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(54) Abstract Title: **Location-based telephone directory**

(57) A method and a system for updating the telephone directory of a mobile communications device is provided comprising; a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit; a receiver for receiving a message comprising at least one telephone number and at least one associated service identifier; a comparator coupled to said telephone directory storage unit and said receiver for comparing the or each said service identifier of said received message with the or each said service identifier stored in said telephone directory in said telephone directory storage unit and; an updater unit coupled to said comparator for updating the or each said telephone number stored in said telephone directory. If the comparator determines that the service identifier corresponding to said telephone number received in said message matches the service identifier stored in said telephone directory, the updater unit updates the telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

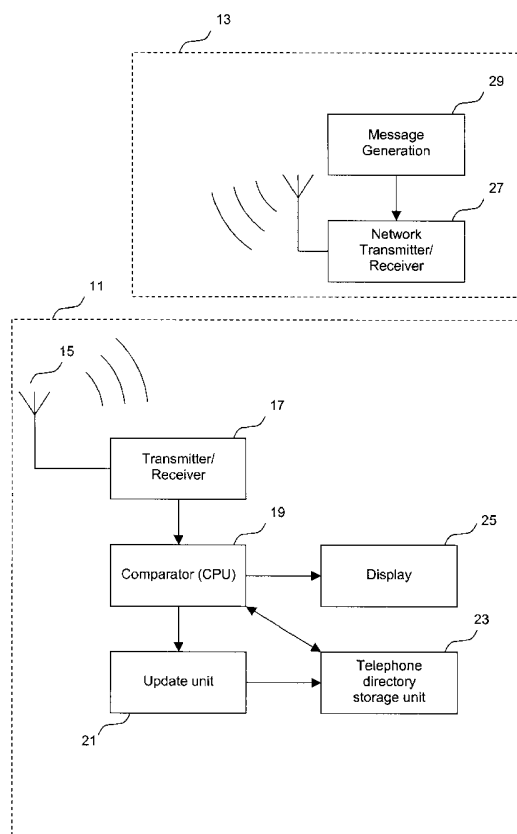


Figure 1

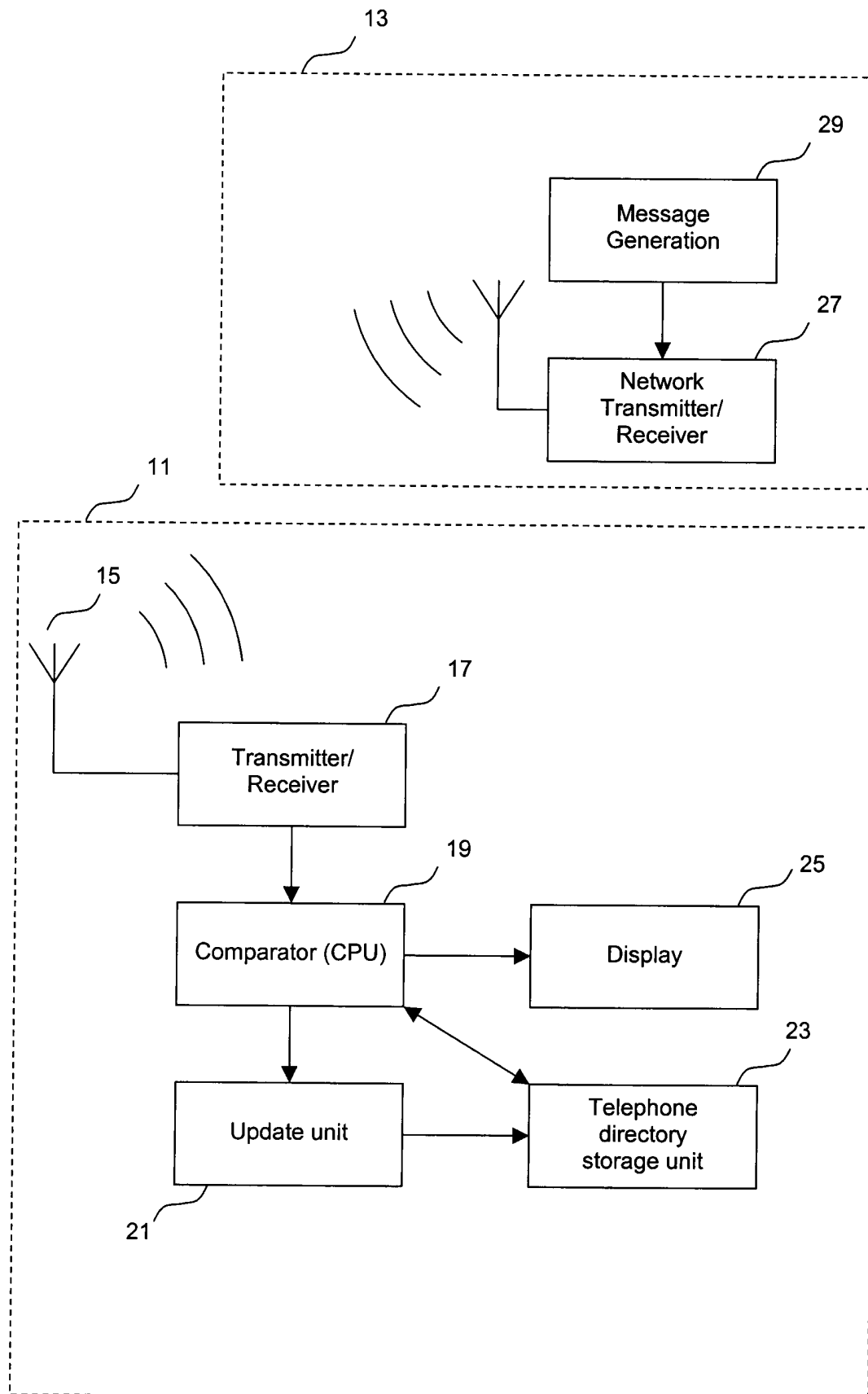


Figure 1

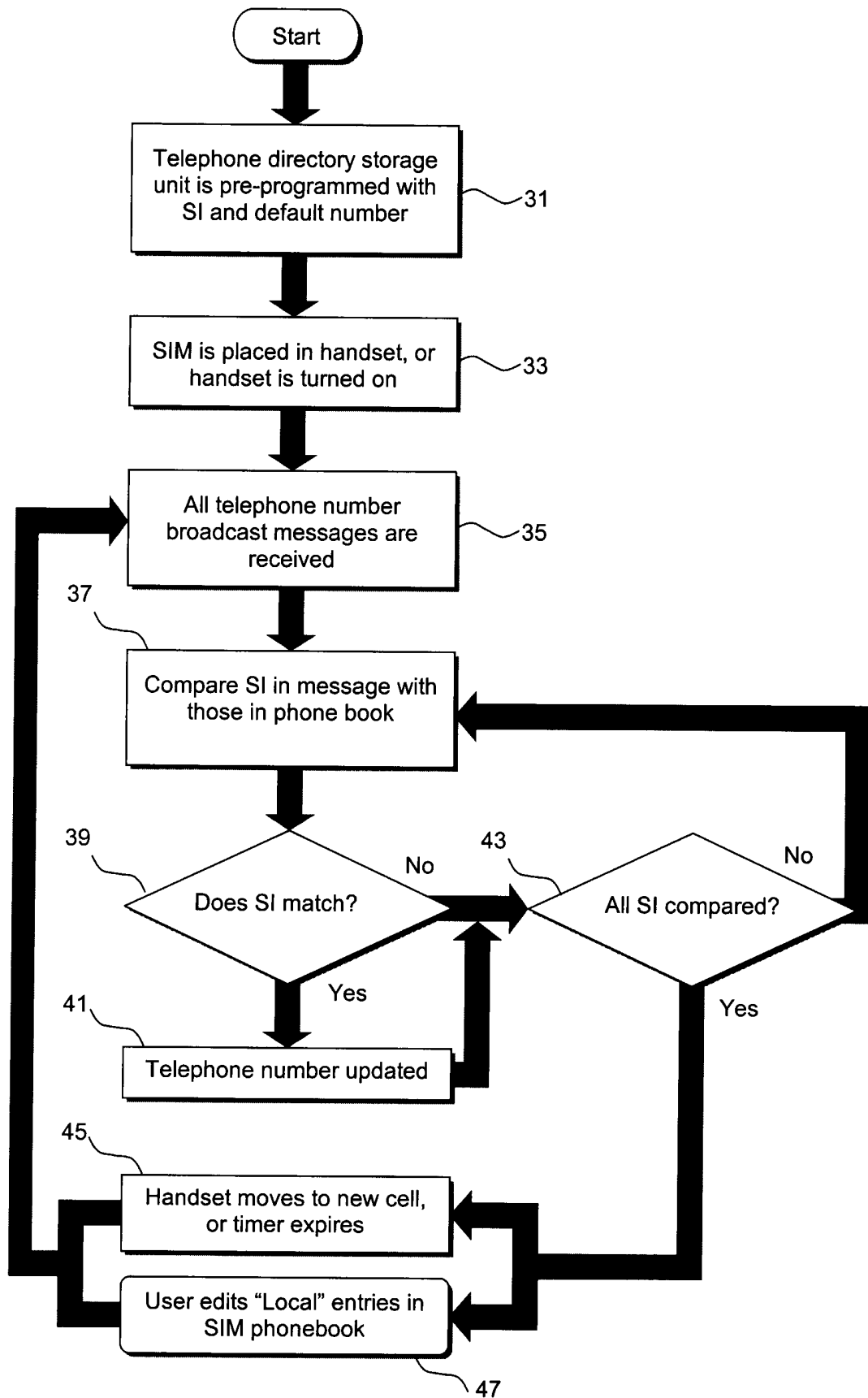


Figure 2

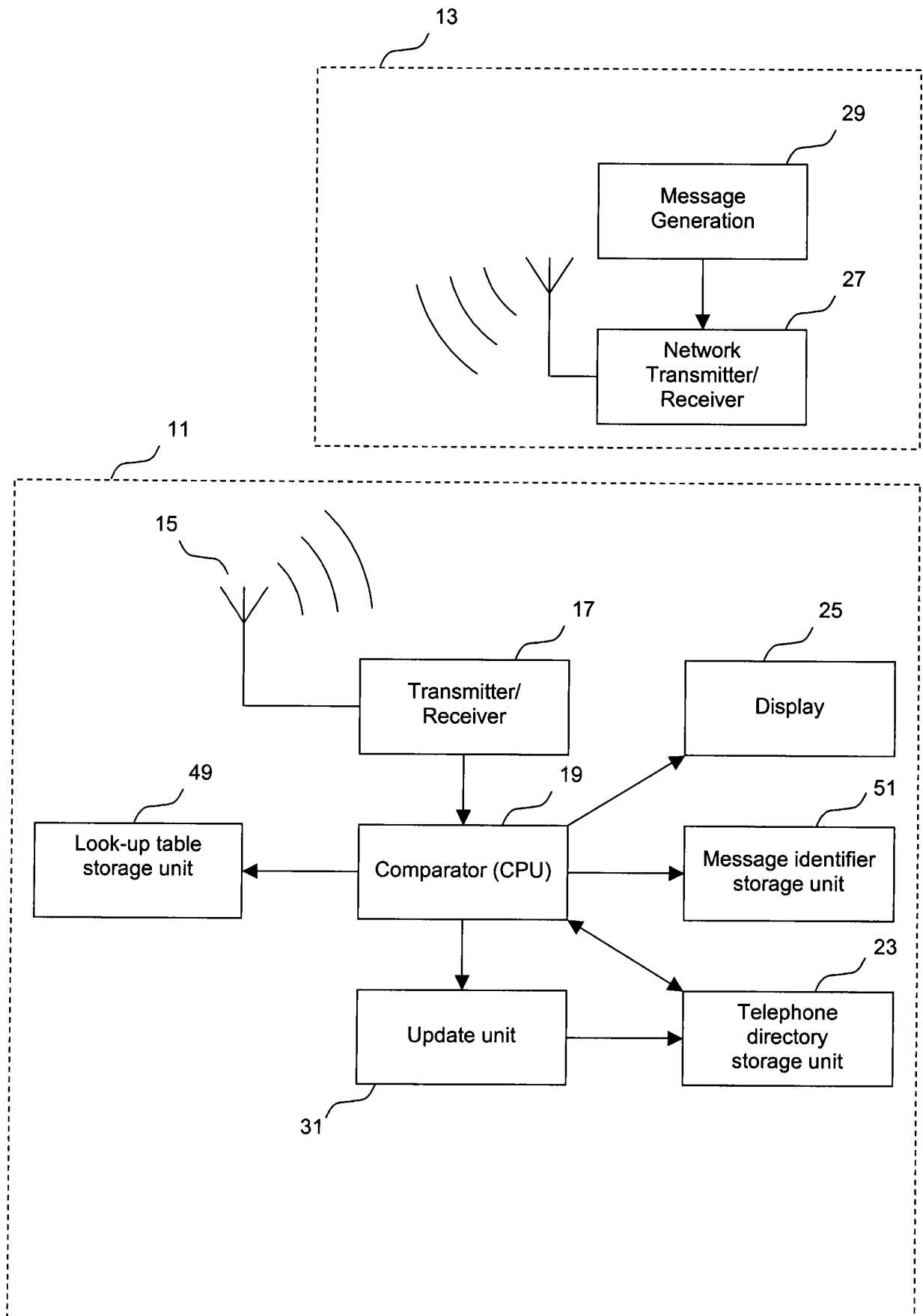


Figure 3

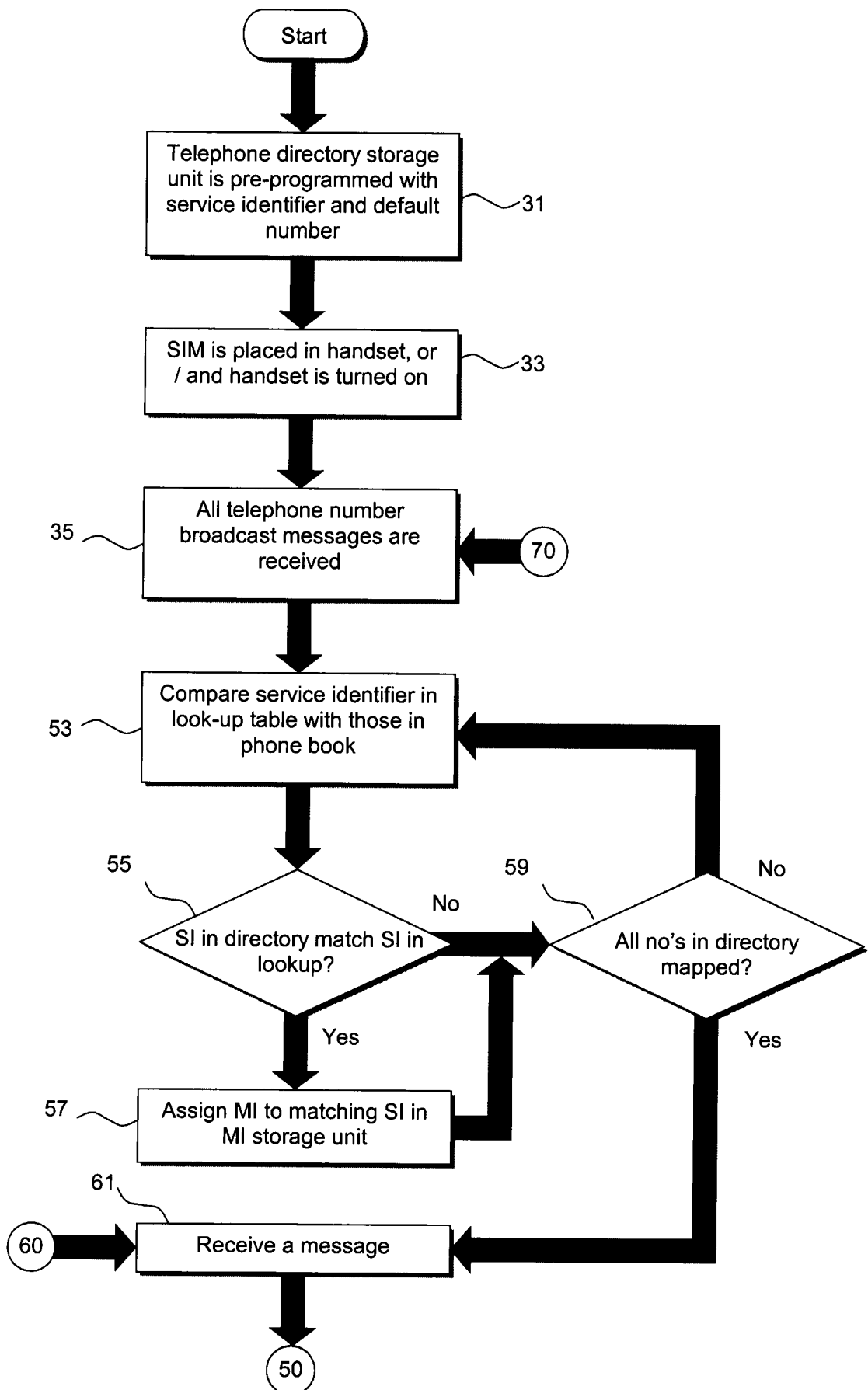


Figure 4

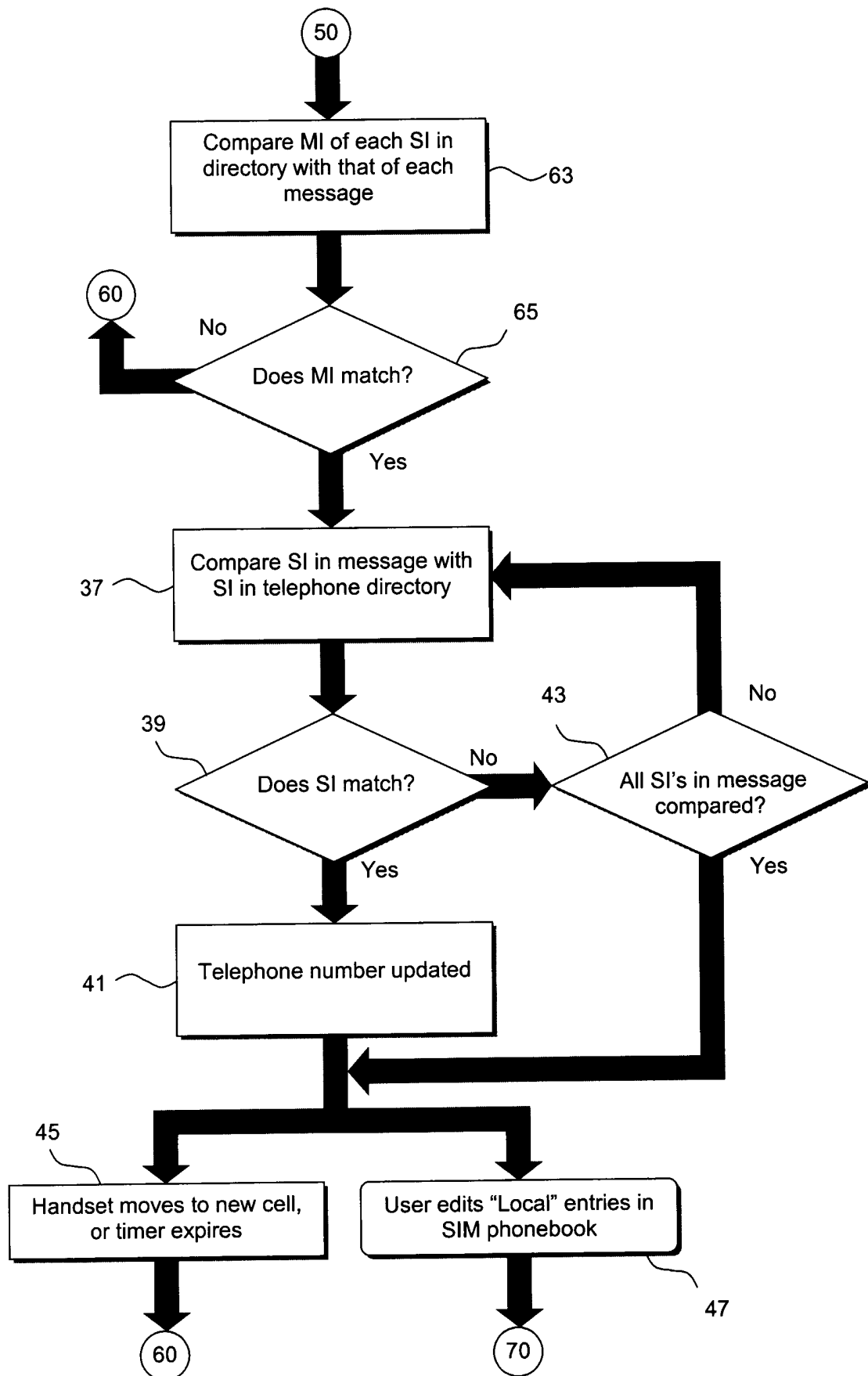


Figure 5

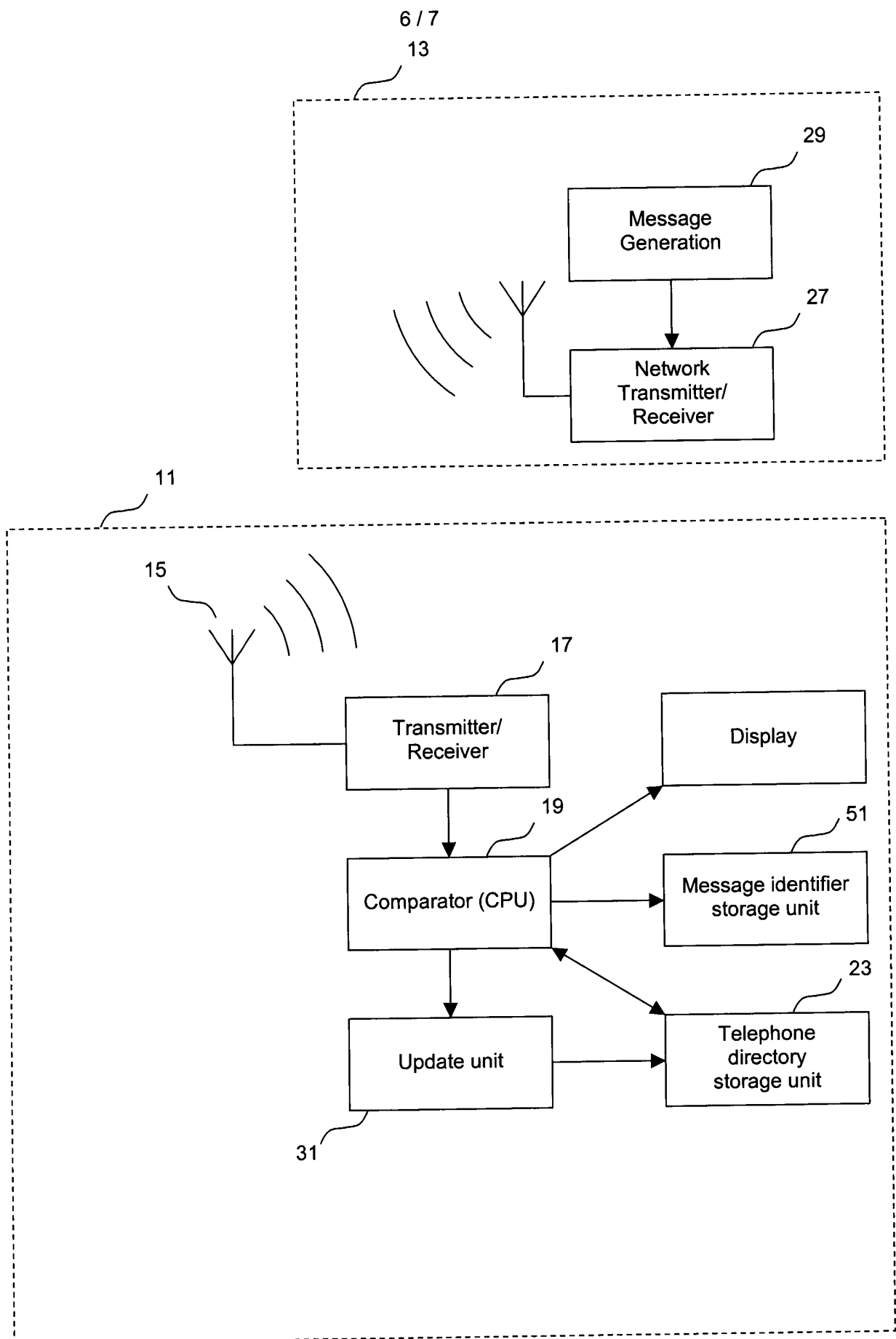


Figure 6

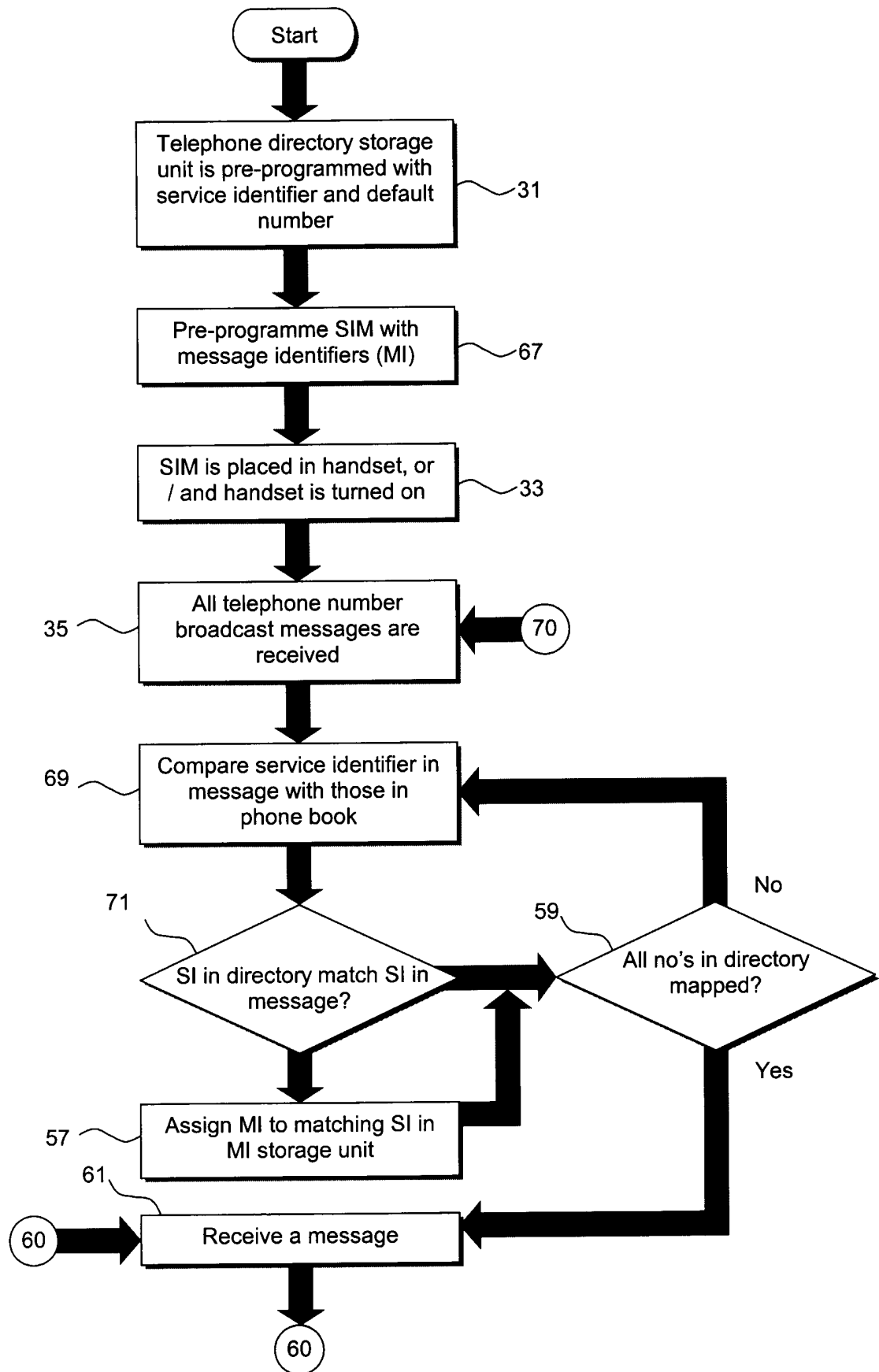


Figure 7

Mobile communications device, method of updating the telephone directory of a mobile communications device, and computer program for implementing the method.

Background of the Invention

5 This invention relates to a mobile communications device; preferably a mobile telephone handset, a method of updating the telephone directory of a mobile communication device, and a computer program for implementing the method.

10 When the user of a mobile communication device is away from his usual location, entries stored in his phone book that relate to local services, for example the local police station, taxi firm, or takeaway, have limited use. Therefore a system whereby the number is updated to give a service appropriate to the user's location is helpful to the user.

15 There are already location-based information services available on a number of networks. These services are generally accessed through WAP (Wireless Application Protocol) or i-Mode, and require the user to perform a relatively complex operation to reach the telephone number for which they are looking. This deters many users from making use of location-based services at all, and for others, it limits their use to when there is no other choice.

20 Furthermore, for users to take advantage of such services they must have relatively advanced handsets, which many users do not have, and also be happy to use more complex features, which many users are not.

25 Modern communications devices include a facility, typically known as a phone book, for users to store frequently used telephone numbers. Usually the store includes a "number" and corresponding "name" field to allow the user to easily find the desired number. The phone book data can either be stored in the mobile telephone itself, or in the SIM (Subscriber Identity Module) card which is in the mobile telephone, or in both. The data from these different sources are typically presented to the user in a single display, the data being combined into a standard format by the mobile communication device.

30 Also, following the implementation of phase 2 of the GSM standard, many modern mobile communication devices allow for the broadcast of short message strings using the short message service (SMS) cell broadcast channels. The

SMS cell broadcast channels are designed to enable the simultaneous delivery of messages to multiple users in a particular area. A message is only delivered to a mobile communication device if it is within a predetermined range of one of the network communications antennas. A similar service has been provided for in 3G systems, known as the service area broadcast message, and those skilled in the art will appreciate the applicability of an embodiment of the invention to both GSM and 3G systems.

Cell broadcast and service area broadcast services are different from the traditional SMS service because the SMS broadcast services are geographically-restricted, one-to-many services whereas the traditional SMS service is a one-to-one or one-to-few service.

Although these channels are optional, they are widely implemented. At present most carry information describing the area in which the cell broadcasting signal is located, for example the name of the nearest town, the local dialling code, weather conditions, or traffic reports and the like. The information is formatted and broadcast to the user in exactly the same way as the conventional point-to-point SMS.

The broadcast message includes formatting that indicates the intended message destination within the mobile station - for example a message can be sent explicitly to the SIM card rather than the mobile telephone handset.

Finally following the implementation of phase 2 of the GSM standard, SIM or Universal SIM (USIM) cards can carry their own applications (application programs). This enables SIMs to have a "SIM toolkit application". SIM toolkits provide additional functionality to mobile phones, for example they allow the user to pay for utility bills such as electricity bills or to access internet banking accounts. These may run automatically, or may be called by the user by accessing a special menu in the handset user interface. If such a menu is supported by the handset, the contents of the menu are provided by the SIM by way of the standards-defined SIM toolkit interface.

Summary of the Invention

In accordance with a first aspect of the present invention there is provided both a method and a system for updating the telephone directory of a mobile communications device comprising; a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service

identifier being associated with a telephone number stored in said telephone directory storage unit; a receiver for receiving a message comprising at least one telephone number and at least one associated service identifier; a comparator coupled to said telephone directory storage unit and said receiver for comparing
5 the or each said service identifier of said received message with the or each said service identifier stored in said telephone directory in said telephone directory storage unit and ; an updater unit coupled to said comparator for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that the service identifier corresponding to said telephone
10 number received in said message matches the service identifier stored in said telephone directory, the updater unit updates the telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

In accordance with a second aspect of the present invention there is
15 provided both a method and a system for updating the telephone directory of a mobile communications device comprising; a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit; a message identifier storage unit for storing one
20 or more message identifiers; a look-up table storage unit for storing a message identifier and associated service identifier; a comparator coupled to said telephone directory storage unit and said look-up table storage unit for comparing the or each said service identifier stored in said look-up table storage unit with the or each service identifier stored in said telephone directory and if the
25 comparator determines that the service identifier stored in said telephone directory matches the service identifier stored in said look-up table, assigning the message identifier associated with said matching service identifier stored in said look-up table to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit; a
30 receiver for receiving a message comprising at least one telephone number, at least one associated service identifier, and a message identifier; a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received message with the or each said message identifier stored in said message identifier storage unit and ; an updater
35 coupled to said comparator and said telephone directory storage unit for updating

the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one of the message identifiers stored in said message identifier storage unit is determined to match the message identifier of said received message, comparing the or each associated service
5 identifier of said received message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said
10 message which is associated with said service identifier.

In accordance with a third aspect of the present invention there is provided both a method and a system for updating the telephone directory of a mobile communications device comprising; a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each
15 service identifier being associated with a telephone number stored in said telephone directory storage unit; a message identifier storage unit for storing one or more message identifiers; a receiver for receiving one or more messages each said message comprising at least one telephone number, at least one associated service identifier, and a message identifier; a comparator coupled to said
20 telephone directory storage unit and said receiver unit for comparing the or each said service identifier stored in said telephone directory with the or each service identifier of said received message and if the comparator determines that the service identifier stored in said telephone directory matches the service identifier of said received message, assigning the message identifier associated with said
25 matching service identifier in said received message to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit; a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received message with the or each said message identifier
30 stored in said message identifier storage unit and; an updater coupled to said comparator and said telephone directory storage unit for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one of the message identifiers stored in said message identifier storage unit is determined to match that of said received
35 message, comparing the or each associated service identifier of said received

message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

Preferably the telephone directory storage unit is the existing phone book provided in mobile handsets, and the service identifier is a specific combination of characters stored in the identifying text that the existing phone book function stores for each telephone number.

The inventor has appreciated that a location-based service can advantageously be provided within the existing cellular infrastructure by using a largely unused channel, preferably the Cell Broadcast channel, which has the advantage that it operates transparently to the user and does not require the handset to have any location services or mobile internet capability.

Brief Description of the Drawings

The invention will now be described in detail by way of example with reference to the accompanying drawings, in which:

Figure 1 is a block diagram showing the main functional components of a mobile communications device and transmitter embodying the invention;

Figure 2 is a flow chart showing the main steps performed by an embodiment of the invention;

Figure 3 is a block diagram showing the main functional components of a mobile communication device and transmitter embodying the invention;

Figure 4 is a flow chart showing the main steps performed by the embodiment of figure 3;

Figure 5 is a continuation of the flow chart of figure 4;

Figure 6 is a block diagram showing the main functional components of a mobile communication device and transmitter embodying the invention; and

Figure 7 is a flow chart showing the main steps performed by a further embodiment.

Detailed Description of the Preferred Embodiments of the Invention

In one embodiment of the present invention illustrated in figure 1, a mobile communications system comprises a mobile communications terminal or device 11, and a base station 13. The mobile communications device 11 comprises an antenna 15, transmitter/receiver 17 to transmit and receive signals to or from the base station 13, a comparator 19, an update unit 21, a telephone directory storage unit 23, and a display 25. The base station 13 comprises a network transmitter/receiver 27 and a message generator 29. These functional components are described in further detail below.

Referring to figure 1 and to the flow chart in figure 2 of the drawings, when the network operator ships a new SIM (not shown), it pre-programs a number of entries in the telephone directory storage unit 23, step 31. Alternatively, the storage unit 23 may be a separate store in the body of the telephone. These entries include a completed name or service identifier (SI) field and an associated default telephone number field for each of the services that the network operator wishes to define. The service identifier is preferably an alphanumeric string. Examples of the service identifier field could be the "Local police" or "Local hospital", with a default number corresponding to the national emergency code for the country in question. For example, in the UK this is 999, or in the US this is 911. Other fields could be specified such as "Local taxi", "Local bus company", "Local train company", "Local Chinese takeaway" or "Local Indian takeaway". In these cases the default number could be the directory enquiries number.

Preferably, for the example illustrated in figure 2, when the SIM is first used in the handset, or, in the case that the telephone directory storage unit is in the mobile communications device, when the mobile communication device is first turned on, step 33, the SIM toolkit application detects the presence of these entries starting with the word "Local". This enables a telephone directory to have both "Local" entries which will be updated, and non-local entries which will not be altered or updated, the word "Local" acting as a service update identifier. However, those skilled in the art will appreciate that any other service update identifier can be used instead of the word "Local" to indicate that the entries in the telephone directory should be updated.

In the embodiment as shown in figure 2, the mobile communication device then receives from the base station 13 and downloads all broadcast messages, step 35, containing telephone number information and associated service

identifiers. The SIM application then instructs the comparator 19 to compare the text strings stored in the SIM phone book with those in the received message, preferably an SMS cell broadcast message, step 37. The comparator 19 is preferably constituted by a CPU processor in the mobile communications device.

5 A separate comparator could be used, but this requires modification of the mobile communication device. Accordingly, when the comparator detects a match, step 39, it notifies the update unit or updater 21 that the entry in the telephone directory storage unit is to be updated with the received local service number, which is now stored in the SIM card phone book as the local number for that local service, step 41, in place of the default number. When there is no match, the

10 comparator checks if there are more local numbers in the received message to be compared with the text entries stored in the phone book, step 43, and if so compares and updates the telephone number in the phone book as necessary. When all local numbers in that received message have been compared, the

15 comparator passes or waits for the next message.

Once all telephone numbers in the address book have been updated, the process, steps 35, 37, 39, 41, and 43, can be repeated each time the handset moves to a new cell, or a timer expires, step 45. Alternatively, it can be repeated each time the user edits the "Local" entries in the SIM phonebook, step 47.

20 The operation is illustrated by table 1. This shows a part of the phone book in a mobile telephone embodying the invention.

Name/service identifier	Number	Default number
Home	01987 654321	
Office	020 7123 4567	
Local taxi	020	118 500
Local hospital	020	999
Local Chinese	118 500	118 500

25 Table 1: Part of a phone book in a mobile communication embodying the invention.

It will be seen that in the phone book name field there are three service identifiers beginning "Local". For these entries, the phone book is extended by the

inclusion of a default field. If the entry is updated by the method described with reference to figure 2, the number field will contain the updated number. If it has not been updated it will contain the default number, as shown for the Local Chinese takeaway, or alternatively it will be blank and the telephone will move to the default field to select the default number when making a call.

Using the SMS cell broadcast message, if the text and number fields are both 16 characters in length, up to five service numbers can be carried in each 160 character broadcast message.

The base station 13 includes amongst other conventional components the network transmitter/receiver 27 and the message generator 29, as shown in figure 1. The message generator is adapted to generate messages which each comprise one or more telephone numbers and at least one associated service identifier. The network transmitter / receiver in its transmitter function is coupled to the message generator for transmitting such messages generated by the message generator.

However, the previously described embodiment has the disadvantage that the mobile communication device must decode all messages, preferably GSM SMS cell broadcast, and compare the text strings of each local service in order to determine whether the local numbers are required. This must be performed every time the handset moves to a new cell or upon expiry of a timer, step 45, or each time the user edits the "local" entries in the SIM phone book, step 47. The embodiments described below seek to overcome these problems.

In the embodiment shown in figure 3, the mobile communication device shares some common components as in the embodiment of figure 1, and those are therefore not described again. However, this embodiment has the additional functional components of a storage unit 49 for a look-up table and a message identifier (MI) storage unit 51, both connected to the comparator CPU 19. The message identifier storage unit can be provided in the phone book. Alternatively, it can be provided separately in the SIM or handset. These features allow additional steps to be provided in order to avoid the need to download all messages each time the phone book needs to be updated, for example when the user edits the "Local" entries in the SIM phone book. To this end additional steps 53, 55, 57, 59, 61, 63, and 65 are provided, as shown in figures 4 and 5. Steps 31, 33, and 35 are the same as in the first embodiment, and will not be described further. Steps 53 – 59 map the phone book entries to particular broadcast

messages. This involves mapping of either each telephone number or each associated text string (service identifier) to a non-unique message identifier (service type identifier) number, i.e. associating each telephone number or service identifier with one of a number of possible message identifier numbers.

5 This step is performed by the comparator unit 19. The message identifier numbers identify the type of information. For example, message identifier 1 could relate to the local police or local hospital fields, transportation numbers such as local taxis, trains or buses could be assigned message identifier 2, while fields relating to local restaurants such as the local Chinese, Italian or Indian
10 restaurants or takeaways could be assigned a message identifier number 3.

The message identifier serves to indicate which messages need to be decoded for each assigned information type, but is not intended as an identifier for the information itself. Providing identifiers in this way allows new information types to be added later. Preferably, when the SIM is first used in the mobile
15 communication device, the SIM toolkit application detects the presence of those entries starting with the word "Local" or with another service update identifier if such has been used. It then maps these entries to message identifier numbers for the type of information and thus makes a note of the information type that needs to be downloaded.

20 Accordingly, when the handset moves to a new cell, or when a timer expires, step 45, steps 61 onwards are repeated, and the relevant broadcast messages, identified by their message identifiers, are received and the local service numbers updated by performing a string comparison of the service identifiers in each broadcast message with the service identifiers of each entry
25 stored in the telephone directory storage unit having a matching message identifier. This cycle is then repeated to keep the local numbers up-to-date. Additionally, when the user edits the "Local" entries in the SIM phone book, step 47, it is once again necessary to repeat steps 35 onwards. This is because the user may have edited the phone book to include new entries, which do not have a
30 mapped message identifier associated with them.

The mapping of the service identifier or telephone number fields to the message identifier using the look-up table storage unit 49 will now be described in further detail, referring to figures 3, 4, and 5. The look-up table stores a service identifier and an associated message identifier. The mapping process is
35 performed by the comparator 19, which compares the service identifier in the

look-up table with those in the phone book at step 53. If it determines that there is a match between the two entries, step 55, then the message identifier associated with the received message is assigned to the service identifier by storing the value in the message identifier storage unit. This process is repeated, step 59,
5 until all service identifiers in the phone book have been mapped an associated message identifier. Once this process is complete, for each of the message identifiers required by the pre-programmed phone book entries, the SIM toolkit requests the handset to download the relevant messages. This is achieved by receiving a message, step 61, and comparing the message identifier of each
10 service identifier in the phone book with that of each message, step 63.

When there is no match, step 65, the comparator passes or waits for the next message. If there is a match, then the comparator compares the service identifier corresponding to one of the telephone numbers in the received message with those in the phone book, step 37, in order to determine whether
15 the entry in the phone book needs to be updated. This step, and following steps 39, 41, and 43, are the same as in the previous embodiment shown in figures 1 and 2, and so will not be described in further detail.

In a further embodiment, shown in figure 6, the mapping of the service identifier fields to the message identifier codes can be achieved by direct
20 reference to the information being broadcast on the messages, preferably "Local number" SMS cell broadcast messages. This is much more flexible since the signal sent can be changed at any time. The mobile communication device shares the same common components as in the embodiment of figure 3, except that a look-up table storage unit is not required, and these are therefore not
25 described again. Once again, the message identifier storage unit 51 can be provided in the phone book. Alternatively, it can be provided separately in the SIM or handset.

Each SMS cell broadcast message comprises the following: a channel number, a message code, an update number, a language identifier and a
30 message body. The channel number can contain the message identifier indicating the type of message contained in the message block. The message code is the ID of the specific message instance, for example a serial number. The update number is a version of a specific message, that is to say the update number differentiates between older and newer versions of the same message,
35 within the indicated geographical area. The language identifier simply indicates

which language the message is in, for example English, French or German. Finally, the message body is a text field, preferably an ASCII text field containing up to 160 characters. The message body can be formatted in the following way as shown in table 2, allowing five service numbers and associated service identifiers to be stored in each message, provided that each is not longer than 16 characters in length.

Local service 1x	012345678901xxxx
Local service 2x	023456789012xxxx
Local service 3x	034567890123xxxx
Local service 4x	045678901234xxxx
Local service 5x	056789012345xxxx

Table 2: The message body of a received message formatted to store five service numbers and associated service identifiers, each up to 16 characters in length. The x indicates additional space for further characters.

In this embodiment, steps 31, 33, and 35 of the mapping process are the same as in the previous embodiment shown in figure 3. These are shown in figure 7 and will not be described in further detail here.

Preferably, however, an additional step is provided, step 67, where the SIM is pre-programmed with the message identifier codes of all SMS cell broadcast channels that can contain local numbers, but with no information on which local numbers are contained within each. The pre-programmed message identifier codes can be stored in the message identifier storage unit 51, since this storage unit is empty before the mapping process occurs.

As in the second embodiment, the mapping is performed by an initial reception and decoding of all broadcasts with the identifiers indicated. However, instead of using a look-up table, the contents of the received messages are then compared with the telephone numbers, preferably local telephone numbers needed by the phone book, step 69.

For example, if the phone book contains entries for the local taxi, local train and local bus company, then the received messages are searched until the text strings for these services are found, i.e. the service identifier in the directory matches one of the service identifiers in the received message, step 71. The

message identifiers for the messages containing those strings are then stored in the message identifier storage unit, 51. In future only messages with these message identifiers need to be decoded in order to update the taxi, train, and bus telephone numbers. This procedure allows a service to be mapped to a message identifier, and is repeated until all telephone numbers in the telephone directory have an associated message identifier. Preferably, each telephone number has an associated service update identifier stored in the telephone directory, for example the word "Local" can be used as a service update identifier, and this prefixes entries in the service identifier field of the phone book. The mapping process is then repeated until all telephone numbers with a service update identifier have an associated message identifier. Once this has been performed, the telephone numbers can be updated following steps 61, 63, 65, 37, 39, 41, and 43 as in the previous embodiment shown in figure 5, and so this will not be describe in further detail here.

However, as in the previous embodiment, each time the user edits the entries with a service update identifier, for example the "Local" entries in the SIM phone book it is necessary to re perform the mapping process according to steps 35, 69, 71, 57, and 59.

Using this method, the appropriate local number can be updated on the SIM phone card.

The mapping of the fields to the message identifier codes by direct reference to the information being broadcast on the messages, preferably "Local number" SMS cell broadcast messages has the advantage that the service provider may later notify the user of new message identifiers that can be supported. Then the user may enter the appropriate new phone book entry beginning with "Local" and these will automatically be picked up from the SMS cell broadcast signals.

The SIM application can be configured to request the handset to receive a message in order to update the phone book whenever the handset moves or changes to a new cell, step 45, or whenever the handset changes routing/location area. These embodiments are preferred since they minimise power consumption by the mobile communication device. The mobile communication device is aware of which cell it is currently connected to as a result of normal handset operation.

Alternatively or additionally, the telephone numbers can be updated periodically even if no change of location occurs. The periodic update in time is the standard mode of operation of SMS cell broadcast messages, and so the handset would not require any change in order to implement this. Performing the
 5 update when the handset changes routing / location area is not preferred since this would require changes to the handset operation.

The SIM application can also be configured to request the handset to receive an SMS cell broadcast message every time the relevant message occurs on the air interface. However, this option is power inefficient and is therefore not
 10 preferred.

Furthermore, a periodic or dynamic update without a change in location could be advantageous for a number of reasons.

Firstly, if a number of providers of the same service in the same area are paying an operator to provide their numbers, then the operator will need to cycle
 15 between several numbers. This can be achieved by cycling the provided number after a period of time has elapsed. Alternatively, the number provided can be varied according to the number of calls that have been made to the currently indicated service provider (by call volume) or to provide a particular balance of calls between providers. This would allow the network operator to bill the service
 20 provider by call volume. Also the telephone number supplied can be varied if for example the number relates to a service which is time limited. For example, certain hospitals only offer accident and emergency cover during core hours. The correct number to call for the service is then time dependent and the broadcast message must reflect this.

It will thus be seen that this system provides a method for networks to find
 25 new sources of revenue. It provides two possible new sources by charging the users for use of the system and by charging companies to have their number to be the one provided by the system.

Preferably, a number of mechanisms can be provided to ensure a robust
 30 operation of the system.

Firstly, if the number entered as "Local" cannot be mapped to an entry in the cell broadcast signals currently being received, then the default number is used, and no updated number is present.

Secondly, if the local numbers are not already set to their default values
 35 when the handset is powered up, then the power-up operation can include a step

to do this. However, this step may be omitted if the first cell found by the handset is the same as the last cell onto which it was camped before power off.

5 Thirdly, the user is free to delete the pre-programmed entries. This may be useful in order to free memory in the SIM or mobile communications device or to reduce the number of SMS cell broadcast receptions performed in order to save power.

10 Finally, if the message identifiers are assigned by comparing the service identifier strings in the received messages and those in the phone books as described above, the same service provider may later notify the user of new message identifiers that can be supported. Then the user may enter the appropriate phone book entry beginning with a service update identifier or the word "Local" and these will also be picked up from the broadcast messages.

15 Although the system has been describe with reference to a SIM phone book and a SIM toolkit, so that the telephone directory storage unit is in fact the SIM card mounted in the mobile telephone, those skilled in the art will appreciate the applicability of an embodiment of the invention to a handset phone book and handset applications.

20 Additionally, in the second and third embodiments, both the storage unit for the look-up table and that for the message identifier can be provided either in the mobile communications device itself or in the SIM card. Having it in the SIM has the advantage that it is simple, but it is relatively inflexible, since once the SIM is in the user's handset, updates to the table could only be achieved through updates to the SIM software, which is a procedure that is not undertaken on a regular basis. However, implementation in the SIM is preferable since it makes
25 the system easier to roll out when each SIM is sold rather than with each handset.

CLAIMS

1. A mobile communications device comprising:

5 (a) a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;

(b) a receiver for receiving a message comprising at least one telephone number and at least one associated service identifier;

10 (c) a comparator coupled to said telephone directory storage unit and said receiver for comparing the or each said service identifier of said received message with the or each said service identifier stored in said telephone directory in said telephone directory storage unit and ;

15 (d) an updater coupled to said comparator for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that the service identifier corresponding to said telephone number received in said message matches the service identifier stored in said telephone directory, the updater updates the telephone number stored in said telephone directory with the telephone number received in said message which is
20 associated with said service identifier.

2. A mobile communications device comprising:

25 (a) a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;

(b) a message identifier storage unit for storing one or more message identifiers;

30 (c) a look-up table storage unit for storing a message identifier and associated service identifier;

(d) a comparator coupled to said telephone directory storage unit and said look-up table storage unit for comparing the or each said service identifier stored in said look-up table storage unit with the or each service identifier stored in said telephone directory and if the comparator determines that the service
35 identifier stored in said telephone directory matches the service identifier stored in

said look-up table, assigning the message identifier associated with said matching service identifier stored in said look-up table to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit;

5 (e) a receiver for receiving a message comprising at least one telephone number, at least one associated service identifier, and a message identifier;

 (f) a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received message with the or each said message identifier stored in said message identifier storage unit and ;

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 (g) an updater coupled to said comparator and said telephone directory storage unit for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one of the message identifiers stored in said message identifier storage unit is determined to match the message identifier of said received message, comparing the or each associated service identifier of said received message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

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25 3. A mobile communications device comprising:

 (a) a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;

30 (b) a message identifier storage unit for storing one or more message identifiers;

 (c) a receiver for receiving one or more messages each said message comprising at least one telephone number, at least one associated service identifier, and a message identifier;

(d) a comparator coupled to said telephone directory storage unit and said receiver unit for comparing the or each said service identifier stored in said telephone directory with the or each service identifier of said received message and if the comparator determines that the service identifier stored in said telephone directory matches the service identifier of said received message, assigning the message identifier associated with said matching service identifier in said received message to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit;

(e) a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received message with the or each said message identifier stored in said message identifier storage unit and ;

(f) an updater coupled to said comparator and said telephone directory storage unit for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one of the message identifiers stored in said message identifier storage unit is determined to match that of said received message, comparing the or each associated service identifier of said received message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

4. A mobile communication device according to any of claims 1, 2 or 3, in which the telephone directory storage unit is initially provided with a default telephone number associated with each service identifier in the telephone directory.

5. A mobile communication device according to any of claims 1 - 4, in which the message received by the receiver is a GSM cell broadcast message.

6. A mobile communication device according to any of claims 1 - 4, in which the message received by the receiver is a 3G service area broadcast message.

7. A mobile communication device according to any of claims 1 to 6 in which a service update identifier associated with each service identifier or with each telephone number stored in said telephone directory is additionally stored in said telephone directory and in which said comparator determines whether a service update identifier is associated with each service identifier or telephone number and only if said service update identifier is present said telephone number is selectively updated with said received telephone number.
8. A method of updating the telephone directory of a mobile communications device, comprising the steps of:
- (a) storing one or more service identifiers in a telephone directory, each service identifier being associated with a telephone number stored in said telephone directory;
 - (b) receiving a message, said message comprising at least one telephone number and at least one associated service identifier;
 - (c) comparing the or each said service identifier of said received message with the or each said service identifier stored in said telephone directory; and
 - (d) if the service identifier corresponding to said telephone number received in said message is determined in said comparing step to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier for the or each matching service identifier in said received message..
9. A method according to claim 8, in which steps (b) – (d) are repeatedly performed.
10. A method according to claim 8, in which said telephone directory additionally stores a service update identifier associated with each service identifier or with each telephone number stored in said telephone directory, and the method further comprises the step of determining whether a service update identifier is associated with each service identifier or telephone number and

selectively updating said telephone number only if said service update identifier is present.

5 11. A method of updating the telephone directory of a mobile communications device, comprising the steps of:

(a) storing one or more service identifiers in a telephone directory, each service identifier being associated with a telephone number stored in said telephone directory;

10 (b) assigning a message identifier to each service identifier stored in said telephone directory by comparing the or each service identifier stored in said telephone directory with the or each service identifier stored in a look-up table to output an associated message identifier to a message identifier storage unit if said service identifiers match ;

15 (c) receiving a message, said message comprising at least one telephone number and at least one associated service identifier, and a message identifier;

(d) comparing the message identifier associated with each service identifier stored in said telephone directory with the message identifier of each said received message;

20 (e) if at least one of the message identifiers stored in said message identifier storage unit is determined to match the message identifier of said received message, comparing the or each associated service identifier of said received message with the or each said service identifier having a matching message identifier stored in said telephone directory; and

25 (f) if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier for the or each matching service identifier in
30 said received message.

12. A method according to claim 11, in which steps (c) – (d) are repeatedly performed.

13. A method according to claim 11, in which step (b) is performed each time the telephone directory is edited.

5 14. A method according to claim 11, in which said telephone directory additionally stores a service update identifier associated with each service identifier or with each telephone number stored in said telephone directory, and the method further comprises the step of determining whether a service update identifier is associated with each service identifier or telephone number and selectively updating said telephone number only if said service update identifier is present.

15. A method of updating the telephone directory of a mobile communications device, comprising the steps of:

15 (a) storing one or more a service identifiers in a telephone directory, each service identifier being associated with a telephone number stored in said telephone directory;

20 (b) assigning a message identifier to each service identifier stored in said telephone directory by receiving a message, said message comprising at least one telephone number, at least one associated service identifier, and one message identifier by comparing the or each service identifier stored in said telephone directory with the or each service identifier in said received message to output an associated message identifier to a message identifier storage unit if the said received and stored service identifiers match;

25 (c) repeating step (b) until each service identifier stored in said telephone directory has been assigned a message identifier;

(d) receiving a message, said message comprising at least one telephone number and at least one associated service identifier and one message identifier;

30 (e) comparing the message identifier associated with each service identifier stored in said telephone directory with the message identifier of each said received message;

(f) if at least one of the message identifiers stored in said message identifier storage unit is determined to match the message identifier of said received message, comparing the or each associated service identifier of said

received message with the or each said service identifier having a matching message identifier stored in said telephone directory;

5 (g) if the service identifier corresponding to said telephone number received in said message is determined to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier for the or each matching service identifier in said received message.

10 16. A method according to claim 15 in which step (b) further comprises the step of pre-programming the message identifier storage unit with one or more message identifier codes of messages that contain telephone number information, and only receiving a message if said message identifier of said received message matches one or more of said message identifiers stored in
15 said message identifier storage unit.

17. A method according to any of claims 15 or 16, in which steps (b)-(c) of claim 15 are performed each time the telephone directory is edited.

20 18. A method according to any of claims 15 or 16, in which steps (d)-(g) of claim 15 are repeatedly performed.

25 19. A method according to any of claims 15 or 16, in which said telephone directory additionally stores a service update identifier associated with each service identifier or with each telephone number stored in said telephone directory, and the method further comprises the step of determining whether a service update identifier is associated with each service identifier or telephone number and selectively updating said telephone number only if said service update identifier is present.

30 20. A method according to any of claims 8 to 16, in which the number or numbers of the service or services included in the message changes according to the time of day.

35 21. A method according to any of claims 8 to 20, in which the telephone directory is stored in a SIM card.

22. A method according to any of claims 8 to 21, in which the telephone directory is stored in the mobile communication device.

5 23. A method according to any of claims 8 - 22 in which the telephone directory is stored in both the mobile communication device and a SIM (subscriber identity module) card.

24. A mobile communications system comprising:
10 a network transmitter adapted to transmit messages which each comprise at least one telephone number and at least one associated service identifier; and at least one mobile communications device, the or each mobile communications device comprising:

(a) a telephone directory storage unit for storing a telephone directory
15 comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;

(b) a receiver for receiving a message comprising at least one telephone number and at least one associated service identifier;

20 (c) a comparator coupled to said telephone directory storage unit and said receiver for comparing the or each said service identifier of said received message with the or each said service identifier stored in said telephone directory in said telephone directory storage unit and ;

(d) an updater unit coupled to said comparator for updating the or
25 each said telephone number stored in said telephone directory, wherein if the comparator determines that the service identifier corresponding to said telephone number received in said message matches the service identifier stored in said telephone directory, the updater updates the telephone number stored in said telephone directory with the telephone number received in said message which is
30 associated with said service identifier.

25. A mobile communications system comprising:
a network transmitter adapted to transmit messages which each comprise at least one telephone number and at least one associated service identifier; and

at least one mobile communications device, the or each mobile communications device comprising:

- 5 (a) a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;
- (b) a message identifier storage unit for storing one or more message identifiers;
- 10 (c) a look-up table storage unit for storing a message identifier and associated service identifier;
- (d) a comparator coupled to said telephone directory storage unit and said look-up table storage unit for comparing the or each said service identifier stored in said look-up table storage unit with the or each service identifier stored in said telephone directory and if the comparator determines that the service
15 identifier stored in said telephone directory matches the service identifier stored in said look-up table, assigning the message identifier associated with said matching service identifier stored in said look-up table to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit;
- 20 (e) a receiver for receiving a message comprising at least one telephone number, at least one associated service identifier, and a message identifier;
- (f) a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received
25 message with the or each said message identifier stored in said message identifier storage unit and ;
- (g) an updater coupled to said comparator and said telephone directory storage unit for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one
30 of the message identifiers stored in said message identifier storage unit is determined to match the message identifier of said received message, comparing the or each associated service identifier of said received message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said
35 message is determined to match the service identifier stored in said telephone

directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

- 5 26. A mobile communications system comprising:
- a network transmitter adapted to transmit messages which each comprise at least one telephone number and at least one associated service identifier; and
- at least one mobile communications device, the or each mobile communications device comprising:
- 10 (a) a telephone directory storage unit for storing a telephone directory comprising one or more service identifiers, each service identifier being associated with a telephone number stored in said telephone directory storage unit;
- (b) a message identifier storage unit for storing one or more message
- 15 identifiers;
- (c) a receiver for receiving one or more messages each said message comprising at least one telephone number, at least one associated service identifier, and a message identifier;
- (d) a comparator coupled to said telephone directory storage unit and
- 20 said receiver unit for comparing the or each said service identifier stored in said telephone directory with the or each service identifier of said received message and if the comparator determines that the service identifier stored in said telephone directory matches the service identifier of said received message, assigning the message identifier associated with said matching service identifier
- 25 in said received message to said service identifier stored in said telephone directory by storing said associated message identifier in said message identifier storage unit;
- (e) a comparator coupled to said message identifier storage unit and said receiver for comparing each said message identifier of said received
- 30 message with the or each said message identifier stored in said message identifier storage unit and ;
- (f) an updater coupled to said comparator and said telephone directory storage unit for updating the or each said telephone number stored in said telephone directory, wherein if the comparator determines that if at least one
- 35 of the message identifiers stored in said message identifier storage unit is

determined to match that of said received message, comparing the or each associated service identifier of said received message with the or each said service identifier having a matching message identifier and if the service identifier corresponding to said telephone number received in said message is determined
5 to match the service identifier stored in said telephone directory, updating the said telephone number stored in said telephone directory with the telephone number received in said message which is associated with said service identifier.

27. A network transmitter for use in a mobile communications system,
10 comprising:

a message generator for generating messages which each comprise at least one telephone number and at least one associated service identifier; and

a transmitter coupled to the message generator for transmitting messages generated by the message generator.

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28. A network transmitter for use in a mobile communications system according to claim 27 wherein said message further comprises a message identifier.

20 29. A network transmitter for use in a mobile communications system according to any of claims 27 or 28 wherein the message generated by the message generator is a GSM cell broadcast message.

25 30. A network transmitter for use in a mobile communications system according to any of claims 27 or 28 wherein the message generated by the message generator is a 3G service area broadcast message.

31. A computer program for updating the telephone directory of a mobile communications device, said computer program comprising program code
30 adapted to perform the method of any of claims 8 to 23 when said program is executed.

32. A method of updating the directory of a mobile communications device, substantially as herein described with reference to the drawings.

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33. A mobile communication system, or a mobile communication terminal or a network transmitter for use therein, substantially as herein described with reference to the drawings.



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Claims searched: 1-26 & 31

Date of search: 5 October 2005

Patents Act 1977: Search Report under Section 17**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 4-6, 8, 9, 21-24 & 31	EP1523204 A1 (LUCENT) whole document
X	1, 4-6, 8, 9, 21-24 & 31	US2004/0204117 A1 (WEINER) whole document
X	1, 4-6, 8, 9, 21-24 & 31	EP1211906 A2 (IBM) whole document esp. col.7 lines 26-31
X	1, 4-6, 8, 9, 20-24 & 31	US6374100 B1 (SMITH) whole document
X	1, 4-6, 8, 9, 21-24 & 31	EP1073298 A2 (SONY) whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^x :

H4L

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

H04M; H04Q

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC