A METHOD AND APPARATUS FOR BOOTSTRAPING INFORMATION IN A COMMUNICATION SYSTEM

REFERENCE TO CO-PENDING APPLICATIONS FOR PATENT

[0001] The present Application for Patent is related to the following co-pending U.S. patent Applications:

[0002] Attorney Docket No. 060081, entitled, "MOBILE WIRELESS ACCESS SYSTEM", filed concurrently herewith, assigned to the assignee hereof and expressly incorporated by reference herein.

FIELD OF INVENTION

[0003] The present description relates generally to a bootstrap technique, more particularly, bootstrapping information/parameters on a forward link in manner that allows an access terminal to determine the structure of the forward communication link and reverse communication link in a communication system.

BACKGROUND

[0004] Wireless communication systems are widely deployed to provide various types of communication content such as voice, data, and so on. These systems may be multiple-access systems capable of supporting communication with multiple users by sharing the available system resources (e.g., bandwidth and transmit power). Examples of such multiple-access systems include code division multiple access (CDMA) systems, time division multiple access (TDMA) systems, frequency division multiple access (FDMA) systems, and orthogonal frequency division multiple access (OFDMA) systems.

[0005] Generally, a wireless multiple-access communication system can simultaneously support communication for multiple wireless access terminals (ATs). Each AT communicates with one or more base stations via transmissions on the forward and reverse links. The forward link (or downlink) refers to the communication link from the base stations to the ATs, and the reverse link (or uplink) refers to the communication link from the ATs to the base stations.

[0006] There are many possible configuration of the forward link (FL) and reverse link (RL) structure. In order for an AT to start utilizing the full capabilities of a system, the AT must have some knowledge of how the FL and RL are configured. In an OFDMA system, there are many possible configurations of the FL and RL structure. Such as number of guard carries, sub-carriers, number of pilots, etc. Without the FL/RL structure information/parameters, the AT either coming into a new sector or waking up on new sector will not be able receive any information on the FL/RL physical channels. One possible way to solve the problem would be to provide a set of known configurations to the AT and have the AT maintain these configurations in memory. However, the total amount of configuration parameters needed could require a large amount of storage on the AT device. However, even if the AT had the capability to store the required configuration parameters, there would be significant issues when the operator desired to change/modify the configuration throughout all or part of their network. For any new base station or any base station with an new configuration The AT would have to search exhaustively through all the configuration possibilities in order to set up a communication link. Alternatively, the owner of the AT could download the new configuration from another information network or physically go to the operator of system to get the updated the configurations. Therefore there is need for a convenient method of providing FL and RL structure to the AT without requiring time-consuming exhaustive search by the AT. Further, such a solution should enable the network operator to make configuration changes in the network as needed without compromising performance of the AT or placing undue burden on the owner of the AT.

BRIEF SUMMARY

[0007] In an aspect, an apparatus comprises plurality of electronic devices, each having a logic, wherein the apparatus is configured for receiving a preamble comprising at least one physical frame structure parameter; and determining a FL physical frame structure by using said received physical frame structure parameter.

[0008] In an aspect, an apparatus comprises plurality of electronic devices, each having a logic, wherein the apparatus is configured for receiving a FL physical frame comprising at least one RL physical frame structure parameter; and determining a RL physical frame structure by using said RL physical frame structure parameter.

[0009] A more complete appreciation of all the advantages and scope of the aspects can be obtained from the accompanying drawings, the description and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The features, nature, and advantages of the present disclosure will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify correspondingly throughout and wherein:

[0011] Fig. 1 illustrates a multiple access wireless communication system according to one aspect;

[0012] FIG. 2 a block diagram of a communication system;

[0013] FIG. 3 illustrates a superframe preamble structure; and

[0014] FIG. 4A illustrates a process executed by the access point;

[0015] FIG. 4B illustrates a process executed by the access point; and

[0016] FIG. 5 illustrates a process executed by access terminal.

DETAILED DESCRIPTION

[0017] Referring to Fig. 1, a multiple access wireless communication system according to one aspect is illustrated. A access point 100 (AP) includes multiple antenna groups, one including 104 and 106, another including 108 and 110, and an additional including 112 and 114. In Fig. 1, only two antennas are shown for each antenna group, however, more or fewer antennas may be utilized for each antenna group. In some aspects, an access point 100 comprises a traffic radio unit, one or more high power amplifiers, a central processor, one or more transmitter, one or more transmitter, one or more microwave antennas, fiber optic multiplexers, and Internet protocol switch for networking, one more memory modules and one more combiners.

[0018] Access terminal 116 (AT) is in communication with antennas 112 and 114, where antennas 112 and 114 transmit information to access terminal 116 over forward link 120 and receive information from access terminal 116 over reverse link 118. Access terminal 122 is in communication with antennas 106 and 108, where antennas 106 and 108 transmit information to access terminal 122 over forward link 126 and receive information from access terminal 122 over reverse link 124.

[0019] Each group of antennas and/or the area in which they are designed to communicate is often referred to as a sector of the access point. In an aspect, antenna groups each are designed to communicate to access terminals in a sector, of the areas covered by access point 100.

[0020] A access point may be a fixed station used for communicating with the terminals and may also be referred to as base station, a Node B, or some other terminology. A access terminal may also be called mobile station, a user equipment (UE), a wireless communication device, terminal, access terminal or some other terminology.

[0021] FIG. 2 is a block diagram of an aspect of a transmitter system 210 (also known as the access point) and a receiver system 250 (also known as access terminal) in a communication system 200. At the transmitter system 210, traffic data for a number of data streams is provided from a data source 212 to a transmit (TX) data processor 214.

[0022] 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.

[0023] The coded data for each data stream may be multiplexed with pilot data using OFDM 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 a particular modulation scheme (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 by processor 230.

[0024] The modulation symbols for all data streams are then provided to Transmitter (TMTR) 222. 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 a channel. The modulated signals from transmitters are then transmitted from antenna 224.

[0025] At receiver system 250, the transmitted modulated signals are received by antenna 252 and the received signal from each antenna 252 is provided to a receiver (RCVR) 254. The 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.

[0026] An RX data processor 260 then receives and processes the received symbol streams from receiver 254 based on a particular receiver processing technique to provide the "detected" symbol streams. The 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 260 is complementary to that performed by TX Data processor 214 at transmitter system 210.

[0027] Upon entering a new sector or during a wake up sequence, the processor 270 determines FL structure and RL structure by executing process 300, described below. The reverse link message is then processed by a TX data processor 238, which also receives traffic data for a number of data streams from a data source 236, modulated by a modulator 280, conditioned by transmitter 254, and transmitted back to transmitter system 210.

[0028] 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 extract the reserve link message transmitted by the receiver system 250.

[0029] In an aspect, a forward link and a reverse link are used to communicate between the AP and AT. The forward link comprises a preamble and a plurality of FL Physical frames. The reverse link comprises a plurality of RL Physical frames. In an aspect, the structure of RL and FL Physical Frame is variable and thus can be modified by the system operator to optimize the performance of the system. Without the knowledge of the FL/RL structure, the AT will not be able receive any information on the FL Physical Frames nor transmit any information the RL Physical Frames. The structure of the preamble is not variable and known to both AP and AT that operated in system according to the aspect. Typically, the preamble comprises information regarding broadcast channels, overhead messages, TDM pilot information, etc. The AT is required to know FL/RL structure at awake up time, when entering a new sector, or when currently serving sector indicates a different FL/RL structure to use. A bootstrap

mechanism according to an aspect is employed whereby the AP will provide information in the preamble (a non-variable or fix structure portion of FL) that will allow the AT to determine the FL/RL Physical structure (variable structure portion). Alternatively, the AT can provide information about the FL structure in the preamble and RL structure parameters in the FL Physical frame. Once the AT determines the FL physical frame structure and decodes the FL physical frame, the AT can extract the RL physical frame structure from FL physical frame.

[0030] The forward link transmission is divided into units of superframes. A superframe shall consist of a superframe preamble followed by a series of FL PHY Frames. FIG 3 illustrates a superframe preamble structure. The superframe preamble 300 carries an overhead channels for example in the first 5 symbols, a common pilot channel (F-CPICH), a broadcast channel (F-pBCH), an acquisition channel (F-ACQCH), and an interference channel (F-OSICH). The F-CPICH that includes pilots that may be used for channel estimation by access terminals and F-pBCH that includes configuration parameters that the access terminal may utilize to demodulate the parameters contained in the forward link frames. In addition, it may include information for paging information. In some aspects, it may contain parameters for the timing of the frames contained in a given superframe. The F-ACQCH that may include timing and other parameters sufficient for an access terminal to communicate on one of the carriers and the F-OSICH may be used for power control at the access terminal.

[0031] The last three OFDM symbols in the superframe preamble (the symbols indexed 5 through 7) are time division multiplex (TDM) pilots which are used for initial acquisition. These symbols will also be referred to TDM pilot 1, TDM pilot 2 and TDM pilot 3. The first two of these form the FL Acquisition Channel (F-ACQCH), while the last is reused in order to transmit the FL Other Sector Interference Channel (F-OSICH). The system supports a large number of unique PN codes (total number is 4096) in order to simplify PN planning requirements. Each sector is identified by a number between 0 and 4095 called the PilotPN, and the PN-planning needs to be such that no two sectors with the same PilotPN are observable at any location.

[0032] In order to reduce acquisition complexity, while still maintaining a large number of PN codes, a hierarchical pilot structure is used. Therefore, TDM pilot 1 is scrambled using only 2 bits of information (i.e., takes on 4 possible values). TDM pilot 2 is scrambled using 8 bits of information (i.e., takes on 256 possible values), 2 of

which are the same ones used to scramble TDM pilot 1. Finally, TDM pilot 3 is scrambled using 12 bits of information, which enables us to distinguish 4096 different PilotPN values. Moreover, TDM 1 is a perdiodic pilot (consisting of two periods), and can hence be detected using a low complexity delayed correlation. The delayed correlation can reduce the initial number of time-hypotheses dramatically, as well as aid in frequency synchronization.

[0033] The first five OFDM symbols in the superframe preamble are used to carry the two FL Primary Broadcast Channels, namely F-pBCH0 and F-pBCH1. These channels carry configuration parameters that the AT needs to have before it can demodulate the FL PHY Frames.

[0034] An F-pBCH0 packet is encoded over 16 superframes, and occupies approximately ¼ of an OFDM symbol in each superframe preamble. This channel therefore has an extremely small overhead. An F-pBCH1 packet is encoded over a single superframe and occupies approximately 4 ¾ OFDM symbols in each superframe preamble. The bandwidth overhead of this channel is approximately 2%.

[0035] In some aspects, the overhead message comprises a System Info Block (SIB), Quick Channel Info Block (QCIB), and Extended Channel Info Message (ECIM). The System Info Block is transmitted over the F-pBCH0 channel in the superframe preamble. It contains information that is expected to be constant over an entire deployment or a large group of sectors. The parameters it carries include the cyclic prefix duration, the number of guard carriers etc. In addition, it also carries the 12 LSBs of the superframe index.

[0036] The Quick Channel Info Block is transmitted over the F-pBCH1 channel in the superframe preamble, more specifically in superframes with odd numbered superframe index. It contains configuration parameters that may enable an AT to demodulate other channels that are transmitted in the PHY Frames or may enable an idle-mode AT to demodulate pages that may be transmitted in the PHY Frames. It is desirable that the AT be able to demodulate these pages even if it wakes up in a new sector, and hence this information may be transmitted with a high periodicity by the AP.

[0037] The Extended Channel Info Message contains additional configuration parameters related to FL and RL structure. This includes parameters related to RL configuration as well as parameters related to transmission of FL power control bits. The Extended Channel Info message comprises of several groups for example Power

Control group, the Sector Information group etc. This message is transmitted like a regular data channel in predefined superframes, using a broadcast MAC ID.

[0038] In certain aspects, other orders of the symbols in superframe may not be as described above. Further, more less of the symbols may be utilized to provide the some or all of the above described information types. The names of the provided symbols are only for information purposes and may vary.

[0039] In an aspect, the FL physical frame comprises the following channels. A Forward Acquisition Channel (F-ACQCH), which carries an acquisition pilot for an access terminal to use to acquire the system. A Forward Auxiliary Pilot Channel (F-AuxPICH) which carries auxiliary pilots. The F-pBCH1 indicates whether the F-AuxPICH is present. A Forward Common Pilot Channel (F-CPICH) which carries the common pilot. A Forward Data Channel (F-DCH), which carries information for a specific access terminal. A Forward Data Channel assignment is assigned to an access terminal by a Forward Shared Signaling Channel (F-SSCH) assignment. Also carries broadcast information including pages and sector specific messages. Forward Dedicated Pilot Channel (F-DPICH), which carries the dedicated pilot wherein the F-pBCH0 may indicate whether the F- DPICH is present. A Forward Shared Signaling Channel (F-SSCH), which carries forward and reverse link data channel assignments, access grants, power control commands, and acknowledgement information for Reverse Data Channel (R-DCH) transmissions.

[0040] In an aspect, the RL physical frame comprises the following channels. Reverse Access Channel (R-ACH) is used by access terminals to initiate communication with the access network. The Reverse Access Channel is also used by access terminals to obtain timing corrections. Reverse Acknowledgement Channel (R-ACKCH), which carries acknowledgement information of the F-DCH reception. Reverse Beam Feedback Channel (R-BFCH), which carries information about the beam index and the quality of the forward link channel. Reverse Channel Quality Indicator Channel (R-CQICH), which carries information about the quality of the forward link channel of a sector as received by an access terminal. The Reverse Channel Quality Indicator Channel also carries information about the desired forward link serving sector. Reverse Data Channel (R-DCH), which carries information from an access terminal. The Reverse Data Channel is assigned to an access terminal by the F-SSCH assignment. Reverse Pilot Channel (R-PICH), which carries the pilot. Reverse Request Channel (R-

REQCH), which carries information about the buffer level at different quality of service classes for an access terminal. The Reverse Request Channel also carries information about the desired revere link serving sector. Reverse Subband Feedback Channel (R-SFCH), which carries information about the quality of a subband or segment of the forward link channel.

[0041] It should be noted that the channels described above need not be utilized and may be omitted. Further, other channels may be utilized in addition to, or in lieu of, any of the above described channels.

[0042] In aspect, both the FL and RL Physical frames structure can be varied based the parameters/value used for chip rate, bandwidth, length of guard carriers, number of guard carriers, or cyclic prefix. For example, a system may be deployed using chip rate maybe 4.9152, 9.8304 or 19.6608 Mcps. Also, the bandwidth may be approximately 5 MHz, approximately 10 MHz or approximately 20 MHz. Additionally, the guard carries are function of the bandwidth and vary number of guard carriers vary base on system requirements.

[0043] FIG. 4A illustrates a process 400 according to an aspect which is executed by the AP processor 230. Upon AP detecting the FL and/or RL structure has been altered or this the first time this sector is activated, process 400 is executed. At block 402, a parameter extracting logic is executed by the processor 230 for extracting FL and RL structure parameters from memory. Even though this FL/RL structure can be altered, the optimized structures are stored in memory, for example 232. At block 404, the processor 230 executes logic to generate the preamble by including the extracted FL/RL Physical Frame structure parameters in a preamble. Thereafter, at block 406, a transmit logic is executed by the processor 230 for transmitting the preamble and the FL Physical frames.

[0044] FIG. 4B illustrate a process 420 according to an alternate aspect which is executed by the AP's processor 230. At block 422, an parameter extracting logic is executed by the processor 230 for extracting FL and RL structure parameters from storage medium, for example memory 232. At block 424, the processor 230 executes logic for generating a preamble by including only the extracted FL Physical Frame structure parameters in a preamble. The RL structure parameters may be incorporated into data that will be sent over the FL Physical Frame. At block 426, a transmit logic is executed by the processor 230 for transmitting the preamble and the FL Physical

frames. According to the alternate aspect, the AP demodulates the parameters received on one ore more the FL Physical frames and extracts the RL Physical Frame structure.

[0045] FIG. 5 illustrates a process 500, executed by AT's processor 270. This process is executed upon AT executing a wake up logic, AT entering a new sector, or AT receiving an indication that FL/RL structure has changed. At block 502, the receiving preamble logic is executed by processor 270 for receiving a preamble portion on the FL. At block 504, extracting parameter logic is executed by the processor for extracting parameters from one or more of the broadcast channels. In an aspect, the F-pBCH0 and pBCH1 of the preamble are extracted. At block 506, demodulating logic is executed by processor 270 for demodulating one or more overhead channels using the parameters extracted from one or more of the broadcast channels. At block 508, extracting logic is executed by the processor 270 for extracting an Extended Channel Message. In an aspect, the Extended Channel Message is used to provide parameters regarding the FL Physical Frame structure. Depending on the deployment of the system, the Extended Channel Message may also comprise the RL Physical Frame Structure.

[0046] At block 510, a determining logic is executed by the processor 270 for determining the FL Physical Frame structure. For example extracting portion of the Extended Channel Message to determine how the FL Physical Frame structure is set up. At block 512, a determining logic is executed by the processor 270 for determining the RL Physical Frame structure. For example, if the RL Physical Frame structure parameters is incorporated in the Extended Channel Message, then extracting portion of the Extended Channel Message to determine how the RL Physical Frame structure is set up. In an aspect, a portion of the Extended Channel Message may indicate that RL Physical Frame structure parameters will be provided using the FL Physical Channels. Then AP then will demodulate the FL Physical Frames as normal and determine the RL Physical Frame Structure from parameters received on one or more the FL Physical channels.

[0035] The techniques described herein may be implemented by various means. For example, these techniques may be implemented in hardware, software, or a combination thereof. For a hardware implementation, the processing units (e.g., processor 230 and 270, TX and RX processors 214 and 260, and so on) for these techniques may be implemented within one or more electronic devices such as 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, other electronic units designed to perform the functions described herein, or a combination thereof.

[0036] For a software implementation, the techniques described herein 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 memory units (e.g., memory 232 and 272 in FIG. 2) and executed by processors (e.g., controllers 230). The memory unit may be implemented within the processor or external to the processor, in which case it can be communicatively coupled to the processor via various means as is known in the art.

[0037] Headings are included herein for reference and to aid in locating certain sections. These headings are not intended to limit the scope of the concepts described therein under, and these concepts may have applicability in other sections throughout the entire specification.

[0038] The previous description of the disclosed aspects is provided to enable any person skilled in the art to make or use the present aspect. 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 without departing from the spirit or scope of the aspect. Thus, the present aspect 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.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method in a wireless communication system, the method including:

receiving a preamble including at least one physical frame structure parameter; and

determining a forward link physical frame structure by using the at least one physical frame structure parameter.

2. The method as claimed in claim 1, further including:

receiving at least one reverse link physical frame structure parameter and receiving at least one forward link physical frame structure parameter.

3. The method as claimed in claim 1, further including:

determining a reverse link physical frame structure by using the at least one physical frame structure parameter.

4. The method as claimed in claim 1, wherein said determining the forward link physical frame structure includes extracting a first portion of said preamble designated for broadcasting data.

5. The method as claimed in claim 4, wherein said determining the forward link physical frame structure includes demodulating said first portion of said preamble.

6. The method as claimed in claim 1, wherein receiving the at least one physical frame structure parameter further includes receiving a cyclic prefix parameter and a bandwidth parameter.

7. The method as claimed in claim 1, wherein receiving the at least one physical frame structure parameter further includes receiving a plurality of guard carriers parameters.

8. The method as claimed in claim 1, further including:

receiving a forward link physical frame including at least one reverse link physical frame structure parameter; and

determining a (RL) physical frame structure by using the at least one reverse link physical frame structure parameter.

9. A method in a wireless communication system, the method including:

extracting physical frame structure parameters from a storage medium;

generating a preamble, wherein said preamble includes said physical frame structure parameters; and

transmitting said preamble.

10. The method as claimed in claim 9, wherein said extracting said physical frame structure parameters includes extracting forward link physical frame structure parameters, wherein said forward link physical frame structure parameters including a cyclic prefix parameter, a bandwidth parameter and a plurality of guard carrier parameters.

11. An apparatus operable in wireless communication, the apparatus including:

a processor, said processor configured to receive a preamble including at least one physical frame structure parameter; and

said processor configured to determine a forward link physical frame structure by using the at least one physical frame structure parameter.

12. The apparatus as claimed in claim 11, wherein said processor is further configured to receive at least one reverse link physical frame structure parameter and is configured to receive at least one forward link physical frame structure parameter.

13. The apparatus as claimed in claim 11, wherein said processor is further configured to determine a reverse link physical frame structure by using the at least one physical frame structure parameter.

14. The apparatus as claimed in claim 11, wherein said processor is configured to extract a first portion of said preamble designated for broadcasting data.

15. The apparatus as claimed in claim 14, wherein said processor is further configured to demodulate said first portion of said preamble.

16. The apparatus as claimed in claim 11, wherein said processor is further configured to receive a cyclic prefix parameter and a bandwidth parameter.

17. The apparatus as claimed in claim 11, wherein said processor is further configured to receive a plurality of guard carriers parameters.

18. The apparatus as claimed in claim 11, wherein said processor is further configured to receive a forward link physical frame including at least one reverse link physical frame structure parameter; and

said processor is configured to determine a reverse link physical frame structure by using the at least one reverse link physical frame structure parameter.

19. An apparatus operable in wireless communication, the apparatus including:

a processor, said processor configured to extract physical frame structure parameters from a storage medium; configured to generate a preamble, wherein said preamble includes said physical frame structure parameters; and configured to transmit said preamble.

20. The apparatus as claimed in claim 19, wherein said processor is configured to extract forward link physical frame structure parameters, wherein said forward link physical frame structure parameters further include a cyclic prefix parameter, a bandwidth parameter and a plurality of guard carrier parameters.

21. An apparatus operable in a wireless communication system, the apparatus including:

means for receiving a preamble including at least one physical frame structure parameter; and

means for determining a forward link physical frame structure by using the at least one physical frame structure parameter.

22. The apparatus as claimed in claim 21, further including:

means for receiving at least one reverse link physical frame structure parameter and means for receiving at least one forward link physical frame structure parameter.

23. The apparatus as claimed in claim 21, further including:

means for determining a reverse link physical frame structure by using the at least one physical frame structure parameter.

24. The apparatus as claimed in claim 21, wherein the means for determining the forward link physical frame structure includes means for extracting a first portion of said preamble designated for broadcasting data.

25. The apparatus as claimed in claim 24, wherein the means for determining the forward link physical frame structure includes means for demodulating said first portion of said preamble.

26. The apparatus as claimed in claim 21, wherein the means for receiving the preamble including the at least one physical frame structure parameter includes means for receiving a cyclic prefix parameter and a bandwidth parameter.

27. The apparatus as claimed in claim 21, wherein the means for receiving the preamble including the at least one physical frame structure parameter includes means for receiving a plurality of guard carriers parameters.

28. The apparatus as claimed in claim 21, further including:

means for receiving a forward link physical frame including at least one reverse link physical frame structure parameter; and

means for determining a (RL) physical frame structure by using the at least one reverse link physical frame structure parameter.

29. An apparatus operable in a wireless communication system, the apparatus including:

means for extracting physical frame structure parameters from a storage medium;

means for generating a preamble, wherein said preamble includes said physical frame structure parameters; and

means for transmitting said preamble.

30. The apparatus as claimed in claim 29, wherein said means for extracting said physical frame structure parameters includes means for extracting forward link physical frame structure parameters, wherein said forward link physical frame structure parameters further include a cyclic prefix parameter, a bandwidth parameter and a plurality of guard carrier parameters.

31. A machine-readable medium including instructions which, when executed by a machine, cause the machine to perform operations including:

receiving a preamble including at least one physical frame structure parameter; and

determining a forward link physical frame structure by using the at least one physical frame structure parameter.

32. The machine-readable medium as claimed in claim 31, further including:

machine readable instruction to cause receiving at least one reverse link physical frame structure parameter and receiving at least one forward link physical frame structure parameter.

33. The machine-readable medium as claimed in claim 31, further including:

machine readable instruction to cause determining a reverse link physical frame structure by using the at least one physical frame structure parameter.

34. The machine-readable medium as claimed in claim 31, wherein machine readable instruction to cause receiving the preamble including the at least one physical frame structure parameter includes machine readable instruction to cause receiving a cyclic prefix parameter and a bandwidth parameter.

35. The machine-readable medium as claimed in claim 31, wherein machine readable instruction to cause receiving the preamble including the at least one physical frame structure parameter includes machine readable instruction to cause receiving a plurality of guard carriers parameters.

36. A machine-readable medium including instructions which, when executed by a machine, cause the machine to perform operations including:

extracting physical frame structure parameters from a storage medium;

generating a preamble, wherein said preamble includes said physical frame structure parameters; and

transmitting said preamble.

37. The machine-readable medium as claimed in claim 36, wherein said machine readable instruction to cause extracting said physical frame structure parameters includes machine readable instruction to cause extracting forward link physical frame structure parameters, wherein said forward link physical frame structure parameters further include a cyclic prefix parameter, a bandwidth parameter and a plurality of guard carrier parameters.