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(71) Applicant: NOKIA SOLUTIONS AND NETWORKS

OY [FI/FI]; Karakaari 7, 02610 Espoo (FI).

(72) Inventors: KOSKINEN, Henri Markus; Huvilinnanmäki

8 A 15, 02600 Espoo (FI). KESKITALO, Ilkka Antero;
Varsankuja 3, 90240 Oulu (FI).

(74) Agent: NOKIA EPO REPRESENTATIVES; Nokia

Technologies Oy, Karakaari 7, 02610 Espoo (FI).

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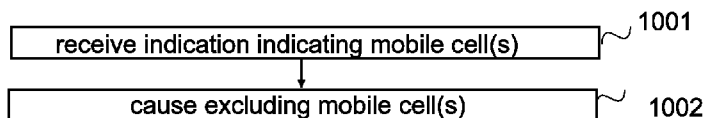


FIG. 10

(57) Abstract: Various solutions for how to, for example, ensure that an integrated access and backhaul node is not handed over to a mobile cell provided by a mobile integrated access and backhaul node are discussed. For example, it may be ensured that said node does not report in neighbor cell measurement reports mobile cells, or that a mobile cell as a target cell will be disregarded or handover to a mobile cell rejected.



DESCRIPTION

TITLE

MOBILE IAB NODE

TECHNICAL FIELD

5 Various example embodiments relate to wireless communications.

BACKGROUND

Wireless communication systems are under constant development. For example, in a solution called Integrated Access and Backhaul (IAB) cellular coverage is extended by access nodes that have wireless backhaul to base stations having fixed connection to core network. Some of the access nodes that provide the wireless backhaul may be mobile access nodes, for example vehicle mounted relays serving devices in surroundings and/or within a vehicle.

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SUMMARY

The independent claims define the scope.

15 According to an aspect there is provided an apparatus for a radio access network, the apparatus comprising at least one processor; and at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus at least to perform at least one of a first functionality, a second functionality, a third functionality, a fourth functionality, a fifth functionality, a sixth functionality, or a seventh functionality. The first functionality comprises at least: receiving an indication indicating one or more mobile cells in the radio access network; determining configuration information for reporting measurements of one or more neighbor cells in the radio access network, wherein the one or more mobile cells are excluded, based on said indication, from the one or more neighbor cells to be reported; and transmitting the configuration information to at least one integrated access and backhaul node in the radio access network. The second functionality comprises at least: controlling one or more mobile cells in the radio access network; and transmitting, to one or more first integrated access and backhaul donor nodes in the radio access network, an indication indicating the one or more mobile cells. The third functionality comprises at least: receiving a first configuration information for reporting measurements of one or more neighbor cells; receiving an indication indicating one or more first cells that are to be excluded from the one or more neighbor cells to be reported; determining, based on said indication and the first configuration information, a second configuration information for reporting, the second configuration information excluding said indicated one

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or more first cells; and using the second configuration information at least for reporting the measurements of the one or more neighbor cells. The fourth functionality comprises at least: controlling cells provided by at least a mobile integrated access and backhaul node; and transmitting, at least to the mobile integrated access and backhaul node, an indication indicating one or more cells that are to be excluded from reports reporting measurements of one or more neighbor cells. The fifth functionality comprises at least: transmitting to a control apparatus, which controls cells provided by at least the apparatus, identity information comprising a first identifier identifying a primary serving cell of the apparatus and a second identifier used by the apparatus with the primary serving cell. The sixth functionality comprises at least: controlling cells provided by at least a mobile integrated access and backhaul node; receiving, from the mobile integrated access and backhaul node, a first identifier identifying a primary serving cell of the mobile integrated access and backhaul node and a second identifier used by the mobile integrated access and backhaul node with the primary serving cell; receiving from a donor node of the mobile integrated access and backhaul node, a handover request requesting a handover of the mobile integrated access and backhaul node to a target cell, the handover request comprising context information; checking whether the first identifier and the second identifier match to the context information in the handover request; and rejecting the handover in response to the first identifier and the second identifier matching to the context information in the handover request. The seventh functionality comprises at least: receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes; receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells; determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

According to an aspect there is provided a method comprising performing, by an apparatus, at least one of the first functionality, the second functionality, the third functionality, the fourth functionality, the fifth functionality, the sixth functionality, or the seventh functionality.

According to an aspect there is provided a computer readable medium comprising program instructions stored thereon for at least one of the first functionality, the

second functionality, the third functionality, the fourth functionality, the fifth functionality, the sixth functionality, or the seventh functionality, for performing corresponding functionality.

According to an aspect there is provided a computer program comprising instructions for causing an apparatus to perform at least one of the first functionality, the second functionality, the third functionality, the fourth functionality, the fifth functionality, the sixth functionality, or the seventh functionality.

BRIEF DESCRIPTION OF DRAWINGS

Embodiments are described below, by way of example only, with reference to the accompanying drawings, in which

Figure 1 illustrates an exemplified wireless communication system;

Figures 2 and 3 illustrates an exemplified IAB architecture;

Figures 4 to 9 illustrate examples of information exchange;

Figure 10 is a flow chart illustrating an example functionality; and

Figures 11 and 12 are schematic block diagrams.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

The following embodiments are only presented as examples. Although the specification may refer to “an”, “one”, or “some” embodiment(s) and/or example(s) in several locations, this does not necessarily mean that each such reference is to the same embodiment(s) or example(s), or that a particular feature only applies to a single embodiment and/or single example. Single features of different embodiments and/or examples may also be combined to provide other embodiments and/or examples. Furthermore, words “comprising” and “including” should be understood as not limiting the described embodiments to consist of only those features that have been mentioned and such embodiments may contain also features/structures that have not been specifically mentioned. Further, although terms including ordinal numbers, such as “first”, “second”, etc., may be used for describing various elements, the structural elements are not restricted by the terms. The terms are used merely for the purpose of distinguishing an element from other elements. For example, a first signal could be termed a second signal, and similarly, a second signal could be also termed a first signal without departing from the scope of the present disclosure.

In the following, different exemplifying embodiments will be described using, as an example of an access architecture to which the embodiments may be applied, a radio access architecture based on long term evolution advanced (LTE Advanced, LTE-A) or new radio (NR, 5G), without restricting the embodiments to such an architecture, however. It is obvious for a person skilled in the art that the embodiments may also be applied

to other kinds of communications networks having suitable means by adjusting parameters and procedures appropriately. Some examples of other options for suitable systems are the universal mobile telecommunications system (UMTS) radio access network (UT-RAN or E-UTRAN), long term evolution (LTE, the same as E-UTRA), wireless local area
5 network (WLAN or WiFi), worldwide interoperability for microwave access (WiMAX), Bluetooth®, personal communications services (PCS), ZigBee®, wideband code division multiple access (WCDMA), systems using ultra-wideband (UWB) technology, sensor networks, mobile ad-hoc networks (MANETs) and Internet Protocol multimedia subsystems (IMS) or any combination thereof.

10 Figure 1 depicts examples of simplified system architectures only showing some elements and functional entities, all being logical units, whose implementation may differ from what is shown. The connections shown in Figure 1 are logical connections; the actual physical connections may be different. It is apparent to a person skilled in the art that the system typically comprises also other functions and structures than those shown
15 in Figure 1.

The embodiments are not, however, restricted to the system 100 given as an example but a person skilled in the art may apply the solution to other communication systems provided with necessary properties.

The example of Figure 1 shows a part of an exemplifying radio access network.

20 Figure 1 shows user devices 101, 101' configured to be in a wireless connection on one or more communication channels in a cell with an access node (such as (e/g)NodeB) providing the cell. The physical link from a user device to a (e/g)NodeB is called uplink or reverse link and the physical link from the (e/g)NodeB to the user device is called downlink or forward link. It should be appreciated that (e/g)NodeBs or their
25 functionalities may be implemented by using any node, host, server or access point etc. entity suitable for such a usage.

A communications system typically comprises more than one (e/g)NodeB in which case the (e/g)NodeBs may also be configured to communicate with one another over links, wired or wireless, designed for the purpose. These links may be used for signalling purposes. The (e/g)NodeB is a computing device configured to control the radio
30 resources of communication system it is coupled to. The NodeB may also be referred to as a base station, an access point or any other type of interfacing device including a relay station capable of operating in a wireless environment. The (e/g)NodeB includes or is coupled to transceivers. From the transceivers of the (e/g)NodeB, a connection is provided to an antenna unit that establishes bi-directional radio links to devices. The antenna
35 unit may comprise a plurality of antennas or antenna elements. The (e/g)NodeB is further connected to the core network 105 (CN or next generation core NGC). Depending on the

system, the counterpart on the CN side can be a serving gateway (S-GW, routing and forwarding user data packets), packet data network gateway (P-GW), for providing connectivity of user devices (UEs) to external packet data networks, or mobile management entity (MME), or user plane function (UPF), or access and mobility management function (AMF), etc.

The user device (also called UE, user equipment, user terminal, terminal device, etc.) illustrates one type of an apparatus to which resources on the air interface are allocated and assigned, and thus any feature described herein with a user device may be implemented with a corresponding apparatus, such as a relay node. An example of such a relay node is a layer 3 relay (self-backhauling relay) towards the base station.

The user device typically refers to a computing device (e.g. a portable computing device) that includes wireless mobile communication devices operating with or without a subscriber identification module (SIM), including, but not limited to, the following types of devices: a mobile station (mobile phone), smartphone, personal digital assistant (PDA), handset, device using a wireless modem (alarm or measurement device, etc.), laptop and/or touch screen computer, tablet, game console, notebook, and multimedia device. It should be appreciated that a user device may also be a nearly exclusive uplink only device, of which an example is a camera or video camera loading images or video clips to a network. A user device may also be a device having capability to operate in Internet of Things (IoT) network which is a scenario in which objects are provided with the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction, e.g. to be used in smart power grids and connected vehicles. The user device may also utilise cloud. In some applications, a user device may comprise a user portable device with radio parts (such as a watch, earphones, eyeglasses, other wearable accessories or wearables) and the computation is carried out in the cloud. The user device (or in some embodiments a layer 3 relay node) is configured to perform one or more of user equipment functionalities. The user device may also be called a subscriber unit, mobile station, remote terminal, access terminal, user terminal or user equipment (UE) just to mention but a few names or apparatuses. Further, it should be appreciated that a number of reception and/or transmission antennas in a user device may vary according to implementation and/or type of the user device.

Various techniques described herein may also be applied to a cyber-physical system (CPS) (a system of collaborating computational elements controlling physical entities). CPS may enable the implementation and exploitation of massive amounts of interconnected ICT devices (sensors, actuators, processors microcontrollers, etc.) embedded in physical objects at different locations. Mobile cyber physical systems, in which the physical system in question has inherent mobility, are a subcategory of cyber-physical

systems. Examples of mobile physical systems include mobile robotics and electronics transported by humans or animals.

Additionally, although the apparatuses have been depicted as single entities, different units, processors and/or memory units (not all shown in Figure 1) may be implemented.

5G enables using multiple input – multiple output (MIMO) antennas, many more base stations or nodes than the LTE (a so-called small cell concept), including macro sites operating in co-operation with smaller stations and employing a variety of radio technologies depending on service needs, use cases and/or spectrum available. 5G mobile communications supports a wide range of use cases and related applications including video streaming, augmented reality, different ways of data sharing and various forms of machine type applications (such as (massive) machine-type communications (mMTC), including vehicular safety, different sensors and real-time control. 5G is expected to have multiple radio interfaces, namely below 6GHz, cmWave and mmWave, and also being integrable with existing legacy radio access technologies, such as the LTE. Integration with the LTE may be implemented, at least in the early phase, as a system, where macro coverage is provided by the LTE and 5G radio interface access comes from small cells by aggregation to the LTE. In other words, 5G is planned to support both inter-RAT operability (such as LTE-5G) and inter-RF operability (inter-radio interface operability, such as below 6GHz – cmWave, below 6GHz – cmWave – mmWave). One of the concepts considered to be used in 5G networks is network slicing in which multiple independent and dedicated virtual sub-networks (network instances) may be created within the same infrastructure to run services that have different requirements on latency, reliability, throughput and mobility.

The current architecture in LTE networks is fully distributed in the radio and fully centralized in the core network. The low latency applications and services in 5G require to bring the content close to the radio which leads to local break out and multi-access edge computing (MEC). 5G enables analytics and knowledge generation to occur at the source of the data. This approach requires leveraging resources that may not be continuously connected to a network such as laptops, smartphones, tablets and sensors. MEC provides a distributed computing environment for application and service hosting. It also has the ability to store and process content in close proximity to cellular subscribers for faster response time. Edge computing covers a wide range of technologies such as wireless sensor networks, mobile data acquisition, mobile signature analysis, cooperative distributed peer-to-peer ad hoc networking and processing also classifiable as local cloud/fog computing and grid/mesh computing, dew computing, mobile edge computing, cloudlet, distributed data storage and retrieval, autonomic self-healing networks, remote cloud services, augmented and virtual reality, data caching, Internet of Things (massive

connectivity and/or latency critical), critical communications (autonomous vehicles, traffic safety, real-time analytics, time-critical control, healthcare applications).

The communication system is also able to communicate with other networks, such as a public switched telephone network or the Internet 106, or utilise services provided by them. The communication network may also be able to support the usage of cloud services, for example at least part of core network operations may be carried out as a cloud service (this is depicted in Figure 1 by “cloud” 107). The communication system may also comprise a central control entity, or a like, providing facilities for networks of different operators to cooperate for example in spectrum sharing.

Edge cloud may be brought into a radio access network (RAN) by utilizing network function virtualization (NVF) and software defined networking (SDN). Using edge cloud may mean access node operations to be carried out, at least partly, in a server, host or node operationally coupled to a remote radio head or base station comprising radio parts. It is also possible that node operations will be distributed among a plurality of servers, nodes or hosts. Application of cloudRAN architecture enables RAN real time functions being carried out at the RAN side (in a distributed unit, DU 102) and non-real time functions being carried out in a centralized manner (in a central unit, CU 104).

It should also be understood that the distribution of labour between core network operations and base station operations may differ from that of the LTE or even be non-existent. Some other technology advancements probably to be used are Big Data and all-IP, which may change the way networks are being constructed and managed. 5G (or new radio, NR) networks are being designed to support multiple hierarchies, where MEC servers can be placed between the core and the base station or nodeB (gNB). It should be appreciated that MEC can be applied in 4G networks as well.

5G may also utilize satellite communication to enhance or complement the coverage of 5G service, for example by providing backhauling. Possible use cases are providing service continuity for machine-to-machine (M2M) or Internet of Things (IoT) devices or for passengers on board of vehicles, or ensuring service availability for critical communications, and future railway/maritime/aeronautical communications. Satellite communication may utilise geostationary earth orbit (GEO) satellite systems, but also low earth orbit (LEO) satellite systems, in particular mega-constellations (systems in which hundreds of (nano)satellites are deployed). Each satellite 103 in the mega-constellation may cover several satellite-enabled network entities that create on-ground cells. The on-ground cells may be created through an on-ground relay node 102 or by a gNB located on-ground or in a satellite.

It is obvious for a person skilled in the art that the depicted system is only an example of a part of a radio access system and in practice, the system may comprise a plurality of (e/g)NodeBs, the user device may have an access to a plurality of radio cells

and the system may comprise also other apparatuses, such as physical layer relay nodes or other network elements, etc. At least one of the (e/g)NodeBs or may be a Home(e/g)nodeB. Additionally, in a geographical area of a radio communication system a plurality of different kinds of radio cells as well as a plurality of radio cells may be provided. Radio cells may be macro cells (or umbrella cells) which are large cells, usually having a diameter of up to tens of kilometers, or smaller cells such as micro-, femto- or picocells. The (e/g)NodeBs of Figure 1 may provide any kind of these cells. A cellular radio system may be implemented as a multilayer network including several kinds of cells. Typically, in multilayer networks, one access node provides one kind of a cell or cells, and thus a plurality of (e/g)NodeBs are required to provide such a network structure.

For fulfilling the need for improving the deployment and performance of communication systems, the concept of “plug-and-play” (e/g)NodeBs has been introduced. Typically, a network which is able to use “plug-and-play” (e/g)NodeBs, includes, in addition to Home (e/g)NodeBs (H(e/g)nodeBs), a home node B gateway, or HNB-GW (not shown in Figure 1). A HNB Gateway (HNB-GW), which is typically installed within an operator’s network may aggregate traffic from a large number of HNBs back to a core network.

6G networks are expected to adopt flexible decentralized and/or distributed computing systems and architecture and ubiquitous computing, with local spectrum licensing, spectrum sharing, infrastructure sharing, and intelligent automated management underpinned by mobile edge computing, artificial intelligence, short-packet communication and blockchain technologies. Key features of 6G will include intelligent connected management and control functions, programmability, integrated sensing and communication, reduction of energy footprint, trustworthy infrastructure, scalability and affordability. In addition to these, 6G is also targeting new use cases covering the integration of localization and sensing capabilities into system definition to unifying user experience across physical and digital worlds.

The integrated access and backhaul (IAB) provides an option for flexible radio access network extensions. The integrated access and backhaul has two types of logical network entities, an integrated access and backhaul (IAB) donor node, or shortly a donor node, and an integrated access and backhaul (IAB) node. The IAB node provides one or more cells, and may provide network connection(s) to user devices served in the one or more cells. The donor node provides access to a core network to IAB nodes, and provides one or more cells that may serve the IAB nodes and user devices. It is assumed that the donor node is a fixed node having a wired access to the core network. In 5G and beyond, it is envisaged that the integrated access and backhaul will support also mobile integrated access and backhaul (IAB) nodes, for example vehicle mounted relays. It is further envisaged that a mobile IAB node should not provide a backhaul to another IAB node. The IAB

architecture supporting mobile IAB nodes may be a multi-hop architecture, illustrated in a very general level in Figure 2, or a single-hop architecture, illustrated in a very general level in Figure 3. In both Figures 2 and 3, a split architecture and operational entities are disclosed, using principles and terminology of 5G technology without limiting the examples to 5G and the terminology used.

Referring to Figure 2, in the illustrated example of the multi-hop IAB architecture 200, a mobile IAB node 201 is connected over two hops, via a non-mobile (fixed) IAB node 202, to a donor node (IAB donor node). The donor node 203 has a wired connection to a core network, for example to a next generation core network (NGC) 205, the donor node providing a multi-hop support (concatenated/cascaded nodes). The IAB node 202 represents a parent node (parent IAB node), which is an IAB node providing a radio link, which may provide a hop, towards the core network. The mobile IAB node 201 represents a child node (child IAB node) to which the hop is provided, the parent node providing a backhaul to the child node. A non-mobile IAB node may be both a parent node and a child node.

The donor node 203 is configured to support the integrated access and backhaul and hosts at least a central unit part (CU) 203-2 for the IAB nodes 201, 202, and a distributed unit part (DU) 203-1 for the IAB node 202, i.e. the integrated access and backhaul is supported by the donor node to non-mobile IAB nodes and mobile IAB nodes, and for access user devices 204a, 204b, 204c. The central unit part (CU) 203-2 may be configured to run radio resource control (RRC) layer, and control functions according to radio access network protocols and definitions. The distributed unit part 203-1 in the donor node may be configured to run lower layer 2 protocol layers, for example a backhaul adaptation protocol (BAP) layer, and a physical layer (PHY) below the layer 2.

The IAB node 201, 202 is an access node (network device) that provides one or more cells and to served user devices 204a, 204b a wireless connection in the radio access network to the donor node 203, either directly or via one or more IAB nodes, i.e. over one or more hops from one IAB node to another IAB node, to the donor node. This means that a non-mobile (fixed) IAB node 202 may provide a shared link to served user apparatuses and/or to one or more IAB nodes. In the illustrated example, the IAB nodes 201, 202 comprise a distributed unit part (DU) 201-1, 202-1, and a co-located mobile termination part (MT) 201-2, 202-2. The distributed unit part (DU) may be configured to perform and/or support similar functionalities as the distributed unit part in the donor node. The mobile termination part (MT) 201-1, 202-1 is configured to act towards a distributed unit part (DU) of the parent node. Hence, the mobile termination part (MT) 201-1, 202-1 may be configured to exchange information with the distributed unit part in the parent using, for example, radio link control protocol and/or the backhaul adaptation protocol. Basically, the mobile termination part transmits/receives transmissions to/from a parent IAB node,

and more precisely from the distributed unit in the parent IAB node, including the donor node, and the distributed unit part transmits/receives transmissions to/from child IAB nodes and served user devices. Further, the central unit part (CU) 203-2 may exchange control information with the distributed unit parts (DU) 201-1, 202-1 using application layer protocol signaling messages, for example F1AP messages.

For mobility management of served user devices 204a, 204b, 204c and the mobile IAB node(s) 201, the core network 205 comprises a mobility management entity, for example an apparatus comprising the access and mobility management function.

As a summary, in the multi-hop architecture 200 core network interfaces are terminated at the donor node 203, and the relaying is a radio access network functionality. This includes that a tunnel for full F1-C signaling (F1AP) or a subset of it, or corresponding control signaling, is within the radio access network, between the CU 203-2 and the DU 201-1.

Referring to Figure 3, in the single-hop IAB architecture 300, the mobile IAB node 201 is connected over one hop to a donor node 303 which may be IAB capable node, as in the multi-hop architecture, or a non-IAB capable node. In both cases the donor node may be a fixed node. Further, in the single-hop IAB architecture 300 there are a centralized mobile m-CU 301-2, and a mobile IAB -specific user plane function, m-UPF 301-1, connected to the centralized mobile m-CU 301-2. The m-CU and m-UPF(s) may locate in a cloud 301, as in the example illustrated in Figure 3, and/or co-locate in the donor node 303. The centralized mobile m-CU 301-2 is configured to control the mobile IAB nodes 201. The backhaul from the mobile IAB node 201 may be established via an end-to-end user plane connectivity, for example by means of a PDU session established between the mobile termination part (MT) 201-2 and the mobile IAB -specific user plane function, m-UPF 301-1. Further, the centralized mobile m-CU 301-2 may exchange control information with the distributed unit part (DU) 201-1 using application layer protocol signaling messages, for example F1AP messages. If the donor node 303 is configured to support the integrated access and backhaul, routing using the backhaul adaptation protocol (BAP) may be terminated to the donor node.

Even though not illustrated in Figure 3, in the single-hop IAB architecture, the central unit part 303-2 may locate in the cloud 301, i.e. not in the donor node 303.

As a summary, in the single-hop architecture 300 the mobile IAB node 201, or more precisely the mobile termination part (MT) 201-2, may have a radio resource control connection with the donor node 303, more precisely with the central unit 303-2 in the donor node 303. Further, the control connection, for example F1 connection, from the m-CU 301-2 to the mobile IAB node 201 is transparent to the radio access network. This means that when the mobile IAB node 201 is handed over from a serving donor node to a target donor node, the backhaul link change may be performed as if it were a handover of

a user device, while the session to the m-UPF 301-1 and the control connection, for example a tunnel for full F1-C signaling (F1AP) or a subset of it, remains between the m-CU 301-2 and the DU 201-1.

Figures 4 to 9 illustrates different examples of information exchange in different scenarios how to facilitate that a mobile IAB node will not become a parent. The examples in Figures 4 and 5 are described assuming the multi-hop architecture (even though multi-hops are not illustrated) and the examples in Figures 6 to 9 assuming the single-hop architecture, without limiting the examples to such architectures. In Figures 4 to 9 a term “s-donor” or “donor-CU” is used for a currently serving donor node, which may be, for example, a base station, such as a gNB, operating as an integrated access and backhaul donor node, or its central unit, configured at least to control at least served IAB nodes, including cells provided by the served IAB nodes, and possibly providing access at least to served IAB nodes. Term “n-donor” is used for a neighbor donor node. Term “mobile cell” means a cell provided by a mobile integrated access and backhaul (IAB) node, i.e. m-IAB node, term “cell” covers mobile and non-mobile cells. Term “m-CU” covers a control apparatus (control node), such as a gNB comprising the central unit, controlling mobile cells. Further, in the illustrated examples of Figures 4 to 8 a radio resource connection set up signaling between the serving donor node and the IAB node/the mobile IAB node is not illustrated, the examples illustrate information exchange that may take place after that.

Referring to Figure 4, a neighbor donor node, n-donor, transmits (message 4-1) an indication indicating one or more mobile cells to its neighbor donor nodes, including the serving donor node, s-donor. Message 4-1 may be “NG-RAN NODE CONFIGURATION UPDATE” according to XnAP, said message comprising a new indication of “cells provided by mobile IAB nodes”. Said indication may be for example a new information element listing mobile cell identifiers.

Upon receiving said indication, the s-donor acknowledges it by transmitting message 4-2. Message 4-2 may be “NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE” according to XnAP. Further, the s-donor configures, in block 4-3, one or more of IAB nodes the s-donor controls, not to report measurements on said mobile cells. In other words, the s-donor determines, based on said indication, for at least one IAB node of controlled IAB nodes, configuration information for reporting measurements of one or more neighbor cells, excluding the one or more mobile cells indicated. (The configuration information may be called a measurement reporting configuration.) In other words, the s-donor determines a configuration for neighbor cell measurement reporting for a set of neighbor cells, the set of neighbor cells to be reported not comprising the one or more mobile cells indicated. Then said configuration is transmitted (message 4-4) to the at least

one IAB node. Message 4-4 may be “RRCReconfiguration” according to RRC (radio resource control), which comprises measurement reporting configuration excluding one or more cells of mobile IAB nodes. Even though not illustrated in Figure 4, the IAB node acknowledges message 4-4, for example by transmitting “RRCReconfigurationComplete” according to RRC.

The IAB node performs neighbor cell measurements as configured. Cells of mobile IAB nodes may not be measured, since they were excluded or not included in message 4-4. An event triggering measurement reporting (block 4-5) is met in the illustrated example, and a measurement report (not containing measurement results on mobile cells) is transmitted (message 4-6) to the serving donor node, s-donor. Message 4-6 may be “MeasurementReport” according to RRC. Then, depending on measurement results in message 4-6, the s-donor may make in block 4-7 a handover (HO) decision, said decision being based on non-mobile cells.

Referring to Figure 5, the serving donor node, s-donor, may receive, as part of the radio resource connection set up signaling or as a response to a capability enquiry, from an integrated access and backhaul node of the controlled integrated access and backhaul nodes, information (message 5-1) indicating a mobile IAB node. Message 5-1 may be “RRCSetupComplete” according to RRC, or “UECapabilityInformation”, with a new indication of mobile IAB, or a mobile IAB MT. In the illustrated example, the s-donor is configured to forward (message 5-2) said indication to its neighbor donor nodes, which then may acknowledge (message 5-3) the indication. Message 5-2 may correspond to message 4-1 and message 5-3 may correspond to message 4-2. It should be appreciated that in another implementation no message 5-2 is transmitted.

Further, the s-donor configures, in block 5-4, one or more of IAB nodes the s-donor controls, not to report measurements on said mobile cells. In other words, the s-donor determines, based on said indication, for at least one IAB node of controlled IAB nodes, configuration information for reporting measurements of one or more neighbor cells in the radio access network, excluding the one or more mobile cells indicated. In other words, the s-donor determines configuration for neighbor cell measurement reporting for a set of neighbor cells, the set of neighbor cells to be reported not comprising the one or more mobile cells. Then said configuration is transmitted (message 5-5) to the at least one IAB node. Message 5-5 may correspond to message 4-4 and comprises measurement reporting configuration excluding one or more cells of mobile IAB nodes. Even though not illustrated in Figure 5, the IAB node acknowledges message 5-5, for example by transmitting “RRCReconfigurationComplete” according to RRC.

The IAB node performs neighbor cell measurements as configured. Cells of mobile IAB nodes may not be measured, since they were not included in message 5-5. An event triggering measurement reporting (block 5-6) is met in the illustrated example, and

a measurement report (not containing measurement results on mobile cells) is transmitted (message 5-7) to the serving donor node, s-donor. Message 5-7 may be "MeasurementReport" according to RRC. Then, depending on measurement results in message 5-7, the s-donor may make in block 5-8 a handover (HO) decision, said decision being based on non-mobile cells.

It should be appreciated that an s-donor node may receive information indicating mobile cells both from mobile IABs the s-donor controls and from neighbor donor cells, and the s-donor node may be configured to perform block 4-3 and block 5-4 combined, i.e. ensure that message 4-4 or 5-5 excludes all mobile cells the s-donor has been made aware by messages 4-1 and 5-1.

The information exchange illustrated above ensure that no handover decision to a mobile IAB node is made, thereby ensuring that a mobile IAB node will not become a parent IAB node. Further, the examples allows more efficient operation, since IAB nodes may skip neighbor cell measurements on mobile cells. The same applies to the information exchange illustrated with Figures 6 and 7 for the single-hop architecture.

Referring to Figure 6, the central unit part of a serving donor node, donor-CU, configures in block 6-1, one or more of IAB nodes the donor-CU controls, to report measurements of one or more neighbor cells. In other words, the donor-CU determines, for at least one IAB node of served IAB nodes, configuration information for neighbor cell measurement reports reporting measurements of one or more of neighbor cells (a first set of neighbor cells). In the illustrated example, the IAB node is a mobile IAB node, M-IAB node. The donor-CU then transmits (message 6-2) the configuration information (first configuration information) to the mobile IAB-node, which acknowledges (message 6-3) the first configuration information. Message 6-2 may be "RRCReconfiguration" according to RRC (radio resource control), which comprises measurement reporting configuration, and message 6-3 may be "RRCReconfigurationComplete" according to RRC. Even though not illustrated in Figure 6, an MT part in the m-IAB node may perform the receiving and acknowledging.

Further, the m-IAB node receives (message 6-4) from the m-CU an indication indicating one or more first cells, a first cell being a cell that is to be excluded from reports reporting measurements of one or more neighbor cells. In other words, the first cell is not to be reported in neighbor cell measurement reports. The one or more first cells may comprise cell(s) controlled by the m-CU, and cell(s) controlled by another m-CU, which has indicated them to the m-CU, for example over an Xn interface. The first cell may be a blacklisted cell, or interpreted to be a blacklisted cell. A blacklisted cell is a cell that is not applicable in event evaluation or measurement reporting. For example, mobile cells may be indicated as first cells. The m-IAB node acknowledges (message 6-5) said indication indicating the one or more second cells. Messages 6-4 and 6-5 may be application protocol

signaling messages transmitted to/from a CU part in the m-IAB. Message 6-4 may be “GNB-CU CONFIGURATION UPDATE” according to F1AP, containing as new information indication of cells not to be measured/reported by MT part of mobile IAB nodes. Message 6-5 may be “GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE” according to F1AP. The
5 CU part relays information of cells not to be measured to the MT part as intra-node information exchange, not illustrated in Figure 6.

The mobile IAB node determines in block 6-6, based on said indication received in message 6-4 and the first configuration information received in message 6-2, a second configuration information for reporting (for neighbor cell measurement reporting), the second configuration information not comprising any first cell to report. In other
10 words, the mobile IAB node combines information received in messages 6-2 and 6-4, and the second configuration information excludes the one or more first cells. The mobile IAB node performs neighbor cell measurements as configured. An event triggering measurement reporting (block 6-7) is met in the illustrated example, and a measurement report
15 (not containing measurement results on first cells) is transmitted (message 6-8) to the donor-CU. Message 6-8 may be “MeasurementReport” according to RRC. Then, depending on measurement results in message 6-8, the donor-CU may make in block 6-9 a handover (HO) decision, said decision being based on usable cells, the usable cells not comprising mobile cells, for example.

Referring to Figure 7, the central unit part of a serving donor node, donor-CU, configures in block 7-1, one or more of IAB nodes the donor-CU controls, to report measurements on neighbor cells. In other words, the donor-CU determines, for at least one IAB node of served IAB nodes, configuration information for reporting measurements of one or more neighbor cells (a first set of neighbor cells). In the illustrated example, the IAB
25 node is a mobile IAB node, M-IAB node. The donor-CU then transmits (message 7-2) the configuration information (first configuration information) to the mobile IAB-node, which acknowledges (message 7-3) the first configuration information. Message 7-2 may be “RRCReconfiguration” according to RRC (radio resource control), which comprises measurement reporting configuration, and message 7-3 may be “RRCReconfigurationComplete” according to RRC. Even though not illustrated in Figure 7, an MT part in the m-IAB
30 node may perform the receiving and acknowledging.

Further, the m-IAB node may be configured to broadcast (message 7-4) an indication indicating that cells the m-IAB node provides are mobile cells. In the illustrated example, the m-IAB node receives (message 7-5) corresponding broadcast from one or
35 more other mobile IAB nodes, the broadcast indicating one or more mobile cells. The m-IAB node is configured to determine in block 7-6, that said indicated cells in received broadcast are first cells, i.e. cells to excluded from neighbor cell(s) to be reported (i.e. cells not to be reported in the neighbor cell measurement reports). Hence, in the illustrated

example, using said indication received in message 7-5 and the first configuration information received in message 7-2, a second configuration information for neighbor cell measurement reporting, the second configuration information not comprising any second cell to report, may be determined by the m-IAB node. In other words, the mobile IAB node may combine information received in messages 7-2 and 7-5 and determine the second configuration information (configuration information for reporting measurements of one or more neighbor cells, excluding the first cells). The mobile IAB node performs neighbor cell measurements as configured. An event triggering measurement reporting (block 7-7) is met in the illustrated example, and a measurement report (not containing measurement results on first cells, or at least on mobile cells) is transmitted (message 7-8) to the donor-CU. Message 7-8 may be "MeasurementReport" according to RRC. Then, depending on measurement results in message 7-8, the donor-CU may make in block 7-9 a handover (HO) decision, said decision being based on usable cells, the usable cells not comprising mobile cells, for example.

It should be appreciated that a mobile IAB node may receive the indication indicating first cells both from m-CU (message 6-4) and in broadcast (message 7-4), and the mobile IAB node may be configured to use both information to determine the first cells that are not to be reported, i.e. are excluded from neighbor cells to be reported.

Figure 8 illustrates an example functionality in which the m-CU is enabled to reject handover requests to mobile cells.

Referring to Figure 8, the central unit part of a serving donor node, donor-CU, configures in block 8-1, one or more of IAB nodes the donor-CU controls, to report measurements on neighbor cells. In other words, the donor-CU determines, for at least one IAB node of served IAB nodes, configuration information for reporting measurements of one or more neighbor cells (a set of neighbor cells). In the illustrated example, the IAB node is a mobile IAB node, M-IAB node. The donor-CU then transmits (message 8-2) the configuration information to the mobile IAB-node, which acknowledges (message 8-3) the configuration information. Message 8-2 may be "RRCReconfiguration" according to RRC (radio resource control), which comprises measurement reporting configuration, and message 8-3 may be "RRCReconfigurationComplete" according to RRC. Even though not illustrated in Figure 8, an MT part in the m-IAB node may perform the receiving and acknowledging.

The mobile IAB node, m-IAB node, is further configured to transmit (message 8-4) to the m-CU, a first identifier identifying a primary serving cell of the mobile IAB node (i.e. an apparatus operating (acting) as the mobile IAB node) and a second identifier used by the mobile IAB node (i.e. the apparatus) with the primary serving cell. The first identifier may be an identifier of the primary cell of the MT part and the second identifier may be an identifier of the MT part used by the MT part in the primary cell. For example, the

first identifier may be a new radio global cell identifier (NGCI), and the second identifier may be a cell radio network temporary identifier (C-RNTI). Although not illustrated in Figure 8, the MT part may relay the identifiers to the DU part, which may transmit message 8-4 to the m-CU. Message 8-4 may be "GNB-DU CONFIGURATION UPDATE" according to F1AP, comprising said identifiers (an identifier of a co-located MT's primary cell and an identifier of MT therein). Even though not illustrated in Figure 8, the m-CU may acknowledge message 8-4 by transmitting, for example "GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE" according to F1AP.

The mobile IAB node performs neighbor cell measurements as configured. An event triggering measurement reporting (block 8-5) is met in the illustrated example, and a measurement report (may contain measurement results on on mobile cells) is transmitted (message 8-6) to the donor-CU. Message 8-6 may be "MeasurementReport" according to RRC. In the illustrated example, using results in message 8-6, the donor-CU makes in block 8-7 a handover (HO) decision to a target cell, and transmits handover request (message 8-8) to the m-CU. Message 8-8 may be "HANDOVER REQUEST" according to XnAP, with indication of "Mobile MT to cell". The handover request contains context information of the mobile IAB node, for example a radio resource control context of the MT part of the IAB node, in a current serving cell. The context information may include, for example, information identifying a current primary serving cell and an identifier of the IAB node/MT part used in the current primary serving cell.

The m-CU checks in block 8-9 whether the first identifier and the second identifier received in message 8-4 are matching to the information received in message 8-8 in the context information. If there is a match, as is assumed in the illustrated example, the m-CU rejects the handover to the target cell, and transmits corresponding information (message 8-10) to the donor-CU. Message 8-10 may be "HANDOVER PREPARATION FAILURE" according to XnAP, the message comprising an indication of "target not allowed". In other words, a handover to a mobile cell is rejected.

Figure 9 illustrates an example functionality which is based on preventing handover requests to mobile cells.

Referring to Figure 9, the m-CU is configured to transmit (message 9-1) to a mobility management node (management apparatus) in the core network, for example an apparatus comprising the access and mobility management function AMF, identification information of the m-CU. For example, the identification information may be identification information of a generalized node B, gNB, in the radio access network, the gNB comprising or hosting the m-CU. Message 9-1 may be "NG SETUP REQUEST" containing an indication of "own RAN-Node ID blocked from mobile IAB nodes". The apparatus comprising the AMF acknowledges (message 9-2) the information and may add in block 9-3 the information to a mobility restriction list (an access restriction list) as a new are definition. In

other words, the m-CU can be indicated as being out of bounds for the m-IAB node. Message 9-2 may be "NG SETUP RESPONSE".

In the illustrated example, the m-IAB node performs RRC set up with the donor-CU, by messages 9-4, 9-5 and 9-6. Message 9-4 may be "RRCSetupRequest" according to RRC. Message 9-5 may be "RRCSetup" according to RRC, and message 9-6 may be "RRCSetupComplete" message according to RRC. In the illustrated example, message 9-6 further piggybacks an indication that the IAB node is a mobile IAB node. Message 9-6 may comprise, as the indication, a non-access-stratum (NAS) message indicating a mobile IAB node. (An IAB node providing one or more mobile cells.) A piggybacked indication is transparent to the donor-CU.

The donor-CU forwards (message 9-7) said piggybacked indication, to the apparatus comprising the AMF. Message 9-7 may be "INITIAL UE MESSAGE" according to NGAP, comprising as a new information, an indication of the mobile IAB node. (NGAP is an application layer protocol.)

The apparatus comprising the AMF responds to the donor-CU by transmitting (message 9-8) information identifying at least the identity of m-CU, possible also identities of other m-CUs, in the mobility restriction list. In other words, at least information identifying a control apparatus controlling one or more cells provided by one or more mobile IAB nodes, including the m-IAB node, is transmitted in message 9-8. Message 9-8 may be "INITIAL CONTEXT SETUP REQUEST" according to NGAP, and it may contain as a new information "ID of m-CU in Mobility Restriction List). The donor-CU may response by sending message 9-9, for example "INITIAL CONTEXT SETUP RESPONSE" according to NGAP.

In the illustrated example, the donor-CU is configured to maintain its own restriction list, and adds in block 9-10 the information received in message 9-8 to the list. It should be appreciated, even though not illustrated in Figure 9, that information corresponding to the one received in message 9-8 may be received during handover from a source donor-CU.

The donor-CU further configures in block 9-11, the m-IAB node to report measurements on neighbor cells. In other words, the donor-CU determines, for the m-IAB node, configuration information for reporting measurements of one or more neighbor cells (a set of neighbor cells). The donor-CU then transmits (message 9-12) the configuration information to the mobile IAB-node (m-IAB node), which acknowledges (message 9-13) the configuration information. Message 9-12 may be "RRCReconfiguration" according to RRC (radio resource control), which comprises measurement reporting configuration, and message 9-13 may be "RRCReconfigurationComplete" according to RRC. Even though not illustrated in Figure 9, an MT part in the m-IAB node may perform the receiving and acknowledging.

The mobile IAB node performs neighbor cell measurements as configured. An event triggering measurement reporting (block 9-14) is met in the illustrated example, and a measurement report (may contain measurement results on on mobile cells) is transmitted (message 9-15) to the donor-CU. Message 9-15 may be "MeasurementReport" according to RRC. In the illustrated example, using results in message 9-12 and the information on its list, the donor-CU makes in block 9-16 a handover (HO) decision, disregarding m-CU cells as target cells. In other words, the donor-CU determines, using the information identifying the m-CU (control apparatus), a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the m-CU and the second set comprising neighbor cells not controlled by the m-CU (assuming the list comprises information on one m-CU); and determines, whether or not to start a handover of the m-IAB node to a cell in the second set based on measurement results of the second set of neighbor cells.

As can be seen from the above example, using a radio access network node identifier as a new area definition in access restrictions, prevents handover requests to cells served by mobile IAB nodes.

Figure 10 illustrates a flow chart of a functionality performed by one or more apparatuses, configured to implement at least common features of the above disclosed examples.

Referring to Figure 10, when an indication indicating at least one or more mobile cells is received in block 1001, excluding the one or more mobile cells as a possible handover target cell is caused in block 1002, based on said indication, or using said indication. For example, the mobile cells may not be reported in measurement reports, i.e. are excluded, as described with Figures 4 to 7, or a mobile cell may be rejected at a later stage, as described with Figures 8 and 9.

The blocks, related functions, and information exchanges (messages) described above by means of Figures 2 to 10 in no absolute chronological order, and some of them may be performed simultaneously or in an order differing from the given one. For example, block 5-4 may be performed before or simultaneously with transmitting message 5-2, in implementations in which message 5-2 is transmitted). Other functions can also be executed between them or within them, and other information may be sent, and/or other rules applied. For example, handovers of user devices to and from mobile cells may be performed. Some of the blocks or part of the blocks or one or more pieces of information can also be left out or replaced by a corresponding block or part of the block or one or more pieces of information. For example, it may be that a reporting from a mobile IAB node may not be triggered.

Figure 11 illustrates an apparatus 1101 according to some embodiments.

The apparatus 1101 may comprise one or more communication control circuitry 1120, such as at least one processor, and at least one memory 1130, including one or more algorithms 1131, such as a computer program code (software) wherein the at least one memory and the computer program code (software) are configured, with the at least one processor, to cause the apparatus to carry out any one of the exemplified functionalities of the apparatus described above. Said at least one memory 1130 may also comprise at least one database 1132.

Referring to Figure 11, the one or more communication control circuitry 1120 of the apparatus 1101 comprise at least a mobile cell ignoring circuitry 1121 (m-cell ignorer) which is configured to perform at least one of a functionality of excluding mobile cell(s) or rejecting/preventing handover to a mobile cell, i.e. a functionality of a mobile IAB node or a donor node or the m-CU or the AMF according to embodiments. To this end, the mobile cell ignoring circuitry 1121 of the apparatus 1101 is configured to carry out at least some of the functionalities of a corresponding apparatus described above, e.g., by means of Figures 2 to 10, using one or more individual circuitries.

Referring to Figure 11, the memory 1130 may be implemented using any suitable data storage technology, such as semiconductor based memory devices, flash memory, magnetic memory devices and systems, optical memory devices and systems, fixed memory and removable memory.

Referring to Figure 11, the apparatus 1101 may further comprise different interfaces 1110 such as one or more communication interfaces (TX/RX) comprising hardware and/or software for realizing communication connectivity according to one or more communication protocols. The one or more communication interfaces 1110 may enable connecting to the Internet and/or to a core network of a wireless communications network. The one or more communication interface 1110 may provide the apparatus with communication capabilities to communicate in a cellular communication system and enable communication to different network nodes or elements. The one or more communication interfaces 1110 may comprise standard well-known components such as an amplifier, filter, frequency-converter, (de)modulator, and encoder/decoder circuitries, controlled by the corresponding controlling units, and one or more antennas.

As used in this application, the term 'circuitry' may refer to one or more or all of the following: (a) hardware-only circuit implementations, such as implementations in only analog and/or digital circuitry, and (b) combinations of hardware circuits and software (and/or firmware), such as (as applicable): (i) a combination of analog and/or digital hardware circuit(s) with software/firmware and (ii) any portions of hardware processor(s) with software, including digital signal processor(s), software, and memory(ies) that work together to cause an apparatus, such as a terminal device or an access node, to

perform various functions, and (c) hardware circuit(s) and processor(s), such as a micro-processor(s) or a portion of a microprocessor(s), that requires software (e.g. firmware) for operation, but the software may not be present when it is not needed for operation. This definition of 'circuitry' applies to all uses of this term in this application, including
5 any claims. As a further example, as used in this application, the term 'circuitry' also covers an implementation of merely a hardware circuit or processor (or multiple processors) or a portion of a hardware circuit or processor and its (or their) accompanying software and/or firmware. The term 'circuitry' also covers, for example and if applicable to the particular claim element, a baseband integrated circuit for an access node or a terminal device or other computing or network device.
10

In an embodiment, as shown in Figure 12, at least some of the functionalities of the apparatus of Figure 11 may be shared between two physically separate devices, forming one operational entity. Therefore, the apparatus may be seen to depict the operational entity comprising one or more physically separate devices for executing at least
15 some of the described processes. Thus, the apparatus of Figure 12, utilizing such shared architecture, may comprise a remote control unit RCU 1220, such as a host computer or a server computer, operatively coupled (e.g. via a wireless or wired network) to a remote distributed unit RDU 1222 located in the base station. In an embodiment, at least some of the described processes may be performed by the RCU 1220. In an embodiment, the execution of at least some of the described processes may be shared among the RDU 1222
20 and the RCU 1220.

Similar to Figure 11, the apparatus of Figure 12 may comprise one or more communication control circuitry (CNTL) 1120, such as at least one processor, and at least one memory (MEM) 1130, including one or more algorithms (PROG) 1131, such as a computer program code (software) wherein the at least one memory and the computer program code (software) are configured, with the at least one processor, to cause the apparatus to carry out any one of the exemplified functionalities of the apparatus described above.
25

In an embodiment, the RCU 1220 may generate a virtual network through which the RCU 1220 communicates with the RDU 1222. In general, virtual networking
30 may involve a process of combining hardware and software network resources and network functionality into a single, software-based administrative entity, a virtual network. Network virtualization may involve platform virtualization, often combined with resource virtualization. Network virtualization may be categorized as external virtual networking which combines many networks, or parts of networks, into the server computer
35 or the host computer (e.g. to the RCU). External network virtualization is targeted to optimized network sharing. Another category is internal virtual networking which provides

network-like functionality to the software containers on a single system. Virtual networking may also be used for testing the terminal device.

In an embodiment, the virtual network may provide flexible distribution of operations between the RDU and the RCU. In practice, any digital signal processing task may be performed in either the RDU or the RCU and the boundary where the responsibility is shifted between the RDU and the RCU may be selected according to implementation.

In an embodiment, at least some of the processes described in connection with Figures 2 to 10 may be carried out by an apparatus comprising corresponding means for carrying out at least some of the described processes. Some example means for carrying out the processes may include at least one of the following: detector, processor (including dual-core and multiple-core processors), digital signal processor, controller, receiver, transmitter, encoder, decoder, memory, RAM, ROM, software, firmware, display, user interface, display circuitry, user interface circuitry, user interface software, display software, circuit, antenna, antenna circuitry, and circuitry. In an embodiment, the at least one processor, the memory, and the computer program code form processing means or comprises one or more computer program code portions for carrying out one or more operations according to any one of the embodiments of Figures 2 to 10 or operations thereof.

According to an embodiment, there is provided an apparatus comprising means for performing at least one of a first functionality, a second functionality, a third functionality, a fourth functionality, a fifth functionality, a sixth functionality, or a seventh functionality, wherein the first functionality comprises at least: receiving an indication indicating one or more mobile cells in the radio access network; determining configuration information for reporting measurements of one or more neighbor cells in the radio access network, wherein the one or more mobile cells are excluded, based on said indication, from the one or more neighbor cells to be reported; and transmitting the configuration information to at least one integrated access and backhaul node in the radio access network, wherein the second functionality comprises at least: controlling one or more mobile cells in the radio access network; and transmitting, to one or more first integrated access and backhaul donor nodes in the radio access network, an indication indicating the one or more mobile cells, wherein the third functionality comprises at least: receiving a first configuration information for reporting measurements of one or more neighbor cells; receiving an indication indicating one or more first cells that are to be excluded from the one or more neighbor cells to be reported; determining, based on said indication and the first configuration information, a second configuration information for reporting, the second configuration information excluding said indicated one or more first cells; and using the second configuration information at least for reporting the measurements of the one or more neighbor cells, wherein the fourth functionality comprises at least: controlling cells provided by at least a mobile integrated access and backhaul node; and transmitting,

at least to the mobile integrated access and backhaul node, an indication indicating one or more cells that are to be excluded from reports reporting measurements of one or more neighbor cells, wherein the fifth functionality comprises at least: transmitting to a control apparatus, which controls cells provided by at least the apparatus, identity information comprising a first identifier identifying a primary serving cell of the apparatus and a second identifier used by the apparatus with the primary serving cell, wherein the sixth functionality comprises at least controlling cells provided by at least a mobile integrated access and backhaul node; receiving, from the mobile integrated access and backhaul node, a first identifier identifying a primary serving cell of the mobile integrated access and backhaul node and a second identifier used by the mobile integrated access and backhaul node with the primary serving cell; receiving from a donor node of the mobile integrated access and backhaul node, a handover request requesting a handover of the mobile integrated access and backhaul node to a target cell, the handover request comprising context information; checking whether the first identifier and the second identifier match to the context information in the handover request; and rejecting the handover in response to the first identifier and the second identifier matching to the context information in the handover request wherein the seventh functionality comprises at least: receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes; receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells; determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

According to an embodiment, there is provided an apparatus comprising means for receiving an indication indicating at least one or more mobile cells; and causing, based on said indication, excluding the one or more mobile cells at least in one or more measurement reports reporting measurements of one or more neighbor cells.

Embodiments as described may also be carried out in the form of a computer process defined by a computer program or portions thereof. Embodiments of the methods described in connection with Figures 2 to 10 may be carried out by executing at least one portion of a computer program comprising corresponding instructions. The computer program may be provided as a computer readable medium comprising program instructions stored thereon or as a non-transitory computer readable medium comprising program instructions stored thereon. The computer program may be in source code form,

object code form, or in some intermediate form, and it may be stored in some sort of carrier, which may be any entity or device capable of carrying the program. For example, the computer program may be stored on a computer program distribution medium readable by a computer or a processor. The computer program medium may be, for example but
5 not limited to, a record medium, computer memory, read-only memory, electrical carrier signal, telecommunications signal, and software distribution package, for example. The computer program medium may be a non-transitory medium. Coding of software for carrying out the embodiments as shown and described is well within the scope of a person of ordinary skill in the art.

10 Even though the embodiments have been described above with reference to examples according to the accompanying drawings, it is clear that the embodiments are not restricted thereto but can be modified in several ways within the scope of the appended claims. Therefore, all words and expressions should be interpreted broadly and they are intended to illustrate, not to restrict, the embodiment. It will be obvious to a person skilled in the art that, as technology advances, the inventive concept can be imple-
15 mented in various ways. Further, it is clear to a person skilled in the art that the described embodiments may, but are not required to, be combined with other embodiments in various ways.

CLAIMS

1. An apparatus for a radio access network, the apparatus comprising
at least one processor; and
at least one memory including computer program code, the at least one
5 memory and computer program code configured to, with the at least one processor, cause
the apparatus at least to perform:
receiving an indication indicating one or more mobile cells in the radio access
network;
determining configuration information for reporting measurements of one or
10 more neighbor cells in the radio access network, wherein the one or more mobile cells are
excluded, based on said indication, from the one or more neighbor cells to be reported;
and
transmitting the configuration information to at least one integrated access
and backhaul node in the radio access network.
- 15 2. The apparatus of claim 1, wherein the at least one memory and computer
program code are configured to, with the at least one processor, cause the apparatus fur-
ther at least to perform:
operating as a first integrated access and backhaul donor node that controls
20 the at least one integrated access and backhaul node in the radio access network.
3. The apparatus of claim 2, wherein the at least one memory and computer
program code are configured to, with the at least one processor, cause the apparatus fur-
ther at least to perform:
25 receiving said indication from a second integrated access and backhaul donor
node; and
determining the configuration information at least upon receiving said indica-
tion from the second integrated access and backhaul donor node.
- 30 4. The apparatus of any of claims 1 to 3, wherein the at least one memory and
computer program code are configured to, with the at least one processor, cause the ap-
paratus further at least to perform:
receiving said indication from a mobile integrated access and backhaul node
in the radio access network; and
35 forwarding said indication to an integrated access and backhaul neighbor do-
nor node in the radio access network.

5. An apparatus for a radio access network, the apparatus comprising
at least one processor; and

at least one memory including computer program code, the at least one
memory and computer program code configured to, with the at least one processor, cause
5 the apparatus at least to perform:

controlling one or more mobile cells in the radio access network; and

transmitting, to one or more first integrated access and backhaul donor nodes
in the radio access network, an indication indicating the one or more mobile cells.

10 6. The apparatus of claim 5, wherein the at least one memory and computer
program code are configured to, with the at least one processor, cause the apparatus fur-
ther at least to perform:

operating as a second integrated access and backhaul donor node that controls
at least one integrated access and backhaul node in the radio access network.

15 7. An apparatus for a radio access network, the apparatus comprising
at least one processor; and

at least one memory including computer program code, the at least one
memory and computer program code configured to, with the at least one processor, cause
20 the apparatus at least to perform:

receiving a first configuration information for reporting measurements of one
or more neighbor cells;

receiving an indication indicating one or more first cells that are to be excluded
from the one or more neighbor cells to be reported;

25 determining, based on said indication and the first configuration information,
a second configuration information for reporting, the second configuration information
excluding said indicated one or more first cells; and

using the second configuration information at least for reporting the measure-
ments of the one or more neighbor cells.

30 8. The apparatus of claim 7, wherein the at least one memory and computer
program code are configured to, with the at least one processor, cause the apparatus fur-
ther at least to perform:

operating as a mobile integrated access and backhaul node in the radio access
35 network; and

receiving the first configuration information from a donor node.

9. The apparatus of claim 7 or 8, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform: receiving said indication from a control apparatus controlling cells provided by at least the apparatus.

5

10. The apparatus of claim 9, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform receiving said indication in an application protocol signaling message.

10

11. The apparatus of any claims of 7 to 10, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform:

15 receiving the indication in broadcast from one or more mobile integrated access and backhaul nodes in the radio access network.

12. The apparatus of any claims of 7 to 11, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform:

20 broadcasting a further indication indicating that one or more cells provided by the apparatus are mobile cells.

13. An apparatus for a radio access network, the apparatus comprising at least one processor; and

25 at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus at least to perform:

controlling cells provided by at least a mobile integrated access and backhaul node; and

30 transmitting, at least to the mobile integrated access and backhaul node, an indication indicating one or more cells that are to be excluded from reports reporting measurements of one or more neighbor cells.

14. The apparatus of claim 13, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform causing transmitting said indication in an application protocol signaling message.

35

15. An apparatus for a radio access network, the apparatus comprising at least one processor; and

at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus at least to perform:

transmitting to a control apparatus, which controls cells provided by at least the apparatus, identity information comprising a first identifier identifying a primary serving cell of the apparatus and a second identifier used by the apparatus with the primary serving cell.

16. The apparatus of claim 15, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform:

operating as a mobile integrated access and backhaul node in the radio access network providing mobile cells controlled by the control apparatus.

17. An apparatus for a radio access network, the apparatus comprising at least one processor; and

at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus at least to perform:

controlling cells provided by at least a mobile integrated access and backhaul node;

receiving, from the mobile integrated access and backhaul node, a first identifier identifying a primary serving cell of the mobile integrated access and backhaul node and a second identifier used by the mobile integrated access and backhaul node with the primary serving cell;

receiving from a donor node of the mobile integrated access and backhaul node, a handover request requesting a handover of the mobile integrated access and backhaul node to a target cell, the handover request comprising context information;

checking whether the first identifier and the second identifier match to the context information in the handover request; and

rejecting the handover in response to the first identifier and the second identifier matching to the context information in the handover request.

18. An apparatus for a radio access network, the apparatus comprising at least one processor; and

at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus at least to perform:

receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes;

receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells;

determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and

determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

19. The apparatus of claim 18, wherein the at least one memory and computer program code are configured to, with the at least one processor, cause the apparatus further at least to perform:

operating in the radio access network as a donor node of the one of the one or more mobile integrated access and backhaul nodes; and

receiving the information identifying at least the control apparatus from a management apparatus providing at least mobility management or during handover from a source donor node.

20. A method for a radio access network, the method comprising performing, by an apparatus, at least one of a first functionality, a second functionality, a third functionality, a fourth functionality, a fifth functionality, a sixth functionality, or a seventh functionality,

wherein the first functionality comprises at least:

receiving an indication indicating one or more mobile cells in the radio access network;

determining configuration information for reporting measurements of one or more neighbor cells in the radio access network, wherein the one or more mobile cells are excluded, based on said indication, from the one or more neighbor cells to be reported;

and

transmitting the configuration information to at least one integrated access and backhaul node in the radio access network,

wherein the second functionality comprises at least:

controlling one or more mobile cells in the radio access network; and
transmitting, to one or more first integrated access and backhaul donor nodes
in the radio access network, an indication indicating the one or more mobile cells,
wherein the third functionality comprises at least:

5 receiving a first configuration information for reporting measurements of one
or more neighbor cells;

receiving an indication indicating one or more first cells that are to be excluded
from the one or more neighbor cells to be reported;

determining, based on said indication and the first configuration information,
10 a second configuration information for reporting, the second configuration information
excluding said indicated one or more first cells; and

using the second configuration information at least for reporting the measure-
ments of the one or more neighbor cells,

wherein the fourth functionality comprises at least:

15 controlling cells provided by at least a mobile integrated access and backhaul
node; and

transmitting, at least to the mobile integrated access and backhaul node, an
indication indicating one or more cells that are to be excluded from reports reporting
measurements of one or more neighbor cells,

20 wherein the fifth functionality comprises at least:

transmitting, by an apparatus, to a control apparatus, which controls cells pro-
vided by at least the apparatus, identity information comprising a first identifier identify-
ing a primary serving cell of the apparatus and a second identifier used by the apparatus
with the primary serving cell,

25 wherein the sixth functionality comprises at least

controlling cells provided by at least a mobile integrated access and backhaul
node;

receiving, from the mobile integrated access and backhaul node, a first identi-
fier identifying a primary serving cell of the mobile integrated access and backhaul node
30 and a second identifier used by the mobile integrated access and backhaul node with the
primary serving cell;

receiving from a donor node of the mobile integrated access and backhaul
node, a handover request requesting a handover of the mobile integrated access and back-
haul node to a target cell, the handover request comprising context information;

35 checking whether the first identifier and the second identifier match to the
context information in the handover request; and

rejecting the handover in response to the first identifier and the second iden-
tifier matching to the context information in the handover request

wherein the seventh functionality comprises at least:

receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes;

receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells;

determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and

determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

21. A computer readable medium comprising program instructions stored thereon for at least one of a first functionality, a second functionality, a third functionality, a fourth functionality, a fifth functionality, a sixth functionality, or a seventh functionality, for performing corresponding functionality:

wherein the first functionality comprises at least:

receiving an indication indicating one or more mobile cells in the radio access network;

determining configuration information for reporting measurements of one or more neighbor cells in the radio access network, wherein the one or more mobile cells are excluded, based on said indication, from the one or more neighbor cells to be reported; and

transmitting the configuration information to at least one integrated access and backhaul node in the radio access network,

wherein the second functionality comprises at least:

controlling one or more mobile cells in the radio access network; and

transmitting, to one or more first integrated access and backhaul donor nodes in the radio access network, an indication indicating the one or more mobile cells,

wherein the third functionality comprises at least:

receiving a first configuration information for reporting measurements of one or more neighbor cells;

receiving an indication indicating one or more first cells that are to be excluded from the one or more neighbor cells to be reported;

determining, based on said indication and the first configuration information, a second configuration information for reporting, the second configuration information excluding said indicated one or more first cells; and

using the second configuration information at least for reporting the measurements of the one or more neighbor cells,

wherein the fourth functionality comprises at least:

controlling cells provided by at least a mobile integrated access and backhaul

5 node; and

transmitting, at least to the mobile integrated access and backhaul node, an indication indicating one or more cells that are to be excluded from reports reporting measurements of one or more neighbor cells,

wherein the fifth functionality comprises at least:

10 transmitting from an apparatus to a control apparatus, which controls cells provided by at least the apparatus, identity information comprising a first identifier identifying a primary serving cell of the apparatus and a second identifier used by the apparatus with the primary serving cell,

wherein the sixth functionality comprises at least

15 controlling cells provided by at least a mobile integrated access and backhaul node;

receiving, from the mobile integrated access and backhaul node, a first identifier identifying a primary serving cell of the mobile integrated access and backhaul node and a second identifier used by the mobile integrated access and backhaul node with the
20 primary serving cell;

receiving from a donor node of the mobile integrated access and backhaul node, a handover request requesting a handover of the mobile integrated access and backhaul node to a target cell, the handover request comprising context information;

25 checking whether the first identifier and the second identifier match to the context information in the handover request; and

rejecting the handover in response to the first identifier and the second identifier matching to the context information in the handover request

wherein the seventh functionality comprises at least:

30 receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes;

receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells;

determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor
35 cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and

determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

5 22. The computer readable medium of claim 21, wherein the medium is a non-transitory computer readable medium.

 23. A computer program comprising instructions for causing an apparatus to perform at least one of a first functionality, a second functionality, a third functionality, a
10 fourth functionality, a fifth functionality, a sixth functionality, or a seventh functionality:
 wherein the first functionality comprises at least:
 receiving an indication indicating one or more mobile cells in the radio access network;
 determining configuration information for reporting measurements of one or
15 more neighbor cells in the radio access network, wherein the one or more mobile cells are excluded, based on said indication, from the one or more neighbor cells to be reported; and
 transmitting the configuration information to at least one integrated access and backhaul node in the radio access network,
20 wherein the second functionality comprises at least:
 controlling one or more mobile cells in the radio access network; and
 transmitting, to one or more first integrated access and backhaul donor nodes in the radio access network, an indication indicating the one or more mobile cells,
 wherein the third functionality comprises at least:
25 receiving a first configuration information for reporting measurements of one or more neighbor cells;
 receiving an indication indicating one or more first cells that are to be excluded from the one or more neighbor cells to be reported;
 determining, based on said indication and the first configuration information,
30 a second configuration information for reporting, the second configuration information excluding said indicated one or more first cells; and
 using the second configuration information at least for reporting the measurements of the one or more neighbor cells,
 wherein the fourth functionality comprises at least:
35 controlling cells provided by at least a mobile integrated access and backhaul node; and

transmitting, at least to the mobile integrated access and backhaul node, an indication indicating one or more cells that are to be excluded from reports reporting measurements of one or more neighbor cells,

wherein the fifth functionality comprises at least:

5 transmitting to a control apparatus, which controls cells provided by at least the apparatus, identity information comprising a first identifier identifying a primary serving cell of the apparatus and a second identifier used by the apparatus with the primary serving cell,

wherein the sixth functionality comprises at least

10 controlling cells provided by at least a mobile integrated access and backhaul node;

receiving, from the mobile integrated access and backhaul node, a first identifier identifying a primary serving cell of the mobile integrated access and backhaul node and a second identifier used by the mobile integrated access and backhaul node with the
15 primary serving cell;

receiving from a donor node of the mobile integrated access and backhaul node, a handover request requesting a handover of the mobile integrated access and backhaul node to a target cell, the handover request comprising context information;

20 checking whether the first identifier and the second identifier match to the context information in the handover request; and

rejecting the handover in response to the first identifier and the second identifier matching to the context information in the handover request

wherein the seventh functionality comprises at least:

25 receiving information identifying at least a control apparatus controlling one or more cells provided by one or more mobile integrated access and backhaul nodes;

receiving from one of the one or more mobile integrated access and backhaul nodes a measurement report reporting measurements of one or more neighbor cells;

30 determining, using the information identifying the control apparatus, a first set of neighbor cells and a second set of neighbor cells, the first set comprising neighbor cells controlled by the control apparatus and the second set comprising neighbor cells not controlled by the control apparatus; and

determining whether or not to start a handover of the one of the mobile integrated access and backhaul nodes to a cell in the second set based on measurement results in the measurement report.

35

24. An apparatus for a radio access network, the apparatus comprising means for performing at least:

receiving an indication indicating at least one or more mobile cells; and

causing, based on said indication, excluding the one or more mobile cells at least in one or more measurement reports reporting measurements of one or more neighbor cells.

5 25. The apparatus of claim 24, wherein the means are further configured to perform:

operating as an integrated access and backhaul donor node in the radio access network to provide access to a core network to one or more integrated access and backhaul nodes;

10 determining, at least upon receiving said indication, for at least one served integrated access and backhaul node of the one or more integrated access and backhaul nodes, configuration information for reporting measurements of one or more neighbor cells, wherein the one or more mobile cells are excluded to be reported; and

15 transmitting the configuration information to the at least one served integrated access and backhaul node.

26. The apparatus of claim 24, wherein the means are further configured to perform:

20 operating as a mobile integrated access and backhaul node in the radio access network;

receiving configuration information for reporting measurements of one or more neighbor cells;

receiving said indication indicating at least the one or more mobile cells; and

25 updating, based on said indication, the configuration information so that the one or more mobile cells are excluded from the one or more neighbor cells to be reported.

27. The apparatus of claim 24, wherein the means are further configured to perform:

30 operating as a mobile integrated access and backhaul node in the radio access network and receiving said indication over the radio access network from a control apparatus controlling cells provided by at least one integrated access and backhaul node of one or more mobile integrated access and backhaul nodes.

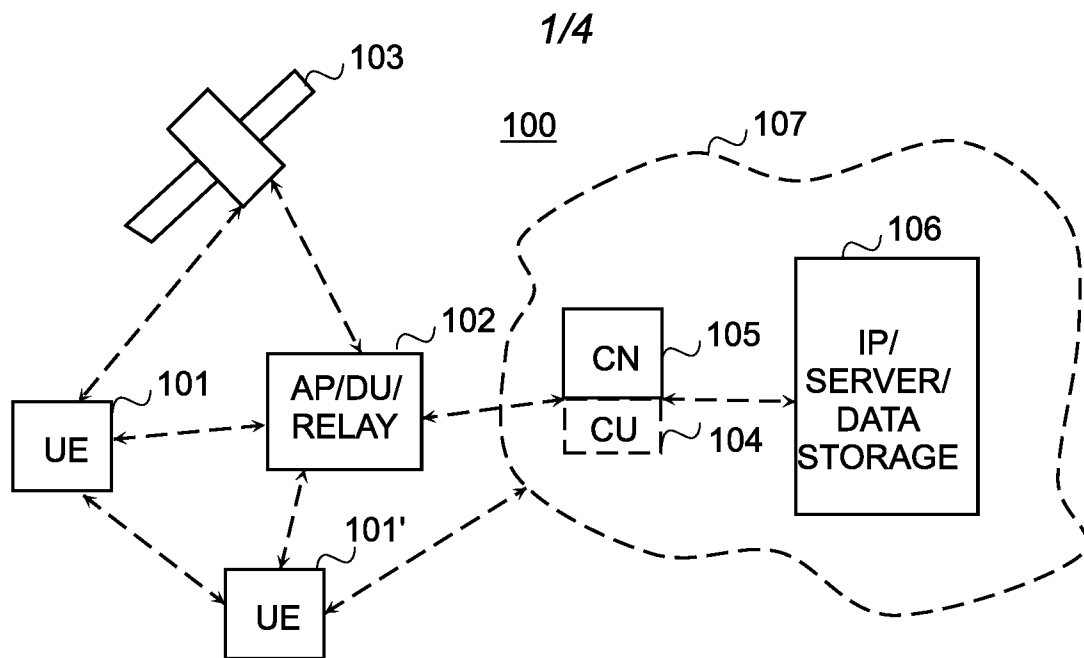


FIG. 1

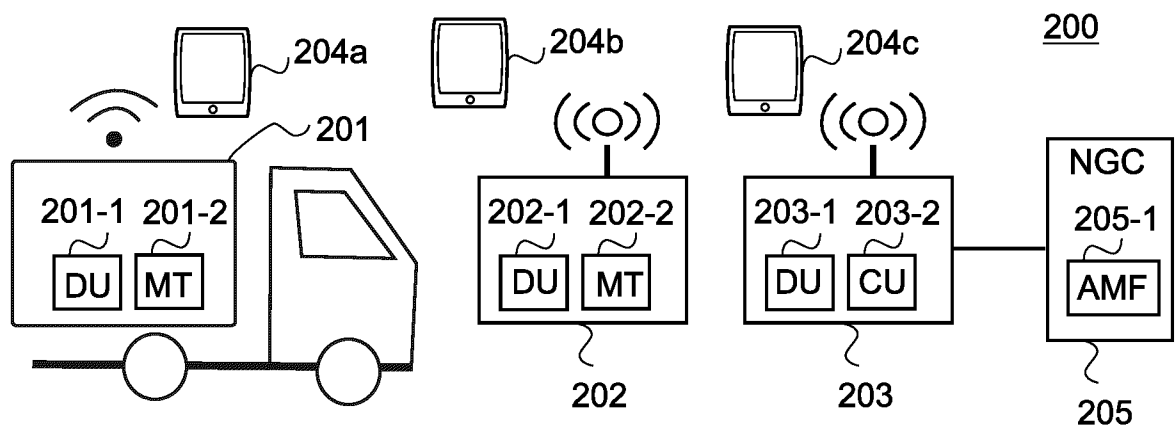


FIG. 2

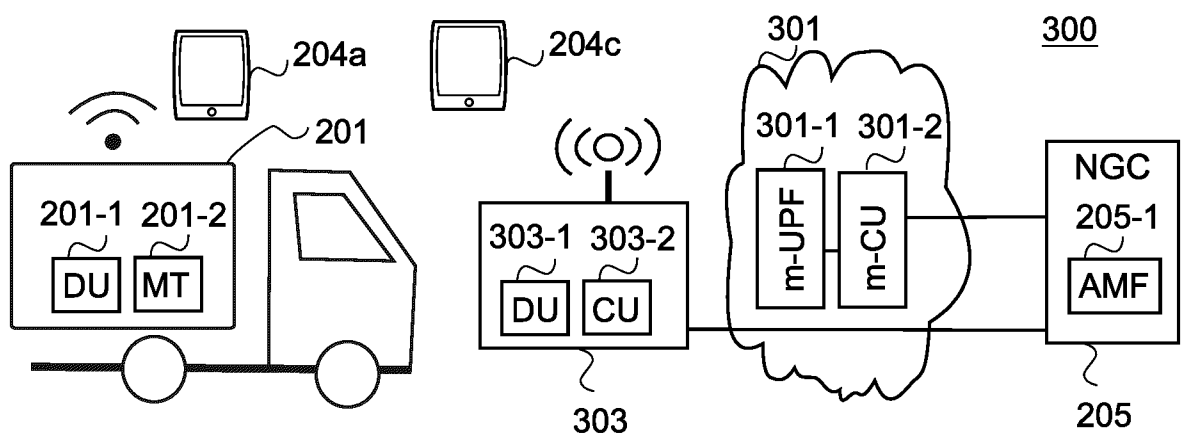


FIG. 3

2/4

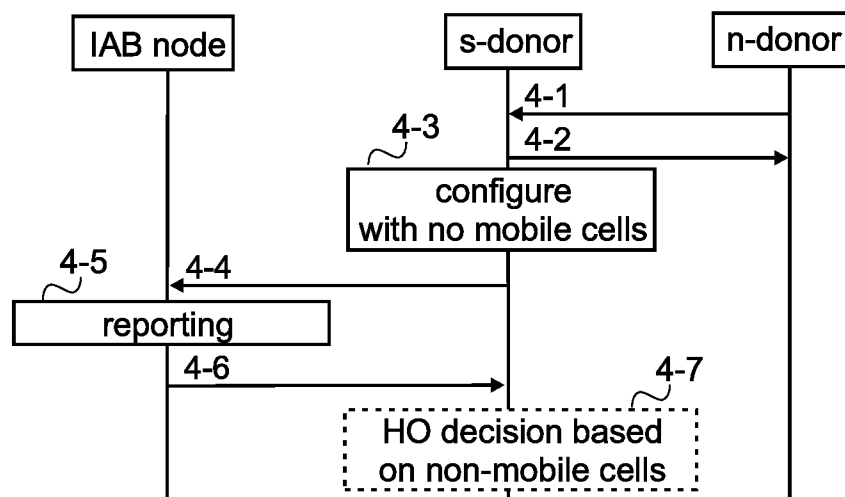


FIG. 4

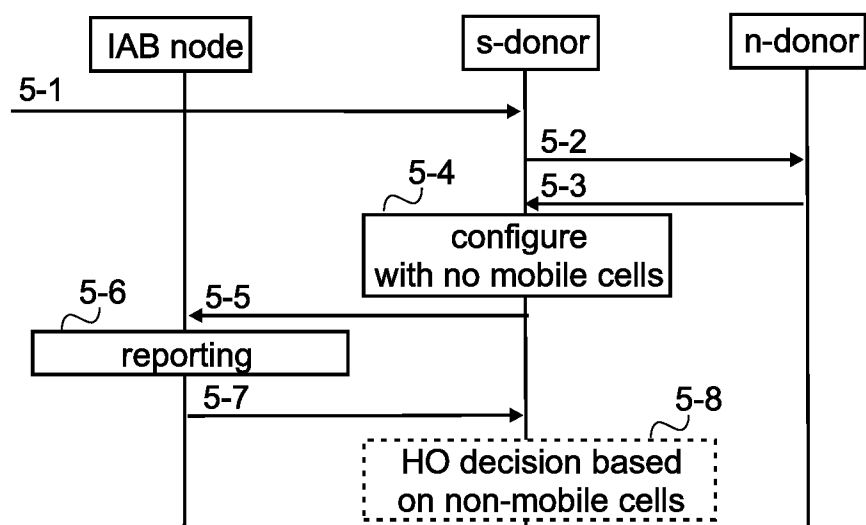


FIG. 5

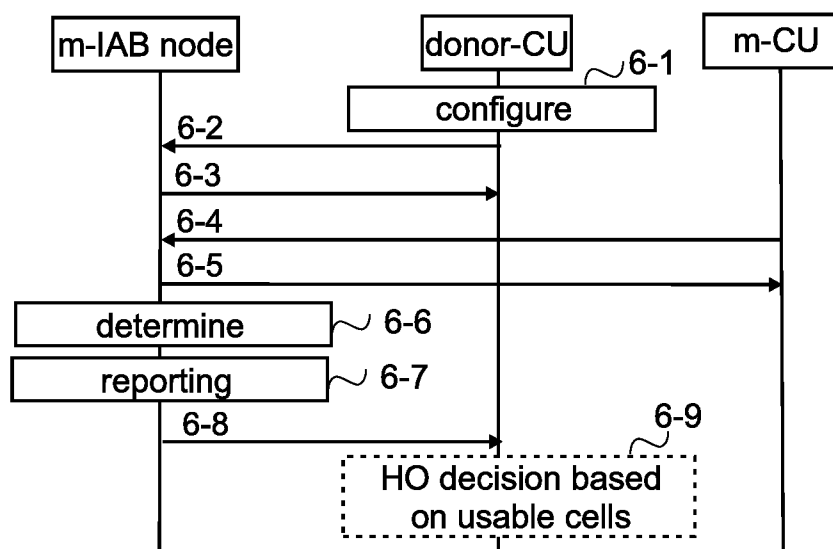
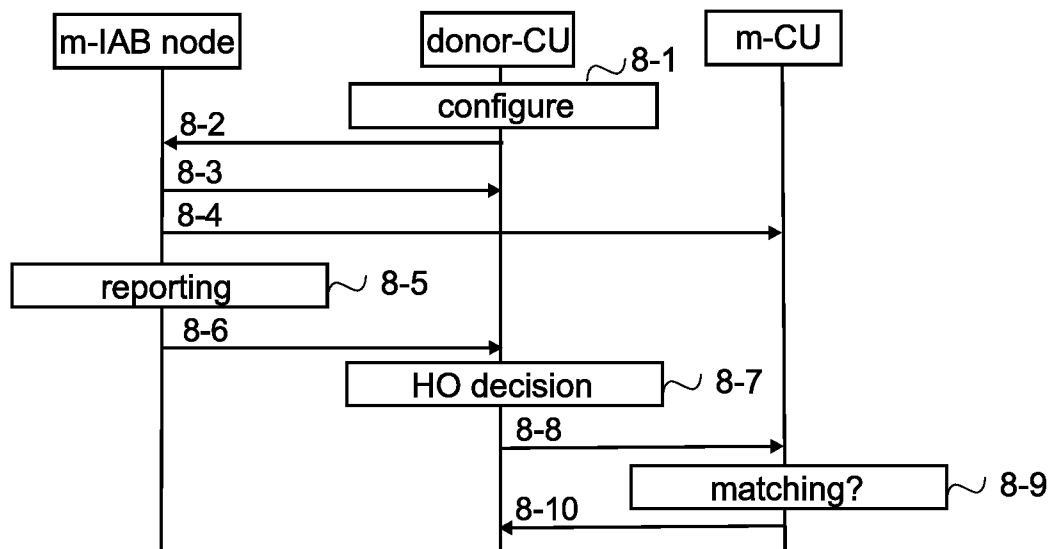
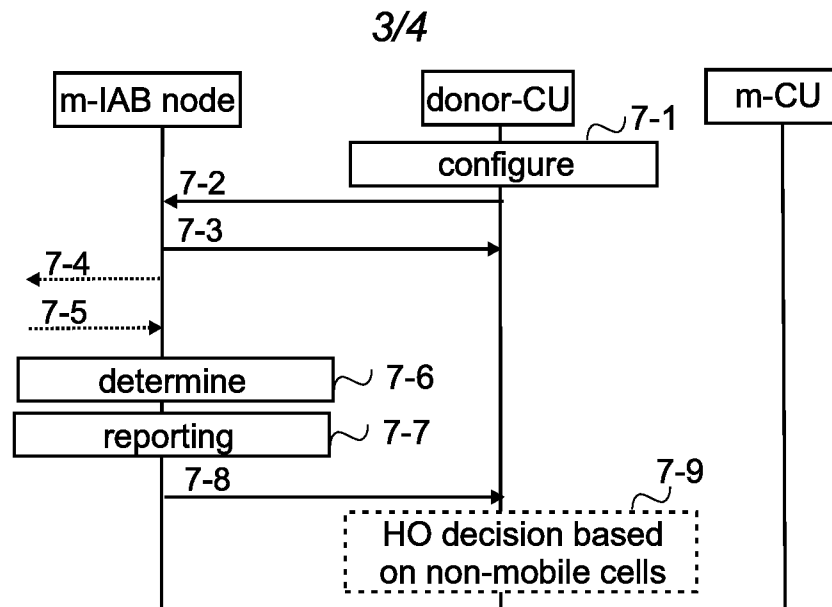


FIG. 6



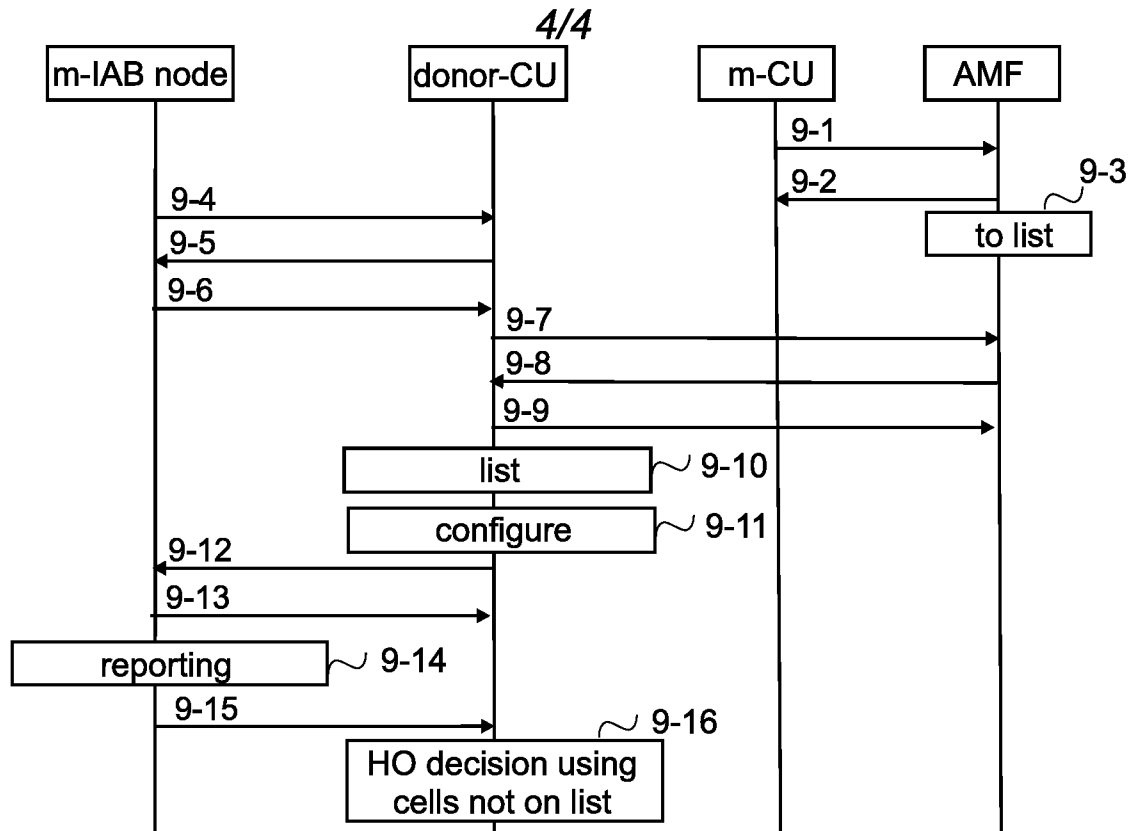


FIG.9

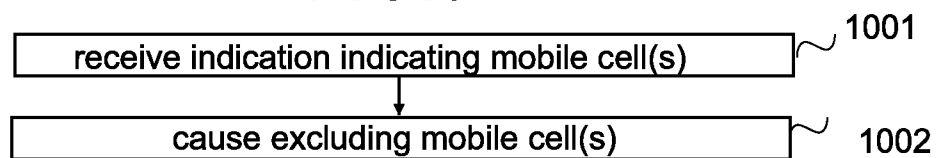


FIG.10

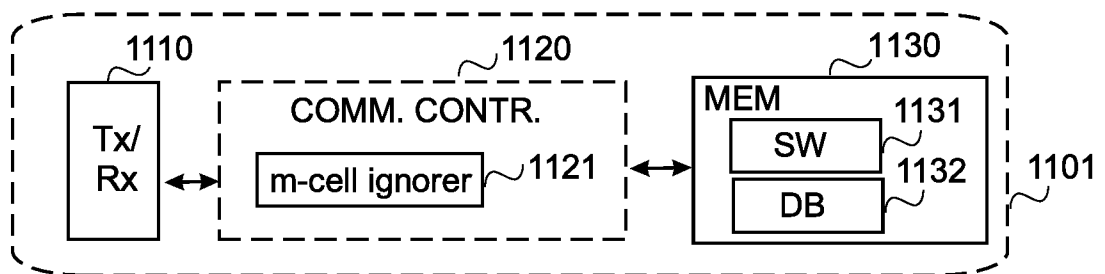


FIG.11

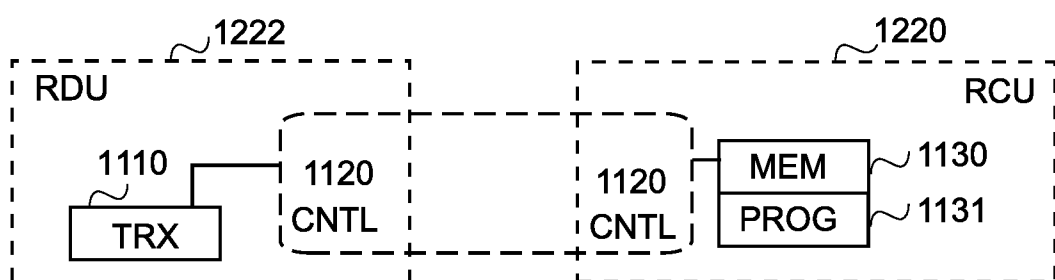


FIG.12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2022/062953

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.:
1-14, 24-27 (completely) ; 20-23 (partially)

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.

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2022/062953

A. CLASSIFICATION OF SUBJECT MATTER INV. H04W36/00 ADD. H04W84/00 H04W84/04		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2021/044958 A1 (ABEDINI NAVID [US] ET AL) 11 February 2021 (2021-02-11) paragraph [0053] - paragraph [0059] paragraph [0064] paragraph [0066] - paragraph [0068] paragraph [0073] - paragraph [0077] figures 4, 5 -----	5, 6
X	WO 2008/060236 A2 (ERICSSON TELEFON AB L M [SE]; VUKAJLOVIC VERA [SE] ET AL.) 22 May 2008 (2008-05-22) paragraph [0003] - paragraph [0004] paragraph [0023] paragraph [0029] - paragraph [0031] -----	7-14
A	US 2021/068096 A1 (ABEDINI NAVID [US] ET AL) 4 March 2021 (2021-03-04) paragraph [0103] -----	1-14, 20-27
-/--		
☒ 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		Date of mailing of the international search report
2 December 2022		30/01/2023
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Hartweg, Norman

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2022/062953

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2021/120517 A1 (AKKARAKARAN SONY [US] ET AL) 22 April 2021 (2021-04-22) paragraph [0155] paragraph [0171] - paragraph [0183] paragraph [0207] - paragraph [0212] -----	1-14, 20-27
A	ZTE ET AL: "Support of Mobile IAB for 5G Advanced", 3GPP DRAFT; RP-212400, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. TSG RAN, no. Electronic Meeting; 20210913 - 20210917 6 September 2021 (2021-09-06), XP052050376, Retrieved from the Internet: URL:https://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_93e/Docs/RP-212400.zip RP-212400 Support of Mobile IAB for 5G Advanced.pdf [retrieved on 2021-09-06] page 6, "Cell mobility aware UE access/mobility" -----	1-14, 20-27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2022/062953

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2021044958 A1	11-02-2021	BR 112022001884 A2 CN 114208391 A EP 4011172 A1 JP 2022543810 A KR 20220046554 A TW 202112174 A US 2021044958 A1 US 2022377527 A1 WO 2021026562 A1	29-03-2022 18-03-2022 15-06-2022 14-10-2022 14-04-2022 16-03-2021 11-02-2021 24-11-2022 11-02-2021
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US 2021068096 A1	04-03-2021	CN 114258728 A EP 4022978 A1 US 2021068096 A1 WO 2021041599 A1	29-03-2022 06-07-2022 04-03-2021 04-03-2021
US 2021120517 A1	22-04-2021	BR 112022006975 A2 CN 114586425 A EP 4046434 A1 JP 2022551748 A KR 20220084045 A US 2021120517 A1 WO 2021076796 A1	05-07-2022 03-06-2022 24-08-2022 13-12-2022 21-06-2022 22-04-2021 22-04-2021

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-14, 24-27(completely); 20-23(partially)

A first IAB node receives from another IAB node an indication of one or more cells, and determines configuration information for reporting measurements of one or more neighbor cells in the radio access network, wherein the one or more indicated cells are excluded from the one or more neighbor cells to be reported.

2. claims: 15-17(completely); 20-23(partially)

A control apparatus, which controls cells provided by a mobile IAB node, receives, from the mobile IAB node, identity information comprising a first identifier identifying a primary serving cell of the mobile IAB node and a second identifier used by the mobile IAB node with the primary serving cell.

3. claims: 18, 19(completely); 20-23(partially)

An IAB donor node receives a neighbor cell measurement report from a mobile IAB node, and determines whether or not to start a handover of the mobile IAB node to a cell in a second set of neighbor cells based on measurement results in the measurement report, wherein the second set of neighbor cells comprise neighbor cells not controlled by a control apparatus.
