

CLAIMS

We claim:

1. A multiple antenna system (MAS) with multiuser (MU) transmissions (MUMAS) comprising:
 - 5 a plurality of antennas or wireless transceiver devices (BTSs) distributed throughout a coverage area without cells, all sharing the same cell identifier (cell ID);
 - a plurality of wireless user devices (UEs) communicatively coupled to the BTSs;
 - the MU-MAS chooses a first subset of BTSs for downlink and uplink data communications based on the spatial diversity between the UEs and BTSs; and
 - 10 a spatial processing unit exploits interference among the BTSs to create a plurality of concurrent non-interfering downlink (DL) or uplink (UL) data links, including control channel links, between the first subset of BTSs and the UEs within the same frequency band.
- 15 2. The system as in claim 1 wherein the MU-MAS chooses the first subset of BTSs to schedule data communications.
3. The system as in claim 1 or claim 2 wherein the data communications capacity of the MU-MAS is shared among the plurality of UEs.
- 20 4. The system as in any one of claims 1 to 3, wherein the MU-MAS chooses a second subset of BTSs at a different time interval than when the MU-MAS chooses the first subset of BTSs.
- 25 5. The system as in claim 4 wherein the first and second subsets of BTSs are disjoint.
6. A method implemented within a multiple antenna system (MAS) with multiuser (MU) transmissions (MU-MAS) comprising:
 - 30 distributing a plurality of antennas or wireless transceiver devices (BTSs) throughout a coverage area without cells, all sharing the same cell ID;

communicatively coupling a plurality of wireless user devices (UEs) to the
BTSs;

the MU-MAS choosing a first subset of BTSs for downlink and uplink data
communications based on the spatial diversity between the UEs and BTSs; and

5 exploiting interference among the BTSs to create a plurality of concurrent
noninterfering DL or UL data links, including control channel links, between the first
subset of BTSs and the UEs within the same frequency band.

7. The method as in claim 6 wherein the MU-MAS chooses the first subset of
10 BTSs to schedule data communications.

8. The method as in claim 6 or claim 7 wherein the MU-MAS shares the data
communications capacity of the MU-MAS among the plurality of UEs.

15 9. The method as in any one of claims 6 to 8, wherein the MU-MAS chooses a
second subset of BTSs at a different time interval than when the MU-MAS chooses the
first subset of BTSs.

10 10. The method as in claim 9 wherein the first and second subsets of BTSs are
disjoint.

11. A multiple antenna system (MAS) with multiuser (MU) transmissions
(MUMAS) comprising:

25 a plurality of antennas or wireless transceiver devices (BTSs) distributed
throughout a coverage area without cells, all sharing the same cell identifier (cell ID);

 a plurality of wireless user devices (UEs) communicatively coupled to the BTSs;
the MU-MAS chooses a first subset of BTSs and a first subset of UEs for downlink and
uplink data communications based on the spatial diversity between the UEs and BTSs;
and

30 a spatial processing unit exploits interference among the BTSs to create a
plurality of concurrent non-interfering downlink (DL) or uplink (UL) data links,

including control channel links, between the first subset BTSs and the first subset of UEs within the same frequency band.

12. The system as in claim 11 wherein the MU-MAS chooses the first subset of
5 BTSs and first subset of UEs to schedule data communications.

13. The system as in claim 11 or claim 12 wherein the data communications capacity of the MU-MAS is shared among the plurality of UEs.

10 14. The system as in any one of claims 11 to 13, wherein the MU-MAS chooses a second subset of BTSs and a second subset of UEs at a different time interval than when the MU-MAS chooses the first subset of BTSs and first subset of UEs.

15 15. The system as in claim 14 wherein the first and second subsets of BTSs and/or the first and second subsets of UEs are disjoint.

16. A method implemented within a multiple antenna system (MAS) with multiuser (MU) transmissions (MU-MAS) comprising:

20 distributing a plurality of antennas or wireless transceiver devices (BTSs) throughout a coverage area without cells, all sharing the same cell ID;

communicatively coupling a plurality of wireless user devices (UEs) to the BTSs; the MU-MAS choosing a first subset of BTSs and a first subset of UEs for downlink and uplink data communications based on the spatial diversity between the UEs and BTSs; and

25 exploiting interference among the BTSs to create a plurality of concurrent noninterfering DL or UL data links, including control channel links, between the first subset of BTSs and the first subset of UEs within the same frequency band.

17. The method as in claim 16 wherein the MU-MAS chooses the first subset of
30 BTSs and first subset of UEs to schedule data communications.

18. The method as in claim 16 or claim 17 wherein the MU-MAS shares the data communications capacity of the MU-MAS among the plurality of UEs.

19. The method as in any one of claims 16 to 18 wherein the MU-MAS chooses a
5 second subset of BTSs and a second subset of UEs at a different time interval than when the MU-MAS chooses the first subset of BTSs and first subset of UEs.

20. The method as in claim 19 wherein the first and second subsets of BTSs and/or the first and second subsets of UEs are disjoint.

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