

**MODIFYING CHANNEL INFORMATION OF A PORTABLE
COMMUNICATION DEVICE, SYSTEM AND A METHOD
THEREOF**

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FIELD OF THE INVENTION

This invention relates to modifying channel
information of a communication device, a roaming receiver
10 system and a method for modifying channel information of
such devices. The invention is particularly suitable
for, but not limited to, over the air programming of
selective call receivers when an associated system
infrastructure is reconfigured or modified.

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BACKGROUND ART

Portable communication devices are becoming widely
20 accepted as a form of communication. One type of
communication device is known as a selective call
receiver, often referred to as a pager, which receives
paged information transmitted from one or more
transmitters in a system. In this specification,
25 selective call receivers will be used by way of example,
however the invention is not necessarily limited to
selective call receivers. Such selective call receivers
are usually carried by users for receiving paged messages
when they are away from their office or home telephone.

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Selective call receivers operate in one or more
designated selective call systems. Such systems provide
transmission of selective call messages from a message
originator who contacts a selective call terminal and
35 provides the contents of the message and information
identifying the intended selective call receiver user.
The selective call terminal encodes the message into one
of several known protocols, such as the POCSAG signaling

code or the FLEX™ high speed paging protocol. In addition, the terminal appends an address assigned to the communication receiver to the message. The address and message are then modulated onto a selective call signal and transmitted from the selective call terminal.

In systems that employ simulcast techniques as used in the FLEX™ protocol and as mentioned, for example, in US patents 469605, 469051, a selective call receiver identifies and monitors a valid channel in order to receive messages. In the remainder of this specification channel includes a message transmission frequency and/or System Identification Information (SII). When considering the FLEX™ protocol, this System Identification Information SSI includes either or both a Network Identifier (NID) or Simulcast System Identifier (SSID). However, other identifiers and other protocols may provide such System Identification Information SSI.

When the infrastructure for a selective call system is initially configured, selective call receivers which are used in the system are programmed with channel information so that they can receive appropriate messages from the initially configured system. However, the system may be reconfigured or modified by the addition of further channels. Accordingly, selective call receivers affiliated to the system are required to have their channel information modified or updated so that they can continue to receive appropriate messages.

One approach for modifying channel information of each selective call receiver is to manually reprogram each selective call receiver. However, this is inconvenient, relatively expensive and may not be readily acceptable.

Another approach for modifying channel information of each selective call receiver is to use over the air reprogramming. Unfortunately, current over the air reprogramming requires individual selective call receivers or specific groups of selective call receivers to be addressed and then reprogrammed. The reason for this is that current selective call receivers are not adapted to process messages to determine if or what reprogramming is required. This therefore imposes unnecessary demands upon the system operators who would generally maintain a database of channel information stored in non-volatile memory (e.g. a codeplug) of individual or groups of selective call receivers. This database would generally also maintain information identifying the specific codeplug addresses of where the channel information is actually stored by each individual or specific selective call receiver groups.

SUMMARY OF THE INVENTION

It is an aim of the invention to overcome or alleviate at least one of the problems associated with adding on modifying channel information stored in memory of a communication device.

According to one aspect of the invention there is provided a communication device comprising:

receiver means for receiving coded messages transmitted on one or more channels;

processing means, in communication with said receiver means, for processing one or more of said messages;

channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

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a memory means storing channel information and coupled to said processing means;

wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by said communication device.

According to another aspect of this invention there is provided a communication system including:

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a plurality of transmitters for transmitting coded messages on one or more channels; and

a plurality of communication devices, each of said devices comprising:

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receiver means for receiving said coded messages transmitted on at least one of said channels;

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processing means, in communication with said receiver means, for processing one or more of said messages;

channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

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a memory means storing channel information and coupled to said processing means,

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wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by
5 said communication device.

Preferably, said communication device may be a selective call receiver.

10 Suitably, said memory means may comprise a non-volatile memory storing said channel information.

Preferably, said communication device may be further characterised by said instructions being contained in one
15 or more messages, wherein said instructions address said device solely by channel information.

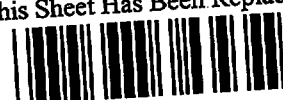
Preferably, said instructions may address said device solely by system identification information.
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Suitably, said system identification information may include a network identifier field.

Preferably, said system identification information
25 may include a simulcast system identifier field.

Suitably, said communication device may be adapted to validate said channel information before adding or modifying said channel information stored in said non-
30 volatile memory.

According to another aspect of this invention, there is provided a method for adding or modifying channel information stored in a communication device, the method
35 comprising the steps of:



receiving coded messages transmitted on one or more channels; and

5 processing said messages for selectively adding or modifying said channel information stored in a memory means of said device, wherein said selectively adding or modifying is in response to one or more instructions that have been received and processed by said communication device.

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BRIEF DESCRIPTION OF THE DRAWINGS

15 In order that the invention may be readily understood and put into practical effect, reference will now be made to a preferred embodiment as illustrated with reference to the accompanying drawings in which:

20 FIG. 1 is a block diagram of a communication device in accordance with an embodiment of an invention;

FIG. 2 illustrates a system SSID change instruction message used by the communication device of Fig. 1

25 FIG. 3 illustrates a simulcast system identifier portion of a message that may be received by the communication device of FIG. 1;

30 FIG. 4 illustrates a system network identifier change instruction message used by the communication device of FIG. 1;

35 FIG. 5 illustrates a network identifier portion of a message that may be received by the communication device of FIG.1;



FIG. 6 illustrates channel information stored in a codeplug of the communication device of FIG. 1;

FIGS. 7a to 7d are flow diagrams illustrating the operation of the communication device of FIG. 1; and

FIG. 8 illustrates a simulcast system suitable for the communication device of FIG. 1.

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DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

With reference to Fig. 1 there is illustrated a communication device in the form of a selective call receiver 1 commonly known as a pager. Selective call receiver 1 comprises a receiver means 2 coupled to be in communication with a processing means 3. Processing means 3 includes a channel control means in the form of a frequency synthesizer 4 coupled to be controllable by a micro-processor 13. However, the frequency synthesizer 4 can be arranged to be external to processing means. Further, an alert generator 17 is coupled to be controllable by micro-processor 13 and a display in the form of a Liquid crystal display (LCD) 5 and user actuatable function switches 6 are coupled to be in communication with micro-processor 13.

In this preferred embodiment receiver means 2 includes a receiver 8 coupled to an antenna 7 by a radio frequency amplifier 9.

The processing means 3 also includes a demodulator 10 coupled to both receiver 8 and a decoder 11. The decoder 11 is coupled to micro-processor 13 and has an associated Read Only Memory (ROM) 12 that stores data for decoding received messages. Micro-processor 13 is also

coupled a Random Access Memory (RAM) 14, a Read Only Memory (ROM) 15 and a non-volatile codeplug memory 20. Further, liquid crystal display 5 has an associated slave driver 16 controllable by micro-processor 13.

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As will be apparent to a person skilled in the art, alert generator 17 comprises an addressable tone generator addressable by micro-processor 13. Outputs of tone generator 17 are coupled to drive either or both a speaker and a transducer in the form of a vibrator motor for vibrating a casing of selective call receiver 1.

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The Read Only Memory 15 stores data for converting decoded received binary messages into characters for displaying on liquid crystal display 5. In this embodiment Read Only Memory 15 also stores operating code for micro-processor 13, whereas Random Access Memory 14 is for storing received decoded paged messages and is also used for storing temporary data as will be apparent to a person skilled in the art. Further, codeplug 20 stores channel information including channel frequencies and information concerning system identifiers such as Simulcast System Identifiers (SSID) or Network Identifiers (NID) as defined in the Flex™ protocol.

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Referring to Figs 2 and 3 there is illustrated part of a messaging protocol of a Simulcast System (SS), the protocol includes a System SSID change instruction message 2000 and a SSID 3000 portion of a message. System SSID change instruction message 2000 includes a system SSID operator messaging address field 2010, a system SSID vector field 2020, and a system SSID change instruction data field 2025. The system SSID change instruction data field comprises a system SSID opcode field 2030, traffic management group selection flags 2040, a new coverage zone addition flag 2050, a system

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SSID coverage zone field 2060 and a system SSID frequency field 2070.

5 The system SSID operator messaging address field
2010 is an address that is uniquely defined to indicate
that the message 2000 is directed to selective call
receivers using SSIDs 3000. The System SSID Vector field
2020 is defined by the secure vector type as defined in
the Flex™ protocol and is used to indicate to selective
10 call receivers associated with the Simulcast System SS
that the message 2000 is a command or instruction type
message. A command or instruction type message is one
where the SSID change instruction data field 2025 begins
with an opcode field (i.e. System SSID Opcode 2030). The
15 System SSID Opcode Field 2030 uniquely identifies the
format and function of the remainder of the system SSID
change instruction data field 2025.

 The traffic management group selection flags 2040
20 are a group of four bits, each bit represents one of four
traffic management groups and corresponds in an order
which is associated to a first of four frequencies that
may be listed in the System SSID Frequency Field 2070.
The traffic management group selection flags 2040 are
25 used when a traffic split is to be performed with a SSID
3000, such traffic splits are known to a person skilled
in the art. The new coverage zone addition flag 2050 is
a single bit which indicates whether a new channel
comprising a SSID and frequency will be added to the
30 Simulcast System SS that transmits the SSID Change
Instruction Message 2000 and an SSID 3000.

 SSID 3000 comprises a Country Code field 3010, a
local identifier field 3020, a coverage zone field 3030
35 and SSID Traffic Management Flags 3040 as defined in the
Flex™ protocol. The Country Code Field 3010 has
information which indicates the country from which the

SSID 3000 is transmitted. The Local Identifier field 3020 represents a division of the area within the country identified by the information in the Country Code field 3010. Further, the Coverage Zone field 3030 represents a division of the area identified by the information of field 3020. The traffic management flags 3040 are a group of four bits, each bit corresponds to a particular traffic management group and is used to identify which traffic management groups are supported on a channel associated with the Simulcast System SS. Information in the respective country code field 3010, local identifier field 3020 and coverage zone field 3030 are used by selective call receivers to uniquely identify a simulcast site of the Simulcast System SS.

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In use, when the new coverage zone addition flag 2050 is set, the system SSID coverage zone field 2060 is deemed valid. When the system SSID coverage zone field 2060 is valid, the information in this field defines the coverage zone 3030 of the SSID 3000 that is being added to the Simulcast System SS. The country code and local identifier are obtained from respective fields 3010 and 3020 of SSID 3000 transmitted on the current channel and previously detected and stored by selective call receivers using this channel. Alternatively, the country code and local identifier could be supplied directly in further fields of message 2000.

The system SSID frequency field 2070 is variable in length and can comprise up to five sub frequency fields each being 21 bits in length. Each sub frequency field forms a list of frequencies which are being added to the Simulcast System SS. Each frequency listed in the system SSID frequency field 2070 has a one to one correspondence starting with each traffic management group flags 2040 that is set and finishing with the new coverage zone addition bit 2050 (if set). For example, if the

traffic management group flags 2040 are set to 1100 and new coverage zone addition bit 2050 is set to 1, then system SSID frequency field 2070 will comprise a list of three sub frequency fields each of 21 bits. In this
5 regard, the last sub frequency field corresponds to the new coverage zone addition bit 2050.

In Figs. 4 and 5 there is illustrated messaging protocols of a system Network Identifier NID change
10 instruction message 4000 and a NID 5000 portion of a message associated with a channel. The NID change instruction message 4000 comprises a NID address field 4010, system NID vector field 4020 and a system NID change instruction data field 4025. The system NID
15 change instruction data field 4025 comprises two fields, these are a system NID opcode field 4030 and a system NID frequency field 4040.

The NID address field 4010 contains information
20 which identifies the NID 5000 to which the system NID change instruction message 4000 is associated. This is a special field for addressing all selective call receivers associated with the network identified by NID 5000. The system NID change instruction message 4000 is
25 transmitted directly after the NID 5000 in a frame of the Flex™ protocol and will be apparent to a person skilled in the art. In this regard, the NID 5000 is used to uniquely identify the network to which the system NID change instruction message 4000 belongs.

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The system NID vector field 4020 is defined by the secure vector type as defined in the Flex™ protocol and is used to indicate to selective call receivers that the message 4000 is a command or instruction type message.
35 The system NID opcode field 4030 uniquely identifies the format and function of the remaining portion of the system NID change instruction data field 4025 which, in

this embodiment, identifies the system NID frequency field 4040 which is variable in length comprising sub frequency fields each being 21 bits in length. Each sub frequency field forms a list of frequencies which have
5 been added to the network identified by the NID 5000.

The NID 5000 comprises an NID address field 5010 and a NID vector field 5015. The NID vector field comprises a NID multiplier field 5020, service area field 5030 and
10 NID traffic management flags 5040. Information in the NID address field 5010, NID multiplier field 5020 and service area field 5030 are used to completely and uniquely identify a network. The NID traffic management
15 flags 5040 are a group of four bits, each bit corresponds to a particular traffic management group and are used to identify which traffic management groups are supported on a channel.

As will be apparent to a person skilled in the art,
20 a traffic management group is a grouping of selective call receivers. There are four traffic management groups defined by the Flex™ protocol. Each selective call receiver 1 will be assigned to only one of the four Traffic Management Groups and each channel identifier
25 (e.g. a SSID or NID) will support its own set of traffic management groups on the channel that it identifies.

Referring to Fig. 6, there is illustrated channel information 6000 stored in codeplug 20 of selective call
30 receiver 1. The channel information 6000 comprises a frequency index list 6010, frequency list 6020, SSID list 3030, frequency index pointer list 6040, a NID list 6050 and traffic management group identifier 6060. The
35 frequency index list 6010 is a sequential numbered list, wherein each number identifies one of the frequencies listed in the frequency list 6020. The frequency list 6020 defines frequencies from which the selective call

receiver 1 may be able to receive messages. The SSID list 6030 is a list of SSIDs 3000 associated with the selective call receiver 1. In this embodiment, the SSIDs in the SSID List 6030 do not contain SSID traffic management flag information.

The SSID frequency index pointer 6040 is a list of frequency indexes 6010 which are linked to individual SSIDs in the SSID List 6030. If a number in the SSID frequency index pointer list 6040 is zero, this indicates that the frequency for the corresponding SSID in SSID list 6030 was not known at the time the selective call receiver 1 was programmed.

The NID List 6050 is a list of NIDs 5000 associated with selective call receiver 1. The NIDs in the NID List 6050 do not contain the NID traffic management flag information. Each NID in the NID List 6050 is applied to all the frequencies in the Frequency List 6020. The traffic management group identifier 6060 defines one of the four possible traffic management groups to which the selective call receiver 1 can belong.

In Fig. 8 there is illustrated a simulcast system 8000 suitable for selective call receiver 1. System 8000 comprises individual simulcast sites that are associated with a channel. System 8000 comprises a channel 1 which is identified by SSID1 and includes a frequency 1. Channel 1 has an associated transmitter 8010, operatively coupled to a control center 8020 which is coupled to receive messages from a telecommunications network 8030 such as a telephone network. As will be apparent to a person skilled in the art, the telecommunications network 8030 is configured to receive messages which are sent to center 8020 for subsequent transmission by transmitter 8010 to at least one selective call receiver 1 operating on channel 1.

From a system perspective, channel 1 is considered to be the first operative channel for communicating with selective call receivers 1 in system 8000. Hence, because channel 1 is using SSIDs, all the traffic management flags 3040 transmitted in SSID 3000 will be set indicating that all traffic management groups are supported by channel 1. As more selective call receivers 1 are added to receive messages from channel 1, there will be a point when channel is filled to capacity and no other selective call receivers 1 can be added. In this event, channel 1 can move selected traffic management groups to another channel using the traffic management flags 3040 contained within the SSID 3000.

Channel 2 is a channel that has approximately the same coverage area as channel 1 and the reason for constructing channel 2 is that channel 1 is filled to capacity. Accordingly, selected traffic management groups can be moved from channel 1 to channel 2 by altering the traffic management flags 3040. In this regard, reprogramming of the selective call receivers 1 is described below.

Channel 2 shares the same SSID as Channel 1. However, the frequency of channel 2 is considered to be frequency 2 and is different from the frequency of channel 1. As is known to a person skilled in the art, the traffic management flags 3040 are complementary between channel 1 and channel 2. As the system 8000 develops new channels may require to be added. For example, channel 3 may be added which is identified by SSID2 and uses frequency 3. Similarly, channel 4 can be added to the system which is identified by NID1 and frequency 4.

In use, a SSID 3000 is transmitted by the system 8000 infrastructure on a FlexTM channel and therefore uniquely identifies the channel. The SSID 3000 is received by the selective call receivers 1 and is used to
5 identify the channel and determine which of the four traffic management groups are supported on that channel. Similarly, a NID 5000 can be transmitted by the system 8000 infrastructure on a FlexTM channel and identifies a network to which the channel is affiliated. An individual
10 channel may transmit the SSID 3000 to identify the channel uniquely while also transmitting an NID to identify that channel's network affiliation.

When a channel cannot support any new selective call
15 receivers, one or more of the four traffic management groups may moved to another channel. When one or more traffic management group(s) are moved from channel 1, the infrastructure for channel 1 will transmit the SSID 3000 with the traffic management flags 3040 corresponding to
20 the moved traffic management groups are reset to zero as defined by the FlexTM protocol. Further, the infrastructure for channel 1 will transmit the system SSID change instruction 2000 with the traffic management group Selection 2040 bits set to indicate which traffic
25 management group(s) are being moved. The system SSID change instruction 2000 will also indicate the new frequencies in the system SSID frequency field 2070 which will support the corresponding moved traffic management groups. The time interval in which the system SSID change
30 instruction 2000 is transmitted on channel 1 is determined by the operator of the system 8000.

Further channels may be planned to be added to the system 8000. However, although such further channel may
35 have a pre-designated SSID 3000, their frequency may not have been allocated at the time the selective call receivers 1 are programmed. Accordingly, the selective

call receivers 1 will be programmed with the SSID 3000 but without the channel frequency. If the additional channel is channel 3, then SSID2 will be programmed into list 6030 of each the selective call receiver 1 and the
5 corresponding frequency pointer in list 6040 will be set to zero. This identifies that the frequency of SSID2 is not known at the time of programming selective call receiver 1.

10 When the frequency of channel 3 becomes known and channel 3 becomes operational, channel 1 and channel 2 will transmit the system SSID change instruction 2000 with the new coverage zone addition flag 2050 set to one along with the value of the coverage zone 2060 that
15 corresponds to SSID 3000 of channel 3. The system SSID change instruction 2000 will also indicate the new frequency in the system SSID frequency field 2070 which will support channel 3. The time interval in which the system SSID change instruction 2000 is transmitted on
20 channel 1 and channel 2 is determined by the operator of the system 8000.

An additional channel may be planned to be added in the future to the system 8000. If the channel is to be
25 identified by an NID 5000, the frequency of the channel may not be known at the time the selective call receiver 1 is programmed. Accordingly, the selective call receivers 1 will be programmed with the NID 5000 that will identify the additional channel. For example, if
30 the additional channel is channel 4, when the frequency of channel 4 becomes known and channel 4 becomes operational, the infrastructure of channel 1, channel 2 8020 and channel 3 will transmit the system NID change instruction 4000. This change instruction 4000 will
35 include the new frequency in the system NID frequency field 4040 which will support channel 4. Note, for the Flex™ protocol the NID 5000 for the network should be

transmitted along with the system NID change instruction 4000 on channel 1, channel 2, and channel 3 for the time interval that the system NID change instruction 4000 will be transmitted. The time interval in which the System NID
5 Change Instruction 4000 is transmitted on channel 1, channel 2 and channel 3 is determined by the operator of the system 8000.

As described above, a traffic management group can
10 be moved from channel 1 to channel 2 using an SSID 3000. However, traffic management group movement can also could be accomplished if an NID 5000 was used to identify channel 1 and channel 2. If an NID 5000 was used to move the traffic management groups from channel 1 to channel
15 2, channel 1 would transmit the system NID change instruction 4000 with the frequency of channel 2 contained in the system NID frequency field 4040. Channel 1 would also transmit the NID 5000 indicating the traffic management groups that channel 1 supports
20 identified by the NID traffic management flags 5040.

Referring to Fig. 7, there is illustrated how selective call receiver 1 selectively reprogrammes channel information 6000 into codeplug 20 in response to
25 the System SSID Change Instruction 2000 or the System NID Change Instruction 4000. At a monitoring step 7010 it is assumed that the selective call receiver 1 has detected and matched a corresponding SSID or NID for an active channel x such that the selective call receiver will be
30 monitoring that channel x for messages at a monitoring step 7020.

During the monitoring step 7020, conventional messages are processed in a manner known to a person
35 skilled in the art. Further during step 7020 selective call receiver 1 determines if channel x should still be monitored for messages. The decision criteria for this is

based on the time interval that the selective call receiver 1 has last detected and matched an SSID or NID. This time interval may be fixed or entered in the codeplug 20. If the selective call receiver 1 determines
5 to no longer monitor channel x, the selective call receiver 1 searches other channels for SSID or NID matches.

When a message is received on channel x (or any
10 other monitored channel) then test step 7050 is effected to determine if the system SSID change instruction message 2000 has been received by the selective call receiver 1. In this regard, a message transmitted by a transmitter 8010 will be received by antenna 7. The
15 message will then be amplified by amplifier 9, filtered by receiver 8 and demodulated by demodulator 10. Decoder 11 and micro-processor 13 in combination with information in associated Read Only Memory 12 and codeplug 20 determines if the message is a message 2000,
20 message 4000 or a conventional message addressing selective call receiver 1.

If the selective call receiver 1 determines a system SSID change instruction message 2000 has been received a
25 test step 7070 is effected, otherwise a test step 7060 is effected. In this regard, a channel frequency (frequency y) identified by one of flags 2040 and corresponding to a subfrequency field of system SSID frequency field 2070 is stored in RAM 14. Further, frequency y is represented
30 as binary data and is used by micro-processor 13 to control frequency synthesizer 4 to thereby alter the filtering characteristics of receiver 8 to allow selective call receiver 1 to monitor a channel y being transmitted on frequency y.

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Test step 7070 determines if traffic management group selection flags 2040 identify the traffic

management group 6060 stored in codeplug 20. If the traffic management group selection flags 2040 identifies the traffic management group 6060 of the selective call receiver 1 then step 7090 is effected, otherwise test
5 step 7080 is effected.

In step 7090 the selective call receiver 1 monitors for an SSID 3000 on channel y transmitted at frequency y. In step 7090 the selective call receiver will sample and
10 monitor for an SSID 3000 for either a fixed time interval or a programmable time interval set in the codeplug 20. A test step 7095 then determines if an SSID 3000 has been received by the selective call receiver 1 on channel y within a given time interval. If an SSID 3000 has been
15 received by the selective call receiver on channel y within a given time interval then test step 7100 is effected, otherwise test step 7080 is effected.

Test step 7100 determines if the received SSID 3000
20 on channel y matches the SSID 3000 of channel x which is stored in codeplug 20. Test step 7100 also determines if the traffic management group 6060 stored in codeplug 20, matches one of the traffic management groups which are supported on channel y as indicated by the traffic
25 management flags 3040 the SSID 3000. If the received SSID 3000 on channel y matches the SSID 3000 of channel x and if the traffic management group 6060, stored in codeplug 20, matches one of the traffic management groups which are supported on channel y, then a test
30 step 7110 is effected, otherwise test step 7080 is effected.

Test step 7110 determines if frequency y is an entry within the frequency list 6020 of codeplug 20. If
35 frequency y is an entry within the Frequency List 6020, then step 7130 is effected, otherwise a step 7120 is effected. In step 7120 the selective call receiver 1

will program frequency y in the Frequency List 6020 by copying frequency y from RAM 14 to codeplug 20 . At the completion of step 7120 step 7130 is effected. In step 7130 the selective call receiver 1 will program the
5 Frequency Pointer 6040 to the Frequency Index 6010 which corresponds to frequency y. At the completion of step 7130 a traffic group split has been effected. In this regard, channel 1 of system 8000 may be considered as channel x and channel 2 may be considered as channel y.

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After completion of step 7130 test step 7080 determines if the new coverage zone addition flag 2050 is set to one in the system SSID change instruction message 2000. If the new coverage zone addition flag 2050 is set
15 to one then step 7200 is effected, otherwise step 7020 is effected. In step 7200 the selective call receiver 1 constructs a new SSID 3000 resulting from the system SSID change instruction message 2000. This is achieved by using information contained in the system SSID coverage
20 zone field 2060 of the system SSID change instruction message 2000 and information from the country code field 3010 and local identifier field 3020 received from channel x and stored in RAM 14.

25 After step 7200 a test step 7210 determines if the new SSID is contained in the SSID List 6030 of codeplug 20. If the new SSID is contained in the SSID List 6030 then a test step 7220 is effected, otherwise a test step 7020 is effected. Test step 7220 determines if the
30 frequency pointer 6040 that corresponds to the new SSID is zero. If this is the case a test step 7230 is effected otherwise step 7020 is effected. Step 7230 is a test step that determines if the new SSID frequency (frequency w) specified in the system SSID frequency
35 field 2070 corresponding to the new coverage zone addition field 2050 is an entry within the frequency list 6020. If frequency w is an entry within the frequency

list 6020, then step 7250 is effected, otherwise step 7240 is effected.

5 In step 7240 the selective call receiver 1 will
program frequency w, stored in RAM 14, into the frequency
list 6020 of codeplug 20. At the completion of step 7240,
step 7250 and 7020 are effected. In step 7250 the
selective call receiver 1 will program the pointer
10 associated with the new SSID in frequency pointer list
6040 to the frequency index 6010 which corresponds to
frequency w. At the completion of step 7250 a new SSID
channel has been programmed into the selective call
receiver 1. In this regard, referring to system 8000,
channel 3, transmitted on frequency 3 with SSID 2 may be
15 considered as frequency w, supporting channel w.

Test step 7060 determines if the System NID Change
Instruction 4000 is received by selective call receiver
1. If the System NID Change Instruction 4000 has been
20 received then a test step 7300 is effected, otherwise
step 7020 is effected to process the received message as
a conventional message. Test step 7300 determines if
any of the frequencies contained in the System NID
Frequency Field 4040 of the System NID Change Instruction
25 4000 are not in the frequency list 6020 of the codeplug.
If any of the frequencies contained in the system NID
frequency field 4040 of the system NID change instruction
4000 are not in the frequency list 6020 step 7310 is
effected, otherwise step 7020 is effected.

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In step 7310 the selective call receiver 1 will
program into the frequency list 6020 all frequencies
contained in the system NID frequency field 4040 which
were not previously contained in the frequency list 6020.
35 After step 7310 step 7020 is effected. Upon the
completion of step 7310 a new NID channel has been
programmed into the selective call receiver 1. In this

regard and referring to system 8000, channel 4, transmitted on frequency 4 with NID 1 may be considered as the new NID channel.

5 Advantageously, the present invention alleviates or overcomes the need for communication systems to maintain information regarding channel information stored in non-volatile memory of individual or specific selective call receiver groups. The present invention alleviates this
10 need because each selective call receiver 1 can selectively add or modify channel information stored in its non-volatile memory.

 Although the invention has been described with
15 reference to a preferred embodiment it is to be understood that the invention is not restricted to the particular embodiment described herein. For example, to enhance reliability the selective call receiver 1 can require that the same exact System SSID Change
20 Instruction 2000 or System NID Change Instruction 4000 be received two or more consecutive times before reprogramming of codeplug 20 is allowed.



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REPLACED

WE CLAIM:

1. A communication device comprising:

5 receiver means for receiving coded messages
transmitted on one or more channels;

processing means, in communication with said
receiver means, for processing one or more of said
10 messages;

channel control means coupled to both said
processing means and said receiver means, said channel
control means being adapted to control said receiver
15 means to thereby control reception of said channels; and

a memory means storing channel information and
coupled to said processing means;

wherein said processing means is adapted to
20 selectively add or modify said channel information stored
in said memory means in response to one or more
instructions that have been received and processed by
said communication device.

25 2. A communication device as claimed in claim 1,
wherein said communication device is a selective call
receiver.

3. A communication device as claimed in any one of
30 claims 1 or 2, wherein said memory means comprises a non-
volatile memory storing said channel information.

4. A communication device as claimed in any one
preceding claim, wherein said communication device is
35 further characterised by said instructions being
contained in one or more messages, and wherein said





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instructions address said device solely by channel
information.

5. A communication device as claimed in any one of
5 claims, wherein said instructions address said device
solely by system identification information.

6. A communication device as claimed in claim 5,
wherein said system identification information includes a
10 network identifier field.

7. A communication device as claimed in claim 5,
wherein said system identification information includes a
simulcast system identifier field.

15 8. A communication device as claimed in any one
preceding claim, wherein said communication device is
adapted to validate said channel information before
adding or modifying said channel information stored in
20 said non-volatile memory.

9. A communication system including:

a plurality of transmitters for transmitting coded
25 messages on one or more channels; and

a plurality of communication devices, each of said
devices comprising:

30 receiver means for receiving said coded messages
transmitted on at least one of said channels;

processing means, in communication with said
receiver means, for processing one or more of said
35 messages;

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channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

5

a memory means storing channel information and coupled to said processing means,

wherein said processing means is adapted to selectively add or modify said channel information stored
10 in said memory means in response to one or more instructions that have been received and processed by said communication device.

10. A communication system as claimed in claim 9,
15 wherein said communication device is a selective call receiver.

11. A communication system as claimed in any one of claims 9 or 10, wherein said memory means comprises a
20 non-volatile memory storing said channel information.

12. A communication system as claimed in any one of claims 9 to 11, wherein said communication device is further characterised by said instructions being
25 contained in one or more messages, and wherein said instructions address said device solely by channel information.

13. A communication system as claimed in any one of
30 claims 9 to 12, wherein said instructions address said device solely by system identification information.

14. A communication system as claimed in claim 13,
wherein said system identification information includes a
35 network identifier field.

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15. A communication system as claimed in claim 14, wherein said system identification information includes a simulcast system identifier field.

5 16. A communication system as claimed in any one of claims 9 to 15, wherein said communication device is adapted to validate said channel information before adding or modifying said channel information stored in said non-volatile memory.

10

17. A method for adding or modifying channel information stored in a communication device, the method comprising the steps of:

15 receiving coded messages transmitted on one or more channels; and

processing said messages for selectively adding or modifying said channel information stored in a memory
20 means of said device, wherein said selectively adding or modifying is in response to one or more instructions that have been received and processed by said communication device.

25 18. A communication device substantially as described herein with reference to and as illustrated by the accompanying drawings.

30 19. A system substantially as described herein with reference to and as illustrated by the accompanying drawings.

35 20. A method substantially as described herein with reference to and as illustrated by the accompanying drawings.

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**MODIFYING CHANNEL INFORMATION OF A PORTABLE
COMMUNICATION DEVICE, SYSTEM AND A METHOD
THEREOF**

5

ABSTRACT

10 A communication device (1) having a receiver (2)
means for receiving coded messages transmitted on one or
more channels. The device (1) has a processor (3) in
communication with the receiver (2), and there is a
frequency synthesizer (4) coupled to the processor (3)
15 and receiver (2). There is a non-volatile memory (20)
storing channel information and coupled to the processor
(3), wherein the processor (3) is adapted to selectively
add or modify the channel information stored in the non-
volatile memory (2) in response to one or more
20 instructions that have been received and processed by the
communication device (1).

25

FIG. 1 to accompany Abstract.

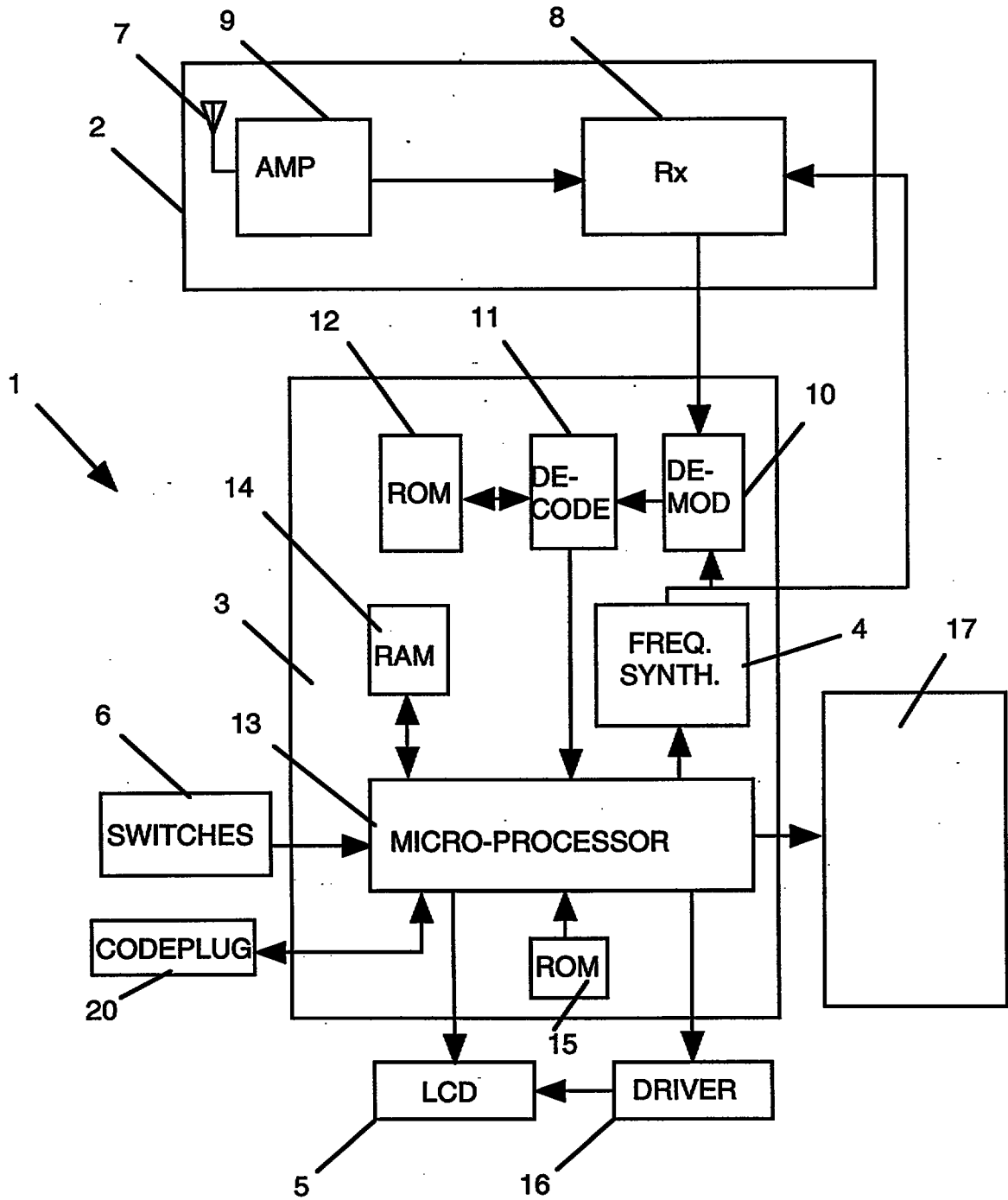


FIG. 1

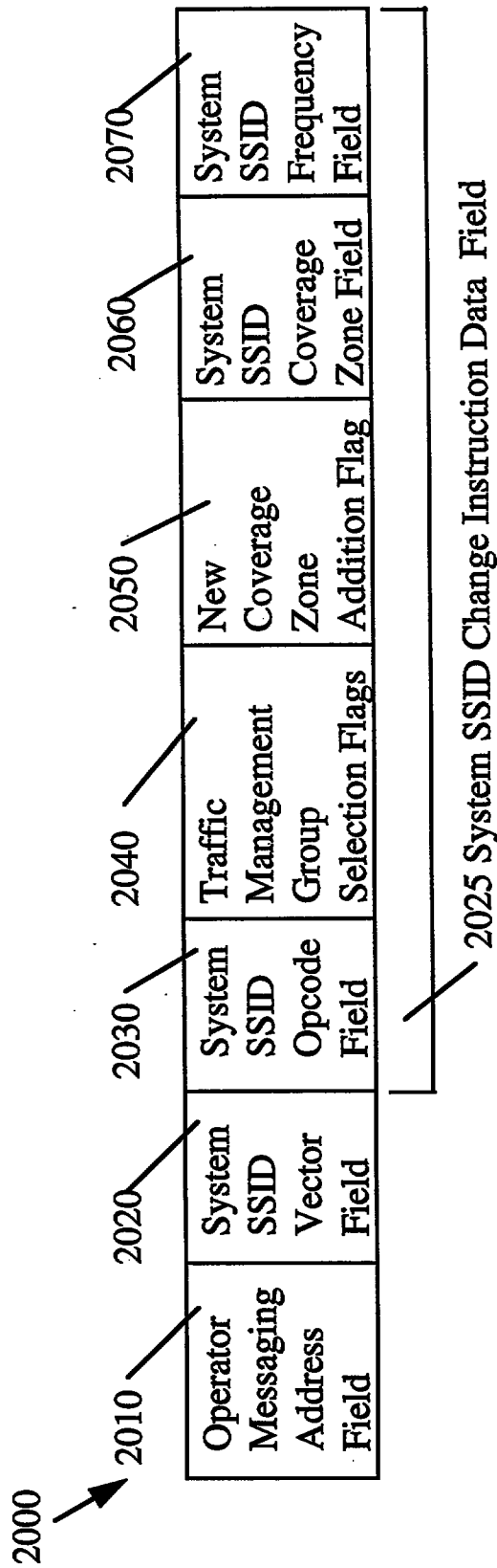


Figure 2

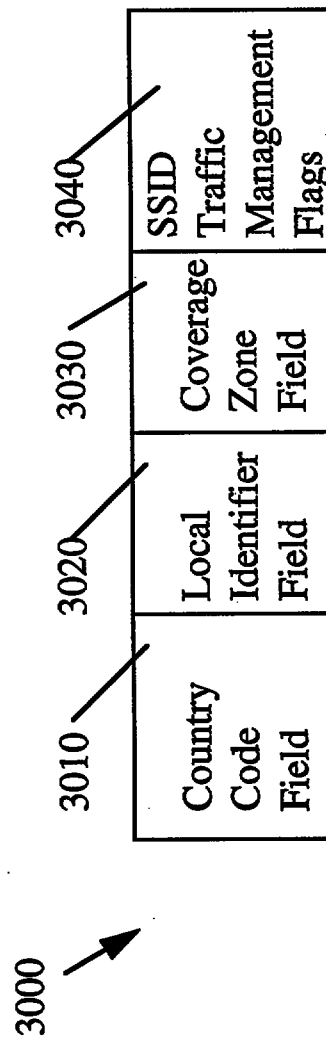


Figure 3

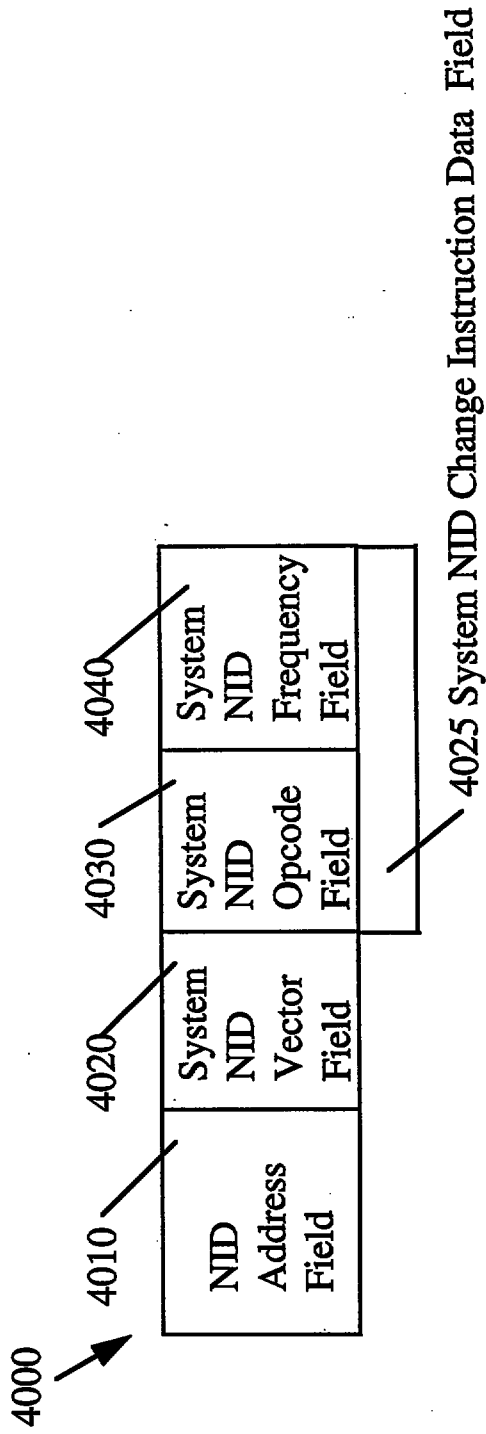


Figure 4

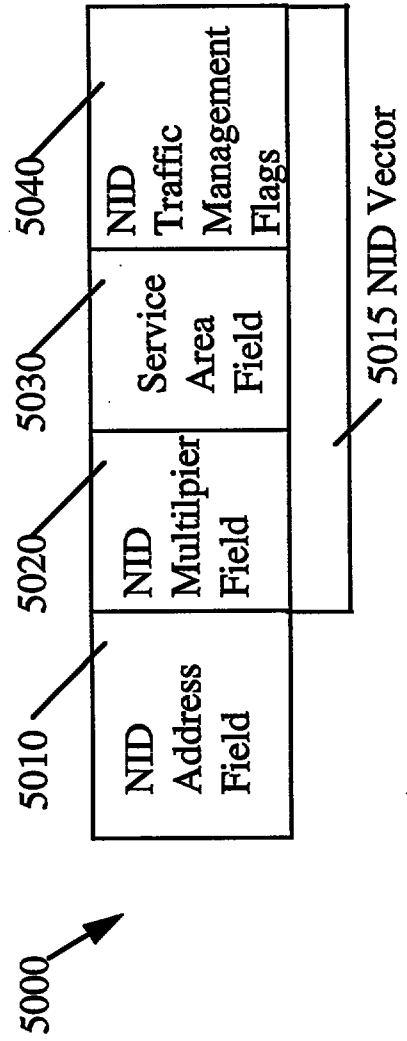


Figure 5

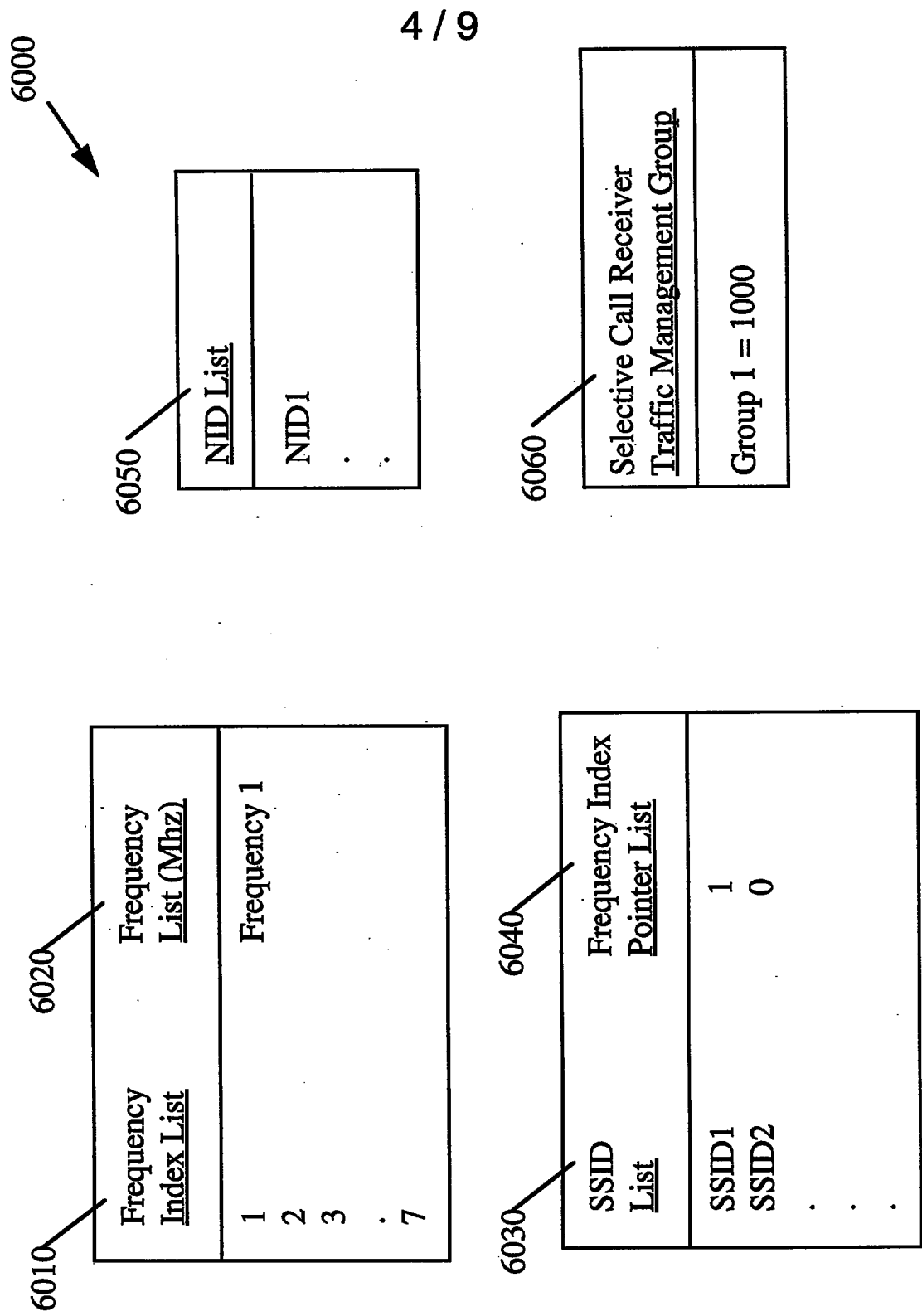


Figure 6

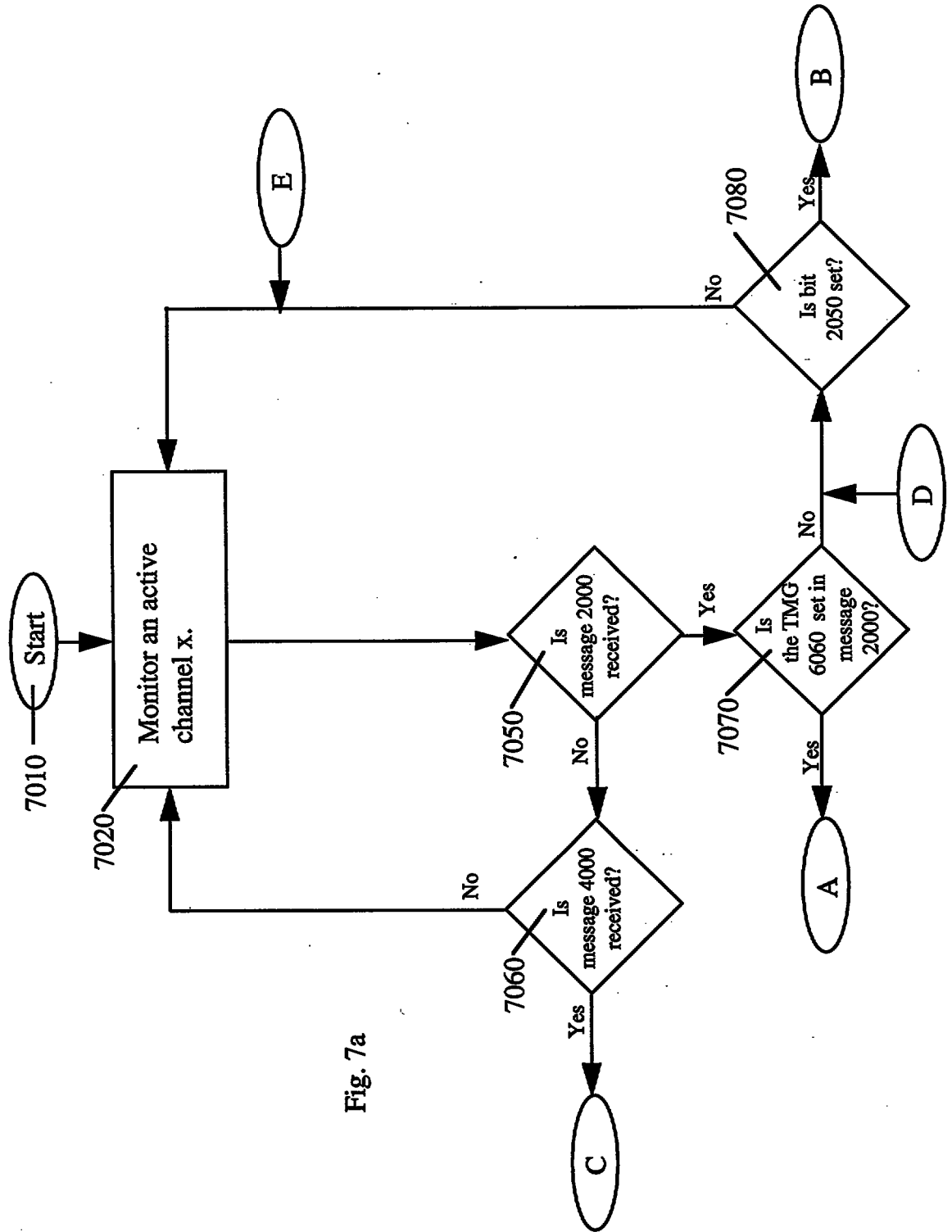
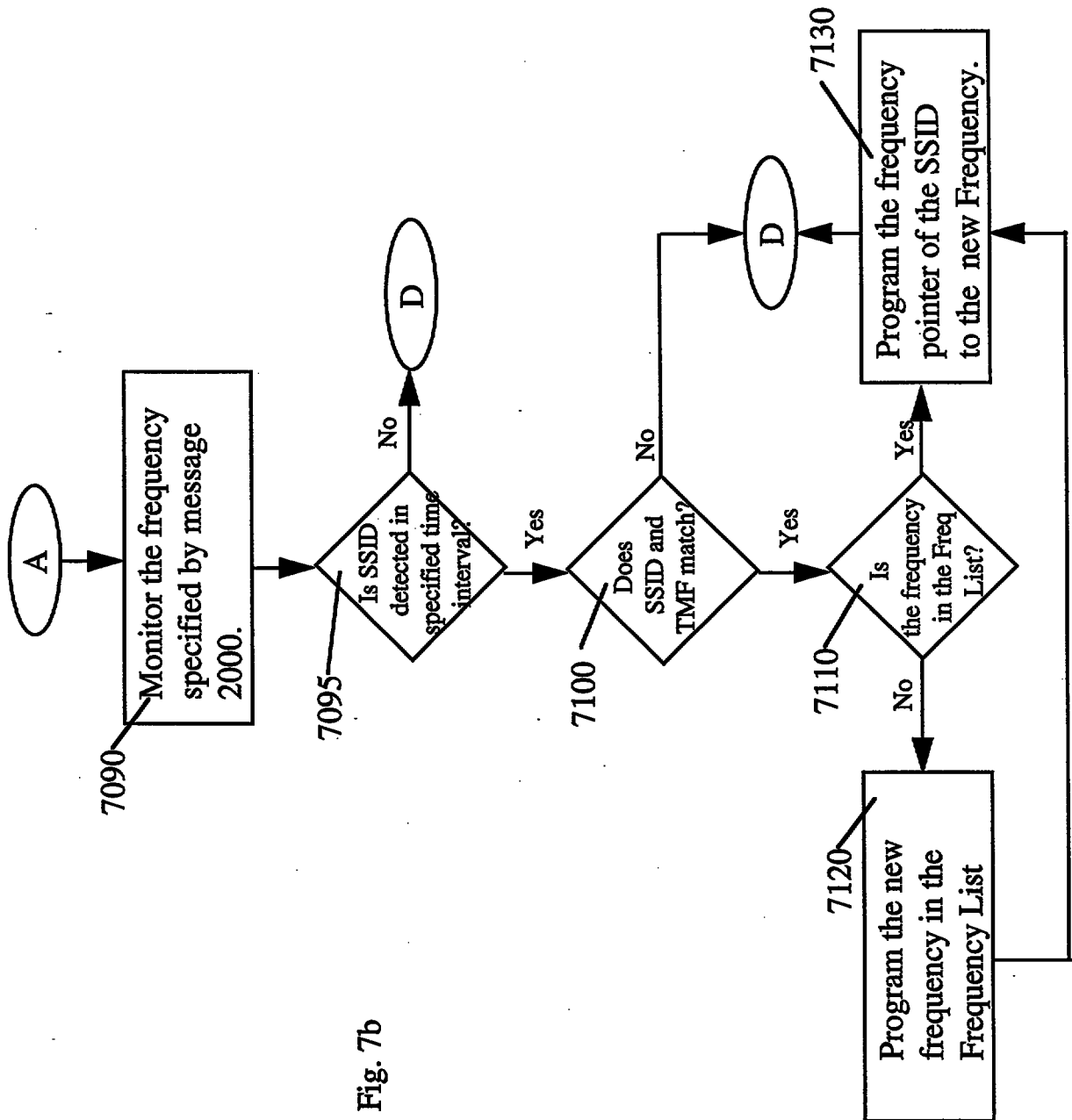
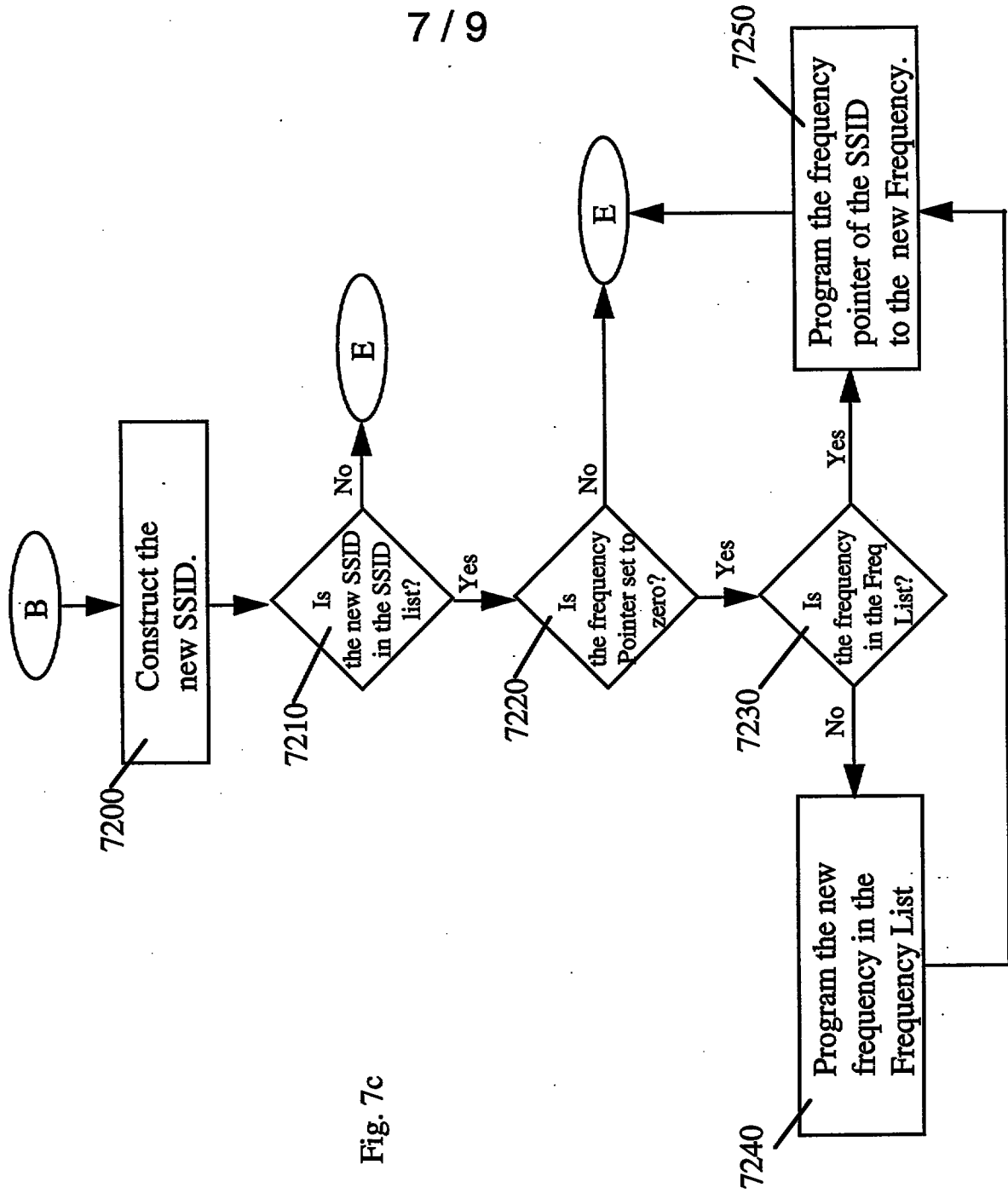


Fig. 7a





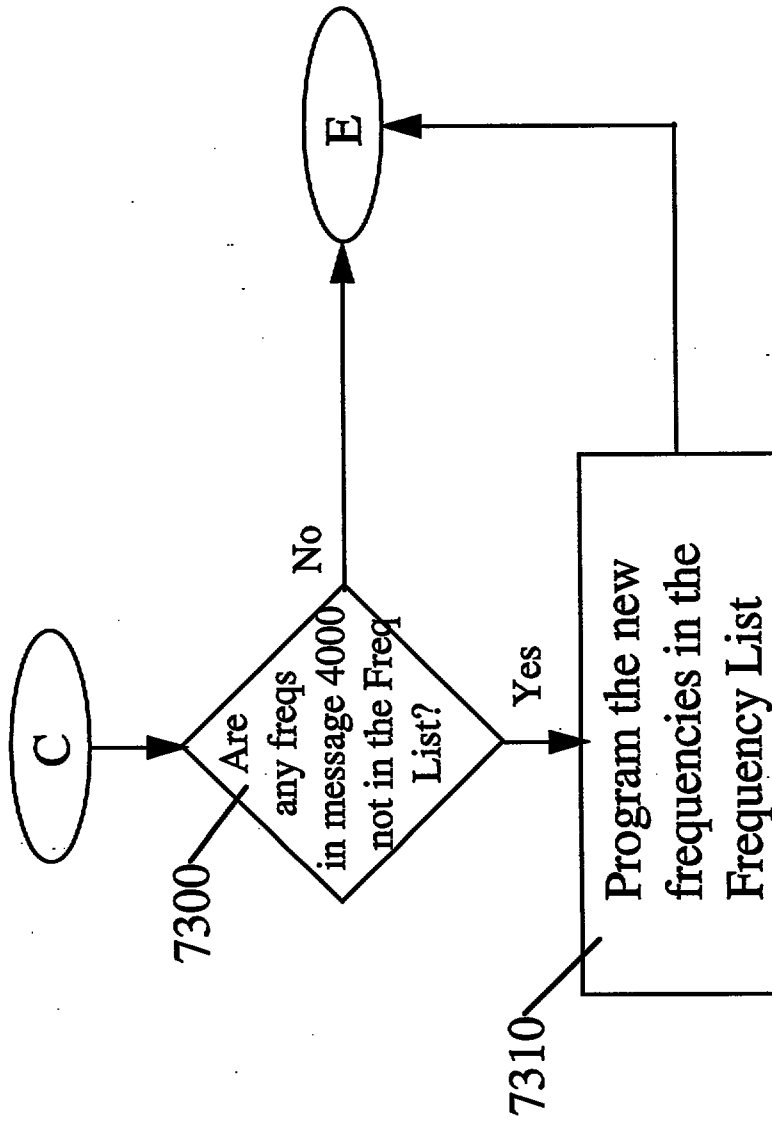


Fig. 7d

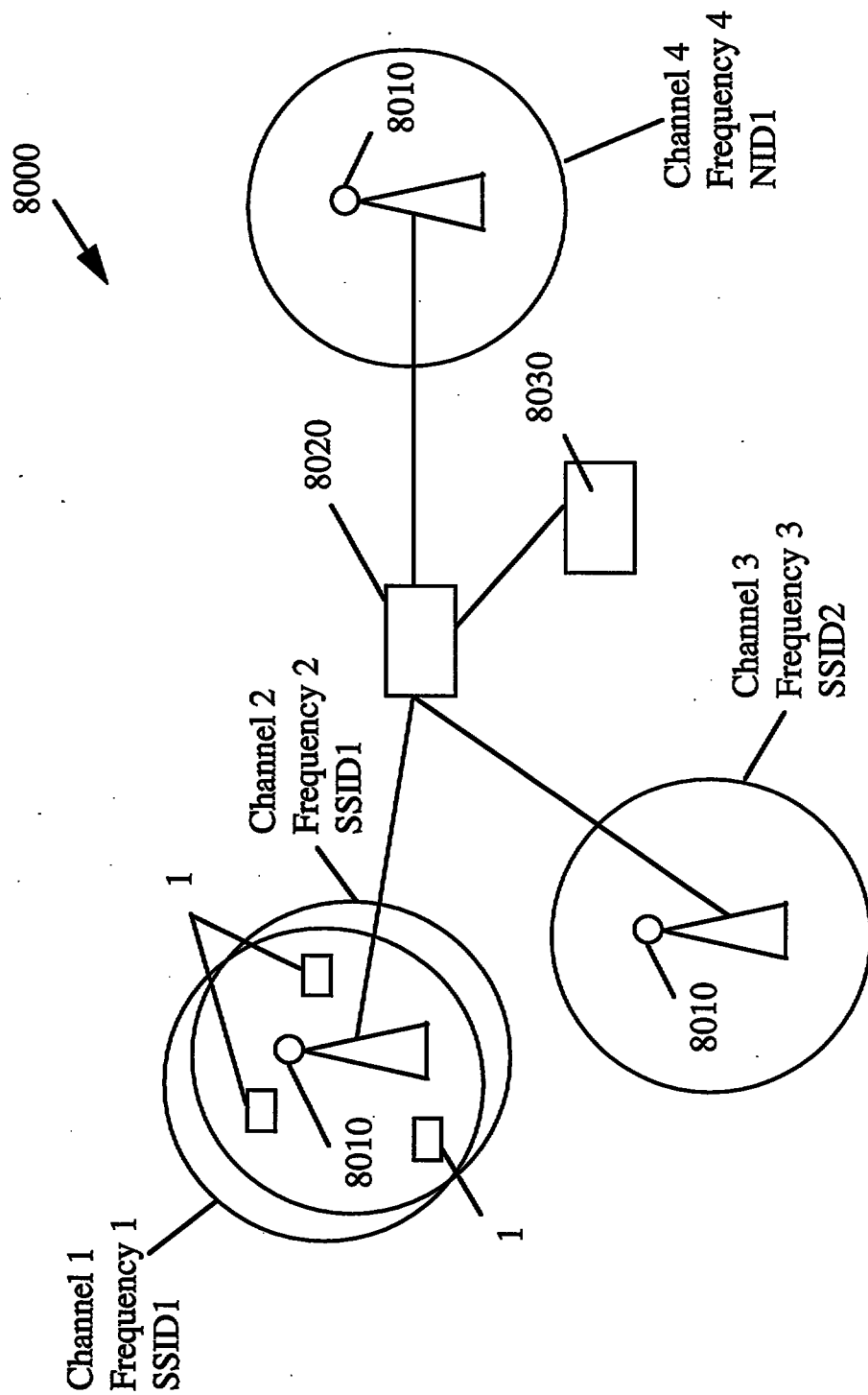


Fig. 8

channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

a memory means storing channel information and coupled to said processing means;

10 wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by said communication device, said

15 instructions being contained in one or more messages, and wherein said instructions address said device solely by channel information.

According to another aspect of this invention

20 there is provided a communication system including:

a plurality of transmitters for transmitting coded messages on one or more channels; and

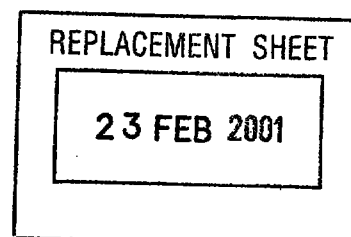
25 a plurality of communication devices, each of said devices comprising:

receiver means for receiving said coded messages transmitted on at least one of said channels;

30 processing means, in communication with said receiver means, for processing one or more of said messages;

35 channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

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a memory means storing channel information and coupled to said processing means,

5 wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by said communication device, said instructions being contained in one or more messages,
10 and wherein said instructions address said device solely by channel information.

Preferably, said communication device may be a selective call receiver.
15

Suitably, said memory means may comprise a non-volatile memory storing said channel information.

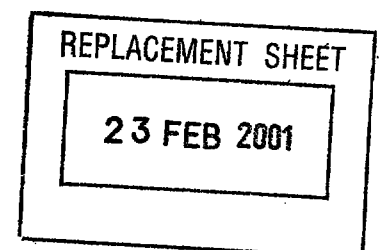
Preferably, said instructions may address said device solely by system identification information.
20

Suitably, said system identification information may include a network identifier field.

25 Preferably, said system identification information may include a simulcast system identifier field.

Suitably, said communication device may be
30 adapted to validate said channel information before adding or modifying said channel information stored in said non-volatile memory.

According to another aspect of this invention,
35 there is provided a method for adding or modifying



channel information stored in a communication device,
the method comprising the steps of:

5 receiving coded messages transmitted on one or
more channels; and

processing said messages for selectively adding
or modifying said channel information stored in a
memory means of said device, wherein said selectively
10 adding or modifying is in response to one or more
instructions that have been received and processed by
said communication device, said instructions being
contained in one or more messages, and wherein said
instructions address said device solely by channel
15 information.

BRIEF DESCRIPTION OF THE DRAWINGS

20 In order that the invention may be readily
understood and put into practical effect, reference
will now be made to a preferred embodiment as
illustrated with reference to the accompanying
drawings in which:

25 FIG. 1 is a block diagram of a communication
device in accordance with an embodiment of an
invention;

30 FIG. 2 illustrates a system SSID change
instruction message used by the communication device
of Fig. 1

35 FIG. 3 illustrates a simulcast system identifier
portion of a message that may be received by the
communication device of FIG. 1;

40 FIG. 4 illustrates a system network identifier
change instruction message used by the communication
device of FIG. 1;

FIG. 5 illustrates a network identifier portion
of a message that may be received by the
communication device of FIG.1;

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WE CLAIM:

1. A communication device comprising:

5 receiver means for receiving coded messages transmitted on one or more channels;

processing means, in communication with said receiver means, for processing one or more of said
10 messages;

channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said
15 receiver means to thereby control reception of said channels; and

a memory means storing channel information and coupled to said processing means;

20 wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by said communication device, said
25 instructions being contained in one or more messages, and wherein said instructions address said device solely by channel information.

2. A communication device as claimed in claim 1,
30 wherein said communication device is a selective call receiver.

3. A communication device as claimed in any one of claims 1 or 2, wherein said memory means comprises a
35 non-volatile memory storing said channel information.

REPLACEMENT SHEET

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4. A communication device as claimed in claim 1, wherein said instructions address said device solely by system identification information.

5 5. A communication device as claimed in claim 4, wherein said system identification information includes a network identifier field.

6. A communication device as claimed in claim 4,
10 wherein said system identification information includes a simulcast system identifier field.

7. A communication device as claimed in any one preceding claim, wherein said communication device is
15 adapted to validate said channel information before adding or modifying said channel information stored in said non-volatile memory.

8. A communication system including:

20 a plurality of transmitters for transmitting coded messages on one or more channels; and

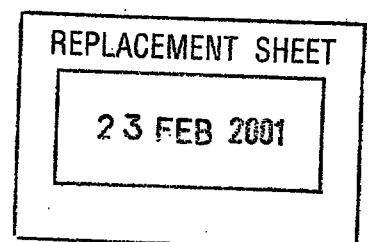
a plurality of communication devices, each of
25 said devices comprising:

receiver means for receiving said coded messages transmitted on at least one of said channels;

30 processing means, in communication with said receiver means, for processing one or more of said messages;

35 channel control means coupled to both said processing means and said receiver means, said channel control means being adapted to control said receiver means to thereby control reception of said channels; and

40





a memory means storing channel information and coupled to said processing means,

5 wherein said processing means is adapted to selectively add or modify said channel information stored in said memory means in response to one or more instructions that have been received and processed by said communication device, said instructions being contained in one or more messages, and wherein said instructions address said device
10 solely by channel information.

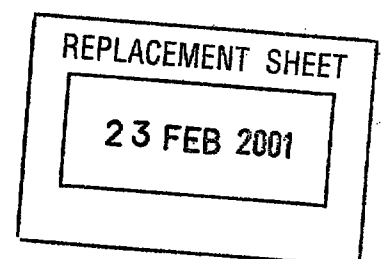
9. A communication system as claimed in claim 8, wherein said communication device is a selective call receiver.
15

10. A communication system as claimed in any one of claims 8 or 9, wherein said memory means comprises a non-volatile memory storing said channel information.

20 11. A communication system as claimed in any one of claims 8 to 10, wherein said instructions address said device solely by system identification information.

25 12. A communication system as claimed in claim 11, wherein said system identification information includes a network identifier field.

30 13. A communication system as claimed in claim 12, wherein said system identification information includes a simulcast system identifier field.





14. A communication system as claimed in any one of
claims 8 to 13, wherein said communication device is
adapted to validate said channel information before
adding or modifying said channel information stored
5 in said non-volatile memory.

15. A method for adding or modifying channel
information stored in a communication device, the
method comprising the steps of:

10 receiving coded messages transmitted on one or
more channels; and

processing said messages for selectively adding
15 or modifying said channel information stored in a
memory means of said device, wherein said selectively
adding or modifying is in response to one or more
instructions that have been received and processed by
said communication device, said instructions being
20 contained in one or more messages, and wherein said
instructions address said device solely by channel
information.

25

