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BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) **Title:** A METHOD TO OPTIMIZE TARGET CELL SELECTION IN DYNAMIC AAS-BASED DEPLOYMENTS

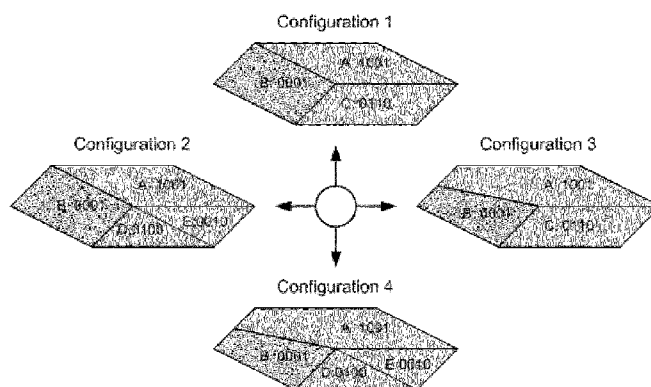


Fig. 2

(57) **Abstract:** A method is described, which comprises serving, in a network control element, a plurality of cells and assigning to each cell a coverage identifier, wherein cells providing coverage for the same area have matching coverage identifiers. A further method comprises initiating, in a network control element, a handover of a user equipment to a target network control element which is configured to serve a plurality of cells, wherein to each cell a coverage identifier is assigned, and preparing cells served by the target network control element based on the coverage identifiers by comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and preparing target cells having coverage identifiers matching with the target coverage identifier. Also, corresponding apparatuses for carrying out the methods are described.



A method to optimize target cell selection in dynamic AAS-based deployments

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Field of the Invention

The present invention relates to an apparatus, a method and a computer program product for optimizing target cell selection in dynamic AAS-based deployments.

10

Related background Art

The following meanings for the abbreviations used in this specification apply:

15

AAS Active Antenna System

eNB evolved NodeB

HOF Handover Failure

20 RAT Radio Access Technology

RLF Radio Link Failure

UE User equipment

25 Embodiments of the present invention relate to the field of mobile radio communications with focus on dynamic cell deployment changes enabled by active antenna systems (AAS).

Dynamic cell deployment changes are basically changes in the cell configuration of an eNB, which may include reshaping of cells and/or splitting cells or combining cells, which is possible by active antenna systems. This is carried in order to handle different load situations, for example.

30

Due to such AAS-based deployment changes, intra LTE mobility failures may occur due to AAS-based reconfigurations. Thus, a general objective, in the context of enabling automatic AAS-based deployment changes, is to identify means to reduce such intra LTE mobility failures due to AAS-based reconfigurations. The reconfigurations that are seen relevant are cell splitting/merging and cell shaping (when it affects neighbour relations).

10 In the course of the discussion, it has been observed that the incoming
— HO failure can be mitigated by successful re-establishment. This,
however, means that the source eNB must know before sending the
handover request message which cells are to be prepared, considering all
the possible configuration of the target (it is assumed all possible cell
15 configurations of the neighboring eNBs are known to the source eNB).
Without knowing details about the coverage of all these cells, this may
mean that many cells need to be prepared. This has been considered as a
— problem that may need a solution (if the total number of all cells in the
target eNB is more than 33, it is not even technically possible to prepare
20 all).

Therefore, the problem to solve is how to enable the source eNB to limit the number of cells to be prepared.

25 In general, the problem of limiting the number of cells to prepare is new,
resulting from fact that deployment may change dynamically, and thus
has not been addressed explicitly so far. Multiple preparation is needed to
increase the probability that re-establishment to an alternative cell is
successful if handover to the primarily intended target cell fails.
30 Alternatively, it has been noted that the failure may be avoided
completely, if the target postpones the AAS reconfiguration until the
incoming HO is completed. However, in case of high load (which is likely
to be a trigger for e.g. cell splitting), the arrival rate of HOs may block

the reconfiguration for a long while, or cause RLFs due to too late handover, if a HO is postponed to execute the reconfiguration.

Summary of the Invention

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Embodiments of the present invention address this situation and aim to overcome the above-described problem and to provide a mechanism by which the number cells to be prepared in connection with a handover.

10 According to a first aspect of the present invention an apparatus is
— provided which comprises a processor and a memory for storing
instructions to be executed by the processor, wherein the processor is
configured to serve a plurality of cells and to assign to each cell a
coverage identifier, wherein cells providing coverage for the same area
15 have matching coverage identifiers.

— According to a second aspect of the present invention a method is
provided which comprises

20 serving, in a network control element, a plurality of cells and
assigning to each cell a coverage identifier,
wherein cells providing coverage for the same area have matching
coverage identifiers.

The first aspect and the second aspect may be modified as follows:

25

For example, matching coverage identifiers may be coverage identifiers,
of which an arithmetic or logical operation on them leads to a
predetermined result.

30 Coverage identifiers may be in the form of a bit string, wherein each bit
indicates a part of the coverage of the plurality of the cells served by the
network control element.

Then, matching coverage identifiers may be coverage identifiers, of which bitwise AND operation leads to a non-zero result.

One or more cells of the plurality of cells may be modifiable in terms of
5 coverage deployment.

Moreover, at least one of the cells may be reshaped, and a new coverage identifier may be assigned to the reshaped cell based on the new coverage area and which matches with the coverage identifier of the cell
10 before reshaping.

Furthermore, at least one neighboring network control element serving cells may be informed about coverage identifiers.

15 According to a third aspect of the present invention an apparatus is provided which comprises a processor and a memory for storing instructions to be executed by the processor, wherein the processor is configured to initiate a handover of a user equipment to a target network control element which is configured to serve a plurality of cells, wherein
20 to each cell a coverage identifier is assigned, and to prepare cells served by the target network control element based on the coverage identifiers by comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and preparing target cells having coverage
25 identifiers matching with the target coverage identifier.

According to a fourth aspect of the present invention a method is provided which comprises

initiating, in a network control element, a handover of a user
30 equipment to a target network control element which is configured to serve a plurality of cells, wherein to each cell a coverage identifier is assigned, and

preparing cells served by the target network control element based

on the coverage identifiers by

comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and

- 5 preparing target cells having coverage identifiers matching with the target coverage identifier.

The third aspect and the fourth aspect may be modified as follows:

- 10 For example, a coverage identifier of the cell may be compared with the target coverage identifier by applying an arithmetic or logical operation on them, wherein the coverage identifier matches with the target coverage identifier when the arithmetic or logical operation leads to a predetermined result.

15

Furthermore, coverage identifiers may be in the form of a bit string, wherein each bit indicates a part of the coverage of the plurality of the cells served by the target network control element.

- 20 Then, matching coverage identifiers may be coverage identifiers, of which a bitwise AND operation leads to a non-zero result.

One or more cells of the plurality of cells served by the target network control element may be modifiable in terms of coverage deployment.

25

According to a fifth aspect of the present invention a computer program product is provided which comprises code means for performing a method according to the second or fourth aspects and/or their modifications when run on a processing means or module. The computer program product may be embodied on a computer-readable medium.

30

It is to be understood that any of the above modifications can be applied singly or in combination to the respective aspects and/or embodiments to

which they refer, unless they are explicitly stated as excluding alternatives.

Brief Description of the Drawings

5

These and other objects, features, details and advantages will become more fully apparent from the following detailed description of embodiments of the present invention which is to be taken in conjunction with the appended drawings, in which:

10

Fig. 1 shows simplified structures of a source eNB and a target eNB according to an embodiment of the present invention, and

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Fig. 2 illustrates deployment changes and usage of coverage IDs according to an embodiment of the present invention.

Detailed Description of embodiments

20

In the following, description will be made to embodiments of the present invention. It is to be understood, however, that the description is given by way of example only, and that the described embodiments are by no means to be understood as limiting the present invention thereto.

25

As mentioned above, it is an aim to solve the problem that occurs in connection with a handover involving eNBs each serving a plurality of potentially activated cells, blindly a high number of cells would have to be prepared if the cell deployment dynamically changes and the coverage affected by these cells is not known. Therefore, embodiments of the present invention enable the source eNB to limit the number of cells to be prepared to those only that indeed may replace the target cell originally reported from the UE, or in other words share parts of the same coverage.

30

In the following, a general embodiment of the present invention is described by referring to Fig. 1.

5 In particular, Fig. 1 shows several elements involved in the procedure according to embodiments of the present invention, in this case a target eNB 1 and a source eNB 2 as examples for network control elements each serving a plurality of cells.

10 The target eNB 1 comprises a processor 11 and a memory 12 for storing instructions to be executed by the processor. The processor 11 is configured to serve a plurality of cells, and to assign to each cell a coverage identifier, wherein cells providing coverage for the same area have matching coverage identifiers.

15

The target eNB 1 may also comprise a transmitter/receiver 13 which is configured to provide a connection with, e.g., the source eNB 2 and other network elements.

20 The source eNB 2 comprises a processor 21 and a memory 22 for storing instructions to be executed by the processor. The processor 21 is configured to initiate a handover of a user equipment to a target network control element (e.g., target eNB 1) which is configured to serve a plurality of cells, wherein to each cell a coverage identifier is assigned,
25 and to prepare cells served by the target network control element based on the coverage identifiers by comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and preparing target cells having coverage identifiers matching with the target coverage
30 identifier.

The source eNB 2 may also comprise a transmitter/receiver 23 which is configured to provide a connection with, e.g., the source eNB 1 and other

network elements. For example, an X2 interface may be defined between the source eNB 1 and the target eNB 2.

Hence, coverage identifiers are assigned to cells of the target network control element (eNB). Therefore, during a handover, only cells have to
5 be prepared of which the coverage identifiers match with the target coverage identifier of the target cell. Hence, only a limited number of cells have to be prepared for a handover.

10 Matching coverage identifiers may be coverage identifiers, of which an arithmetic or logical operation on them leads to a predetermined result.

In the following, a more detailed embodiment of the present invention is described by referring to Fig. 2.

15

As mentioned above, according to an embodiment, a coverage identifier (coverage ID) is provided that can be assigned to each cell served in an eNB and that may be subject of AAS-based reconfigurations. The cells that have matching coverage IDs provide coverage for the same area and
20 therefore must all be prepared if one of them is reported as a HO target.

From implementation perspective, the coverage ID may have, for example, a form of a bit string, where each bit identifies some part of the coverage. Then, the source eNB needs only to prepare the cells that have
25 coverage ID that can be matched with the coverage ID of the reported target eNB (non-zero result of the bitwise AND operation). This is illustrated in Fig. 2 which shows that 4 configuration states are planned.

In Fig. 2 an example is given, where the eNB (e.g., the target eNB 1 shown in Fig. 1) serves 5 cells. In configuration 1, only three cells are
30 provided, namely cell A (coverage ID: 1001), cell B (coverage ID; 0001) and cell C (coverage ID: 0110).

Cell A may be reshaped so that it takes over part of the original coverage of cell (shown in configuration 3), while cell C may be split into D and E (shown in configuration 2). Configuration 4 shows a combination thereof, i.e., cell A is reshaped in cell C is split into the two cells D and E.

5

The coverage ID of each served cell is represented by a 4-bit string, as indicated in Fig. 2. eNBs exchange the information of coverage IDs with corresponding cell IDs, so that they can identify what is the coverage ID (in the following also referred to as CovID) of a given cell at neighbour eNB.

10

The algorithm at the neighbour eNBs, when one of their UEs reports one of the cells of this eNB as a target, is:

15 If 'A' reported, its CovID is 1001; matches with 0001, which is B
-> prepare A and B;

If 'B' reported, its CovID is 0001; matches with 1001, which is A
-> prepare A and B;

If 'C' reported, its CovID is 0110; matches with 0100 and 0010, which
20 are D and E
-> prepare C, D and E;

If 'D' reported, its CovID is 0100; matches with 0110, which is C
-> prepare C and D;

If 'E' reported, its CovID is 0010; matches with 0110, which is C
25 -> prepare C and E;

In this way, instead of preparing all 5 cells, the source eNB prepares at the maximum 3 cells, usually only 2.

30 According to a further embodiment, the implementation of the principles described above may be based on the extension of the X2 Setup and eNB Configuration Update procedures:

1. The coverage IDs are configured for each eNB at the planning phase, when the allowed deployments are configured, or automatically assigned by eNB's SON functionality when the eNB is deployed;

5 2. At the X2 setup, the eNB signals coverage ID bit string of each of its served cells;

3. When a HO is needed, the source prepares all the cells at target eNB that have at least one '1' at the same position as the reported target
10 (non-zero AND operation).

4. If the planned configurations are modified later, eNB configuration update is used to inform neighbours about changed coverage IDs of the served cells (existing and new ones, if new configurations are added).

15

Hence, according to embodiments, target cell selection in dynamic AAS-based deployments is optimized.

It is noted that the embodiments and the present invention in general is
20 not limited to the specific examples given above.

For example, in the above embodiment described by referring to Fig. 2, a bit string was used for different coverage IDs, so that matching coverage IDs can be found by applying a bitwise AND operation. However,
25 matching coverage IDs can be established in a different way. For example, the coverage IDs may be in the form of integer numbers, and matching coverage IDs (i.e., cells which provide coverage for the same area or at least partly the same area) may be in a certain number range (e.g., in the example of Fig. 2, cells A and B may have coverage IDs
30 between 1 and 10, and cells C, D and E may have coverage IDs between 11 and 20 or the like). Further alternatively, the coverage IDs may be established in a way that matching coverage IDs have the same sum of

the digits or even be simply identified with the same number so that the matching is just comparing the number, or the like

According to another aspect of embodiments of the present invention, an

5 apparatus is provided which comprises

means for serving a plurality of cells, and

means for assigning to each cell a coverage identifier,

wherein cells providing coverage for the same area have matching coverage identifiers.

10

According to a further aspect of embodiments of the present invention, an apparatus is provided which comprises

means for initiating a handover of a user equipment to a target network control element which is configured to serve a plurality of cells,

15 wherein to each cell a coverage identifier is assigned, and

means for preparing cells served by the target network control element based on the coverage identifiers by comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and preparing target cells having coverage identifiers matching with the target coverage identifier.

20

It is to be understood that any of the above modifications can be applied singly or in combination to the respective aspects and/or embodiments to which they refer, unless they are explicitly stated as excluding alternatives.

25

For the purpose of the present invention as described herein above, it should be noted that

30 - method steps likely to be implemented as software code portions and being run using a processor at a network element or terminal (as examples of devices, apparatuses and/or modules thereof, or as examples of entities including apparatuses and/or modules therefore),

are software code independent and can be specified using any known or future developed programming language as long as the functionality defined by the method steps is preserved;

- generally, any method step is suitable to be implemented as software or by hardware without changing the idea of the invention in terms of the functionality implemented;

- method steps and/or devices, units or means likely to be implemented as hardware components at the above-defined apparatuses, or any module(s) thereof, (e.g., devices carrying out the functions of the apparatuses according to the embodiments as described above, eNode-B etc. as described above) are hardware independent and can be implemented using any known or future developed hardware technology or any hybrids of these, such as MOS (Metal Oxide Semiconductor), CMOS (Complementary MOS), BiMOS (Bipolar MOS), BiCMOS (Bipolar CMOS), ECL (Emitter Coupled Logic), TTL (Transistor-Transistor Logic), etc., using for example ASIC (Application Specific IC (Integrated Circuit)) components, FPGA (Field-programmable Gate Arrays) components, CPLD (Complex Programmable Logic Device) components or DSP (Digital Signal Processor) components;

- devices, units or means (e.g. the above-defined apparatuses, or any one of their respective means) can be implemented as individual devices, units or means, but this does not exclude that they are implemented in a distributed fashion throughout the system, as long as the functionality of the device, unit or means is preserved;

- an apparatus may be represented by a semiconductor chip, a chipset, or a (hardware) module comprising such chip or chipset; this, however, does not exclude the possibility that a functionality of an apparatus or module, instead of being hardware implemented, be implemented as software in a (software) module such as a computer program or a computer program product comprising executable software code portions for execution/being run on a processor;

- a device may be regarded as an apparatus or as an assembly of more than one apparatus, whether functionally in cooperation with each other

or functionally independently of each other but in a same device housing, for example.

5 It is noted that the embodiments and examples described above are provided for illustrative purposes only and are in no way intended that the present invention is restricted thereto. Rather, it is the intention that all variations and modifications be included which fall within the spirit and scope of the appended claims.

10

CLAIMS

1. An apparatus comprising
a processor and
5 a memory for storing instructions to be executed by the processor,
wherein the processor is configured
to serve a plurality of cells and
to assign to each cell a coverage identifier,
wherein cells providing coverage for the same area have matching
10 coverage identifiers.
2. The apparatus according to claim 1, wherein matching coverage
identifiers are coverage identifiers, of which an arithmetic or logical
operation on them leads to a predetermined result.
- 15 3. The apparatus according to claim 1 or 2, wherein coverage
identifiers are in the form of a bit string, wherein each bit indicates a part
of the coverage of the plurality of the cells served by the apparatus.
- 20 4. The apparatus according to claim 3, wherein matching coverage
identifiers are coverage identifiers, of which bitwise AND operation leads
to a non-zero result.
5. The apparatus according to any one of the claims 1 to 4, wherein
25 one or more cells of the plurality of cells are modifiable in terms of
coverage deployment.
6. The apparatus according to any one of the claims 1 to 5, wherein
the processor is configured
30 to reshape at least one of the cells, and
to assign a new coverage identifier to the reshaped cell based on
the new coverage area and which matches with the coverage identifier of
the cell before reshaping.

7. The apparatus according to any one of the claims 1 to 6, wherein the processor is configured

to inform at least one neighboring network control element serving
5 cells about coverage identifiers.

8. An apparatus comprising
a processor and

a memory for storing instructions to be executed by the processor,
10 wherein the processor is configured

to initiate a handover of a user equipment to a target network
control element which is configured to serve a plurality of cells, wherein
to each cell a coverage identifier is assigned, and

to prepare cells served by the target network control element
15 based on the coverage identifiers by comparing a target coverage
identifier indicating a target cell for the handover with the coverage
identifiers of the cells served in the target network control element, and
preparing target cells having coverage identifiers matching with the
target coverage identifier.

20

9. The apparatus according to claim 8, wherein the processor is
configured to compare a coverage identifier of the cell with the target
coverage identifier by applying an arithmetic or logical operation on
them, wherein the coverage identifier matches with the target coverage
25 identifier when the arithmetic or logical operation leads to a
predetermined result.

10. The apparatus according to claim 8 or 9, wherein coverage
identifiers are in the form of a bit string, wherein each bit indicates a part
30 of the coverage of the plurality of the cells served by the target network
control element.

11. The apparatus according to claim 10, wherein matching coverage

identifiers are coverage identifiers, of which a bitwise AND operation leads to a non-zero result.

12. The apparatus according to any one of the claims 8 to 11, wherein
5 one or more cells of the plurality of cells served by the target network control element are modifiable in terms of coverage deployment.

13. A method comprising
serving, in a network control element, a plurality of cells and
10 assigning to each cell a coverage identifier,
— wherein cells providing coverage for the same area have matching coverage identifiers.

14. The method according to claim 13, wherein matching coverage
15 identifiers are coverage identifiers, of which an arithmetic or logical operation on them leads to a predetermined result.

15. The method according to claim 13 or 14, wherein coverage
identifiers are in the form of a bit string, wherein each bit indicates a part
20 of the coverage of the plurality of the cells served by the apparatus.

16. The method according to claim 15, wherein matching coverage
identifiers are coverage identifiers, of which bitwise AND operation leads
to a non-zero result.

25

17. The method according to any one of the claims 13 to 16, wherein
one or more cells of the plurality of cells are modifiable in terms of
coverage deployment.

30 18. The method according to any one of the claims 13 to 17, further comprising

reshaping at least one of the cells, and
assigning a new coverage identifier to the reshaped cell based on

the new coverage area and which matches with the coverage identifier of the cell before reshaping.

19. The method according to any one of the claims 13 to 18, further
5 comprising
informing at least one neighboring network control element serving cells about coverage identifiers.

20. A method comprising
10 initiating, in a network control element, a handover of a user equipment to a target network control element which is configured to serve a plurality of cells, wherein to each cell a coverage identifier is assigned, and
preparing cells served by the target network control element based
15 on the coverage identifiers by
comparing a target coverage identifier indicating a target cell for the handover with the coverage identifiers of the cells served in the target network control element, and
preparing target cells having coverage identifiers matching
20 with the target coverage identifier.

21. The method according to claim 20, further comprising
comparing a coverage identifier of the cell with the target coverage identifier by applying an arithmetic or logical operation on them, wherein
25 the coverage identifier matches with the target coverage identifier when the arithmetic or logical operation leads to a predetermined result.

22. The method according to claim 20 or 21, wherein coverage identifiers are in the form of a bit string, wherein each bit indicates a part
30 of the coverage of the plurality of the cells served by the target network control element.

23. The method according to claim 22, wherein matching coverage

identifiers are coverage identifiers, of which a bitwise AND operation leads to a non-zero result.

24. The method according to any one of the claims 20 to 12, wherein
5 one or more cells of the plurality of cells served by the target network control element are modifiable in terms of coverage deployment.

25. A computer program product comprising code means for
performing a method according to any one of the claims 13 to 24 when
10 run on a processing means or module.

26. The computer program product according to claim 25, wherein the
computer program product is embodied on a computer-readable medium.

15

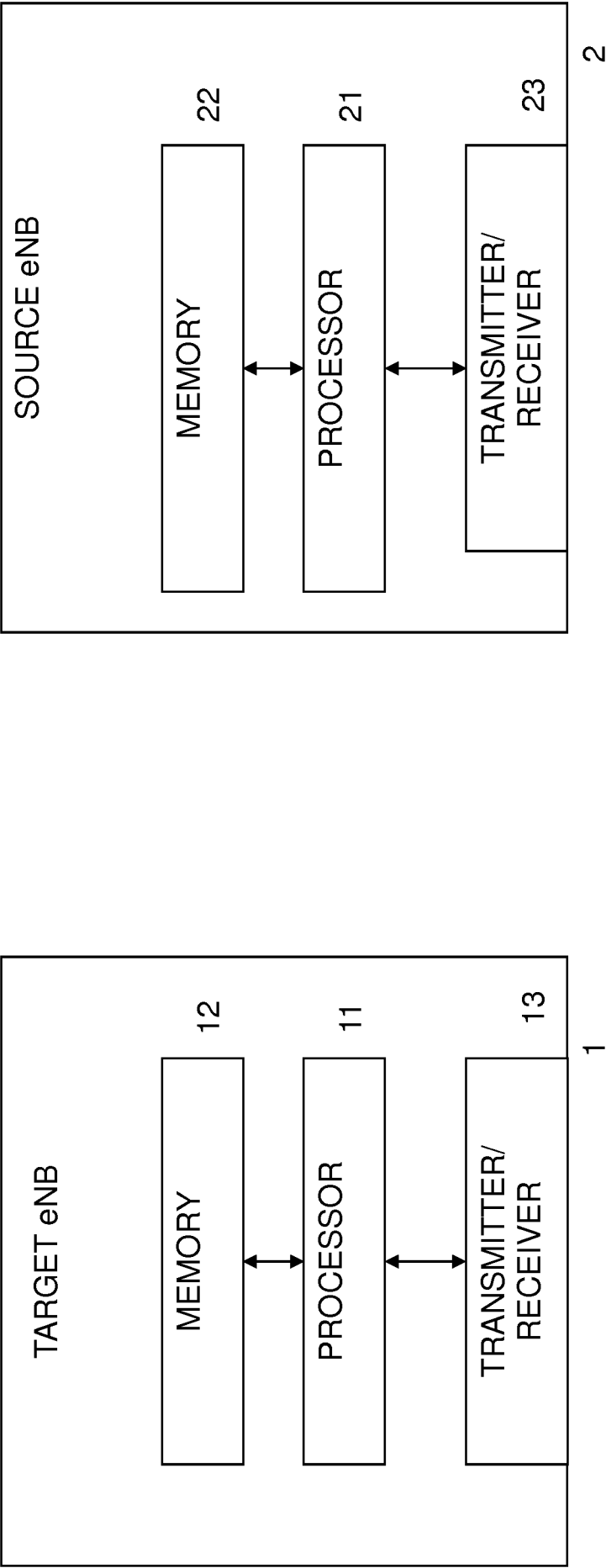


Fig. 1

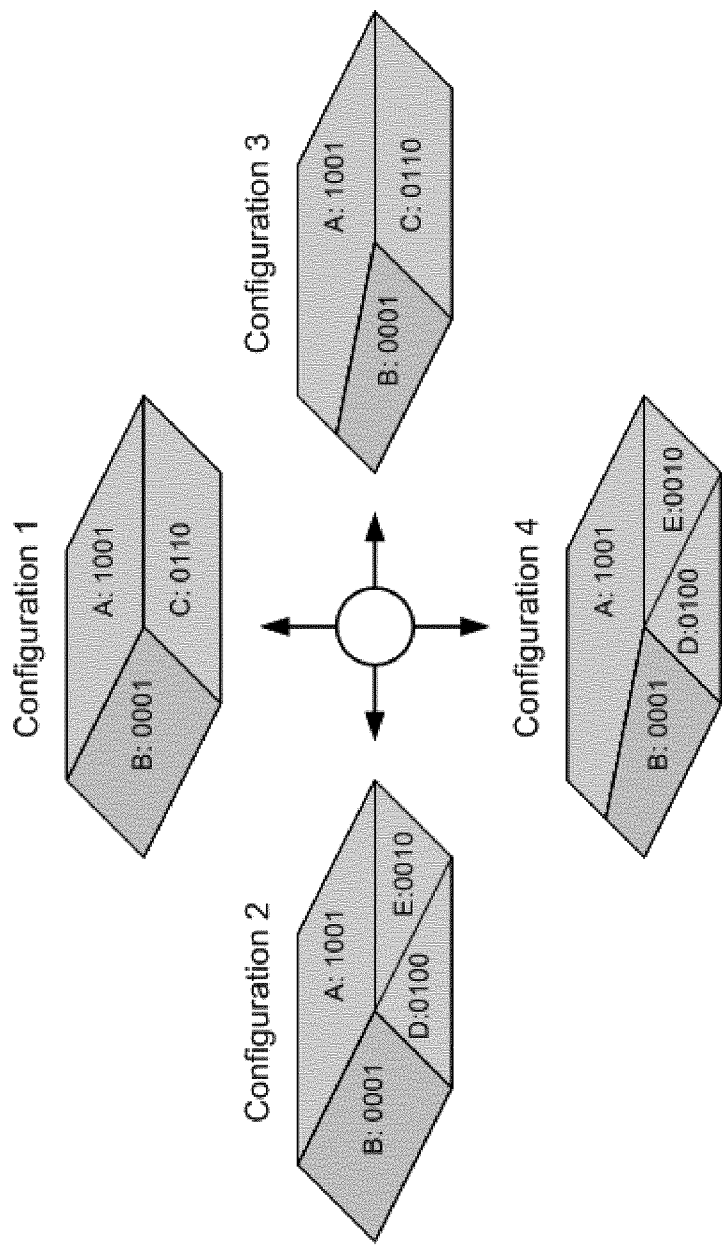


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/051817

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W8/26 H04W16/24
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04W

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ALCATEL-LUCENT: "Standards impacts of solutions for AAS", 3GPP DRAFT; R3-132187, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG3, no. San Francisco, USA; 20131111 - 20131115 12 November 2013 (2013-11-12), XP050738248, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN/RAN3/Docs/ [retrieved on 2013-11-12] chapter 2.1; figure 1 ----- -/-	1-7, 13-19, 25,26



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

21 October 2015

Date of mailing of the international search report

13/01/2016

Name and mailing address of the ISA/

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Authorized officer

Patras, Paula Larisa

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2015/051817

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2015/005729 A1 (LG ELECTRONICS INC [KR]) 15 January 2015 (2015-01-15) paragraphs [0082], [0117] - [0133]; figure 7 -----	1-7, 13-19, 25,26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2015/051817

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-7, 13-19, 25, 26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7, 13-19, 25, 26

Assigning a coverage identifier to served cells by a node in a communication network

2. claims: 8-12, 20-24

Preparing target cells according to coverage identifiers in a source cell of a communication network.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/051817

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015005729	A1	15-01-2015	NONE
