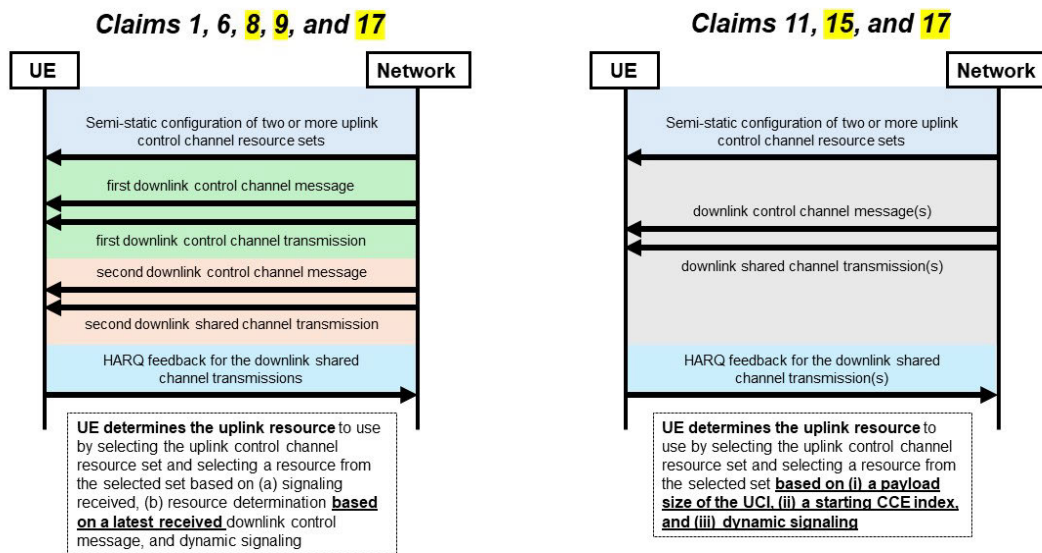
Although the difference in proposals does not appear to affect any of the substantive issues in this investigation, the Staff is of the view that Ericsson's broader definition should be adopted.

B. Anticipation and Obviousness under 35 U.S.C. §§ 102 and 103

Lenovo asserts that the asserted claims of the '669 patent are invalid over three references. The Staff is of the view that Lenovo has not shown by clear and convincing evidence that the asserted claims of the '669 patent are invalid over these three references.

The asserted claims are directed to determination of the PUCCH resource, and PUCCH resource sets, based on different combinations of signaling elements and rules. Tr. (Mahon) at 300:3-18, 209:16-21; *see also* JX-0002 at 8:7-12.

'669 Claim Comparison - Two Sets of Claims



CDX-0008C.45.

1. Scope and Content of the Prior Art

Ahn (RX-0688). U.S. Patent No. 10, 333,679 (“Ahn”) was published on July 7, 2016. RX-0688. There is no dispute that Ahn is prior art to the ’669 patent. Joint Statement at § IV.D.

3GPP-Intel (RX-0684). It is undisputed that 3GPP-Intel was published to the 3GPP FTP server on January 10, 2017. *See* Joint Statement at § IV.D; RX-2293; RX-1323. 3GPP-Intel was considered by the PTAB during a petition for inter partes review filed by Apple. *See* CX-3754 (*Apple Inc. v. Telefonaktiebolaget LM Ericsson*, IPR2022-00561, Paper 7 (PTAB Oct. 11, 2022)) at 9, 30; Tr. (Mahon) at 1511:13-19; CDX-21.26.

Park ’389 (RX-0695). PCT App. Int’l Pub. No. WO 2012/050389 43F44 (“Park ’389”) is dated April 19, 2012. It is undisputed that Park ’389 is prior art to the ’669 patent. Joint Statement at § IV.D. Park ’389 was disclosed to the Examiner during prosecution of the ’669 patent. JX-0002 (’669 patent); Tr. (Mahon) at 1511:2-12; CDX-21.25.

2. Ground 1: Claim 8 is not anticipated or rendered obvious by Ahn

For a prior art reference to anticipate a patent claim under 35 U.S.C. § 102, “each and every limitation [must be] found either expressly or inherently in [the] single prior art reference.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 851 F.3d 1270, 1273 (Fed. Cir. 2017). The Staff is of the view that Ahn does not disclose the each claim element of claim 8. In this section, the Staff has also listed analogous claim elements from other claims because the arguments for claim 8 are equally applicable for purposes of Lenovo’s grounds 2 and 3.

a) Claim Elements [1.F] / [6.H] and [8.C]

Claims 1 and 17	Claims 6, 8, and 9	Claims 11 and 15
[1.F] and wherein determining the uplink control channel resource to use for transmitting the	[6.H] and wherein determining the uplink control channel resource to use for transmitting the	

uplink control information comprises determining the uplink control channel resource based on (a) signaling received from the network node and (b) resource determination performed by the wireless device based on a latest received one of the first downlink control channel message and the second downlink control channel message; and	uplink control information comprises determining the uplink control channel resource based on (a) signaling received from the network node and (b) resource determination performed by the wireless device based on a latest received one of the first downlink control channel message and the second downlink control channel message; and	
	[8.C] selecting the one of the two or more uplink control channel resources from the selected uplink control channel resource set based on dynamic signaling from the network node comprises selecting, as the uplink control channel resource to use for transmitting the uplink control information to the network node, the one of the two or more uplink control channel resources from the selected uplink control channel resource set based on the bits for use to select one of the two or more uplink control channel resources from the selected uplink control channel resource set that are comprised in the latest received one of the first downlink control channel message and the second downlink control channel message.	

Lenovo contends that “the base station uses the ARI to indicate the PUCCH resource index and the UE uses the *ARI to determine which PUCCH resource to use* for transmitting

[REDACTED]

HARQ feedback.” RBr. at 44 (emphasis added). Ahn does not disclose using the latest received ARI for resource determination. For claim element [6.H], Lenovo relies on Ahn’s disclosure in another embodiment that the UE “may select a PUCCH format or may configure an ACK/NACK payload through **DCI in a most recently received subframe among the M subframes.**” RBr. at 43; RX-0688 at 20:8-22. The Staff is of the view that this portion of Ahn does not disclose PUCCH **resource determination** based on the latest received downlink message as required in claim element [6.H]. Dr. Mahon testified that “[a] PUCCH format is basically a particular way to arrange bits” and is “very different than selecting a timer and frequency resource for transmitting data.” Tr. (Mahon) at 1513:21-1514:3. Further, Dr. Rangan testified that Ahn does not mention an ARI (i.e., an ACK/NACK Resource Indicator”) in this embodiment. Tr. (Rangan) at 1118:7-1120:6. Lenovo argues that Ahn discloses that “the ARI in Ahn defines both PUCCH format and PUCCH resource index such that selecting the format is the same as selecting a PUCCH resource.” RBr. at 46. Ericsson contends that Ahn does not disclose combining this “reinterpretation” with the method. Further, the method Lenovo identified teaches using the DAI to determine the PUCCH format. Tr. (Mahon) at 1517:2-8. The Staff is of the view that Lenovo pulls disclosures from multiple distinct teachings, which is not enough for anticipation. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (“[I]t is not enough that the prior art reference ... includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention’ to show anticipation.”).

Without providing support, Lenovo argues that a person of ordinary skill in the art “would immediately envisage using the latest received DCI for resource determination in all embodiments of Ahn.” RBr. at 49 citing Tr. (Rangan) at 1072:12-1074:25. *Nidec Motor Corporation v. Zhongshan Broad Ocean Motor Co. Ltd*, 851 F.3d 1270 (Fed. Cir. 2017) (holding

that anticipation does not permit “fill[ing] in missing limitations simply because a skilled artisan would immediately envision them”). But “the ‘relevant question’ is whether ‘the number of categories and components disclosed in the prior art reference is so large that the combination . . . would not be immediately apparent to one of ordinary skill in the art.’” *Nidec*, 851 F.3d at 1274. In particular, Lenovo has not provided an explanation of the number of categories and components disclosed in Ahn. In the Staff’s view, Lenovo has not shown by clear and convincing evidence that Ahn discloses claim elements [6.H] and [8.C] for purposes of anticipation. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (As a general matter, an anticipatory reference “must not only disclose all elements of the claim within the four corners of the document,” but must also disclose those elements “arranged as in the claim.”).

b) Claim Element [1.H] / [6.J] / [11.E]

Claims 1 and 17	Claims 6, 8, and 9	Claims 11 and 15
[1.H] wherein the signaling received from the network node comprises information that provides a semi-static configuration of two or more uplink control channel resource sets each comprising two or more uplink control channel resources; and	[6.J] wherein the signaling received from the network node comprises information that provides a semi-static configuration of two or more uplink control channel resource sets each comprising two or more uplink control channel resources; and	[11.E] receive, from the network node, signaling comprising information that provides a semi-static configuration of two or more uplink control channel resource sets each comprising two or more uplink control channel resources,

Lenovo contends that Ahn’s disclosure that the base station may “predetermine a plurality of candidate resources for the PUCCHy and a plurality of candidate resources for the PUCCHz through RRC signaling.” RBr. at 49-50 citing RX-0688 (Ahn) at 8:25-29. Ericsson’s expert, Dr. Mahon, testified that Ahn does not disclose “two or more resource sets” because this disclosure refers to multiple PUCCH formats rather than multiple resources in a resource set. Tr.

(Mahon) at 1520:18-1521:9; CDX-21.36. The Staff is of the view that it is not clear whether Ahn discloses multiple resource sets as recited in the claims.

c) Claim Element [1.I] / [6.K] / [11.J]

Claims 1 and 17	Claims 6, 8, and 9	Claims 11 and 15
[1.I] wherein determining the uplink control channel resource based on (a) and (b) comprises selecting one of the two or more uplink control channel resource sets, and selecting, as the uplink control channel resource to use for transmitting the uplink control information to the network node, one of the two or more uplink control channel resources from the selected uplink control channel resources from the selected uplink control channel resource set based on dynamic signaling from the network node.	[6.K] wherein determining the uplink control channel resource based on (a) and (b) comprises selecting one of the two or more uplink control channel sets, and selecting, as the uplink control channel resource to use for transmitting the uplink control information to the network node, one of the two or more uplink control channel resources from the selected uplink control channel resource set based on dynamic signaling from the network node.	[11.J] wherein selecting the uplink control channel resource from the two or more uplink control channel resources in the two or more uplink control channel resource sets comprises selecting one of the two or more uplink control channel resource sets, and selecting, as the uplink control channel resource to use for transmitting the uplink control information to the network node, one of the two or more uplink control channel resources from the selected uplink control channel resource set based on dynamic signaling from the network node.

For same reasons set forth above, Ahn does not disclose selecting a resource from a selected resource set. Tr. (Mahon) at 1516:1-24; CDX-21.32, *see supra* Section III.B.2.b.

3. Grounds 2 and 3: Ahn in view of Park '389 or 3GPP-Intel

The Staff is of the view that Lenovo has not met its clear and convincing burden of showing Ahn in view of Park '389 or 3GPP-Intel would render the asserted claims of the '669 patent obvious.

a) Claim Elements [1.F], [6.H], and [8.C]

For these claim elements, Lenovo relies solely on Ahn. RBr. at 60. As discussed above, Ahn fails to disclose or suggest these claim elements. *See supra* at Section III.B.2.a.

b) Claim Elements [1.H], [6.J], and [11.E]

For these claim elements, Lenovo relies solely on Ahn. RBr. at 60. As discussed above, Ahn fails to disclose or suggest these claim elements. *See supra* at Section III.B.2.b.

c) Claim Element [17] and [11.H]

Claims 1 and 17	Claims 6, 8, and 9	Claims 11 and 15
[17] The method of claim 1, wherein determining the uplink control channel resource further comprises selecting the uplink control channel resource from uplink control channel resources in two or more uplink control channel resource sets based on: a payload size of the uplink control information; a starting control channel element index of the latest received one of the first downlink control channel message and the second downlink control channel message downlink control channel; and dynamic signaling received from the network node.		[11.H] and determining the uplink control channel resource comprises selecting the uplink control channel resource from uplink control channel resources in two or more uplink control channel resource sets based on: a payload size of the uplink control information; a starting control channel element index of a downlink control channel candidate on which the downlink control channel message was received; and dynamic signaling received from the network node; and

These claim elements require that the UE determine a PUCCH resource by selecting the PUCCH resource from two or more PUCCH resource sets based on three inputs: (1) payload size of the uplink control information (“UCI”); (2) a starting control channel element index of a downlink control channel candidate on which the downlink control channel message was

received; and (3) dynamic signaling received from the network node. Tr. (Mahon) at 222:24-223:3. Lenovo concedes that Ahn does not expressly disclose “using the CCE index for resource determination.” RBr. at 59; Tr. (Rangan) at 1124:22-1125:1.

Park ’389. Lenovo contends that “Park ’389 does expressly disclose resource allocation based on CCE index.” RBr. at 57. In particular, Lenovo identifies the following disclosure in Park ’389: “UE may obtain a resource index ($n_{PUCCH,0}$) for allocation of the ACK/NACK resource on the PUCCH through an indicator for a first CCE among CCEs on the PDCCH.” RBr. at 57 citing RX-0695 at ¶¶153, 163. Lenovo also argues the Park ’389 teaches resource determination on payload size and dynamic signaling. RBr. at 57 citing RX-0695 ¶ 55.

For motivation to combine, Dr. Rangan gave the following testimony:

Q. Would a person of skill in the art have been motivated specifically to use a control channel element index for resource determination in the Ahn system in light of the disclosures in Park?

A. Absolutely. Because, as I said, the CCE index was a well-known concept. It was well-known specifically for resource allocation of the PUCCH. Ahn does not in any way try to discourage the use of that and it would be natural.

Tr. (Rangan) at 1082:20-1083:3.

But Lenovo and Dr. Rangan fail to demonstrate how one of ordinary skill in the art would combine the references. Further, the Staff is of the view that the Dr. Rangan’s general testimony regarding the CCE being “well known” does not provide sufficient rationale for a motivation to combine.

3GPP-Intel. Lenovo asserts that 3GPP-Intel discloses all three inputs for determining the PUCCH resource. Tr. (Rangan) at 1084:23-1085:2. For motivation to combine, Dr. Rangan provided the following testimony:

Q. Now turning to slide 82, what opinion, if any, do you have regarding whether a person of skill in the art would have been motivated to combine the disclosure that we’ve just looked at from

3GPP-Intel with Ahn to arrive at the claimed invention of the '669 patent?

A. Again, for very similar reasons, we would have – a POSITA would be motivated to combine them. They are aimed at the same problem, namely, PUCCH resource allocation. They’re directed to 3GPP standards on being LTE . . . – and 3GPP-Intel being on 5G which is derived heavily from LTE. And, again, they have known and predictable resource allocation techniques combining, for example, implicit and explicit signaling.

Tr. (Rangan) at 1085:3-16.

The Staff is of the view that Dr. Rangan does not provide sufficient rationale for a motivation to combine. Specifically, Dr. Rangan has not provided an explanation as to why the mere alleged fact that both references disclose known and predictable resource allocation techniques would motivate one of ordinary skill in the art to combine the references.

d) Claim Elements [9] / [15]

Claims 1 and 17	Claims 6, 8, and 9	Claims 11 and 15
	[9] The wireless device of claim 6, wherein determining the uplink control channel resource to use comprises determining the uplink control channel resource to use when the timing is variable between when the wireless device receives the first and second downlink control channel messages scheduling the first and second downlink control channel messages scheduling the first and second downlink shared channel transmissions and when the wireless device transmits the uplink control information.	[15] The wireless device of claim 11 wherein determining the uplink control channel resource to use comprises determining the uplink control channel resource to use when the timing is variable between when the wireless device receives the downlink control channel messages scheduling the downlink shared channel transmission and when the wireless device transmits the uplink control channel.

Lenovo contends that Ahn discloses variable timing based on Figure 1, which is shown below.

Ahn Discloses the Limitations of Claims 9 and 15

Claim 9

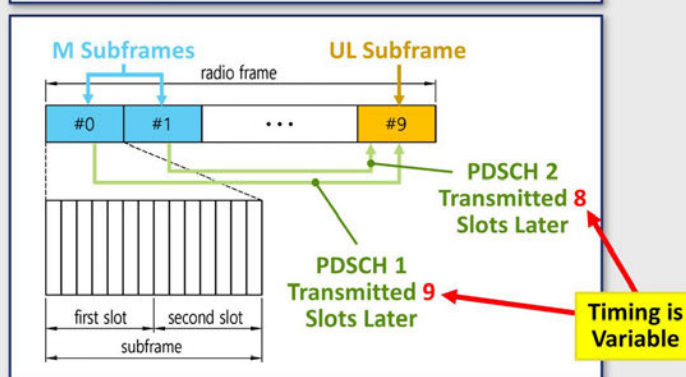
The wireless device of claim 6, wherein determining the uplink control channel resource to use comprises determining the uplink control channel resource to use when the timing is variable between when the wireless device receives the first and second downlink control channel messages scheduling the first and second downlink shared channel transmissions and when the wireless device transmits the uplink control information.

Claim 15

The wireless device of claim 11 wherein determining the uplink control channel resource to use comprises determining the uplink control channel resource to use when the timing is variable between when the wireless device receives the downlink control channel messages scheduling the downlink shared channel transmission and when the wireless device transmits the uplink control information.

Ahn

NACK payload is included in DCI to be scheduled. When ACK/NACK information for a plurality of PDSCHs to be transmitted through M subframes is transmitted through one UL subframe as in the TDD system, a BS may not be able



RX-0688.43 (Ahn) at 19:64-67; RX-0688.3 (Ahn Fig. 1)

RDX-0006.83

RDX-0006.83. Dr. Rangan testified that the description in Figure 1 does not address timing. Tr. (Rangan) at 1121:1-5. Dr. Mahon testified that Ahn discloses fixed timing, rather than variable timing. Tr. (Mahon) at 1522:1-1523:5. The Staff is of the view that Lenovo has not clearly and convincingly shown that Ahn discloses variable timing because there is no specific disclosure of variable timing and Ahn's disclosures regarding fixed timing. See Tr. (Mahon) at 1522:10-1523:5.

Park '389. Lenovo relies on Park '389's disclosure that "transmission time of the ACK/NACK signal with respect to the downlink data or a resource allocation may be dynamically informed by the BS." RBr. at 63. While it does not appear that Ericsson disputes that Park '389 discloses these claim elements, the Staff is of the view that, as discussed below, Lenovo has sufficiently shown that a person of ordinary skill in the art would combine Park '389 with Ahn.

3GPP-Intel. Lenovo relies on the disclosure that the timing between “data reception” (when the UE receives the first and second downlink control channel messages scheduling the first and second downlink shared channel transmissions) and “hybrid-ARQ acknowledgement transmission” (when the UE transmits the uplink control information) be “dynamically indicate[d].” RBr. at 64. While Dr. Mahon did not testify as to this disclosure, the Staff is of the view that this disclosure does not clearly show variable timing for both a first and second downlink message.

Regarding motivation to combine Ahn with Park ’389 or 3GPP-Intel, Dr. Rangan provided the following testimony:

Q. Do you have a view as to whether a person of skill in the art would have been motivated to include this dynamic indication or dynamic information that we see here in 3GPP-Intel or Park with the teachings of Ahn?

A. Yes. To the extent it’s not obvious from Ahn itself, this – one would be motivated to combine. Again, they are addressing the same problem, they are on related systems, and there using known and predictable techniques.

Tr. (Rangan) at 1087:20-1088:2. The Staff is of the view that Dr. Rangan has not provided a sufficient rationale for a motivation to combine. Dr. Rangan’s motivation does not sufficiently explain why or how a person of ordinary skill in the art would allegedly combine Ahn with the variable timing of Park ’389 or 3GPP-Intel.

4. Secondary Considerations

The Staff is of the view that Ericsson’s asserted secondary considerations are not sufficiently tied to the asserted claims such that they would weigh in favor of patentability.

Long felt but unmet need. Ericsson contends that there were “dozens of companies” that submitted “hundreds of contributions” directed to PUCCH determination. CRBr. at 52. The Staff

[REDACTED]

is of the view that the submission of other contributions does not necessarily mean that there was a long felt but unmet need.

Commercial success. Ericsson contends that “[t]he claims are also practiced by 5G products, which have enjoyed tremendous commercial success.” CRBr. at 53. The Staff is of the view that Ericsson has not shown a nexus between the asserted claims and the asserted commercial success because the commercial success of 5G products are a result of many different features unrelated to the asserted claims. *Ormco*, 463 F.3d at 1312 (Fed. Cir. 2006) (“[I]f the commercial success is due to an unclaimed feature of the device, the commercial success is irrelevant.”).

Industry praise. Ericsson contends that “[i]ndustry praise is demonstrated by proposals covering the claims being proposed to and then adopted by the 3GPP delegates at the standard.” CRBr. at 53. Again, the Staff is of the view that Ericsson has not shown a nexus between the asserted claims and the alleged secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed.Cir.1995) (“For objective [evidence of secondary considerations] to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.”)

IV. U.S. PATENT NO. 11,317,342

Although Lenovo’s pre-hearing brief alleged that the asserted claims of the ’342 patent are invalid based on several references, Lenovo did not present any evidence during the evidentiary hearing and did not introduce any arguments in its initial post-hearing brief regarding invalidity of the ’342 patent. The ’342 patent is presumed valid and enforceable. *See* 35 U.S.C. § 282. The Staff is also not challenging validity of the ’342 patent. Therefore, the evidence does not show that the ’342 patent is invalid.

V. U.S. PATENT NO. 11,515,893

Lenovo contends that the asserted claims of the '893 patent are invalid under 35 U.S.C. § 101 as being drawn to ineligible subject matter. *See* RBr. at 79. Lenovo also contends that all asserted claims are rendered obvious under 35 U.S.C. § 103 by certain combinations of prior art. RBr. at 79. The asserted patent is presumed to be valid. *See* 35 U.S.C. § 282. Although Ericsson bears the burden of proving a violation of Section 337, Lenovo must overcome this presumption by clear and convincing evidence. *See, e.g., Checkpoint Sys., Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 671 (Fed. Cir. 1995). In the Staff's view, Lenovo has failed to show by clear and convincing evidence that any asserted claim of the '893 patent is invalid.

As discussed below, the Staff is of the view that Ericsson has shown infringement of claim 4, but has not shown infringement of claim 1.

A. Level of Ordinary Skill in the Art

The private parties propose the following definition for a person of ordinary skill in the art.

Ericsson	Lenovo
A person of ordinary skill in the art for the '893 Patent would have had a bachelor's degree in electrical engineering, computer engineering, or computer science with (1) at least three years of experience in the field of telecommunications or wireless systems; and/or (2) an advanced degree in electrical engineering, computer engineering, or computer science in the field of telecommunications or wireless systems. CBr. at 25-26.	A person of ordinary skill in the art would have had a Ph.D. in mathematics, electrical or computer engineering, or computer science with emphasis in signal processing, communications, or coding with at least three years of research or work experience in this field at the time of the alleged invention. RBr. at 79.

Although the difference in proposals does not appear to affect any of the substantive issues in this investigation, the Staff submits the following definition:

One of ordinary skill in the art would have had a bachelor's degree in mathematics, electrical engineering, computer engineering, or

computer science with (1) at least three years of professional experience in the field of wireless communications; and/or (2) an advanced degree in electrical engineering, computer engineering, or computer science and at least one year of professional experience in the field of wireless communications.

See Staff's Claim Construction Brief.

B. Patentable Subject Matter under 35 U.S.C. § 101

The Federal Circuit explained that “[t]he ‘directed to’ inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether ‘their character as a whole is directed to excluded subject matter.’” *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016).

Step one. Lenovo argues that the asserted claims of the ’893 patent are directed to “abstract mathematical conception.” RBr. at 88. The claims are directed to a 5G NR transmitter or receiver that encodes/decodes using a specific PCM (described by a shift coefficient design) to improve block-error rate performance. Tr. (Wesel) at 1444:22-1445:25. Because there is evidence that shows that the claimed invention of the ’893 patent improves an existing technological process, the asserted claims are not directed to an abstract idea. *See Enfish*, 822 F.3d at 1335; *Koninklijke*, 942 F.3d at 1150.

With respect to claims directed to improvements in computer-related technology, “it [is] relevant to ask whether the claims are directed to an improvement to computer functionality versus being directed to an abstract idea, even at the first step of the Alice analysis.” *Enfish*, 822 F.3d at 1335. The Federal Circuit has “found software inventions to be patent-eligible where they have made non-abstract improvements to existing technological processes and computer technology.” *Koninklijke*, 942 F.3d at 1150. “To be patent-eligible, the claims must recite a specific means or method that solves a problem in an existing technological process.” *Id.* However, simply because a claim employs a mathematical formula does not mean that it is

patent ineligible. *California Institute of Technology v. Broadcom Ltd.*, 25 F.4th 976, 988 (Fed. Cir. 2022) (claim not patent ineligible where it “claims more than a mathematical formula because it is directed to an efficient, improved method of encoding data that relied in part on irregular repetition”). Here, the asserted claims of the ’893 patent are directed to specific PCMs used to improve block-error rate performance. JX-0004 (’893 patent) at claims 1 and 4. There is a restriction on how to improve block-error rate recited in the claims—using the PCM described by the base matrix, shift size, and shift coefficients. In other words, the asserted claims of the ’893 patent do not merely recite the improved result, but instead recite the specific transmitter and PCM that is used to achieve that improved result. To be sure, the asserted claims are not so broad as to encompass any transmitter that encodes using any PCM that improves block error rate performance. *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1305-06 (Fed. Cir. 2018) (holding that claims “recite more than the mere result”)

Lenovo’s view that the claimed invention does not improve block error rate is of no moment because the patent specification makes clear that the invention is directed to improving block-error rate performance. Further, in its obviousness arguments, Lenovo concedes that the PCM has an effect on block-error rate performance. For these reasons, the Staff is of the view that the evidence shows that the ’893 patent is not directed to an abstract idea.

Step two. Because the asserted claims are not directed to an abstract idea under step one of *Alice*, there is no need to proceed to step two of the *Alice* analysis. *See CardioNet LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1371 (Fed. Cir. 2020); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016). However, even if the claims were abstract under step one, the Staff is of the view that the asserted claims would still be eligible under step two of *Alice*. Under the second step of the *Alice* analysis, the elements of the claims must be considered “both

individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application.” *Alice*, 134 S.Ct. at 2355 (internal quotations omitted). “Whether the claim elements or the claimed combination are well-understood, routine, convention is a question of fact.” *Aatrix Software, Inc. v. Green Shares Software, Inc.*, 882 F.3d 1121, 1128 (Fed. Cir. 2018). The asserted claims as a whole are directed to a specific transmitter that is operable to encode/decode using a specific PCM. *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1260 (Fed. Cir. 2017).

C. Obviousness under 35 U.S.C. § 103

1. Scope and Content of the Prior Art

Jayasinghe (RX-0822, RX-1438). Tdoc R1-1711545 (“Jayasinghe”) is titled “Summary of [89-24] Email discussion on LDPC code base graph #1 for NR,” and was authored by Nokia engineer Keeth Jayasinghe. Jayasinghe discloses a specific base matrix, shift size, and mapping function “ $\text{mod}(V_{i,j}, Z)$.” *See* RX-0822. Jayasinghe further solicited proposals for the shift coefficients and provided block-error rate (BLER) based performance criteria. RX-0822.2.

Yue (RX-0849). U.S. Patent Pub. No. 2010/0257425A1 to Guosen Yue et al. was published on October 7, 2010.

Chiu (RX-0848). U.S. Patent Application No. 15/594,239 to Chiu was filed on May 12, 2017. Chiu relates to “generating a respective table of shift values for each lifting factor of a first set of lifting factors” and “optimizing the first set of lifting factors.” RX-0848 (Chiu) at 1:55-60; 11:19-25.

2. Obviousness Jayasinghe in view of Yue and/or Chiu

Lenovo asserts that claims 1 and 4 would have been obvious over Jayasinghe in view of Yue and/or Chiu. RBr. at 91. The parties do not dispute that Jayasinghe discloses the base

matrix, shift size, and mapping function recited in the asserted claims. There is no dispute that the prior art references do not disclose the claimed shift coefficients recited in claim elements [1.F] and [4.F]. RBr. at 91; CRBr. at 64; Tr. (Wesel) at 1476:24-1478:5. The Staff is of the view that Lenovo has not shown by clear and convincing evidence that reaching the claimed shift coefficients and the resulting PCMs would have been achievable through routine optimization.

Lenovo contends that “[a] POSITA would have been motivated to optimize the result-effective shift vector to improve BLER using existing, prior art lifting methods to perform routine optimization of Jayasinghe’s disclosed encoding.” RBr. at 102. Even assuming that the claimed shift vector is a “result-effective variable,” which the Staff does not concede, Lenovo would still need to “provide some rational underpinning explaining *why a person of ordinary skill in the art would have arrived at the claimed invention* through routine optimization.” *In re Stepan Co.*, 868 F.3d 1342, 1346 (Fed. Cir. 2017). Lenovo has not done that. During the evidentiary hearing, Lenovo’s expert, Dr. Liu, stated that:

Q. . . . You would agree that there are a lot of possibilities as to what the shift coefficients for the parity-check matrix could have been, right?

A. Yes, I agree.

* * *

Q. But you still think a POSITA could have somehow come up with the exact same parity-check matrix described by the claims, right?

A. *I’m not saying the POSITA will come up exact same parity-check matrix.* I’m saying the POSITA can use existing algorithm to come up with parity-check matrix or shift vectors which performs can be even better, just like Chiu as he disclosed in his method. And also that’s –

Tr. (Liu) at 1202:20-1203:2 (emphasis added). In the Staff’s view, Lenovo has not shown that a person of ordinary skill would have arrived at the invention even using the prior art methods asserted by Lenovo.

Further, the file history does not establish that the asserted claims are obvious. Lenovo argues that shift vector is not a patentable distinction based on the Examiner's obviousness type double patenting rejection and Ericsson's filing of a terminal disclaimer during prosecution of the '893 patent. RRB. at 97. The Federal Circuit has held that "[a] terminal disclaimer simply is not an admission that a later-filed invention is obvious." *Motionless Keyboard Co. v. Microsoft Corp.*, 486 F.3d 1376, 1385 (Fed. Cir. 2007). Therefore, Lenovo still carries the burden of establishing by clear and convincing evidence that the shift coefficients would have been obvious which, in the Staff's view, it has not done.

3. Secondary considerations

The Staff is of the view that the evidence shows that certain secondary considerations of nonobviousness weigh in favor of patentability.

Copying and industry praise. Ericsson contends that there is evidence of copying because the Space Development Agency (SDA) has adopted the PCMs of the asserted claims for payload forward error correction for all optical communication terminal modems. *See* CBr. at 78 citing to CX-1409 (OCT Standard Version 3.1.0) at 29-30; Tr. (Wesel) at 1453:15-18. The Staff believes that the adoption of the specific claimed PCMs by the SDA weighs in favor of patentability.

Commercial success. Ericsson contends that the '893 patent has enjoyed commercial success "demonstrated through 3GPP's adoption of the '893 Patent into the standard and confirms the importance of that technology to standard-compliant products." CRBr. at 78-79. The Staff is of the view that Ericsson has not established the required nexus to the asserted claims. *See In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed.Cir.1995) ("For objective [evidence of secondary considerations] to be accorded substantial weight, its proponent must establish a nexus

between the evidence and the merits of the claimed invention.”). The Staff is of the view that standard-compliant products have many features that may not be tied to the asserted claims, and therefore Ericsson has not shown a nexus with the asserted claims.

D. Infringement and Domestic Industry

1. Non-infringement of Claim 1

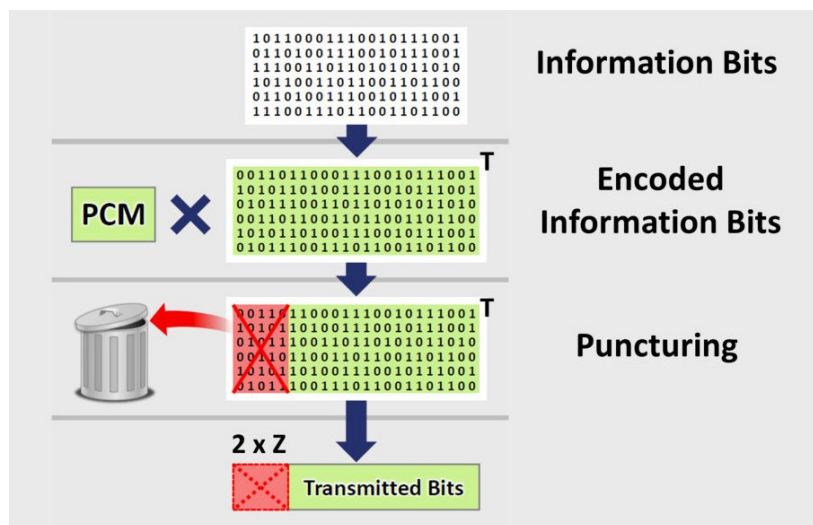
In the Staff’s view, the accused products and DI products do not practice claim 1 because they do not “transmit the encoded information bits to a 5G NR wireless receiver” as recited in claim element [1.C]. Claim 1 recites:

[1.A] A wireless transmitter operable in a fifth generation, 5G, new radio, NR, wireless network, the wireless transmitter comprising processing circuitry operable to:

[1.B] encode information bits for transmission in a 5G NR wireless network using a low-density parity check, LDPC, code and a parity check matrix, PCM, . . . ; and

[1.C] transmit *the encoded information bits* to a 5G NR wireless receiver

JX-0004 at claim 1 (emphasis added). As shown below, the experts agreed that, after encoding, certain encoded information bits are discarded (i.e., “punctured”) such that those punctured bits are not transmitted. Tr. (Liu) at 1146:6-1147:18; Tr. (Wesel) at 477:12-14.



RDX-0008.18. Therefore, all of the encoded information bits are not transmitted as required in claim 1. *Harris Corp. v. Fed. Exp. Corp.*, 502 F. App'x 957 (Fed. Cir. January 17, 2013).

There does not appear to be a dispute that all of the encoded information bits resulting from the encoding process in claim element [1.B] must be transmitted in claim element [1.C]. *See* CBr. at 124; RRBBr. at 44. Instead, the dispute appears to be which encoded information bits result from claim element [1.B]. During the evidentiary hearing, Ericsson's expert, Dr. Wesel, testified for the first time that only a subset of the "encoded information bits" (i.e., the unpunctured bits) are "for transmission" because the encoder knows the code rate. The Staff is of the view that this reading is inconsistent with plain language of claim 1 read in light of the specification. Claim element [1.B] requires the transmitter to encode "information bits for transmission," not encode for transmission "information bits." *See* CBr. at 124. The '893 patent specification uses the term "information bits for transmission" in this way:

The method may begin at step 210 where the wireless transmitter obtains information bits. For example, network node 120 may obtain ***information bits (e.g., user data)*** from a high layer ***for wireless transmission*** to wireless device 110.

JX-0004 ('893 patent) at 27:45-49 (emphasis added). The specification then discusses encoding those information bits. JX-0004 ('893 patent) at 27:50-51; *see also* Fig. 2. Therefore, the Staff is of the view that Ericsson has not met its burden in showing that claim 1 of the '893 patent is infringed.

2. Infringement of Claim 4

As discussed in the Staff's initial post-hearing brief, the Staff is of the view that Ericsson has shown that claim 4 is infringed. Lenovo argues that "Staff misreads the claim language, and portions of the claim omitted by Staff provide the necessary context to confirm that ***claim 4***

requires receiving all encoded information bits.” RRBBr. at 50 (emphasis added). Claim 4

recites:

[4.A] A wireless receiver operable in a fifth generation, 5G, new radio, NR, wireless network, the wireless receiver comprising processing circuitry operable to:

[4.B] receive ***encoded information bits*** from a 5G NR wireless transmitter; and

[4.C] decode ***the information bits*** received from the 5G NR wireless network using a low-density parity check, LDPC, code and a parity check matrix, PCM

JX-0004 at claim 4 (emphasis added). As shown above, claim 4 only requires that the receiver is operable to “receive encoded information bits from a 5G NR wireless transmitter” and decode the information bits received. It does not specify that all encoded information bits encoded by the transmitter must be received.

To support its reading of claim 4, Lenovo argues that “if the ALJ determines that claim 1 requires transmission of all encoded information bits . . . the ***mirror-image nature*** of claim 4 necessitates the same finding of non-infringement of claim 4.” RRBBr. at 50 (emphasis added). The Staff does not agree that any purported mirror-image relationship between claims 1 and 4 can import limitations into claim 4 that are not there.

Lenovo argues that “Staff’s argument conflates ‘information bits’ (i.e., the user data before encoding) with the distinct term ‘encoded information bits’ (i.e., the result of encoding).” Lenovo argues that “[t]he antecedent basis for ‘the information bits’ are those information bits that were input to the 5G NR wireless transmitter (as in claim 1)” because “claim 4’s receiver must ‘receive encoded information bits from a 5G NR wireless transmitter.’” RRBBr. at 52. First, a claim element cannot derive antecedent from another claim such that additional limitations are imported into that claim element. Second, it would make no sense to construe “the information bits” as the “user data before encoding” in claim element [4.C], which requires “decod[ing] the

information bits received from the 5G NR wireless network.” A receiver would not decode unencoded information bits. Finally, the Staff respectfully submits that it would defy the laws of physics and be contrary to the stated purpose of the ’893 patent to require a wireless receiver to receive all encoded bits transmitted by the wireless transmitter. It cannot be disputed that bits get distorted and lost during wireless transmission, whether or not puncturing occurs. RBr. at 68 (stating that “because of the noisy nature of wireless communication, some received codeword bits will likely be corrupted during transmission (i.e., a bit transmitted as 0 is received as 1, or vice versa)”); RDX-0008.7; Tr. (Liu) at 1140:25-1141:9. Therefore, for the reasons discussed above and in the Staff’s initial post-hearing brief, the Staff is of the view that Ericsson has shown that claim element [4.B] is met.

VI. PUBLIC INTEREST

A. The evidence does not reflect any FRAND-related public interest concerns

The Staff is of the view that the evidence shows that Ericsson has negotiated in good faith and has met its FRAND obligations. SBr. at 79-108. Further, although Lenovo contends that the alleged FRAND violation negatively impacts the public interest, Lenovo’s argument is not supported by any evidence in the record.

1. Ericsson’s FRAND obligations

Lenovo argues that “Ericsson is contractually bound by ETSI’s IPR Policy to license [its asserted patents] to Respondents on FRAND terms.” RBr. at 113-114. Although Lenovo argues that the Staff’s interpretation is “inconsistent with French law,” it does not state specifically what part of the Staff’s interpretation is allegedly inconsistent. RRBBr. at 102. To the extent Lenovo is arguing that the FRAND obligation requires actually concluding a contract, that proposition has already been rejected. *Certain Wireless Devices with 3G Capabilities and Components Thereof*,

[REDACTED]

Inv. No. 337-TA-800, Initial Determination at 427 (July 29, 2013) (“Under French law, the type of obligation set forth in the ETSI undertaking is best described as un accord de principe (agreement in principle). ... This imposes on both negotiating parties a duty to negotiate in good faith. ... It does not, however, impose an obligation actually to conclude a contract.”); *see also Certain LTE- and 3G-Compliant Cellular Communications Devices*, Inv. No. 337-TA-1138, Initial Determination at fn. 102 (February 18, 2020).

2. Lenovo has not demonstrated that Ericsson conducted its licensing negotiations in bad faith

Regarding the parties’ licensing negotiations, Lenovo complains that the Staff “uncritically adopt[s]” Ms. Petersson’s testimony. RRB. at 82. The focus of the FRAND issues in this investigation is whether *Ericsson* acted in good faith during negotiations. Therefore, the focus is naturally on what Ericsson’s corporate representative and negotiator, Ms. Petersson, thought and considered during those negotiations. Any rebuttal from Lenovo concerned Lenovo’s subjective view of what happened during negotiations. Further, the Staff is of the view that Lenovo has not shown that there are any credibility concerns with Ms. Petersson’s testimony. As discussed in the Staff’s initial brief, the course of negotiations shows that Ericsson acted in good faith.

Regarding the 2011 MMI License, Lenovo argues that the Staff ignores the fact that

[REDACTED]

[REDACTED] RBr. at 93. The Staff did not address it because it is not relevant to the question of whether Ericsson has acted in good faith.

As an initial matter, under the 2011 License, it is Lenovo’s burden to show that its products [REDACTED]

[REDACTED] Further, Ericsson’s offer explicitly stated “**no** **royalty due** for 4G user equipment that is subject to Ericsson’s license agreement with Motorola

[REDACTED]

Mobility from 2011.” CX-0095C.0003 (emphasis added). As Ericsson proposes, the parties can enter into a license with the understanding that there would be no royalty for any 4G products shown to be licensed under the 2011 MMI License. *Id.* Moreover, in the Staff’s view, the ALJ does not need to determine which specific smartphones are covered under 2011 MMI License to find that Ericsson complied with its FRAND obligations.

3. Seeking exclusion orders or injunctions is not inconsistent with FRAND

Ericsson’s filing of the complaint in this investigation after two years of trying to negotiate an NDA with Lenovo is not indicative of bad faith. Lenovo argues that “Ericsson has not engaged in good faith FRAND negotiations because its offer came the same day as its demand for injunctive relief and has been subsequently accompanied by even more claims for injunctive relief.” RRBr. at 101. Lenovo’s accusation that the Staff “attempts to discredit the rulings and statements [regarding injunctions] from numerous courts and agencies around the world” is a mischaracterization of the Staff’s position. RRBr. at 100. As the Staff stated in its initial post-hearing brief, “[w]hether those jurisdictions will grant injunctive relief is a decision ETSI leaves to each nation’s laws and policies.” SBr. at 95. The fact that some jurisdictions will not issue injunctions under certain circumstances does not mean that it is a breach of FRAND obligations to request them.

Further, an exclusion order is not an “injunction.” It is an *in rem* trade remedy created by statute, one that must be applied if the conditions specified in 19 U.S.C. § 1337 are found to exist. *See* 19 U.S.C. § 1337(d)(1). Given the different statutory underpinnings for relief before the Commission in Section 337 actions and before the district courts in patent infringement suits (and other foreign courts, such as the European Court of Justice, cited by Lenovo), legal and policy considerations that factor into a federal court’s application of equity when issuing

[REDACTED]

injunctive relief do not necessarily apply to Commission remedy determinations under Section 337. *See Spansion, Inc. v. International Trade Comm’n*, 629 F.3d 1331, 1359 (Fed. Cir. 2010) (holding that *eBay* does not apply to Commission remedy determinations under Section 337) (referring to *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006)).

Despite Lenovo’s argument to the contrary (*see* RRBBr. at 100), the Staff never argued that Lenovo’s filing of the 1388 investigation would obviate any alleged FRAND violation by Ericsson. As stated clearly in the Staff’s initial brief, the Staff is of the view that the 1388 investigation (and Lenovo’s requests for injunctions in other jurisdictions) contradicts Lenovo’s argument that filing an ITC complaint with the first offer is contrary to FRAND obligations. It further contradicts Lenovo’s claim that this investigation will result in supra-FRAND rates. In the Staff’s view, where Lenovo’s proverbial “Sword of Damocles” is hanging over both parties, not just one party (*see* RRBBr. at 100), Ericsson does not have the leverage that Lenovo contends would result in supra-FRAND royalty payments.

4. Whether Lenovo is engaging in reverse holdup

The evidence shows that, since Ericsson first approached Lenovo in 2021 regarding 5G licensing, Lenovo has not made a credible offer (or counteroffer) to Ericsson. *See* SBr. at 108-111. Although Lenovo references an alleged 5G offer that it made to Ericsson in 2017, there is no evidence in the record of what that offer is. The only evidence of its existence is based on the testimony of Mr. Mulgrew. *See* RBr. at 145 citing Tr. (Mulgrew) at 923:3-925:12, 936:24-937:6 (Q. Had Lenovo previously made Ericsson an offer to license its 5G patents? A. Yes, we had. Q. And about what time was that? A. I believe it was 2017. I think we made an offer back then.). The Staff is of the view that there are questions regarding Mr. Mulgrew’s credibility, especially where it relates to Lenovo’s “offers.” As discussed in the Staff’s initial post-hearing brief, Mr.

[REDACTED]

Mulgrew testified during deposition as to Lenovo's \$1.4 billion dollar "make use and sell" offer but then, at the evidentiary hearing, testified that the offer was not actually an offer. *See* SBr. at 110. Therefore, the Staff is of the view that Lenovo's alleged 2017 offer does little to show that Lenovo has not delayed in negotiations especially considering Lenovo's failure to make any credible offer to Ericsson. As time continues without Lenovo making a credible offer, Lenovo's actions become less like those of a willing licensee, and more like an unwilling licensee.

Lenovo argues that the Staff "mischaracterizes what Respondents' position is on entering into a FRAND license with Ericsson." As the Staff stated in its initial post-hearing brief, "Lenovo's willingness appears to be qualified by terms set by its preferred forum (the UK court) after all appeals have been exhausted (or some other forum under procedures of Lenovo's choosing)." SBr. at 109. This statement is supported by the record. Lenovo stated in pleadings that it will only be bound by the UK rate setting action after all appeals are exhausted. RX-0657C.0017 (stating to the English Court that "Lenovo hereby undertakes to this Court that it will enter into a licence agreement in the form that is determined to be FRAND at the FRAND trial in these proceedings *or, to the extent that there are any appeals of judgment of the FRAND trial, a licence agreement that is finally determined to be FRAND on appeal*"). That interim payments may be made does not change that fact. Further, while Lenovo appears to have agreed to a rate setting procedure in EDNC, Lenovo has not agreed to be bound by EDNC if it finds Ericsson's offer to be FRAND. CX-2441 (stating that "Lenovo has neither committed to accepting Ericsson's offer if its FRAND nor would it be forced to."); CDX-45.20 (Lenovo's submission to the Federal Circuit stating that "Lenovo has not committed to accepting Ericsson's offer if the court determines that it is consistent with Ericsson's FRAND obligations.").

5. Lenovo's requests for denial or delay of remedial orders due to the UK Actions should be rejected

Lenovo argues that the Staff “trivialize[s] the significant harm Ericsson’s non-FRAND conduct could cause if the Commission grants Ericsson’s requested remedial orders and reinforces the need to deny or delay entry of any remedial orders.” RRBBr. at 78. But the evidence shows that Ericsson fully complied with its FRAND obligations and negotiated in good faith. SBr. at 92. Lenovo seems to argue that any relief against willing licensees will harm the public interest. These arguments have been rejected before. *See, e.g., Certain Mobile Electronic Devices, Including Wireless Communication Devices, Portable Music and Data Processing Devices, and Tablet Computers*, Inv. No. 337-TA-794, Disapproval of the U.S. International Trade Commission’s Determination at 3 (August 3, 2013) (“794 USTR Disapproval”); *Certain Electronic Devices, Including Wireless Communication Devices, Portable Music and Data Processing Devices, and Tablet Computers*, Inv. No. 337-TA-794, Comm’n Op. at 48, 62 (June 4, 2013) (public version July 5, 2013). Lenovo cites no U.S. authority to support its position. *See* RRBBr. at 107-108 (citing to Ericsson’s statements and statements from the EU). As discussed in the Staff’s initial post-hearing brief, Lenovo has not shown any concrete evidence of any FRAND consideration relevant to the public interest factors. SBr. at 111-114.

In the Staff’s view, if a violation of Section 337 is found, then an exclusion order in this investigation, like all exclusion orders, would serve an important purpose regardless of whether Ericsson later obtains royalties, or interim payments, from Lenovo through the UK or some other forum. Unfair trade practices related to import trade “are unlawful, and when found by the Commission to exist shall be dealt with, *in addition to any other provision of law*, as provided in this section[.]” 19 U.S.C. § 1337(a)(1) (emphasis added). While Lenovo argues that the Staff has not “identified any ‘unfair trade’” (*see* RRBBr. at 109), the unfair trade is clearly the importation

[REDACTED]

of infringing and unlicensed products if a violation of Section 337 is found. As explained in the Staff’s initial post-hearing brief, the requested relief under the facts in this investigation do not conflict with the public interest. *See, e.g., Certain LTE- and 3G- Compliant Cellular Communication Devices*, Inv. No. 337-TA-1138, Recommended Determination at 2, 38 (Mar. 9, 2020).

Regarding Lenovo’s request for delay of remedial orders based on the UK actions, Lenovo relies on Sir Christopher Floyd’s predictions as to what and when determinations will be made. RRBBr. at 110. Even assuming that Sir Christopher Floyd’s predictions will come to pass, a binding decision will not issue until between August and December 2025. Tr. (Floyd) at 1361:16-1362:11. Based on the Commission’s past practice on parallel *inter partes* review proceedings before the PTAB, the Staff is of the view that the Commission should not delay or suspend remedial orders unless, *at minimum*, a final decision is issued prior to the target date (April 17, 2025), which does not appear will happen in this investigation. *Certain Unmanned Aerial Vehicles & Components Thereof*, Inv. No. 337-TA-1133, Comm’n Op. at 37-38 (Sept. 8, 2020).

B. The recommended remedy does not conflict with any of the public interest factors

Lenovo argues that “Ericsson and Staff also incorrectly argue that an exclusion order would have ‘no material impact’ or no ‘economically significant adverse effect’ on the statutory public interest in the United States.” RBr. at 105. As explained in the Staff’s initial brief, Dr. Dippon’s alleged consumer surplus harms are of the type that the Commission has previously found insufficient to deny remedial orders. *See* SBr. at 78-79.

Further, Lenovo argues that “neither Ericsson nor Staff explain why the Werden-Froeb model is inapplicable.” RRBBr. at 107. As discussed in the Staff’s initial post-hearing brief, the

[REDACTED]

issue with applying the Werden-Froeb model is that an exclusion order requires that an infringing product be removed from the market, which would always be expected to result in some alleged consumer surplus loss associated with fewer choices and price increases. *See* SBr. at 77. Further, the Werner-Froeb model assumes that the demand for Motorola phones would stay the same throughout the term of the proposed remedial orders. *See* SBr. at 78; Tr. (Dippon) at 1410:17-21. Dr. Dippon testified that he did not analyze what other products consumers might substitute if the accused products were unavailable. Tr. (Dippon) at 1435:3-20. Moreover, Lenovo (and Dr. Dippon) does not provide any guidance as to what level of consumer surplus loss associated with reduced choice or increased prices in the marketplace is acceptable as a tradeoff for protecting intellectual property rights. Therefore, the Staff is of the view that Lenovo has not shown that there would be an adverse impact on U.S. consumers that would warrant declining or delaying remedial orders.

VII. REMEDY AND BONDING

The Staff expects the evidence to establish that a limited exclusion order will be appropriate in this investigation if a violation of section 337 is found.

Although Lenovo requests an exception for warranty-based maintenance and service for the accused products, Lenovo does not cite to any evidence in its either of its briefs. RBr. at 154. There does not appear to be any evidence in the record that would substantiate the necessity of a warranty exception. *Certain Fitness Devices, Streaming Components Thereof and Systems Containing Same*, Inv. No. 337-TA-1265, Comm'n Op. at 88-92 (March 23, 2023). The Staff generally does not support a service, repair, or replacement parts exception in the absence of clear contractual provisions that would necessitate the exception. To the extent Lenovo substantiates the necessity of a warranty exception to the Commission, the Staff would

recommend that it be included in the exclusion order. *See, e.g., Certain Mobile Devices, Associated Software, and Components Thereof*, Inv. No. 337-TA-744, Comm. Op. at 22 (June 5, 2012) (“[T]he Commission has recognized that the public interest weighs in favor of permitting the importation of service, repair, and replacement parts for accused articles that were purchased prior to the issuance of a remedial order, where necessary to prevent disruptions to the domestic business operations of innocent third parties and consumers.”).

VIII. CONCLUSION

For the reasons above and in the Staff’s Initial Post-Hearing Brief, the Staff believes the ALJ should find:

- The Commission has statutory authority over this investigation and over the accused products;
- The accused products infringe claims 10 and 13-15 of the ’817 patent;
- The accused products infringe claims 8, 9, 15, and 17 of the ’669 patent;
- The accused products infringe claims 34 and 39 of the ’342 patent;
- The accused products infringe claim 4 of the ’893 patent;
- The DI Products practice claims 10 and 13-15 of the ’817 patent;
- The DI products practice claims 8, 9, 15, and 17 of the ’669 patent;
- The DI products practice claims 34, 39, and 41 of the ’342 patent;
- The DI products practice claim 4 of the ’893 patent;
- The Complainant has satisfied the economic prong of the domestic industry requirement;
- The asserted claims of the asserted patents are not invalid.

The Staff also believes that if the Commission finds that a violation has occurred, the ALJ should recommend issuance of a limited exclusion order; cease and desist orders directed to

Motorola Mobility LLC and Lenovo (United States), Inc. should issue; and a bond rate of a zero percent of entered value would be appropriate during the Presidential review period. Finally, the public interest will not be adversely affected if a remedy is imposed in this investigation.

Date: September 6, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that on September 6, 2024, she caused the foregoing **Commission Investigative Staff's Post-Hearing Reply Brief** to be filed with the Secretary (in electronic format), served electronically upon Administrative Law Judge MaryJoan McNamara, (McNamara337@usitc.gov), and served upon the parties in the manner indicated below:

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