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62/543,581	08/10/2017		260	0203-2117		

CONFIRMATION NO. 9333

FILING RECEIPT



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68103
Jefferson IP Law, LLP
1130 Connecticut Ave., NW, Suite 420
Washington, DC 20036

Date Mailed: 08/17/2017

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/543,581**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title**SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER
SUPPORTING MULTIPLE BANDWIDTH PARTS****Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No****PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

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Application Number	
Filing Date	August 10, 2017
First Named Inventor	Anil AGIWAL
Title	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS
Art Unit	
Examiner Name	
Attorney Docket Number	0203-2117

SIGNATURE of Applicant or Patent Practitioner

Signature	/Gregory L. CLINTON/	Date	August 10, 2017
Name	Gregory L. Clinton	Telephone	202-293-2539
Registration Number	59,134		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.

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68103

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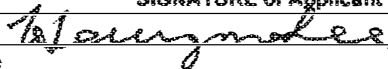
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SIGNATURE of Applicant for Patent

Signature		Date	2012.10.11
Name	Heungmo Lee	Telephone	+82-31-279-4761
Title and Company	Vice President, Samsung Electronics Co., Ltd.		

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INVENTION DISCLOSURE FORM

INVENTION TITLE: System and Method of SI Transmission and Reception on a Carrier supporting Multiple Bandwidth Parts

DESCRIPTION OF THE INVENTION

This description should be written in the Inventor's own words and should follow this guideline:

1. Describe the disadvantages of the prior art without mentioning your invention (including any related publicly available documentation, such as journal articles or patents).

In the recent years several broadband wireless technologies have been developed to meet the growing number of broadband subscribers and to provide more and better applications and services. The second generation wireless communication system has been developed to provide voice services while ensuring the mobility of users. Third generation wireless communication system supports not only the voice service but also data service. In recent years, the fourth wireless communication system has been developed to provide high-speed data service. However, currently, the fourth generation wireless communication system suffers from lack of resources to meet the growing demand for high speed data services. So fifth generation wireless communication system is being developed to meet the growing demand for high speed data services, support ultra-reliability and low latency applications.

The fifth generation wireless communication system will be implemented not only in lower frequency bands but also in higher frequency (mmWave) bands, e.g., 10 GHz to 100 GHz bands, so as to accomplish higher data rates. To mitigate propagation loss of the radio waves and increase the transmission distance, the beamforming, massive Multiple-Input Multiple-Output (MIMO), Full Dimensional MIMO (FD-MIMO), array antenna, an analog beam forming, large scale antenna techniques are being considered in the design of fifth generation wireless communication system. In addition, the fifth generation wireless communication system is expected to address different use cases having quite different requirements in terms of data rate, latency, reliability, mobility etc. However, it is expected that the design of the air-interface of the fifth generation wireless communication system would be flexible enough to serve the UEs having quite different capabilities depending on the use case and market segment the UE cater service to the end customer. Few example use cases the fifth generation wireless communication system wireless system is expected to address is enhanced Mobile Broadband (eMBB), massive Machine Type Communication (m-MTC), ultra-reliable low latency communication (URLL) etc. The eMBB requirements like tens of Gbps data rate, low latency, high mobility so on and so forth address the market segment representing the conventional wireless broadband subscribers needing internet connectivity everywhere, all the time and on the go. The m-MTC requirements like very high connection density, infrequent data transmission, very long battery life, low mobility address so on and so forth address the market segment representing the Internet of Things (IoT)/Internet of Everything (IoE) envisioning connectivity of billions of devices. The URLL requirements like very low latency, very high reliability and variable mobility so on and so forth address the market segment representing the Industrial automation application, vehicle-to-vehicle/vehicle-to-infrastructure communication foreseen as one of the enabler for autonomous cars.

In the fourth generation wireless communication system, enhanced node B (eNB) or base station in cell broadcast system information. System information is structured into master information block (MIB) and a set of system information blocks (SIBs). MIB consists of System Frame Number (SFN), Downlink System bandwidth and Physical Hybrid ARQ Feedback Indicator Channel (PHICH) configuration. MIB is transmitted every 40ms. It is repeated every 10ms wherein the first transmission occurs in subframe #0 when SFN mod 4 equals zero. MIB is transmitted on physical broadcast channel. System Information Block Type 1 carries cell identity, tracking area code, cell barring information, value tag (common for all scheduling units), and scheduling information of other SIBs.

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SIB 1 is transmitted every 80ms in subframe #5 when SFN mod 8 equals zero. SIB 1 is repeated in subframe#5 when SFN mod 2 equals zero. SIB 1 is transmitted on Physical downlink shared channel. Other SIBs (SIB 2 to SIB 19) are transmitted in System Information (SI) message wherein scheduling info of these SIBs are indicated in SIB 1.

UE acquires the system information at cell selection, cell reselection, after handover completion, after entering E-UTRA from another RAT, upon re-entering service area, upon receiving a notification (paging), and upon exceeding the maximum validity duration (3 hr). In RRC idle and inactive state, UE needs to acquire MIB, SIB 1, SIB 2 to SIB 5, SIB 6 to SIB 8 (depending on RAT supported), SIB 17 (if LTE-WLAN IWK is supported), and SIB 18 to SIB 19 (if D2D is supported). In RRC connected state, UE needs to acquire MIB, SIB 1, SIB 2, SIB 8 (depending on RAT supported), SIB 17 (if LTE-WLAN IWK is supported), and SIB 18 to SIB 19 (if D2D is supported). System information acquired and stored is considered invalid if value tag in received SIB 1 is different from the one in stored SI. System information can be changed and is notified as follows: Change is notified through *paging* message (in RRC_IDLE, RRC_INACTIVE or RRC_CONNECTED) with cause systemInfoModification to let UE know that some SI is changing in the next modification period. Modification period boundaries are in terms of SFN such that $\text{SFN mod modificationPeriod} = 0$. Change of SI only occurs at specific radio frames. Notification of changes in modification period N will be reflected in N+1. SIB 1 also carries value tag to indicate change in SI. UE finds the change in SI by looking at value tag in SIB 1 at the end modificationPeriod (if missed checking page) or receiving paging with systemInfoModification.

Issue Description

In the fifth generation wireless communication system, carrier bandwidth can be partitioned into multiple bandwidth parts (BWPs) in frequency domain. In downlink (DL), UE can be configured to monitor and receive DL transmissions from gNB in one or more DL BWPs. DL BWPs in which UE receive in DL is referred as active DL BWP. Similarly in UL, UE can be configured to transmit to gNB in one or more UL BWPs. UL BWP in which UE transmit in UL is referred as active UL BWP. UE can be configured with BWP in terms of physical resource blocks (PRBs).

On a given carrier, one of configured DL BWPs includes one control resource set (CORESET) with common search space. Each configured DL BWPs includes at least one CORESET with UE specific search space for the case of single active BWP at a given time. This means that the active DL BWP of a UE may or may not have CORESET with common search space. Physical downlink common control channel (PDCCH) for broadcast signals such as paging and system information is transmitted by gNB in common search space and UE monitors the common search space for receiving the PDCCH for paging and system information (SI). For a UE in connected state, if the active DL BWP of a UE does not have CORESET with common search space then UE cannot receive SI update indication and updated system information. In a given cell, system information can be updated and UE will fail to receive the updated system information. So a system and method of delivering updated system information is needed for the scenario where active DL BWP does not have CORESET with common search space.

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Description of the invention in detail (Including its operation, purpose, environment and how your invention overcomes the shortcomings of the prior art). Begin with a system level diagram and associated high level description of your invention in the context of a possible product deployment of your invention, for example a handset, a base station, and/or a wireless network comprising one or more base stations and one or more handsets.

For a UE in connected state, if the active DL BWP of a UE does not have CORESET with common search space then UE cannot receive SI update indication and updated system information. In a given cell, system information can be updated and UE will fail to receive the updated system information. Various methods of delivering updated system information in the disclosure are as follows:

Method 1: Dedicated RRC message carrying updated SIBs transmitted in active DL BWP

Embodiment 1:

Figure 1A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 1B and Figure 1C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP without common search space, gNB provides the updated SI in dedicated RRC signaling message. The dedicated RRC signaling message is transmitted by gNB in UE's active DL BWP. We propose to define a RRC signaling message to include SIB(s) for delivering SI in a dedicated manner.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the updated SI in dedicated RRC signaling message.

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured with common search space, UE receives the updated SI (e.g. one or more SIBs or SI messages) in dedicated RRC signaling in active DL BWP. Otherwise If active DL BWP is configured with common search space, UE receives the updated SI indication broadcasted (e.g. in paging message) by gNB in active DL BWP. UE then receives the updated SIs broadcasted by gNB in the active DL BWP.

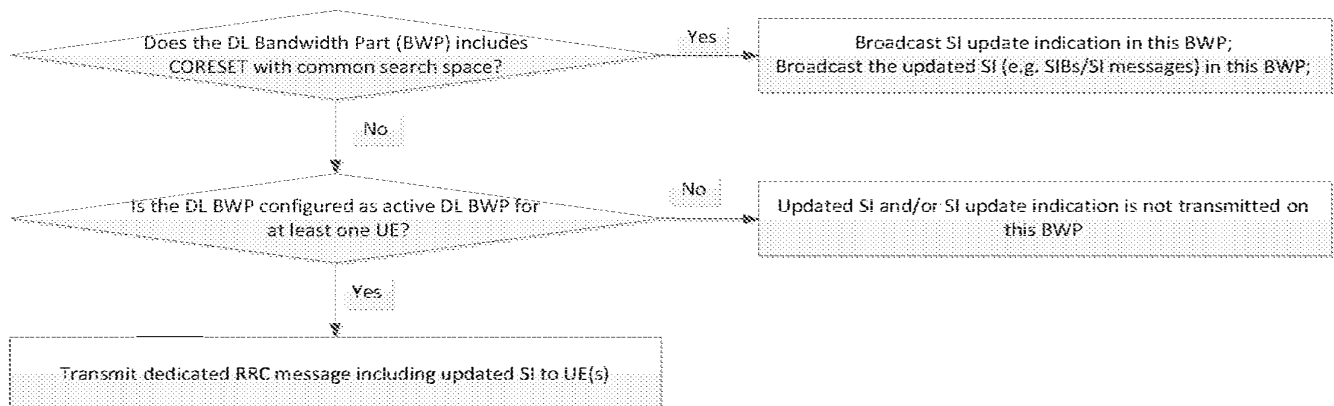


Figure 1A

INVENTION DISCLOSURE FORM

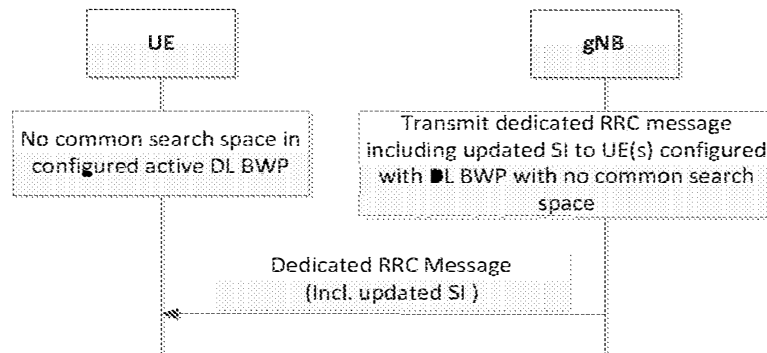


Figure 1B

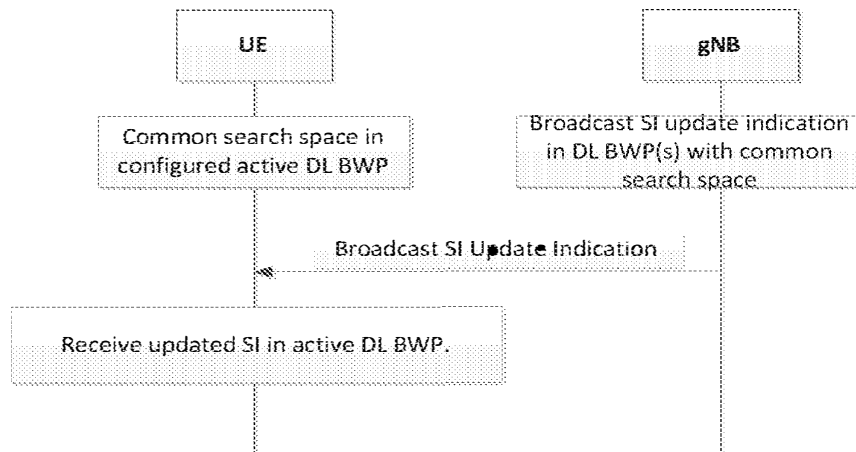


Figure 1C

Embodiment 2:

Figure 2A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 2B and Figure 2C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are configured without common search space, gNB provides the updated SI in dedicated RRC signaling message. The dedicated RRC signaling message is transmitted by gNB in UE's active DL BWP. We propose to define a RRC signaling message to include SIB(s) for delivering SI in a dedicated manner.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as the only active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as the only active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the updated SI in dedicated RRC signaling message.

UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured with common search space, UE receives the updated SI in dedicated RRC signaling in active DL BWP. If at least one of the active DL BWPs is configured with common search space, UE receives the SI update indication in broadcast signaling in active DL BWP and updated SIs in the active DL

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BWP. In case of multiple active DL BWP(s) with common search space, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

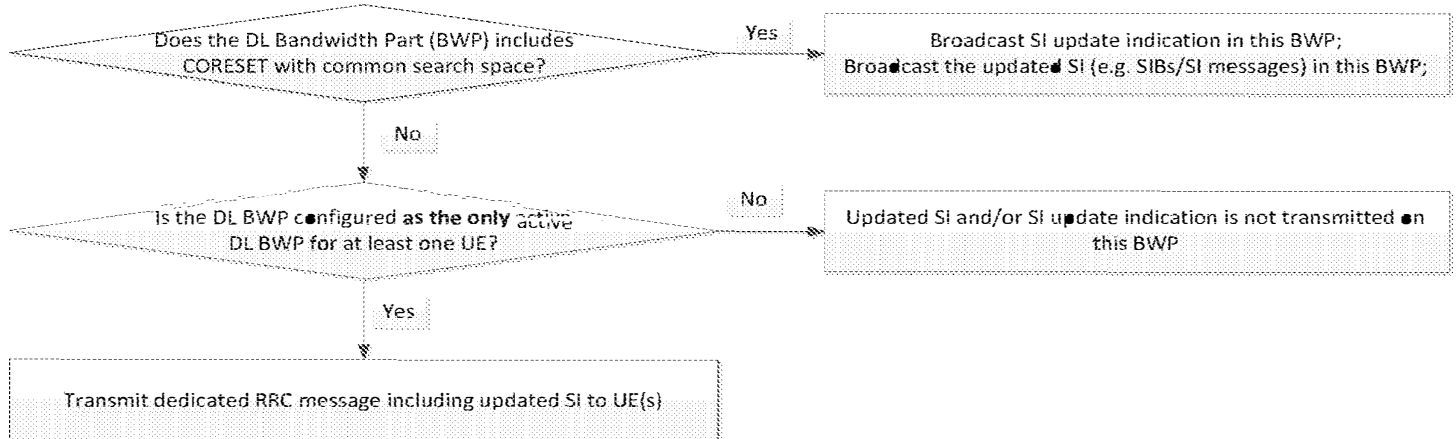


Figure 2A

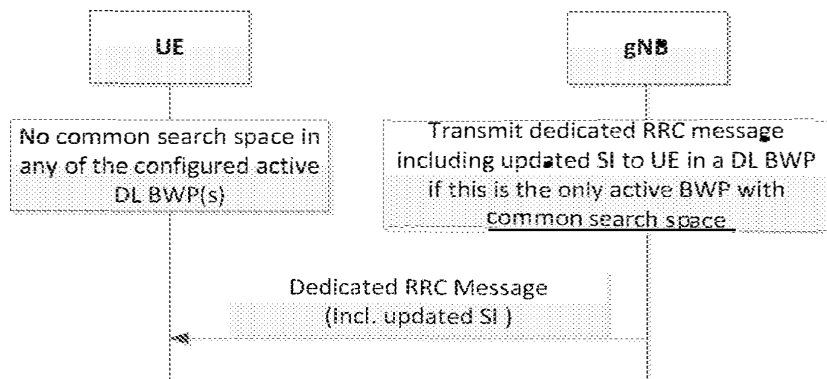


Figure 2B

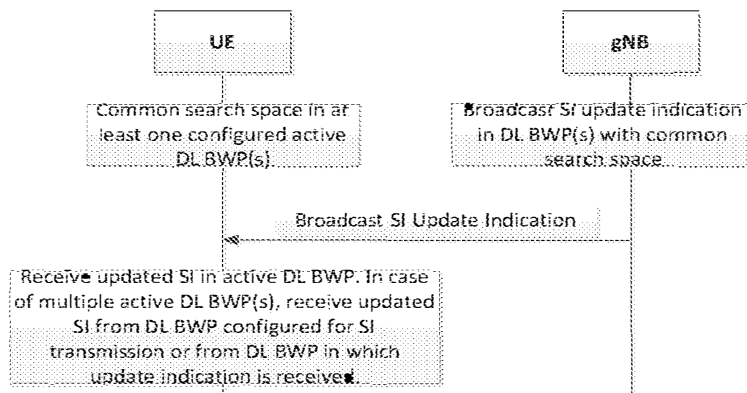


Figure 2C

Embodiment 3:

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Figure 3A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 3B and Figure 3C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP in which SI is not transmitted, gNB provides the updated SI in dedicated RRC signaling message. The dedicated RRC signaling message is transmitted by gNB in UE's active DL BWP. We propose to define a RRC signaling message to include SIB(s) for delivering SI in a dedicated manner.

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured for SI transmission, UE receives the updated SI (e.g. one or more SIBs or SI messages) in dedicated RRC signaling in active DL BWP. If active DL BWP is configured for SI transmission, UE receives the updated SI indication broadcasted (e.g. in paging message) by gNB in active DL BWP. UE then receives the updated SIs broadcasted by gNB in the active DL BWP.

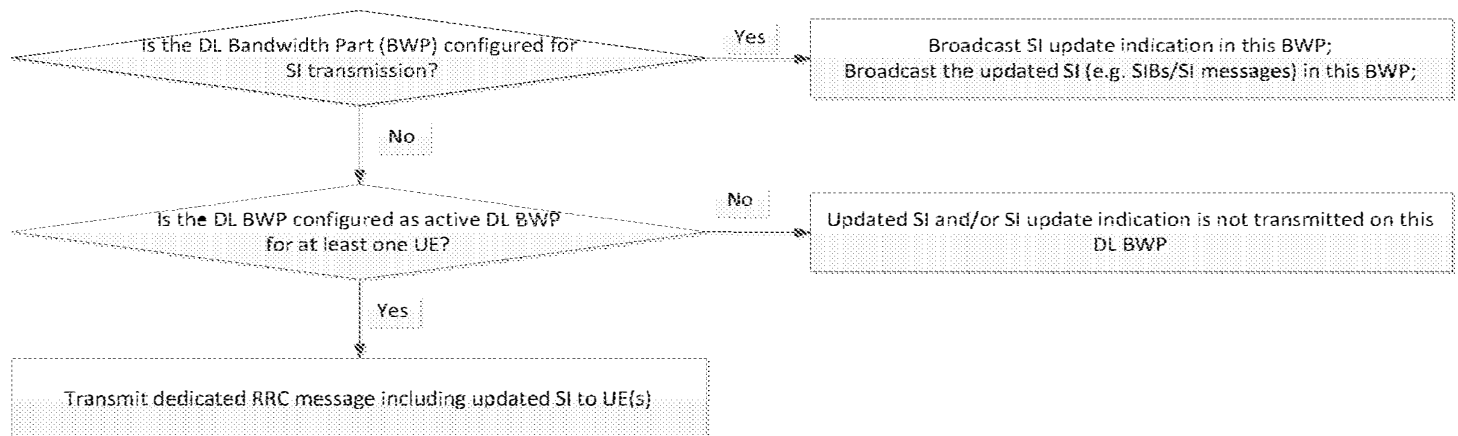


Figure 3A

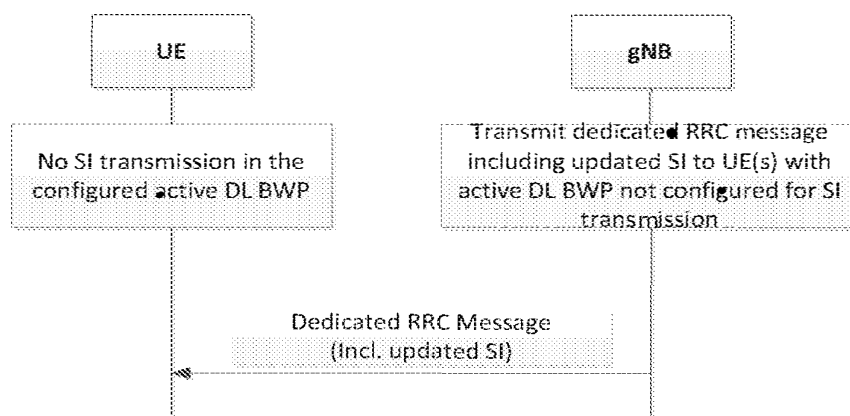


Figure 3B

INVENTION DISCLOSURE FORM

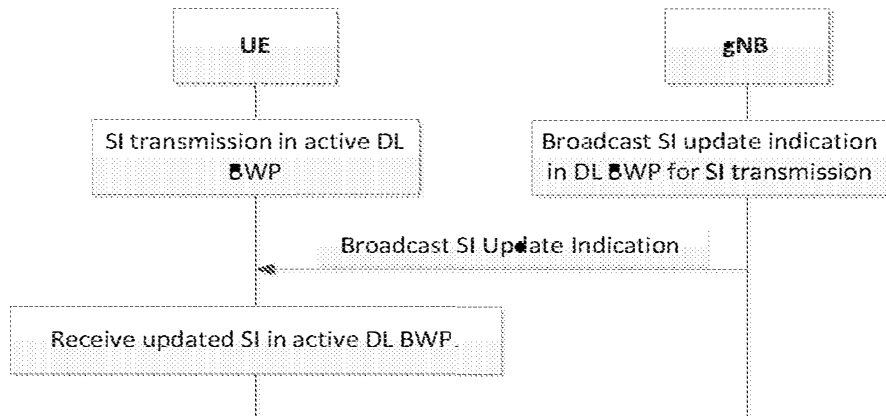


Figure 3C

Embodiment 4:

Figure 4A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 4B and Figure 4C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are not configured for SI transmission, gNB provides the updated SI in dedicated RRC signaling message. The dedicated RRC signaling message is transmitted by gNB in UE's active DL BWP. We propose to define a RRC signaling message to include SIB(s) for delivering SI in a dedicated manner.

UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured for SI transmission, UE receives the updated SI in dedicated RRC signaling in active DL BWP. Otherwise, If at least one of the active DL BWPs is configured for SI transmission, UE receives the SI update indication in broadcast signaling in active DL BWP and updated SIs in the active DL BWP configured for SI transmission. In case of multiple active DL BWP(s) configured for SI transmission, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

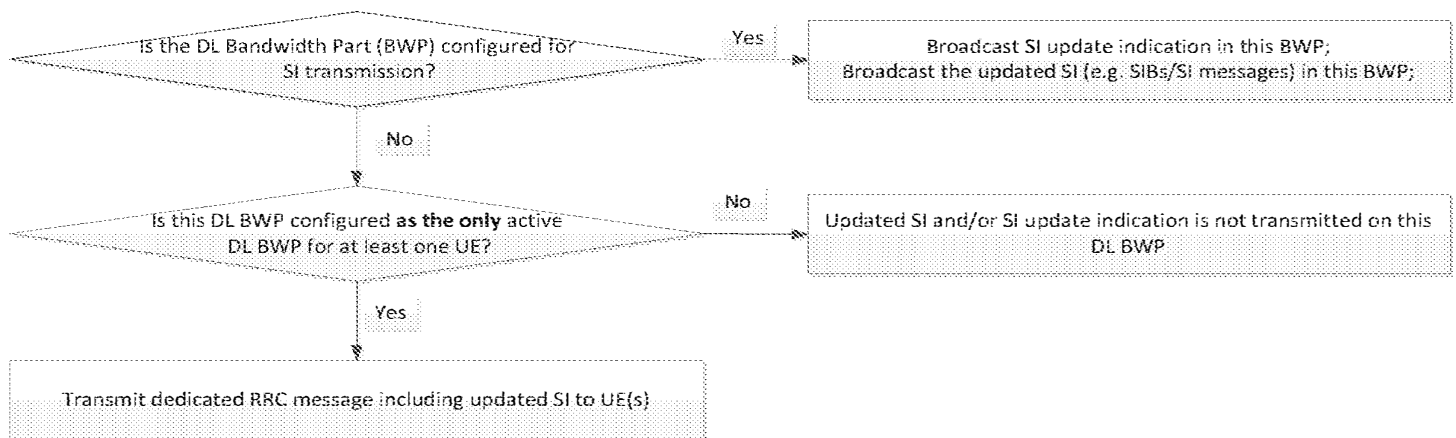


Figure 4A

INVENTION DISCLOSURE FORM

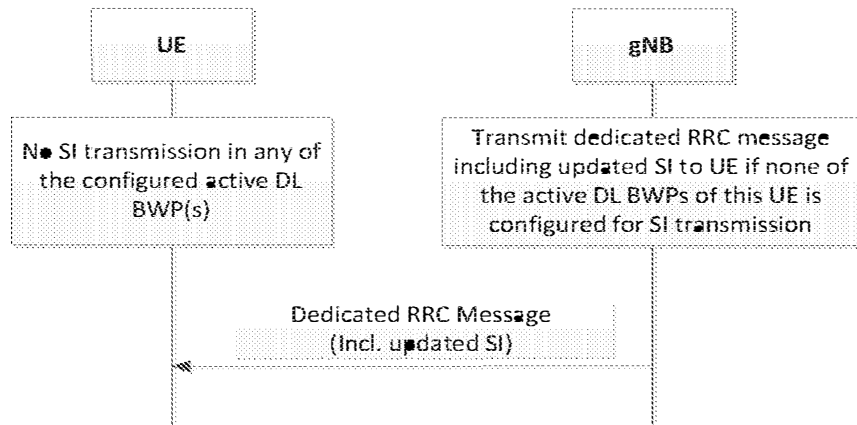


Figure 4B

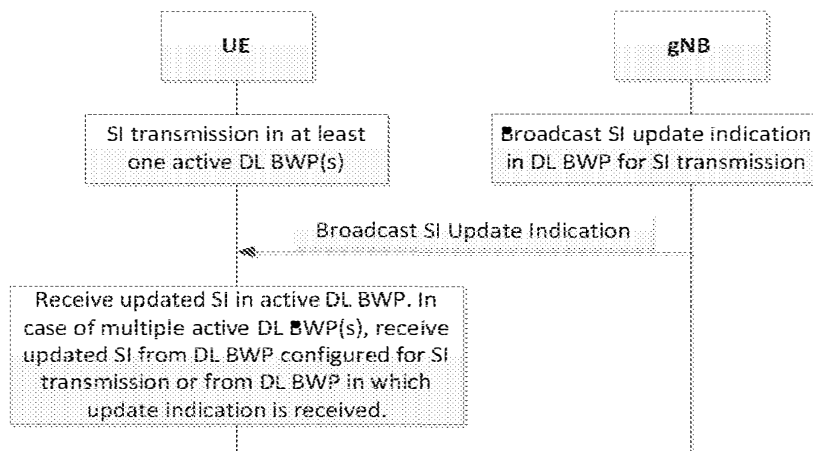


Figure 4C

INVENTION DISCLOSURE FORM

Method 2: Dedicated SI update indication followed by SI request/response to acquire updated SI

Embodiment 1:

Figure 5A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 5B and Figure 5C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP without common search space, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the SI update indication in dedicated RRC signaling.

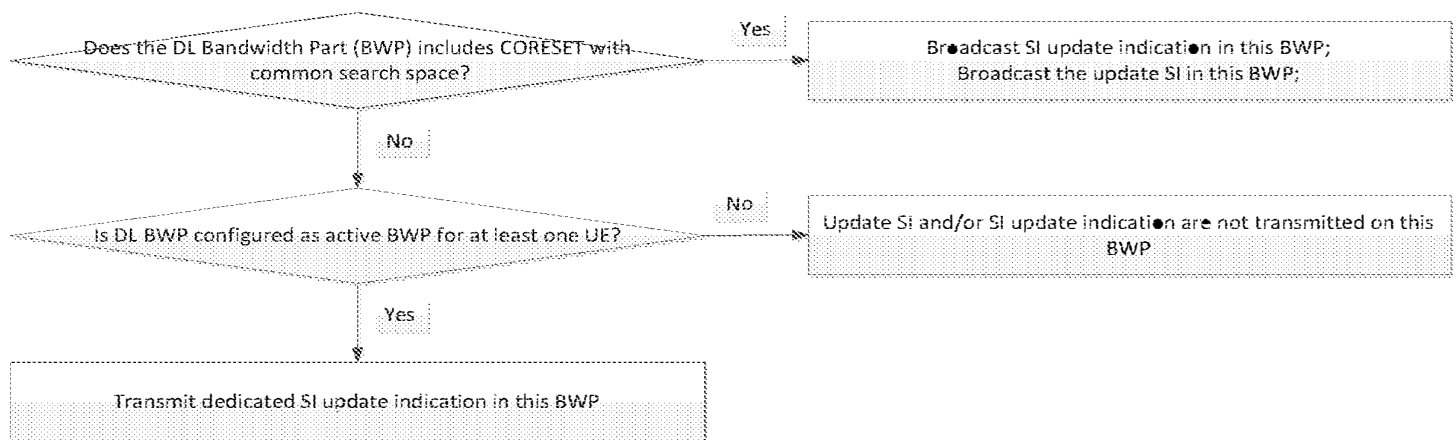


Figure 5A

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured with common search space, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers On Demand SI procedure to acquire the update SI in active DL BWP. Otherwise if active DL BWP is configured with common search space, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP.

In an embodiment, after receiving the SI update indication, if the active DL BWP includes CORESET with common search space, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request).

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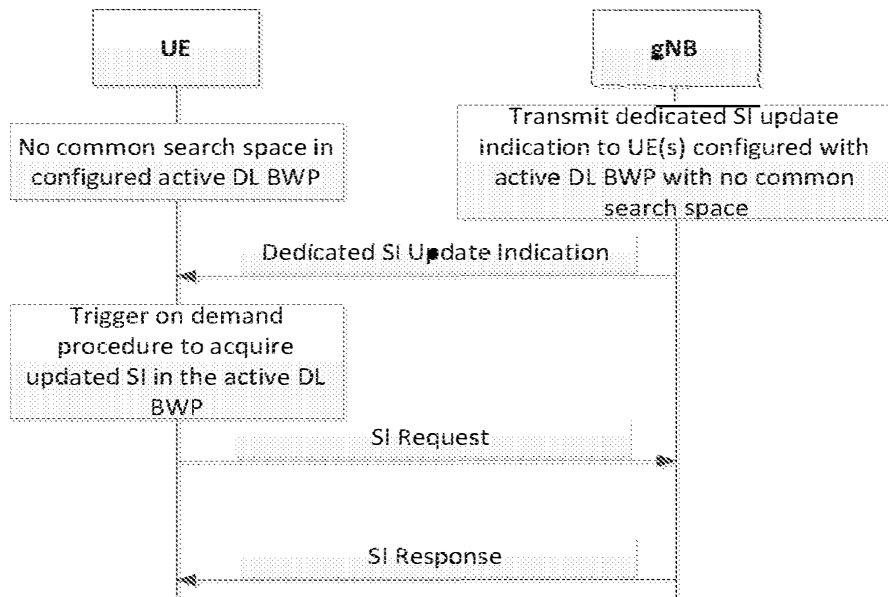


Figure 5B

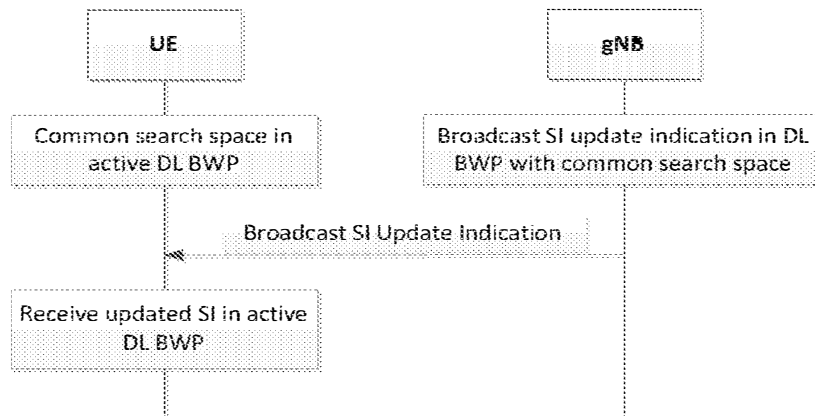


Figure 5C

Embodiment 2:

Figure 6A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 6B and Figure 6C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are configured without common search space, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

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In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the SI update indication in dedicated RRC signaling.

In this method, UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured with common search space, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers On Demand SI procedure to acquire the update SI in active DL BWP. Otherwise If at least one of the active DL BWPs is configured with common search space, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP. In case of multiple active DL BWP(s) with common search space, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

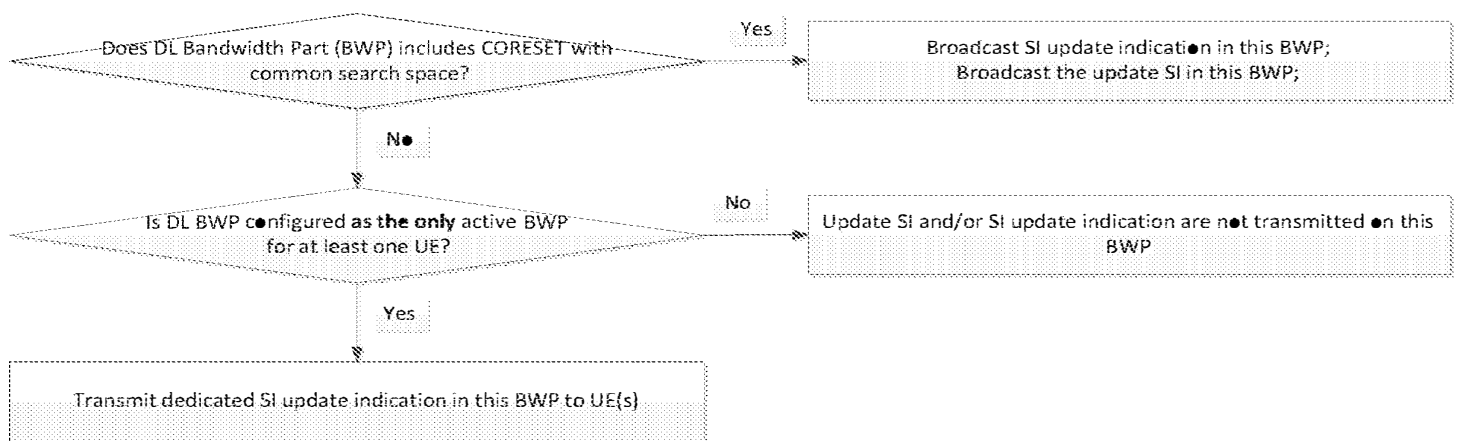


Figure 6A

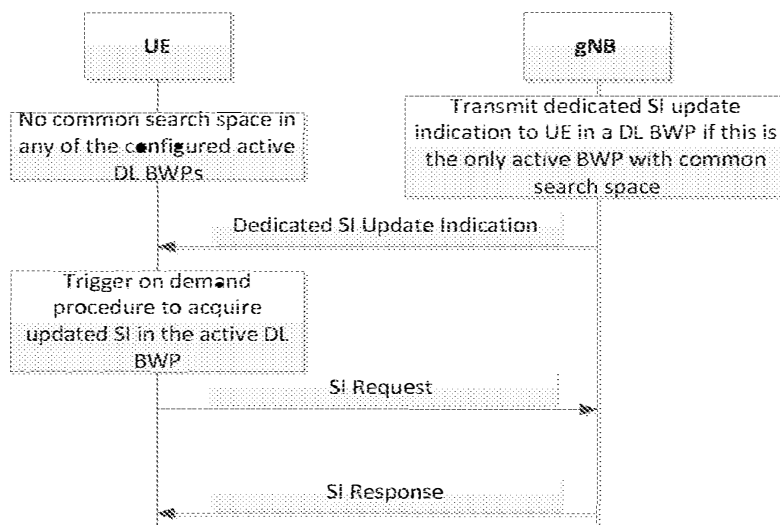


Figure 6B

INVENTION DISCLOSURE FORM

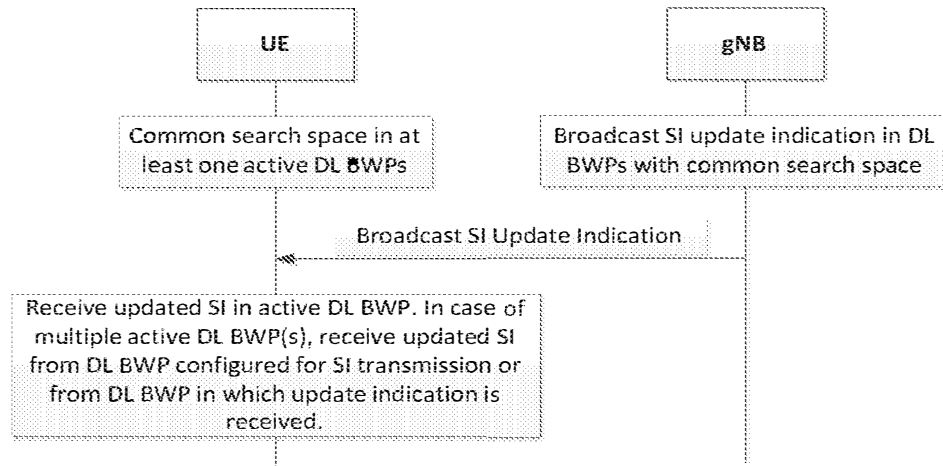


Figure 6C

In an embodiment, after receiving the SI update indication, if at least one active DL BWP includes CORESET with common search space, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request).

Embodiment 3:

Figure 7A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 7B and Figure 7C illustrate the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP in which SI is not transmitted, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternatively paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternatively SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured for SI transmission, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers On Demand SI procedure to acquire the update SI in active DL BWP. Otherwise if active DL BWP is configured for SI transmission, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP.

In an embodiment, after receiving the SI update indication, if the active DL BWP is configured for SI transmission, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE receives the updated SI in active DL BWP and UE does not send SI request. Otherwise UE acquires the SI using on demand SI procedure (i.e. UE sends SI request).

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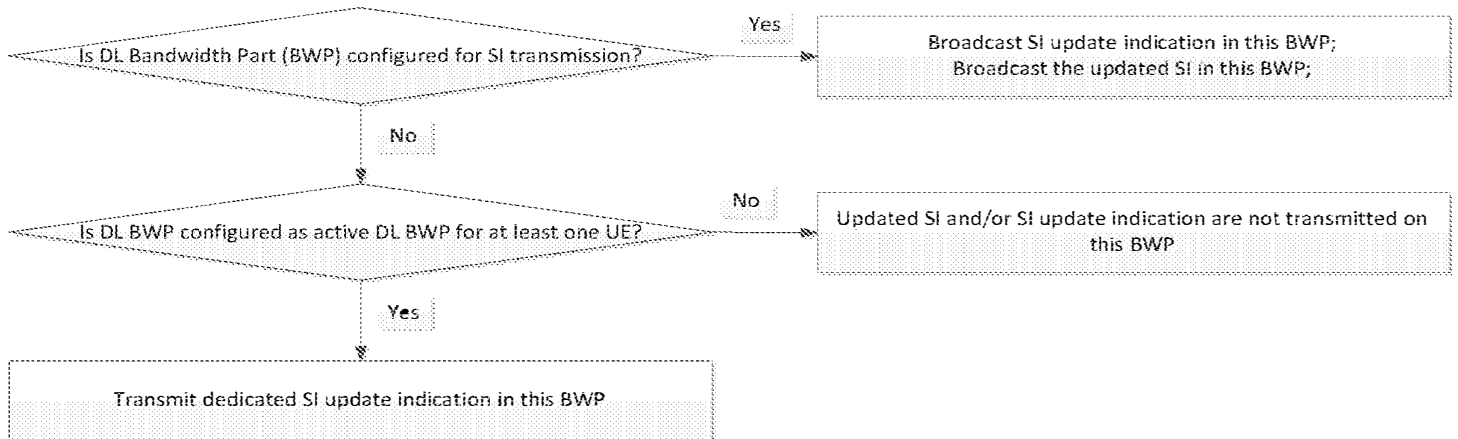


Figure 7A

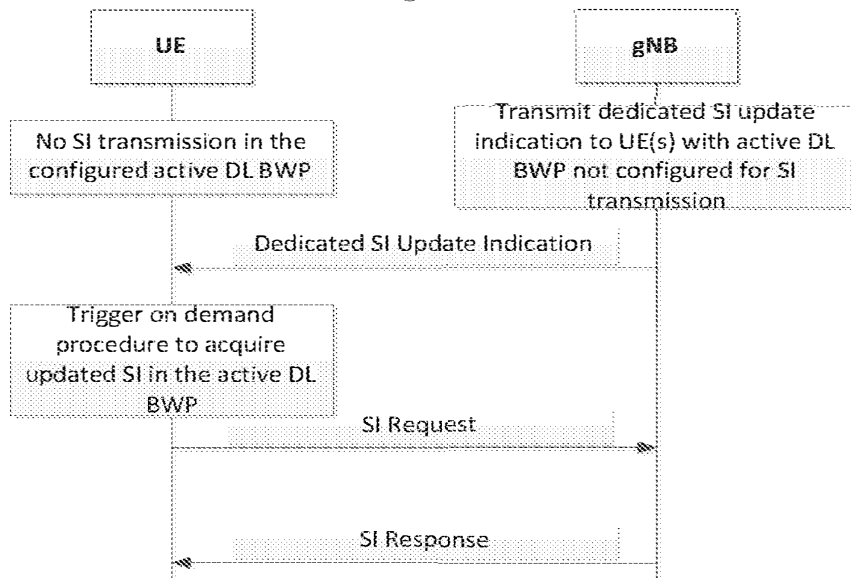


Figure 7B

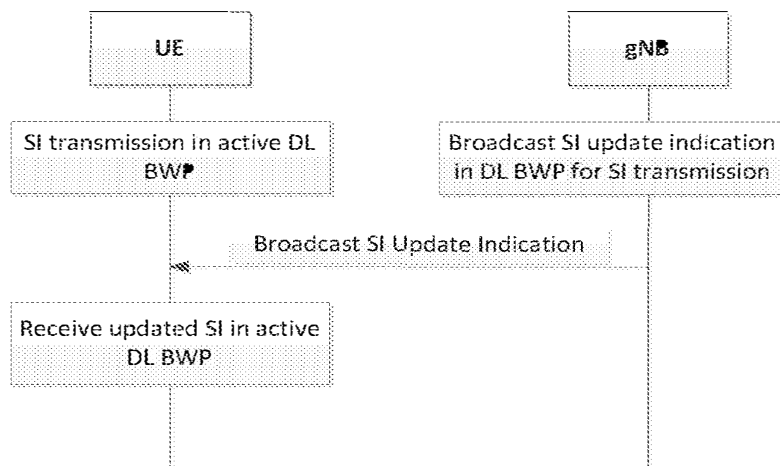


Figure 7C

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Embodiment 4:

Figure 8A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 8B and Figure 8C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are not configured for SI transmission, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In this method, UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured for SI transmission, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers On Demand SI procedure to acquire the update SI in active DL BWP. Otherwise, If at least one of the active DL BWPs is configured for SI transmission, UE receives the SI update indication in broadcast signaling in active DL BWP and updated SIs in the active DL BWP configured for SI transmission. In case of multiple active DL BWP(s) configured for SI transmission, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

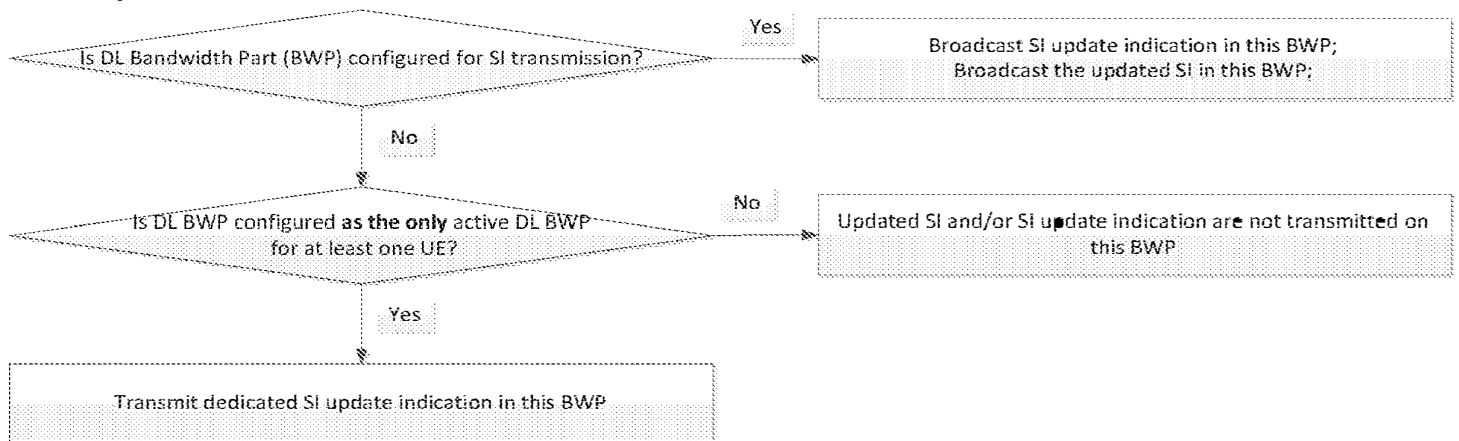


Figure 8A

In an embodiment, after receiving the SI update indication, if atleast one active DL BWP is configured for SI transmission, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request). In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE receives the updated SI in active DL BWP and UE does not sent SI request. Otherwise UE acquire the SI using on demand SI procedure (i.e. UE sends SI request).

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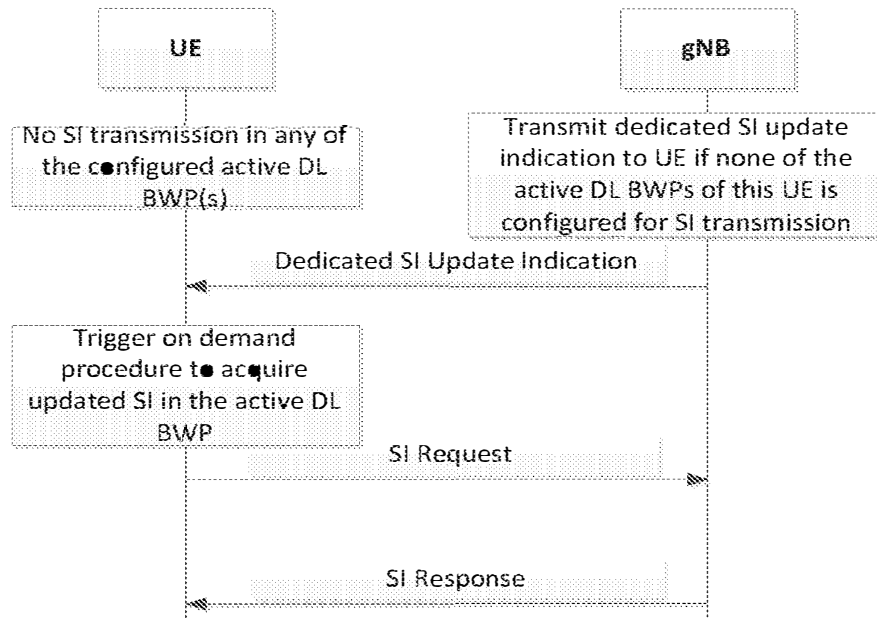


Figure 8B

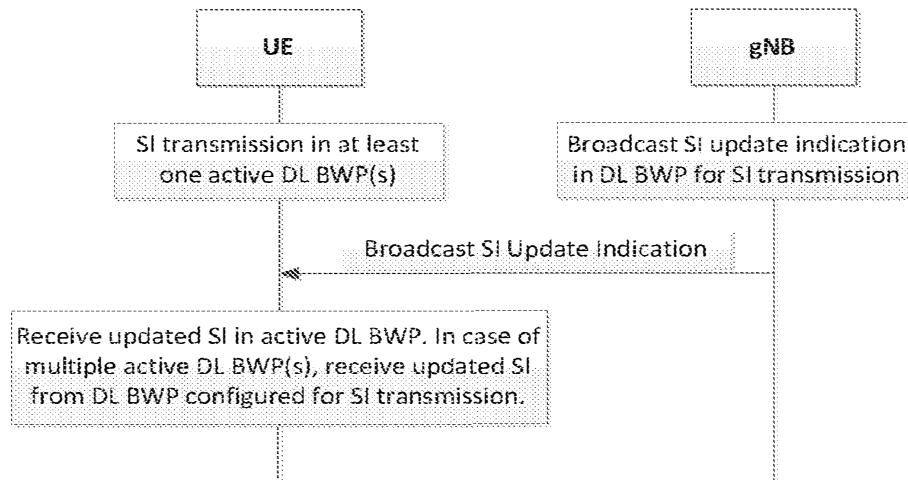


Figure 8C

Method 3: Dedicated SI update indication followed by BWPSwitch procedure initiated by UE

Embodiment 1:

Figure 5A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 9A and Figure 9B illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP without common search space, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH

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carrying DCI for SI update using UE's C-RNTI.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the SI update indication in dedicated RRC signaling.

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured with common search space, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers BWP switch procedure to switch to BWP with common search space. UE then receives the updated SI in active DL BWP. Otherwise if active DL BWP is configured with common search space, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP.

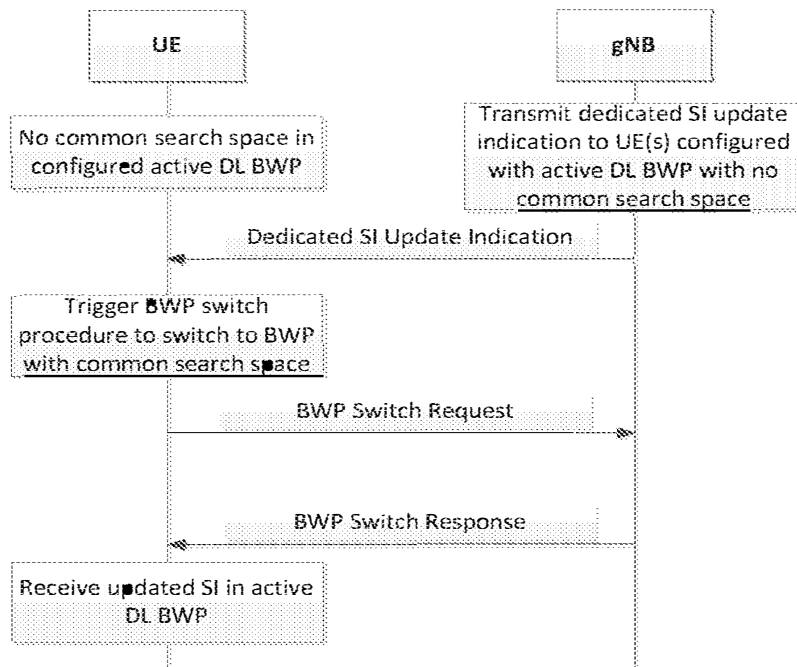


Figure 9A

In an embodiment, after receiving the SI update indication, if the active DL BWP is configured with common search space, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure.

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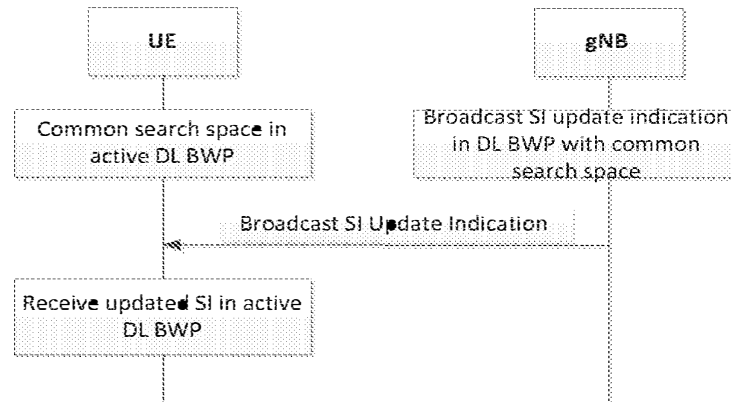


Figure 9B

Embodiment 2:

Figure 6A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 10A and Figure 10B illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are configured without common search space, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB provides the SI update indication in dedicated RRC signaling.

In this method, UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured with common search space, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers BWP switch procedure to switch to BWP with common search space. UE then receives the updated SI in active DL BWP. Otherwise if at least one of the active DL BWPs is configured with common search space, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP. In case of multiple active DL BWP(s) with common search space, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

In an embodiment, after receiving the SI update indication, if atleast one active DL BWP is configured with common search space, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure.

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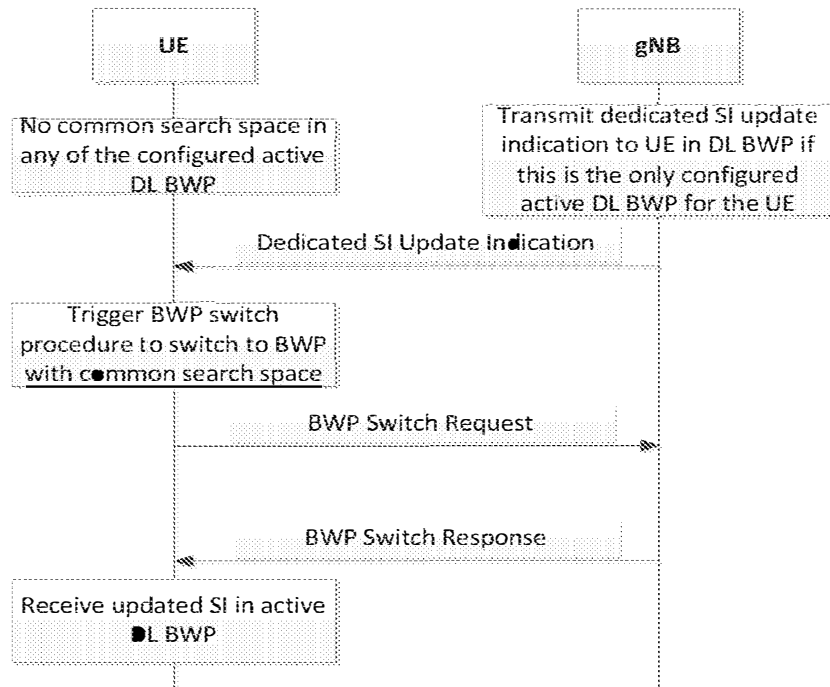


Figure 10A

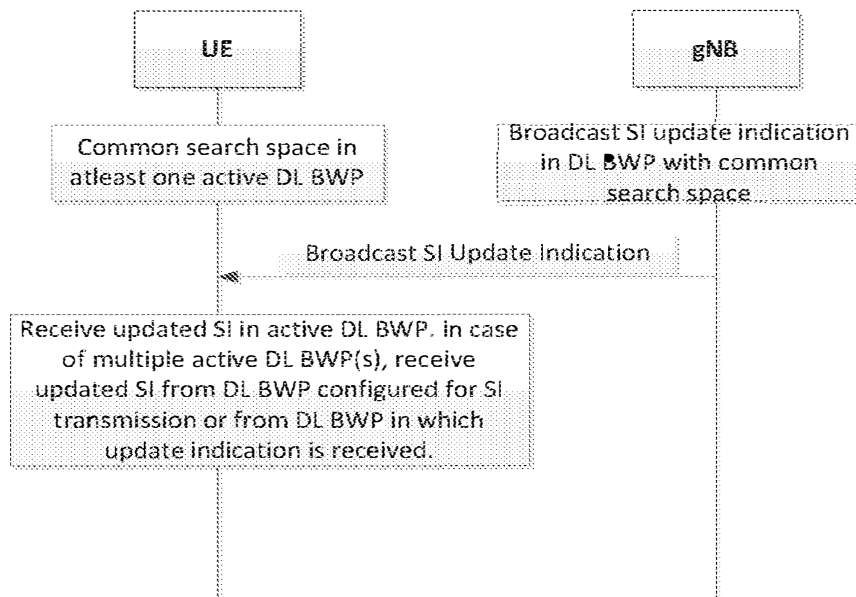


Figure 10B

Embodiment 3:

Figure 7A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 11A and Figure 11B illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP in which SI is not transmitted, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging

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message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In this method, UE is configured with one active DL BWP. If active DL BWP is not configured for SI transmission, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers BWP switch procedure to switch to BWP with common search space. UE then receives the updated SI in active DL BWP. Otherwise if active DL BWP is configured for SI transmission, UE receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP.

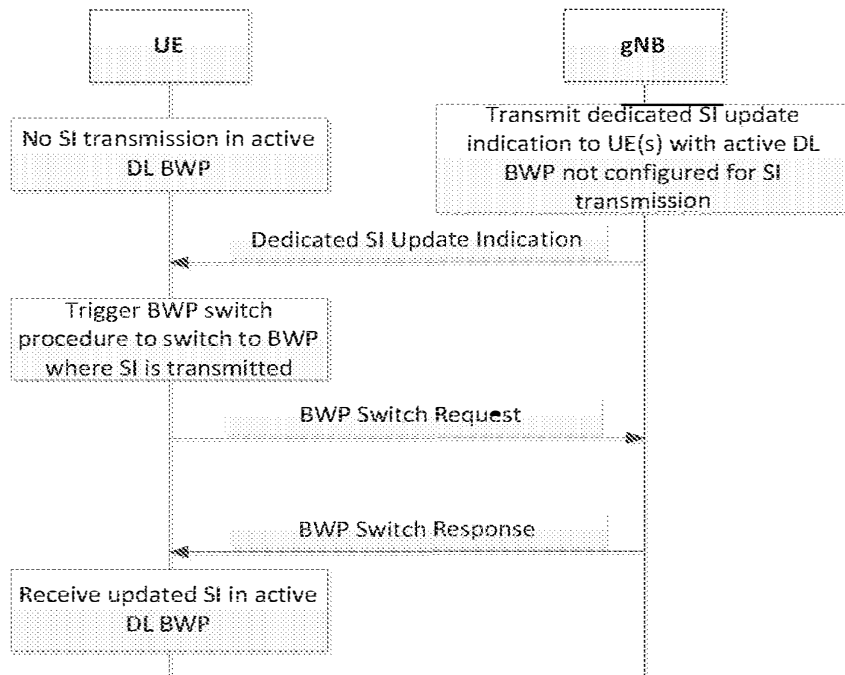


Figure 11A

In an embodiment, after receiving the SI update indication, if active DL BWP is configured for SI transmission, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure.

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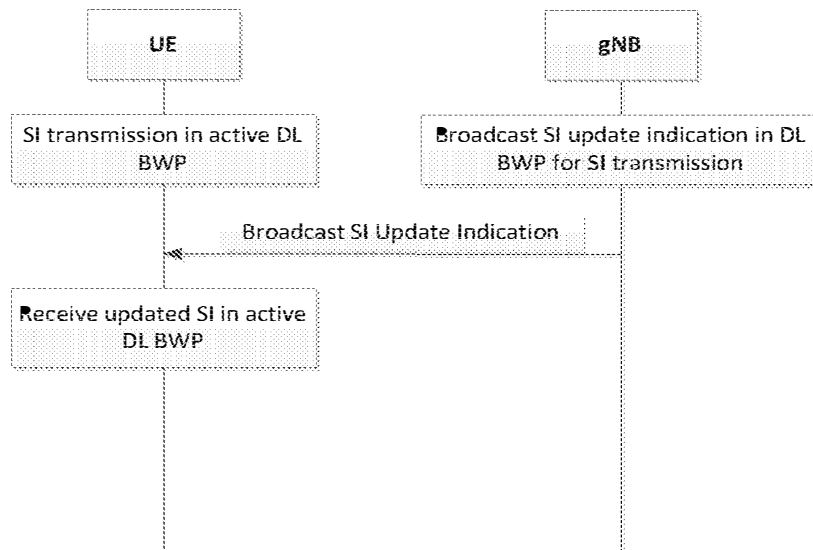


Figure 11B

Embodiment 4:

Figure 8A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 12A and Figure 12B illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are not configured for SI transmission, gNB provides the updated SI indication in dedicated manner. The dedicated SI update indication is transmitted by gNB in UE's active DL BWP. A new RRC message can be defined to transmit SI update indication in dedicated manner. Alternately paging message with SI update indication can be transmitted in dedicated manner by transmitting PDCCH for TB carrying paging message using UE's C-RNTI. Alternately SI update indication can be transmitted in dedicated manner by transmitting PDCCH carrying DCI for SI update using UE's C-RNTI.

In this method, UE is configured with one or more active DL BWPs. If none of the active DL BWPs is configured for SI transmission, UE receives the SI update indication in dedicated RRC signaling in active DL BWP. UE then triggers BWP switch procedure to switch to BWP with common search space. UE then receives the updated SI in active DL BWP. Otherwise, if at least one of the active DL BWPs is configured for SI transmission, UE receives the SI update indication in broadcast signaling in active DL BWP and updated SIs in the active DL BWP configured for SI transmission. In case of multiple active DL BWP(s) configured for SI transmission, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

In an embodiment, after receiving the SI update indication, if at least one active DL BWP is configured for SI transmission, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in broadcast signaling, UE receives the updated SI in active DL BWP and UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure. In another embodiment, after receiving the SI update indication, if the SI updated was received in dedicated RRC signaling, UE does not trigger BWP switch procedure. Otherwise UE trigger BWP switch procedure.

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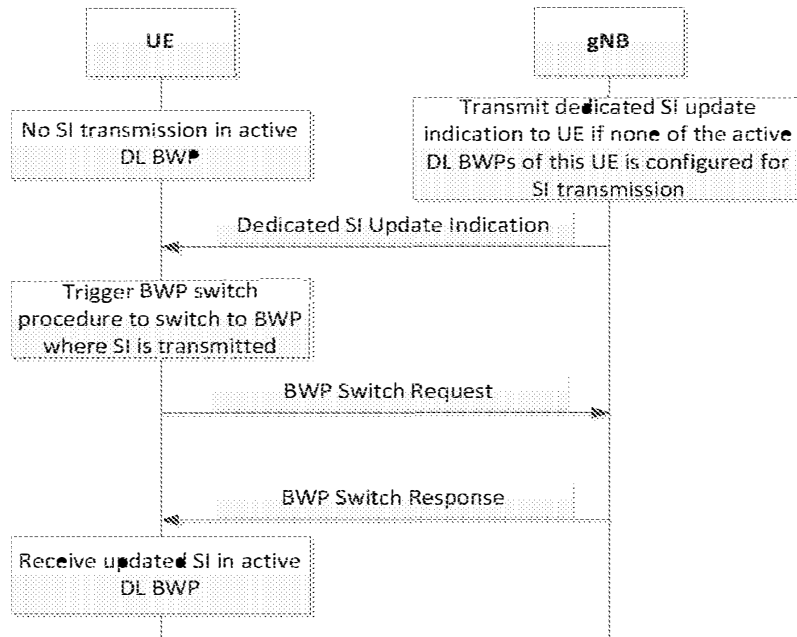


Figure 12A

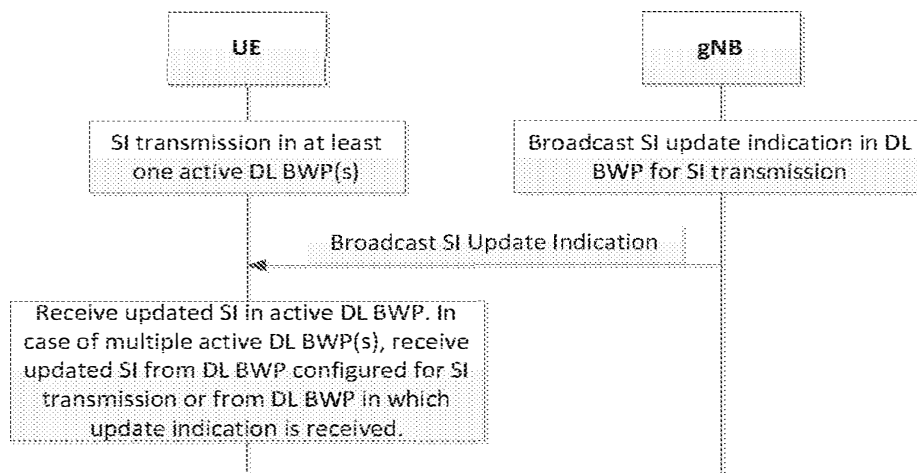


Figure 12B

In an embodiment 1, 2, 3 and 4 of method 3 explained above, instead of initiating BWP switching procedure after receiving the SI update indication, UE may autonomously switch to BWP configured for SI transmission for a predefined period (i.e. the period in which UE acquires the updated SI. For e.g. if SI update indication is received in modification period N, updated SI is received in modification period N+1). The predefined period can be indicated in SI update indication. BWP for SI transmission can be indicated in SI update indication or it can be configured to UE in RRC signaling or it can be indicated in minimum system information.

Method 4: BWP Switch procedure initiated by NW followed by updated SI delivery

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Embodiment 1:

Figure 13A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 13B and Figure 13C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP without common search space, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space. UE then receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP. In an embodiment, SI update indication can be included (e.g. in BWP switch request) in BWP switch procedure. After BWP switching UE receives the updated SI in active DL BWP.

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as active BWP for at least one UE and it does not include CORESET with common search space, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space.

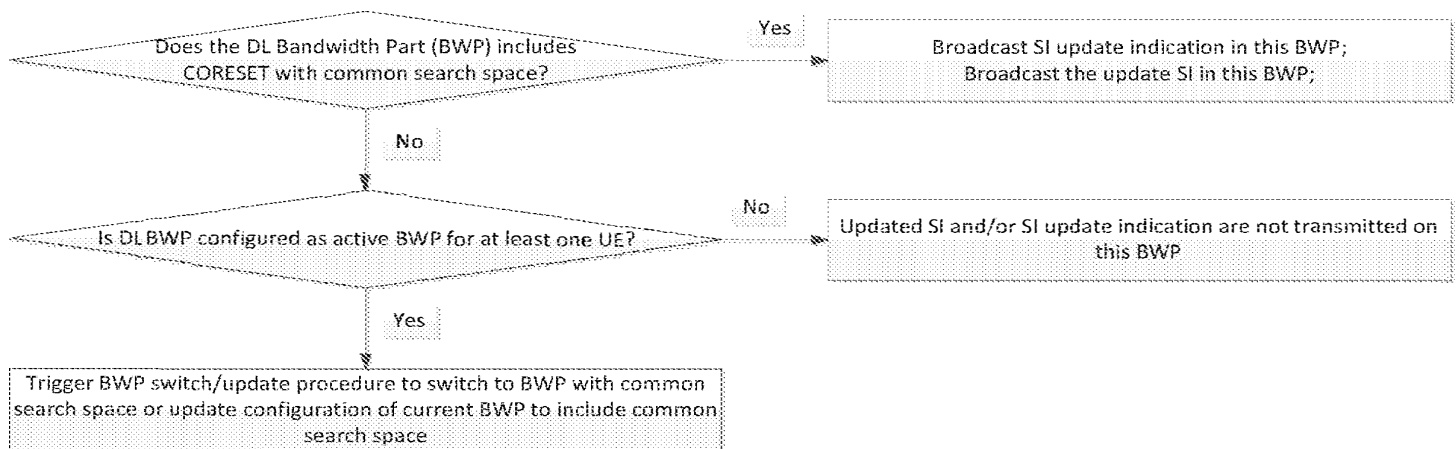


Figure 13A

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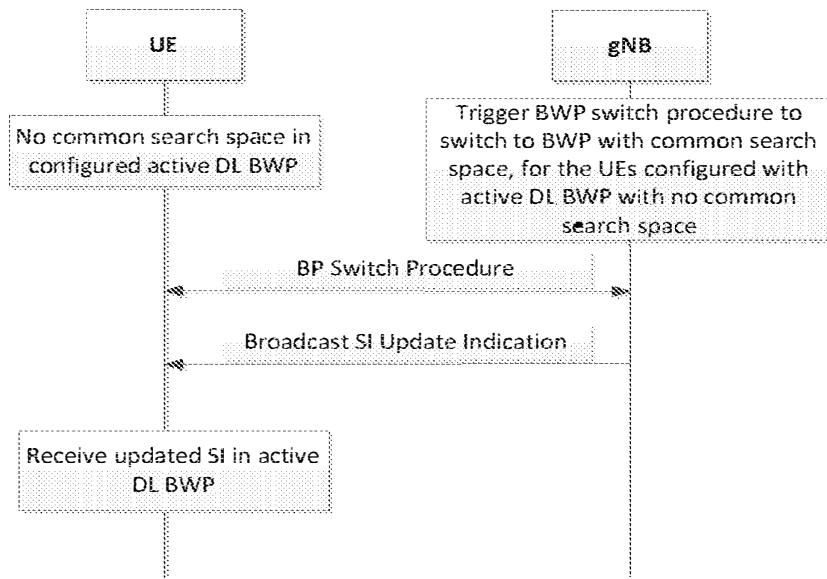


Figure 13B

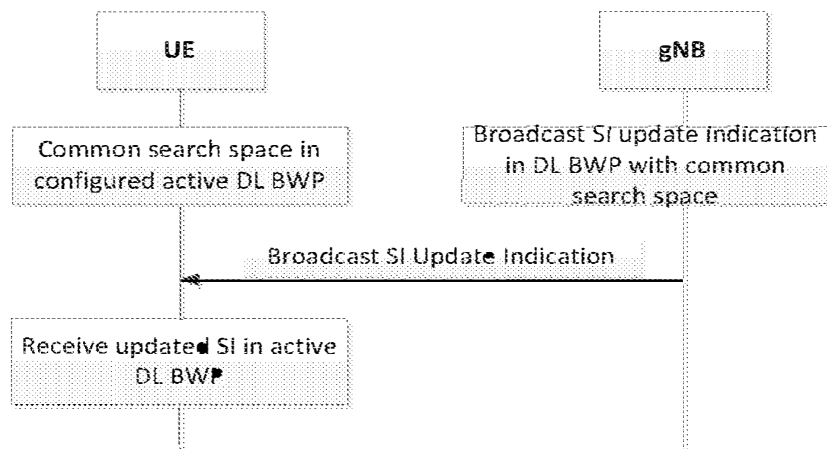


Figure 13C

Embodiment 2:

Figure 14A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 14B and Figure 14C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are configured without common search space, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space. GNB then broadcast SI update indication and updated SI. UE then receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP. In case of multiple active DL BWP(s) with common search space, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

In an embodiment, SI update indication can be included (e.g. in BWP switch request) in BWP switch procedure. After BWP switching UE receives the updated SI in active DL BWP.

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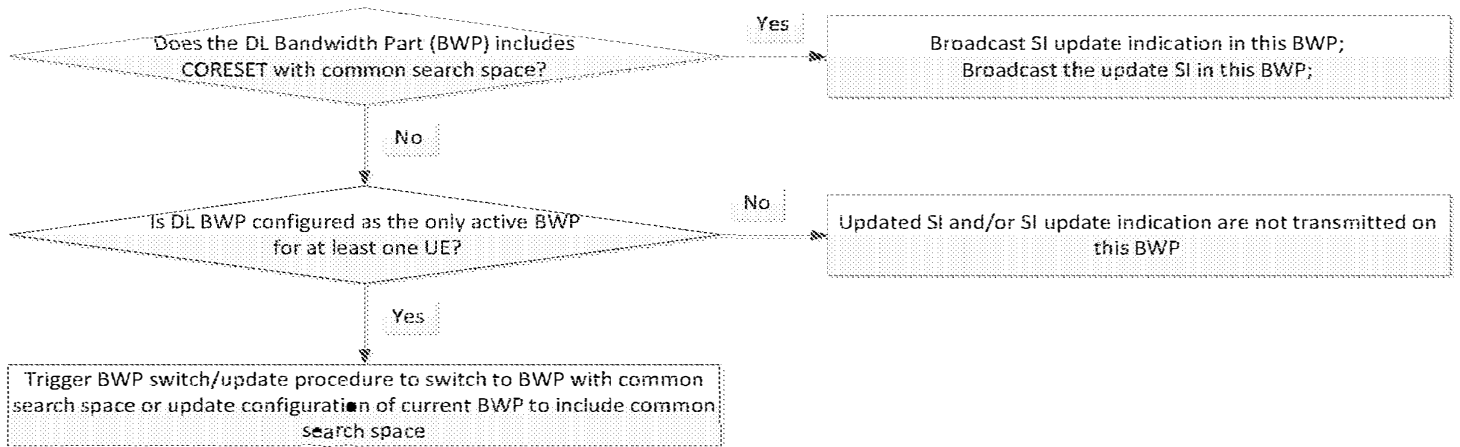


Figure 14A

In an embodiment, if the DL BWP includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP.

In another embodiment, if the DL BWP is configured as the only active BWP for at least one UE and it includes CORESET with common search space, gNB broadcast SI update indication in this BWP and also broadcast the updated SI in this BWP. If the DL BWP is configured as the only active BWP for at least one UE and it does not include CORESET with common search space, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space.

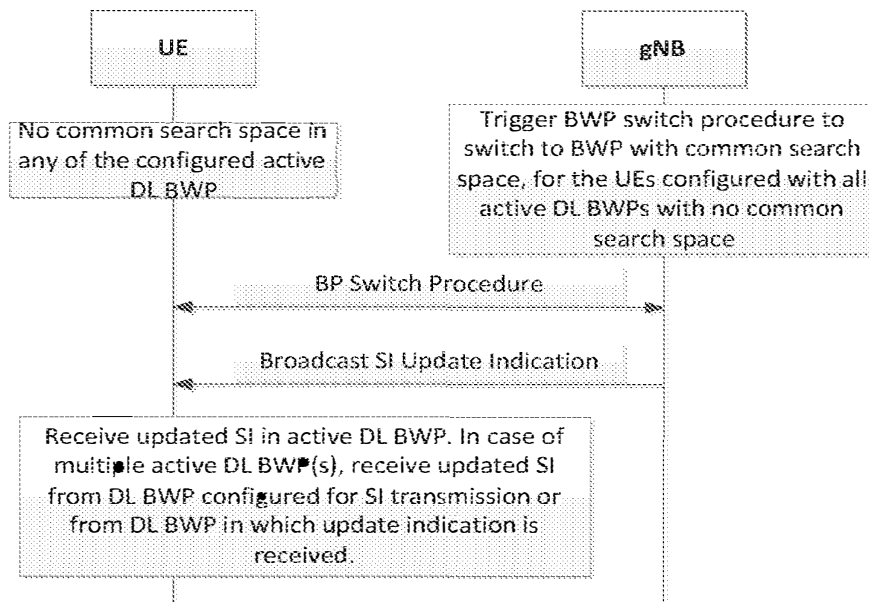


Figure 14B

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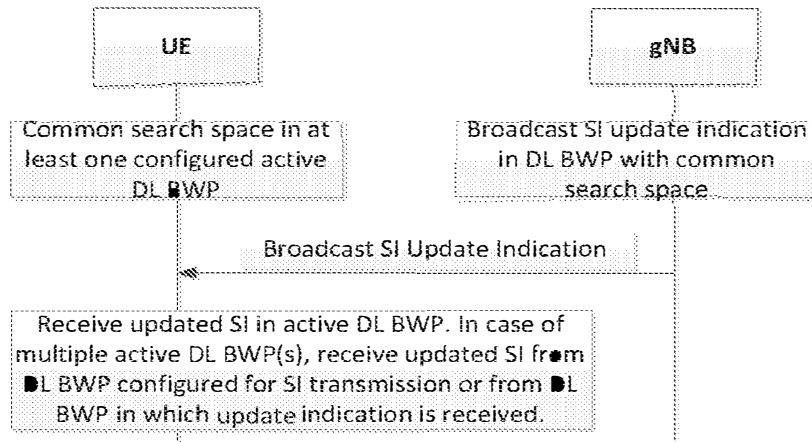


Figure 14C

Embodiment 3:

Figure 15A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 15B and Figure 15C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with active DL BWP in which SI is not transmitted, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space. GNB then broadcast SI update indication and updated SI. UE then receives the SI update indication in broadcast signaling in active DL BWP. UE then receives the updated SI in active DL BWP.

In an embodiment, SI update indication can be included (e.g. in BWP switch request) in BWP switch procedure. After BWP switching UE receives the updated SI in active DL BWP.

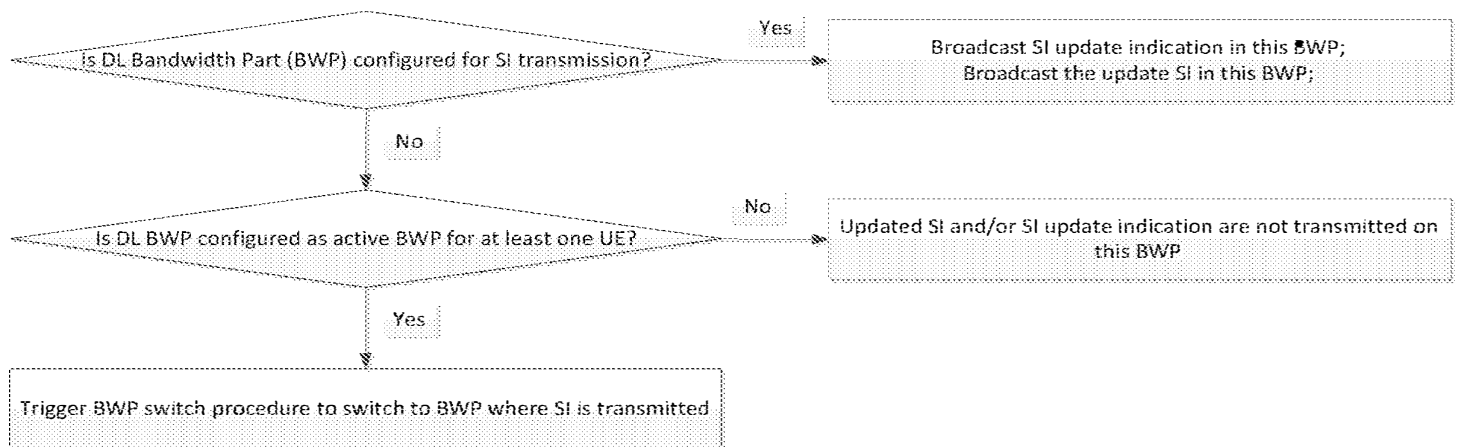


Figure 15A

INVENTION DISCLOSURE FORM

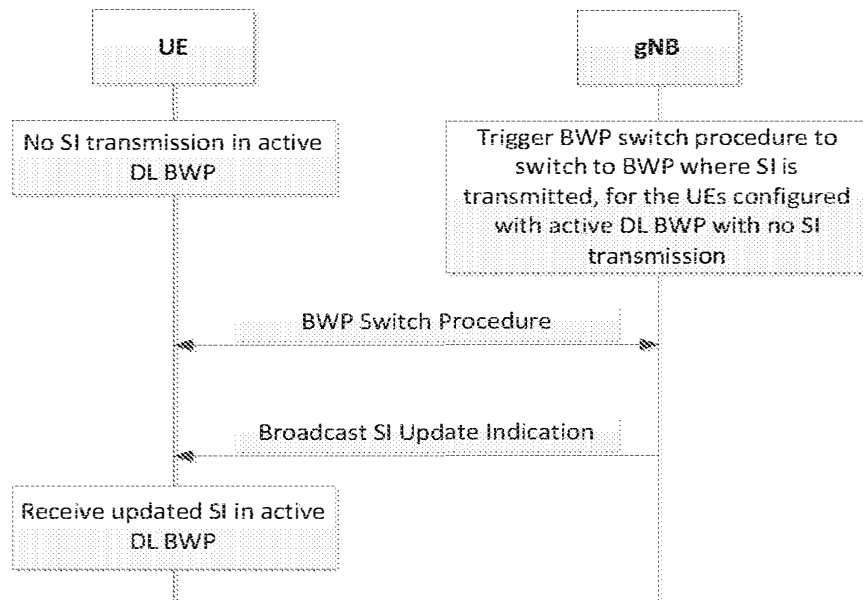


Figure 15B

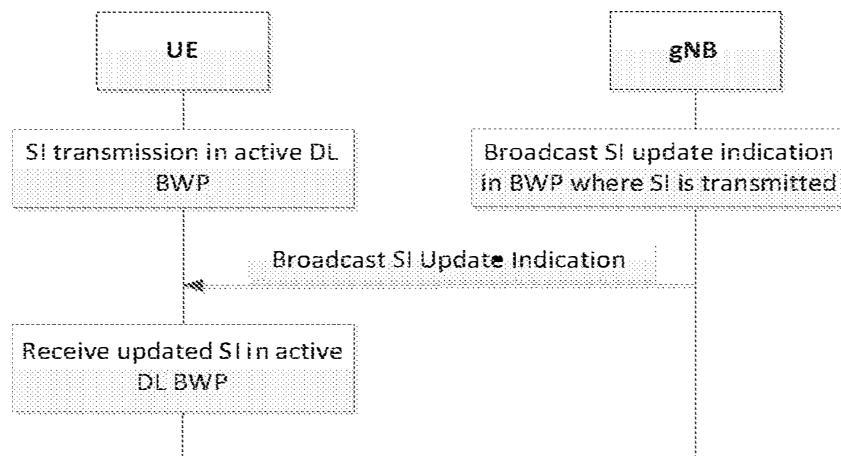


Figure 15C

Embodiment 4:

Figure 16A illustrates the gNB operation for updating SI in a system wherein multiple DL BWPs are configured on a carrier. The gNB performs this operation for each configured DL BWP. Figure 16B and Figure 16C illustrates the signaling flow between UE and gNB in the proposed method. In this method we propose that for one or more UE(s) which are configured with one or more active DL BWPs and each of the active DL BWPs are not configured for SI transmission, gNB triggers the BWP switch or update procedure to switch to BWP with common search space or update configuration of current BWP to include common search space. GNB then broadcast SI update indication and updated SI. UE then receives the updated SI in active DL BWP. In case of multiple active DL BWP(s) with common search space, UE can receive updated SI from DL BWP indicated (e.g. in update indication) by network for SI transmission or UE can receive updated SI from DL BWP in which it has received update indication.

In an embodiment, SI update indication can be included (e.g. in BWP switch request) in BWP switch procedure. After BWP switching UE receives the updated SI in active DL BWP.

INVENTION DISCLOSURE FORM

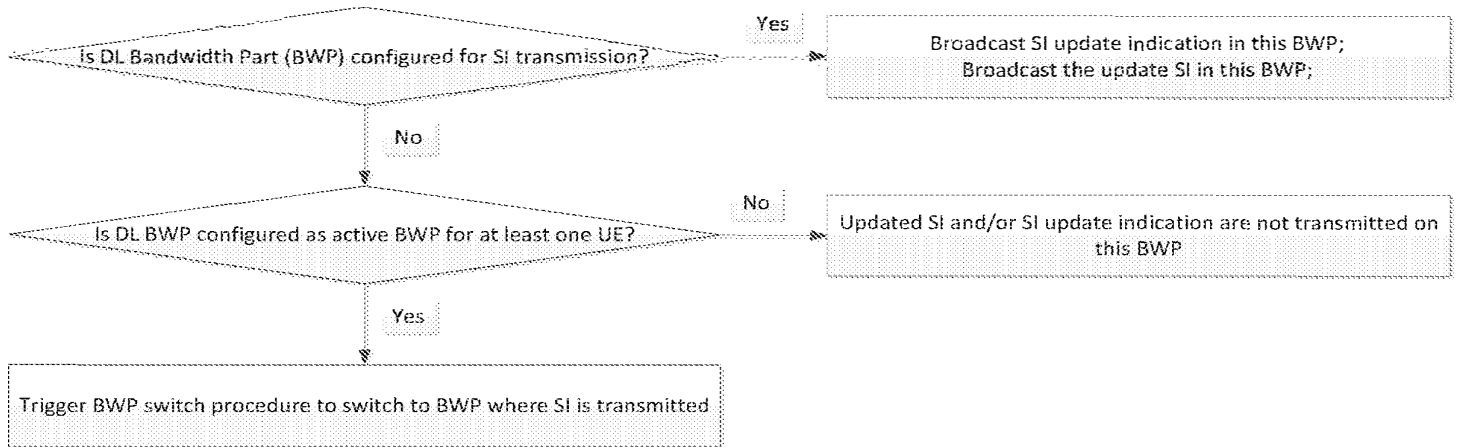


Figure 16A

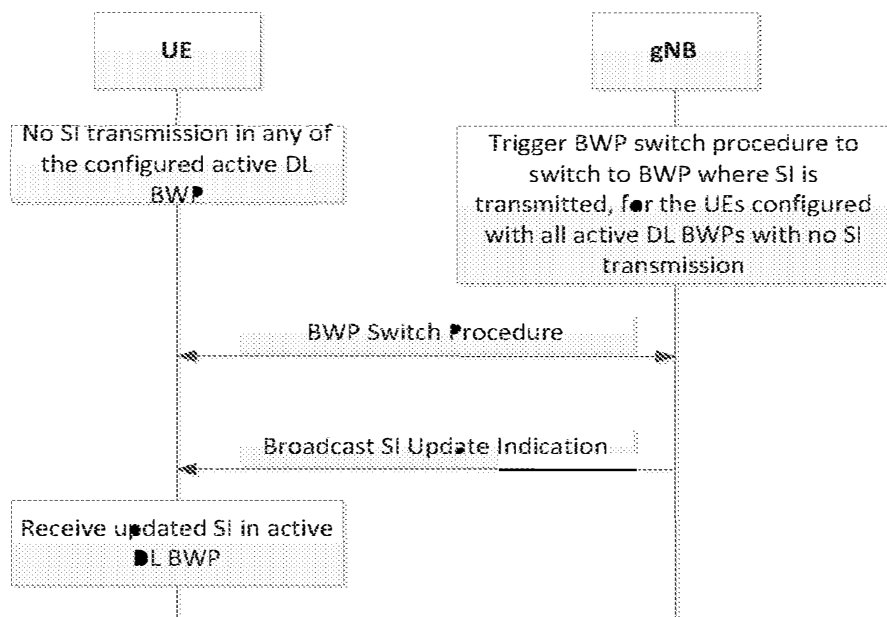


Figure 16B

INVENTION DISCLOSURE FORM

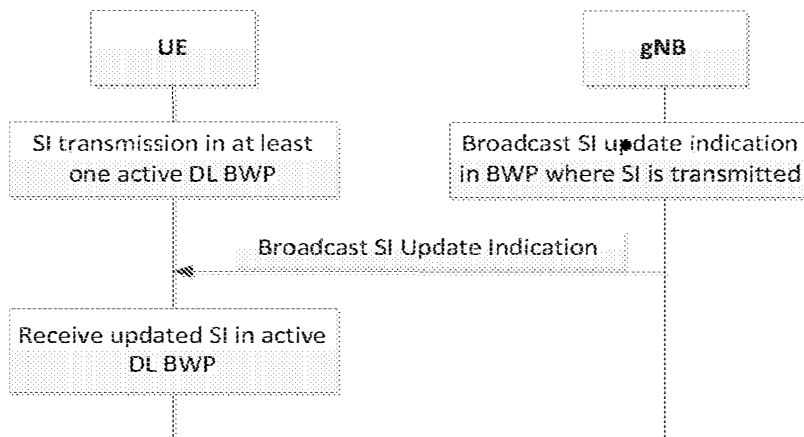


Figure 16C

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Anil		AGIWAL	
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service				
City	Suwon-si	Country of Residence ⁱ	KR	

Mailing Address of Inventor:

Address 1	No. 104-1902, 363, Hyowon-ro, Yeongtong-gu			
Address 2				
City	Suwon-si, Gyeonggi-do	State/Province		
Postal Code		Country ⁱ	KR	

Inventor 2 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Peng		XUE	
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service				
City	Suwon-si	Country of Residence ⁱ	KR	

Mailing Address of Inventor:

Address 1	No. 3008-1101, 134, Beopjo-ro, Yeongtong-gu			
Address 2				
City	Suwon-si, Gyeonggi-do	State/Province		
Postal Code		Country ⁱ	KR	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

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Correspondence Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	68103		
Email Address	usdocketing@jeffersonip.com	Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		
Attorney Docket Number	0203-2117	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	68103 Ex. 1018		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)	Remove
Additional Foreign Priority Data may be generated within this form by selecting the Add button.				Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	0203-2117
	Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
------------------	---	---------------------------------------

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
---	--	----------------

Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest
---	--

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Samsung Electronics Co., Ltd.
-------------------	-------------------------------

Mailing Address Information For Applicant:

Address 1	129, Samsung-ro, Yeongtong-gu		
Address 2			
City	Suwon-si, Gyeonggi-do	State/Province	
Country	KR	Postal Code	16677
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
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Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is **not** checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Gregory L. CLINTON/		Date (YYYY-MM-DD)	2017-08-10
First Name	Gregory	Last Name	Clinton	Registration Number
				59134
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0203-2117
		Application Number	
Title of Invention	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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Application Number:				
Filing Date:				
Title of Invention:	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS			
First Named Inventor/Applicant Name:	Anil AGIWAL			
Filer:	Gregory Laurence Clinton/Jung Park			
Attorney Docket Number:	0203-2117			
Filed as Large Entity				
Filing Fees for Provisional				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
PROVISIONAL APPLICATION FILING	1005	1	260	260
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				260

Electronic Acknowledgement Receipt

EFS ID:	30041244
Application Number:	62543581
International Application Number:	
Confirmation Number:	9333
Title of Invention:	SYSTEM AND METHOD OF SI TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS
First Named Inventor/Applicant Name:	Anil AGIWAL
Customer Number:	68103
Filer:	Gregory Laurence Clinton/Jung Park
Filer Authorized By:	Gregory Laurence Clinton
Attorney Docket Number:	0203-2117
Receipt Date:	10-AUG-2017
Filing Date:	
Time Stamp:	15:15:17
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 260
RAM confirmation Number	081117INTEFSW15154600
Deposit Account	504100
Authorized User	JUNG HYUN PARK

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37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

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37 CFR 1.19 (Document supply fees)
37 CFR 1.20 (Post Issuance fees)
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	0203-2117ProvisionalApplicationTransmittalAsFiled.pdf	2071668	no	3
			84f13feafcc140c25af4ea055ae53a5d0bb18f6a		
Warnings:					
Information:					
2		0203-2117ProvisionalApplicationAsFiled.pdf	2761861	yes	30
			fb2bba5f2cf5b6309715d10139d26bc7b02ffca62		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Power of Attorney		29	30	
	Specification		1	28	
Warnings:					
Information:					
3	Application Data Sheet	0203-2117ApplicationDataSheetAsFiled.pdf	1823188	no	8
			a5a80705469c1dd419110a905bb917c70b004ca8		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	29936	no	2
			4f8d87e8d20858ca01965512dab173fc2d592c36		
Warnings:					
Information:					
Total Files Size (in bytes):			6686653		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

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Middle Name

Family Name

City

State

Country i

Anil

AGIWAL

Suwon-si

KR

Inventor 2

[Remove](#)

Given Name

Middle Name

Family Name

City

State

Country i

Peng

XUE

Suwon-si

KR

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

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Title of Invention

SYSTEM AND METHOD OF SIGNAL TRANSMISSION AND RECEPTION ON A CARRIER SUPPORTING MULTIPLE BANDWIDTH PARTS

Attorney Docket Number (if applicable)

0203-2117

Correspondence Address

Direct all correspondence to (select one):

☒ The address corresponding to Customer Number

☐ Firm or Individual Name

Customer Number

68103

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

- ☐ Yes, applicant qualifies for small entity status under 37 CFR 1.27
- ☒ No

Warning

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	Gregory L. CLINTON/		Date (YYYY-MM-DD)	2017-08-10	
First Name	Gregory	Last Name	Clinton	Registration Number (If appropriate)	59134

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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