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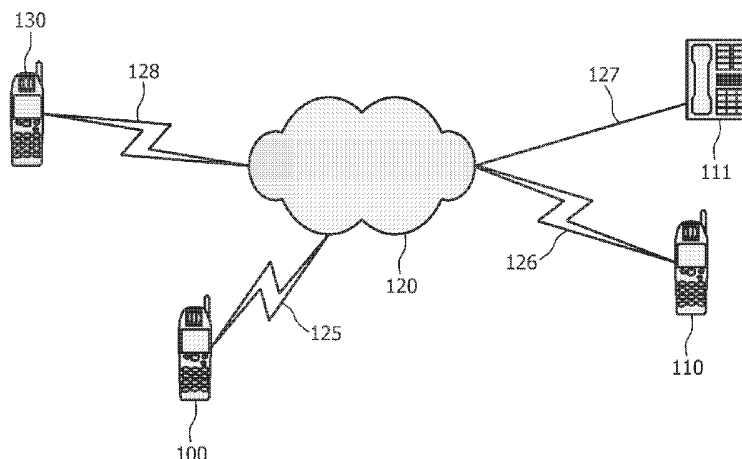
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(54) **Title:** COMMUNICATION SYSTEM FOR ENABLING AT LEAST TWO HANDHELD APPARATUSES TO JOIN A NETWORK SERVICE



(57) **Abstract:** A communication system comprising: a first handheld apparatus (100) comprising a first near field communication device and a first radio frequency transmitting/receiving device, said first handheld apparatus (100) being connected to a network service through a first connection (125) to a communication network (120), a second handheld apparatus (130) comprising a second near field communication device and a second radio frequency transmitting/receiving device, the first and second near field communication devices being adapted to exchange identification information when they are held next to each other so as to initiate a second connection (128) between the second handheld apparatus and the communication network (120) so that the second handheld apparatus is able to join the network service. Such a communication system in accordance with the invention could be a conference call service provided by a mobile network or an online gaming service between multiple participants.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Communication system for enabling at least two handheld apparatuses to join a network service.

5 FIELD OF THE INVENTION

The present invention relates to a communication system comprising at least two handheld apparatuses, one handheld apparatus being connected to a network service, another handheld apparatus wishing to join the network service.

10 The invention also relates to a handheld apparatus comprised in such a communication system.

The invention finally relates to a communication method between handheld apparatuses, one handheld apparatus being connected to a network service, another handheld apparatus wishing to join the network service.

15 This invention finds its application, for example, in the field of mobile phones or personal digital assistants PDAs, or any other apparatus able to connect to a network service.

BACKGROUND OF THE INVENTION

The mobile network operators offer more and more network services to the users. While these services are usually individual, the introduction of services between several users
20 is getting more common. Such a service is, for example, the ability to establish a conference call between several parties.

While these network services are useful to the users, their usage is limited due to the complexity of setting up such services, which require to go through lengthy menu and/or to press on a combination of keys.

25 In more detail, let us suppose that a user of a first mobile phone is in a pre-established call with a remote user, and that the user of a second mobile phone is in the immediate proximity of the first one. In this case, the establishment of a conference call between the three users requires several steps, which can differ as a function of the network used.

A conventional solution requires that at least the first mobile phone:

- 30
- suspends the pre-established call,
 - gets the phone number of the second mobile phone,
 - dials the second mobile phone (assuming that this feature is supported by his mobile phone and the Mobile Network Operator),
 - waits until a second call between to the first and second mobile phones is established,

- links the two calls by a mechanism provided by the Mobile Network Operator.

The above-described solution is not satisfactory and extremely complex from a user point of view, since they require a major involvement from the user. According to the example of the conference call, establishing a second call is already a challenge on most of the mobile phones today, and, in addition to this complexity, the user must know how to
5 activate the conference call service of the Mobile Network Operator. As a matter of fact, whereas mobile phone users are familiar with the basics functions provided by the mobile phones (e.g. dialing up, answering), they are extremely unfamiliar with advanced functions such as call forwarding or conferencing.

10

SUMMARY OF THE INVENTION

It is an object of the invention to propose a communication system enabling a handheld apparatus which is close to another handheld apparatus, said another handheld apparatus being connected to a network service, to join the network service in a more
15 convenient way for the user than the one of the prior art.

In accordance with the present invention, there is provided a communication system comprising:

- a first handheld apparatus comprising a first near field communication device and a first radio frequency transmitting/receiving device, said first handheld apparatus being
20 connected to a network service through a first connection to a communication network,
- a second handheld apparatus comprising a second near field communication device and a second radio frequency transmitting/receiving device, the first and second near field communication devices being adapted to exchange identification information when they are held next to each other so as to initiate a second connection between the second handheld
25 apparatus and the communication network so that the second handheld apparatus is able to join the network service.

As a consequence, when holding the near field communication devices next to each other, the communication between the first and the second handheld apparatuses is initiated without any other involvement of the users of the handheld apparatuses, which is a much
30 more convenient solution for the users than the one of the prior art.

Beneficially, the first and second near field communication devices are of the NFC type.

The present invention also extends to a handheld apparatus comprised in such a communication system.

These and other aspects of the invention will be apparent from and will be elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

- 5 The present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, wherein:
- Figure 1 shows an embodiment of a communication system in accordance with the invention,
 - Figure 2 illustrates the structure of information exchanged in accordance with the
10 NTIP specifications,
 - Figure 3 shows another embodiment of a communication system in accordance with the invention,
 - Figure 4 illustrates an implementation of the NFC related software and of the network service connection software,
 - 15 - Figure 5 illustrates the method of establishing a connection to a network service according to an embodiment of the invention,
 - Figure 6 illustrates the method of establishing a connection to a network service according to another embodiment of the invention,

20 DETAILED DESCRIPTION OF THE INVENTION

Referring to Figure 1, a communication system in accordance with the invention is depicted in the general case.

Such a communication system comprises at least two handheld apparatuses 100 and 130, e.g. mobile phones. The two handheld apparatuses are able to connect to a network
25 service through first and second connections 125 and 128 to a communication network 120.

The first handheld apparatus 100 comprises a first near field communication device, a first conventional radio frequency transmitting device and a first network service connection software.

The communication system also comprises a second handheld apparatus 130, e.g. a
30 mobile phone, in the neighborhood of the master handheld apparatus. Said second handheld apparatus comprises a second near field communication device, a second radio frequency transmitting device and a second network service connection software.

According to an embodiment of the invention, the first and second near field communication devices are of the NFC type. NFC is described for example in the documents

ECMA 340: Near Field Communication Interface and Protocol (NFCIP-1) dated December 2002, and ECMA 352: NFC Interface and Protocol-2 (NFCIP-2). However, the invention is not limited to this embodiment. The near field communication devices may alternatively be based on colored lights, LED flashing or any other technology provided that the slave
5 handheld apparatus can communicate with the master handheld apparatus when they are close to each other.

The first handheld apparatus 100 is either in a first state where it is using a service provided by the communication network through the first connection 125, or in a second state where it is potentially able to use the service provided by the communication network (i.e.
10 the service is not established between the apparatus and the communication network). The service network is established using any conventional method to exchange information with the network.

The second handheld apparatus is either in an idle state, or in a state which is compatible with the network service to which the first handheld apparatus is connected or is
15 able to connect.

The network service can be seen as a cooperative service which is provided by a network operator, or any other third party enabling two or more handheld apparatus to collaborate to a specific instantiation of the service. It can be, for example, a conference call which is provided by the mobile network. In this case, a mobile handset already in a pre-
20 established call with a remote handset is able to request to the mobile network a kind of upgrade of the pre-established call so as to establish a conference call including a new user. Another example is on-line gaming between several participants in the neighborhood of each other using the services provided by the mobile network.

The communication system in accordance with the invention operates as follows.
25 When the first and second near field communication devices are held next to each other, a first, short range (a few centimeter), communication link is established between the two devices so that they are able to exchange identification information. This first communication link enables the two handheld apparatuses to exchange information such as but not limited to apparatus identification on the network, including international calling number, state of the
30 handheld apparatus, preferred and/or supported network services, service parameters.

This information exchange is achieved in accordance with the NFC Transfer Interface Protocol, or/and any extensions or variances of this protocol. According to an embodiment of the invention, the two apparatuses exchange state and service information using the NTIP protocol. The NTIP protocol is specified by the Near Filed communication Forum (NFC

Forum) in the NFC Transfer Interface Protocol (NTIP) specifications. The structure of the exchanged information in accordance with the NTIP specifications is given in Figure 2. Data exchange is done in the form of NTIP packets. A NTIP packet 200 contains an NTIP header 210 and a record list 220 comprising at least one record. The NTIP header contains the length of the record list within an NTIP packet. Each record 225 is a sequence of three elements, a record type 226, a record content length 227 and a record content element 228. The record content element contains the state and service information that shall be exchanged.

A more secure embodiment may limit the amount of information exchanged during the NFC communication between the apparatuses in order to increase security and privacy.

For example a temporary unique apparatus identification may be exchanged.

Once the handheld apparatuses have exchanged state and service information, the two apparatuses establish the network service through their respective connections 125 and 128 using their respective network service connection software. If the first handheld apparatus is already connected to the network service through the first connection 125 to the communication network 120, the second handheld apparatus is able to join the established network service through the second connection 128 to the communication network 120 using its network service connection software.

Each handheld apparatus may comprise a memory for storing context parameters and service parameters, said context parameters defining data to be transmitted over the connections 125 or 128, the handheld apparatuses being able to join the network service depending on the context parameters as will be described in more detail hereinafter.

The handheld apparatuses establish or join the network service according to the specifications of the network service provider, and to the information exchanged during the NFC communication between the two handheld apparatuses.

Confirmation from the user prior joining the network service may be requested for security reasons or if any additional charges are required to access such a network service. The network service is pending until one of the following conditions occurs:

- the user terminates the service,
- the network terminates the service,
- the application on the handheld apparatus authorizing the access to the network service terminates the service,
- network failure, or any other failure.

Turning to Figure 3, a communication system in accordance with the invention is depicted in the case of a conference call service provided by a mobile network.

A pre-established call has been placed between the first handheld apparatus 100 (i.e. a mobile phone in our example) and a remote communication apparatus over a communication network 120 via a radio frequency link 125. The remote communication apparatus can be another mobile phone 110 connected to the communication network 120 via a wireless connection 126 or a fixed landline or wireless phone 111 connected to the communication network 120 via a fixed line connection 127.

A second handheld apparatus 130 (i.e. another mobile phone in our example) wants to join the pre-established call using the network service provided by the network operator.

The two mobile phones are close to each other and are held next to each other so as to establish an NFC connection between the two mobile phones, as described before.

Once the NFC connection has been established, the two mobile phones exchange their unique identification to the mobile network. As an example, the unique network identification is the mobile phone calling number.

During the NFC communication, the first mobile phone sends all necessary information to the second mobile phone in order to join the pre-established call, or, if more than two mobile phones are communicating, to join the pre-established conference call, such as but not limited to identification of the service and/or service parameters.

The second mobile phone, which is in an idle state prior the NFC connection, acknowledges receipt of the request of the other phone(s), and responds positively to the request. The second mobile phone then establishes its intention of joining the network service identified (i.e. a conference call in our case) to the mobile network by exchanging information with the mobile network using the radio frequency transmitting/receiving device incorporated in this second mobile phone. The protocol used between the mobile network and the mobile phones are not part of this invention and may be specific to the mobile network.

The first mobile phone then finalizes the network service by instructing the mobile network to accept the second mobile phone as part of the conference call.

According to an embodiment of the invention, the second mobile phone calls the second mobile phone using the mobile network based on the calling number exchanged during the NFC communication. The first mobile phone receives a notification from the mobile network of an additional call, the network service connection software of the first mobile phones verifies that the incoming call is coming from the second mobile phone (based

on the calling number exchanged during the NFC communication), and enables the second mobile phone to join the conference call by instructing the mobile network.

The conference call is terminated upon request of the first mobile phone, of the network, of a third party, or any network failure. Each additional handheld device can
5 directly terminates their participation, or been disconnect from the conference call by the first apparatus.

Figure 4 illustrates an implementation of the NFC related software and of the network service connection software. The software stack comprises:

- 10 – a real Time Operating System & Drivers 410,
- a NFC related software (based on NTIP) 420,
- a mobile software stack and event manager 430,
- a network service connection software 440,
- different applications 450.

15

Figure 5 illustrates a first embodiment of the different steps implemented by the network service connection software, which are required to establish a network service between the two handheld apparatuses using the services provided by the mobile network.

In a step 500, the first mobile phone 100 is in a pre-established call or conference call
20 with one or more correspondents. The second mobile phone 130 is in an idle state 550. If the second mobile phone wants to join the pre-established call, the two mobile phones are held next to each other, making the two mobile phones enter in a state 510 according to which a target device (i.e. the first or second mobile phone) has been detected.

Once each of the mobile phone has been detected by the other one, an NFC
25 connection is established. At that time, each mobile phone exchange identification information, network service capabilities and related parameters, as described before, with the other one in a step 520. Once the information exchange is done, the NFC connection is terminated.

In a step 530, each mobile phone then establishes the connection to the mobile
30 network so as to set up the conference call, as described before.

Figure 6 illustrates a second embodiment of the different steps implemented by the network service connection software, which are required to establish a network service between the two handheld apparatuses using services provided by the mobile network.

The first mobile phone is in a call with one or more correspondents. The second mobile phone is in a non-idle state. If the second mobile phone wants to join the pre-established call, the two mobile phones are held next to each other, making the two mobile phones enter in a state 600 according to which a new device has been detected.

5 Once each of the mobile phone has been detected by the other one, an NFC connection is established. At that time, each mobile phone exchange identification information, network service capabilities and related parameters, as described before, with the other one in a step 610.

10 In a step 620, each mobile phone evaluates, as a function of its own state, the network service capabilities, the state of the other mobile phone, the most probable network service (in the present case a conference call) with associated context parameters.

15 If a network service is identified by the first mobile phone, the first mobile phone enter in a state 630 and sends to the second mobile phone an invitation to join the network service of the mobile network with the parameters exchanged during the NFC communication.

 If a network service is identified by the second mobile phone, the second mobile phone enter in a state 631 and sends to the first mobile phone an invitation to join the network service of the mobile network with the parameters exchanged during the NFC communication.

20 Then, each mobile phone waits for an acknowledgement in a step 635.

 In a test 640, if the first mobile phone receives a compatible request from the second mobile phone (y), the first mobile phone re-issues/confirms the invitation to the second mobile phone to join the network service identified by the first mobile phone, optionally exchanges additional parameters to join the network service in a step 650, prior terminating the NFC connection and launching the network service in a step 660.

 In the test 640, if the first mobile phone receives a non-compatible request from the second mobile phone (n), the first mobile phone is not able to establish the conference call with the second mobile phone, and drops the request, and terminates the NFC connection.

30 In a test 641, if the second mobile phone receives a compatible request from the first mobile phone (y), the second mobile phone acknowledges receipt of the request, exchanges additional parameters to join the network service in a step 650 if needed, prior terminating the NFC connection and launching the network service in a step 660.

In the test 641, if the second mobile phone receives a non-compatible request from the first mobile phone (n), the second mobile phone is not able to establish the conference call with the first mobile phone, and drops the request, and terminates the NFC connection.

5 It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be capable of designing many alternative embodiments without departing from the scope of the invention as defined by the appended claims.

10 Any reference sign in the following claims should not be construed as limiting the claim. It will be obvious that the use of the verb "to comprise" and its conjugations do not exclude the presence of any other steps or elements besides those defined in any claim. The word "a" or "an" preceding an element or step does not exclude the presence of a plurality of such elements or steps.

CLAIMS

1 A communication system comprising:

- a first handheld apparatus (100) comprising a first near field communication device
5 and a first radio frequency transmitting/receiving device, said first handheld apparatus (100)
being connected to a network service through a first connection (125) to a communication
network (120),
- a second handheld apparatus (130) comprising a second near field communication
device and a second radio frequency transmitting/receiving device, the first and second near
10 field communication devices being adapted to exchange identification information when they
are held next to each other so as to initiate a second connection (128) between the second
handheld apparatus and the communication network (120) so that the second handheld
apparatus is able to join the network service.

15 2 A communication system as claimed in claim 1, wherein the first and second
near field communication devices are of the NFC type.

3 A handheld apparatus (130) for joining a network service, another handheld
apparatus (100) comprising a first near field communication device and a first radio
20 frequency transmitting/receiving device and being connected to said network service through
a first connection (125) to a communication network (120), the joining handheld apparatus
(130) comprising a second near field communication device and a second radio frequency
transmitting/receiving device, the second near field communication device being adapted to
exchange identification information with the first near field communication device when they
25 are held next to each other so as to initiate a second connection (128) between the joining
handheld apparatus and the communication network (120) so that the joining handheld
apparatus is able to join the network service.

4 A handheld apparatus as claimed in claim 3, further comprising a memory for
30 storing context parameters and service parameters, said context parameters defining data to
be transmitted over the connections, said handheld apparatus being able to join the network
service depending on the context parameters.

5 A handheld apparatus (100) comprising a first near field communication device and a first radio frequency transmitting/receiving device, said handheld apparatus being suitable for communicating with another handheld apparatus (130) comprising a second near field communication device and a second radio frequency transmitting/receiving
5 device, the handheld apparatus (100) being connected to a network service through a first connection (125) to a communication network (120), wherein the first near field communication device is adapted to exchange identification information with the second near field communication device when they are held next to each other so as to initiate a second connection (128) between the another handheld apparatus and the communication network
10 (120) so that the another handheld apparatus is able to join the network service.

6 A communication method between a first handheld apparatus (100) comprising a first near field communication device and a first radio frequency transmitting/receiving device, and a second handheld apparatus (130) comprising a second
15 near field communication device and a second radio frequency transmitting/receiving device, said first handheld apparatus (100) being connected to a network service through a first communication (125) to a communication network (120), the method comprising:

- exchanging identification information between the first and second near field communication devices when they are held next to each other,
- 20 - initiating a second connection (128) between the second handheld apparatus and the communication network (120),
- enabling the second handheld apparatus (130) to join the network service through said second connection (128) to the communication network (120).

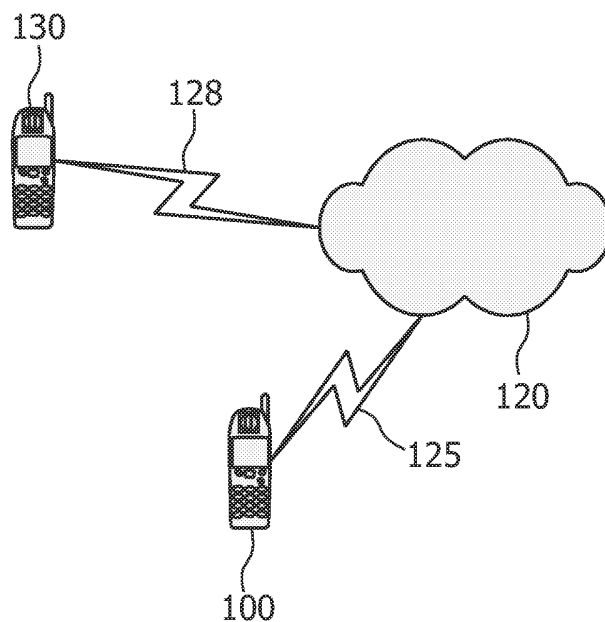


FIG. 1

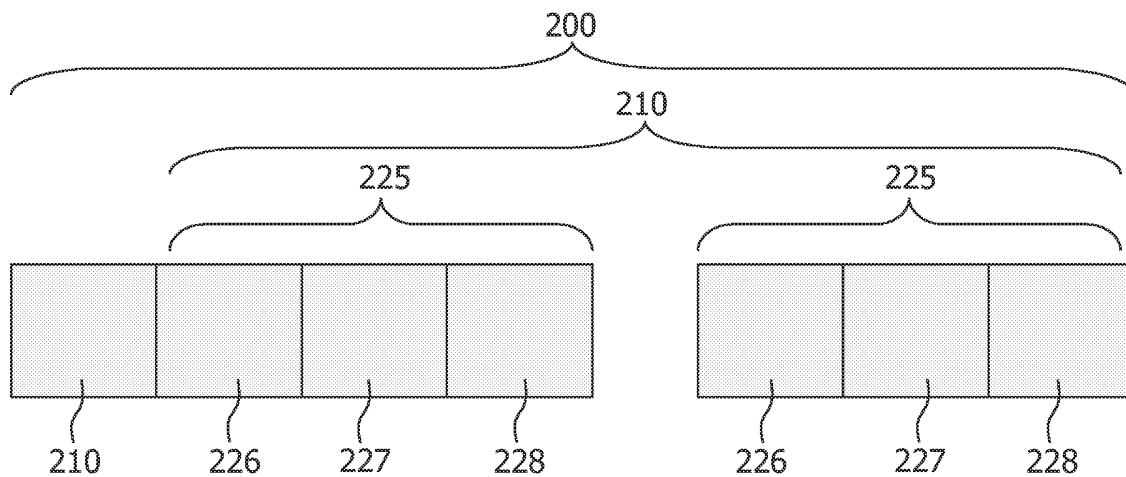


FIG. 2

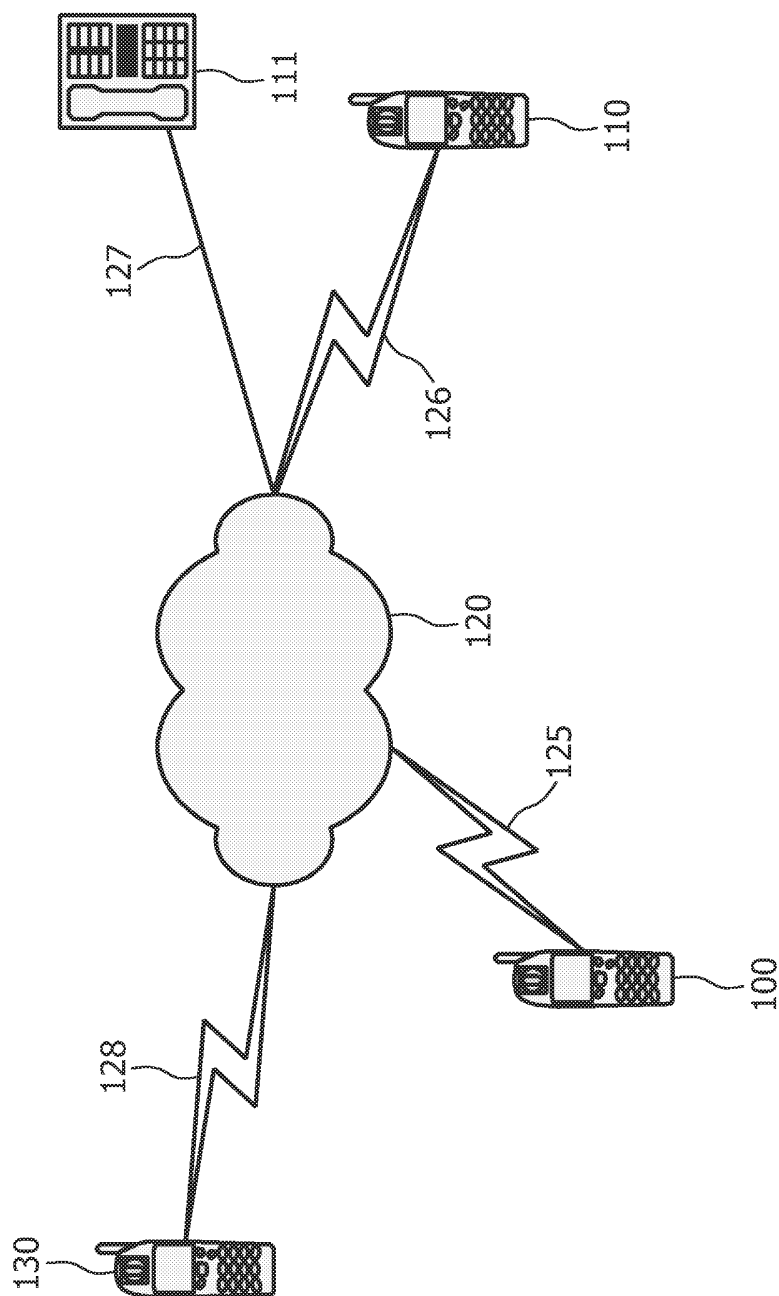


FIG. 3

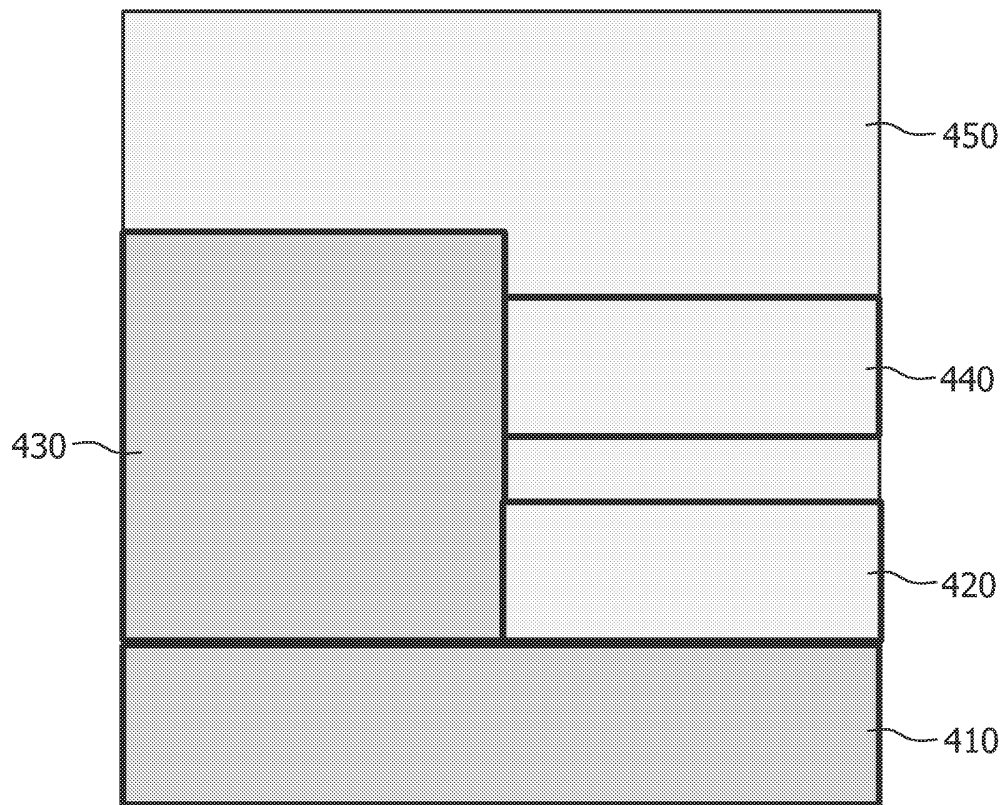


FIG. 4

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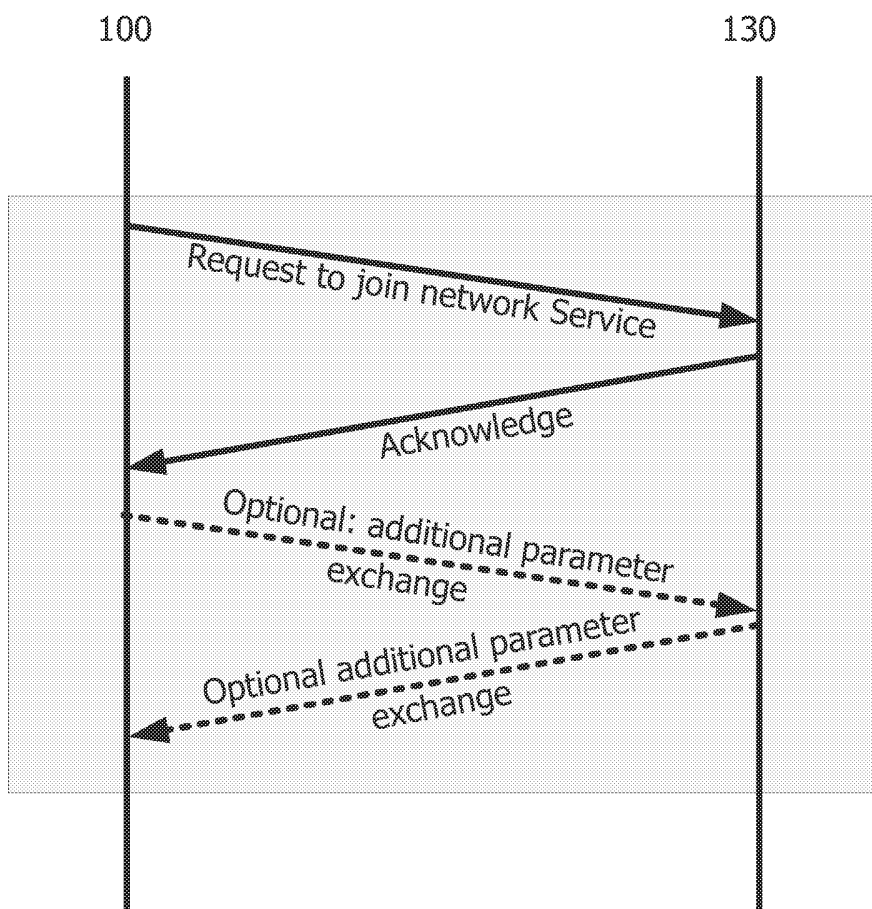
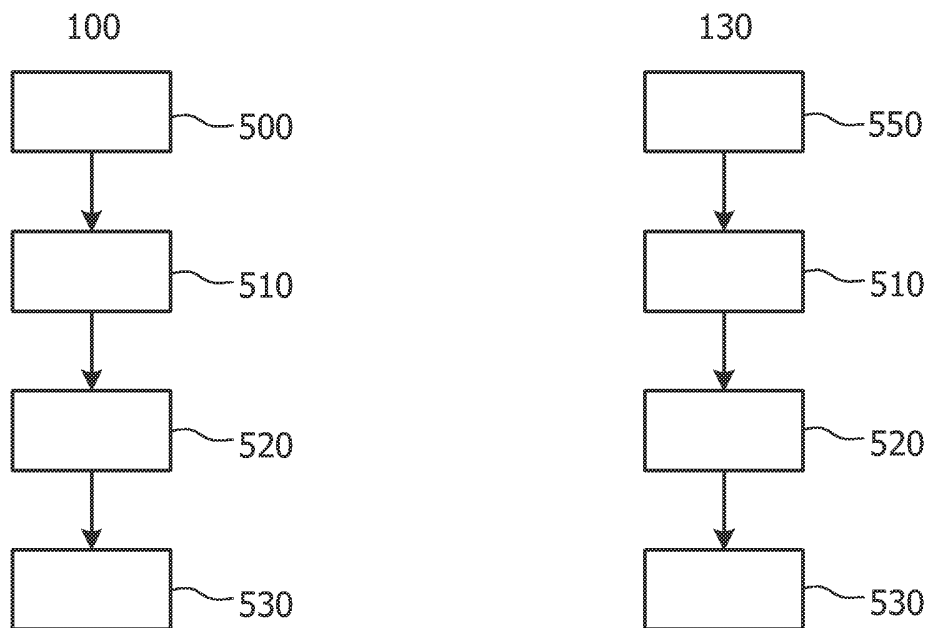


FIG. 5

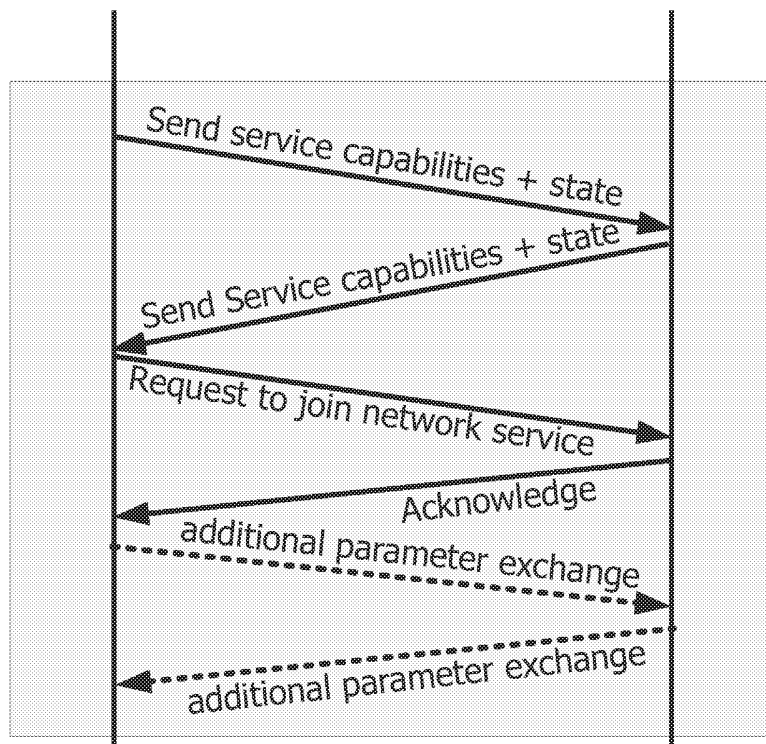
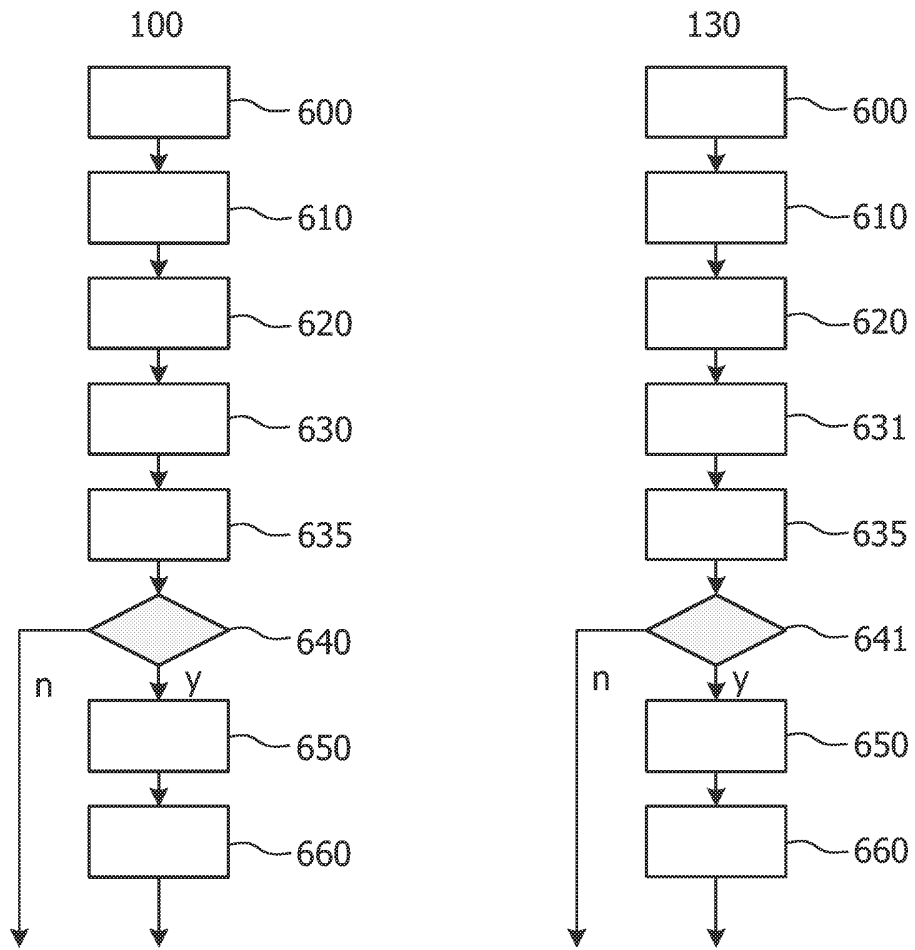


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. H04M1/725 H04Q7/38 ADD. H04M3/56		
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) H04Q H04M		
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 practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 322 131 A (TELEFONAKTIEBOLAGET L M ERICSSON ; TELEFONAKTIEBOLAGET LM ERICSSON (PU) 25 June 2003 (2003-06-25) abstract; figures 2-6,8 paragraphs [0008] - [0010], [0036] - [0042], [0048], [0052]	1-3,5,6
A	EP 1 161 114 A (NOKIA CORPORATION; NOKIA MOBILE PHONES LTD) 5 December 2001 (2001-12-05) the whole document	1,3,5,6
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
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