

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.
NOKIA OF AMERICA CORPORATION
Petitioners,

v.

ACTIVE WIRELESS TECHNOLOGIES LLC
Patent Owner.

U.S. PATENT NO. 11,019,557
Title: APPARATUS AND METHOD FOR ACQUISITION OF PERIODICALLY
BROADCASTED SYSTEM INFORMATION IN WIRELESS
COMMUNICATION

Inter Partes Review No.: IPR2024-00886

PETITION FOR *INTER PARTES* REVIEW OF U.S. PAT. NO. 11,019,557

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Petitioners' Exhibit List

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 11,019,557 (the “557 Patent”)
1002	Prosecution history of the '557 Patent (“File History”)
1003	Declaration of Petitioners' Expert Dr. Mark Mahon
1004	International Patent Application Publication No. WO 2018/016922 (“Ingale”)
1005	U.S. Patent Application Publication No. 2015/0223258 (“Jung”)
1006	Canadian Patent Application Publication No. CA 3 030 329 (“Zhang”)
1007	U.S. Patent Application Publication No. 2016/0234736 (“Kubota”)
1008	3GPP TS 38.331 v15.1.0 (2018-03) (“TS38.331”)
1009	U.S. Patent Application Publication No. 2017/0251500 (“Agiwal”)
1010	U.S. Patent Application Publication No. 2018/0332521 (“Subramanian”)
1011	U.S. Patent Application Publication No. 2017/0048920 (“Kim”)
1012	U.S. Patent Application Publication No. 2018/0132165 (“Takahashi”)
1013	Recommendation GSM 05.08 (February 1992)
1014	ETSI TS 136 304 v10.3.0 (2011-11)
1015	TSGR2#4(99)393

I. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311 *et seq.* and 37 C.F.R. §§ 42.1 *et seq.*, Ericsson Inc. and Nokia of America Corporation (collectively “Petitioners”) hereby petition for an *inter partes* review of U.S. Patent No. 11,019,557 (the “’557 Patent”).

Petitioners respectfully submit that claims 9-16 (the “Challenged Claims”) of the ’557 Patent are unpatentable under 35 U.S.C. §103 in view of the prior art herein – none of which was considered during prosecution.

II. OVERVIEW

The Challenged Claims are directed to techniques for improving communicating and/or updating system information blocks (“SIBs”) between an access node or base station (“BS”) and a wireless terminal or user equipment (“UE”). Specifically, the BS comprises transmitter circuitry and processor circuitry. The transmitter circuitry is configured to transmit a first type system information block (“SIB”), which may be minimum system information (“MSI”). MSI may include a master information block (“MIB”) and a limited number of SIBs, including SIB1. The first type SIB includes scheduling information of a system information (“SI”) message and an indication of broadcast status for the SI message, with the indication indicating broadcasting. The SI message may include at least one second type SIB, which may include Other SI, e.g., SI other than MSI. EX-1001, 2:42-59; 5:49-64; 9:31-35.

The Challenged Claims also require the MSI to include a parameter that is associated with a condition for determining failure of an SI message acquisition process. The parameter may be a maximum number of SI message reception opportunities (e.g., SI windows) or a timer configuration that UE should use as a termination condition for the SI reception procedure. If the UE is not able to acquire the SI message within the maximum number of SI windows identified in SIB1 and/or the timer expires, then the SI message acquisition process has failed and the UE should re-initiate a re-acquisition process to re-acquire SIB1 from the BS. A master information block (“MIB”) may need to be acquired prior to acquiring SIB1. According to the ’557 Patent, the provisioning of the parameter enables a determination of a SI message acquisition process failure and provides for the initiation of remedial processes. EX-1001, 1:57-2:3, 14:55-65, 16:47-61.

FIG. 13A, which is reproduced below in annotated form, shows one example of SIB1 that includes an information element “si-MaxAcqAttempts” having a parameter that indicates the maximum number of SI message reception opportunities (e.g., SI windows) allowed before the end of an SI reception procedure.

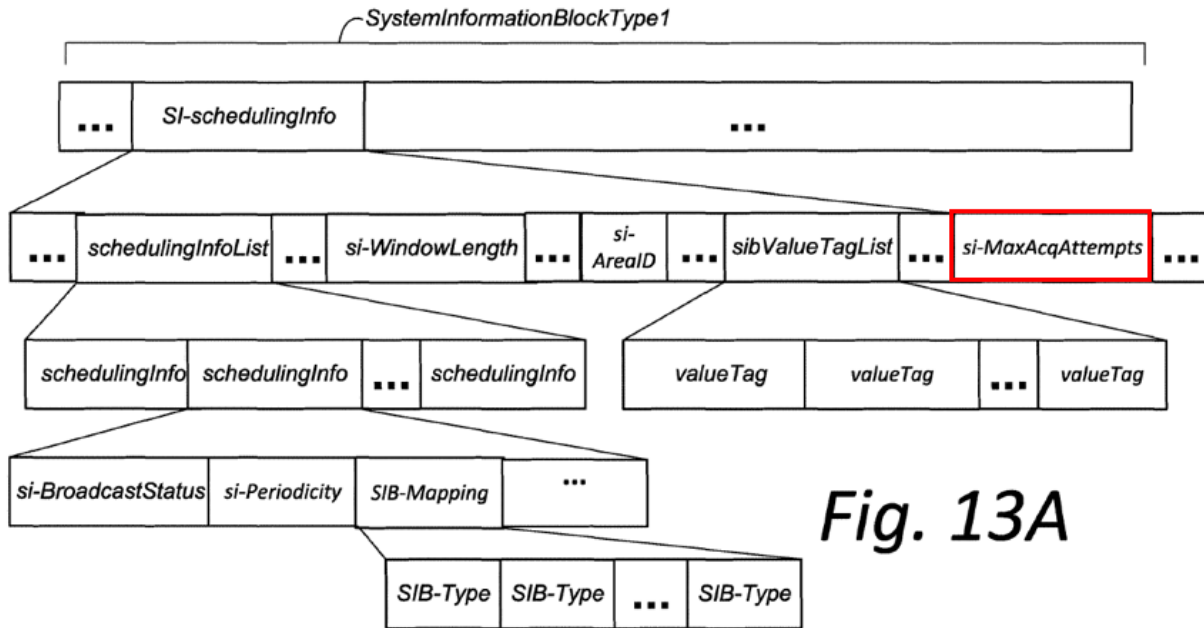


Fig. 13A

EX-1001, FIG. 13A.¹

FIG. 13B, which also is reproduced below in annotated form, illustrates another example of SIB1 having an information element “Ue-TimersAndConstants.” The Ue-TimersAndConstants information element includes one or more timer configurations (T#x) that are to be used as a termination condition for an SI reception procedure. EX-1001, 14:61-65.

¹ Unless otherwise noted, all emphases and annotations herein have been added.

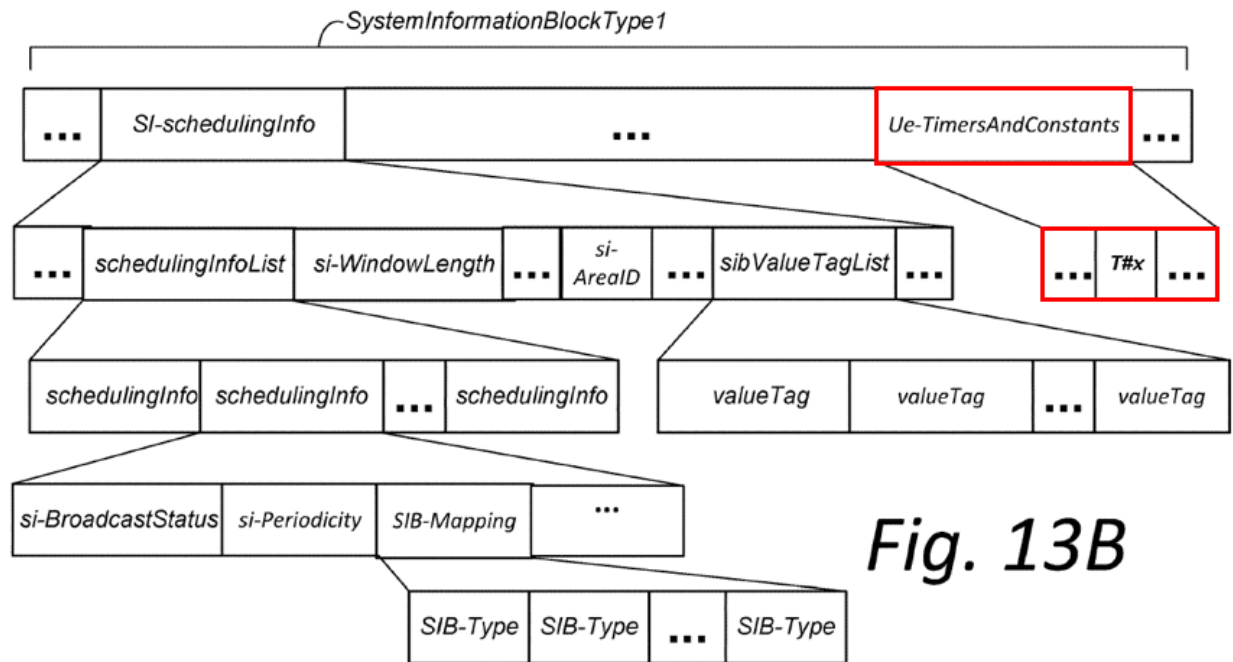
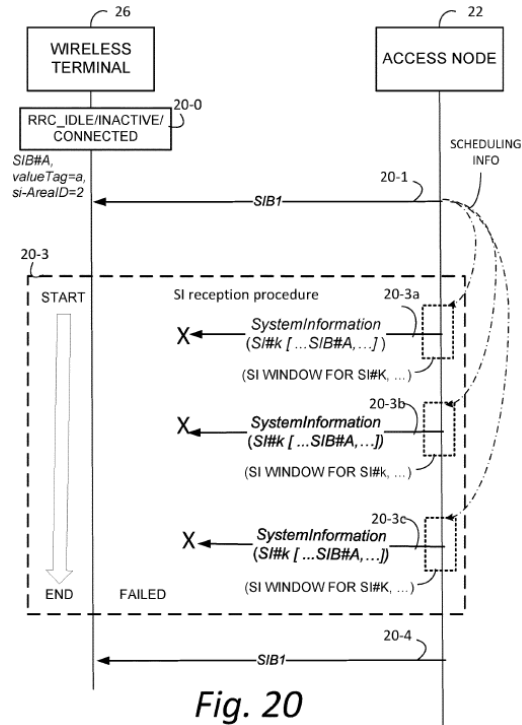


Fig. 13B

EX-1001, FIG. 13B.

The parameter associated with a condition for determining failure of an SI message acquisition process is used as follows (described with reference to FIG. 20). A UE obtains SIB1 as Minimum SI, e.g., first type system information, from a periodic broadcast by a BS at 20-1. SIB1 includes the *schedulingInfoList* that identifies that an SI message is available by broadcast. An SI reception procedure is performed at 20-3 by monitoring signals from the BS to obtain the SI message, SI#k, in the designated SI windows identified by the *schedulingInfoList* in the SIB1. Three successive attempts to receive the requested SI message, SI#k, but ultimately fail after the third attempt at 20-3c. Failure of the SI reception procedure is determined by a system acquisition failure detector 80, which makes the failure determination based on a termination condition. EX-1001, 20:20-67.



EX-1001, FIG. 20.

Upon detection of the failure of the SI acquisition process, the UE initiates a re-acquisition of the first type system information, i.e., the MINIMAL SI or SIB1, at 20-4. The re-acquisition procedure may include re-acquiring MIB prior to acquiring SIB1 if the UE does not have a valid version of a stored SIB. EX-1001, 21:1-15.

The Challenged Claims recite a known principle – communicating information to facilitate system block acquisition and re-acquisition by a UE. Ingale describes a BS broadcasting precisely the information claimed – a parameter for use by a UE in determining a failure of an SI acquisition process, which was the only basis of patentability identified during prosecution. Petitioners

respectfully request that the Board institute IPR and cancel the Challenged Claims.

III. GROUNDS FOR STANDING (37 C.F.R. § 42.104(A))

Petitioners certify that the '557 Patent is available for IPR and that Petitioners are not barred or estopped from requesting an IPR of the Challenged Claims on the grounds identified herein. 37 C.F.R. § 42.104(a).

IV. REASONS FOR THE REQUESTED RELIEF

As explained below and in the attached Declaration of Petitioners' Dr. Expert Mark Mahon (EX-1003), the Challenged Claims were obvious over the prior art to a person of ordinary skill in the art ("POSITA") at the time of the invention.

V. BACKGROUND

A. Summary of the '557 Patent

As shown in the Introduction, the '557 Patent claims the admittedly well-known concept of a BS configured to communicate SIBs to a UE so that the UE may synchronize with the BS and obtain and/or update system information.

B. Prosecution History

The '557 Patent issued from U.S. Patent Application No. 16/408,922, which was filed on May 10, 2019 as a continuation of International Patent Application No. PCT/US2019/031674, filed on May 10, 2019 claiming priority to U.S. Provisional Patent Application No. 62/669,851, filed May 10, 2018 ("851 Provisional").

During prosecution, the Examiner rejected the originally pending claims as being obvious from U.S. Patent Application Publication No. 2018/0124685 (“Jha”) in view of R2-1805017, “Remaining issues on on-demand System Information,” submitted by Intel Corporation (“R2-1805017”). EX-1002, 264-274. In response, Applicant amended the claims. EX-1002, 285-294. Applicant also argued that the cited prior art references did not teach or suggest, “‘a failure of the SI message acquisition process’ occurs upon failure to receive the SI message that is broadcasted.” EX-1002, 288-289.

A Final Office Action then issued rejecting the pending claims over U.S. patent Application Publication No. 2018/0049107 (“Johnson”) in view of U.S. Patent Application Publication No. 2011/0275375 (“Yamagishi”). EX-1002, 319-331. In the Final Action, the Examiner cited the Yamagishi reference for disclosing that the first type SIB acquisition is initiated upon a failure of the SI message acquisition process. EX-1002, 321-3270

Applicant then filed a Request for Continued Examination and further amended the claims; this time to require the scheduling information to configure SI windows, which are periodically occurring time windows in which the SI message is transmitted. EX-1002, 340-349. Applicant also argued that Yamagishi’s “re-establishment process” cited in the Final Action involved re-establishing connection with another cell and not the claimed re-acquisition process. EX-1002,

346-347.

Another office action issued, this time rejecting all pending claims over U.S. Patent Application Publication No. 2017/0251500 (“Agiwal”; EX-1009) in view of U.S. Patent Application No. 2018/0332521 (“Subramanian”; EX-1010). EX-1002, 356-367. The Examiner cited the Subramanian reference as disclosing the claimed re-acquisition process. EX-1002, 360.

In response, Applicant amended the independent claim 5, which issued as claim 9, to require “a parameter associated with a condition for determination of a failure of an SI message acquisition process” and “the base station apparatus is a current serving access node of the user equipment.” EX-1002, 389-401.

Paragraphs 105, 108, and 109 were identified as support for the amendments. EX-1002, 395. Applicant argued that Subramanian discloses SI acquisition failure during an attempted cell selection and does not disclose re-acquiring the SIB1 or the minimum SI when the SI acquisition failure occurs. EX-1002, 396-399.

Applicant further argued that neither Agiwal nor Subramanian discloses the claimed “parameter associated with a condition for determination of a failure of an SI message acquisition process. EX-1002, 399.

A Notice of Allowance then issued, but did not set forth any reasons for allowance. EX-1002, 404-427.

C. Priority Date

For purposes of this Petition, Petitioners do not challenge that the Challenged Claims are entitled to the priority date established by the '851 Provisional because each of the cited prior art references is prior art to the Challenged Claims of the '557 Patent regardless of whether the Challenged Claims are entitled to the filing date of the '851 Provisional.

D. Claim Construction

Petitioners propose that each claim term be given its plain and ordinary meaning herein. The prior art herein meets each claim limitation under any reasonable construction.

E. Person of Ordinary Skill in the Art

With respect to the '557 Patent, a POSITA in May 2018 would have been familiar with wireless communications networks, equipment, and integrated circuit chips, and would have had at least a working knowledge of the communication protocols used in LTE and 5G radio access networks ("RAN"). A POSITA would have had at least a Bachelor's degree in Electrical Engineering or related field, and at least two years of work experience in design, development, and/or testing wireless telecommunication systems. A POSITA would have had familiarity with the wireless standards and protocols related to data transmission and network management. To the extent a POSITA would have had a more advanced degree, such as a Master's degree in Electrical Engineering or related field, then a POSITA

may have had less work experience. EX-1003, ¶¶37-39.

F. State of the Art

The following section describes the relevant state of the art as of the priority date. The prior art references, and the discussions of what was known to a POSITA, provide the factual support for the general description of the state of the art, assist in understanding how a POSITA would have understood the prior art, and provide the motivation to modify or combine the teachings of references.

1. Mobile Wireless Communication Systems

As the '557 Patent acknowledges, a group known as the 3rd Generation Partnership Project (“3GPP”) defines global technical specifications and reports for present and future wireless communication systems. EX-1001, 1:30-34. These standards are used by equipment manufacturers – both for network equipment, such as base stations (“BS”), and end-user devices, referred to as user equipment (“UE”) – to ensure that the devices may communicate with one another. EX-1003, ¶44.

In a typical cellular communication system, a BS broadcasts on radio channels certain information that is required for UEs to access the network. EX-1001, 1:39-42. In Long-Term Evolution (“LTE”) and LTE Advanced (“LTE-A”), this information is called “system information” (“SI”). In the 5G New Radio (“NR”) System, the system information is broadcast in a Master Information Block

(“MIB”) and several System Information Blocks (“SIBs”). EX-1001, 1:42-49. To conserve energy and reduce emissions, a BS may broadcast only certain types of SI and make other SI available to UEs in an on demand manner. EX-1001, 1:65-2:3; EX-1006, 1:28-30; EX-1007, Abstract; EX-1003 ¶45.

2. TS 38.331 v.15.1.0

Technical Specification (“TS”) 38.331 v.15.1.0 (“TS38.331”; EX-1008) set forth the 3GPP standard as of March 2018 with respect to Radio Resource Control protocol for the radio interface between a UE and an NG-RAN. EX-1008, 1, 11. Much of the disclosure from the ’557 Patent was pulled directly or otherwise derived from TS38.331, which was publicly accessible uploaded to the 3GPP website, www.3gpp.org, on April 2, 2018, prior to the earliest claimed priority date of the ’557 Patent. EX-1003 ¶46.

For example, per TS38.331, SI “is divided into the *MasterInformationBlock* (MIB) and a number of *SystemInformationBlocks*” in which MIB is to be transmitted with a periodicity of 80 ms and includes parameters needed to acquire *SystemInformationBlockType1* (“SIB1”). EX-1008, 19; EX-1003 ¶47. SIB1 also was to be transmitted on a periodic broadcast basis and include information regarding the availability and scheduling of other SIBs, including whether they would be broadcast or provided on an on-demand basis. EX-1008, 19; EX-1003 ¶47. If other SIBs were to be provided on-demand, then it was determined that

SIB1 would include information for the UE to perform an SI request to obtain the needed information. EX-1008, 19; EX-1003 ¶47. This other information included the periodically occurring time domain windows (“SI-windows”) in which the SI messages are transmitted. EX-1008, 19; EX-1003 ¶47.

After performing cell selection, i.e., known as camping on a cell, a UE performs an SI acquisition procedure to acquire access stratum (“AS”) and non-access stratum (“NAS”) information. EX-1008, 19; EX-1003 ¶48; *see also* EX-1013, 10-17 (describing camping/cell (re)selection); EX-1014, 8-9 (defining “camped on a cell” and “serving cell”); EX-1015, 3. In the RRC_IDLE and RRC_INACTIVE states, the UE ensures it has a valid version of at least the MIB, SIB1, and *SystemInformationBlockTypeX* through *SystemInformationBlockTypeY*. EX-1008, 19; EX-1003 ¶49. In the RRC_CONNECTED state, the UE ensures it has a valid version of at least the MIB, SIB1, and *SystemInformationBlockTypeX*. EX-1008, 19; EX-1003 ¶49.

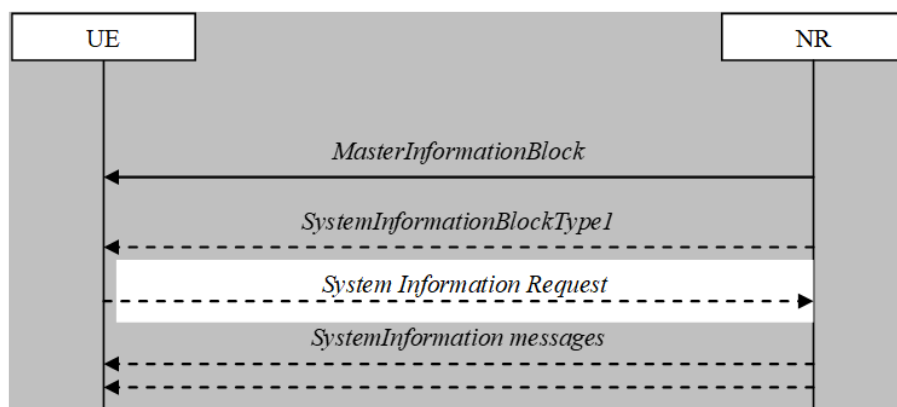


Figure 5.2.2.1-1: System information acquisition

EX-1008, 19; EX-1003 ¶49.

The UE stores the SI acquired from the serving cell on which the UE is camped currently, which is valid for only a certain time. EX-1008, 19; EX-1003 ¶50. As long as the stored version of the SI is valid, the UE may use the stored version of the SI after cell re-selection, upon return from out of coverage, or after an indication of an SI change. EX-1008, 19; EX-1003 ¶50. If the stored version of the SI is invalid due to the expiration of the validity time, then the UE would re-acquire the SI using the SI acquisition process. EX-1008, 20; EX-1003 ¶50.

With respect to broadcast SI other than MIB and SIB1, then a UE would receive the downlink-shared channel (“DL-SCH”) using the system information radio network temporary identifier (“SI-RNTI) from the start of the SI window and continues until the end of the SI window or until the SI message is received. EX-1008, 21; EX-1003 ¶51. If the SI message is not received by the end of the SI-window, then the UE repeats reception at the next SI window for the concerned SI message. EX-1008, 21; EX-1003 ¶51.

3. Use of timers/counters

Timers and counters have been used in connection wireless communication for decades. EX-1003 ¶52. For example, with respect to LTE and 5G technologies, timers have been used by UEs to identify if system information is valid or needs to be re-acquired from a base station:

In accordance with an aspect of the present disclosure, a method for a terminal to management system information in a mobile communication system is provided. The method includes: receiving system information from a base station; checking whether information related to the management of a valid time regarding system information is included in the system information, and determining a valid time regarding the system information according to the checking result; and starting a timer by employing the determined valid time (validity timer) and managing the system information.

EX-1011 ¶8.

The UE determines whether its storing value differs from values of the IEs [information elements] in operation 660. When the UE ascertains that its storing value does not differ from values of the IEs in operation 660, it does not need to update system information. On the other hand, when the UE ascertains that its storing value differs from values of the IEs in operation 660, it receives system information that an eNB is currently broadcasting in operation 665.

EX-1011 ¶75; EX-1003 ¶52.

Timers also were known to be used to identify when a period for receiving system information expired, which would then trigger one or more subsequent operations:

For example, the second receiving unit 220 may receive the needed system information block (SIB) in any one of the following manners:

...

(3) ***Start a receive timer*** according to pre-configured information. Receive the data packets on a corresponding downlink channel in the operation period of the timer according to the time indicated in the scheduling information.

Multiple scheduling times may appear in the operation period of the timer. If the UE does not receive the requested SIB (or SI message) at the first scheduling time, the UE may continue the receiving at the second scheduling time. The process continues until the SIB (or SI message) is correctly received. ***If the timer times out and the SIB is not yet correctly received, the UE can judge that the current link is abnormal; at this time, cell reselection or other mechanisms may need to be started.***

EX-1006, 6:13-21.

For example, SI may be acquired when a UE is unattached to a network (e.g., as part of an initial acquisition of SI). ***SI also may be acquired*** after a UE attaches to a network and while the UE is stationary (e.g., ***because a timer or SI has expired***, or because the network has indicated (e.g., in an instance of a synch signal or in a paging message) that SI has changed).

EX-1007 ¶105.

The service-specific SIBs 375, 390 may include a service-specific configuration such as SI parameters specifically configured to improve the service or meet service requirements. For example, ***service-specific configurations may include validity timers*** or SI reading requirements ***that require an IOE device to reacquire SI*** after the IOE device

awakens from a power saving mode (PSM) or deep sleep.

EX-1007 ¶124; EX-1003 ¶53.

The same is true with respect to a counter, which could be configured to count to a predetermined value or down from a predetermined value. EX-1003 ¶54. For example, a counter may be used to identify when system information is to be changed:

In some embodiments, the instance of the sync signal or paging message may include a general indicator that SI has changed (e.g., a modification flag). The general indicator or modification flag may include, for example, *a counter value that is incremented when SI has changed*, or a Boolean variable (e.g., a binary value) that is set to TRUE (e.g., a logic “1”) when SI included in an MSIB has changed (or when the network expects a UE to re-acquire the MSIB) or FALSE (e.g., a logic “0”) when SI included in an SMIB has not changed (or when the network does not expect a UE to re-acquire the MSIB).

EX-1007 ¶144; EX-1003 ¶54.

It also was known for a counter or other value to indicate a number of times system information would be (re)broadcast by a BS:

Here, the repeatedly transmitted subframes may be identified with a window length, *a repetition cycle* and a transmission start timing for transmission of the second system information. In other words, the scheduling information may include the window length, the repetition cycle and the transmission starting timing for transmitting the second

system information.

EX-1012 ¶37.

There can also be a timer or a counter (specified in terms of seconds or radio frame) associated with the broadcast indicator/FLAG when the FLAG is set to TRUE to indicate how long the network will broadcast the other system information with reference to the beginning of system modification interval.

EX-1004 ¶136; EX-1003 ¶55.

VI. IDENTIFICATION OF CHALLENGES

A. Challenged Claims

This Petition challenges claims 9-16 of the '557 Patent.

B. Statutory Grounds for Challenges

The Challenges are detailed below and summarized as follows:

Ground	Claims	Basis	Reference
1	9-16	§ 103	Ingale, alone, or in combination with Jung

International Patent Application Publication No. WO 2018/016922 in the name of Ingale et al. (“Ingale”) (EX-1004) published on January 25, 2018 and qualifies as prior art under 35 U.S.C. §102(a)(1). U.S. Patent Application Publication No. 2015/0223258 in the name of Jung et al. (“Jung”) published on August 5, 2015 and qualifies as prior art 35 U.S.C. §102(a)(1).

Neither Ingale nor Jung was cited during the prosecution of the '557 Patent.

VII. IDENTIFICATION OF HOW THE CHALLENGED CLAIMS ARE UNPATENTABLE

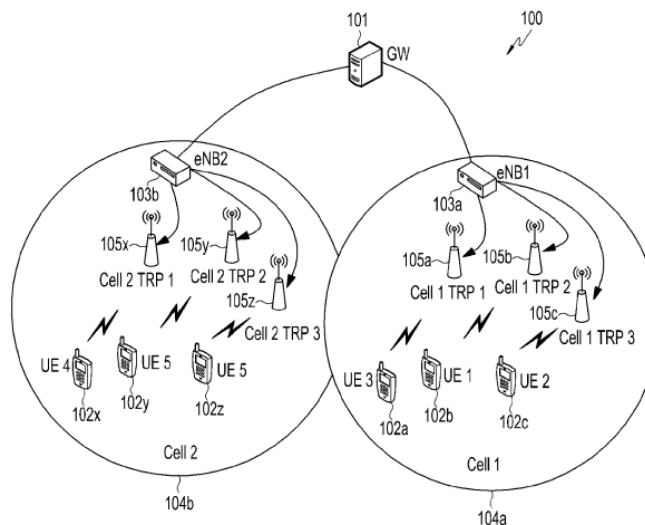
A. Ground 1: Claims 9-16 are unpatentable over Ingale, alone, or in combination with Jung

Ground 1 is that Ingale, alone, or in combination with Jung renders the Challenged Claims obvious.

1. Overview of Ingale

Ingale discloses methods and systems for information acquisition in a wireless communication system such that a UE may be provisioned with system information (“SI”) with greater efficiency by reducing excessive signaling overhead. FIG. 1 illustrates a next generation wireless system 100 having a gateway 101; a set of UEs 102, a set of base stations, also referred to as eNBs, 103; cells 104; and set of transmission reception points (“TRPs”) 105. EX-1004, Abstract, ¶¶ 10, 107-108.

[Fig. 1]



EX-1004, FIG. 1.

The eNBs 103 are configured to transmit a broadcast channel to at least one of the UEs 102. The periodic broadcast includes Minimum System Information (“MSI”), which includes at least a first master information block (“MIB”) and a second MIB. The second MIB (MIB#2) also is referred to as a SIB1. The MSI identifies whether at least one of a SI block or Other System Information (“OSI”) is available in the camped cell (serving the UE) on-demand or via periodic broadcast by the BS as well as a number of other indicators. EX-1004 ¶¶16, 46, 87, 113. Table 1, which is produced below, identifies the various SIBs.

[Table 1]

MIB/SIB	Main purpose	MIB/SIB	Main purpose
MIB	Cell access	SIB 10	ETWS
SIB 1	Cell access	SIB 11	ETWS
SIB 2	Radio Resource Configuration	SIB 12	CMAS
SIB 3	Cell reselection	SIB 13	MBSFN
SIB 4	Cell reselection intra-frequency	SIB 14	EAB
SIB 5	Cell reselection inter-frequency	SIB 15	MBMS SAI list
SIB 6	Inter-RAT reselection UMTS	SIB 16	GPS/UTC time
SIB 7	Inter-RAT reselection GERAN	SIB 17	WLAN
SIB 8	Inter-RAT reselection CMDA2000	SIB 18	D2D Communication
SIB 9	Home eNB name	SIB 19	D2D discovery

EX-1004 ¶124 (Table 1).

The indicators broadcast as MSI includes: an OSI broadcast indication/FLAG indicating whether the cell is broadcasting OSI; multiple System Configuration Identifiers (“SCI”) associated with configuration of each SIB provided in the OSI; System (“Area-Id/SAID”), which define the SI area validity scope; a common valuetag, i.e., a counter indicating that at least one SIB configuration provided in OSI has changed or been updated; one or more individual valuetags, i.e., counters associated with change or update configuration of corresponding SI blocks provided in the OSI; and a validity flag indicating whether the already acquired and stored SI is still valid. A System Information Table (“SIT”) invalidity flag is broadcasted in MSI, which if set TRUE, indicates that the UE that already acquired and stored SI is not valid and the UE need to clear all stored system information and acquire updated SIT. A timer or counter (specified in terms of seconds or radio frame) associated with the broadcast indicator/FLAG when the FLAG is set to TRUE indicates how long the network will broadcast the OSI. EX-1004 ¶¶87-94, 136.

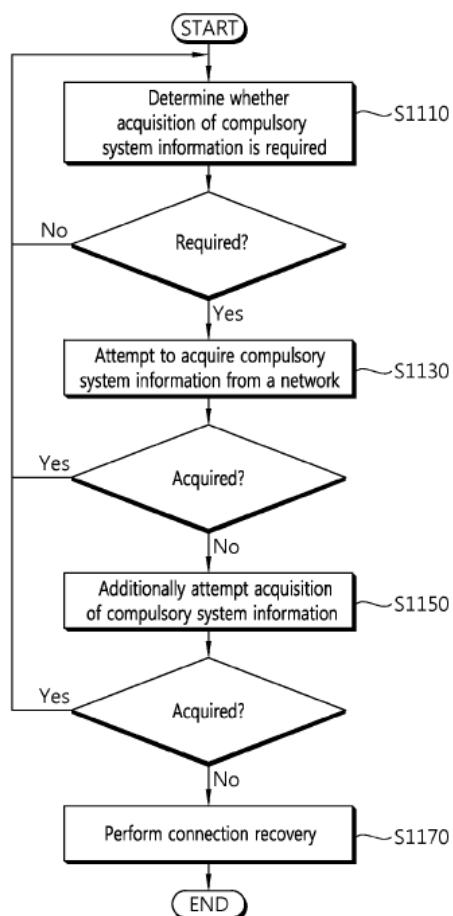
2. Overview of Jung

Jung discloses a method for acquiring system information by a UE in a wireless communication system in which the UE generates an information acquisition failure report upon the failure of the acquisition of compulsory system information. EX-1005, Abstract. In Jung, system information includes essential

information that needs to be known by a UE (also referred to as a terminal) in order for the UE to access a BS. EX-1005 ¶59. The system information is divided into a Master Information Block (“MIB”) and a plurality of System Information Blocks (“SIBs”). EX-1005 ¶59. The MIB may be broadcasted and transmitted on a broadcast channel (“BCH”). EX-1005 ¶60. SystemInformationBlockType1 (“SIB1”) includes scheduling information for other SIBs. EX-1005 ¶61.

FIG. 11 of Jung is a flowchart illustrating a method for acquiring system information. EX-1005 ¶215. At S1110, the UE determines whether the acquisition of compulsory system information is required. EX-1005 ¶215. If the UE determines that acquisition of compulsory information is required, then the terminal attempts to acquire the compulsory system information, which may be broadcast by the BS, at S1130. EX-1005 ¶218.

FIG. 11



EX-1005, FIG. 11.

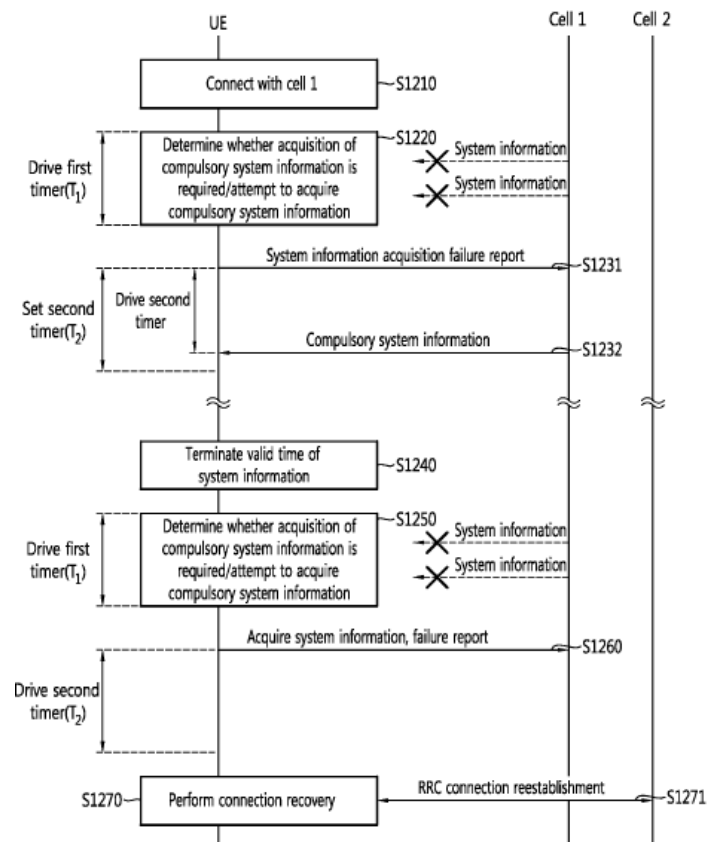
The UE may set a first timer or a first counter with a specific value when attempting to acquire the compulsory information. EX-1005 ¶219. The first timer may be set to a maximum time interval when the UE may attempt to acquire the compulsory system information, or the first counter may be set to a maximum number of times when the terminal may attempt to acquire broadcasted system information for acquisition of the compulsory system information. EX-1005 ¶219.

If the UE does not acquire the compulsory system information at S1130,

then the UE generates a system acquisition failure report message and attempts to acquire the compulsory system information again at S1150. EX-1005 ¶221. The UE performs connection recovery at S1170 if the UE is not able to acquire the compulsory system information at S1150. EX-1005 ¶231.

FIG. 12 is a diagram illustrating the method for acquiring system information, which was described above with respect to FIG. 11. EX-1005 ¶235.

FIG. 12



EX-1005, FIG. 12.

The UE connects with cell 1 at S1210 and determines whether compulsory system information is to be acquired at S1220. EX-1005 ¶¶236-237. Upon determining that it needs to acquire the compulsory system information, then the UE sets a first timer to T1 or a first counter to N2. EX-1005 ¶239. The UE attempts to acquire the compulsory system information until expiration of the first timer or the first counter. EX-1005 ¶239.

If the acquisition of system information fails, then the UE may attempt to acquire the compulsory system information again. EX-1005 ¶240. This second attempt may include transmitting a system information acquisition failure report message to the network at S1231 and setting a second timer to T2 or a second counter to N2. EX-1005 ¶240. The UE may acquire the compulsory system information from the network at S1232. Otherwise, the UE may repeat the process and attempt to connect to a different cell, e.g., cell 2, if unable to acquire the compulsory system information. EX-1005 ¶¶243-247. The disclosed methods provide for improved continuity of service and network efficiency. EX-1005 ¶21.

3. Reasons to combine Ingale and Jung

Both Ingale and Jung disclose methods in which a UE acquires system information from a BS on-demand or via broadcast for the common purpose of enabling to determine and access services available in the camped cell. EX-1004, Abstract; EX-1005, Abstract; EX-1003 ¶86. In both references, the BS broadcasts

MSI/compulsory SI periodically over a broadcast channel. EX-1004 ¶13; EX-1005 ¶14; EX-1003 ¶86. The MSI/compulsory SI includes MIB and SIB1. EX-1004 ¶138; EX-1005 ¶¶60-61; EX-1003 ¶87.

Ingale discloses that the MIS can be transmitted in the MIB and SIB1 and can include a timer or counter associated with a broadcast indicator/FLAG when the FLAG is set to TRUE to indicate how long the network will broadcast the other system information. EX-1004 ¶136; EX-1003 ¶88. Ingale does not expressly state what happens if a UE is not able acquire the SI prior to the expiration of the timer or the counter. EX-1003 ¶88.

However, Jung, which is in the same field of endeavor (wireless network communications) and directed to addressing a similar problem as Ingale, i.e., a UE obtaining SI from a BS, discloses a timer or counter used to identify an SI acquisition failure condition. EX-1005 ¶¶219, 239; EX-1003 ¶89. Jung further discloses that the UE may re-attempt to acquire the SI after the expiration of the timer or counter by first transmitting a system information acquisition failure report message to the BS and then starting a second timer or counter. EX-1005 ¶¶221-223, 240; EX-1003 ¶89.

A POSITA would have been motivated to combine the teachings of Ingale and Jung because that combination involves merely using known mechanisms (e.g., timers and counters) in a known way (e.g., to signify the lapsing of a validity

period) to yield a predictable result (e.g., triggering remedial and/or subsequent action). EX-1003 ¶90. For example, although Ingale does not expressly disclose how a UE would use the timer or counter associated with the broadcast indicator/FLAG when the FLAG is set to TRUE, a POSITA would have understood that the expiration of the timer or counter could be used to trigger a subsequent action by the UE. EX-1003 ¶90. Indeed, as discussed above in V.F.3, timers and counters were used frequently in wireless communication systems as triggers to performing actions.

A POSITA would have understood that retrying to obtain compulsory SI after failing to acquire it in the first instance, as taught by Jung, would advantageously minimize a service impossible state that would separate a UE from a cell. EX-1005 ¶248; EX-1003 ¶91. Indeed, Jung expressly states that retrying to obtain the compulsory SI upon having failed to do so would advantageously improve continuity of service to a UE and network efficiency. EX-1005 ¶248; EX-1003 ¶91. At the very least, attempting to reacquire the Other SI, i.e., SI other than MSI, upon expiration of a timer or counter was nothing more than an obvious design choice a POSITA would have made when confronted with the finite set of potential actions a UE could take to acquire the SI needed to communicate within the cell. EX-1003 ¶92.

For example, one less desirable alternative would be to initiate cell

reselection upon the UE failing to acquire the SI. EX-1003 ¶93. Cell selection involves a UE searching for a suitable cell by performing various measurements to identify a cell with suitable signaling. EX-1003 ¶93. Once a cell has been selected, the UE camps on a cell and then performs SI acquisition. EX-1003, VI.B, ¶93. Accordingly, a POSITA would have understood it to be more efficient for a UE to re-attempt to acquire the SI upon failing to do so when remaining in the camped cell, as opposed to the more resource and time intensive process of performing cell reselection followed by cell acquisition. EX-1003 ¶93. Accordingly, a POSITA would have combined the teachings of Ingale and Jung to provide a method in which a BS transmits a parameter that may be used to set a timer or counter in a UE for determining a failure of an SI acquisition process, as detailed below. EX-1003 ¶93.

4. Detailed Application of Ingale and Jung to the Challenged Claims

a. Claim 9

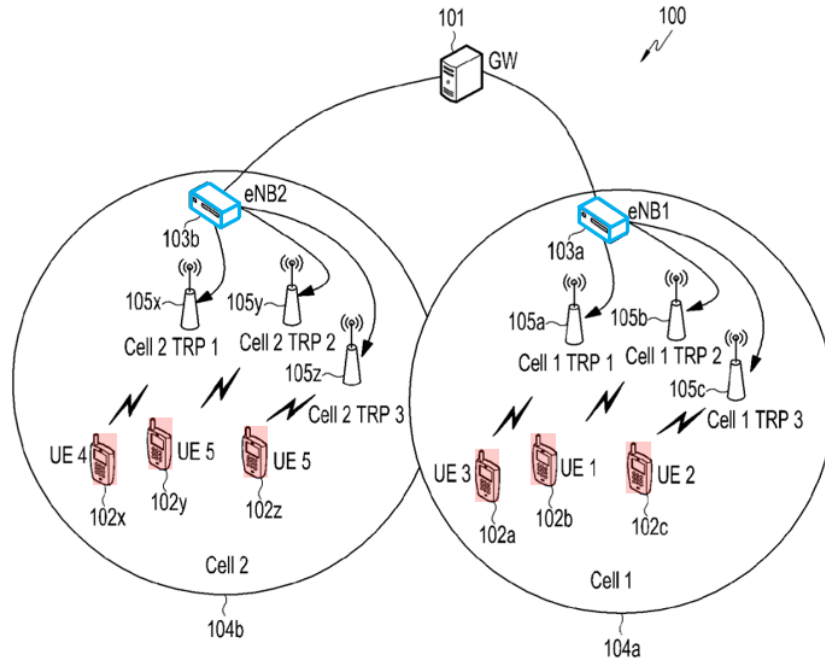
- i. [9.0] A base station apparatus of a radio access network (RAN) that communicates over a radio interface with a user equipment, the base station apparatus comprising:*

To the extent the preamble is limiting, Ingale discloses² this claim element.

² As used throughout this Petition, “discloses” encompasses what a reference

EX-1003 ¶94. Specifically, Ingale discloses a base station (*eNB 103*) (**blue**) of a RAN that communicates over a radio interface with a user equipment (*UE 102*) (**red**).

[Fig. 1]



EX-1004, FIG. 1; EX-1003 ¶94.

FIG. 1 is an example illustration of a deployment of *Radio Access Network (RAN) of next generation wireless system 100*, according to an embodiment as disclosed herein.

In an embodiment, the next generation wireless system 100 includes a gateway (GW) 101, a set of *UE's 102a, 102b, 102c, 102x, 102y, and 102z* (hereafter, the label of the UE is 102), a set of *5G eNBs 103a,*

would teach, suggest, or render obvious to a POSITA.

103b (hereafter, the label of the 5G eNB is 103), a set of cells 104a, 104b (hereafter, the label of the cell is 104), and a set of Transmission Reception Points (TRPs) 105a, 105b, 105x, and 105y (hereafter, the label of the TRP is 105).

EX-1004 ¶¶107-108;³ *see also* EX-1004 ¶80 (“Throughout the description, the terms ***base station, eNode-B (eNB)***, gNode-B (gNB), RAN and NW ***are used interchangeably.***”), ¶111; EX-1003 ¶94.

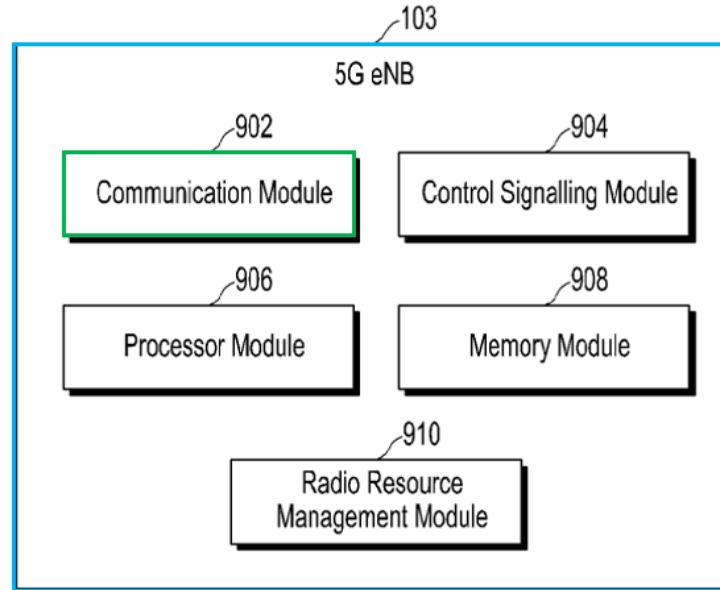
Ingale thus discloses claim element 9.0. EX-1003 ¶95.

ii. [9.1] transmitting circuitry configured to transmit first type system information block (SIB), the first type SIB comprising:

Ingale discloses this claim element. EX-1003, ¶96. As shown and described with reference to FIG. 9a, the BS (*eNB 103*) (**blue**) includes transmitting circuitry (*communication module 902*) (**green**).

³ All emphasis added unless otherwise stated.

[Fig. 9a]



EX-1004, FIG. 9a; EX-1003 ¶96.

Ingale further discloses that the communication module 902 (*transmitting circuitry*) is configured to transmit first type system information block (SIB) (*Minimum System Information (MSI)*), which includes a Master Information Block and SIB1:

Another object of the embodiments herein is to decode a broadcast channel to acquire ***Minimum System Information (MSI) periodically transmitted by a base station.***

EX-1004 ¶13.

In an embodiment, ***the minimum system information (MSI) is broadcasted*** on at least one of the PBCH and the SBCH, wherein the ***MSI comprises at least one of a first Master Information Block (MIB#1) and a second MIB (MIB#2) referred as System Information***

Block Type1 (SIB1).

EX-1004 ¶140; EX-1003 ¶97.

Indeed, the foregoing disclosure from Ingale is nearly identical to the description of first type system information block in the '557 Patent:

As used herein, “system information” (“SI”) may include a ***Master Information Block (MIB)*** and several System Information Blocks (SIBs) which are provided on downlink radio resources allocated to an access node....

...In an example embodiment and mode, ***a first type of the system information is Minimum System Information (Minimum SI)***, minimally containing information required for UEs initially access to the network, periodically broadcasted by each access node (e.g. eNB for LTE, gNB for 5G Radio System). In some configurations, ***Minimum System SI may consist of MIB and a limited number of SIBs.***

EX-1001, 5:49-64; EX-1003 ¶98.

Accordingly, Ingale discloses claim element 9.1. EX-1003 ¶99.

- iii. [9.2] scheduling information of a system information (SI) message, the SI message comprising at least one second type SIB, the scheduling information configuring SI windows, the SI windows comprising periodically occurring time windows in which the SI message is transmitted;***

Ingale discloses this claim element. EX-1003 ¶100. A POSITA would have

understood the claimed “at least one second type SIB” to have a plain and ordinary meaning consistent with the manner in which “Other SI” is discussed in the ’557 Patent, i.e., SI other than MSI. EX-1003 ¶100. Such an understanding is consistent with the disclosure of the ’557 Patent. For example, the ’557 Patent describes “at least one second type SIB” as follows:

A second type of system information, e.g., []Other system information, “Other SI”, or second type system information contains all the other types of information, i.e., all types of system information except the Minimum System Information. The Other SI may comprise several system information blocks (SIBs) that are not categorized as Minimum SI.

EX-1001, 6:4-9; EX-1003 ¶100.

The MSI disclosed by Ingale (*first type of SIB*) includes scheduling information of a system information (SI message) comprising at least one second type SIB (*Other System Information (OSI)*) as claimed:

In an embodiment, the UE monitors respective ***SI windows for the OSI indicated by the scheduling information included in the MSI to obtain one or more SI blocks of the OSI*** available in the camped cell after triggering the SI request for on-demand delivery.

EX-1004 ¶148.

In an embodiment, ***the minimum system information broadcasted periodically includes*** at least one of the DL system bandwidth. System

Frame Number (SFN), the list of PLMN-ID, the Tracking Area Code (TAC), the Global Cell-ID, the TRP-ID, the Cell Barred Status (i.e. parameters for Access Control Barring (ACB)), the configuration comprising the resource for requesting one or more SI blocks of OSI delivered through on-demand basis, ***the scheduling information related to the SI windows for reception of one or more SI blocks of OSI***, the ePDCCH configuration, parameters for camping (i.e. cell selection/cell re-selection), the random access parameters, the plurality of indicators and the plurality of SCI.

In an embodiment, the minimum system information is transmitted in at least one system information block called the master information block (MIB).

EX-1004 ¶¶156-157; EX-1003 ¶101.

Accordingly, Ingale discloses claim element 9.2. EX-1003 ¶102.

iv. [9.3] a parameter associated with a condition for determination of a failure of an SI message acquisition process; and

The '557 Patent describes the “parameter associated with a condition for determination of a failure of an SI message acquisition process” as being one of a maximum number of reception opportunities (e.g., SI windows) that are allowed before the end of an SI reception procedure or one or more timer configurations that are to be used as a termination condition for an SI reception procedure. *See, e.g.,* EX-1001, 11:59-65, 14:13-24, 14:55-65, 19:23-32. Ingale in combination

with Jung renders obvious such a parameter. EX-1003 ¶103.

Specifically, Ingale discloses a timer or counter that is associated with an indicator/FLAG that indicates how long the network will broadcast OSI:

Before camping on the cell 104 of next generation RAT, the UE 102 blindly decodes *the MIB (353) which contains at least the most essential or most important parameters i.e. minimum system information (MSI): ... scheduling information related to SI windows for reception of one or more SI blocks of OSI, ePDCCH configuration, parameters for camping (i.e. cell selection/cell re-selection), random access parameters, the plurality of indicators and the plurality of system configuration indices or identifiers (SCI)...*The plurality of indicators may include broadcast indicator/FLAG, a common value tag i.e., counter associated with version of each system information block and SIT invalidity FLAG which indicates whether the stored SIT is valid or not. *There can also be a timer or a counter (specified in terms of seconds or radio frame) associated with the broadcast indicator/FLAG when the FLAG is set to true to indicate how long the network will broadcast the other system information* with reference to the beginning of system modification interval.

EX-1004 ¶136; EX-1003 ¶104.

A POSITA would have understood that Ingale's disclosure of a timer or counter as rendering obvious the claimed parameter in the '557 Patent in light of Jung's disclosure as detailed below. EX-1003 ¶105. Indeed, the above-quoted disclosure from Ingale concerning the timer or counter in combination with Jung's

disclosure below is consistent with the parameters disclosed in the '557 Patent:

The system information generator 54 of radio access node 22(12) is configured to generate first type system information. For the example embodiment and mode of FIG. 12, and in an example, non-limiting manner shown in FIG. 13, the first type system information comprises (information elements or the like which indicate): availability of second type SI messages; scheduling information of each of the SI messages; a delivery mode for each of the second type SI messages; and, ***a configuration parameter to configure at least one termination condition for determination of a failure of an SI acquisition process*** for the on-demand based second type SI messages.

EX-1001, 14:13-24.

FIG. 13A is an exemplary format of SIB1, which is based on the format shown in FIG. 7 with an additional information element si-MaxAcqAttempts. The information element si-MaxAcqAttempts provides ***a termination condition for the SI reception procedure, indicating the maximum number of SI message reception opportunities (e.g. SI windows) allowed before the end of the SI reception procedure.*** FIG. 13B is an alternative format of SIB1, wherein the information element ue-TimersAndConstants includes ***a timer configuration (T#x) to be used as a termination condition for the SI reception procedure.***

EX-1001, 14:55-65.

FIG. 19 shows that wireless terminal 26(17) also comprises system information acquisition failure detector 80...The system information

failure detector 80 is configured to make a determination of a failure of the SI message acquisition process. ***The system information acquisition failure detector 80 may make such failure determination based on a termination condition***, as herein explained.

EX-1001, 19:23-32; EX-1003 ¶105.

A POSITA would have understood the timer and counter disclosed by Ingale as corresponding to the claimed parameter in light of Jung's disclosure below.

EX-1003 ¶106. For example, the timer or counter disclosed by Ingale identifies how long the network (i.e., the BS (*eNB 103*)) will broadcast the SI message (*Other SI*) on the camped cell (*cell 104*). EX-1004 ¶¶113, 136; EX-1003 ¶106. If a UE is not able to obtain the SI message within the period specified by the timer or number of SI windows identified by the counter included in the first type SIB (*MSI*) broadcast by the BS disclosed by Ingale, then the UE will fail to acquire the SI message. EX-1004 ¶136; EX-1003 ¶107; *see also* EX-1006, 6:1-21. The UE would thus fail the SI message acquisition process and would necessarily need to re-initiate such a process in order to obtain the SI message as detailed in Jung below. EX-1003 ¶107. Failure to acquire the SI message would prevent the UE from accessing all of the available services of the camped cell and/or would prevent the UE from being allocated available resources of the cell. EX-1003 ¶107.

Further, when combined with the teachings of Jung, there is no question that

POSITA would have understood Ingale's timer and/or counter transmitted by the BS of the camped cell and used by Jung's UE to be a parameter associated with a condition for determining a failure of an SI message acquisition process. EX-1003 ¶108. As discussed above in VII.A.3, Jung expressly discloses a parameter associated with a condition for determining a failure of an SI acquisition process, i.e., a timer or a counter that is used by a UE for determining a failure of an SI acquisition process. EX-1005 ¶¶219, 221-223, 239, 240-248; EX-1003 ¶109. A POSITA would have been motivated to combine the teachings of Ingale and Jung to provide a method that minimizes a service impossible state and will improve continuity of service and network efficiency. *See* VII.A.3; EX-1003 ¶109.

The combined teachings of Ingale and Jung are distinct from those of Subramanian, which was cited by the Office during prosecution for disclosing an SI Acquisition failure. EX-1003 ¶110. First, although Subramanian discloses an SI Acquisition failure occurs after a "predefined time period," EX-1010 ¶63, the reference does not expressly disclose that the value of the "predefined time period" is included in a transmission from a base station. EX-1003 ¶111. As demonstrated above, Ingale expressly discloses that the value of the timer/counter that is used by Jung's UE (i.e., the claimed parameter) is included in the MIB transmitted by the eNB and used by the UE. EX-1004 ¶136; EX-1003 ¶111.

Second, the Applicant distinguished Subramanian during prosecution by

arguing that the SI Acquisition failure occurred during cell selection – not when a UE is camped in a cell (i.e., the base station of a current serving access node).

However, both Ingale and Jung disclose that the UE is camped in a cell served by the eNB when the acquisition of the Other SI is performed. *See, e.g.*, EX-1004 ¶¶162-167, 171-174; EX-1005 ¶¶81, 235-240; EX-1003 ¶¶112-117.

Accordingly, Ingale, alone, or in combination with Jung renders obvious claim element 9.3. EX-1003 ¶118.

- v. ***[9.4] an indication of broadcast status for the SI message, the indication indicating broadcasting; and***

Ingale discloses that the MSI (as discussed above, the claimed “first type system information block (SIB)”) includes an indication of broadcast status for “Other System Information” or “OSI” (as discussed above, the claimed “SI message”), with the indication indicating broadcasting.

Another object of the embodiments herein is to determine whether ***at least one of a SI block of Other System Information (OSI) available in the camped cell is provided based on at least one of the periodic broadcast*** and an on-demand basis, where the on-demand basis to deliver the SI block of the OSI available in the camped cell is ***decided based on at least one of an indication and a flag included in the MSI.***

EX-1004 ¶16.

Before camping on the cell 104 of next generation RAT, the UE 102

blindly decodes *the MIB (353) which contains at least the most essential or most important parameters i.e. minimum system information (MSI):....* The plurality of indicators may include *broadcast indicator/FLAG....*

EX-1004 ¶136.

If at step 404b, as depicted in the FIG. 4b, the UE 102 detects the **FLAG is set to TRUE (i.e. Other SI broadcast indicator) meaning that the network is periodically broadcasting the Other SI** then UE 102 is not required to initiate the SI request procedure to request Other SI.

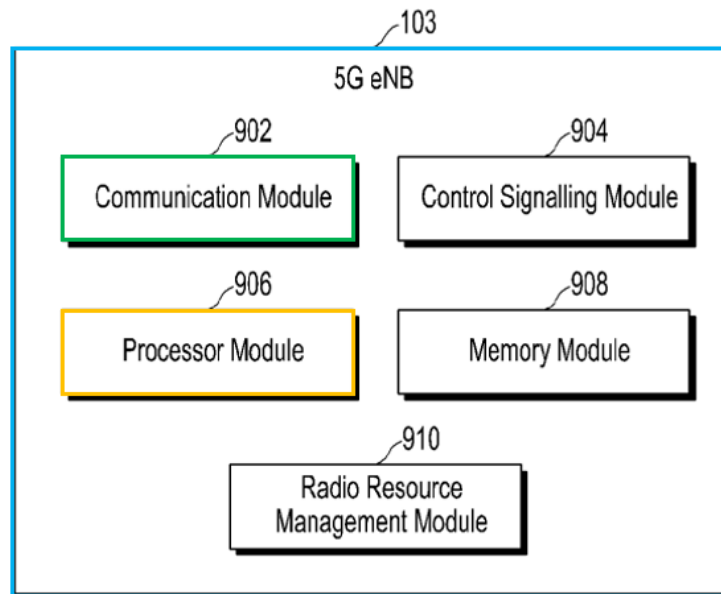
EX-1004 ¶173; EX-1003 ¶119.

Accordingly, Ingale discloses claim element 9.4. EX-1003 ¶120.

vi. [9.5] processor circuitry configured to cause the transmitting circuitry to broadcast the SI message;

Ingale discloses this claim element. EX-1003 ¶121. As shown and described with reference to FIG. 9a, the BS (*eNB 103*) (**blue**) includes processor circuitry (*processor module 906*) (**orange**) in addition to having transmitting circuitry (*communication module 902*) (**green**).

[Fig. 9a]



EX-1004, FIG. 9a.

FIG. 9a is a block diagram illustrating various modules of the 5G eNB 103, according to the embodiments as disclosed herein. In an embodiment, *the 5G eNB 103 includes a communication module 902, a control signaling module 904, a processor module 906, a memory module 908 and a radio resource management module 910.*

EX-1004 ¶274; EX-1003 ¶121.

Ingale discloses that “[t]he processing module 906 synchronizes the operations and executes the instructions based on the timing signals generated by the clock chip.” EX-1004 ¶276. A POSITA would have understood that the operations synchronized and executed by the processing module 906 includes operations performed by the communication module 902. EX-1003 ¶122.

Ingale further discloses that the transmitting circuitry (*communication*

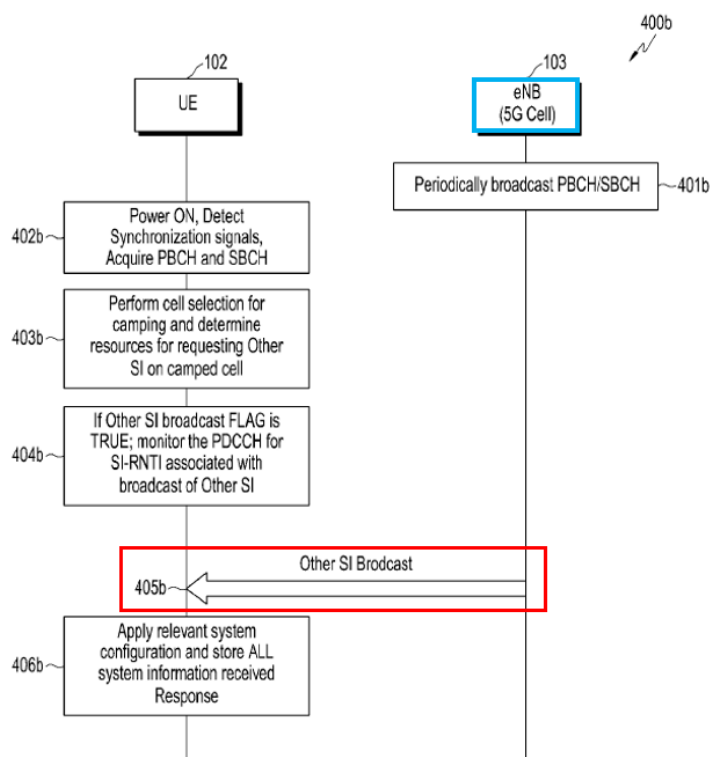
module 902) of the BS (*eNB 103*) is configured to broadcast the SI message (*Other SI*):

In an embodiment, ***the communication module 902 is configured to broadcast*** synchronization signal, the PBCH and the SBCH to plurality of UEs 102a-102c and 102x-102z.... In yet another embodiment, ***the communication module 902 is configured to*** transmit system information response message or ***broadcast OSI during the SI windows to plurality of UEs*** 102a-102c and 102x-102z.

EX-1004 ¶274; EX-1003 ¶123.

Ingale further discloses two flow diagrams in which an SI message (*Other SI*) is broadcast by a BS (*eNB 103*). EX-1003 ¶124. As shown below in the annotated version of FIG. 4b, the SI message is broadcast at 405b.

[Fig. 4b]



EX-1004, FIG. 4b.

If at step 404b, as depicted in the FIG. 4b, the UE 102 detects the FLAG is set to TRUE (i.e. Other SI broadcast indicator) meaning that the **network is periodically broadcasting the Other SI** then UE 102 is not required to initiate the SI request procedure to request the Other SI. Further, the UE 102 then monitors the PDCCH during respective SI windows for the OSI indicated by the scheduling information included in the MSI to check if the other system information is addressed with SI-RNTI

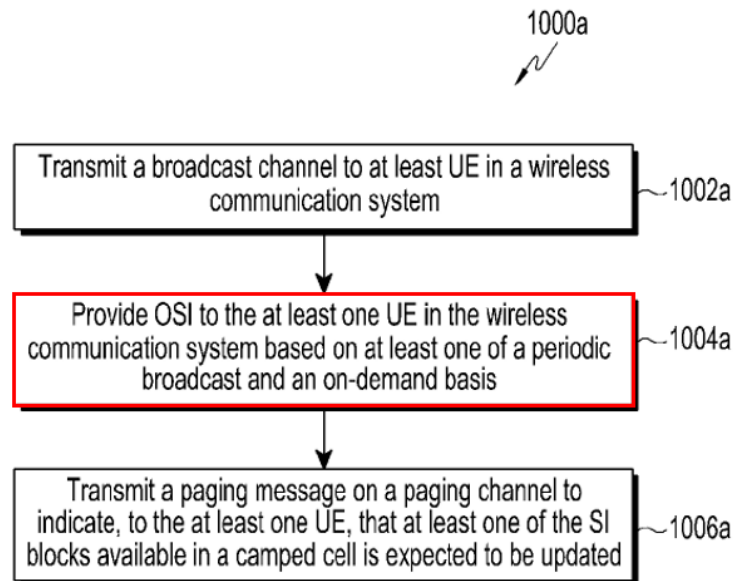
According to steps 405b and 406b of the FIG. 4b, **after acquiring the other system information**, the UE 102 applies the relevant configuration parameters according to one or more SCI acquired from the MSI.... Further at step 406b, the UE stores the one or more SI

blocks of the OSI available in the camped cell acquired by the UE from periodic broadcast; wherein the stored SI blocks of the OSI are associated with at least a System Indication Area Identifier (SAID) and System Information Configuration Index (SCI).

EX-1004 ¶¶173-174; EX-1003 ¶124.

FIG. 10a illustrates another flowchart showing the BS (*eNB 103*) broadcasting an SI message (*Other SI*) that is received by a UE.

[Fig. 10a]



EX-1004, FIG. 10a; EX-1003 ¶125.

FIG. 10a is a flow diagram 1000a illustrating *a method for provisioning the SI by the base station 103* in the wireless communication system 100, according to an embodiment as disclosed herein.

* * *

At step 1004a, the method includes *providing the OSI to the at least one UE 102 based on at least one of the periodic broadcast and the on-demand basis.*

EX-1004 ¶¶282-284; EX-1003 ¶125.

Accordingly, Ingale discloses claim element 9.5. EX-1003 ¶126.

vii. [9.6] wherein: the first type SIB is re-acquired by the user equipment upon the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message,

Ingale, alone, or in combination with Jung discloses this claim element. EX-1003 ¶127. As discussed above in VII.A.4.a.iv, Ingale, alone or in combination with Jung, renders obvious a parameter (*timer or counter*) associated with a condition for determining a failure of an SI message acquisition process. EX-1003 ¶127.

A POSITA would have understood that if the UE failed to acquire one or more of Ingale's Other SI blocks (*SI message*) prior to the expiration of the timer or before the counter is exceeded, then the UE would not have successfully received the one or more Other SI blocks. EX-1003 ¶128. Jung expressly discloses that, in such a scenario, the UE would initiate another attempt to acquire the SI. EX-1005 ¶¶221, 240; EX-1003 ¶129. Such teachings are consistent with Ingale. EX-1003 ¶130. Indeed, Ingale discloses that, if a UE does not have stored

a valid version of the one or more Other SI blocks, then the UE re-acquires the one or more Other SI blocks (*SI message*) after first acquiring the MSI (*first type SIB*) broadcast on the PBCH and/or SBCH:

Another object of the embodiments herein is to monitor respective ***SI windows indicated by scheduling information included in the MSI to acquire one or more SI blocks of the OSI*** available in the camped cell.

EX-1004 ¶19.

The plurality of indicators broadcasted on PBCH and/or SBCH comprises at least one or more of: ... a common valtag i.e. a counter indicating at least one system information block configuration provided in other SI has changed or updated and one or more individual valuetags i.e. counter associated with change or update of configuration of corresponding SI block provided in other SI and ***a validity flag indicating whether the already acquired and stored system information is still valid.***

EX-1004 ¶87.

In an embodiment, the SIT invalidity flag is broadcasted in the minimum system information on the PBCH/SBCH which if set TRUE indicates the UE 102 that already acquired and stored system information is not valid and the UE 102 ***need to clear all stored system information and acquired updated SIT.***

EX-1004 ¶182.

The configurations associated with SI block applicable in different

parts of the network can be provided to UE upon request or broadcasted based on network implementation such that SI block provided in one cell can be also applicable and valid for other cells. The SCI associated with each SI block represents the configuration corresponding to the SI block used in the *cell*. ***The SCI need to broadcast in the minimum SI (MSI)*** so that when UE performs cell re-selection and if UE has stored configuration of SI block corresponding to SCI, UE do not need to re-acquire or request that SI block. ***UE re-acquires*** or requests for ***a SI block only when it does not have the configuration of SI block corresponding to SCI of that SI block or the stored configuration (SIT) is invalid***. It is logical that the plurality of SCI is broadcast in MIB#2 (i.e. SIB1) and MIB#1 because list of SCI associated with SI blocks available in cell needs to be signaled and MIB#1 has size restriction.

EX-1004 ¶204; EX-1003 ¶130.

A POSITA would have understood from the teachings of Ingale and Jung that the UE would re-acquire the MSI because the MSI includes the scheduling information identifying the SI windows for acquiring one or more SI blocks of the OSI and validity flags identifying whether any stored information is valid. EX-1003 ¶131. As such, the UE would need to confirm that it has the current scheduling information so that the UE can determine how (e.g., broadcast or on-demand) and when (e.g., SI windows) to acquire one or more Other SI blocks.

EX-1003 ¶131.

As discussed above in VII.A.4.a.iv, the teachings of Ingale and Jung are distinct from those previously considered by the Office with respect to Agriwal and Subramanian. For example, the SI Acquisition procedure discussed in Subramanian was an SI acquisition procedure performed during cell selection, and thus Subramanian did not disclose expressly re-acquiring the first type SIB. EX-1002, 396-399; EX-1010 ¶¶59-63; EX-1003 ¶132. However, as discussed above, both Ingale and Jung disclose that the UE has acquired the MSI (*first type SIB*) prior to attempting to acquire the Other SI (*second type SIB*). EX-1004 ¶¶162-167, 171-174, FIG. 4b (steps 403b, 404b); EX-1005 ¶¶235-240; EX-1003 ¶132.

Accordingly, Ingale, alone, or in combination with Jung renders obvious claim element 9.6. EX-1003 ¶133.

viii. [9.7] the base station apparatus is a current serving access node of the user equipment.

Ingale discloses that the BS (*eNB 103*) is a current serving access node of the UE (*UE 102*). EX-1003 ¶134. For example, Ingale discloses that the UE 102 is “camped” in an area served by the eNB 103 prior to attempting to acquire the Other SI (*second type SIB*) and therefore the current serving access node of the UE:

The on-demand basis to deliver the corresponding system information block of the second system information ***available in the camped cell*** is decided based on at least one of an indication and a flag included in the

first system information for the system information block.

EX-1004, Abstract.

At step 403a, the UE 102 camps on the cell 104 based on at least the cell access parameters, the cell selection and the PLMN selection parameters and the cell barring parameters included in the minimum system information. The minimum system information is either included in one Master information block (MIB) or distributed over two blocks i.e. MIB#1 and MIB#2/SIB1.

...

Further, at step 403a, the UE 102 determines the resources to access the camped cell 104 based on the configuration parameters for sending SI request acquired from the minimum system information transmitted by the camped cell 104.

EX-1004 ¶¶162-164.

FIG. 4b is a sequential flow diagram 400b illustrating step by step procedure for provisioning the SI to a UE 102 in the next generation wireless system based on periodic broadcast information, according to an embodiment as disclosed herein;

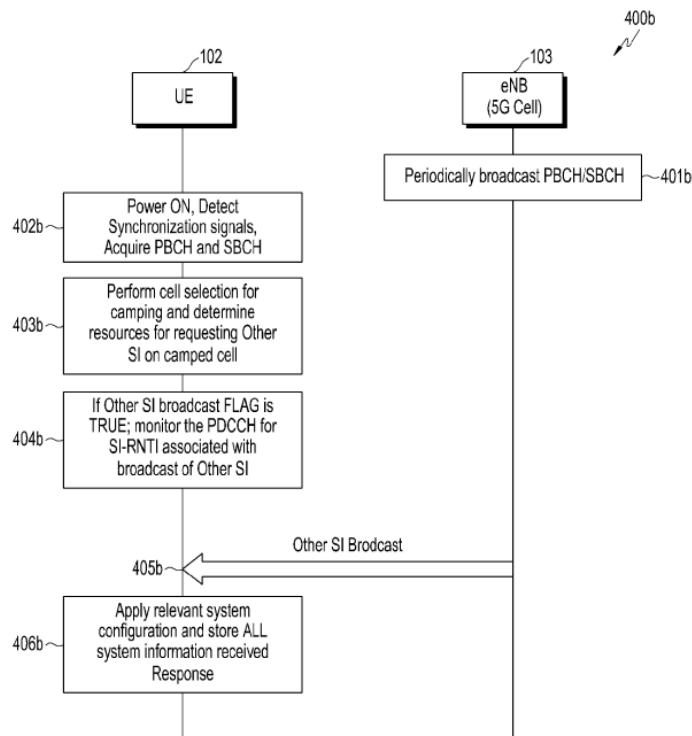
The operations and procedures of the steps 401a to 403b are similar or substantially similar to the steps 401a to 403a.

If at step 404b, as depicted in the FIG. 4b, the UE 102 detects the FLAG is set to TRUE (i.e. Other SI broadcast indicator) meaning that the network is periodically broadcasting the Other SI then UE 102 is not

required to initiate the SI request procedure to request Other SI. Further, the UE 102 then monitors the PDCCH during respective SI windows for the OSI indicated by the scheduling information included in the MSI to check if the other system information is addressed with SI-RNTI.

EX-1004 ¶¶171-173.

[Fig. 4b]



EX-1004, FIG. 4b; EX-1003 ¶134.

A POSITA would have understood that when a UE 102 is camped in an area served by an eNB 103, then the eNB 103 is a current serving access node for the UE 102. EX-1004, FIGs. 1, 4b, 5b, 5c. EX-1003 ¶135. Further, as discussed above, the UE 102 is camped in a cell upon receiving and applying the

configuration parameters in the MSI. EX-1003 ¶135. Accordingly, when the UE 102 attempts to acquire the Other SI, the eNB 103 is the current serving access node for the UE. EX-1003 ¶135.

Jung also discloses that the SI acquisition procedure to acquire compulsory system information is performed when the base station apparatus (*BS*) is the current serving access node of the user equipment (*terminal*).

Referring to FIG. 12, the terminal connects with a cell 1 and is operated (S1210). When the terminal connects with a cell 1 to be operated, the terminal may be operated by periodically acquiring broadcasted system information.

EX-1005 ¶235.

When the terminal determines that acquisition of the compulsory system information is required, the terminal may wait to acquire broadcasted system information from the cell 1 at a specific time interval. When the terminal determines that the acquisition of the compulsory system information is required, the terminal may drive a first timer set to T1 or may drive the first counter set to N1. The terminal may wait to acquire the system information until the first timer is terminated or the first counter is determined.

EX-1005 ¶239; EX-1003 ¶136.

Accordingly, Ingale, alone, or in view of Jung discloses claim element 9.7.

EX-1003 ¶137. Thus, for at least the foregoing reasons, Ingale, alone, or in view

of Jung renders obvious claim 9 of the '557 Patent. EX-1003 ¶137.

b. Claim 10

- i. [10] The base station apparatus of claim 9, wherein the first type SIB re-acquired by the user equipment is used by the user equipment to re-initiate the SI message acquisition process.*

Ingale discloses claim 10. EX-1003 ¶138. As discussed above in VII.A.4.a.vii, a POSITA would have understood that if a UE (Ingale's *UE 102*) did not have a valid configuration parameter(s) for an SI message (Ingale's *Other SI block*), then the UE would need to acquire the configuration parameter(s) for the SI message from the first type SIB (Ingale's *MSI*). EX-1003 ¶138. This is because Ingale expressly discloses that the first type SIB (*MSI*) includes the parameter(s), such as the scheduling information, for acquiring the SI message.

Another object of the embodiments herein is to monitor respective *SI windows indicated by scheduling information included in the MSI to acquire one or more SI blocks of the OSI* available in the camped cell.

EX-1004 ¶19.

In an embodiment, the SIT invalidity flag is broadcasted in the minimum system information on the PBCH/SBCH which if set TRUE indicates the UE 102 that already acquired and stored system information is not valid and the UE 102 *need to clear all stored system information and acquired updated SIT*.

EX-1004 ¶182.

The configurations associated with SI block applicable in different parts of the network can be provided to UE upon request or broadcasted based on network implementation such that SI block provided in one cell can be also applicable and valid for other cells. ***The SCI associated with each SI block represents the configuration corresponding to the SI block used in the cell. The SCI need to broadcast in the minimum SI (MSI)*** so that when UE performs cell re-selection and if UE has stored configuration of SI block corresponding to SCI, UE do not need to re-acquire or request that SI block. ***UE re-acquires or requests for a SI block only when it does not have the configuration of SI block corresponding to SCI of that SI block or the stored configuration (SIT) is invalid.*** It is logical that the plurality of SCI is broadcast in MIB#2 (i.e. SIB1) and MIB#1 because list of SCI associated with SI blocks available in cell needs to be signaled and MIB#1 has size restriction.

EX-1004 ¶204; EX-1003 ¶138.

The UE (*UE 102*) would thus use the first type SIB (*MSI*) to determine how (e.g., broadcast or on-demand) and when (e.g., SI windows) such that an SI message acquisition process may be re-initiated. EX-1003 ¶139.

Accordingly, Ingale discloses claim 12 of the '557 Patent. EX-1003 ¶140.

c. **Claim 11**

- i. ***[11] The base station apparatus of claim 9, wherein a master information block (MIB) is re-acquired by the user equipment from the base station apparatus prior to the re-acquisition of***

the first type SIB.

Ingale discloses claim 11. EX-1003 ¶141. For example, Ingale specifically discloses that the Minimum System Information (“MSI”) includes a first master information block (MIB”) and may include a second MIB, which may be referred to as System Information Block #1 (SIB1):

The MSI can be transmitted in at least one block i.e. MIB (353) or if the MIB size is constrained by physical layer design then the MSI is distributed in a first MIB (353) and a second MIB i.e. ***MIB#2 also referred as SIB1.***

EX-1004 ¶136; EX-1003 ¶141.

Ingale further discloses that MIB#1 includes the scheduling information for receiving MIB#2 (e.g., SIB1) and that SIB1 may not be provided in all instances, such as when a cell is barred:

In an embodiment, ***the scheduling information included in the first MIB indicates at least one of periodicity of the second MIB transmitted on the SBCH*** and an absence of the second MIB when the second MIB is not transmitted on the SBCH.

In an embodiment, when the scheduling ***information included in the first MIB indicates the absence of the second MIB*** then the cell is considered as barred because the UE cannot acquire the full contents of the MSI.

EX-1004 ¶¶59-60; EX-1003 ¶142.

A POSITA would have understood from the foregoing disclosures that a master information block (MIB) (*MIB#1*) would be received (e.g., re-acquired) before the first type SIB (*MIB#2/SIB1*), as receiving these MIBs in any other order would be contrary to the express teachings of Ingale. EX-1003 ¶143.

Consequently, in situations where a UE fails to acquire first type SIB (e.g., an SI acquisition failure occurs), it would have been obvious based on the teachings of Ingale and Jung to configure the UE to re-acquire the MIB (e.g., MSI) prior to attempting to re-acquire the first type SIB (e.g., SIB1). EX-1003 ¶143. This is because MIB#1 (e.g., MIB) includes the scheduling information for receiving the first type SIB (e.g., MIB#2/SIB1). EX-1004 ¶59; EX-1003 ¶143. Accordingly, the UE would want to ensure, upon failing to acquire the first type SIB, that it has the most up-to-date scheduling information to reduce the likelihood that it will again fail to acquire the first type SIB and therefore would attempt to re-acquire the MIB (e.g., MIB#1) prior to attempting to re-acquire the first type SIB (e.g., MIB#2/SIB1). EX-1004 ¶59; EX-1003 ¶144.

Thus, Ingale, alone or in combination with Jung, renders obvious claim 11 of the '557 Patent. EX-1003 ¶145.

d. **Claim 12**

- i. *[12] The base station apparatus of claim 9, wherein the condition for the determination of the failure of the SI message acquisition process includes that a stored version of one of the at*

least one second type SIB is not valid.

Ingale discloses claim 12. EX-1003 ¶146. Ingale discloses validity information in the form of a temporal value (e.g., a timer) and a geographic value (e.g., an area ID):

The plurality of indicators broadcasted on PBCH and/or SBCH comprises at least one or more of: ... ***System Information area identifier (Area-Id/SAID) which defines the SI area validity scope and points to the linking of Area-Id and SCI provided in other system information***, a common valuetag i.e. a counter indicating at least one system information block configuration provided in other SI has changed or updated and ***one or more individual valuetags i.e. counter associated with change or update of configuration of corresponding SI block provided in other SI and a validity flag indicating whether the already acquired and stored system information is still valid.***

EX-1004 ¶87.

In an embodiment, a ***SIT invalidity flag is broadcasted in minimum system information*** on PBCH/SBCH which if set TRUE indicates the UE that already acquired and stored system information ***is not valid*** and UE need to clear all stored system information and acquire updated SIT.

EX-1004 ¶94; EX-1003 ¶¶146.

Ingale further discloses that when a UE 102 determines that an SI block configuration is invalid, then the UE must re-acquire the configurations parameters for the SI block:

The configurations associated with SI block applicable in different parts of the network can be provided to UE upon request or broadcasted based on network implementation such that SI block provided in one cell can be also applicable and valid for other cells. ***The SCI associated with each SI block represents the configuration corresponding to the SI block used in the cell. The SCI need to broadcast in the minimum SI (MSI)*** so that when UE performs cell re-selection and if UE has stored configuration of SI block corresponding to SCI, UE do not need to re-acquire or request that SI block. ***UE re-acquires or requests for a SI block only when it does not have the configuration of SI block corresponding to SCI of that SI block or the stored configuration (SIT) is invalid.*** It is logical that the plurality of SCI is broadcast in MIB#2 (i.e. SIB1) and MIB#1 because list of SCI associated with SI blocks available in cell needs to be signaled and MIB#1 has size restriction.

EX-1004 ¶204; EX-1003 ¶147.

Accordingly, Ingale discloses that the condition for the determination of the failure of the SI message (*SI block in Other SI*) acquisition process includes that a stored version of one of the at least one second type SIB (*stored SCI for Other SI*) is not valid. EX-1003 ¶148.

The above-cited disclosures from Ingale are similar to those from the '577 Patent with respect to using validity tags to determine whether the stored version of at least one second type SIB is valid:

The first type SIB is re-acquired by the user equipment upon the user

equipment failing on an SI message acquisition process to receive the SI message, *in a case that a version of one of the at least one second type SIB stored in the user equipment is not valid.*

EX-1001, 2:54-59.

The Minimum SI may contain information about the Other SI, including the delivery method, e.g., periodic broadcast/on-demand, scheduling information, *validity information*, etc.

EX-1001, 9:14-17; EX-1003 ¶149.

The validity information disclosed by the '557 Patent may be both a temporal value (e.g., a timer) and geographic value (e.g., an area ID):

FIG. 4 shows an example format of SIB Type 1, including...validityInfo and *validity information of the SIB (a value tag [valueTag], and other parameters, such as validity timer, etc.).*

EX-1001, 9:48-56; *see also* EX-1001, 10:63-65 (“Furthermore, the otherSIBInfo corresponding to SIB#A indicates that the *validity information of SIB#A is valueTag=b, si-AreaID=3.*”); EX-1003 ¶150.

Accordingly, a POSITA would have understood Ingale as disclosing that the condition for the determination of the failure of the SI message acquisition process includes that a stored version of one of the at least one second type SIB is not valid. EX-1003 ¶151. Claim 12 therefore is invalid over Ingale. EX-1003 ¶151.

e. **Claim 13**

- i. ***[13.0] A method for a base station apparatus of a radio access network (RAN) that communicates over a radio interface with a user equipment, the method comprising:***

To the extent the preamble is limiting, Ingale discloses a method for a base station apparatus of a RN that communications with a UE. See VII.A.4.a.i; EX-1003 ¶152.

- ii. ***[13.1] transmitting a first type system information block (SIB), the first type SIB comprising:***

Ingale discloses this claim element for the same reasons set forth above in VII.A.4.a.ii. EX-1003 ¶153.

- iii. ***[13.2] scheduling information of a system information (SI) message, the SI message comprising at least one second type SIB, the scheduling information configuring SI windows, the SI windows comprising periodically occurring time windows in which the SI message is transmitted;***

Ingale discloses this claim element for the same reasons set forth in above in VII.A.4.a.iii. EX-1003 ¶154.

- iv. ***[13.3] a parameter associated with a condition for determination of a failure of an SI message acquisition process; and***

Ingale, alone, or in combination with Jung renders obvious this claim element for the same reasons set forth in above in VII.A.4.a.iv. EX-1003 ¶155.

- v. ***[13.4] an indication of broadcast status for the SI message, the indication indicating broadcasting; and***

Ingale discloses this claim element for the same reasons set forth in above in VII.A.4.a.v. EX-1003 ¶156.

- vi. ***[13.5] broadcasting the SI message;***

Ingale discloses this claim element for the same reasons set forth above in VII.A.4.a.vi. EX-1003 ¶157.

- vii. ***[13.6] wherein: the first type SIB is re-acquired by the user equipment upon the user equipment failing on the SI message acquisition process in at least one of the SI windows to receive the SI message;***

Ingale, alone, or in combination with Jung renders obvious this claim element for the same reasons set forth in above in VII.A.4.a.vii. EX-1003 ¶158.

- viii. ***[13.7] the base station apparatus is a current serving access node of the user equipment.***

Ingale discloses this claim element for the same reasons set forth in above in VII.A.4.a.viii. EX-1003 ¶159.

f. **Claim 14**

- i. ***[14] The method of claim 13, wherein the first type SIB re-acquired by the user equipment is used by the user equipment to re-initiate the SI message acquisition process.***

Ingale discloses this claim element for the same reasons set forth in above in

VII.A.4.b.i. EX-1003 ¶160.

g. Claim 15

- i. [15] The method of claim 13, wherein a master information block (MIB) is re-acquired by the user equipment from the base station apparatus prior to re-acquisition of the first type SIB.*

Ingale discloses this claim element for the same reasons set forth in above in

VII.A.4.c.i. EX-1003 ¶161.

h. Claim 16

- i. [16] The method of claim 13, wherein the condition for the determination of the failure of the SI message acquisition process includes that a stored version of one of the at least one second type SIB is not valid.*

Ingale discloses this claim element for the same reasons set forth in above in

VII.A.4.d.i. EX-1003 ¶162.

VIII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION AND DENY INSTITUTION

A. The Board Should Not Deny Institution Under 35 U.S.C. § 325(d)

The '557 Patent has not been previously challenged in an IPR. The Examiner did not consider any of the prior art used in the analysis above. Moreover, the cited prior art references, Ingale and Jung, disclose the exact element that provided patentability during prosecution.

B. The Board Should Not Deny Institution Under 35 U.S.C. § 314(a)

The PTAB has discretion to deny institution under 35 U.S.C. § 314(a).

Related to the Director's June 2022 interim guidance regarding application of the *Fintiv* factors⁴, (1) the Petition is particularly strong in the underlying merits, and (2) Petitioners will not pursue in the Related Litigations any ground raised in this IPR. Thus, under the Interim Guidance, the Board should not deny institution.

Nevertheless, the Board's decision in *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (Dec. 1, 2020) instructs that a holistic view of the remaining *Fintiv* factors also weighs in favor of institution.

Factor 1 is neutral because no request for stay has been filed.

Under factor 2, the earliest scheduled trial date is March 17, 2025. A Final Written Decision is expected in the present matter around November of 2025. Considering the inherent uncertainties of litigation scheduling, this factor is neutral. Because much can change, the current trial date does not support denial. *See Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb.

⁴ Interim Procedure For Discretionary Denials In AIA Post Grant Proceedings With Parallel District Court Litigation, PTO Director's Memorandum (June 21, 2022).

4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).

Factor 3 heavily favors institution. The earliest *Markman* hearing is scheduled for October 1, 2024, and the other *Markman* hearing is scheduling for March 11, 2025, which is after the time of the projected institution date. Fact discovery closes on October 11, 2024 and April 18, 2025, and expert discovery closes on December 4, 2024 and June 10, 2025. Thus, the Related Litigations are in their early stages, and the investment in them has been minimal at this time. The district court likely will not invest significant resources or issue substantive orders related to the challenged patent prior to the issuance of an institution decision. Moreover, Petitioners diligently prepared this Petition and filed well in advance of the statutory deadline, which weighs further against denying institution.

Under factor 4, there will not be complete overlap in the issues raised in the IPR and the Related Litigations and this favors institution. PO has asserted 21 claims from four patents in the Related Litigations, including seven claims from the '557 Patent – an amount that exceeds the number of claims that the district court will allow to be presented at trial. See <https://txed.uscourts.gov/?q=model-order-focusing-patent-claims-and-prior-art-reduce-costs>. (Model Order limiting patentees to a “Final Election of Asserted Claims, which shall identify no more than five asserted claims per patent from among the ten previously identified

claims and no more than a total of 16 claims”). Given that the patentee will likely be limited to only five claims from the ’557 Patent (at most), it is highly unlikely the district court will be addressing the validity of all of the eight (8) claims challenged by this Petition. Petitioners stipulate that they will not pursue invalidity against the asserted claims in the district court using the specific combination of prior art references set forth in the grounds presented in this Petition for purposes of establishing obviousness. *See Sand Revolution II LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 11-12 (PTAB June 16, 2020) (holding a similar stipulation weighs against discretionary denial).

Under factor 5, Petitioners are Intervenors / Defendants in the Related Litigations. This factor is neutral as it is “far from an unusual circumstance that a petitioner in inter partes review and a defendant in a parallel district court proceeding are the same.” *Sand*, No. IPR2019-01393, Paper 24, at 12-13.

Under factor 6, other circumstances weigh in favor of institution. Here, the merits of the Petition are particularly strong. For example, Ingale is directed at the same problem and proposes the same solution as the ’557 Patent, and discloses identical communications and the identical concepts disclosed in the ’557 Patent, demonstrating that the Petition is particularly strong in the underlying merits. Moreover, as detailed above, except for the portions of the claim disclosed by Ingale, the Examiner determined all of the claim elements to be in the prior art.

When viewed holistically, the timing of the present Petition is reasonable, there has been limited investment in the Related Litigations, and there is minimal overlap between the present IPR and the Related Litigations. Coupling these *Fintiv* considerations with the compelling evidence of unpatentability presented in the Petition, the efficiency and integrity of the IPR process is best served by instituting review.

IX. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

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

The real party-in-interest (“RPI”) in this Petition is Ericsson Inc., and corporate parent Telefonaktiebolaget LM Ericsson, and Nokia of America Corporation. No other parties have directed, funded, or controlled the filing of this IPR, and this IPR was not filed at the behest of any other party.

To avoid additional issues associated with RPI, Petitioners likewise identify T-Mobile USA, Inc., and Cellco Partnership d/b/a Verizon Wireless, because one or both of the Petitioners have intervened in the Related Matters identified below due to their products being accused of infringement.

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

1. Judicial Matters

As of the filing date of this Petition and to the best knowledge of Petitioners, the ’557 Patent is involved in the following litigations:

- *Active Wireless Technologies LLC v. Verizon Communications Inc. et*

al., U.S.D.C. EDTX Case No. 2:23-cv-00620-JRG-RSP;

- *Active Wireless Technologies LLC v. T-Mobile USA, Inc. et al.*,

U.S.D.C. EDTX Case No. 2:23-cv-00261-JRG-RSP.

These are referenced collectively herein as the “Related Litigation(s).”

2. Administrative Matters:

As of the filing date of this Petition and to the best knowledge of Petitioners, the ’557 Patent was not subject to any administrative matters.

C. Related Patents

Petitioners are unaware of any related patents.

D. Lead/Back-up Counsel (37 C.F.R. § 42.8(b)(3)):

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E. Notice of Service Information (37 C.F.R. § 42.8(b)(4)):

Please direct all correspondence to lead and back-up counsel at the above addresses. Petitioners consent to electronic service at the email addresses above.

X. CONCLUSION

Petitioners requests the Board institute *inter partes* review and cancel all Challenged Claims.

Respectfully submitted,

DUANE MORRIS LLP

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Dated: May 1, 2024

CERTIFICATION OF SERVICE ON PATENT OWNER

Pursuant to 37 C.F.R. §§ 42.6(e), 42.8(b)(4) and 42.105, the undersigned certifies that on the 1st of May, 2024, a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent No. 11,019,557 and all supporting exhibits were served hard-copy via delivery service (UPS / FedEx) to the correspondence address of record for the '557 Patent:

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ATTORNEY FOR PETITIONERS

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24 *et seq.*, the undersigned certifies that this document complies with the type-volume limitations. This document contains 12,435 words as calculated by the “Word Count” feature of Microsoft Word 2010, the word processing program used to create it.

Dated: May 1, 2024

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