

WHAT IS CLAIMED IS:

1. A wireless device, comprising:
a wireless interface, the wireless interface configured to communicate with a wireless network;
5 a processor; and
a computer readable apparatus having a storage medium with at least one computer program stored thereon, the at least one computer program configured to, when executed by the processor, cause the wireless device to:
determine one or more frequency partitions, where each frequency
10 partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
identify a corresponding one of the one or more control channel regions for receiving control channel information; and
extract control channel information from the identified corresponding
15 one of the one or more control channel regions based on the logical mapping of resource blocks.
2. The wireless device of Claim 1, wherein the logical mapping of resource blocks is permuted over a number of physical resource blocks.
3. The wireless device of Claim 1, wherein the determination of the one
20 or more frequency partitions is performed dynamically.
4. The wireless device of Claim 1, wherein the extracted control channel information comprises one or more reference signals specific to the wireless device.
5. The wireless receiver of Claim 1, wherein the identification of the one control channel region is based at least on a message received from the wireless
25 network.
6. A wireless device, comprising:
a wireless interface, the wireless interface configured to communicate with a wireless network;
logic configured to determine one or more frequency partitions, where each
30 frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
logic configured to identify at least one control channel region of the one or more control channel regions for receiving control channel information; and

logic configured to extract control channel information from the identified at least one control region based on the logical mapping of resource blocks of the identified at least one control region.

5 7. The wireless device of Claim 6, wherein the extracted control channel information comprises one or more reference signals specific to the wireless device.

8. The wireless receiver of Claim 6, wherein the identification of one or more control channel regions is based at least on a message received from the wireless network.

9. A method for receiving control information, comprising:
10 determining one or more frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
identifying a corresponding one of the one or more control channel regions for receiving control channel information; and
15 extracting control channel information from the identified corresponding one of the one or more control channel regions based on the logical mapping of resource blocks.

10. The method of Claim 9, wherein the logical mapping of resource blocks is permuted over a number of physical resource blocks.

20 11. The method of Claim 9, wherein the logical mapping of resource blocks changes over a number of transmissions.

12. The method of Claim 9, wherein the logical mapping of resource blocks is fixed.

13. A method of transmitting control information, comprising:
25 partitioning one or more frequency resources into a number of frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

30 associating one or more wireless devices to a corresponding one of the one or more control channel regions;

assigning the corresponding one of the one or more control channel regions to one or more remote radio entities; and

transmitting control information for the associated one or more wireless devices.

14. The method of Claim 13, wherein the logical mapping of resource blocks is dynamically determined.

5 15. The method of Claim 13, wherein:
the one or more remote radio entities are geographically distinct; and
the associating of one or more wireless devices to the corresponding one of the one or more control channel regions is based at least in part on a location of the one or more wireless devices.

10 16. The method of Claim 13, wherein the one or more remote radio entities share a common identifier.

17. The method of Claim 13, wherein the logical mapping is permuted over a number of transmissions.

18. A wireless network apparatus, comprising:
15 a wireless interface, the wireless interface configured to communicate with one or more wireless devices;
a network interface, the network interface configured to communicate with a plurality of remote radio entities associated with the wireless network apparatus;
logic configured to partition one or more frequency resources into a number of
20 frequency partitions, where each frequency partition comprises one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
logic configured to associate a first set of wireless devices to a first control channel region;
25 logic configured to assign the first control channel region to a first remote radio entity associated with the wireless network apparatus; and
logic configured to cause the transmission of control information for the first set of wireless devices in the first control channel region.

19. A base station apparatus, comprising:
30 a wireless interface, the wireless interface configured to communicate with a plurality of mobile devices;
a network interface, the network interface configured to communicate with a plurality of remote radio entities associated with the base station apparatus;

- a processor; and
a computer readable apparatus in data communication with the processor and
having a storage medium with at least one computer program stored thereon, the at
least one computer program configured to, when executed by the processor, cause the
5 base station apparatus to:
- partition one or more frequency resources into a number of frequency
partitions, where each frequency partition comprises one or more control
channel regions, and each control channel region comprises a logical mapping
of resource blocks;
- 10 associate one or more mobile devices of the plurality of mobile devices
to a corresponding one of the one or more control channel regions;
assign the corresponding one control channel region to at least one
remote radio entity associated with the base station apparatus; and
transmit control information for the associated one or more mobile
15 devices via the corresponding one of the one or more control channel regions.
20. The base station apparatus of Claim 19, wherein the at least one remote
radio entity shares a common identifier with the base station apparatus.
21. The base station apparatus of Claim 19, wherein the transmitted control
information includes at least one reference signal specific to at least one of the
20 associated one or more mobile devices.
22. A user equipment device for receiving control information,
comprising:
means for determining one or more frequency partitions, where each
frequency partition contains one or more control channel regions, and each control
25 channel region comprises a logical mapping of resource blocks;
means for identifying a corresponding one of the one or more control channel
regions for receiving control channel information; and
means for extracting control channel information from the identified
corresponding one of the one or more control channel regions based on the logical
30 mapping of resource blocks.
23. A wireless network apparatus for transmitting control information,
comprising:

means for partitioning one or more frequency resources into a number of frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

5 means for associating one or more wireless devices to a corresponding one of the one or more control channel regions;

means for assigning the corresponding one of the one or more control channel regions to one or more remote radio entities; and

10 means for transmitting control information for the associated one or more wireless devices.

CLAIMS

1. A wireless-device, comprising:
a wireless interface, the wireless interface configured to communicate with a wireless network;
a processor; and
a computer apparatus suitable for reading storage media having a storage medium with at least one computer program stored thereon, the at least one computer program configured to,
when executed by the processor, cause the wireless system to:
partition one or more frequency resources into one or more frequency partitions, where the number of the frequency partitions is dynamically configured based on a parameter of the wireless network, and each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks and a scalable size dependent on a frequency range of the frequency resource;
identify one or more control channel regions for transmitting control channel information from the one or more frequency partitions; and
determine control channel information from the identified one or more control channel regions based on the logical mapping of resource blocks.
2. The wireless device system of Claim 1, wherein the logical mapping of resource blocks is permuted over a number of physical resource blocks.
3. The wireless device system of Claim 1, wherein the determination of the one or more frequency partitions is performed dynamically.
4. The wireless device of Claim 1, wherein the extracted control channel information comprises one or more reference signals specific to the wireless device.

5. The wireless receiver of Claim 1, wherein the identification of the one control channel region is based at least on a message received from the wireless network.

6. A wireless device, comprising:

a wireless interface, the wireless interface configured to communicate with a wireless network;

logic configured to partition one or more frequency resources into one or more frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

logic configured to identify at least one control channel region of the one or more control channel regions for receiving control channel information; and

logic configured to extract control channel information from the identified at least one control region based on the logical mapping of resource blocks of the identified at least one control region.

7. The wireless device of Claim 6, wherein the extracted control channel information comprises one or more reference signals specific to the wireless device.

8. The wireless receiver of Claim 6, wherein the identification of one or more control channel regions is based at least on a message received from the wireless network.

9. A method for receiving control information, comprising:

partitioning one or more frequency resources into one or more frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

identifying one or more control channel regions for receiving control channel information; and

extracting control channel information from the identified one or more control channel regions based on the logical mapping of resource blocks.

10. The method of Claim 9, wherein the logical mapping of resource blocks is permuted over a number of physical resource blocks.

11. The method of Claim 9, wherein the logical mapping of resource blocks changes over a number of transmissions.

12. The method of Claim 9, wherein the logical mapping of resource blocks is fixed.

13. A method of transmitting control information, comprising:
partitioning one or more frequency resources into a number of frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
associating one or more wireless devices to one or more control channel regions;
assigning the one or more control channel regions to one or more remote radio heads; and
transmitting control information for the associated one or more wireless devices.

14. The method of Claim 13, wherein the logical mapping of resource blocks is dynamically determined.

15. The method of Claim 13, wherein:
the one or more remote radio heads are geographically distinct; and
the associating of one or more wireless devices to the one or more control channel regions is based at least in part on a location of the one or more wireless devices.

16. The method of Claim 1, wherein the one or more remote radio heads share a common identifier.

17. The method of Claim 13, wherein the logical mapping is permuted over a number of transmissions.

18. A wireless network apparatus, comprising:

a wireless interface, the wireless interface configured to communicate with one or more wireless devices;

a network interface, the network interface configured to communicate with a plurality of remote radio heads associated with the wireless network apparatus; logic configured to partition one or more frequency resources into a number of frequency partitions, where each frequency partition comprises one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

logic configured to associate a first set of wireless devices to a first control channel region;

logic configured to assign the first control channel region to a first remote radio heads associated with the wireless network apparatus; and

logic configured to cause the transmission of control information for the first set of wireless devices in the first control channel region.

19. A base station apparatus, comprising:

a wireless interface, the wireless interface configured to communicate with a plurality of mobile devices;

a network interface, the network interface configured to communicate with a plurality of remote radio entities associated with the base station apparatus;
a processor; and

a computer readable apparatus in data communication with the processor and having a storage medium with at least one computer program stored thereon, the at least one computer program configured to, when executed by the processor, cause the base station apparatus to:

partition one or more frequency resources into a number of frequency partitions, where each frequency partition comprises one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

associate one or more mobile devices of the plurality of mobile devices to one of the one or more control channel regions;

assign the control channel region to at least one remote radio entity associated with the base station apparatus; and

transmit control information for the associated one or more mobile devices via the one or more control channel regions.

20. The base station apparatus of Claim 19, wherein the at least one remote radio entity shares a common identifier with the base station apparatus.

21. The base station apparatus of Claim 19, wherein the transmitted control information includes at least one reference signal specific to at least one of the associated one or more mobile devices.

22. A user equipment device for receiving control information, comprising:

means for partitioning one or more frequency resources into one or more frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;

means for identifying one or more control channel regions for receiving control channel information; and

means for extracting control channel information from the identified one or more control channel regions based on the logical mapping of resource blocks.

23. A wireless network apparatus for transmitting control information, comprising:
- means for partitioning one or more frequency resources into a number of frequency partitions, where each frequency partition contains one or more control channel regions, and each control channel region comprises a logical mapping of resource blocks;
 - means for associating one or more wireless devices to one or more control channel regions;
 - means for assigning the one or more control channel regions to one or more remote radio entities; and
 - means for transmitting control information for the associated one or more wireless devices.