METHO: A METHOD AND APPARATUS FOR GENERATING A QUICKCHANNELINFO BLOCK IN WIRELESS COMMUNICATION SYSTEMS

500

START

Generating a QuickChannelInfo block.

502

Transmitting the QuickChannelInfo block.

END

(54) Title: A METHOD AND APPARATUS FOR GENERATING A QUICKCHANNELINFO BLOCK IN WIRELESS COMMUNICATION SYSTEMS

(57) Abstract: A method and apparatus for transmitting a QuickChannelInfo block is provided, comprising generating a QuickChannelInfo block having a 3 bit QuickChannelInfoValidity field, a FLFirstRestrictedSetSubband field of length 2+log2(5NCARRIER_SIZE/5) 2, a 2 bit FLNumRestrictedSetSubbands field, a 4 bit FLChannelTreeIndex field, a 4 bit FLSectorHopSeed field, a 1 bit FLIntraCellCommonHopping field, a 2 bit FLDPISectorOffset field, a 1 bit FLDPISectorRandam field, a 2 bit FLNumSDMADimensions field, a 1 bit FLNumSubbands field, a 1 bit FLDiversityHoppingMode field, a 3 bit EffectiveNumAntennas field, a 1 bit NumCommonPilotTransmitAntennas field, a 1 bit EnableCommonPilotStaggering field, a 1 bit EnableAuxPilotStaggering field, a 3 bit SSCHNumHports field, a 3 bit SSCHNumBlocks field and a 2 bit SSCHModulationSymbolsPerBlock field and transmitting the block by a Control Channel MAC protocol.

Declarations under Rule 4.17:

— as to applicant’s entitlement to apply for and be granted a patent (Rule 4.17(U))

— as to the applicant’s entitlement to claim the priority of the earlier application (Rule 4.17(Hi))

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
A METHOD AND APPARATUS FOR GENERATING A QUICKCHANNELINFO BLOCK IN WIRELESS COMMUNICATION SYSTEMS

CLAIM OF PRIORITY UNDER 35 U.S.C. §119

[0001] The present Application for Patent claims priority to Provisional Application Ser. No. 60/731,126, entitled "METHOD AND APPARATUS FOR PROVIDING MOBILE BROADBAND WIRELESS LOWER MAC", filed October 27, 2005, assigned to the assignee hereof, and expressly incorporated herein by reference.

BACKGROUND

[0002] The present disclosure relates generally to wireless communication and more particularly to method and apparatus for generating a QuickChannelInfo block overpBCHI channel.

Background

[0003] Wireless communication systems have become a prevalent means by which a majority of people worldwide have come to communicate. Wireless communication devices have become smaller and more powerful in order to meet consumer needs and to improve portability and convenience. The increase in processing power in mobile devices such as cellular telephones has lead to an increase in demands on wireless network transmission systems. Such systems typically are not as easily updated as the cellular devices that communicate there over. As mobile device capabilities expand, it can be difficult to maintain an older wireless network system in a manner that facilitates fully exploiting new and improved wireless device capabilities.

[0004] Wireless communication systems generally utilize different approaches to generate transmission resources in the form of channels. These systems may be code division multiplexing (CDM) systems, frequency division multiplexing (FDM) systems, and time division multiplexing (TDM) systems. One commonly utilized variant of FDM is orthogonal frequency division multiplexing (OFDM) that effectively partitions the overall system bandwidth into multiple orthogonal subcarriers. These subcarriers may also be referred to as tones, bins, and frequency channels. Each subcarrier can be...
modulated with data. With time division based techniques, a each subcarrier can
comprise a portion of sequential time slices or time slots. Each user may be provided
with a one or more time slot and subcarrier combinations for transmitting and receiving
information in a defined burst period or frame. The hopping schemes may generally be a
symbol rate hopping scheme or a block hopping scheme.

[0005] Code division based techniques typically transmit data over a number of
frequencies available at any time in a range. In general, data is digitized and spread
over available bandwidth, wherein multiple users can be overlaid on the channel and
respective users can be assigned a unique sequence code. Users can transmit in the
same wide-band chunk of spectrum, wherein each user's signal is spread over the entire
bandwidth by its respective unique spreading code. This technique can provide for
sharing, wherein one or more users can concurrently transmit and receive. Such sharing
can be achieved through spread spectrum digital modulation, wherein a user's stream of
bits is encoded and spread across a very wide channel in a pseudo-random fashion. The
receiver is designed to recognize the associated unique sequence code and undo the
randomization in order to collect the bits for a particular user in a coherent manner.

[0006] A typical wireless communication network (e.g., employing frequency,
time, and/or code division techniques) includes one or more base stations that provide a
coverage area and one or more mobile (e.g., wireless) terminals that can transmit and
receive data within the coverage area. A typical base station can simultaneously
transmit multiple data streams for broadcast, multicast, and/or unicast services, wherein
a data stream is a stream of data that can be of independent reception interest to a
mobile terminal. A mobile terminal within the coverage area of that base station can be
interested in receiving one, more than one or all the data streams transmitted from the
base station. Likewise, a mobile terminal can transmit data to the base station or
another mobile terminal. In these systems the bandwidth and other system resources are
assigned utilizing a scheduler.

SUMMARY

[0007] The following presents a simplified summary of one or more aspects in
order to provide a basic understanding of such aspects. This summary is not an
extensive overview of all contemplated aspects, and is intended to neither identify key
or critical elements of all aspects nor delineate the scope of any or all aspects. Its sole
purpose is to present some concepts of one or more aspects in a simplified form as a prelude to the more detailed description that is presented later.

[0008] The signals, signal formats, signal exchanges, methods, processes, and techniques disclosed herein provide several advantages over known approaches. These include, for example, reduced signaling overhead, improved system throughput, increased signaling flexibility, reduced information processing, reduced transmission bandwidth, reduced bit processing, increased robustness, improved efficiency, and reduced transmission power.

[0009] According to one embodiment, a method is provided for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+log2(NCARRIER_SIZE/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit
antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH and transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

According to another embodiment, a computer-readable medium is described having a first set of instructions for a first set of instructions for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+log2(NCARRDER_SIZE/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode field indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit
EffectiveNxraiAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH and a second set of instructions for transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

[0011] According to yet another embodiment, an apparatus is described comprising means for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+log2(NCARPJER_SIZE/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLhitraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the
FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH and means for transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

To the accomplishment of the foregoing and related ends, the one or more aspects comprise the features hereinafter fully described and particularly pointed out in the claims. The following description and the annexed drawings set forth in detail certain illustrative aspects of the one or more aspects. These aspects are indicative, however, of but a few of the various ways in which the principles of various aspects may be employed and the described aspects are intended to include all such aspects and their equivalents.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0013] Fig. 1 illustrates aspects of a multiple access wireless communication system.

[0014] Fig. 2 illustrates aspects of a transmitter and receiver in a multiple access wireless communication system.

[0015] Figs. 3A and 3B illustrate aspects of superframe structures for a multiple access wireless communication system.

[0016] Fig. 4 illustrates aspect of a communication between an access terminal and preferred channel;
[0017] Fig. 5A illustrates a flow diagram of a process by an access network; and Fig. 5B illustrates module for generating and transmitting a QuickChannelInfo block.

DETAILED DESCRIPTION

[0018] Various aspects are now described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of one or more aspects. It may be evident, however, that such aspect(s) may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to facilitate describing one or more aspects.

[0019] Referring to Fig. 1, a multiple access wireless communication system according to one aspect is illustrated. A multiple access wireless communication system 100 includes multiple cells, e.g. cells 102, 104, and 106. In the aspect of Fig. 1, each cell 102, 104, and 106 may include an access point 150 that includes multiple sectors. The multiple sectors are formed by groups of antennas each responsible for communication with access terminals in a portion of the cell. In cell 102, antenna groups 112, 114, and 116 each correspond to a different sector; in cell 104, antenna groups 118, 120, and 122 each correspond to a different sector. In cell 106, antenna groups 124, 126, and 128 each correspond to a different sector.

[0020] Each cell includes several access terminals which are in communication with one or more sectors of each access point. For example, access terminals 130 and 132 are in communication base 142, access terminals 134 and 136 are in communication with access point 144, and access terminals 138 and 140 are in communication with access point 146.

[0021] Controller 130 is coupled to each of the cells 102, 104, and 106. Controller 130 may contain one or more connections to multiple networks, e.g. the Internet, other packet based networks, or circuit switched voice networks that provide information to, and from, the access terminals in communication with the cells of the multiple access wireless communication system 100. The controller 130 includes, or is coupled with, a scheduler that schedules transmission from and to access terminals. In other aspects, the scheduler may reside in each individual cell, each sector of a cell, or a combination thereof.
As used herein, an access point may be a fixed station used for communicating with the terminals and may also be referred to as, and include some or all the functionality of, a base station, a Node B, or some other terminology. An access terminal may also be referred to as, and include some or all the functionality of, a user equipment (UE), a wireless communication device, terminal, a mobile station or some other terminology.

It should be noted that while Fig. 1, depicts physical sectors, i.e. having different antenna groups for different sectors, other approaches may be utilized. For example, utilizing multiple fixed "beams" that each cover different areas of the cell in frequency space may be utilized in lieu of, or in combination with physical sectors. Such an approach is depicted and disclosed in co-pending US Patent Application Serial No. 11/260,895, entitled "Adaptive Sectorization in Cellular System."

Referring to Fig.2, a block diagram of an aspect of a transmitter system 210 and a receiver system 250 in a MEVIO system 200 is illustrated. At transmitter system 210, traffic data for a number of data streams is provided from a data source 212 to transmit (TX) data processor 214. In an aspect, each data stream is transmitted over a respective transmit antenna. TX data processor 214 formats, codes, and interleaves the traffic data for each data stream based on a particular coding scheme selected for that data stream to provide coded data.

The coded data for each data stream may be multiplexed with pilot data using OFDM, or other orthogonalization or non-orthogonalization techniques. The pilot data is typically a known data pattern that is processed in a known manner and may be used at the receiver system to estimate the channel response. The multiplexed pilot and coded data for each data stream is then modulated (i.e., symbol mapped) based on one or more particular modulation schemes (e.g., BPSK, QSPK, M-PSK, or M-QAM) selected for that data stream to provide modulation symbols. The data rate, coding, and modulation for each data stream may be determined by instructions performed on provided by processor 230.

The modulation symbols for all data streams are then provided to a TX processor 220, which may further process the modulation symbols (e.g., for OFDM). TX processor 220 then provides $N_T$ modulation symbol streams to $N_T$ transmitters (TMTR) 222a through 222t. Each transmitter 222 receives and processes a respective symbol stream to provide one or more analog signals, and further conditions (e.g., amplifies, filters, and upconverts) the analog signals to provide a modulated signal.
suitable for transmission over the MIMO channel. $N_T$ modulated signals from
transmitters 222a through 222t are then transmitted from $N_A$ antennas 224a through 224t,
respectively.

At receiver system 250, the transmitted modulated signals are received by
$N_R$ antennas 252a through 252r and the received signal from each antenna 252 is
provided to a respective receiver (RCVR) 254. Each receiver 254 conditions (e.g.,
filters, amplifies, and downconverts) a respective received signal, digitizes the
conditioned signal to provide samples, and further processes the samples to provide a
Corresponding "received" symbol stream.

An RX data processor 260 then receives and processes the $N_R$ received
symbol streams from $N_R$ receivers 254 based on a particular receiver processing
technique to provide $N_T$ "detected" symbol streams. The processing by RX data
processor 260 is described in further detail below. Each detected symbol stream
includes symbols that are estimates of the modulation symbols transmitted for the
corresponding data stream. RX data processor 260 then demodulates, deinterleaves, and
decodes each detected symbol stream to recover the traffic data for the data stream. The
processing by RX data processor 218 is complementary to that performed by TX
processor 220 and TX data processor 214 at transmitter system 210.

RX data processor 260 may be limited in the number of subcarriers that it
may simultaneously demodulate, e.g. 512 subcarriers or 5 MHz, and such a receiver
should be scheduled on a single carrier. This limitation may be a function of its FFT
range, e.g. sample rates at which the processor 260 may operate, the memory available
for FFT, or other functions available for demodulation. Further, the greater the number of
subcarriers utilized, the greater the expense of the access terminal.

The channel response estimate generated by RX processor 260 may be used
to perform space, space/time processing at the receiver, adjust power levels, change
modulation rates or schemes, or other actions. RX processor 260 may further estimate
the signal-to-noise-and-interference ratios (SNRs) of the detected symbol streams, and
possibly other channel characteristics, and provides these quantities to a processor 270.
RX data processor 260 or processor 270 may further derive an estimate of the
"operating" SNR for the system. Processor 270 then provides channel state information
(CSI), which may comprise various types of information regarding the communication
link and/or the received data stream. For example, the CSI may comprise only the
operating SNR. In other aspects, the CSI may comprise a channel quality indicator
(CQI), which may be a numerical value indicative of one or more channel conditions. The CSI is then processed by a TX data processor 278, modulated by a modulator 280, conditioned by transmitters 254a through 254r, and transmitted back to transmitter system 210.

At transmitter system 210, the modulated signals from receiver system 250 are received by antennas 224, conditioned by receivers 222, demodulated by a demodulator 240, and processed by a RX data processor 242 to recover the CSI reported by the receiver system. The reported CSI is then provided to processor 230 and used to (1) determine the data rates and coding and modulation schemes to be used for the data streams and (2) generate various controls for TX data processor 214 and TX processor 220. Alternatively, the CSI may be utilized by processor 270 to determine modulation schemes and/or coding rates for transmission, along with other information. This may then be provided to the transmitter which uses this information, which may be quantized, to provide later transmissions to the receiver.

Processors 230 and 270 direct the operation at the transmitter and receiver systems, respectively. Memories 232 and 272 provide storage for program codes and data used by processors 230 and 270, respectively.

At the receiver, various processing techniques may be used to process the $N_R$ received signals to detect the $N_T$ transmitted symbol streams. These receiver processing techniques may be grouped into two primary categories (i) spatial and space-time receiver processing techniques (which are also referred to as equalization techniques); and (ii) "successive nulling/equalization and interference cancellation" receiver processing technique (which is also referred to as "successive interference cancellation" or "successive cancellation" receiver processing technique).

While Fig. 2 discusses a MIMO system, the same system may be applied to a multi-input single-output system where multiple transmit antennas, e.g. those on a base station, transmit one or more symbol streams to a single antenna device, e.g. a mobile station. Also, a single output to single input antenna system may be utilized in the same manner as described with respect to Fig. 2.

The transmission techniques described herein may be implemented by various means. For example, these techniques may be implemented in hardware, firmware, software, or a combination thereof. For a hardware implementation, the processing units at a transmitter may be implemented within one or more application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal
processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, micro-controllers, microprocessors, processors, other electronic units designed to perform the functions described herein, or a combination thereof. The processing units at a receiver may also be implemented within one or more ASICs, DSPs, processors, and so on.

[0036] For a software implementation, the transmission techniques may be implemented with modules (e.g., procedures, functions, and so on) that perform the functions described herein. The software codes may be stored in a memory (e.g., memory 230, 272x or 272y in FIG. 2) and executed by a processor (e.g., processor 232, 270x or 270y). The memory may be implemented within the processor or external to the processor.

[0037] It should be noted that the concept of channels herein refers to information or transmission types that may be transmitted by the access point or access terminal. It does not require or utilize fixed or predetermined blocks of subcarriers, time periods; or other resources dedicated to such transmissions.

[0038] Referring to Figs. 3A and 3B, aspects of superframe structures for a multiple access wireless communication system are illustrated. Fig. 3A illustrates aspects of superframe structures for a frequency division duplexed (FDD) multiple access wireless communication system, while Fig. 3B illustrates aspects of superframe structures for a time division duplexed (TDD) multiple access wireless communication system. The superframe preamble may be transmitted separately for each carrier or may span all of the carriers of the sector.

[0039] In both Figs. 3A and 3B, the forward link transmission is divided into units of superframes. A superframe may consist of a superframe preamble followed by a series of frames. In an FDD system, the reverse link and the forward link transmission may occupy different frequency bandwidths so that transmissions on the links do not, or for the most part do not, overlap on any frequency subcarriers. In a TDD system, N forward link frames and M reverse link frames define the number of sequential forward link and reverse link frames that maybe continuously transmitted prior to allowing transmission of the opposite type of frame. It should be noted that the number of N and M may be vary within a given superframe or between superframes.

[0040] In both FDD and TDD systems each superframe may comprise a superframe preamble. In certain aspects, the superframe preamble includes a pilot channel that includes pilots that may be used for channel estimation by access
terminals, a broadcast channel that includes configuration information that the access
terminal may utilize to demodulate the information contained in the forward link frame. 
Further acquisition information such as timing and other information sufficient for an 
access terminal to communicate on one of the carriers and basic power control or offset 
information may also be included in the superframe preamble. In other cases, only some 
of the above and/or other information may be included in this superframe preamble.

As shown in Figs. 3A and 3B, the superframe preamble is followed by a 
sequence of frames. Each frame may consist of a same or a different number of OFDM 
symbols, which may constitute a number of subcarriers that may simultaneously utilized 
for transmission over some defined period. Further, each frame may operate according 
to a symbol rate hopping mode, where one or more non-contiguous OFDM symbols are 
assigned to a user on a forward link or reverse link, or a block hopping mode, where 
users hop within a block of OFDM symbols. The actual blocks or OFDM symbols may 
or may not hop between frames.

Fig.4 illustrates transmission of a QuickChannelInfo message 410 by an 
access network 404 to an access terminal 402 on a pBCHlchannel 406. Using a 
communication link and based upon predetermined timing, system conditions, or other 
decision criteria, the access terminal 402 will request connection on a channel 406. The 
communication link may be implemented using communication protocols/standards 
such as World Interoperability for Microwave Access (WiMAX), infrared protocols 
such as Infrared Data Association (IrDA), short-range wireless protocols/technologies, 
Bluetooth® technology, ZigBee® protocol, ultra wide band (UWB) protocol, home 
radio frequency (HomeRF), shared wireless access protocol (SWAP), wideband 
technology such as a wireless Ethernet compatibility alliance (WECA), wireless fidelity 
alliance (Wi-Fi Alliance), 802.11 network technology, public switched telephone 
network technology, public heterogeneous communications network technology such as 
the Internet, private wireless communications network, land mobile radio network, code 
division multiple access (CDMA), wideband code division multiple access (WCDMA), 
universal mobile telecommunications system (UMTS), advanced mobile phone service 
(AMPS), time division multiple access (TDMA), frequency division multiple access 
(FDMA), orthogonal frequency division multiple (OFDM), orthogonal frequency 
division multiple access (OFDMA), orthogonal frequency division multiple FLASH 
(OFDM-FLASH), global system for mobile communications (GSM), single carrier (IX) 
radio transmission technology (RTT), evolution data only (EV-DO) technology, general
packet radio service (GPRS), enhanced data GSM environment (EDGE), high speed
downlink data packet access (HSPDA), analog and digital satellite systems, and any
other technologies/protocols that may be used in at least one of a wireless
communications network and a data communications network.

The access network 404 is configured to generate a QuickChannelInfo
block and transmit it to access terminal 402. The QuickChannelInfo block is a part of F-
pBCHI that carries information about the sectors to be received by access terminals. The
QuickChannelInfo block comprises a 3 bit QuickChannelInfo Validity field, a
FLFirstRestrictedSetSubband field, a 2 bit FLNumRestrictedSetSubbands field, a 4 bit
FLChannelTreeIndex field, a 4 bit FLSectorHopSpeed field, a 1 bit
FLIntraCellCommonHopping field, a 2 bit DPISectorOffset field, a 1 bit
DPISectorSramble field, a 2 bit FLNumSDMDimensions field, a 1 bit FLNumSubbands
field, a 1 bit FLDiversityHoppingMode field, a 1 bit NumPilots field, a 3 bit
EffectiveNumAntennas field, a 1 bit NumCommonPilotTransmitAntennas field, a 1 bit
EnableCommonPilotStaggering field, a 1 bit EnableAuxPilotStaggering field, a 3 bit
SSCHNumHoppports field, a 3 bit SSCHNumBlocks field and a 2 bit
SSCHModulationSymbolsPerBlock field. The generated QuickChannelInfo block is
then transmitted over the pBCHI Channel 406 by the access network 404 to the access
terminal 402.

Fig.5A illustrates a flow diagram of a process 500, according to an
embodiment. At 502, a QuickChannelInfo block is generated comprising a 3 bit
QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a
value to determine the superframes in which all the fields in a QuickChannelInfo block
except the QuickChannelInfoValidity field will remain unchanged, a
FLFirstRestrictedSetSubband field of length 2+log2(NCARRIER_SIZE/512) wherein
the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on
the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the
FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the
forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field
is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the
FLSectorHopSeed field indicates a hopping pattern, a 1 bit
FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field
indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the
FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH
section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH. At 504, the QuickChannellnfo block is transmitted by a Control Channel MAC protocol.

Fig. 5B illustrates processor 550 configured to generate and transmit a QuickChannellnfo block over a pBCH  Channel. The processor referred to may be electronic devices and may comprise one or more processors configured to generate and transmit the QuickChannellnfo block over the pBCH  Channel. Processor 552 is configured to generate a QuickChannellnfo block comprising a 3 bit QuickChannellnfoValidity field wherein the QuickChannellnfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannellnfo block except the QuickChannellnfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+log2(NCARRIER_SIZE/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the
forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumBlocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH. Processor 554 is configured to transmit the QuickChannelInfo block by a Control Channel MAC protocol. The functionality of the discrete processors 552 to 554 depicted in the figure may be combined into a single processor 556. A memory 558 is also coupled to the processor 556.

[0046] In an embodiment, an apparatus comprising means for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in
which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity
field will remain unchanged, a FLFirstRestrictedSetSubband field of length
2+log₂(NCARRIER_SIZE/512) wherein the FLFirstRestrictedSetSubband field
indicates the index of first restricted subband on the forward link, a 2 bit
FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field
indicates the number of restricted subbands on the forward link, a 4 bit
FLChannelTrellIndex field wherein the FLChannelTrellIndex field is used by a Lower
MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field
indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the
FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit
FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset
of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein
the FLDPISectorScramble field indicates a value to determine scrambling of pilots as
defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit
FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates
a value to determine number of spatial dimensions on the forward link, a 1 bit
FLNumSubbands field wherein the FLNumSubbands field indicates the number of
subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the
FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field
wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit
EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the
effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein
the NumCommonPilotTransmitAntennas indicates number or common pilot transmit
antennas, a 1 bit EnableCommonPilotStaggering field wherein the
EnableCommonPilotStaggering field indicates the status of common pilot staggering, a
1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field
indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field
wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-
SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the
number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock
field wherein the SSCHModulationSymbolsPerBlock field indicates the number of
modulation symbols for each block carried by the F-SSCH and means for transmitting
the QuickChannelInfo block by a Control Channel MAC protocol. The means described
herein may comprise one or more processors.
Furthermore, embodiments may be implemented by hardware, software, firmware, middleware, microcode, or any combination thereof. When implemented in software, firmware, middleware or microcode, the program code or code segments to perform the necessary tasks may be stored in a machine readable medium such as a separate storage(s) not shown. A processor may perform the necessary tasks. A code segment may represent a procedure, a function, a subprogram, a program, a routine, a subroutine, a module, a software package, a class, or any combination of instructions, data structures, or program statements. A code segment may be coupled to another code segment or a hardware circuit by passing and/or receiving information, data, arguments, parameters, or memory contents. Information, arguments, parameters, data, etc. may be passed, forwarded, or transmitted via any suitable means including memory sharing, message passing, token passing, network transmission, etc.

Various modifications to these aspects will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other aspects. Thus, the description is not intended to be limited to the aspects shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.
CLAIMS

We claim:

1. A method of transmitting a QuickChannellnfo block in a wireless communication system, characterized in that:
   - generating a QuickChannellnfo block comprising a 3 bit QuickChannellnfoValidity field wherein the QuickChannellnfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannellnfo block except the QuickChannellnfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length $2 + \log_2( NCARRIER_SIZE/512 )$ wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorScramble field wherein the FLDPISectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode field indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a
1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCH NumHopports field wherein the SSCH NumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCH NumBlocks field wherein the SSCH Numblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCH Modulation Symbols Per Block field wherein the SSCH Modulation Symbols Per Block field indicates the number of modulation symbols for each block carried by the F-SSCH; and transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

2. A method as claimed in claim 1, characterized in that determining the number of superframes in the QuickChannelInfo Validity field, for which the fields of the QuickChannelInfo block, would remain unchanged by using a function of value of QuickChannelInfo Validity field and current superframe number.

3. A method as claimed in claim 1, characterized in that determining the number of restricted subbands by using a function of FL First Restricted Set Subbands and FL Num Restricted Set Subbands values.

4. A method as claimed in claim 1, characterized in that setting the value of the FL Num Subbands field to $N_{CA \text{RR, } \text{ER, } \text{SZ}}E/128$ if number of current superframe($n$) is 0 and to $N_{\text{CARRIE} \text{RR, } \text{ER, } \text{SZ}}/256$ if $n=1$.

5. A method as claimed in claim 1, characterized in that setting the value of the FL Diversity Hopping Mode field to 'T' if the Diversity Hopping Mode is On and to '0' if Diversity Hopping Mode is Off.

6. A method as claimed in claim 1, characterized in that determining the number of pilots as $N_{CA \text{RR, } \text{ER, } \text{SZ}}E/16$ if the Num Pilots field is set to '0' or $N_{\text{CARRIE} \text{RR, } \text{ER, } \text{SZ}}/8$ if the field is set to 'V'.

7. A method as claimed in claim 1, characterized in that setting the value of the Effective Num Antennas field to four or below when a Block Hopping Enabled field of a System Mb block is set to '0'.
8. A method as claimed in claim 1, characterized in that setting the value of EffectiveCommonPilotStaggering field to ‘1’ if common pilot staggering is enabled or setting the value to ‘0’ if common pilot staggering is disabled.

9. A method as claimed in claim 1, characterized in that setting the value of the EnableAuxPilotStaggering field to ‘1’ if auxiliary pilot staggering is enabled or setting the value to ‘0’ if auxiliary pilot staggering is disabled.

10. A method as claimed in claim 1, characterized in that interpreting the number of hopports allocated to F-SSCH as 48 if MultiCarrierOn and 48 x N_CARRER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '000', interpreting the number as 64 if MultiCarrierOn and 64 x N_CARRIER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '001', interpreting the number as 80 if MultiCarrierOn and 80 x N_CARRIER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '010' interpreting the number as 96 if MultiCarrierOn and 96 x N_CARRER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '011', interpreting the number as 128 if MultiCarrierOn and 128 x N_CARRIER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '100', interpreting the number as 160 if MultiCarrierOn and 160 x N_CARRIER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '101', interpreting the number as 208 if MultiCarrierOn and 208 x N_CARRER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '110' and interpreting the number as 256 if MultiCarrierOn and 256 x N_CARRER_SIZE /512 if MultiCarrierOff when value of the SSCHNumHopports field is '111'.

11. A method as claimed in claim 1, characterized in that interpreting the number of modulation symbols for each block carried by F-SSCH as 45 if the value of the SSCHModulationSymbolsPerBlock field is '00', interpreting the number of modulation symbols as 60 if the value of the SSCHModulationSymbolsPerBlock field is '01', interpreting the number of modulation symbols as 90 if the value of the SSCHModulationSymbolsPerBlock field is '10' and interpreting the number of modulation symbols as 180 if the value of the SSCHModulationSymbolsPerBlock field is '11'.
12. A computer-readable medium including instructions stored thereon, characterized in that:

a first set of instructions for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+\log_2(\text{NCARRIER\_SIZE}/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreeIndex field wherein the FLChannelTreeIndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPISectorOffset field wherein the FLDPISectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPISectorSramble field wherein the FLDPISectorSramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the
number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH; and

a second set of instructions for transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

13. An apparatus operable in a wireless communication system, characterized in that:

means for generating a QuickChannelInfo block comprising a 3 bit QuickChannelInfoValidity field wherein the QuickChannelInfoValidity field indicates a value to determine the superframes in which all the fields in a QuickChannelInfo block except the QuickChannelInfoValidity field will remain unchanged, a FLFirstRestrictedSetSubband field of length 2+log2(NCARRIER_SIZE/512) wherein the FLFirstRestrictedSetSubband field indicates the index of first restricted subband on the forward link, a 2 bit FLNumRestrictedSetSubbands field wherein the FLNumRestrictedSetSubbands field indicates the number of restricted subbands on the forward link, a 4 bit FLChannelTreelndex field wherein the FLChannelTreelndex field is used by a Lower MAC Sublayer, a 4 bit FLSectorHopSeed field wherein the FLSectorHopSeed field indicates a hopping pattern, a 1 bit FLIntraCellCommonHopping field wherein the FLIntraCellCommonHopping field indicates a hopping pattern, a 2 bit FLDPSectorOffset field wherein the FLDPSectorOffset field indicates relative offset of pilots as defined in a F-DPICH section, a 1 bit FLDPSectorScramble field wherein the FLDPSectorScramble field indicates a value to determine scrambling of pilots as defined in sector and cell specific scrambling sections in the Physical layer, a 2 bit FLNumSDMADimensions field wherein the FLNumSDMADimensions field indicates a value to determine number of spatial dimensions on the forward link, a 1 bit FLNumSubbands field wherein the FLNumSubbands field indicates the number of subbands on the forward link, a 1 bit FLDiversityHoppingMode field wherein the FLDiversityHoppingMode field indicates a hop pattern for a sector, a 1 bit NumPilots field wherein the NumPilots field indicates nominal number of pilots in F-CPICH, a 3 bit EffectiveNumAntennas field wherein the EffectiveNumAntennas field indicates the effective number of antennas, a 1 bit NumCommonPilotTransmitAntennas field wherein the NumCommonPilotTransmitAntennas indicates number or common pilot transmit
antennas, a 1 bit EnableCommonPilotStaggering field wherein the EnableCommonPilotStaggering field indicates the status of common pilot staggering, a 1 bit EnableAuxPilotStaggering field wherein the EnableAuxPilotStaggering field indicates the status of auxiliary pilot staggering, a 3 bit SSCHNumHopports field wherein the SSCHNumHopports field indicates the number of hop-ports allocated to F-SSCH, a 3 bit SSCHNumBlocks field wherein the SSCHNumblocks field indicates the number of blocks carried by F-SSCH and a 2 bit SSCHModulationSymbolsPerBlock field wherein the SSCHModulationSymbolsPerBlock field indicates the number of modulation symbols for each block carried by the F-SSCH;

means for transmitting the QuickChannelInfo block by a Control Channel MAC protocol.

14. The apparatus as claimed in claim 13, further comprising means for determining the number of superframes in the QuickChannelInfoValidity field, for which the fields of the QuickChannelInfo block would remain unchanged by using a function of value of QuickChannelInfoValidity field and current superframe number.

15. The apparatus as claimed in claim 13, characterized in that having means for determining the number of restricted subbands by using a function of FLFirstRestrictedSetSubbands and FLNumRestrictedSetSubbands values.

16. The apparatus as claimed in claim 13, characterized in that having means for setting the value of the FLNumSubbands field to $N_{\text{CARRIER-SIZE}}/128$ if number of current superframe(n) is 0 and to $N_{\text{CARRIER-SIZE}}/256$ if $n=\backslash$

17. The apparatus as claimed in claim 13, characterized in that having means for setting the value of the FLDiversityHoppingMode field to '1' if the DiversityHoppingMode is On and to '0' if DiversityHoppingMode is Off.

18. The apparatus as claimed in claim 13, characterized in that having means for determining the number of pilots as $N_{\text{CARRIER-SIZE}}/16$ if the NumPilots field is set to '0' or $N_{\text{CARRIER-SIZE}}/8$ if the field is set to '1'.
19. The apparatus as claimed in claim 13, characterized in that having means for setting the value of the EffectiveNumAntennas field to four or below when a BlockHoppingEnabled field of a SystemInfo block is set to '0'.

20. The apparatus as claimed in claim 13, characterized in that having means for setting the value of EffectiveCommonPilotStaggering field to '1' if common pilot staggering is enabled or setting the value to '0' if common pilot staggering is disabled.

21. The apparatus as claimed in claim 13, characterized in that having means for setting the value of the EnableAuxPilotStaggering field to 'F' if auxiliary pilot staggering is enabled or setting the value to '0' if auxiliary pilot staggering is disabled.

22. The apparatus as claimed in claim 13, characterized in that having means for interpreting the number of hopports allocated to F-SSCH as 48 if MultiCarrierOn and 48 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '000', interpreting the number as 64 if MultiCarrierOn and 64 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '001', interpreting the number as 80 if MultiCarrierOn and 80 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '010', interpreting the number as 96 if MultiCarrierOn and 96 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '011', interpreting the number as 128 if MultiCarrierOn and 128 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '100', interpreting the number as 160 if MultiCarrierOn and 160 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '101', interpreting the number as 208 if MultiCarrierOn and 208 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '110' and interpreting the number as 256 if MultiCarrierOn and 256 x N_{CARRIER-SIZE}/512 if MultiCarrierOff when value of the SSCHNumHopports field is '111'.

23. The apparatus as claimed in claim 13, characterized in that having means for interpreting the number of modulation symbols for each block carried by F-SSCH as 45 if the value of the SSCHModulationSymbolsPerBlock field is 'OO', interpreting the number of modulation symbols as 60 if the value of the SSCHModulationSymbolsPerBlock field is '01', interpreting the number of modulation
symbols as 90 if the value of the SSCHModulationSymbolsPerBlock field is '10' and interpreting the number of modulation symbols as 180 if the value of the SSCHModulationSymbolsPerBlock field is '11'.
START

Generating a QuickChannelInfo block.

Transmitting the QuickChannelInfo block.

END

FIG. 5A
FIG. 5B

Processor configured to generate a QuickChannelInfo block.

Processor configured to transmit the QuickChannelInfo block.

Memory coupled to the processor.