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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

113264 U.S. PTO 60/653429 021605

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INVENTOR(S)

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Additional inventors are being named on the 0 separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)

METHOD AND SYSTEM FOR COMPROMISE GREENFIELD PREAMBLES FOR 802.11N

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☐ Application Data Sheet. See 37 CFR 1.76

☐ CD(s), Number of CDs ____

☒ Specification *Number of Pages* 30

☐ Other (specify) ____

☒ Drawing(s) *Number of Sheets* 8

Application Size Fee: If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

METHOD OF PAYMENT OF FILING FEES AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL FEE AMOUNT ($)

☒ A check or money order is enclosed to cover the filing fee and application size fee (if applicable). 200.00

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☒ The Director is hereby authorized to charge additional filing fees (if applicable) or credit any overpayment to Deposit Account Number: 13-0017 . A duplicative copy of this form is enclosed for fee processing.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

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SIGNATURE [signature] Date February 16, 2005

TYPED or PRINTED NAME Christopher C. Winslade

REGISTRATION NO. *(if appropriate)* 36,308

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Docket Number: 16490US01

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This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O.

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METHOD AND SYSTEM FOR COMPROMISE GREENFIELD PREAMBLES FOR 802.11N

CROSS-REFERENCE TO RELATED APPLICATIONS/INCORPORATION BY REFERENCE

[01] This application makes reference to:

United States Patent Application Serial No. 10/973,595 filed October 26, 2004;

United States Patent Application Serial No. ________ (Attorney Docket No. 16354US02) filed February 7, 2005; and

United States Patent Application Serial No. ________ (Attorney Docket No. 16307US02) filed February 7, 2005.

[02] All of the above state applications are hereby incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

[03] Certain embodiments of the invention relate to wireless communication. More specifically, certain embodiments of the invention relate to a method and system for compromise Greenfield preambles for 802.11n.

BACKGROUND OF THE INVENTION

[04] The Institute for Electrical and Electronics Engineers (IEEE), in resolution IEEE 802.11, also referred as "802.11", has defined a plurality of specifications which are related to wireless networking. Among them are specifications for "closed loop" feedback mechanisms by which a receiving mobile terminal may feed back information to a transmitting mobile terminal to assist the transmitting mobile terminal in adapting signals which are sent to the receiving mobile terminal.

[05] Smart antenna systems combine multiple antenna elements with a signal processing capability to optimize the pattern of transmitted signal radiation and/or reception in response to the communications medium environment. The process of optimizing the pattern of radiation is sometimes referred to as "beamforming," which may utilize linear array mathematical operations to increase the average signal to noise ratio (SNR) by focusing energy in desired directions. In conventional smart antenna systems, only the transmitter or the receiver may be equipped with more than one antenna, and may typically be located in the base transceiver station (BTS) where the cost and space associated with smart antenna systems have been perceived as more easily affordable than on mobile terminals such as cellular telephones. Such systems are also known as multiple input single output (MISO) when a multiple antenna transmitter is transmitting signals to a single antenna receiver, or single input multiple output (SIMO) when a multiple antenna receiver is receiving signals that have been transmitted from a single antenna transmitter. With advances in digital signal processing (DSP) integrated circuits (ICs) in recent years, multiple antenna multiple output (MIMO) systems have emerged in which mobile terminals incorporate smart antenna systems comprising multiple transmit antenna and multiple receive antenna. One area of early adoption of MIMO systems has been in the field of wireless networking, particularly as applied to wireless local area networks (WLANs) where transmitting mobile terminals communicate with receiving mobile terminals. IEEE resolution 802.11 comprises specifications for communications between mobile terminals in WLAN systems.

[06] Signal fading is a significant problem in wireless communications systems, often leading to temporary loss of communications at mobile terminals. One of the most pervasive forms of fading is known as multipath fading, in which dispersion of transmitted signals due to incident reflections from buildings and other obstacles, results in multiple versions of the transmitted signals arriving at a receiving mobile terminal. The multiple versions of the transmitted signal may interfere with each other and may result in a reduced signal level detected at the receiving mobile terminal. When versions of the transmitted signal are 180° out of phase they may cancel each other such that a signal level of 0 is detected. Locations where this occurs may correspond to "dead zones" in which communication to the wireless terminal is temporarily lost. This type of fading is also known as "Rayleigh" or "flat" fading.

[07] A transmitting mobile terminal may transmit data signals in which data is arranged as "symbols". The transmission of symbols may be constrained such that after a symbol is transmitted, a minimum period of time, T_s, must transpire before another symbol may be transmitted. After transmission of a symbol from a transmitting mobile terminal, some period of dispersion time, T_d, may transpire which may be the time over which the receiving mobile terminal is able to receive the symbol, including multipath reflections. The time T_d may not need to account for the arrival of all multipath reflections because interference from later arriving reflected signals may be negligible. If the period T_s is less than T_d there is a possibility that the receiving mobile terminal will start receiving a second symbol from the transmitting mobile terminal while it is still receiving the first symbol. This may result in inter-symbol interference (ISI), producing distortion in received signals, and possibility resulting in a loss of information. The quantity $1/T_d$ is also referred to as the "coherence bandwidth" which may indicate the maximum rate at which symbols, and correspondingly information, may be transmitted via a given communications medium. One method to compensate for ISI in signals may entail utilizing DSP algorithms which perform adaptive equalization.

[08] Another important type of fading is related to motion. When a transmitting mobile terminal, or a receiving mobile terminal is in motion, the Doppler phenomenon may affect the frequency of the received signal. The frequency of the received signal may be changed by an amount which is a function of the velocity at which a mobile terminal is moving. Because of the Doppler effect, ISI may result when a mobile terminal is in motion, particularly when the mobile terminal is moving at a high velocity. Intuitively, if a receiving mobile terminal is in motion and nearing a transmitting mobile terminal, the distance between the two mobile terminals will change as a function of time. As the distance is reduced, the propagation delay time, T_p, which is the time between when a transmitter first transmits a signal and when it first arrives at a receiver, is also reduced. As the mobile terminals become closer it is also possible that T_d may be increased if, for example, the transmitting mobile terminal does not reduce the radiated power of transmitted signals. If T_p becomes less than T_d, there may be ISI due to the Doppler effect. This case, which illustrates why data rates may be reduced for mobile terminals that are in motion, is referred to as "fast fading". Because fast fading may distort signals at some frequencies while not distorting signals at other frequencies, fast fading may also be referred to as "frequency selective" fading.

[09] Smart antenna systems may transmit multiple versions of a signal in what is known as "spatial diversity". A key concept in spatial diversity is that the propagation of multiple versions of a signal, or "spatial stream", from different antenna may significantly reduce the probability of flat fading at the receiving mobile terminal since not all of the transmitted signals would have the same dead zone.

[10] Current transmission schemes in MIMO systems typically fall into two categories: data rate maximization, and diversity maximization. Data rate maximization focuses on increasing the aggregate data transfer rate between a transmitting mobile terminal and a receiving mobile terminal by transmitting different spatial streams from different antenna. One method for increasing the data rate from a transmitting mobile terminal would be to decompose a high bit rate data stream into a plurality of lower bit rate data streams such that the aggregate bit rates among the plurality of lower bit rate data streams is equal to that of the high bit rate data stream. Next, each of the lower bit rate data streams may be mapped to at least one of the transmitting antenna for transmission. In addition, each signal comprising one of the lower bit rate data streams is multiplicatively scaled by a weighting factor prior to transmission. The plurality of

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