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(54) **METHOD FOR SUPPORTING VARIOUS MULTI-ANTENNA SCHEMES IN BWA SYSTEM USING MULTIPLE ANTENNAS**

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(75) Inventors: **Jeong-Tae Oh**, Yongin-si (KR); **Won-Il Roh**, Yongin-si (KR); **Kyun-Byoung Ko**, Hwaseong-si (KR); **Jae-Ho Jeon**, Seongnam-si (KR); **Sung-Ryul Yun**, Suwon-si (KR); **Hong-Sil Jeong**, Suwon-si (KR); **Chan-Byoung Chae**, Seoul (KR); **Seung-Joo Maeng**, Seongnam-si (KR)

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(57) **ABSTRACT**

Disclosed is a method for using various multiple antenna schemes in a baseband wireless access system is provided. According to the method, a downlink MAP message is constructed in order to support various multiple antenna schemes based on a multiple-input multiple output (MIMO), which is one of the multiple antenna schemes, so that compatibility with exiting MIMO technology having no MIMO feedback can be achieved and overhead occurring in transmission of an MAP information element can be reduced. Further, it is possible to efficiently support spatial multiplexing technology capable of transmitting multiple layers having different modulation and coding in a MIMO system.

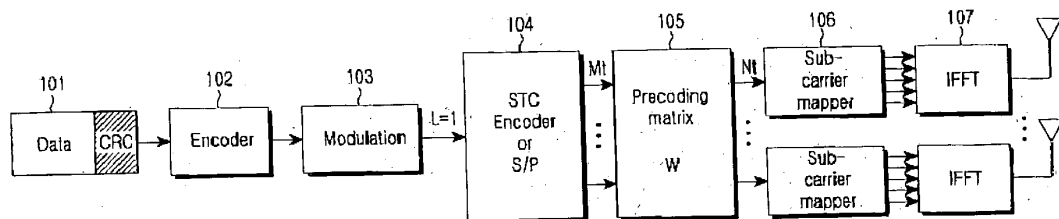
Correspondence Address:

DILWORTH & BARRESE, LLP
333 EARLE OVINGTON BLVD.
UNIONDALE, NY 11553 (US)

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR)

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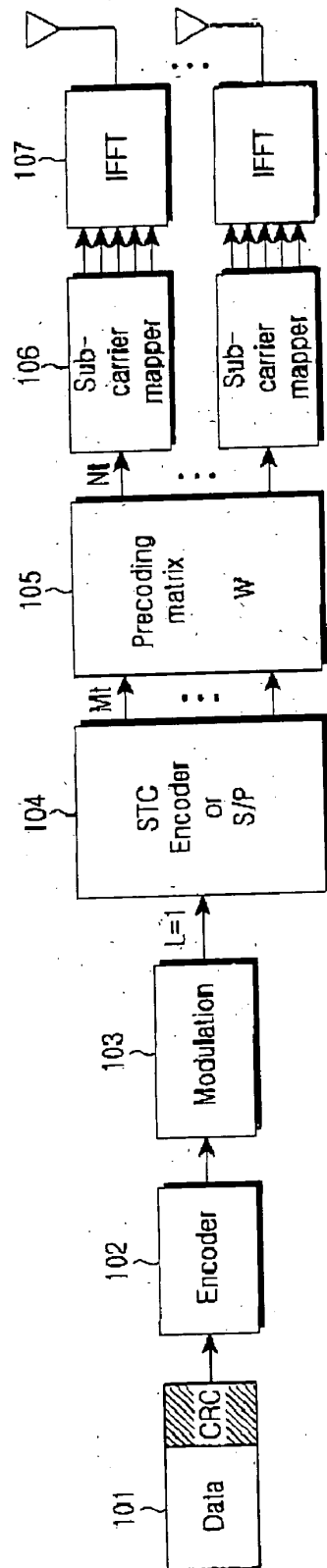


FIG. 1

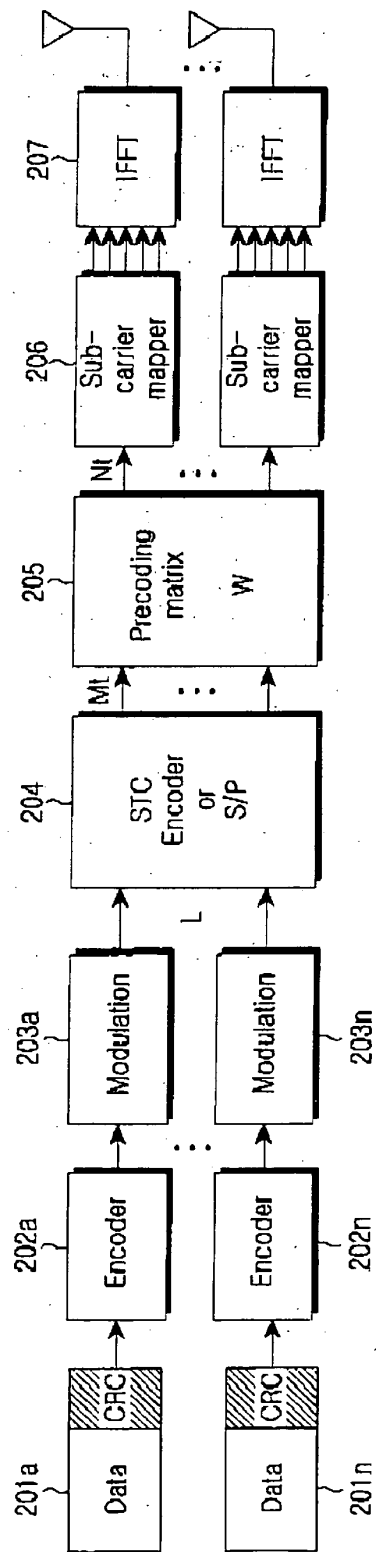


FIG. 2

Layer=1(TD or VE only)		L=2 (HE only)				L=3 (HE only)				L=4 (HE only)					
MI=1	2	3	4	MI=1	2	3	4	1	2	3	4	1	2	3	4
	A (TD)	A (TD)	A (TD)												
		B (VE)	B (VE)			B (HE)	B (HE)								
	C (VE)	C (VE)	C (VE)		C (HE)					C (HE)					C (HE)

FIG.3

**METHOD FOR SUPPORTING VARIOUS
MULTI-ANTENNA SCHEMES IN BWA SYSTEM
USING MULTIPLE ANTENNAS**

PRIORITY

[0001] This application claims priority to an application entitled "Method for Supporting Various Multi-antenna Schemes in BWA System Using Multiple Antenna" filed in the Korean Intellectual Property Office on Nov. 9, 2004 and assigned Serial No. 2004-91120, the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a Broadband Wireless Access (BWA) system, and more particularly to a method for supporting various multiple antenna schemes in a system using an Orthogonal Frequency Division Multiple Access (OFDMA) scheme.

[0004] 2. Description of the Related Art

[0005] In the current wireless mobile communication system, extensive research is being conducted into a high quality multimedia service capable of transmitting mass storage data at a high speed. Different from wire channel environments, wireless channel environments are subject to a distortion of the actual transmission signals due to various factors such as multi-path interference, shadowing, wave attenuation, time-varying noise and interference. Fading due to the multi-path interference is closely related to the mobility of a reflector or a user terminal. Accordingly, the actual transmission signals are mixed with interference signals and mixed signals are received. Because the received signals already represent a serious distortion of the actual transmission signals, the entire performance of a mobile communication system may deteriorate.

[0006] Fading may also distort the amplitude and phase of the received signals, and may become a main factor that disrupts the high speed data communication in wireless channel environments. Therefore, extensive research is being conducted in order to solve the fading problem. In order to transmit data at a high speed in a mobile communication system, it is necessary to minimize loss and any user-by-user interference resulting from the characteristics of a mobile communication channel. One of the technologies proposed in order to solve the afore-described problems is a Multiple Input Multiple Output (MIMO) technology.

[0007] The MIMO technology may be classified according to the data transmission schemes used and whether the channel information is feedback.

[0008] First, the MIMO technology may be classified into a Spatial Multiplexing (SM) technique and a Spatial Diversity (SD) technique according to the data transmission schemes. The SM technique is a technique for simultaneously transmitting different data by means of multiple antennas in a transmitter and a receiver, thereby transmitting data at a higher speed without increasing the bandwidth of the system. The SD technique is a technique for transmitting the identical data through multiple transmit (Tx) antennas, thereby achieving the Transmit Diversity (TD).

[0009] The MIMO technology may also be classified into a closed-loop scheme, in which channel information is feedback from a receiver to a transmitter, and an open loop scheme, in which channel information is not feedback from a receiver to a transmitter.

[0010] Referring to the current standard documents 802.16-REVd&D5, REVe/D5-2004 of the Institute of Electrical and Electronics Engineers (IEEE) 802.16e standard, only a scheme for supporting the MIMO technology using the open loop scheme has been proposed.

SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention has been made to solve at least the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a method for supporting various multiple antenna schemes based on MIMO technology in a BWA system using multiple antennas.

[0012] It is another object of the present invention to provide a method for supporting various multiple antenna schemes by constructing an MAP message for classifying MIMO technology in a BWA system using multiple antennas.

[0013] It is a further object of the present invention to provide a method for supporting various multiple antenna schemes by constructing a downlink MAP message for efficiently providing multiple antenna technology, precoding or antenna grouping technology, antenna selection technology, etc., which have feedback from a mobile station.

[0014] In order to accomplish the aforementioned objects, according to one aspect of the present, there is provided a method for supporting various Multiple Input Multiple Output (MIMO) and precoding technologies in a Broadband Wireless Access (BWA) system employing an antenna technique of a MIMO scheme, the method including configuring a downlink MAP message that includes basic information fields for indicating the MIMO technology and information fields for indicating various precoding technologies; and applying the MIMO technology to a mobile station by means of the downlink MAP message.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0016] **FIG. 1** is a block diagram illustrating the construction of a transmitter, which includes a single encoder and a single modulator, capable of performing precoding by means of feedback information received from a mobile station in a BWA system according to an embodiment of the present invention;

[0017] **FIG. 2** is a block diagram illustrating the construction of a transmitter, which includes a plurality of encoders and modulators, capable of performing precoding by means of feedback information received from a mobile station in a BWA system according to another embodiment of the present invention; and

[0018] **FIG. 3** is a diagram illustrating available technology according to the number of layers and streams according to an embodiment of the present invention.

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