



US010455621B2

(12) **United States Patent**
Agiwal et al.

(10) **Patent No.:** **US 10,455,621 B2**
(45) **Date of Patent:** **Oct. 22, 2019**

(54) **APPARATUS AND METHOD FOR SIGNALING SYSTEM INFORMATION**

(56) **References Cited**

(71) Applicant: **Samsung Electronics Co., Ltd.**,
Suwon-si, Gyeonggi-do (KR)

U.S. PATENT DOCUMENTS
10,200,920 B2 * 2/2019 Kubota H04W 36/0083
10,257,772 B2 * 4/2019 Johansson H04W 48/10
(Continued)

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FOREIGN PATENT DOCUMENTS

(73) Assignee: **Samsung Electronics Co., Ltd.**,
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WO 2014-206311 A1 12/2014
WO 2015-113384 A1 8/2015

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 94 days.

OTHER PUBLICATIONS

Extended European Search Report dated Jan. 4, 2019, issued in a counterpart European application No. 17760267.9-1215/3409048.
(Continued)

(21) Appl. No.: **15/443,307**

Primary Examiner — Sithu Ko

(22) Filed: **Feb. 27, 2017**

(74) *Attorney, Agent, or Firm* — Jefferson IP Law, LLP

(65) **Prior Publication Data**

(57) **ABSTRACT**

US 2017/0251500 A1 Aug. 31, 2017

The present disclosure relates to a communication method and system for converging a 5th-generation (5G) communication system for supporting higher data rates beyond a 4th-generation (4G) system with a technology for internet of things (IoT). The present disclosure may be applied to intelligent services based on the 5G communication technology and the IoT-related technology, such as smart home, smart building, smart city, smart car, connected car, health care, digital education, smart retail, security and safety services. A method for receiving system information (SI) by a user equipment (UE) in a wireless communication system is provided. The method includes receiving, from a base station (BS), first type SI associated with SI which is essential for communication with the BS, transmitting, to the BS, a physical random access channel (PRACH) preamble based on the first type SI, receiving, from the BS, a random access response (RAR) message, and receiving, from the BS, second type SI associated with at least one SI which the UE needs.

Related U.S. Application Data

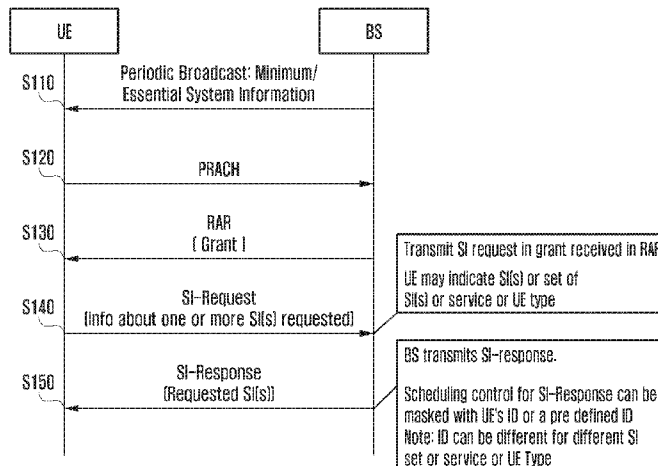
(60) Provisional application No. 62/301,016, filed on Feb. 29, 2016, provisional application No. 62/334,706, filed on May 11, 2016.

(51) **Int. Cl.**
H04L 12/18 (2006.01)
H04W 74/08 (2009.01)
(Continued)

(52) **U.S. Cl.**
CPC **H04W 74/0833** (2013.01); **H04W 4/06** (2013.01); **H04W 48/12** (2013.01);
(Continued)

(58) **Field of Classification Search**
None
See application file for complete search history.

14 Claims, 20 Drawing Sheets



- (51) **Int. Cl.** 2016/0234735 A1* 8/2016 Kubota H04W 48/14
H04W 4/06 (2009.01) 2016/0345325 A1 11/2016 Liu et al.
H04W 72/04 (2009.01) 2017/0265165 A1* 9/2017 Li H04W 48/14
H04W 72/14 (2009.01)
H04W 48/12 (2009.01)
H04W 74/00 (2009.01)

OTHER PUBLICATIONS

- (52) **U.S. Cl.**
 CPC *H04W 72/0413* (2013.01); *H04W 72/14*
 (2013.01); *H04W 74/006* (2013.01)

NEC: Further clarification of on-demand S-BCH 3GPP Draft; R2-063090; LTE BCH-On-Demand Clarification, 3rd Generation Partnership Project (3GPP), Mobile Competence Centre; 650, Route Des Lucioles; F-06921 Sophiaantipolis Cedex; France, vol. Ran WG2, No. Riga, Latvia; Nov. 1, 2006, Nov. 1, 2006, XP050132601. NEC: "LTE BCH-on-demand", 3GPP Draft; R2-062930; LTE BCH on Demand, 3rd Generation Partnership Project (3GPP), Mobile Competence Centre ; 650, Route Des Lucioles ; F-06921 Sophia-Antipolis Cedex; France, vol. Ran WG2, No. Seoul, Korea; Oct. 5, 2006, Oct. 5, 2006, XP050132448. Nortel: "System Information broadcast gating", 3GPP; Draft; R2-063137, 3rd Generation Partnership Project (3GPP), Mobilecompetence Centre ; 650, Route; Deslucioles ; F-06921 Sophia-Antipolis Cedex; France, vol. Ran WG2, No. Riga, Latvia; Nov. 1, 2006, Nov. 1, 2006, XP050132644.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 2010/0027466 A1* 2/2010 Mustapha H04J 11/0069
 370/328
 2015/0016312 A1* 1/2015 Li H04W 74/0833
 370/280
 2015/0085689 A1 3/2015 Vos
 2015/0181624 A1 6/2015 Hwang et al.
 2015/0305065 A1 10/2015 Bai et al.
 2015/0382284 A1* 12/2015 Brismar H04W 74/04
 370/329
 2016/0150570 A1 5/2016 Wang et al.

* cited by examiner

FIG. 1

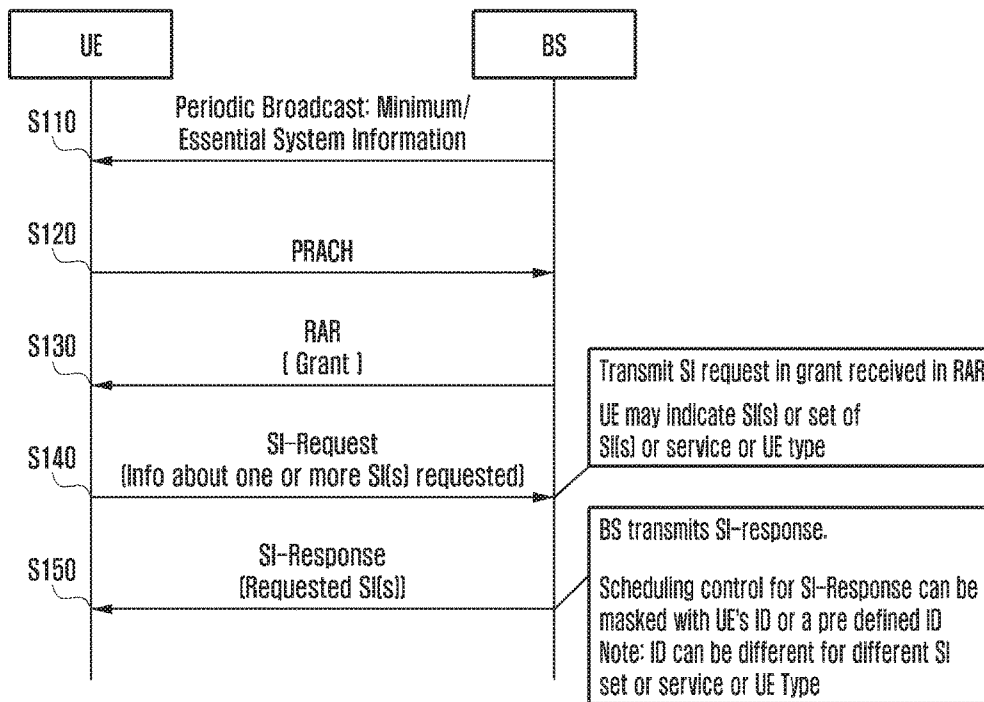


FIG. 2

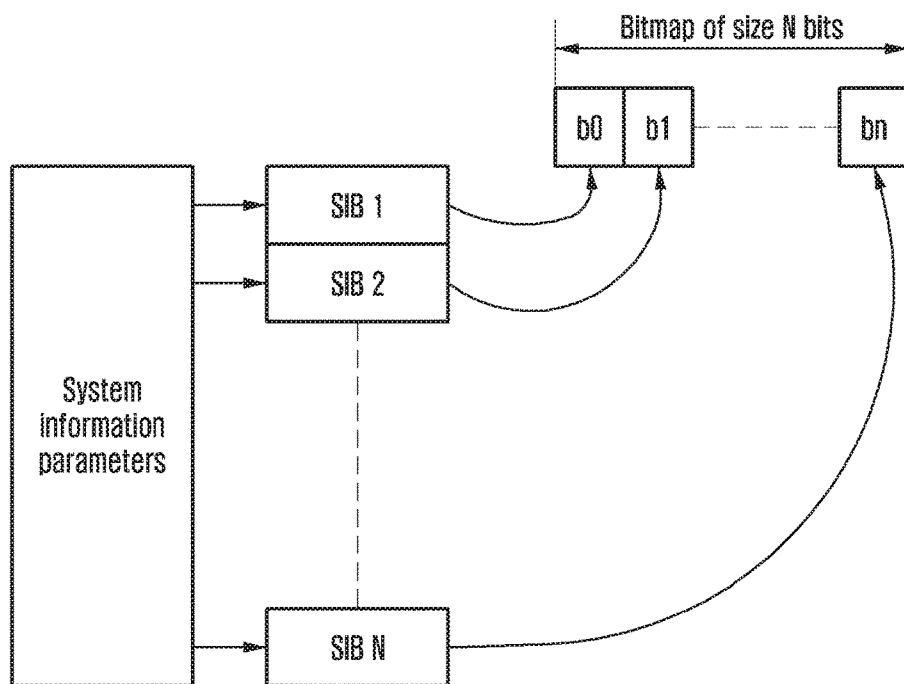
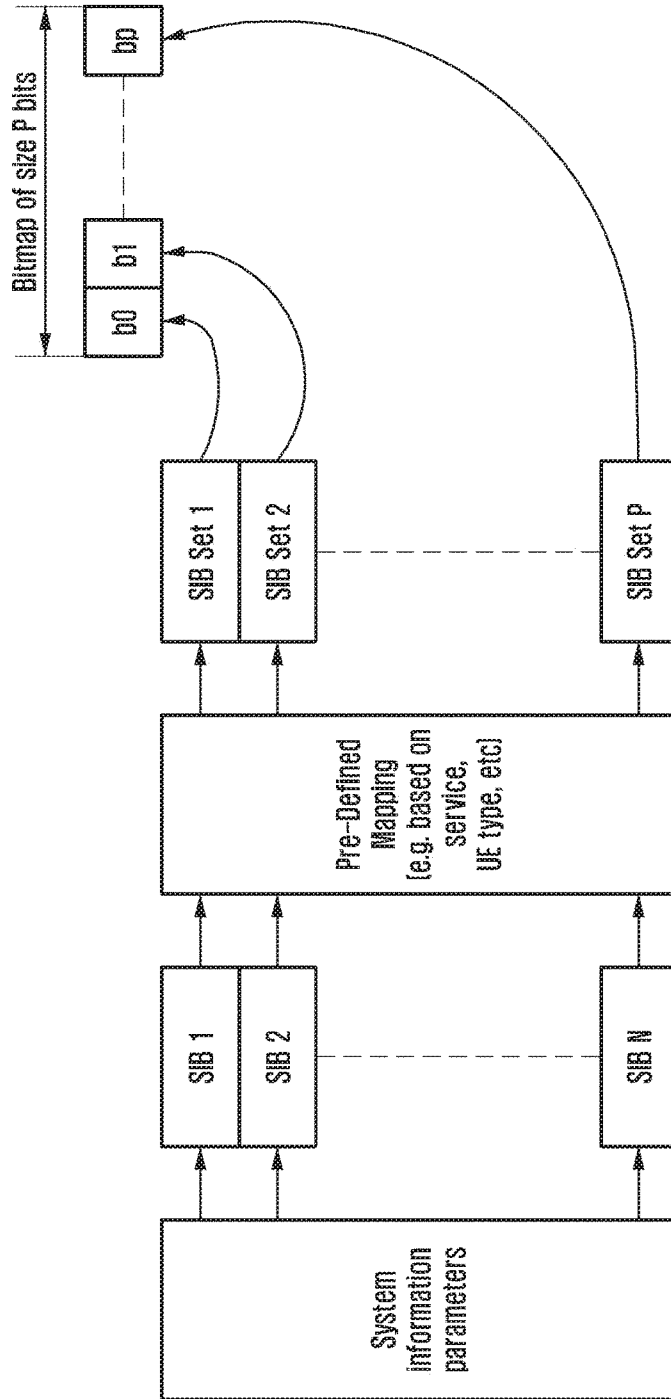


FIG. 3



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