

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

Petitioners

v.

INNOVATIVE SONIC LIMITED

Patent Owner

Patent No. 7,664,059

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 7,664,059**

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PETITIONERS' EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent 7,664,059 (“the ’059 patent”)
1002	Declaration of Dr. Zygmunt J. Haas
1003	Curriculum Vitae of Dr. Zygmunt J. Haas
1004	3GPP TS 04.60 V8.6.0 (2000-10): 3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/ Medium Access Control (RLC/MAC) protocol (Release 1999) (“3GPP-4.60-v860- Specification”)
1005	3GPP TS 25.322 V6.3.0 (2005-03): 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Link Control (RLC) protocol specification (Release 6) (“3GPP-25.322-v630-Specification”)
1006	Declaration of Craig Bishop
1007	File history of U.S. Patent 7,664,059
1008	U.S. Patent Pub. No. 2004/0208160 to Petrovic (“Petrovic”)
1009	U.S. Patent No. 6,483,855 to Mingawa (“Mingawa”)
1010	U.S. Patent Pub. No. 2006/0067238 to Olsson (“Olsson”)
1011	June 21, 2022 Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings With Parallel District Court Litigation
1012	Docket Control Order
1013	Consolidation Order
1014	Order Granting Intervention

I. Introduction

AT&T Services Inc., T-Mobile USA, Inc., Cellco Partnership d/b/a Verizon Wireless, Ericsson Inc., and Nokia of America Corporation (collectively, “Petitioners”) petition for *inter partes* review (“IPR”) seeking cancellation of claims 1–8 (the “Challenged Claims”) of U.S. Patent No. 7,664,059 (“the ’059 patent”) (Ex-1001), assigned to Innovative Sonic Limited (“Patent Owner”) according to USPTO records.

The Challenged Claims are drawn a very narrow disclosure in which an error occurs when two state variables are equal in value to each other when using a particular transmission mode for wireless communication, as was the case in the then-current draft of the 3G wireless communication standard. The ’059 patent’s file history admits that in all other cases—that is, when the two state variables are not equal in value to each other—the inequality expression recited in the then-current draft of the 3G wireless communication standard could be used without error. Thus, the ’059 patent claims as its invention a different inequality expression that is used in all conditions for the two state variables, including when they are equal to each other. This different inequality expression, however, is nothing more than a regurgitation and reuse of the *same* inequality expression used in an earlier generation wireless communication standard. Simply stated, all the claimed features

of the independent claim and the dependent claims were disclosed or suggested in the prior art discussed herein.

Because all of the claimed features of the Challenged Claims, were disclosed or suggested in the cited prior art, the Challenged Claims are unpatentable and should be canceled.

II. Grounds for Standing

Pursuant to 37 C.F.R. § 42.104(a), Petitioners certify that the '059 patent is available for *inter partes* review ("IPR"), and that they are not barred or estopped from requesting IPR of the Challenged Claims on the grounds identified in this petition. Neither Petitioners, nor any party in privity with Petitioners: (i) have filed a civil action challenging the validity of claims of the '059 patent; (ii) have been served a complaint alleging infringement of the '059 patent more than one year prior to the present date; or (iii) are estopped from challenging the claims on the grounds identified in the petition. The Challenged Claims of the '059 patent also have not been the subject of a prior IPR or a finally concluded district court litigation.

III. Overview of the Challenge

A. Claims for Which Review Is Requested (37 C.F.R. § 42.104(b)(1))

Petitioners request the review and cancelation of claims 1-8 of the '059 Patent.

B. Statutory Grounds of Challenge (37 C.F.R. § 42.104(b)(2))

Ground 1: Claims 1-3 and 5-8 are anticipated under 35 U.S.C. § 102 based on 3GPP-4.60-v860-Specification (Ex-1004).

Ground 2: Claims 1-3 and 5-8 are rendered obvious under 35 U.S.C. § 103 based on 3GPP-4.60-v860-Specification (Ex-1004).

Ground 3: Claims 1-8 are rendered obvious under 35 U.S.C. § 103 based on 3GPP-25.322-v630-Specification (Ex-1005) in view of 3GPP-4.60-v860-Specification (Ex-1004).

Petitioners' full statement of the reasons for the relief requested is set forth below and in the supporting declaration of Dr. Zygmunt Haas (Ex-1002).¹

C. The Asserted References Are Prior Art to the '059 Patent

The '059 patent purports to claim the benefit of U.S. Provisional Application No. 60/594,415 filed April 5, 2005. Ex-1001, 1:7-9, Cover. For purposes of this Petition, Petitioners assume that April 5, 2005 is the priority date for the '059 patent, without conceding the priority date. Because this date is before March 16, 2013, the

¹ Petitioners submits the declaration of Dr. Zymunt J. Haas (Ex. 1002), an expert in the field of the '059 patent. Ex. 1002, ¶¶4-15, 40-41; Ex. 1003.

Pre-America Invents Act (AIA) version of 35 U.S.C. § 102 applies in this proceeding.

As described below in Sections VII.A.1.b and VII.A.2.b, each of 3GPP-4.60-v860-Specification and 3GPP-25.322-v630-Specification qualify as prior art to the '059 patent under pre-AIA 35 U.S.C. § 102. *Infra* Sections VII.A.1.b and VII.A.2.b.

IV. Overview of the '059 Patent

A. Background of the '059 Patent

The '059 patent is titled “Error handling in a wireless communications system.” Under the heading “Field of the Invention,” the '059 patent states that the “present invention is a method and a device of detecting an erroneous sequence number in a status report unit in a wireless communications system, in particular a method of effectively detecting a status report unit comprising the erroneous sequence number and activating a reset mechanism at an appropriate time, and a device implementing the method.” Ex-1001, 1:14-19.

In the “Background” section, the '059 patent describes that that “third generation mobile communication was developed to have better usage of the frequency spectrum and higher-speed transmission service.” Ex-1001, 1:25-28. The “third generation mobile communication uses a Wideband Code Division Multiple Access (WCDMA) protocol for wireless access,” and that “[t]he WCDMA protocol

can satisfy different service requirements of QoS [Quality of Service],” among other things. Ex-1001, 1:31-38. The ’059 patent specifically notes that “a specification set by the 3rd Generation Partnership Project (3GPP), the 3rd generation mobile communications system can provide different levels of transmission quality and operates in different modes,” which include “Transparent Mode (TM), Unacknowledged Mode (UM), Acknowledged Mode (AM).” Ex-1001, 1:39-44. The Acknowledged Mode of transmission “is used for robust services requiring data accuracy but not instant transmission.” Ex-1001, 1:47-48.

AM requires that every data packet (or “Protocol Data Unit” (PDU)) sent by a transmitter is received and acknowledged by the receiver, ensuring that no data loss occurs for a given data transmission. Ex-1002, ¶46. In AM, “Radio Link Control (RLC) layers of a transmitter and a receiver initiate a status report procedure at an appropriate time to have the receiver transmit a status report unit.” Ex-1001, 1:49-52. The status report transmission is used to track the latest PDUs that have been sent by the transmitter, and which have been received and acknowledged by the receiver. *Id.* The PDUs are numbered by Sequence Numbers (SNs) at the transmitter to identify each PDU and to indicate their order. *Id.* Typically, the SNs are used by the receiver to confirm correct receipt of a PDU (or a group of PDUs) by sending (back to the transmitter) acknowledgements, which carry the SNs (or a

representative SN). The transmitter then uses these SN(s) to decide which packet(s) might have not been received (or correctly received) and will retransmit such PDU(s) to the receiver. *Id.*

The '059 patent describes that the following terminology is set for AM in the 3GPP specification:

1. Variable VT(S): represents a Sequence Number (SN) of a next Protocol Data Unit (PDU) to be transmitted for a first time (i.e. excluding retransmitted PDUs). The variable is updated after corresponding PDUs are transmitted. An initial value of the variable is 0.

2. Variable VT(A): represents an SN of a next expected acknowledged PDU, meaning the SN following an SN of a last in-sequence acknowledged PDU. The variable is updated after a status report unit showing the expected PDU had been positively acknowledged.

Ex-1001, 1:58-67. The '059 patent explains that the “variables VT(S) and VT(A)” allow the RLC layer to “detect whether an SN in a status report unit is correct.” Ex-1001, 2:1-3.

The '059 patent identifies the expression defined in the 3GPP specification that is used, in AM, to identify whether an appropriate SN has been received. This expression is $VT(A) \leq SN \leq VT(S) - 1$. “Comparisons between SNs are done by modulus operations with VT(A) as a modulus base. With the base=VT(A) and a

negatively acknowledged SN x , determination is made whether x lies outside an interval $\{x|(VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 \leq (VT(S)-1-base) \bmod 4096\}$, in order to detect whether any erroneous SN is contained in the status report unit.” Ex-1001, 2:10-16.

The '059 patent further describes two examples of the usage of the expression from the 3GPP specification, one that correctly identifies a protocol error, and one that fails to correctly identify a protocol error. In the first example, the transmitter has transmitted 250 PDUs (i.e., those with SNs from 0 to 249), and the receiver has positively acknowledged the receipt of the first 200 PDUs (i.e., those with SNs from 0 to 199). Ex-1001, 2:17-25. Because the last-in-sequence acknowledged PDU's SN is 199, $VT(A) = 200$, which, as explained above, is the SN of the next expected PDU by the receiver. *Id.* The transmitter, meanwhile, will have a $VT(S)$ of 250, which is the SN of the next PDU to be transmitted. *Id.* If a protocol error occurs and the next PDU received has an SN of 300, then $x=SN$ does not meet the interval expression $\{x|(VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 \leq (VT(S)-1-base) \bmod 4096\}$ (where the base = $VT(A) = 200$). The '059 patent recites the following:

$$[1.1] \quad \{x|(VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 \leq (VT(S)-1-base) \bmod 4096\}$$

$$[1.2] \quad = \{x \mid (200-200) \bmod 4096 \leq (x-200) \bmod 4096 \leq (250-1-200) \bmod 4096\}$$

$$[1.3] = \{x | 0 \leq (x-200) \bmod 4096 \leq 49\}$$

Ex-1001, 2:26-30. Because x is 300 (i.e., x is the SN of the received PDU), the middle part of the expression equals to 100, the inequality expression shown in [1.3] reduces to $\{x | 0 \leq 100 \leq 49\}$ and the expression is not met (and thus detects a protocol error). Ex-1001, 2:31-34. The RLC layer may then initiate a reset procedure to recover from the error.

The '059 patent further describes a second example in which the expression used in AM as disclosed in the 3GPP specification does not correctly detect an error. Specifically, when $VT(A)$ equals $VT(S)$, a protocol error may not be detected even when one has occurred. In this example, both $VT(A)$ and $VT(S)$ are equal to 200, as the transmitter has transmitted PDU with SNs up to and including 199, and the receiver has positively acknowledged all of the same. If a protocol error occurs and the next received PDU has an SN of 300, then the interval expression $\{x | (VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 \leq (VT(S)-1-base) \bmod 4096\}$ (where the base = $VT(A) = 200$) does not detect an error. The '059 patent recites the following:

$$[2.1] \{x | (VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 \leq (VT(S)-1-base) \bmod 4096\}$$

$$[2.2] = \{x | (200-200) \bmod 4096 \leq (x-200) \bmod 4096 \leq (200-1-200) \bmod 4096\}$$

$$[2.3] = \{x | 0 \leq (x-200) \bmod 4096 \leq 4095\}$$

Ex-1001, 2:53-57. In expression [2.2], the rightmost portion of the expression simplifies to $(-1 \bmod 4096)$, which equals 4095. This result then renders the expression [2.3] as satisfied $\{x \mid 0 \leq 100 \leq 4095\}$, without indicating an error, and the protocol error that should have been detected is not actually detected. Ex-1001, 2:63-3:3.

The '059 patent explains that it was known and desired in the then-current 3GPP standard for protocol errors in sequence numbers to be accurately identified and corrected, but that the then-current 3GPP standard could not correctly do so in the instance when $VT(A)$ equaled $VT(S)$ while operating in the AM. Ex-1002, ¶¶50-51.

B. The '059 Patent's Solution

The '059 patent explains that “the present invention detects whether the negatively acknowledged SN lies in a range of greater than or equal to an SN following an SN of a last in-sequence acknowledged packet of a transmitter and less than an SN of a next packet to be transmitted for the first time by the transmitter, meaning to detect whether the negatively acknowledged SN agrees with $VT(A) \leq SN < VT(S)$.” Ex-1001, 4:31-37. The '059 patent further explains that “[a]s the equation $VT(A) \leq SN < VT(S)$ shows, a modulus operation with $VT(A)$ as a modulus base, meaning that $base = VT(A)$, is used to detect whether the SN “x” lies outside

the set $\{x | (VT(A) - \text{base}) \bmod 4096 \leq (x - \text{base}) \bmod 4096 < (VT(S) - \text{base}) \bmod 4096\}$ and hence detect[s] whether the status report unit comprises an erroneous SN.” Ex-1001, 4:41-46.

In particular, the '059 patent purports that the invention focuses on the following difference between expression [2.1], shown above as the expression used in the existing prior art 3GPP specification, and expression [3.1], the '059 patent's purported invention (emphasis added to show differences):

$$\begin{aligned} [2.1] \quad & \{x | (VT(A) - \text{base}) \bmod 4096 \leq (x - \text{base}) \bmod \\ & 4096 \leq (\mathbf{VT(S) - 1 - base}) \bmod 4096\} \end{aligned}$$

$$\begin{aligned} [3.1] \quad & \{x | (VT(A) - \text{base}) \bmod 4096 \leq (x - \text{base}) \bmod \\ & 4096 < (\mathbf{VT(S) - base}) \bmod 4096\} \end{aligned}$$

Ex-1002, ¶54.

Using a similar setup as above—that is, in the example in which the error was not detected—the '059 patent explains the difference between the then-existing 3GPP expression and the '059 patent's purported invention. In that example, both VT(A) and VT(S) are equal to 200, as the transmitter has transmitted PDU with SNs up to and including 199, and the receiver has positively acknowledged all of these PDUs. If a protocol error occurs and the next PDU received has an SN of 300, then the set expression $\{x | (VT(A) - \text{base}) \bmod 4096 \leq (x - \text{base}) \bmod 4096 < (VT(S) - \text{base})$

mod 4096}(where the base = VT(A) = 200) meets the received SN=x and does detect an error. Ex-1001, 5:4-17.

$$[3.1] \{x|(VT(A)-base) \bmod 4096 \leq (x-base) \bmod 4096 < (VT(S)-base) \bmod 4096\}$$

$$[3.2] = \{x|(200-200) \bmod 4096 \leq (x-200) \bmod 4096 < (200-200) \bmod 4096\}$$

$$[3.3] = \{x|0 \leq (x-200) \bmod 4096 < 0\}$$

Ex-1001, 5:13-17. In expression [3.2], the rightmost portion of the expression simplifies to (0 mod 4096), which equals 0. Thus, for SN=300, the expression [3.3], results in $\{x|0 \leq (300-200) \bmod 4096 < 0\} = \{x|0 \leq (100) \bmod 4096 < 0\} = \{x|0 \leq 100 < 0\}$, which cannot be met, because it requires $100 < 0$, which is incorrect. Ex-1002, ¶55. That is, in the case where VT(A) = VT(S) = 200 and the next PDU's received SN is 300, an erroneous SN is detected, as it should be. Ex-1001, 5:18-21. Ex-1002, ¶55. In fact, in the case when VT(A) = VT(S), because all PDUs that were transmitted by a transmitter were positively acknowledged, any negative acknowledgement by a status report unit must be an error caused by a protocol. Ex-1002, ¶¶54-55.

The '059 patent thus purports that “[t]he prior art cannot detect protocol errors in this case[] [i]n comparison to the present invention in the same situation [].” Ex-1001, 5:27-28.

C. Prosecution History of the '059 Patent

The file history of the '059 patent explains that the claimed invention is narrowly focused on the specific edge-case described when $VT(A)$ equals $VT(S)$ in the AM mode.

The Examiner initially rejected claims 1-2 and 5-7 as being anticipated by a reference entitled Petrovic. Ex-1008 (U.S. Patent Pub. No. 2004/0208160); Ex-1007 (File History, Office Action dated January 23, 2008), 323. The Examiner also rejected claims 3-4 as being obvious over Petrovic and Minagawa (U.S. Patent No. 6,483,855; Ex-1009) or Olsson (U.S. Patent Pub. No. 2006/0067238; Ex-1010). Ex-1007 (File History, Office Action dated January 23, 2008), 323.

In a response to the Office Action rejection, the applicant admitted that “for the case of $VT(S) \neq VT(A)$, both Petrovic [cited prior art patent publication] and the claimed invention **as set forth in claim 1 will work.**” Ex-1007 (File History, Office Action Response dated April 23, 2008), 264.² Thus, the scope of the invention is for the narrow case in which $VT(S) = VT(A)$.

The applicant further explained that Petrovic’s checking condition is “ $VT(A) \leq SN \leq VT(S)-1$ ” but that the '059 patent’s checking condition is “ $VT(A) \leq SN <$

² All emphasis in citations in this document has been added unless otherwise noted.

VT(S).” Ex-1007 (File History, Office Action Response dated April 23, 2008), 262. In explaining the difference between Petrovic’s approach and the ’059 patent’s approach, the applicant explained that “[w]hen VT(S) is a regular integer, the above two conditions are equivalent to each other. However, since VT(S) is represented by finite bits, say 12 bits, to overcome wrap[]around from the maximum representing value by the finite bits to zero, modulus operation with a modulo base must be used.” *Id.*; *see also id.* at 262-264 (further explaining the difference).

In an IDS filed on January 3, 2007, the file history does cite to “Universal Mobile Telecommunications System (UMTS); Radio Link Control (RLC) protocol specification. ETSI TS125 322 V6.3.0. Date 2005-03,” which is similar to the 3GPP reference relied upon in Ground 3. Ex-1007 (’059 Patent File History, Information Disclosure Statement dated January 3, 2007), 357. However, this reference did not form the basis of a rejection by the Examiner nor was it discussed by the Examiner or applicant in the prosecution history. After a few rounds of prosecution, the Examiner allowed the claims. *Id.*, 23. Importantly, there is no evidence that the Examiner was even aware of the 3GPP-4.60-v860-Specification prior art identified in this Petition. And, as explained in detail below in Sections VII.A.1 and VII.B.1, 3GPP-4.60-v860-Specification (relied upon for anticipation in Ground 1, single-reference obviousness in Ground 2, and a reference relied upon in combination with

3GPP-25.322-v630-Specification for Ground 3) discloses or suggests precisely what the Examiner found lacking in the prior art. The Examiner would not have allowed the application over the prior art relied upon in this Petition.

V. Claim Construction

As explained in 83 Fed. Reg. 51341 (Oct. 11, 2018), the Board construes the Challenged Claims according to the standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Petitioners believe that, for the purposes of this proceeding and the analysis presented herein, no claim term requires express construction. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Accordingly, this Petition analyzes the Challenged Claims consistent with the ordinary and customary meaning as would be understood by one of ordinary skill in the art in light of the specification. *Phillips*, 415 F.3d at 1314–17; Ex-1002, ¶¶42-43.

VI. Person of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) related to the ’359 patent would possess: (1) an undergraduate degree, or equivalent of an undergraduate degree, in Electrical Engineering, Computer Science, or Computer Engineering; and (2) at least one year of experience in research, design, development, and/or testing of cellular networks. Ex-1002, ¶¶40-41. Furthermore, an individual could qualify

as a POSITA with more technical education (e.g., a PhD in Electrical Engineering, Computer Science, or Computer Engineering) and less professional experience or *vice versa. Id.*

VII. REASONS FOR THE RELIEF REQUESTED UNDER 37 C.F.R. §§ 42.22(A)(2) AND 42.104(B)(4)

A. Overview of the Prior Art

1. 3GPP-4.60-v860-Specification

a. Overview of 3GPP-4.60-v860-Specification

3GPP-4.60-v860-Specification is an 3GPP Technical Specification that is part of the Global System for Mobile Communications (GSM) EDGE Radio Access Network, 04.60 version 8.6.0 Release 1999 standard. 3GPP-4.60-v860-Specification describes and specifies various aspects of the GSM EDGE 04.60 version 8.5.0 Release 1999 standard, including the Radio Link Control/Medium Access Control (RLC/MAC) protocol used in the General Packet Radio Service (GPRS) for Digital cellular telecommunications system (Phase 2+) for GSM. Ex-1002, ¶¶65-68.

b. 3GPP-4.60-v860-Specification Qualifies as Prior Art to the '059 Patent Under At Least Pre-AIA 35 U.S.C. §§ 102(b) and 102(a)

As explained in detail by Craig Bishop (Ex-1006), 3GPP technical specifications (TS), including GSM 04.60 version 8.5.0 Release 1999 (3GPP-4.60-

v860-Specification), are publicly accessible as of the date they were uploaded to 3GPP's file server. Ex-1006, ¶¶48-53; *see generally* Ex-1006, ¶¶19-60. Indeed, at least one PTAB panel has found that this is true of all 3GPP documents:

TR 33.821 and TS 23.401,³ *like all 3GPP documents*, were generated with intent to distribute them to interested members of the telecommunications industry. They were uploaded to 3GPP's FTP server without restriction or expectation of confidentiality, and were indefinitely maintained there. They have been available for downloading (copying) from the FTP server since being uploaded, and can be shared with others without restriction. *Under such circumstances, the documents are publicly accessible.*

Samsung Elecs. Co., Ltd. v. Huawei Techs. Co., Ltd., IPR2017-01487, Paper 45 (Final Written Decision), 2018 WL 6519544, *5 (P.T.A.B. Dec. 10, 2018).

3GPP-4.60-v860-Specification was uploaded to 3GPP's file server on October 11, 2000. Ex-1006, ¶¶51-53. As a result, 3GPP-4.60-v860-Specification

³ Like 3GPP TS 25.322, "TS 23.401" is a type of 3GPP document called a technical specification (TS) that was prepared and published by 3GPP. *See, e.g.*, <https://www.3gpp.org/specifications>; *see also* Ex-1007, ¶¶26-40 (describing various categories of documents published by 3GPP as part of standard development, including technical reports and specifications).

became a “printed publication” under pre-AIA 35 U.S.C. § 102(a) on October 11, 2000. *Id.*; see, e.g., *Samsung Elecs. Co.*, 2018 WL 6519544, *3–5 (concluding that technical reports and specifications uploaded to a standards organization’s file server before a challenged patent’s priority date qualify as prior art under 35 U.S.C. § 102). 3GPP-4.60-v860-Specification thus qualifies as prior art to the ’059 patent at least under pre-AIA 35 U.S.C. § 102(a).

Further, because 3GPP-4.60-v860-Specification was published more than one year before the ’059 patent’s priority date of April 5, 2005, 3GPP-4.60-v860-Specification also qualifies as prior art to the ’059 patent under pre-AIA 35 U.S.C. § 102(b).

2. 3GPP-25.322-v630-Specification

a. Overview of 3GPP-25.322-v630-Specification

3GPP-25.322-v630-Specification is a 3GPP Technical Specification that is part of the 5G / 3GPP 25.322 standard. 3GPP-25.322-v630-Specification describes and specifies various aspects of the 25.322 standard, including error detection and operation using RLC in the AM. Ex-1002, ¶¶69-71.

b. 3GPP-25.322-v630-Specification Qualifies as Prior Art to the '059 Patent Under At Least Pre-AIA 35 U.S.C. §§ 102(b) and 102(a)

As explained above and in detail by Craig Bishop (Ex-1006), 3GPP technical specifications (TS), including 3GPP TS 25.322 V6.3.0 (3GPP-25.322-v630-Specification), are publicly accessible as of the date they were uploaded to 3GPP's file server. Ex-1006, ¶¶54-59; *see generally* Ex-1006, ¶¶19-60.

3GPP-25.322-v630-Specification was uploaded to 3GPP's file server on March 22, 2005. Ex-1006, ¶¶55-59. As a result, 3GPP-25.322-v630-Specification became a “printed publication” under pre-AIA 35 U.S.C. § 102(a) on March 22, 2005. *See, e.g., Samsung Elecs. Co.*, 2018 WL 6519544, *3–5 (concluding that technical reports and specifications uploaded to 3GPP's file server before a challenged patent's priority date qualify as prior art under 35 U.S.C. § 102). 3GPP-25.322-v630-Specification thus qualifies as prior art to the '059 patent at least under pre-AIA 35 U.S.C. § 102(a).

B. Ground 1: Claims 1-3 and 5-8 Are Anticipated By 3GPP-4.60-v860-Specification

1. Claim 1

- a. “A method of detecting an erroneous sequence number of a status report unit in a wireless communications system, the method comprising”**

To the extent that the preamble is limiting, 3GPP-4.60-v860-Specification discloses a method of detecting an erroneous sequence number of a status report unit in a wireless communications system. Ex-1002, ¶¶72-73; *see also infra* Sections VIII.B.1.b to 1.d. For example, 3GPP-4.60-v860-Specification discloses that it relates to GSM, which is the Global System for Mobile communications wireless standard, which is a standard for a wireless communication system. Ex-1004, 1; Ex-1002, ¶72. 3GPP-4.60-v860-Specification also discloses a Radio Link Control (RLC) acknowledged mode for packet transfer. Ex-1004, 19 (“The RLC function defines the procedures for segmentation and reassemble of LLC PDUs into RLC/MAC blocks and, in RLC acknowledged mode of operation, for the Backward Error Correction (BEC) procedures enabling the selective retransmission of unsuccessfully delivered RLC/MAC blocks.”); *id.* at 98 (“RLC acknowledged mode operation uses retransmission of RLC data blocks to achieve high reliability.”). 3GPP-4.60-v860-Specification discloses that the RLC acknowledged mode function is “responsible for ... Backward Error Correction (BEC) procedures enabling the

selective retransmission of RLC data blocks.” Ex-1004, 85. Further, 3GPP-4.60-v860-Specification discloses that valid sequence numbers for PDUs are detected in RLC acknowledged mode (AM), and that, accordingly, sequence numbers that are not valid (i.e., those that are erroneous) may also be detected. Ex-1004, 86 (“All BSNs [Block Sequence Numbers] which meet that criteria are valid within the transmit window.”). Ex-1002, ¶72.

This mapping of “detecting an erroneous sequence number” is consistent with the ’059 patent. Ex-1001, Abstract (“detecting that the status report includes an erroneous sequence number when a negatively acknowledged sequence number is not within the abovementioned range”), 1:40-44 (“the 3rd generation mobile communications system can provide different levels of transmission quality and operates in different modes according to the different requirements, for instance ... Acknowledged Mode (AM)”), 1:49-54 (“In AM, for better data accuracy and robustness, Radio Link Control (RLC) layers of a transmitter and a receiver initiate a status report procedure at an appropriate time to have the receiver transmit a status report unit, or a piggybacked status report unit to the transmitter.”); Ex-1002, ¶73.

b. “receiving a status report unit output from a receiver of the wireless communications system,”

3GPP-4.60-v860-Specification discloses this limitation. Ex-1002, ¶¶74-75.

3GPP-4.60-v860-Specification discloses receiving a packet control acknowledgement from the RLC receiver of the wireless communication system:

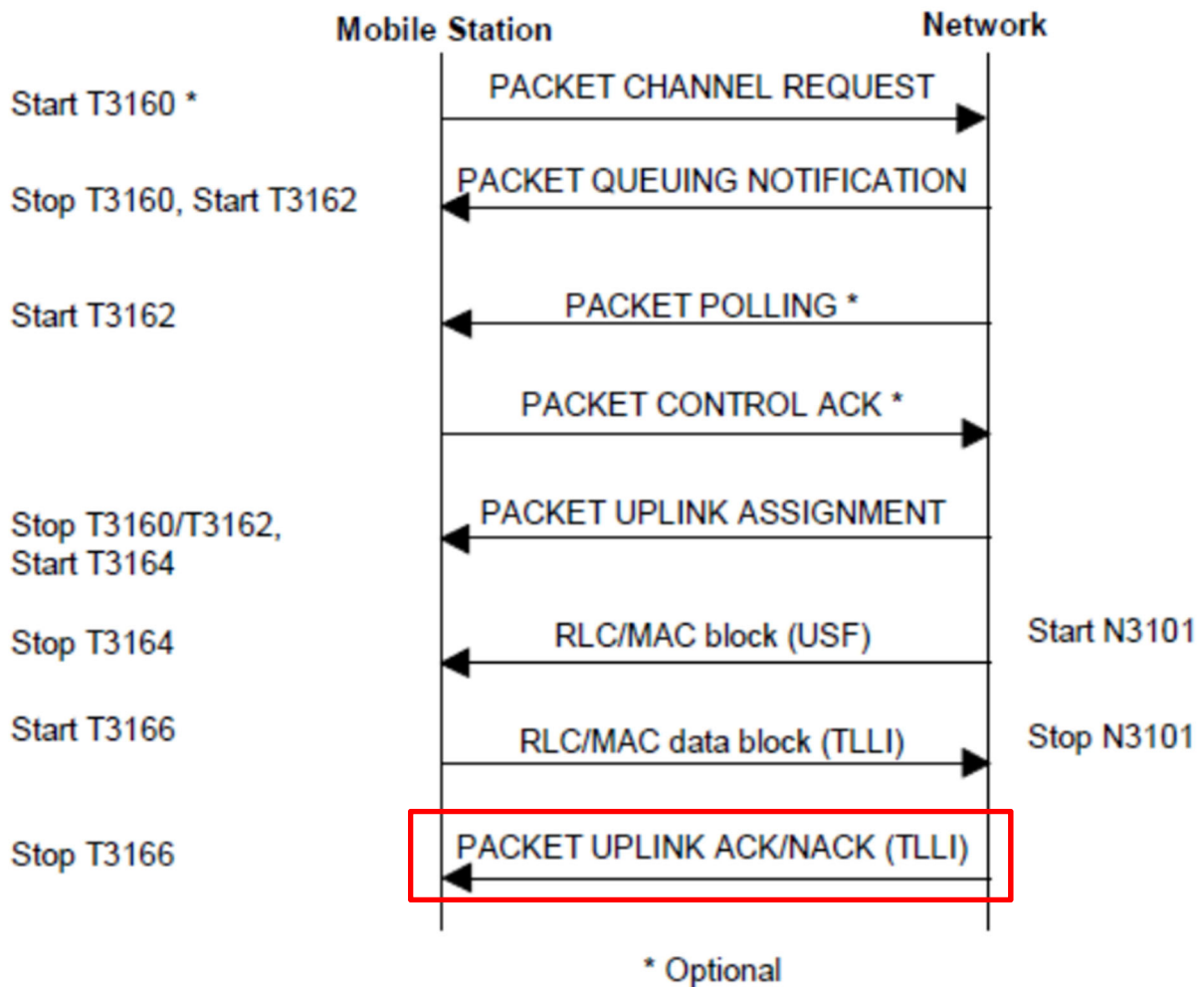


Figure C.1: Message Sequence Diagram for one phase packet access

Ex-1004, 286. The image above identifies a Packet Uplink Ack/Nack, which is a “message [that] contains a starting sequence number (SSN) and a received block

bitmap (RBB),” “*is sent by the RLC receiver* and is received by the RLC transmitter.” Ex-1004, 89. The specification further explains that the “network shall acknowledge packet transfers by sending PACKET UPLINK ACK/NACK messages on the PACCH during gaps in the uplink allocation.” Ex-1004, 65. The Packet Uplink Ack/Nack includes sequence number information sent by the RLC receiver to the RLC transmitter (thus received from the RLC receiver as claimed), is the claimed status report unit output. Thus, 3GPP-4.60-v860-Specification discloses receiving a status report Packet Uplink Ack/Nack that was output from a receiver of the wireless communications system. Ex-1002, ¶¶74-75.

- c. **“detecting whether a negatively acknowledged sequence number lies in a range of greater than or equal to a sequence number following a sequence number of a last in-sequence acknowledged packet of a transmitter and less than a sequence number of a next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit; and”**

3GPP-4.60-v860-Specification discloses this limitation. Ex-1002, ¶¶76-82. For example, 3GPP-4.60-v860-Specification discloses that the following inequality expression is used to evaluate whether the block sequence number BSN is within a valid range: “In RLC acknowledged mode, the transmit window is defined by the send state variable V(S) in the following inequality:

$$[V(A) \leq \text{BSN} < V(S)] \text{ modulo SNS.}''$$

Ex-1004, 86; Ex-1002, ¶76.

Expression [3.1] below shows the '059 patent's purported invention, compared against expression [4.1], shows inequality expression from the 3GPP-4.60-v860-Specification. Expression [4.2] shows expression [4.1] with the modulus operation distributed through the brackets. The 'x' represented in expression [3.1] is the sequence number of the PDU being received, which is analogous to the 'BSN' from expressions [4.1] and [4.2]. Ex-1002, ¶77.

$$\begin{aligned} [3.1] \quad & \{x|(VT(A)\text{-base}) \bmod 4096 \leq (x\text{-base}) \bmod 4096 \\ & < (VT(S)\text{-base}) \bmod 4096\} \\ [4.1] \quad & [V(A) \leq \text{BSN} < V(S)] \text{ modulo SNS} \\ [4.2] \quad & V(A) \text{ modulo SNS} \leq \text{BSN modulo SNS} \\ & < V(S) \text{ modulo SNS} \end{aligned}$$

Ex-1002, ¶77.

3GPP-4.60-v860-Specification discloses that V(A) is the "Acknowledge state variable V(A)" and that in the RLC acknowledged mode, "V(A) contains the BSN value of the oldest RLC data block that has not been positively acknowledged by its peer." Ex-1004, 86; Ex-1002, ¶78. V(S) is the "Send state variable V(S)" and "V(S) denotes the sequence number of the next in-sequence RLC data block to be transmitted." Ex-1004, 86; Ex-1002, ¶78.

Thus, the inequality expression that is used to evaluate the validity of the block sequence number BSN (i.e., the claimed negatively acknowledged sequence number) requires that BSN must be greater than or equal to the “oldest RLC data block that has not been positively acknowledged by its peer” (i.e., the claimed “a sequence number following a sequence number of a last in-sequence acknowledged packet of a transmitter”) and less than “the sequence number of the next in-sequence RLC data block to be transmitted” (i.e., “a sequence number of a next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit”). Ex-1004, 86; Ex-1002, ¶79.

3GPP-4.60-v860-Specification also discloses that the modulus of each of these values is taken relative to the SNS, the “Sequence Number Space,” which is the entire space of values that the sequence number may fall into. Ex-1004, 86; *id.* at (disclosing that the inequality ‘[$V(A) \leq BSN < V(S)$] ***modulo SNS***’ is evaluated). Ex-1002, ¶80.

This is consistent with terms identified in the inequality expression disclosed in the ’059 patent, as explained above in Section IV.B. *See also*, Ex-1001, 5:13-17. Accordingly, $V(A)$ disclosed in the 3GPP-4.60-v860-Specification is analogous to $VT(A)$ from the ’059 patent; $V(S)$ disclosed in the 3GPP-4.60-v860-Specification is

analogous to VT(S) from the '059 patent; and BSN disclosed in the 3GPP-4.60-v860-Specification is analogous to SN from the '059 patent. Ex-1002, ¶81.

Further, the SNS disclosed in the 3GPP-4.60-v860-Specification is analogous to the '059 patent's disclosure of modulus in evaluating the terms of the inequality with "mod 4096," where "4096" represents the 12-bit number space for sequence numbers. Ex-1001, 2:4-5; Ex-1002, ¶¶81-82. The '059 patent explains that the sequence number of a PDU is "represented by 12 bits." The sequence number may be any value from 0 to 4095, and '4096' (where $2^{12} = 4096$) is the resultant value used in the modulus operation against each of the terms in the inequality expression. Similarly, in the 3GPP-4.60-v860-Specification, the SNS, or sequence number space, is defined as the number "2048 [i.e., 11 bits] in EGPRS, and 128 [i.e., 7 bits] in GPRS," and the sequence number values could range from 0 to 2047 (where $2^{11} = 2048$), in the case of EGPRS, for example. Ex-1004, 86; Ex-1002, ¶82. Thus, the "modulo SNS" in 3GPP-4.60-v860-Specification is analogous to the "mod 4096" in the '059 patent. *Id.*

d. "detecting that the status report unit comprises an erroneous sequence number when the negatively acknowledged sequence number is not in the range."

3GPP-4.60-v860-Specification discloses this limitation, as explained above for limitations 1(a) and 1(c). *Supra* Section VII.B.1(a) & 1(c); Ex-1002, ¶82. For

example, 3GPP-4.60-v860-Specification discloses that only negatively acknowledged sequence numbers are “valid”—i.e., not erroneous—if they fall within the range defined by the inequality:

In RLC acknowledged mode, the transmit window is defined by the send state variable $V(S)$ in the following inequality: $[V(A) \leq BSN < V(S)] \text{ modulo SNS}....$ *All BSNs which meet that criteria are valid within the transmit window.*

Ex-1004, 86. Thus, when a BSN value falls outside of that window, erroneous sequence numbers are detected. Ex-1002, ¶82.

2. Claim 2

- a. **“The method of claim 1 further comprising initiating a reset procedure when the status report unit comprises the erroneous sequence number.”**

3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶¶84-85. For example, as described above in Section VII.B.1.d, 3GPP-4.60-v860-Specification discloses detecting an erroneous sequence number when the sequence number does not satisfy the expression determined by the inequality “[$V(A) \leq BSN < V(S)$] modulo SNS.” *Supra* Section VII.B.1.d; Ex-1004, 86; Ex-1002, ¶84.

When the inequality is not satisfied based on the corresponding values of BSN, $V(A)$, and $V(S)$, it is determined that the Block Sequence number is not valid, and a reset procedure to retransmit the erroneous sequence number is initiated. For

example, 3GPP-4.60-v860-Specification discloses that Backward Error Correction is used to selectively retransmit unsuccessfully delivered PDUs.

The RLC function defines the procedures for segmentation and reassemble of LLC PDUs into RLC/MAC blocks and, in RLC acknowledged mode of operation, for *the Backward Error Correction (BEC) procedures enabling the selective retransmission of unsuccessfully delivered RLC/MAC blocks*.

In RLC acknowledged mode of operation, the RLC function preserves the order of higher layer PDUs provided to it.

Ex-1004, 19; *id.* at 85 (“The RLC function is responsible for ... Backward Error Correction (BEC) procedures enabling the *selective retransmission of RLC data blocks*.”); *id.* at 99 (“The receiving side sends PACKET Ack/Nack messages in order to request retransmission of RLC data blocks.”); Ex-1002, ¶85.

3. Claim 3

- a. “The method of claim 1 wherein detecting whether the negatively acknowledged sequence number lies in the range of greater than or equal to the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter and less than the sequence number of the next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit is performed by modulus operation with the sequence number following the sequence number of the last in-sequence

acknowledged packet of the transmitter as a modulus base.”

3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶¶86-88. For example, as described above in Section VII.B.1.d, 3GPP-4.60-v860-Specification discloses detecting an erroneous sequence number with an inequality expression that uses a modulus operation: “[$V(A) \leq BSN < V(S)$] modulo SNS.” *Supra* Section VII.B.1.d; Ex-1004, 86; Ex-1002, ¶86.

The '059 Patent explains that an erroneous SN may be identified with “a modulus operation with $VT(A)$ as a modulus base, meaning that $base=VT(A)$, is used to detect whether the SN x lies outside the set $\{x \mid (x - VT(A)) \bmod 4096 \leq (VT(S) - VT(A)) \bmod 4096\}$.” Ex-1001, 4:41-46; *see also id.* at 4:47-65. The left side of the expression equals 0 when $VT(A)$ is used as the base (because $VT(A) - VT(A) = 0$), and the inequality expression becomes $\{x \mid (x - VT(A)) \bmod 4096 < (VT(S) - VT(A)) \bmod 4096\}$. Ex-1002, ¶87.

Similarly, the 3GPP-4.60-v860-Specification explains that a “valid BSN value in the RBB is one that is in the range [$V(A) \leq BSN < V(S)$] modulo SNS,” which “shall be interpreted in the following way: BSN is valid if, and only if, [$BSN - V(A)$] modulo SNS < [$V(S) - V(A)$] modulo SNS.” Ex-1004, 89; Ex-1002, ¶88. Subtracting $V(A)$ from both the BSN value and the $V(S)$ value discloses using $V(A)$ as the base. *Id.*

4. Claim 5

- a. “The method of claim 1 wherein the wireless communications system is a third generation mobile communications system.”**

3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶89. In its introductory pages, 3GPP-4.60-v860-Specification identifies that certain documents “contain provisions which, through reference in this text, constitute provisions of the present document.” Ex-1004, 15. One of the documents which contains provisions from 3GPP-4.60-v860-Specification is a 3G UMTS specification, which is a specification for a third generation mobile communications system: “3G TS 24.008: Universal Mobile Telecommunications System; Mobile radio interface layer 3 specification.” *Id.* at 14; Ex-1002, ¶89. Accordingly, 3GPP-4.60-v860-Specification discloses a third generation mobile communications network. *Id.*

5. Claim 6

- a. “The method of claim 5 wherein the third generation mobile communications system is operating in an acknowledged mode.”**

3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶90. As noted above in Section VII.B.4.a, 3GPP-4.60-v860-Specification discloses a third generation mobile communications system. 3GPP-4.60-v860-Specification further discloses operating in acknowledged mode:

9.3.2 Acknowledged mode operation

The transfer of RLC data blocks in the RLC acknowledged mode uses retransmissions of RLC data blocks. The transmitting side numbers the RLC data blocks via the block sequence number (BSN). The BSN is used for retransmission and for reassembly. The receiving side sends PACKET Ack/Nack messages in order to request retransmission of RLC data blocks.

Ex-1004, 99; Ex-1002, ¶90.

6. Claim 7

- a. “A wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code for implementing the method of claim 1.”**

3GPP-4.60-v860-Specification inherently discloses this claim. Ex-1002, ¶¶91-92. 3GPP-4.60-v860-Specification does not explicitly disclose “a wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code for implementing the method of claim 1,” but “a wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code” is inherently disclosed. *Id.*

Specifically, these elements are inherent in 3GPP-4.60-v860-Specification’s disclosure. One of skill in the art, reading 3GPP-4.60-v860-Specification, would have understood that the disclosed wireless communications system necessarily

includes a wireless device that comprises a central processing unit in electrical communications with a memory, where the memory comprises program code that is used to execute the wireless communication protocol disclosed in the 3GPP-4.60-v860-Specification. Ex-1002, ¶92; *see also HTC Corp. v. Cellular Commn's Equip. LLC*, IPR2016-01501, 2018 WL 842897, at 18-19 (P.T.A.B. Feb. 12, 2018) (deciding that a skilled artisan, reading a prior art reference relating to a cellular wireless communication specification would have been motivated to utilize a processor, memory, and software of typical user equipment to perform the claimed limitations). Claim 7, therefore, is inherently disclosed by 3GPP-4.60-v860-Specification. *Id.*

7. Claim 8

- a. “The method of claim 1 wherein it is determined that the status report unit comprises an erroneous sequence number when the negatively acknowledged sequence number is not in the range of greater than or equal to the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter and less than and not equal to the sequence number of the next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit.”**

3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶¶93-95. For example, as described above in Section VII.B.1.d, 3GPP-4.60-v860-Specification

discloses detecting an erroneous sequence number when the sequence number does not satisfy the expression determined by the inequality “[$V(A) \leq BSN < V(S)$] modulo SNS.” *Supra* Section VII.B.1.d; Ex-1004, 86; Ex-1002, ¶93.

When the inequality is not satisfied based on the corresponding value of BSN is not within the range of greater than or equal to $V(A)$ (i.e., the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter), and less than and not equal to $V(S)$ (i.e., the next packet to be transmitted for the first time by the transmitter), then the negatively acknowledged sequence number is detected in the status report unit. Ex-1002, ¶94.

3GPP-4.60-v860-Specification also discloses that valid sequence numbers may be confirmed “if, and only if, [$BSN - V(A)$] modulo SNS < [$V(S) - V(A)$] modulo SNS.” Ex-1004, 86; Ex-1002, ¶95.

C. Ground 2: Claims 1-3 and 5-8 Are Obvious in View of 3GPP-4.60-v860-Specification

As explained above in Ground 1, 3GPP-4.60-v860-Specification anticipates claims 1-3 and 5-8 of the '059 patent. To the extent that 3GPP-4.60-v860-Specification does not anticipate those claims, it renders the claims obvious for the reasons described below. Ex-1002, ¶96

1. Independent Claim 1

3GPP-4.60-v860-Specification renders obvious claim 1. Ex-1002, ¶¶97-100. 3GPP-4.60-v860-Specification discloses each of the claim's elements. To the extent that 3GPP-4.60-v860-Specification does not disclose limitation 1(b) (described above in Section VII.B.1.b), it would have been obvious to modify the system to meet that limitation. Ex-1002, ¶¶97-98. For example, to the extent that it is not already disclosed in the 3GPP-4.60-v860-Specification, it would have been obvious to have a separate status report procedure transmitted between a transmitter and receiver. The 3GPP-4.60-v860-Specification describes different types of communications between a mobile station and the wireless communications network, an example of which is shown below.

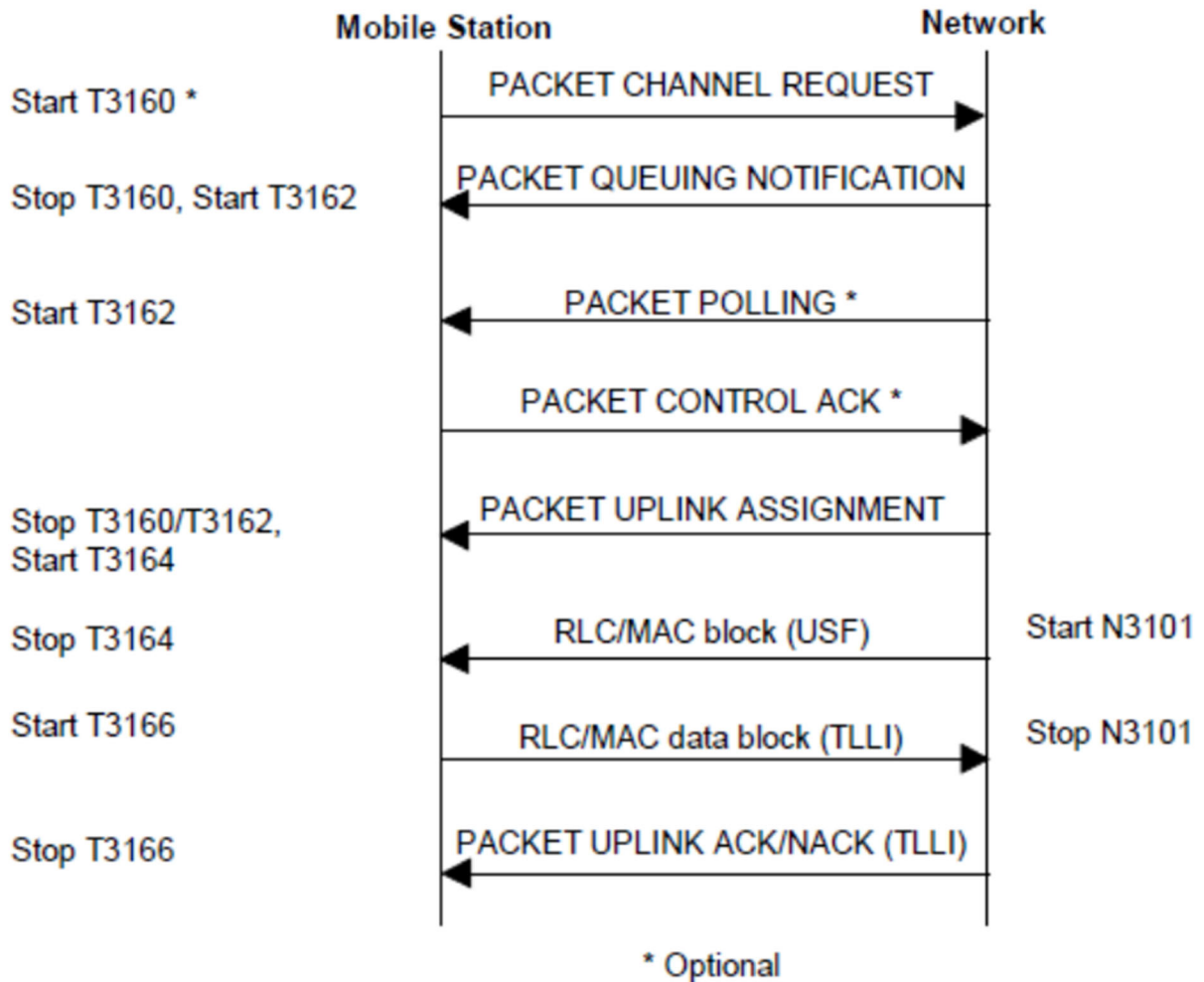


Figure C.1: Message Sequence Diagram for one phase packet access

Ex-1004, 286. As explained above in Section VII.B.1.b, the LRC receiver sends a Packet Uplink Ack/Nack to the transmitter, and this message includes information related to the sequence number. To the extent that the sequence number is not the only information that might be sent in a Packet Uplink Ack/Nack, it would have been obvious to include acknowledged sequence number information in a separate status report unit sent by the receiver, rather than relying on the Packet Uplink

Ack/Nack to carry that information. Ex-1002, ¶¶98-99. The transmitter needs to be able to identify the right sequence number to retransmit the right PDU to the receiver in acknowledged mode, so information relating to the sequence number received by the receiver must be sent to the transmitter, to allow the transmitter to be able to identify the sequence numbers of PDUs that should be sent next. Ex-1002, ¶100. Thus, a POSITA would have found it obvious to have the receiver send status update information to the transmitter. Ex-1002, ¶100.

2. Dependent Claims

3GPP-4.60-v860-Specification discloses claims 2-3 and 5-8. Ex-1002, ¶¶101-103. Specifically, as described above, 3GPP-4.60-v860-Specification discloses each of the elements of each of these claims. To the extent that 3GPP-4.60-v860-Specification does not disclose claim 3, it would have been obvious to modify 3GPP-4.60-v860-Specification to meet the limitations of that claim. Ex-1002, ¶101. Claim 3 recites that “the negatively acknowledged sequence number is detected in the status report unit is performed by modulus operation with the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter as a modulus base.” As described above in Section VII.B.3, the negatively acknowledged sequence number is detected based on a modulus operation. To the extent that 3GPP-4.60-v860-Specification does not

disclose using “the last in-sequence acknowledged packet of the transmitter” as the modulus base, it would have been obvious to modify 3GPP-4.60-v860-Specification to do so.

As disclosed in 3GPP-4.60-v860-Specification, $V(A)$ represents the oldest RLC data block that has not yet been positively acknowledged by its peer. Ex-1004, 86. $V(S)$ represents the sequence number of the next in-sequence RLC data block to be transmitted. A POSITA would understand that large values for $V(A)$ and $V(S)$ could trigger an overflow of the modulus operation used to evaluate the inequality expression “[$V(A) \leq BSN < V(S)$] modulo SNS.” Ex-1002, ¶102. One way to reduce the likelihood of triggering this potential overflow would be to subtract out the value of the last known positively acknowledged sequence number from each of the terms of the inequality. *Id.* This would result in smaller absolute values for each of $V(A)$, BSN , and $V(S)$, each of which cannot overflow the SNS (sequence number space). *Id.* It would have been obvious to a POSITA to modify 3GPP-4.60-v860-Specification to thus use “the last in-sequence acknowledged packet of the transmitter” as the modulus base in the inequality evaluation. *Id.* Further, the ’059 Patent acknowledges that a base value is equal to the $VT(A)$ value: “Comparisons between SNs are done by modulus operations with $VT(A)$ as a modulus base.” Ex-1001, 2:10-12.

D. Ground 3: Claims 1-8 Are Obvious in View of the Combination of 3GPP-25.322-v630-Specification and 3GPP-4.60-v860-Specification

1. Claim 1

- a. “A method of detecting an erroneous sequence number of a status report unit in a wireless communications system, the method comprising”**

To the extent that the preamble is limiting, 3GPP-25.322-v630-Specification discloses a method of detecting an erroneous sequence number of a status report unit in a wireless communications system. Ex-1002, ¶¶104-105; *see also infra* Sections VII.D.1.b to 1.d (remaining elements of this claim). For example, 3GPP-25.322-v630-Specification discloses that it relates to Universal Mobile Telecommunications System (UMTS); Radio Link Control (RLC) protocol specification, which is a standard for a wireless communication system. Ex-1005, 1; Ex-1002, ¶104. 3GPP-25.322-v630-Specification also discloses a Radio Link Control (RLC) acknowledged mode for packet transfer. Ex-1005, 8 (“The present document specifies the *Radio Link Control* protocol for the UE-UTRAN radio interface.”). One of the modes of operation under RLC is Acknowledged Mode (AM), which includes supported functions such as error correction. Ex-1005, 8 (“Features for the current Release: ... *Acknowledged mode*”); *id.* at 18-19 (“The following functions are needed to support acknowledged data transfer [acknowledged mode]: ... Error

correction” and “Protocol error detection and recovery”). Ex-1002, ¶104. 3GPP-25.322-v630-Specification discloses a “STATUS PDU ... that contains: ... a LIST, BITMAP or RLIST SUFI *in which the ‘Sequence Number’ of at least one AMD PDU* that is negatively acknowledged *is outside the interval $VT(A) \leq \text{‘Sequence Number’} \leq VT(S)-1$* .” Ex-1005, 57; Ex-1002, ¶104.

As mentioned in Section VII.B.1.a, this mapping of “detecting an erroneous sequence number” is consistent with the ’059 patent. Ex-1001, Abstract (“detecting that the *status report includes an erroneous sequence number when a negatively acknowledged sequence number is not within the abovementioned range*”), 1:40-44 (“the 3rd generation mobile communications system can provide different levels of transmission quality and operates in different modes according to the different requirements, for instance ... Acknowledged Mode (AM)”), 1:49-54 (“In AM, for better data accuracy and robustness, Radio Link Control (RLC) layers of a transmitter and a receiver initiate a status report procedure at an appropriate time to have the receiver transmit a status report unit, or a piggybacked status report unit to the transmitter.”); Ex-1002, ¶105.

b. “receiving a status report unit output from a receiver of the wireless communications system,”

3GPP-25.322-v630-Specification discloses this limitation. Ex-1002, ¶106. 3GPP-25.322-v630-Specification discloses that “[t]he Receiver transmits *status*

reports to the Sender in order to inform the Sender about *which AMD PDUs* have been received and not received. Each *status report* consists of one or several *STATUS PDUs*.” Ex-1005, 50. Thus, 3GPP-25.322-v630-Specification discloses receiving a status report packet control acknowledgement that was output from a receiver of the wireless communications system. Ex-1002, ¶106.

- c. “detecting whether a negatively acknowledged sequence number lies in a range of greater than or equal to a sequence number following a sequence number of a last in-sequence acknowledged packet of a transmitter and less than a sequence number of a next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit; and”

3GPP-25.322-v630-Specification in combination with 3GPP-4.60-v860-Specification discloses this limitation. Ex-1002, ¶¶107-115. For example, 3GPP-25.322-v630-Specification discloses that a “STATUS PDU or Piggybacked STATUS PDU including ‘erroneous Sequence Number’ is a STATUS PDU or Piggybacked STATUS PDU that contains: ... a LIST, BITMAP or RLIST SUFI *in which the ‘Sequence Number’ of at least one AMD PDU* that is *negatively acknowledged* is outside the interval $VT(A) \leq \text{‘Sequence Number’} \leq VT(S)-1$.” Ex-1005, 57; Ex-1002, ¶¶107. 3GPP-25.322-v630-Specification further discloses that to evaluate this inequality expression, “a modulus base shall be used.” Ex-1005, 43.

3GPP-25.322-v630-Specification defines the variables as follows: “VT(S)” is a “send state variable” that “contains the ‘Sequence Number’ of the next AMD PDU to be transmitted for the first time (i.e. excluding retransmitted PDUs).” Ex-1005, 43. “VT(A)” is an “acknowledge state variable” that “contains the ‘Sequence Number’ following the ‘Sequence Number’ of the last in-sequence acknowledged AMD PDU.” *Id.* Thus, 3GPP-25.322-v630-Specification discloses detecting whether a negatively acknowledged sequence number lies in a range greater than or equal to a last in-sequence acknowledged packet of a transmitter (i.e., VT(A)), and less than (or equal to) a sequence number of a next packet to be transmitted for the first time by the transmitter (VT(S)), as claimed. Ex-1002, ¶108.

To the extent that 3GPP-25.322-v630-Specification does not teach that the sequence number is less than (but not equal to) the sequence number of a next packet/PDU to be transmitted for the first time by the transmitter (VT(S)), 3GPP-4.60-v860-Specification discloses it, and the combination of 3GPP-25.322-v630-Specification and 3GPP-4.60-v860-Specification renders this limitation obvious to a POSITA. Ex-1002, ¶109.

First, as explained in Section VII.B.1.c, the V(A) value from 3GPP-4.60-v860-Specification corresponds to the VT(A) value from the 3GPP-25.322-v630-Specification (and the ’059 patent), and the V(S) value from 3GPP-4.60-v860-

Specification corresponds to the VT(S) value from the 3GPP-25.322-v630-Specification (and the '059 patent). Thus, a POSITA would have understood that the variables would be interchangeable. Ex-1002, ¶110. Second, as also explained in Section VII.B.1.c, 3GPP-4.60-v860-Specification uses an inequality that explicitly recites that the received sequence number is less than the sequence number of the next packet/PDU to be transmitted for the first time: “[$V(A) \leq BSN < V(S)$] modulo SNS.” Ex-1004, 86; Ex-1002, ¶111. Thus, 3GPP-25.322-v630-Specification and 3GPP-4.60-v860-Specification use a very similar inequality expression with the same terms to evaluate whether a sequence number is negatively acknowledged and thus erroneous. Ex-1002, ¶111. Third, the 3GPP-25.322-v630-Specification and 3GPP-4.60-v860-Specification are both wireless communications standards, they both use RLC, and they both include an AM mode. Ex-1002, ¶112.

Further, a POSITA would have been motivated to replace the inequality expression from 3GPP-25.322-v630-Specification to the inequality from 3GPP-4.60-v860-Specification once the POSITA realized that the edge case of $VT(A) == VT(S)$ will fail for the inequality expression disclosed in 3GPP-25.322-v630-Specification. Ex-1002, ¶113. As discussed above, due to the use of the modulus operation, when $VT(A) == VT(S)$, the term “ $VT(S) - 1$ - the modulus base” returns a value of ‘-1’—a value that then cycles, due to the modulus operation, to

the largest possible value for that variable. For example, a 12-bit representation of the “ $VT(S) - 1 - \text{the modulus base}$ ” returns ‘-1’ when $VT(S)$ equals $VT(A)$, and this equals 4095, as explained above in Section IV.A. Ex-1002, ¶113. A POSITA would have found it obvious to replace the inequality expression from 3GPP-25.322-v630-Specification, which can potentially evaluate to an incorrect solution when $VT(S)$ equals $VT(A)$, with the inequality expression from 3GPP-4.60-v860-Specification, which does not evaluate to an incorrect solution. Ex-1002, ¶113.

Further, a POSITA would also have been motivated to replace the expression from 3GPP-25.322-v630-Specification to the inequality from 3GPP-4.60-v860-Specification, because the expression from the 3GPP-4.60-v860-Specification avoids an additional subtraction operation (“-1”). Ex-1002, ¶114. A POSITA would have been motivated to reduce computational operations involved in evaluating the inequality expression, as to reduce the overhead of frequently computed calculation. Ex-1002, ¶114.

In addition to being motivated to pursue the proposed combination, a POSITA would have had a reasonable expectation of success in “meet[ing] the limitations of the claimed invention.” *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). As noted above, the two specifications both relate to wireless communications standards and 3GPP-4.60-v860-Specification

even references the UMTS (*see supra* Section VII.B.5.a), which is the subject of the 3GPP-25.322-v630-Specification. Both address the issue of identifying valid or invalid sequence numbers of PDUs in Acknowledged Mode of data transmission, and both use inequalities to compare sequence numbers of PDUs that been received previously against expected PDU sequence numbers. A POSITA would have understood that the inequality expression from 3GPP-25.322-v630-Specification could be easily substituted with the expression from 3GPP-4.60-v860-Specification. Ex-1002, ¶115. This element would thus be obvious in view of 3GPP-25.322-v630-Specification combined with 3GPP-4.60-v860-Specification. *Id.*

d. “detecting that the status report unit comprises an erroneous sequence number when the negatively acknowledged sequence number is not in the range.”

3GPP-25.322-v630-Specification discloses this limitation, as explained above for limitations 1(a) and 1(c). *Supra* Section VII.D.1(a) & 1(c); Ex-1002, ¶¶116-117. For example, 3GPP-25.322-v630-Specification discloses that negatively acknowledged sequence numbers are erroneous if they fall “outside” the range bounded by VT(A) and VT(S).

For example, 3GPP-25.322-v630-Specification discloses that a “STATUS PDU or Piggybacked STATUS PDU including ‘erroneous Sequence Number’ is a STATUS PDU or Piggybacked STATUS PDU that contains: ... a LIST, BITMAP

or RLIST SUFI *in which the ‘Sequence Number’ of at least one AMD PDU* that is negatively acknowledged *is outside the interval $VT(A) \leq \text{‘Sequence Number’} \leq VT(S)-1$* .” Ex-1005, 57; Ex-1002, ¶¶117.

2. Claim 2

- a. **“The method of claim 1 further comprising initiating a reset procedure when the status report unit comprises the erroneous sequence number.”**

3GPP-25.322-v630-Specification discloses this claim. Ex-1002, ¶¶118-119. For example, as described above in Section VII.D.1.d, 3GPP-25.322-v630-Specification discloses detecting an erroneous sequence number when the sequence number is outside the range bounded by $VT(A)$ and $VT(S)$. *Supra* Section VII.D.1.d; Ex-1005, 74; Ex-1002, ¶118.

When the inequality is not satisfied based on the corresponding values of BSN, $VT(A)$, and $VT(S)$, it is determined that the sequence number is invalid, and a reset procedure to retransmit the erroneous sequence number is initiated. For example, 3GPP-25.322-v630-Specification discloses that “If an AM RLC entity receives a STATUS PDU or a Piggybacked STATUS PDU including ‘*erroneous Sequence Number*’, it shall: ... *initiate the RLC reset procedure* (see subclause 11.4).” Ex-1005, 57-58; Ex-1002, ¶119.

3. Claim 3

- a. **“The method of claim 1 wherein detecting whether the negatively acknowledged sequence number lies in the range of greater than or equal to the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter and less than the sequence number of the next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit is performed by modulus operation with the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter as a modulus base.”**

3GPP-25.322-v630-Specification discloses this claim. Ex-1002, ¶¶120-121. For example, as described above in Section VII.D.1.d, 3GPP-25.322-v630-Specification discloses detecting an erroneous sequence number with an inequality expression that uses a modulus operation, and where the last in-sequence acknowledged packet of the transmitter serves as a modulus base:

*This sub-clause describes the state variables used in AM and UM in order to specify the peer-to-peer protocol. All state variables are non-negative integers. UMD and AMD **PDU**s are numbered by modulo integer sequence numbers (SN) cycling through the field: 0 to 212 – 1 for AM and 0 to 27 – 1 for UM. All arithmetic operations contained in the present document on $VT(S)$, $VT(A)$, $VT(MS)$, $VR(R)$, $VR(H)$ and $VR(MR)$ are affected by the AM modulus. All arithmetic operations*

contained in the present document on VT(US), VR(US), VR(UDH), VR(UDR) and VR(UOH) are affected by the UM modulus. *When performing arithmetic comparisons of state variables or Sequence number values a modulus base shall be used. This modulus base is subtracted (within the appropriate field) from all the values involved and then an absolute comparison is performed.* At the Sender, *VT(A)* and VT(US) shall be assumed to be the modulus base in AM and UM respectively. At the Receiver, VR(R) and VR(US) shall be assumed to be the modulus base in AM and UM respectively.

Ex-1005, 43; Ex-1002, ¶120. As disclosed above, “all arithmetic operations ... on VT(S), VT(A) ... are affected by the AM modulus.” Ex-1005, 43. Further, a modulus base “shall” be used “[w]hen performing arithmetic comparisons of state variables or Sequence number values.” Ex-1005, 43; Ex-1002, ¶120.

As explained in the '059 patent in its description of the then-existing 3GPP specification, the modulus base is the same as VT(A): “Comparisons between SNs are done by modulus operations with VT(A) as a modulus base.” Ex-1001, 2:10-12; 2:4-5; Ex-1002, ¶121.

4. Claim 4

- a. “The method of claim 1 wherein the status report unit is a piggybacked status report unit.”**

3GPP-25.322-v630-Specification discloses this claim. Ex-1002, ¶122. For example, 3GPP-25.322-v630-Specification discloses that:

STATUS PDUs can be piggybacked on the AMD PDU by using part or all of the padding space. A predefined “Length Indicator” shall be used to indicate the presence of a piggybacked STATUS PDU. This “Length Indicator” replaces the padding “Length Indicator”. The piggybacked STATUS PDU shall be appended immediately following the PDU data.

Ex-1005, 31; Ex-1002, ¶122. Further, as discussed above for limitation 1(c) in Section VII.D.1.c, 3GPP-25.322-v630-Specification discloses that a:

“STATUS PDU or *Piggybacked STATUS PDU* including ‘erroneous Sequence Number’ is a STATUS PDU or Piggybacked STATUS PDU that contains ... a LIST, BITMAP or RLIST SUFI in which the “Sequence Number” of at least one AMD PDU that is negatively acknowledged is outside the interval $VT(A) \leq \text{“Sequence Number”} \leq VT(S)-1$.

Ex-1005, 57; Ex-1002, ¶122.

5. Claim 5

- a. “The method of claim 1 wherein the wireless communications system is a third generation mobile communications system.”**

3GPP-25.322-v630-Specification discloses this claim. Ex-1002, ¶123. In its introductory pages, 3GPP-25.322-v630-Specification is titled “***3rd Generation Partnership Project***; Technical Specification Group Radio Access Network; Radio Link Control (RLC) protocol specification” and identifies that “[t]his Technical Specification (TS) has been produced by the ***3rd Generation Partnership Project (3GPP)***.” Ex-1005, 1 and 7. Accordingly, 3GPP-25.322-v630-Specification discloses a third generation mobile communications network. Ex-1002, ¶123.

6. Claim 6

- a. “The method of claim 5 wherein the third generation mobile communications system is operating in an acknowledged mode.”**

3GPP-25.322-v630-Specification discloses this claim. Ex-1002, ¶124. As noted above in Section VII.D.5.a, 3GPP-25.322-v630-Specification discloses a third generation mobile communications system. 3GPP-25.322-v630-Specification further discloses operating in acknowledged mode: “The RLC sublayer consists of RLC entities, of which there are three types: Transparent Mode (TM), Unacknowledged Mode (UM), and ***Acknowledged Mode (AM)*** RLC entities.” Ex-1005, 10; *see also id.* at 15-17; Ex-1002, ¶124.

7. Claim 7

- a. “A wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code for implementing the method of claim 1.”**

3GPP-25.322-v630-Specification inherently discloses this claim. Ex-1002, ¶¶125-126. 3GPP-25.322-v630-Specification does not explicitly disclose “a wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code for implementing the method of claim 1,” but “a wireless device comprising a central processing unit in electrical communications with a memory, the memory comprising program code” is inherently disclosed. Ex-1002, ¶125.

These elements are inherent in 3GPP-25.322-v630-Specification’s disclosure. One of skill in the art, reading 3GPP-25.322-v630-Specification, would understand that the disclosed wireless communications system necessarily includes a wireless device that comprises a central processing unit in electrical communications with a memory, where the memory comprises program code that is used to execute the wireless communication protocol disclosed in the 3GPP-25.322-v630-Specification. Ex-1002, ¶126; *see also HTC Corp. v. Cellular Comm’n’s Equip. LLC*, IPR2016-01501, at 18-19 (P.T.A.B. Feb. 12, 2018) (deciding that a skilled artisan, reading a prior art reference relating to a cellular wireless communication specification would

have been motivated to utilize a processor, memory, and software of typical user equipment to perform the claimed limitations). Claim 7, therefore, is inherently disclosed by 3GPP-25.322-v630-Specification. Ex-1002, ¶126.

8. Claim 8

- a. “The method of claim 1 wherein it is determined that the status report unit comprises an erroneous sequence number when the negatively acknowledged sequence number is not in the range of greater than or equal to the sequence number following the sequence number of the last in-sequence acknowledged packet of the transmitter and less than and not equal to the sequence number of the next packet to be transmitted for the first time by the transmitter when the negatively acknowledged sequence number is detected in the status report unit.”**

3GPP-25.322-v630-Specification in combination with 3GPP-4.60-v860-Specification discloses this claim. Ex-1002, ¶¶127-128. For example, as described above in Section VII.D.1.d, 3GPP-4.60-v860-Specification discloses detecting an erroneous sequence number when the sequence number does not satisfy the expression determined by the inequality “[$V(A) \leq BSN < V(S)$] modulo SNS.”

Supra Section VII.B.1.d; Ex-1004, 86; Ex-1002, ¶¶127-128.

When the inequality is not satisfied based on the corresponding value of BSN is not within the range of greater than or equal to $V(A)$ (i.e., the sequence number

following the sequence number of the last in-sequence acknowledged packet of the transmitter), and less than *and not equal to* V(S) (i.e., the next packet to be transmitted for the first time by the transmitter), then the negatively acknowledged sequence number is detected in the status report unit. Ex-1002, ¶128.

VIII. 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. 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.

IX. The Board Should Reach the Merits of This Petition

A. Institution is Proper Under § 325(a)

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 '059 Patent that could bar review under Section 325.

This is also the first and only petition challenging any of the '059 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). None of the *Becton, Dickinson* factors weigh in favor of discretionary denial under § 325(d). *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017) (precedential). 3GPP-4.60-v860-Specification is a new reference that was not disclosed, cited, or considered during prosecution. Ex-1001, Cover (code (56)). Although the 3GPP-25.322-v630-Specification was listed in an Information Disclosure Statement during prosecution (Ex-1007, 357), the Examiner did not use 3GPP-25.322-v630-Specification as the basis for any claim rejections and did not cite to any disclosures of 3GPP-25.322-v630-Specification (i.e., v6.3.0 of the standard specification) relied upon in this Petition. Further, this Petition relies on the 3GPP-4.60-v860-Specification, which was never disclosed, for the precise element that was purportedly lacking from the 3GPP-25.322-v630-Specification draft.

This Petition thus does not present a situation in which “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). The Board should, therefore, institute trial based in the Grounds presented in this Petition.

B. Institution is Proper Under § 314(a)

The factors in *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (P.T.A.B. Sept. 6, 2017) favor institution. This is the first and only petition challenging any claims of the '059 patent.

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-1011, 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-1012, 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-1013. 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-1011, 3. 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-1014. 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-1012, 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 tip 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-1014), 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). As discussed *supra*, the Examiner found most of the features in the prior art, but was likely not aware of the prior art identified in this Petition, which discloses or suggests **precisely** what the Examiner found lacking in the prior art. The Examiner would not have allowed the application over the prior art relied upon herein.

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.

X. Mandatory Notices

A. Real Parties-in-Interest

The real parties in interest are AT&T Enterprises, LLC,⁴ 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.⁵

⁴ 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.

⁵ 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

B. Related Matters

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

Petitioners identify lead and backup counsel below. A Power of Attorney for each Petitioner entity is filed concurrently herewith under 37 C.F.R. § 42.10(b).

direct this 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).

Patent Owner consents to electronic service by email at
Celerity_IPRs@mckoolsmith.com.

D. Service Information

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).

Lead Counsel	Backup Counsel
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XI. FEES

The Office is authorized to charge any fees due during this proceeding to
Deposit Account No. DA-505723.

XII. Conclusion

For the grounds specified above, the Board should institute IPR of the Challenged Claims.

Respectfully submitted,

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

Counsel for Petitioners

Dated: July 19, 2024

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(a), Petitioners hereby certify that portions of the above-captioned PETITION FOR INTER PARTES REVIEW OF U.S. PATENT 7,664,059, in accordance with and reliance on the word count provided by the word processing system used to prepare this Petition, that the number of words in this paper is 11,138. Pursuant to 37 C.F.R. §42.24(a), this word count is in compliance and excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing. This word count was prepared using Microsoft Word.

Respectfully submitted,

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

Counsel for Petitioners

Dated: July 19, 2024

CERTIFICATE OF SERVICE

The undersigned hereby certifies, in accordance with 37 C.F.R. § 42.205, that the foregoing **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT 7,664,059** and all supporting exhibits are being served on counsel for patent owner via electronic mail and FEDERAL EXPRESS, costs prepaid, on July 19, 2024, in their entirety on the correspondence address of record of Patent Owner as detailed below:

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Dated: July 19, 2024