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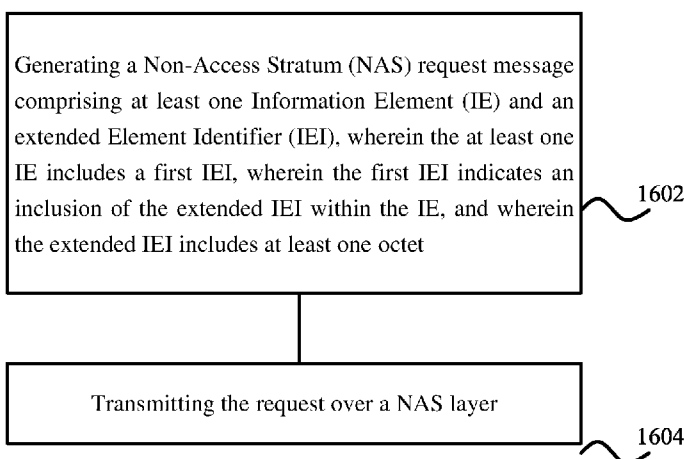


Fig.16

(57) Abstract: Various aspects of the present disclosure relate to a User Equipment (UE) for wireless communication and including at least one memory and at least one processor coupled with the at least one memory. The at least one processor may be configured to cause the UE to generate a Non-Access Stratum (NAS) request message including at least one Information Element (IE). The at least one IE may include an extended Element Identifier (IEI). The at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE. The extended IEI may include at least one octet. The at least one processor may be further configured to cause the UE to transmit the NAS request message via a NAS layer.

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METHOD AND APPARATUS FOR EXTENDED INFORMATION ELEMENT IDENTIFIER

TECHNICAL FIELD

[0001] The present disclosure relates to wireless communications, and more specifically to information elements (IEs) used in non-access stratum (NAS) signaling.

BACKGROUND

[0002] A wireless communications system or public land mobile network (PLMN) may include one or multiple network communication devices, such as base stations, which may support wireless communications for one or multiple user communication devices, which may be otherwise known as User Equipment (UE), or other suitable terminology. The wireless communications system may support wireless communications with one or multiple user communication devices by utilizing resources of the wireless communication system (e.g., time resources (e.g., symbols, slots, subframes, frames, or the like) or frequency resources (e.g., subcarriers, carriers, or the like). Additionally, the wireless communications system may support wireless communications across various radio access technologies including third generation (3G) radio access technology, fourth generation (4G) radio access technology, fifth generation (5G) radio access technology, among other suitable radio access technologies beyond 5G (e.g., sixth generation (6G)).

SUMMARY

[0003] An article “a” before an element is unrestricted and understood to refer to “at least one” of those elements or “one or more” of those elements. The terms “a,” “at least one,” “one or more,” and “at least one of one or more” may be interchangeable. As used herein, including in the claims, “or” as used in a list of items (e.g., a list of items prefaced by a phrase such as “at least one of” or “one or more of” or “one or both of”) indicates an inclusive list such that, for example, a list of at least one of A, B, or C means A or B or C or AB or AC or BC or ABC (i.e., A and B and C). Also, as used herein, the phrase “based on” shall not be construed as a reference to a closed set of conditions. For example, an example step that is described as “based on condition A” may be based on both a condition A and a condition B

without departing from the scope of the present disclosure. In other words, as used herein, the phrase “based on” shall be construed in the same manner as the phrase “based at least in part on. Further, as used herein, including in the claims, a “set” may include one or more elements.

[0004] Some implementations of the method and apparatuses described herein may include a UE for wireless communication and comprising at least one memory and at least one processor coupled with the at least one memory. The processor is configured to cause the UE to generate a NAS request message comprising at least one IE, wherein the at least one IE includes an extended Element Identifier (IEI), wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0005] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 1 IE of format type value (TV), the first IEI has a length of a first half of a first octet, a value part is included in a second half of the first octet, and the extended IEI is encapsulated within at least one or more second octets.

[0006] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 2 IE of format type (T), the first IEI has a length of a first octet, and the extended IEI is encapsulated within at least one or more second octets.

[0007] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 3 IE of format type value (TV), the first IEI has a length of a first octet, the extended IEI is encapsulated within at least one or more second octets, and a value part is encapsulated within at least one or more third octets.

[0008] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 4 IE of format type length value (TLV), the first IEI has a length of a first octet, the extended IEI is encapsulated within at least one or more second octets, a Length Indicator (LI) is encapsulated within at least one third octet, and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

[0009] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 6 IE of format TLV-E, the first IEI has a length of a first octet, the

extended IEI is encapsulated within at least one or more second octets, an LI is encapsulated within at least two third octets, and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

[0010] In some implementations of the method and apparatuses described herein the at least one processor is configured to cause the UE to receive a NAS accept message over the NAS layer, the NAS accept message including at least one standard IE containing the extended IEI.

[0011] In some implementations of the method and apparatuses described herein the at least one IE comprises a 5G Mobility Management (5GMM) IE or a 5G System (5GS) Session Management (5GSM) IE.

[0012] Some implementations of the method and apparatuses described herein may include a processor for wireless communication, comprising at least one controller coupled with at least one memory and configured to cause the processor to generate a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0013] Some implementations of the method and apparatuses described herein may include a method performed by a UE, the method comprising generating a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmitting the NAS request message via a NAS layer.

[0014] Some implementations of the method and apparatuses described herein may include a network entity for wireless communication, comprising at least one memory, and at least one processor coupled with the at least one memory and configured to cause the network entity to generate a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0015] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 1 IE of format TV, the first IEI has a length of a first half of a first octet, a value part is included in a second half of the first octet, and the extended IEI is encapsulated within at least one or more second octets.

[0016] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 2 IE of format T, the first IEI has a length of a first octet, and the extended IEI is encapsulated within at least one or more second octets.

In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 3 IE of format TV, the first IEI has a length of a first octet, the extended IEI is encapsulated within at least one or more second octets, and a value part is encapsulated within at least one or more third octets.

[0017] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 4 IE of format TLV, the first IEI has a length of a first octet, the extended IEI is encapsulated within at least one or more second octets, an LI is encapsulated within at least one third octet, and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

[0018] In some implementations of the method and apparatuses described herein: the IE corresponds to a Type 6 IE of format TLV-E, the first IEI has a length of a first octet, the extended IEI is encapsulated within at least one or more second octets, an LI is encapsulated within at least two third octets, and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

[0019] In some implementations of the method and apparatuses described herein, wherein the at least one processor is configured to cause the UE to receive a NAS accept message via the NAS layer, the NAS accept message including at least one standard IE containing the extended IEI.

[0020] In some implementations of the method and apparatuses described herein the at least one standard IE is a 5GMM IE or a 5GSM IE.

[0021] In some implementations of the method and apparatuses described herein the network entity comprises an Access and Mobility Management Function (AMF).

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Figures 1a, 1b and 1c illustrate various Type 1 standard IEs of format V in accordance with aspects of the present disclosure.

[0023] Figure 2 illustrates a Type 2 standard IE of format T in accordance with aspects of the present disclosure.

[0024] Figures 3a and 3b illustrate Type 3 standard IEs of format V and TV respectively in accordance with aspects of the present disclosure.

[0025] Figures 4a and 4b illustrate Type 4 standard IEs of format LV and TLV respectively in accordance with aspects of the present disclosure.

[0026] Figures 5a and 5b illustrate Type 6 standard IEs of format LV-E and TLV-E respectively in accordance with aspects of the present disclosure.

[0027] Figure 6 illustrates an example of a wireless communications system in accordance with aspects of the present disclosure.

[0028] Figure 7 illustrates a Type 1 standard IE of format TV in accordance with aspects of the present disclosure.

[0029] Figure 8 illustrates a Type 2 standard IE of format T in accordance with aspects of the present disclosure .

[0030] Figure 9 illustrates a Type 3 standard IE of format TV in accordance with aspects of the present disclosure .

[0031] Figure 10 illustrates a Type 4 standard IE of format TLV in accordance with aspects of the present disclosure .

[0032] Figure 11 illustrates a Type 6 standard IE of format TLV-E in accordance with aspects of the present disclosure.

[0033] Figure 12 shows an example of a signaling diagram in accordance with aspects of the present disclosure.

[0034] Figure 13 illustrates an example of a UE in accordance with aspects of the present disclosure.

[0035] Figure 14 illustrates an example of a processor in accordance with aspects of the present disclosure.

[0036] Figure 15 illustrates an example of a network equipment (NE) in accordance with aspects of the present disclosure.

[0037] Figure 16 is a flowchart of method performed by a UE in accordance with aspects of the present disclosure.

[0038] Figure 17 is a flowchart of a method performed by a NE in accordance with aspects of the present disclosure.

DETAILED DESCRIPTION

[0039] A wireless communication system, which may include a public land mobile network (PLMN), may support NAS signalling (e.g., NAS messaging via a NAS layer). NAS signalling may use IEs to indicate information. For example, a non-mandatory IE type may include an 8 bit binary number or octet, or two hexadecimal numbers (where the hexadecimal numbers are identified by respective 4-bit segments of the octet). An 8-bit range limits (to 256) numbers to uniquely identify non-mandatory IEs. This limitation may be problematic when it comes to introducing new non-mandatory IEs for new features as is likely with future 5G architectures.

[0040] For example, for services provided by the wireless communication system, routing functions of a 5G system (5GS) NAS pass standard layer-3 (L3) messages according to the protocol discriminator and protocol data unit (PDU) session identity towards the 5G mobility management (5GMM) entities or towards the 5G session management (5GSM) entities of the various 5GS NAS service access points (SAPs). 3GPP TS 24.007 defines standard L3 messages as consisting of an “imperative part” which contains a header and a “non-imperative part”. The non-header of the imperative part and the non-imperative part are composed of successive parts, referred as standard IEs, where each standard IE may have the following format:

- an IE identifier (IEI);
- a length indicator (LI); and
- a value part.

[0041] A standard IE has one of the formats shown in Table 11.1 of 3GPP TS 24.007:

Format	Meaning	IEI present	LI present	Value part present
T	Type only	yes	no	no
V	Value only	no	no	yes
TV	Type and Value	yes	no	yes
LV	Length and Value	no	yes	yes
TLV	Type, Length and Value	yes	yes	yes
LV-E	Length and Value	no	yes	yes
TLV-E	Type, Length and Value	yes	yes	yes

Table 11.1: Formats of IEs

[0042] The IEI is of length half an octet if the IE is of type 1 IE of format TV and is one octet if the IE is of:

- type 2 IE of format T;
- type 3 IE of format TV;
- type 4 IE of format TLV; and
- type 6 IE of format TLV-E.

The IEI is used for the non-mandatory standard IE, which may not be present. Formats with the IEI are T, TV, TLV or TLV-E.

[0043] If the format of the standard IE is LV or TLV, the length indicator (LI) of the standard IE is one octet. If the format of the standard IE is LV-E and TLV-E, the LI of the standard IE is two octets where bit 8 of the first octet contains the most significant bit and bit 1 of the second octet contains the least significant bit.

[0044] The value part of a standard IE either consists of zero octet, a half octet, one octet, or multiple octets. The value part of a type 2 standard IE of format T does not consist of any value part, and as such it is always empty. If a standard IE is type 1 IE of format V or TV, the value part of the standard IE consists of a half octet, whilst a type 3 standard IE of format V or TV contains a value part of at least one octet. The value part of a type 4 standard IE of format LV or TLV consists of an integral number of octets, between 0 and 255 inclusive (as such it may be empty, i.e., consist of zero octets). For a standard IE of LV-E and TLV-E, the value part of a standard IE consists of an integral number of octets, between 0 and 65535 inclusive (and as such it may be empty, i.e., consist of zero octets).

[0045] According to clause 11.2.1.1.4 in 3GPP TS 24.007, five categories or types of standard IEs are defined and each type adopts one or more of the formats listed above in Table 11.1. The types are as follows:

[0046] **Type 1**

1- standard IEs of format V provide:

The value in bit positions 8, 7, 6, 5 of an octet (Figure 1a); or

the value in bit positions 4, 3, 2, 1 of an octet (Figure 1b).

2- or standard IEs of format TV have an IEI of a half octet length; they provide the IEI in bit positions 8, 7, 6, 5 of an octet and the value part in bit positions 4, 3, 2, 1 of the same octet (Figure 1c)

[0047] **Type 2**

Standard IE has format T; its IEI consists of one octet, its value part is empty (Figure 2).

[0048] **Type 3**

1- standard IEs of format V provide value part with at least one octet (Figure 3a); or

2- or standard IEs of format TV provide one octet IEI and an at least one octet value part (Figure 3b).

[0049] **Type 4**

1- standard IE of format LV with LI having one octet and precedes the value part, which consists of zero, one, or up to 255 octets (Fig4a); or

2- standard IE of format TLV with one octet IEI and LI having one octet and precedes the value part, which consists of zero, one, or up to 255 octets (Figure 4b).

[0050] **Type 6** (No Type 4 is specified)

1- standard IE has format LV-E with LI having 2 octets and precedes the value part, which consists of zero, one or up to 65535 octets (Figure 5a); or

2- standard IE has format TLV-E with one octet IEI and LI having 2 octets and precedes the value part, which consists of zero, one or up to 65535 octets (Figure 5b).

[0051] As will be apparent from the discussion below it is proposed here to specify a new IEI which, when included in an IE, indicates that the IE contains an “extended” IEI that is contained elsewhere in the IE. This allows for the specification of IEIs of length greater than half an octet for type 1 IE of format TV or one octet for type 3 IE of format TV, type 4 IE of format TLV, and type 6 IE of format TLV-E.

[0052] Aspects of the present disclosure are described in the context of a wireless communications system.

[0053] Figure 6 illustrates an example of a wireless communications system 100 in accordance with aspects of the present disclosure. The wireless communications system 100 may include one or more NE 102, one or more UE 104, and a core network (CN) 106. The wireless communications system 100 may support various radio access technologies. In some implementations, the wireless communications system 100 may be a 4G network, such as an LTE network or an LTE-Advanced (LTE-A) network. In some other implementations, the wireless communications system 100 may be a NR network, such as a 5G network, a 5G-Advanced (5G-A) network, or a 5G ultrawideband (5G-UWB) network. In other implementations, the wireless communications system 100 may be a combination of a 4G network and a 5G network, or other suitable radio access technology including Institute of Electrical and Electronics Engineers (IEEE) 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20. The wireless communications system 100 may support radio access technologies beyond 5G, for example, 6G. Additionally, the wireless communications system 100 may support technologies, such as time division multiple access (TDMA), frequency division multiple access (FDMA), or code division multiple access (CDMA), etc.

[0054] The one or more NE 102 may be dispersed throughout a geographic region to form the wireless communications system 100. One or more of the NE 102 described herein may be or include or may be referred to as a network node, a base station, a network element, a network function, a network entity, a radio access network (RAN), a NodeB, an eNodeB (eNB), a next-generation NodeB (gNB), or other suitable terminology. An NE 102 and a UE 104 may communicate via a communication link, which may be a wireless or wired connection. For example, an NE 102 and a UE 104 may perform wireless communication (e.g., receive signaling, transmit signaling) over a Uu interface.

[0055] An NE 102 may provide a geographic coverage area for which the NE 102 may support services for one or more UEs 104 within the geographic coverage area. For example, an NE 102 and a UE 104 may support wireless communication of signals related to services (e.g., voice, video, packet data, messaging, broadcast, etc.) according to one or multiple radio access technologies. In some implementations, an NE 102 may be moveable, for example, a satellite associated with a non-terrestrial network (NTN). In some implementations, different

geographic coverage areas 112 associated with the same or different radio access technologies may overlap, but the different geographic coverage areas may be associated with different NE 102.

[0056] The one or more UE 104 may be dispersed throughout a geographic region of the wireless communications system 100. A UE 104 may include or may be referred to as a remote unit, a mobile device, a wireless device, a remote device, a subscriber device, a transmitter device, a receiver device, or some other suitable terminology. In some implementations, the UE 104 may be referred to as a unit, a station, a terminal, or a client, among other examples. Additionally, or alternatively, the UE 104 may be referred to as an Internet-of-Things (IoT) device, an Internet-of-Everything (IoE) device, or machine-type communication (MTC) device, among other examples.

[0057] A UE 104 may be able to support wireless communication directly with other UEs 104 over a communication link. For example, a UE 104 may support wireless communication directly with another UE 104 over a device-to-device (D2D) communication link. In some implementations, such as vehicle-to-vehicle (V2V) deployments, vehicle-to-everything (V2X) deployments, or cellular-V2X deployments, the communication link 114 may be referred to as a sidelink. For example, a UE 104 may support wireless communication directly with another UE 104 over a PC5 interface.

[0058] An NE 102 may support communications with the CN 106, or with another NE 102, or both. For example, an NE 102 may interface with other NE 102 or the CN 106 through one or more backhaul links (e.g., S1, N2, N2, or network interface). In some implementations, the NE 102 may communicate with each other directly. In some other implementations, the NE 102 may communicate with each other directly or indirectly (e.g., via the CN 106). In some implementations, one or more NE 102 may include subcomponents, such as an access network entity, which may be an example of an access node controller (ANC). An ANC may communicate with the one or more UEs 104 through one or more other access network transmission entities, which may be referred to as a radio heads, smart radio heads, or transmission-reception points (TRPs).

[0059] The CN 106 may support user authentication, access authorization, tracking, connectivity, and other access, routing, or mobility functions. The CN 106 may be an evolved packet core (EPC), or a 5G core (5GC), which may include a control plane entity

that manages access and mobility (e.g., a mobility management entity (MME), an access and mobility management functions (AMF)) and a user plane entity that routes packets or interconnects to external networks (e.g., a serving gateway (S-GW), a Packet Data Network (PDN) gateway (P-GW), or a user plane function (UPF)). In some implementations, the control plane entity may manage non-access stratum (NAS) functions, such as mobility, authentication, and bearer management (e.g., data bearers, signal bearers, etc.) for the one or more UEs 104 served by the one or more NE 102 associated with the CN 106.

[0060] The CN 106 may communicate with a packet data network over one or more backhaul links (e.g., via an S1, N2, N2, or another network interface). The packet data network may include an application server. In some implementations, one or more UEs 104 may communicate with the application server. A UE 104 may establish a session (e.g., a protocol data unit (PDU) session, or the like) with the CN 106 via an NE 102. The CN 106 may route traffic (e.g., control information, data, and the like) between the UE 104 and the application server using the established session (e.g., the established PDU session). The PDU session may be an example of a logical connection between the UE 104 and the CN 106 (e.g., one or more network functions of the CN 106).

[0061] In the wireless communications system 100, the NEs 102 and the UEs 104 may use resources of the wireless communications system 100 (e.g., time resources (e.g., symbols, slots, subframes, frames, or the like) or frequency resources (e.g., subcarriers, carriers)) to perform various operations (e.g., wireless communications). In some implementations, the NEs 102 and the UEs 104 may support different resource structures. For example, the NEs 102 and the UEs 104 may support different frame structures. In some implementations, such as in 4G, the NEs 102 and the UEs 104 may support a single frame structure. In some other implementations, such as in 5G and among other suitable radio access technologies, the NEs 102 and the UEs 104 may support various frame structures (i.e., multiple frame structures). The NEs 102 and the UEs 104 may support various frame structures based on one or more numerologies.

[0062] One or more numerologies may be supported in the wireless communications system 100, and a numerology may include a subcarrier spacing and a cyclic prefix. A first numerology (e.g., $\mu=0$) may be associated with a first subcarrier spacing (e.g., 15 kHz) and a normal cyclic prefix. In some implementations, the first numerology (e.g., $\mu=0$) associated

with the first subcarrier spacing (e.g., 15 kHz) may utilize one slot per subframe. A second numerology (e.g., $\mu=1$) may be associated with a second subcarrier spacing (e.g., 30 kHz) and a normal cyclic prefix. A third numerology (e.g., $\mu=2$) may be associated with a third subcarrier spacing (e.g., 60 kHz) and a normal cyclic prefix or an extended cyclic prefix. A fourth numerology (e.g., $\mu=3$) may be associated with a fourth subcarrier spacing (e.g., 120 kHz) and a normal cyclic prefix. A fifth numerology (e.g., $\mu=4$) may be associated with a fifth subcarrier spacing (e.g., 240 kHz) and a normal cyclic prefix.

[0063] A time interval of a resource (e.g., a communication resource) may be organized according to frames (also referred to as radio frames). Each frame may have a duration, for example, a 10 millisecond (ms) duration. In some implementations, each frame may include multiple subframes. For example, each frame may include 10 subframes, and each subframe may have a duration, for example, a 1ms duration. In some implementations, each frame may have the same duration. In some implementations, each subframe of a frame may have the same duration.

[0064] Additionally or alternatively, a time interval of a resource (e.g., a communication resource) may be organized according to slots. For example, a subframe may include a number (e.g., quantity) of slots. The number of slots in each subframe may also depend on the one or more numerologies supported in the wireless communications system 100. For instance, the first, second, third, fourth, and fifth numerologies (i.e., $\mu=0$, $\mu=1$, $\mu=2$, $\mu=3$, $\mu=4$) associated with respective subcarrier spacings of 15 kHz, 30 kHz, 60 kHz, 120 kHz, and 240 kHz may utilize a single slot per subframe, two slots per subframe, four slots per subframe, eight slots per subframe, and 16 slots per subframe, respectively. Each slot may include a number (e.g., quantity) of symbols (e.g., OFDM symbols). In some implementations, the number (e.g., quantity) of slots for a subframe may depend on a numerology. For a normal cyclic prefix, a slot may include 14 symbols. For an extended cyclic prefix (e.g., applicable for 60 kHz subcarrier spacing), a slot may include 12 symbols. The relationship between the number of symbols per slot, the number of slots per subframe, and the number of slots per frame for a normal cyclic prefix and an extended cyclic prefix may depend on a numerology. It should be understood that reference to a first numerology (e.g., $\mu=0$) associated with a first subcarrier spacing (e.g., 15 kHz) may be used interchangeably between subframes and slots.

[0065] In the wireless communications system 100, an electromagnetic (EM) spectrum may be split, based on frequency or wavelength, into various classes, frequency bands, frequency channels, etc. By way of example, the wireless communications system 100 may support one or multiple operating frequency bands, such as frequency range designations FR1 (410 MHz – 7.125 GHz), FR2 (24.25 GHz – 52.6 GHz), FR3 (7.125 GHz – 24.25 GHz), FR4 (52.6 GHz – 114.25 GHz), FR4a or FR4-1 (52.6 GHz – 71 GHz), and FR5 (114.25 GHz – 300 GHz). In some implementations, the NEs 102 and the UEs 104 may perform wireless communications over one or more of the operating frequency bands. In some implementations, FR1 may be used by the NEs 102 and the UEs 104, among other equipment or devices for cellular communications traffic (e.g., control information, data). In some implementations, FR2 may be used by the NEs 102 and the UEs 104, among other equipment or devices for short-range, high data rate capabilities.

[0066] FR1 may be associated with one or multiple numerologies (e.g., at least three numerologies). For example, FR1 may be associated with a first numerology (e.g., $\mu=0$), which includes 15 kHz subcarrier spacing; a second numerology (e.g., $\mu=1$), which includes 30 kHz subcarrier spacing; and a third numerology (e.g., $\mu=2$), which includes 60 kHz subcarrier spacing. FR2 may be associated with one or multiple numerologies (e.g., at least 2 numerologies). For example, FR2 may be associated with a third numerology (e.g., $\mu=2$), which includes 60 kHz subcarrier spacing; and a fourth numerology (e.g., $\mu=3$), which includes 120 kHz subcarrier spacing.

[0067] The wireless communications system 100 may address the shortcomings of the current single (of half) octet length of an IEI, relevant to IEs transmitted via a NAS layer (some IEs containing information IEI may be non-mandatory IEs). The wireless communications system 100 may support a new IEI defined and set to a certain value referred to herein as “IEI_0”. This might be, for example the (hexadecimal) value 00 or FF if available and if the IEI comprises two hexadecimals, or 0 or F if available and if the IEI comprises one hexadecimal. The inclusion of this new IEI indicates that IE contains a non-mandatory IEI and that this non-mandatory IEI is extended by at least one octet.

[0068] Five categories or types of standard IEs that include an IEI are defined below.

Type 1: standard IEs of format TV have an IEI_0 of a half octet length in bit positions 8, 7, 6, 5 of an octet to indicate that the standard IE contains the extension of the IEI;

they provide the IEI in octet n+1 thru octet n+1+I), and in addition a half octet value part (Figure 7).

Type 2: standard IE has format T; its IEI consists of one octet set to value IEI_0 to indicate that the standard IE contains the extension of the IEI and the extended IEI containing one or more octets, with no added value part (Figure 8).

Type 3: standard IEs of format TV provide one octet set to value IEI_0 to indicate that the standard IE contains the extension of the IEI and the extended IEI containing one or more octets, and in addition at least one octet value part (Figure 9).

Type 4: standard IE of format TLV with one octet set to IEI_0 to indicate that the standard IE contains the extension of the IEI and the extended IEI containing one or more octets, and LI having one octet and precedes the value part, which consists of zero, one, or up to 255 octets (Figure 10).

Type 6: standard IE has format TLV-E with one octet set to IEI_0 to indicate that the standard IE contains the extension of the IEI and the extended IEI containing one or more octets, and LI having 2 octets and precedes the value part, which consists of zero, one or up to 65535 octets (Figure 11).

- [0069] Backward compatibility analysis shows that the recipient of the standard IEs
- a) may not know the value IEI_0, indicating that the standard non-mandatory IE contains the extended IEI, and will therefore drop the standard IE, or
 - b) may know the value IEI_0, indicating that the standard non-mandatory IE contains the extended IEI, but may not treat the extended IEI appropriately.

In both cases however the recipient may ignore the standard non-mandatory IE and, since this IE is not mandatory, the situation is no worse than would have been the case without the availability of the extended IEI.

[0070] Figure 12 shows an example of a signaling diagram in accordance with aspects of the present disclosure. In some implementations, the signaling diagram may implement, or be implemented by, aspects of the wireless communication system 100 as described with reference to Figure 6. The signaling diagram may include a UE 150, which may be examples of a UE 104 as described with reference to Figure 6. The signaling diagram may additionally include one or more of an AMF 152, a session and mobility management function (SMF) 154, or a user plane function (UPF) 156 as described with reference to Figure 6.

[0071] In the following description of the signaling diagram, the operations between the UE 150 and one or more of the AMF 152, the SMF 154, or the UPF 156 may be transmitted in a different order than the example order shown, or the operations performed by the UE 150 and one or more of the AMF 152, the SMF 154, or the UPF 156 may be performed in different orders or at different times. Some operations may also be omitted from the signaling diagram, and other operations may be added to the signaling diagram.

[0072] At 1202, the UE 150 may output (e.g., transmit), to the AMF 152, a service request message. In some implementations, the UE 150 may output (e.g., transmit), to the AMF 152 via a base station (not shown), the service request message. For example, the UE 150 may transmit the service request message to the base station, which may receive and forward the service request message to the AMF 152. In some implementations, the service request message may be an example of a SERVICE REQUEST message as defined in 3GPP TS 24.501. The service request message may include a non-mandatory standard IE, which may be applicable to establishing a service or modifying a current service. The non-mandatory IE may be based at least in part on the new configuration with a value IEI_0, for example as previously discussed with reference to Figures 7 to 11.

[0073] The AMF 152 may receive, the service request message, and at 1204, the AMF 152 may transmit, to the SMF 154, a session management (SM) context request message, which the SMF 154 may receive from the AMF 152. For example, in some implementations, the AMF 152 may receive, the service request message, and may identify the value IEI_0. Because the AMF 152 may be configured to support handling extended IEI, the AMF 152 may determine the inclusion of the new standard IE by the UE 150. As such, the SM context request message may indicate or trigger the SMF 154 to perform one or more operations based at least in part on the new standard IE.

At 1206, the SMF 154 and the UPF 156 may perform one or more of a session medication procedure or a session establishment procedure, for example, in response to the received SM context request message.

[0074] At 1208, the SMF 154 may transmit, and the AMF 156 may receive, an SM context response message.

[0075] At 1210, the AMF 152 may transmit, and the UE 150 may receive, a service accept message. For example, the AMF 152 may transmit the service accept message to a

base station (not shown), which may receive and forward the service accept message to the UE 150. The service accept message may include a non-mandatory standard IE that may use the extended IEI.

[0076] At 1212, one or more of the UE 150 and one or more of the AMF 152, the SMF 154, or the UPF 156 may exchange data.

[0077] Figure 13 illustrates an example of a UE 200 in accordance with aspects of the present disclosure. The UE 200 may include a processor 202, a memory 204, a controller 206, and a transceiver 208. The processor 202, the memory 204, the controller 206, or the transceiver 208, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. These components may be coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0078] The processor 202, the memory 204, the controller 206, or the transceiver 208, or various combinations or components thereof may be implemented in hardware (e.g., circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0079] The processor 202 may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 202 may be configured to operate the memory 204. In some other implementations, the memory 204 may be integrated into the processor 202. The processor 202 may be configured to execute computer-readable instructions stored in the memory 204 to cause the UE 200 to perform various functions of the present disclosure.

[0080] The memory 204 may include volatile or non-volatile memory. The memory 204 may store computer-readable, computer-executable code including instructions when executed by the processor 202 cause the UE 200 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such the memory 204 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage

medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0081] In some implementations, the processor 202 and the memory 204 coupled with the processor 202 may be configured to cause the UE 200 to perform one or more of the functions described herein (e.g., executing, by the processor 202, instructions stored in the memory 204). For example, the processor 202 may support wireless communication at the UE 200 in accordance with examples as disclosed herein. The UE 200 may be configured to support a means for wireless communication and comprising at least one memory and at least one processor coupled with the at least one memory. The processor is configured to cause the UE to generate a NAS request message comprising at least one IE, wherein the at least one IE includes an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0082] The controller 206 may manage input and output signals for the UE 200. The controller 206 may also manage peripherals not integrated into the UE 200. In some implementations, the controller 206 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 206 may be implemented as part of the processor 202.

[0083] In some implementations, the UE 200 may include at least one transceiver 208. In some other implementations, the UE 200 may have more than one transceiver 208. The transceiver 208 may represent a wireless transceiver. The transceiver 208 may include one or more receiver chains 210, one or more transmitter chains 212, or a combination thereof.

[0084] A receiver chain 210 may be configured to receive signals (e.g., control information, data, packets) over a wireless medium. For example, the receiver chain 210 may include one or more antennas for receive the signal over the air or wireless medium. The receiver chain 210 may include at least one amplifier (e.g., a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 210 may include at least one demodulator configured to demodulate the receive signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 210 may include at least one decoder for decoding the processing the demodulated signal to receive the transmitted data.

[0085] A transmitter chain 212 may be configured to generate and transmit signals (e.g., control information, data, packets). The transmitter chain 212 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 212 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate power level suitable for transmission over the wireless medium. The transmitter chain 212 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0086] Figure 14 illustrates an example of a processor 300 in accordance with aspects of the present disclosure. The processor 300 may be an example of a processor configured to perform various operations in accordance with examples as described herein. The processor 300 may include a controller 302 configured to perform various operations in accordance with examples as described herein. The processor 300 may optionally include at least one memory 304, which may be, for example, an L1/L2/L3 cache. Additionally, or alternatively, the processor 300 may optionally include one or more arithmetic-logic units (ALUs) 306. One or more of these components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces (e.g., buses).

[0087] The processor 300 may be a processor chipset and include a protocol stack (e.g., a software stack) executed by the processor chipset to perform various operations (e.g., receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) in accordance with examples as described herein. The processor chipset may include one or more cores, one or more caches (e.g., memory local to or included in the processor chipset (e.g., the processor 300) or other memory (e.g., random access memory (RAM), read-only memory (ROM), dynamic RAM (DRAM), synchronous dynamic RAM (SDRAM), static RAM (SRAM), ferroelectric RAM (FeRAM), magnetic RAM (MRAM), resistive RAM (RRAM), flash memory, phase change memory (PCM), and others).

[0088] The controller 302 may be configured to manage and coordinate various operations (e.g., signaling, receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) of the processor 300 to cause the processor 300 to support various operations in accordance with examples as described herein. For example, the controller 302 may operate as a control unit of the processor 300, generating control signals that manage the operation of various components of the processor 300. These control signals include enabling or disabling functional units, selecting data paths, initiating memory access, and coordinating timing of operations.

[0089] The controller 302 may be configured to fetch (e.g., obtain, retrieve, receive) instructions from the memory 304 and determine subsequent instruction(s) to be executed to cause the processor 300 to support various operations in accordance with examples as described herein. The controller 302 may be configured to track memory address of instructions associated with the memory 304. The controller 302 may be configured to decode instructions to determine the operation to be performed and the operands involved. For example, the controller 302 may be configured to interpret the instruction and determine control signals to be output to other components of the processor 300 to cause the processor 300 to support various operations in accordance with examples as described herein. Additionally, or alternatively, the controller 302 may be configured to manage flow of data within the processor 300. The controller 302 may be configured to control transfer of data between registers, arithmetic logic units (ALUs), and other functional units of the processor 300.

[0090] The memory 304 may include one or more caches (e.g., memory local to or included in the processor 300 or other memory, such RAM, ROM, DRAM, SDRAM, SRAM, MRAM, flash memory, etc. In some implementations, the memory 304 may reside within or on a processor chipset (e.g., local to the processor 300). In some other implementations, the memory 304 may reside external to the processor chipset (e.g., remote to the processor 300).

[0091] The memory 304 may store computer-readable, computer-executable code including instructions that, when executed by the processor 300, cause the processor 300 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. The

controller 302 and/or the processor 300 may be configured to execute computer-readable instructions stored in the memory 304 to cause the processor 300 to perform various functions. For example, the processor 300 and/or the controller 302 may be coupled with or to the memory 304, the processor 300, the controller 302, and the memory 304 may be configured to perform various functions described herein. In some examples, the processor 300 may include multiple processors and the memory 304 may include multiple memories. One or more of the multiple processors may be coupled with one or more of the multiple memories, which may, individually or collectively, be configured to perform various functions herein.

[0092] The one or more ALUs 306 may be configured to support various operations in accordance with examples as described herein. In some implementations, the one or more ALUs 306 may reside within or on a processor chipset (e.g., the processor 300). In some other implementations, the one or more ALUs 306 may reside external to the processor chipset (e.g., the processor 300). One or more ALUs 306 may perform one or more computations such as addition, subtraction, multiplication, and division on data. For example, one or more ALUs 306 may receive input operands and an operation code, which determines an operation to be executed. One or more ALUs 306 be configured with a variety of logical and arithmetic circuits, including adders, subtractors, shifters, and logic gates, to process and manipulate the data according to the operation. Additionally, or alternatively, the one or more ALUs 306 may support logical operations such as AND, OR, exclusive-OR (XOR), not-OR (NOR), and not-AND (NAND), enabling the one or more ALUs 306 to handle conditional operations, comparisons, and bitwise operations.

[0093] The processor 300 may support wireless communication in accordance with examples as disclosed herein. The processor 300 may be configured to or operable to support a means for wireless communication comprising at least one controller coupled with at least one memory and configured to cause the processor to generate a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0094] Figure 15 illustrates an example of a NE 400 in accordance with aspects of the present disclosure. The NE 400 may include a processor 402, a memory 404, a controller 406, and a transceiver 408. The processor 402, the memory 404, the controller 406, or the transceiver 408, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. These components may be coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0095] The processor 402, the memory 404, the controller 406, or the transceiver 408, or various combinations or components thereof may be implemented in hardware (e.g., circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0096] The processor 402 may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 402 may be configured to operate the memory 404. In some other implementations, the memory 404 may be integrated into the processor 402. The processor 402 may be configured to execute computer-readable instructions stored in the memory 404 to cause the NE 400 to perform various functions of the present disclosure.

[0097] The memory 404 may include volatile or non-volatile memory. The memory 404 may store computer-readable, computer-executable code including instructions when executed by the processor 402 cause the NE 400 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such the memory 404 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0098] In some implementations, the processor 402 and the memory 404 coupled with the processor 402 may be configured to cause the NE 400 to perform one or more of the functions described herein (e.g., executing, by the processor 402, instructions stored in the

memory 404). For example, the processor 402 may support wireless communication at the NE 400 in accordance with examples as disclosed herein. The NE 400 may be configured to support a means for wireless communication, comprising at least one memory and at least one processor coupled with the at least one memory and configured to generate a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet, and transmit the NAS request message via a NAS layer.

[0099] The controller 406 may manage input and output signals for the NE 400. The controller 406 may also manage peripherals not integrated into the NE 400. In some implementations, the controller 406 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 406 may be implemented as part of the processor 402.

[0100] In some implementations, the NE 400 may include at least one transceiver 408. In some other implementations, the NE 400 may have more than one transceiver 408. The transceiver 408 may represent a wireless transceiver. The transceiver 408 may include one or more receiver chains 410, one or more transmitter chains 412, or a combination thereof.

[0101] A receiver chain 410 may be configured to receive signals (e.g., control information, data, packets) over a wireless medium. For example, the receiver chain 410 may include one or more antennas for receive the signal over the air or wireless medium. The receiver chain 410 may include at least one amplifier (e.g., a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 410 may include at least one demodulator configured to demodulate the receive signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 410 may include at least one decoder for decoding the processing the demodulated signal to receive the transmitted data.

[0102] A transmitter chain 412 may be configured to generate and transmit signals (e.g., control information, data, packets). The transmitter chain 412 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital

modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 412 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate power level suitable for transmission over the wireless medium. The transmitter chain 412 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0103] Figure 16 illustrates a flowchart of a method in accordance with aspects of the present disclosure. The operations of the method may be implemented by a UE as described herein. In some implementations, the UE may execute a set of instructions to control the function elements of the UE to perform the described functions.

[0104] At 1602, the method may include generating a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet. In some implementations, aspects of the operations of 1602 may be performed by a UE as described with reference to Figure 13.

[0105] At 1604, the method may include transmitting the request via a NAS layer. The operations of 1604 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1604 may be performed by a UE as described with reference to Figure 13.

[0106] Figure 17 illustrates a flowchart of a method in accordance with aspects of the present disclosure. The operations of the method may be implemented by a NE as described herein. In some implementations, the NE may execute a set of instructions to control the function elements of the NE to perform the described functions.

[0107] At 1702, the method may include generating a NAS request message comprising at least one IE and an extended IEI, wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet. The operations of 1702 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1702 may be performed by a NE as described with reference to Figure 15.

[0108] At 1704, the method may include transmitting the request via a NAS layer. The operations of 1704 may be performed in accordance with examples as described herein. In

some implementations, aspects of the operations of 1704 may be performed by a NE as described with reference to Figure 15.

[0109] The description herein is provided to enable a person having ordinary skill in the art to make or use the disclosure. Various modifications to the disclosure will be apparent to a person having ordinary skill in the art, and the generic principles defined herein may be applied to other variations without departing from the scope of the disclosure. Thus, the disclosure is not limited to the examples and designs described herein but is to be accorded the broadest scope consistent with the principles and novel features disclosed herein.

What is claimed is:

1. A User Equipment (UE) for wireless communication, comprising:
 - at least one memory; and
 - at least one processor coupled with the at least one memory and configured to cause the UE to:
 - generate a Non-Access Stratum (NAS) request message comprising at least one Information Element (IE), wherein the at least one IE includes an extended Element Identifier (IEI), wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet; and
 - transmit the NAS request message via a NAS layer.
2. The UE of claim 1, wherein:
 - the IE corresponds to a Type 1 IE of format type value (TV);
 - the first IEI has a length of a first half of a first octet;
 - a value part is included in a second half of the first octet; and
 - the extended IEI is encapsulated within at least one or more second octets.
3. The UE of claim 1, wherein:
 - the IE corresponds to a Type 2 IE of format type (T);
 - the first IEI has a length of a first octet; and
 - the extended IEI is encapsulated within at least one or more second octets.
4. The UE of claim 1, wherein:
 - the IE corresponds to a Type 3 IE of format TV;
 - the first IEI has a length of a first octet;
 - the extended IEI is encapsulated within at least one or more second octets; and
 - a value part is encapsulated within at least one or more third octets.
5. The UE of claim 1, wherein:

the IE corresponds to a Type 4 IE of format TLV;
the first IEI has a length of a first octet;
the extended IEI is encapsulated within at least one or more second octets;
a Length Indicator (LI) is encapsulated within at least one third octet; and
a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

6. The UE of claim 1, wherein:

the IE corresponds to a Type 6 IE of format TLV-E;
the first IEI has a length of a first octet;
the extended IEI is encapsulated within at least one or more second octets;
a Length Indicator (LI) is encapsulated within at least two third octets; and
and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.

7. The UE of claim 1, wherein the at least one processor is configured to cause the UE to receive a NAS accept message over the NAS layer, the NAS accept message including at least one standard Information Element, IE, containing the extended IEI.

8. The UE of any preceding claim, wherein the at least one IE comprises a Fifth Generation (5G) Mobility Management (5GMM) IE or a 5G System (5GS) Session Management (5GSM) IE.

9. A processor for wireless communication, comprising:

at least one controller coupled with at least one memory and configured to cause the processor to:

generate a Non-Access Stratum (NAS) request message comprising at least one Information Element (IE) and an extended Element Identifier (IEI), wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet; and

transmit the NAS request message via a NAS layer.

10. A method performed by a User Equipment (UE), the method comprising:
 - generating a Non-Access Stratum (NAS) request message comprising at least one Information Element (IE) and an extended Element Identifier (IEI), wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet; and
 - transmitting the NAS request message via a NAS layer.
11. A Network Entity for wireless communication, comprising:
 - at least one memory; and
 - at least one processor coupled with the at least one memory and configured to cause the Network Entity to:
 - generate a Non-Access Stratum (NAS) request message comprising at least one Information Element (IE) and an extended Element Identifier (IEI), wherein the at least one IE includes a first IEI, wherein the first IEI indicates an inclusion of the extended IEI within the IE, and wherein the extended IEI includes at least one octet; and
 - transmit the NAS request message via a NAS layer.
12. The Network Entity of claim 11, wherein:
 - the IE corresponds to a Type 1 IE of format type value (TV);
 - the first IEI has a length of a first half of a first octet;
 - a value part is included in a second half of the first octet; and
 - the extended IEI is encapsulated within at least one or more second octets.
13. The Network Entity of claim 11, wherein:
 - the IE corresponds to a Type 2 IE of format type (T);
 - the first IEI has a length of a first octet; and
 - the extended IEI is encapsulated within at least one or more second octets.
14. The Network Entity of claim 11, wherein:
 - the IE corresponds to a Type 3 IE of format TV;

the first IEI has a length of a first octet;
the extended IEI is encapsulated within at least one or more second octets; and
a value part is encapsulated within at least one or more third octets.

15. The Network Entity of claim 11, wherein:
the IE corresponds to a Type 4 IE of format TLV;
the first IEI has a length of a first octet;
the extended IEI is encapsulated within at least one or more second octets;
a Length Indicator (LI) is encapsulated within at least one third octet; and
a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.
16. The Network Entity of claim 10, wherein:
the IE corresponds to a Type 6 IE of format TLV-E;
the first IEI has a length of a first octet;
the extended IEI is encapsulated within at least one or more second octets;
a Length Indicator (LI) is encapsulated within at least two third octets; and
and a value part is encapsulated within at least one or more fourth octets or the value part is absent from the IE based at least in part on a value of the LI.
17. The Network Entity of claim 11, wherein the at least one processor is configured to cause the Network Entity to receive a NAS accept message via the NAS layer, the NAS accept message including at least one standard IE containing the extended IEI.
18. The network entity of any one of claims 11 to 17, wherein the at least one standard IE is a 5G Mobility Management, 5GMM, Information Element or a 5GS Session Management, 5GSM, information element.
19. The Network Entity of any one of claims 11 to 18, the Network Entity comprises an Access and Mobility Management Function, AMF.

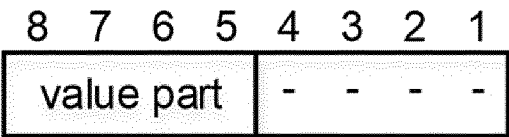


Fig.1a

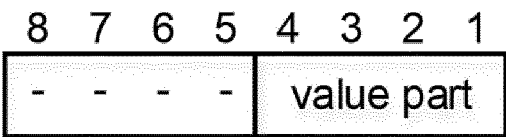


Fig.1b

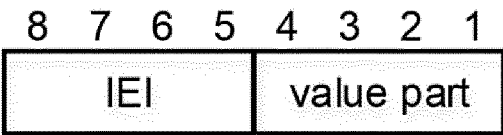


Fig.1c

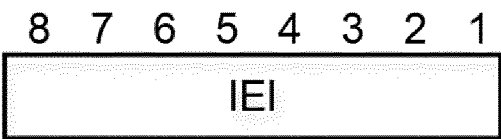


Fig.2

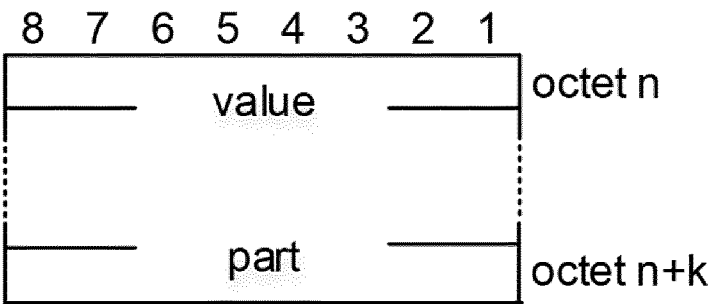


Fig.3a

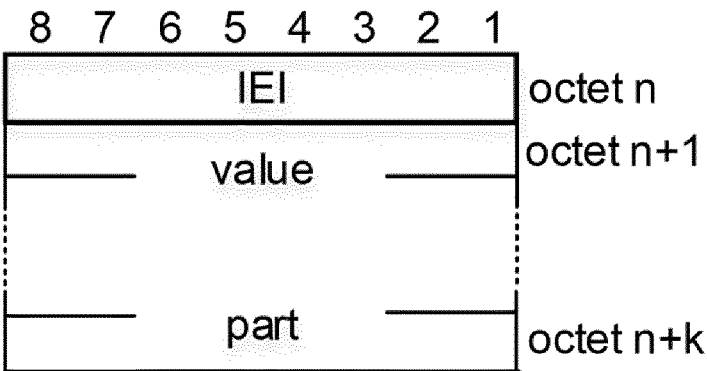


Fig.3b

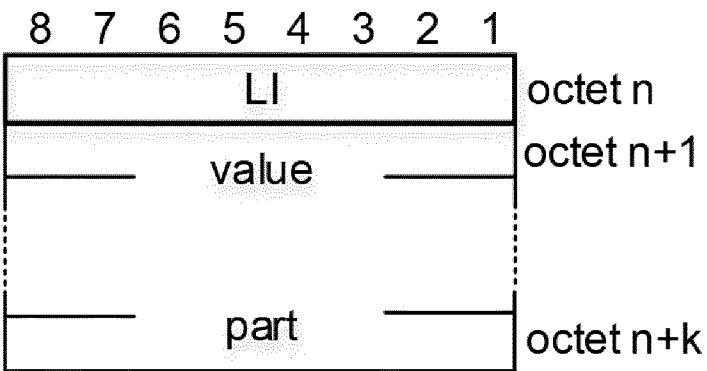


Fig.4a

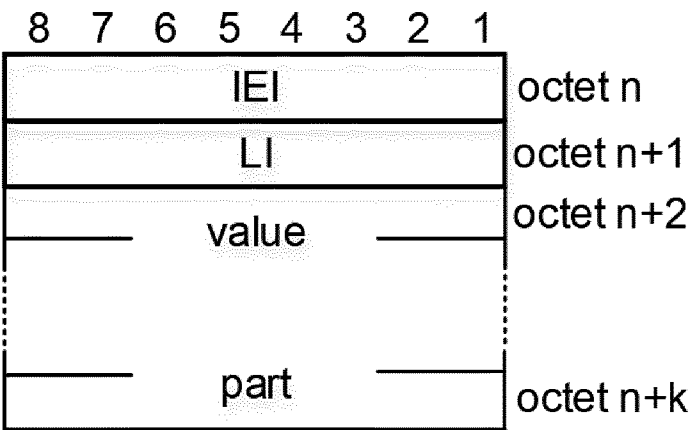


Fig.4b

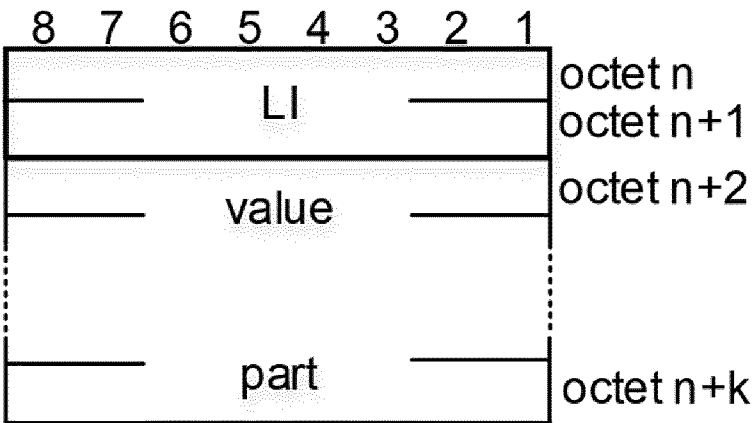


Fig.5a)

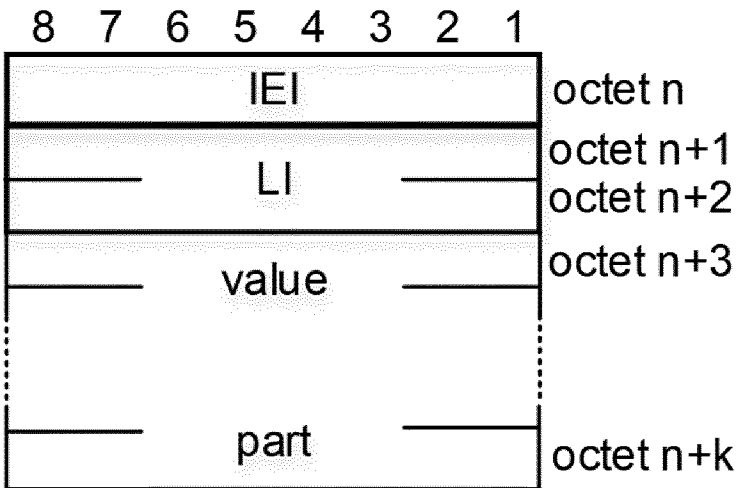


Fig.5b

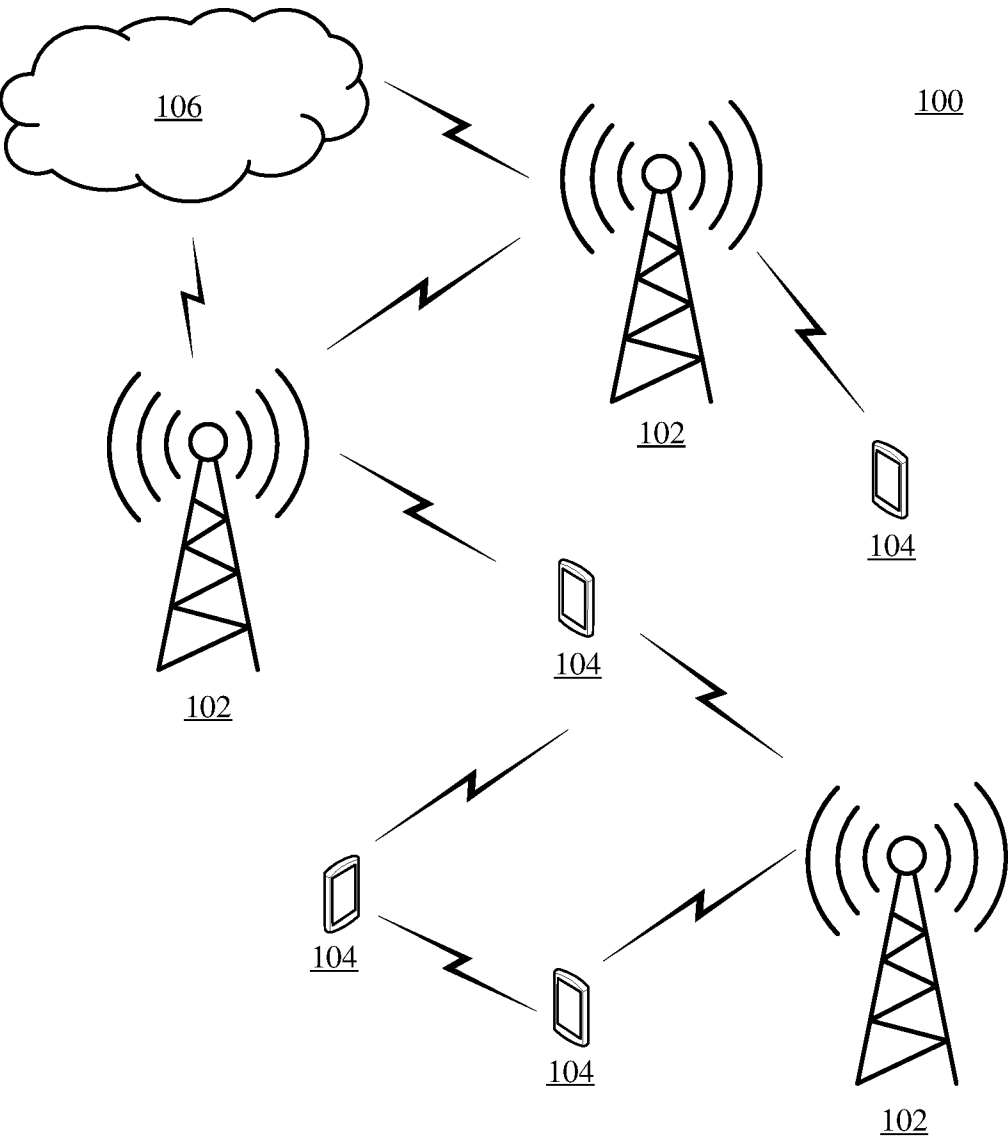


Fig.6

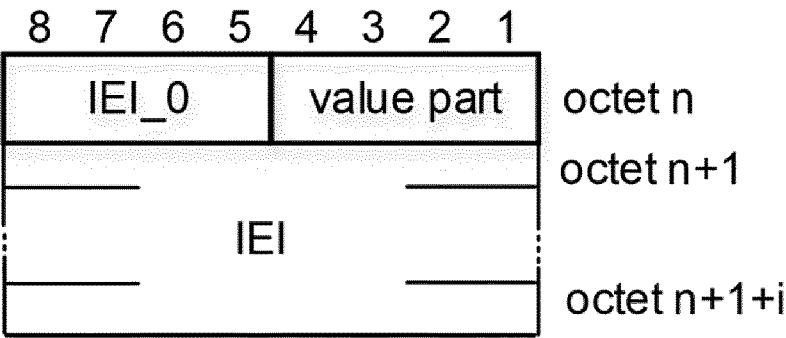


Fig.7

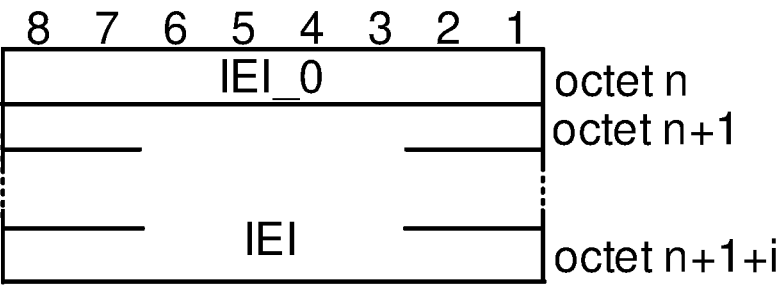


Fig.8

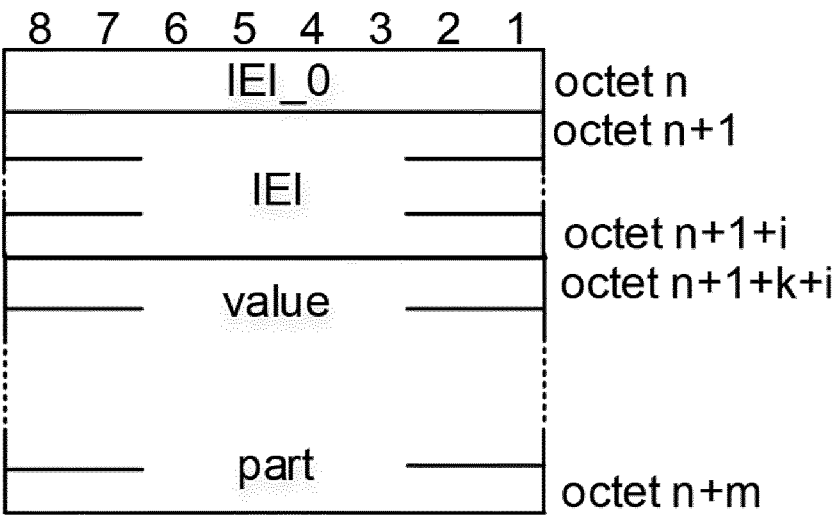


Fig.9

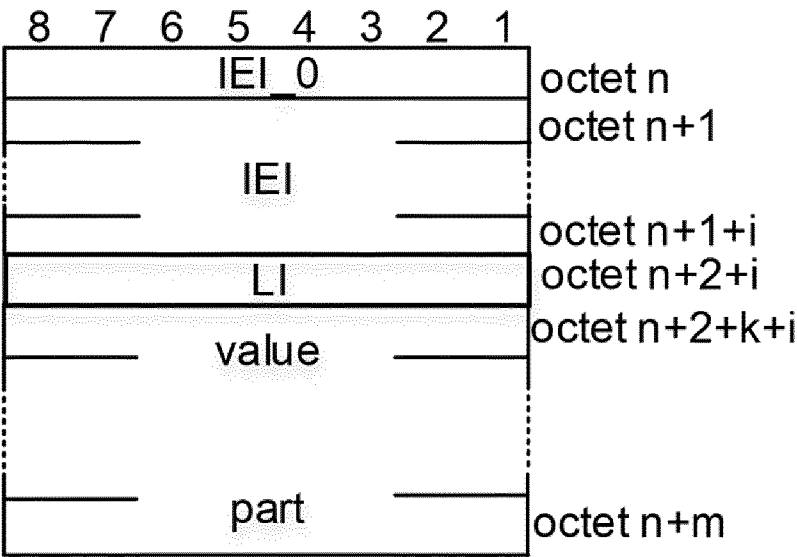


Fig.10

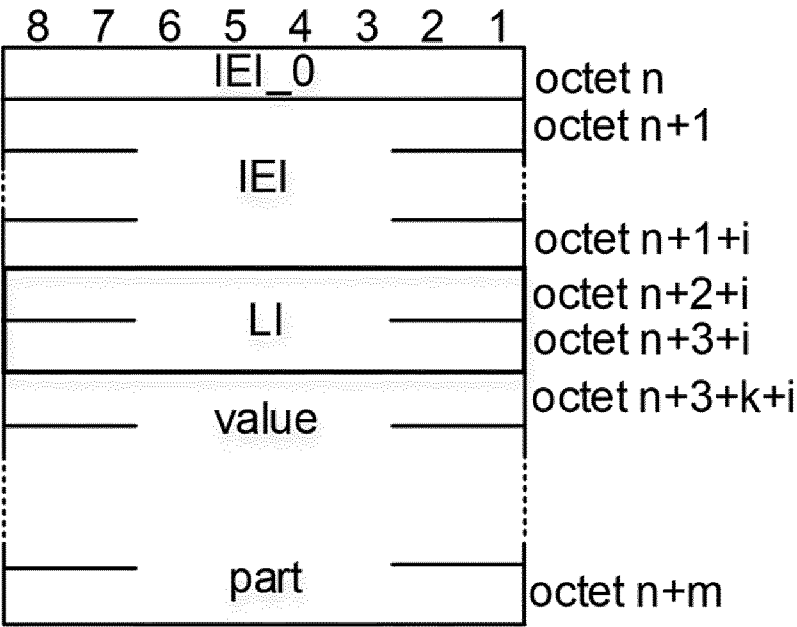


Fig.11

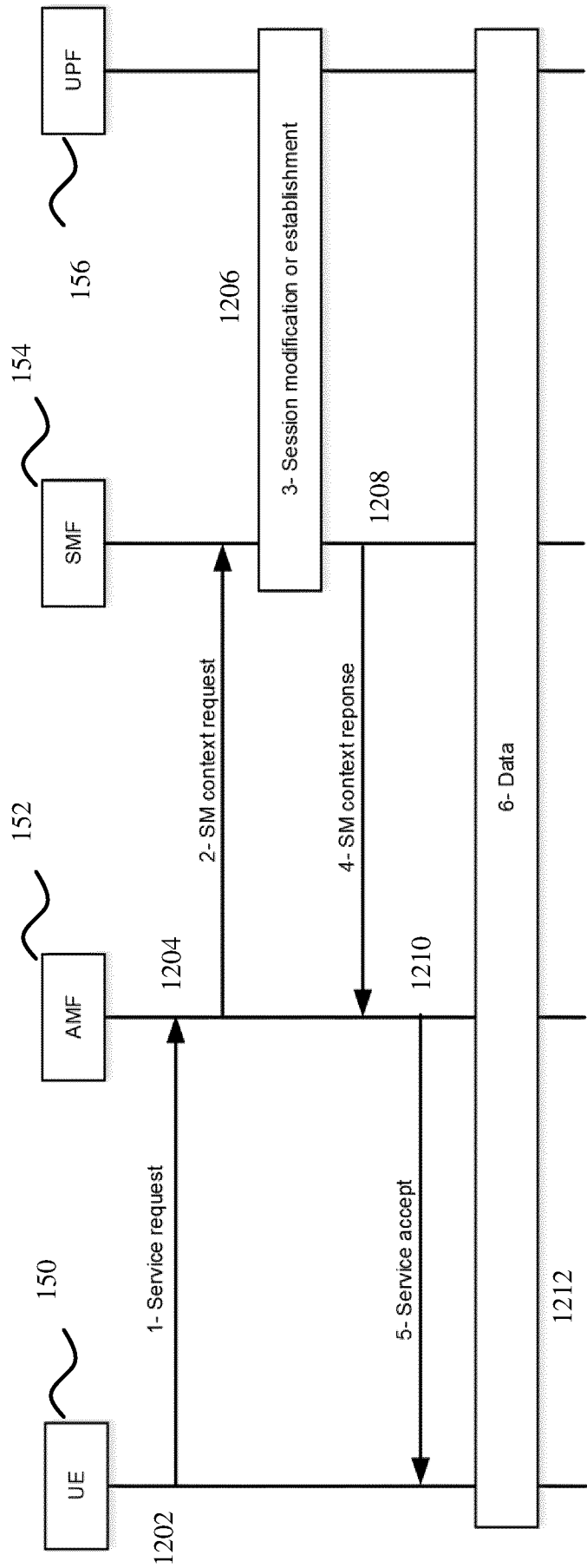


Fig.12

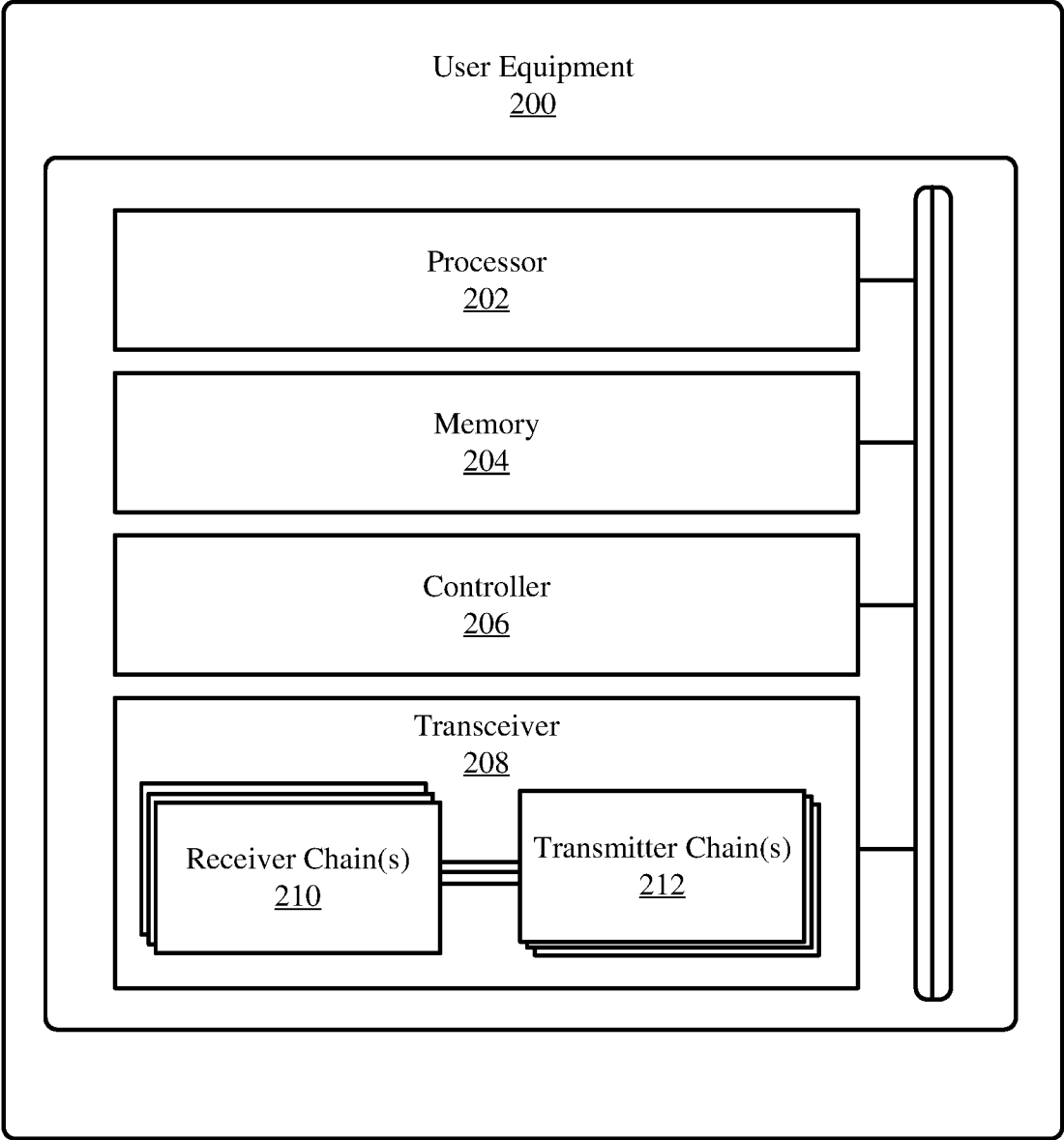


Fig.13

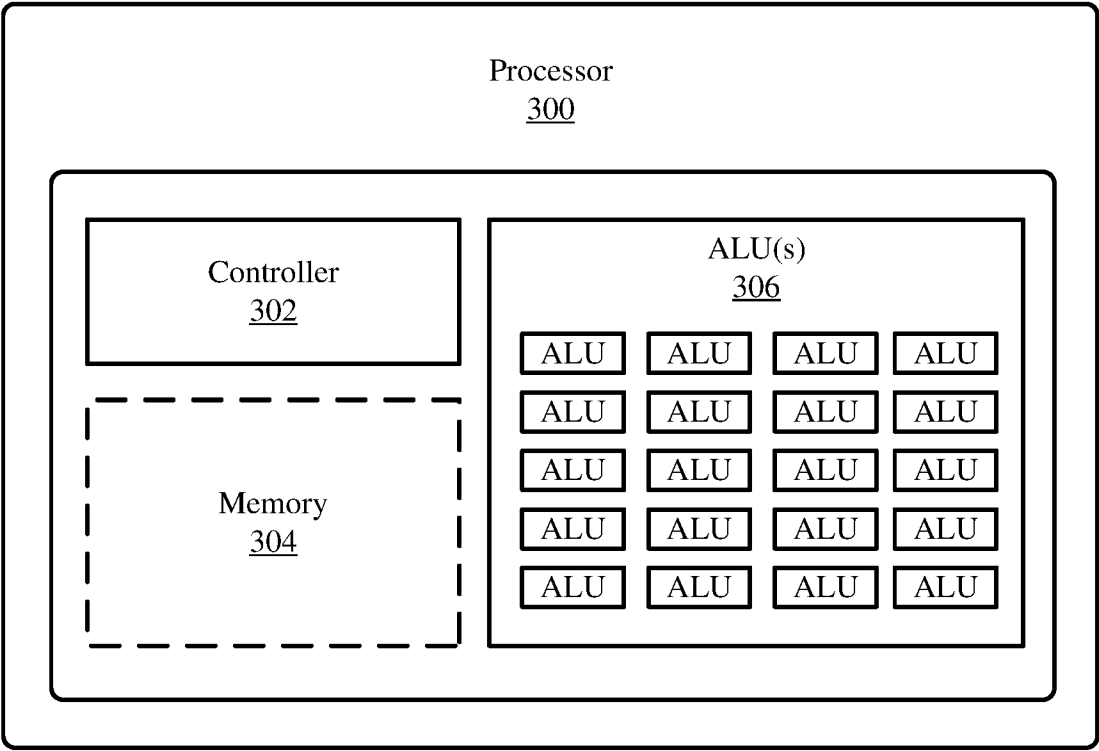


Fig.14

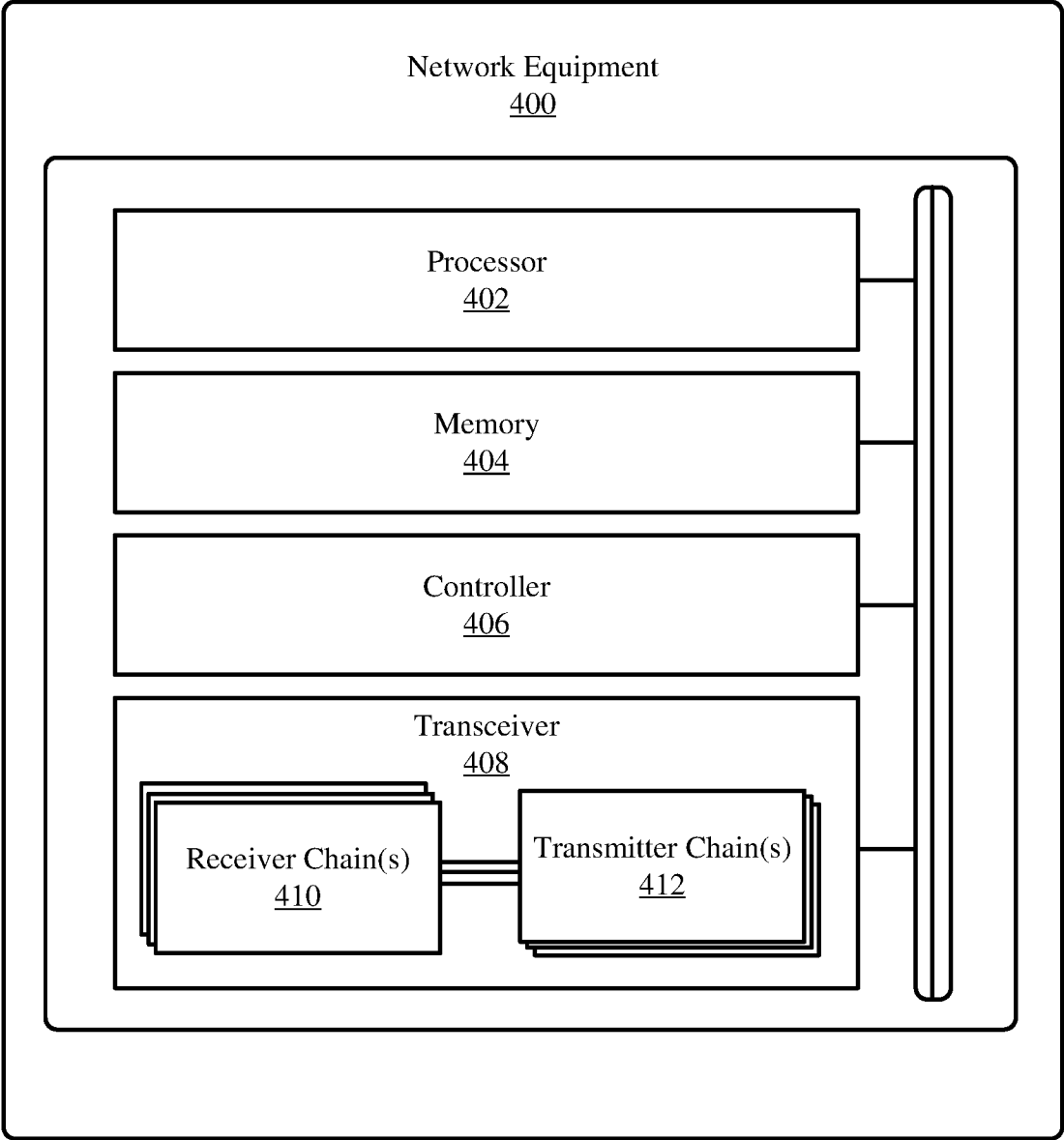


Fig.15

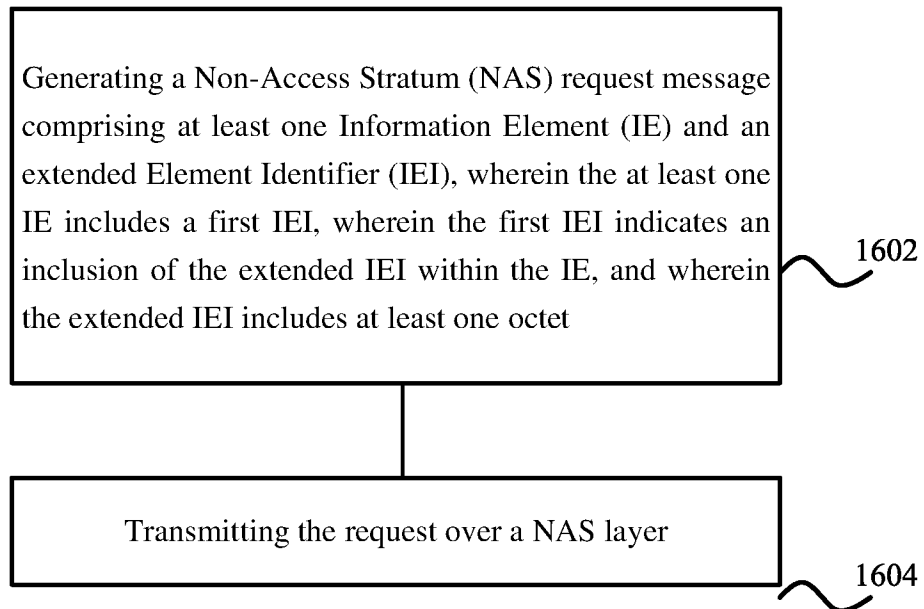


Fig.16

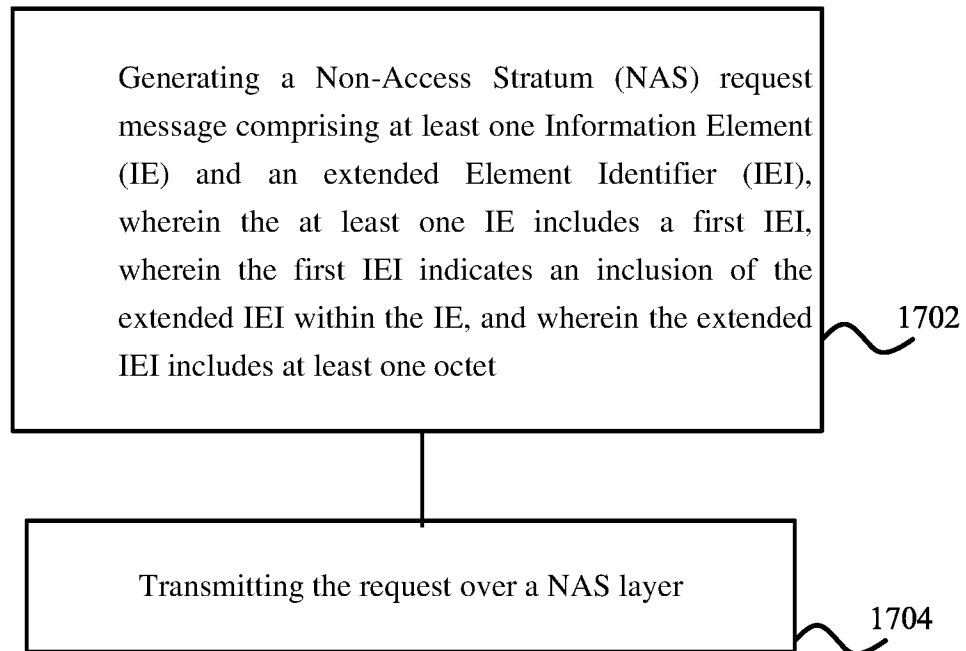


Fig.17

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/053630

A. CLASSIFICATION OF SUBJECT MATTER INV. H04L5/00 H04W48/00 H04W76/10 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) H04L 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, COMPENDEX, INSPEC, IBM-TDB, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2024/000412 A1 (GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP LTD [CN]) 4 January 2024 (2024-01-04) paragraph [0054] - paragraph [0095] ----- -/--	1, 5-11, 15-19
☒ 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 25 March 2024		Date of mailing of the international search report 05/04/2024
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 Mavridis, Theodoros

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2024/053630

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	"3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3; (Release 18)", 3GPP DRAFT; 24.501-I20, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE / 1 April 2023 (2023-04-01), XP052326359, Retrieved from the Internet: URL:https://ftp.3gpp.org/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_141e/Draft%20Specifications/Corrected/24.501-i20.zip 24.501-i20/Draft 24501-i20_with rm.docx [retrieved on 2023-04-01] page 736 - page 741 -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2024/053630

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2024000412	A1	04-01-2024	NONE
