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Approved for use through 04/30/2003. OMB 0651-003  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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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).

13441 U.S. PTO  
601601178



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Additional inventors are being named on the 2nd separately numbered sheets attached hereto

#### TITLE OF THE INVENTION (280 characters max)

SYSTEMS AND METHODS FOR OFDMA SPACE TIME CODING SUB- CHANNEL MAPPING AND POWER CONTROL

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#### ENCLOSED APPLICATION PARTS (check all that apply)

- Specification Number of Pages   CD(s), Number
- Drawing(s) Number of Sheets
- Application Data Sheet. See 37 CFR 1.76  Other (specify)

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- A check or money order is enclosed to cover the filing fees
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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.
- Yes, the name of the U.S. Government agency and the Government contract number are: \_\_\_\_\_

Respectfully submitted,

SIGNATURE

TYPED or PRINTED NAME Allan Brett

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Date 08/13/04

REGISTRATION NO. 40,476

(if appropriate)  
Docket Number: 71493-1308 /aba

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P19LARGE/REV06

### PROVISIONAL APPLICATION COVER SHEET Additional Page

PTO/SB/16 (8-00)

Approved for use through 10/31/2002. OMB 0851-0032  
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Docket Number	71493-1308 /aba	Type a plus sign (+) inside this box →	+
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Number 2 of 2

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17269ROUS01P

- 1 -

Systems and Methods for OFDMA Space Time Coding Sub-Channel  
Mapping and Power control

Description

The existing specification of IEEE802.16e has  
5 deficiencies in the following areas:

power balanced space time code for odd number of  
transmit antennas;

antenna/sub-channel allocation for the multi-user;

closed-loop power control for the Space time coding;

10 and

continuous pilot allocation for multiple antennas.

Embodiments of the invention provide solutions for a  
power balanced space time code for odd number of transmit  
antennas, antenna/sub-channel allocation for the multi-user,  
15 closed-loop power control for the Space time coding, and  
continuous pilot allocation for multiple antennas. Any  
combination of one or more of these solutions may be included  
in a given implementation.

In particular, for power balanced space time code for  
20 odd number of transmit antennas code aggregation is performed  
in three dimensions (time/space/frequency).

To perform antenna/sub-channel allocation for the  
multi-user, a multi-user antenna/sub-channel loading criteria  
is provided and utilized.

25 To perform closed-loop power control for the Space  
time coding, a method of multi-bit power control is provided.

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To provide a continuous pilot allocation for multiple antennas, an antenna mapping is provided to allow to assist the receiver operation.

Attached slides 1 to 38 provide details of a plurality of specific embodiments of the invention.

Each embodiment is generalizable to an arbitrary number of sub-carriers and/or an arbitrary number of transmit antennas/receive antennas as will be apparent to one skilled in the art. Embodiments provide transmitters adapted to generate signals containing the disclosed transmit code-sets/sub-carrier allocations, methods of transmitting such signals, receivers adapted to receive such transmissions, and methods of receiving and decoding such signals.

Numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

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