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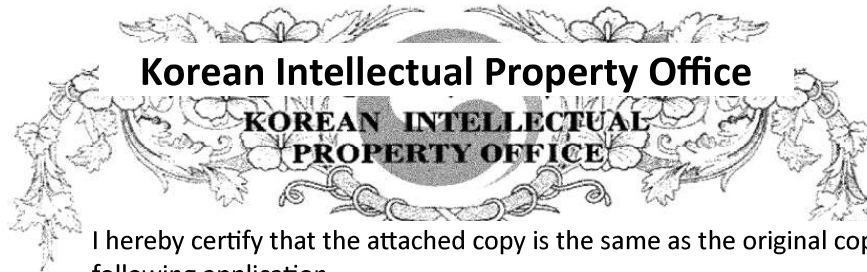
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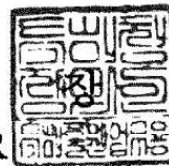
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[Title of Invention in Korean] 차세대 무선네트워크를 위한 슬라이싱 기반의 이동성
제공방법 및 장치 (Mobility Provision Method Based on Slicing for Next Generation Wireless
Network and Device)

[Title of Invention in English] Network Slice based Mobility management method and
apparatus in 5G network

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[Purport] I hereby make a submission as above to the Commissioner of the Korea Intellectual Property Office.

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[Description of the Invention]

[Title of invention].

Mobility Provision Method Based on Slicing for Next Generation Wireless Network and Device

(Network Slice based Mobility management method and apparatus in 5G network}

[Technical Field]

[0001] The present invention relates to a method and a device for providing network slicing in the next generation mobile communication network, which includes a method wherein a terminal in a connected state transmits and receives a service based on network slicing without disruption due to the movement of the terminal between cells.

[Content of the Invention]

[Means to Solve the Problem]

[0002] The present invention provides a method for performing mobility control by a terminal, wherein the terminal transmits and receives data based on network slicing while minimizing service disruption due to a movement of the terminal in an idle state between cells.

[Brief Description of the Drawings]

[0003] FIG. 1 is a diagram showing an example of multiple slices built within the same network infrastructure.

FIG. 2 is a diagram showing the configuration of a base station according to another embodiment.

FIG. 3 is a diagram showing the configuration of a user terminal according to another embodiment.

[Specific Content to Implement the Invention].

[0004] Hereinafter, some embodiments of the present invention will be described in detail with reference to the exemplary drawings. In assigning reference numerals to the components of each drawing and the like, it is important to note that the same components have the same numerals as much as possible, even when the components are shown on different drawings. Furthermore, in describing the invention, in a case wherein it is deemed that the gist of the invention can be obscured by detailed description of related publicly-known configuration or function of the disclosure, the detailed description thereof is omitted.

[0005] An MTC terminal described herein may mean a terminal that supports low cost (or low complexity), a terminal that supports coverage enhancement, or the like. An MTC terminal described herein may mean a terminal that supports low cost (or low complexity) or a terminal that supports coverage enhancement, or the like. Alternatively, an MTC terminal described herein may mean a terminal defined into a certain category for supporting low cost (or low complexity) and/or coverage enhancement.

[0006] In other words, an MTC terminal herein may mean a newly defined 3GPP Release-13 low cost (or low complexity) UE category/type that performs WTC-related operations based on LTE. Alternatively, an MTC terminal herein may mean a UE category/type defined in 3GPP Release-12 or earlier which supports an enhanced coverage compared to the existing LTE coverage or supports low power consumption, or a newly defined Release-13 low cost (or low complexity) UE category/type.

[0007] The wireless communication system of the present invention is widely deployed to provide various communication services such as voice packet data. A wireless communication system includes User Equipment (UE) terminal and Base Stations (Base station, BS, or eNB). The terminal herein is a comprehensive concept that means the terminal in wireless communication, and must be interpreted to include all of MS (Mobile Station), UT (User Terminal), SS (Subscribe Station), wireless devices, and the like, as well as the User Equipment (UE) in WCDMA and LTE, HSPA, and the like.

[0008] A base station or cell generally refers to a point (station) of communication with a user terminal and may be referred to by other terms, such as Node-B, evolved Node-B (eNB), Sector, Site, Base Transceiver System (BTS), Access Point, Relay Node, Remote Radio Head (RRH), Radio Unit (RU), small cell and the like.

[0009] That is, the term base station or cell herein must be interpreted in a comprehensive sense that indicates some domain or functions covered by Base Station Controller (BSC) in CDMA, NodeB, eNB in LTE, sectors (sites), or the like and means to encompass a variety of coverage domains such as megacell, macrocell, microcell, picocell, femtocell, and relay node, RRH, RU, and small cell communication range.

[0010] The various cells listed above have a base station that controls each cell, and thus base station can be interpreted into two meanings, which: i) indicates a device itself that provides a mechacell, macrocell, microcell, picocell, femtocell, or small cell with respect to the wireless domain; or ii) indicates the wireless domain itself. In i), all interacting devices wherein the devices providing a predetermined wireless domain are controlled by the same object or collaboratively configure the wireless domain are indicated as a base station. According to the configuration method of the wireless domain, eNBs, RRHs, antennas, RUs, Low Power Nodes (LPNs), points, transmission-reception points, transmission points, reception points, or the like is one example of a base station. In ii), the wireless domain itself, wherein signals are received or transmitted from the perspective of a user terminal or from the position of the neighboring base station, may be indicated as a base station.

[0011] Accordingly, megacell, macrocell, microcell, picocell, femtocell, small cell, RRH, antenna, RU, low power node (LPN), point, eNB, transmission-reception point, transmission point, and reception point are collectively referred to as base stations.

[0012] User terminal and base station herein are used as a comprehensive meaning of two transmission-reception objects used to realize the art described herein or technical ideas and are not limited by any specifically indicated term or word. User terminal and base station are used as a comprehensive meaning of two (Uplink or Downlink) transmission-reception objects used to realize the art or technical ideas described in the present invention and are not limited by any specifically indicated term or word. In this case, Uplink (UL or uplink) means a method for transmitting and receiving data from the user terminal to the base station, and downlink (DL or downlink) means a method for transmitting and receiving data from the base station to the user terminal.

[0013] There is no limit to the multiple access methods that are applied to a wireless communication system. A variety of multiple access methods can be used such as Code Division Multiple Access (CDMA), Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA), Orthogonal Frequency Division Multiple Access (OFDMA), OFDM-FDMA, OFDM-TDMA, and OFDM-CDMA. One embodiment of the present invention can be applied to resource allocation of nonsynchronous wireless communications, which evolves to LTE and LTE-advance

after GSM, WCDMA, HSPA, synchronous wireless communications field, and the like, which evolves to CDMA, CDMA-2000, and UMB, and the like. The present invention must not be interpreted as limited or restricted to any particular field of wireless communications, but must be interpreted to include all fields of art to which the ideas of the present invention may be applied.

[0014] For the uplink and downlink transmissions, a time division duplex (TDD) method may be used, wherein the transmissions are performed using different times, or a frequency division duplex (FDD) method, wherein the transmissions are performed using different frequencies.

[0015] Furthermore, in systems such as LTE and LTE-advanced forms a standard by configuring uplinks and downlinks based on a single carrier or pair of carriers. Uplink and downlink transmit control information via control channels such as Physical Downlink Control Channel (PDCCH), Physical Control Format Indicator Channel (PCFICH), Physical Hybrid ARQ Indicator Channel (PHICH), Physical Uplink Control Channel (PUCCH), Enhanced Physical Downlink Control Channel (EPDCCH), and the like and transmit data by being configured by data channels such as Physical Downlink Shared Channel (PDSCH), Physical Uplink Shared Channel (PUSCH), and the like to transmit data.

[0016] On the other hand, control information can also be transmitted using EPDCCH (enhanced PDCCH or extended PDCCH).

[0017] As used herein, a cell may mean a coverage of signals transmitted from a transmission-reception point, a component carrier having a coverage of signals transmitted from a transmission-reception point (transmission point or transmission/reception point), or the transmission-reception point itself.

[0018] The wireless communication system to which the embodiments apply may be a coordinated multi-point transmission/reception system (CoMP system) or a coordinated multi-antenna transmission system, or a coordinated multiple cell communication system, wherein two or more transmission-reception points collaboratively transmit signals. A CoMP system may include at least two multiple transmission-reception points and terminals.

[0019] A multiple transmission-reception point may be a base station or macro cell (hereinafter referred to as “eNB”), or at least one RRH having a high transmission power or having a low transmission power within a macro cell region, which is wire-controlled by being connected to an eNB by an optical cable or optical fiber.

[0020] Hereinafter, downlink means a communication or communication path from a multiple transmission-reception point to a terminal, and uplink means a communication or communication path from a terminal to a multiple transmission-reception point. In a downlink, a transmitter can be part of a multiple transmission-reception point, and a receiver can be part of a terminal. In an uplink, the transmitter can be part of a terminal, and the receiver can be part of a multiple transmission-reception point.

[0021] Hereinafter, the situation wherein signals are transmitted and received via channels such as PUCCH, PUSCH, PDCCH, EPDCCH, and PDSCH is sometimes denoted in the form "PUCCH, PUSCH, PDCCH, EPDCCH, and PDSCH are transmitted and received".

[0022] In addition, the description that signals PDCCH is transmitted or received or that signals are transmitted or received via PDCCH can be used as a meaning that includes transmitting or receiving EPDCCH or transmitting or receiving signals via EPDCCH.

[0023] That is, a physical downlink control channel described below may mean PDCCH or EPDCCH, and are used as a meaning that includes both PDCCH and EPDCCH.

[0024] Furthermore, for ease of description, EPDCCH, which is one embodiment of the present invention, may also be applied to the portions described as PDCCH, and EPDCCH may also be applied to the portions described as EPDCCH as one example of the present invention.

[0025] On the other hand, the High Layer Signaling described hereinafter includes RRC signaling that transmits RRC information containing RRC parameters.

[0026] The eNB performs downlink transmissions to the terminals. The eNB can transmit a Physical Downlink Shared Channel (PDSCH), which is the primary physical channel for unicast transmissions, and downlink control information such as scheduling necessary for reception of PDSCH and a physical downlink control channel (PDCCH) for transmitting scheduling approval information for transmitting in an uplink data channel (for example a physical uplink shared

channel, PUSCH). In the following, the signals being transmitted and received over each channel shall be described as the form such that the channel is transmitted and received.

[0027] Conventional mobile communication networks, such as LTE, utilize physical network objects to form a core network and an access network. Due to this, network resource utilization is inefficient and network configuration changes are not easy. Recently, there has been an active discussion on service-oriented next-generation mobile telecommunication networks to which network slicing technology is applied to effectively accommodate mobile services having different requirements and ensure end-to-end service quality to the terminal. Network slicing is art that can enhance the flexibility by dividing a network into a plurality of virtualized networks utilizing network virtualization technology and by configuring and managing a separate logical network per service or per user member. Using network slicing allows resources to be allocated for each service type from a virtualized network resource pool, and thus prompt service can be provided without building a physical network when a new service is introduced, and limited physical network resources can be efficiently utilized. As such, it is possible for network slicing to be realized into a logical network in an infrastructure wherein each slice instance is more shared, compared to building independent network infrastructures. FIG. 1 illustrates an example of multiple slices built within the same network infrastructure.

[0028] Network slicing enables differentiated processing according to needs of each individual customer. Slicing allows operators to have the customers belong to mutually different tenant types that have different requirements for mutually different services.(Network Slicing allow differentiated treatment depending on each customer requirements. With slicing , it is now possible for Mobile Network Operators (MNO) to consider customers as belonging to different tenant types with each having different service requirements that govern in terms of what slice types each tenant is eligible to use based on Service Level Agreement (SLA) and subscriptions.)

[0029] For data transmission-reception via a specific network slice or one or more network slices provided on an infrastructure wherein the terminal is shared, a specific procedure must be provided therefor. However, no specific methods for this have been currently provided. In particular, mobile communication terminals are based on mobility. In order to transmit and receive data without service interruption via a particular network slice or one or more network

slices as the terminal moves, a specific method must be provided therefor, but no specific method has been provided for this.

[0030] As described in detail, in the conventional art, for data transmission-reception via a specific network slice or one or more network slices provided on an infrastructure wherein the terminal is shared, a specific procedure must be provided therefor. However, no specific methods for this have been currently provided. In particular, mobile communication terminals are based on mobility. In order to transmit and receive data without service interruption via a particular network slice or one or more network slices as the terminal moves, a specific method must be provided therefor, but no specific method has been provided for this. Due to this, continuity of service could not be guaranteed when cell changes occurred by the movement of terminals.

[0031] The present invention, which is devised to solve the above problems, provides a data transmission-reception method based on network slicing in a (next-generation) mobile communication network. In particular, the purpose is to provide a method for transmitting and received data based on network slicing while minimizing service disruption due to the movement of a terminal between cells.

[0032] The specific methods of the present invention will be described below. The methods described below can be used individually or in combination of each method.

[0033] Currently, the concept of a cell is not clearly defined in the next generation mobile communications networks (NR: New Radio, 5G networks, hereafter denoted by NR for ease of description.). In LTE, this is defined as "combination of downlink and optionally uplink resources". In LTE, the cells are associated with synchronization (Synchronization depends on PSS/SSS and allows the UE to acquire the encoded PCI and the frame timing for reception of all downlink transmissions and for all uplink transmissions (in addition to the uplink timing advance, for uplink transmissions). In this sense, all downlink transmissions which are time aligned with PSS/SSS and all uplink transmissions using the PSS/SSS as timing reference belong to a cell.), inter-cell interference suppression (In order to suppress interference from neighbor cells, all downlink transmissions are scrambled with (for physical channels) or determined by (for reference signals) a specific sequence. For most downlink transmissions, the corresponding sequence is associated to the PCI, which value is determined from the sequence visible from PSS/SSS. Using different PCI

values for neighbor cells allows different downlink transmissions to use different sequences.), system information (After synchronization to the network, the UE acquires the cell reference symbols (CRS) which allows decoding the PBCH carrying the MIB. According to the MIB, the UE knows the cell bandwidth, PHICH and SFN. After acquiring the MIB and the PCFICH, the UE knows exactly the location of control channel, i.e. PDCCH and can acquire system information. From L3 perspective, system information is a set of parameters associated to each other as part of "a cell". All these signals and channels are using a sequence determined by the value of the PCI, which is the same for all.), data transmission (Data transmission in LTE is controlled by information transmitted on PDCCH. The UE is allocated at least a C-RNTI, which is implicitly encoded in control indications (either downlink, DCI, or uplink, UCI) via a CRC calculation. As for data, they are scrambled using a sequence determined by the PCI but also by the UE RNTI also providing some randomization of transmissions across multiple UEs, which can be useful e.g. in case of spatial multiplexing.), measurement and handover (When the UE is in RRC_CONNECTED, the UE is configured with DL measurement gap and measurement events in order to prepare handover as the UE is moving. The measurement process includes synchronization and reading of CRS and PCI is used to identify different cells.), and procedures. For NR, one NR cell can be associated with one or more among the procedures mentioned below.

[0034] - DL synchronization signals deriving identical NR cell ID;

[0035] - identical System information distribution for at least Minimum SI;

[0036] - efficient use of all possible types of multi-TRP operation:

[0037] - downlink/uplink physical channels/signals towards a connected UE are identical/valid in more than one TRP.

[0038] A single NR cell can have one or more among from a single set of system information, barring, and the same tracking area. When an NR cell is composed of one or more TRPs, all TRPs can transmit the same system information. (An NR Cell has a single set of system information, barring and same tracking area. In the case that a single NR Cell consists of more than one TRP then all the TRPs transmit the same system information.)

[0039] An NR cell may be smoothly linked to slice information (slice type, tenant type, slice ID, tenant ID, multi-dimensional descriptor (MDD) information, or slice service, slice

information, slice configuration information, slice characteristic information, or RAN function (any NR functions or any E-UTRAN functions) of the slice, ran function list for the slice. For ease of description, hereinafter denoted as slice information. This is for ease of description, and any information for identifying/describing/configuring a specific network slicing at NR is included in the scope of the present invention) For example, one NR cell may have one of dedicated slice information or a plurality of mutually different slice information. NR cells may have mutually different slice information on the neighbors.

[0040] An NR cell can provide helpful and relevant information to allow a terminal having specific slice information or one or more slice information (or linked to this) (hereinafter denoted by a terminal interested in a specific terminal for ease of description) to access an NR cell that has the slice information.

[0041] As one example, the NR cell may provide slice information to the terminal. As one example, broadcasting can be performed via system information. As another example, terminals can be instructed via signaling dedicated to RRC. Through this information, the terminal can select the NR cells that provide the slices that the terminal is interested in (or that the terminal belongs to, is linked to, or is subscribed to).

[0042] In another example, the NR cell can provide slice information of neighboring cells to the terminal. As one example, broadcasting can be performed via system information. As another example, terminals can be instructed via signaling dedicated to RRC. Through is information, the terminal can select/reselect the NR cells that provide the slices that the terminal is interested in (or that the terminal belongs to, is linked to, or is subscribed to).

[0043] When a terminal interested in the slice provided via the network slice moves between cells (or moves between base stations or moves to a different base station cell), service continuity support techniques can be provided to reduce disruption of service. One example of a possible service scenario is as follows.

[0044] Scenario 1: Moving from a network slicing transmission cell to a cell that does not support network slicing

[0045] While in the source cell (or the current cell or the camped cell), the terminal can allow the neighboring cells to which the terminal intends to move to know whether network

slicing is supported based on the system information associated with network slicing of the neighboring cell or on-demand system information linked to the minimum system information associated with network slicing or the instruction information from which it can be confirmed whether network slicing is supported by the neighboring cell.

[0046] If the neighboring cell to which the terminal intends to move does not support network slicing, the terminal may request network slicing services using an application server for supporting network slicing via unicast while receiving the service via network slicing in the source cell.

[0047] Scenario 2: moving from a network slicing transmission cell to a network slicing transmission cell

[0048] While in the source cell (or the current cell or the camped cell), the terminal can allow the neighboring cells to which the terminal intends to move to know whether network slicing is supported based on the system information associated with network slicing of the neighboring cell or on-demand system information linked to the minimum system information associated with network slicing or the instruction information from which it can be confirmed whether network slicing is supported by the neighboring cell.

[0049] Embodiments for providing service continuity for RRC Connected terminals will be described in detail below. The methods described below can be used individually or in combination of each method.

[0050] 1) Communication of terminal interest information that includes network slice information

[0051] For RRC Connected terminals, having network slicing handed over to a supporting cell (or cell that supports a specific network slicing in which the terminal is interested) may be efficient in the aspect of the network.

[0052] Furthermore, for RRC IDLE terminals or RRC INACTIVE terminals, it may be helpful for the base station to know that the terminal is interested in a specific network slicing for allowing the terminal to be continuously provided with service based on the network slices according to the terminal movement afterwards.

[0053] As one example, when slice information is provided via system information in the serving cell (or current cell, or PCell, hereinafter referred to as the serving cell) and the terminal receives the network slice information via system information from the serving cell (and/or if specific network slicing is pre-configured in the terminal and/or if network slicing is configured on the terminal via the network), the terminal may direct information thereof to the base station.

[0054] As another example, in the RRC IDLE state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can disclose a procedure for giving an instruction on interest information to a base station in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; or change of service to be received via network slicing.

[0055] As another example, in the RRC INACTIVE state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can disclose a procedure for instructing interest information to a base station in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; or change of service to be received via network slicing. In this case, the RRC INACTIVE indicates a new state of a core network connection base. The new state can satisfy the following properties.

[0056] (While the UE is in the new state, the attributes of UE, RAN and CN are characterized as follows:

[0057] - The connection between CN and RAN is maintained in terms of both control and user planes.

[0058] - The UE is reachable by a RAN initiated notification procedure for which the relevant parameters are configured by RAN itself.

[0059] - RAN is tracking the UE location on the level of a "RAN-based notification area" and is aware whenever the UE moves from one "RAN-based notification area" to another.)

[0060] As another example, in the RRC CONNECTED state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can initiate a procedure for giving an instruction on interest information to a base station in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; or change of service to be received via network slicing., or after an RRC connection reconfiguration message has been sent to the target base station by receiving an RRC connection reconfiguration message that includes mobility control information.

[0061] The network slicing can operate independently even when cells/base stations use the same frequency. Additionally/alternatively network slicing domains can be configured regardless of the frequency.

[0062] The terminal can allow the slice information to be included in the interest information described above .Alternatively, the terminal can have one or more information from among the slice information received via system information, pre-configured in the terminal, or received via RRC connection reconfiguration message, information for identifying the service/session/bearer linked to the slice information, and priority information for the corresponding network slice included in the interest information described above.

[0063] The interest information described above can be provided by incorporating new fields into one or more RRC messages from among the UE assistance messages, RRC connection setup request messages, RRC connection setup completion messages, or provided via new RRC messages.

[0064] The base station can control the data transmission-reception via network slicing based on the information received from the terminals described above. As one example, initiation or termination thereof can be performed. As another example, the base station can instruct

network slice information to a terminal. As another example, the base station can give an instruction on a bearer linked to network slicing to a terminal.

[0065] 2) Transmitting network slice information to the base station via the core network object

[0066] It may be more efficient to have RRC connected terminals handed over to a cell that supports network slicing (or a cell that supports a specific network slicing in which the device is interested) from the viewpoint of the network.

[0067] Furthermore, for RRC IDLE terminals or RRC INACTIVE terminals, it may be helpful for the base station to know that the terminal is interested in network slicing to enable the terminal to continuously receive services based on the network slice according to the movement of the terminal afterwards.

[0068] As one example, if the serving cell (or current cell or PCell, hereinafter denoted as the serving cell) provides slice information via system information, and the terminal receives network slice information via system information from the serving cell (and/or if a specific network slicing is pre-configured on the terminal and/or network slicing is configured on the terminal via the network), the terminal can instruct the interest information to the base station via the 5G core network object.

[0069] As another example, in the RRC IDLE state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can transmit network slice information to a 5G core network object in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; change of service to be received via network slicing; network attach, tracking area update; service request; or network connection setup.

[0070] As another example, in an RRC INACTIVE state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication

based on specific network slice via network slicing can transmit network slice information to a 5G core network object in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; change of service to be received via network slicing; network attach, tracking area update; service request; or network connection setup.

[0071] As another example, in the RRC CONNECTED state, a terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can transmit network slice information to a 5G core network object in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; change of service to be received via network slicing; network attach, tracking area update; service request; or network connection setup.

[0072] A 5G core network object can transmit the network slice information to the base station via a procedure for setting up a terminal context.

[0073] The network slicing can operate independently even when cells/base stations use the same frequency. Additionally/alternatively network slicing domains can be configured regardless of the frequency.

[0074] The terminal may allow specific interest information to be included in the network slice information transmitted to the core network object described above. Alternatively, the terminal can have one or more information from among the slice information received via system information, pre-configured in the terminal, or received via RRC connection reconfiguration message, information for identifying the service/session/bearer linked to the slice information, and priority information for the network slice included in the network slice information described above.

[0075] The base station can control data transmission-reception via network slicing based on the information received from terminals as described above. As one example, initiation or

termination thereof can be performed. As another example, a base station can instruct network slice information to a terminal. As another example, a base station can give an instruction on a bearer linked to network slicing to a terminal. As another example, a base station can process data based on network slicing.

[0076] 3) Transmitting slice information to the target base station during handover

[0077] Handover can be performed according to the movement of the terminal while transmitting and receiving data via network slicing in RRC Connected state. Alternatively, During handover preparation, the source base station can forward the network slice information received from the core network to the target base station, if available.

[0078] During handover preparation, the source base station can forward the network slice information received from the terminal to the target base station, if available.

[0079] As one example, after handover, before the terminal updates the network slice information, the terminal can read the system information related to network slicing (or on-demand system information linked to the minimum system information related to network slicing, or control information from which whether network slicing is available can be confirmed).

[0080] As another example, when the source cell does not provide network slicing-related system information (or on-demand system information linked to the minimum system information related to network slicing, or control information from which whether network slicing is available can be confirmed), or when a terminal that has not received via network slicing performs a handover, the terminal can instruct the interest information described above to the base station after the handover.

[0081] As another example, the information described above can be sent as included in a handover request message.

[0082] As another example, the information described above can be sent as included in a handover preparation message.

[0083] As another example, the transmitted information can be sent as included in the AS-Context information of the HandoverPreparation message.

[0084] As another example, the target cell/base station may include network slice information in a handover response X2 message or a handover command Inter-node RRC message.

[0085] As another example, if the target cell/base station does not support network slicing, the target base station may include information to give an instruction in the handover response X2 message or the handover command inter-node RRC message.

[0086] As one example, if the target cell/base station receives the information described above via the source cell/base station, and when the target cell/base station does not support network slicing, or does not provide the network slice via network slicing, the target base station may transmit the information to the source base station as included in the handover response X2 message. As another example, when the target cell/base station receives the information described above via the source cell/base station, and when the target cell/base station does not support network slicing, or does not provide the corresponding interest group communication via network slicing, the information may be forwarded to the terminal to give an instruction in the handover command internode RRC message.

[0087] As another example, the source base station may not decide to handover to the target base station described above.

[0088] 4) Transmitting network slice information to the target base station via an RRC connection reconfiguration confirmation message

[0089] As one example, the terminal can receive an RRC connection reconfiguration message including mobility control information via the source base station. As another example, the terminal can receive an RRC connection reconfiguration message generated by the target base station and containing mobility control information via the source base station. The terminal can allow the network slice information described above (network slice related information or network slice interest information) included in the RRC connection reconfiguration confirmation message. The base station can control data transmission-reception via the network slice based on the information described above, which is received from the terminals. As one example, initiation or termination thereof can be performed. As another example, the base station can give an instruction on network slice information to the terminal. As another example, a base station can

give an instruction on a bearer linked to network slicing to the terminal. As another example, a base station can process data based on network slicing.

[0090] 5) A method for receiving slice information from the 5G core network object via the interface between the core network and the base station.

[0091] The base station can receive slice information from the 5G core network object via the interface between the core network and the base station. As one example, when a 5G core network object receives a path change request message (for example, a Path switch request message) from a (target) base station, the 5G core network object can transmit the path change request confirmation message including the slice information described above. The base station can control data transmission-reception via network slicing based on the information described above, which is received from the core network object. As one example, initiation or termination thereof can be performed. As another example, the base station can give an instruction on network slice information to the terminal. As another example, a base station can give an instruction on a bearer linked to network slicing to a terminal. As another example, the base station can process data based on network slicing.

[0092] As another example, a 5G core network object can transmit network slice information to a base station via a procedure for setting up/configuring terminal contexts. A terminal interested in network slicing, terminal that is interested in data transmission-reception via specific network slicing, terminal capable of network slicing, or terminal that intends to perform data communication based on specific network slice via network slicing can transmit network slice information to a 5G core network object in one or more of the cases among: at the RRC Connection setup; when entering or leaving the current network slicing cell; start or end of a session; change of system information related to network slicing; change of interested network slice to be received via network slicing; change of service to be received via network slicing; network attach, tracking area update; service request; or network connection setup. The 5G core network object can transmit network slice information to the base station via a procedure for setting up a terminal context. To this end, the 5G core network object can give an instruction on the terminal context information including specific network slice information to the base station

according to the value included in the subscription data via the subscriber information server, and the like.

[0093] 6) Another method is for the terminal to transmit network slice information to the base station after handover is completed.

[0094] As described above, the present invention has the effect of providing continuous service while reducing service disruption.

[0095] FIG. 2 is a diagram showing the configuration of a base station according to another embodiment.

[0096] With reference to FIG. 2, a base station 1000 according to another embodiment includes a control unit 1010, a transmitting unit 1020, and a receiving unit 1030.

[0097] The control unit 1010 controls the overall operation of the base station in accordance with providing a method for transmitting and receiving data based on network slicing while minimizing service disruption due to the movement of the terminal in the idle state (RRC IDLE or ECM-IDLE or INACTIVE) between cells, which is necessary to carry out the present invention described above.

[0098] The transmitting unit 1020 and the receiving unit 1030 are used for transmitting and receiving the signal, message, or data necessary to carry out the present invention described above.

[0099] FIG. 3 is a diagram illustrating a configuration of a user terminal according to another embodiment.

[0100] With reference to FIG. 3, a user terminal 1100 by another embodiment includes a receiving unit 1110 and a control unit 1120, and a transmitting unit 1130.

[0101] The receiving unit 1110 receives downlink control information, data, and messages from the base station via the corresponding channel.

[0102] Furthermore, the control unit 1120 controls the overall operation of the terminal in accordance with providing a method for transmitting and receiving data based on network slicing while minimizing service disruption due to the movement of the terminal in the idle state (RRC IDLE or ECM-IDLE or INACTIVE) between cells, which is necessary to carry out the present invention described above.

[0103] The transmitting unit 1130 transmits the uplink control information, data, and messages to the base station via the corresponding channel.

[0104] The standard contents or standard documents mentioned in the above embodiments are omitted to simplify the description of the specification and constitute a part of the present specification. Therefore, adding the above standard content and part of the content of standard documents to this specification or describing those in the claims should be interpreted as falling within the scope of the present invention.

[0105] The above description is merely an illustrative description of the technical idea of the present invention, and a person of ordinary skill in the art will be able to make various modifications and variations without departing from the essential characteristics of the present invention. Accordingly, the embodiments disclosed in the present invention are not intended to limit the technical idea of the present invention, but are for illustrative purposes, and the scope of the technical idea of the present invention is not limited by these embodiments. The scope of protection of the present invention should be interpreted by the scope of claims below, and all technical ideas within the equivalent scope should be interpreted as being included in the scope of patent rights of the present invention.

[Scope of Patent Claims]

[Claim 1]

A method for performing mobility control by a terminal,
wherein the terminal transmits and receives data based on network slicing while minimizing
service disruption due to a movement of the terminal in an idle state between cells.

[Abstract Page]

[Abstract]

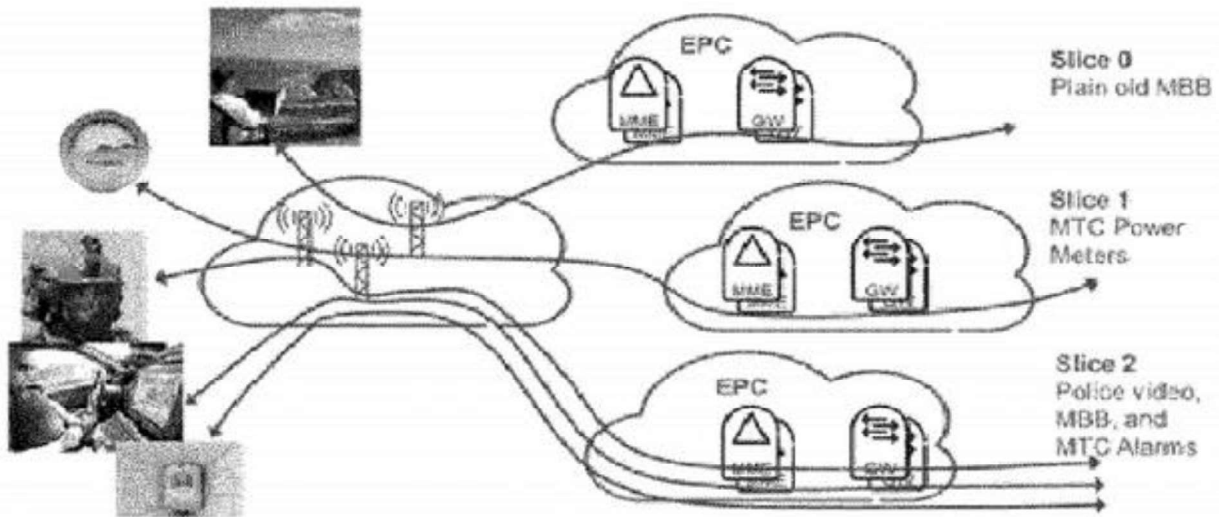
The present invention relates to a method and a device for providing network slicing in the next generation mobile communication network, which includes a method wherein a terminal in a connected state transmits and receives services based on network slicing without disruption due to the movement of the terminal between cells. In particular, the present invention provides a method for performing mobility control by a terminal, wherein the terminal transmits and receives data based on network slicing while minimizing service disruption due to a movement of the terminal in an idle state between cells.

[Representative Drawing]

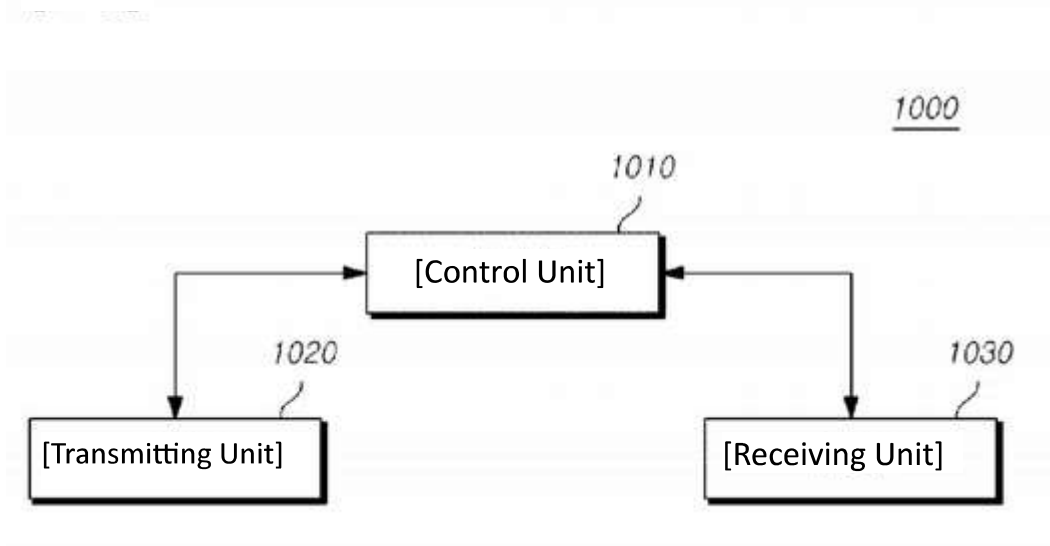
FIG. 2

[Drawings]

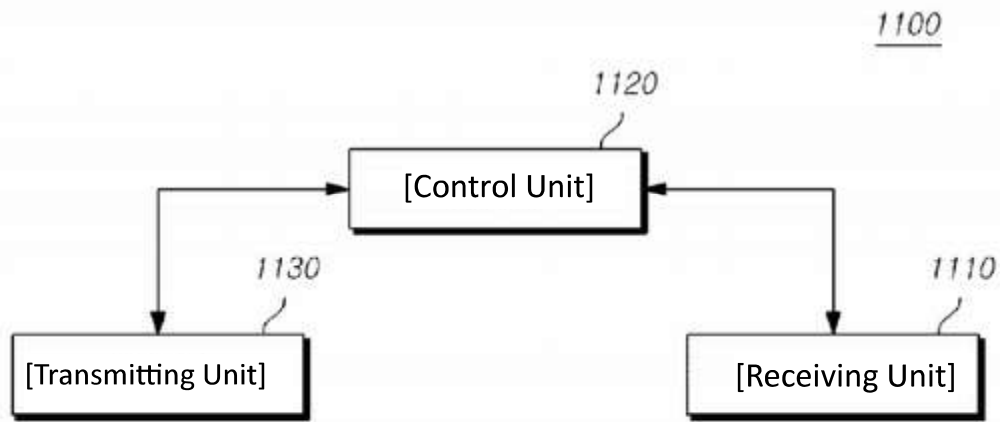
[FIG. 1]



[FIG. 2]



[FIG. 3]





August 8, 2024

Certification

Welocalize Translations

TRANSLATOR'S DECLARATION:

I, Seongweon Park, translator to Welocalize declare:

1. That I am a citizen of The Republic of Korea.
2. That I am well acquainted with the Japanese and English languages.
3. That the attached is, to the best of my knowledge and belief, a true translation into the English language of the accompanying document "KR 10-2016-0146054 (631 priority document)"
4. That I believe that all statements made herein of my own knowledge are true and that all statements made on information and belief are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Seongweon Park

A handwritten signature in cursive script that reads "Park Seongweon".

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Petitioners' Exhibit 1006
Nokia of America Corp., et al. v. KT Corporation, et al.
Case No. IPR2025-00036; U.S. Patent No. 11,627,631
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