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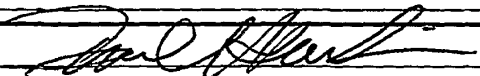
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22651 U.S. PTO

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INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
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Additional inventors are being named on the <u>ONE</u> separately numbered sheets attached hereto		
TITLE OF THE INVENTION (500 characters max):		
METHODS AND APPARATUS OF CLOSED LOOP MIMO PRE-CODING AND FEEDBACK FOR IEEE802.16e		
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ENCLOSED APPLICATION PARTS (check all that apply)		
<input checked="" type="checkbox"/> Specification Number of Pages <u>15</u>	<input type="checkbox"/> CD(s), Number of CDs _____	
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<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76		
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT		
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.	FILING FEE Amount (\$)	
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<input type="checkbox"/> The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government. No.		
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SIGNATURE

Date September 30, 2004TYPED or PRINTED NAME PAUL C. HASHIMREGISTRATION NO. 31,618TELEPHONE 972-684-7886

(if appropriate)

Docket Number: 17381ROUS01P**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

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PTO/SB/16 (09-04)

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First Named Inventor	MING JIA	Docket Number	17381ROUS01P
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PROVISIONAL PATENT APPLICATION

SUBMITTED ON SEPTEMBER 30, 2004

TITLE:

**SYSTEM AND METHOD FOR CLOSED LOOP MIMO PRE-CODING AND
FEEDBACK**

INVENTORS:

MING JIA, OTTAWA, ONTARIO CANADA

WEN TONG, OTTAWA, ONTARIO CANADA

PEIYING ZHU, KANATA, ONTARIO CANADA

SYSTEM AND METHOD FOR CLOSED LOOP MIMO PRE-CODING AND FEEDBACK

The present invention generally relates to closed loop MIMO (Multiple Input Multiple Output) pre-coding and feedback, and more specifically to closed loop MIMO pre-coding and feedback for purposes of the IEEE 802.16(e) and IEEE 802.11(n) standards.

BACKGROUND OF THE INVENTION

As will be apparent to one of skill in the art there are numerous problems with the current IEEE 802.16(e) standard that need to be resolved including:

- [1] MIMO channel feedback bandwidth reduction
- [2] Antenna group selection
- [3] MIMO channel feedback ageing
- [4] Vector quantization for the MIMO channel
- [5] MIMO feedback flow control associated MAC design
- [6] Feedback channel design
- [7] Feedback STC coding and channel sounding

While several solutions have been proposed in IEEE802.16(e) and IEEE802.11(n) for the closed loop MIMO pre-coding transmission, they are not practical for the following reasons:

[1] The Hausholder transform based SVD beam former feedback: The problem with this approach is that it is too complex for mobile channel realization

[2] Single user based fixed sub-channel allocation: The problem with this approach is that it has 2~3 times capacity loss compared to multi-user diversity

[3] Receiver based vector channel quantization: The problem with this approach is that it exponentially increases terminal complexity

A need exists therefore for an improved system and method for enabling closed loop MIMO pre-coding and feedback.

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