

CLAIMS

1. A method in a receiving node (540) for receiving an information carrying signal that is transmitted to the receiving node (540) by a transmitting node (560) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540), the method comprising:

receiving (910) from the transmitting node (560) a dynamic configuration message that identifies, to said receiving node (540), at least one muting configuration among a plurality of possible muting configurations, the at least one muting configuration corresponding to a transmission configuration selected from said plurality of transmission configurations by the transmitting node (560) for the transmission of said information carrying signal to said receiving node (540);

receiving (920) said information carrying signal from the transmitting node (560);

decoding (930) said received information carrying signal taking said at least one muting configuration into account by assuming that no information expected to be decoded by the receiving node (540) is transmitted on Time-Frequency Resource Elements, TFREs, identified as muted by said at least one muting configuration.

2. The method according to claim 1, wherein the at least one muting configuration is identified by an indicator in the dynamic configuration message.

3. The method according to claim 2, wherein the indicator comprises one or more bits in a Downlink Control Information, DCI, format.

4. The method according to claim 1-3, wherein the at least one muting configuration comprises a zero-power Channel State Information Reference Signal, CSI-RS, configuration.

5. The method according to claim 4, wherein the at least one muting configuration covers TFREs of at least one Cell Specific Reference Signal, CRS, configuration and/or all TFREs of an Orthogonal Frequency Division Multiplexing, OFDM, symbol.

6. The method according to claim 1-5, wherein the plurality of muting configurations comprises muting configurations that cover TFREs that are zero-power CSI-RS configurable.

7. The method according to claim 6, wherein the plurality of muting configurations comprises at least one muting configuration that covers TFREs of at least one CRS configuration.

8. The method according to claim 6-7, wherein the plurality of muting configurations comprises at least one muting configuration that covers all TFREs of an OFDM symbol.

9. The method according to claim 1-8, wherein the at least one muting configuration is a muting pattern of TFREs that is adjusted to match a desired muting pattern for one or more specific transmission points that are transmitting to the receiving node (540) in a given instance.

10. The method according to claim 9, wherein the given instance is a current subframe in which the dynamic configuration message is received from the transmitting node (560) and wherein the muting pattern is applied for decoding of the information carrying signal in the current subframe.

11. The method according to claim 1-8, wherein the at least one muting configuration identified in the dynamic configuration message received from the transmitting node (560) in a current subframe is applied for decoding of the information carrying signal in the current subframe.

12. The method according to claim 1-11, wherein the information carrying signal is received from the transmitting node (560) in a coordinated transmission via one or more transmission points (510, 520, 530).

13. The method according to claim 12, wherein the coordinated transmission is a Coordinated Multi-Point transmission.

14. The method according to claim 2 or 3-13 when dependent from claim 2, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein the at least one muting configuration is determined from the indicator received in the dynamic configuration message, system information of the serving cell of the UE and/or dedicated radio resource control messages from the eNodeB to the UE.

15. The method according to claim 1-13, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein information that specifies Resource Element mapping of a Physical Downlink Shared Channel includes one or more of: the at least one muting configuration, information on a number of OFDM symbols occupied by a Physical Downlink Control Channel, TFREs occupied by CRS, and configured non-zero power CSI-RS.

16. A method in a transmitting node (560) for transmitting an information carrying signal to a receiving node (540) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540), the method comprising:

determining (940) a plurality of muting configurations, each muting configuration in said plurality of muting configurations corresponding to at least one transmission configuration in said plurality of transmission configurations;

selecting (950) a transmission configuration from said plurality of transmission configurations for transmitting said information carrying signal to said receiving node (540);

transmitting (960) to said receiving node a dynamic configuration message identifying, to said receiving node (540), at least one muting configuration out of said plurality of muting configurations that corresponds to said selected transmission configuration; and

transmitting (970) said information carrying signal to said receiving node (540) in a transmission according to said selected transmission configuration, wherein the transmission is muted in accordance with the identified at least one muting configuration.

17. The method according to claim 16, wherein the at least one muting configuration is identified by an indicator in the dynamic configuration message.

18. The method according to claim 17, wherein the indicator comprises one or more bits in a Downlink Control Information, DCI, format.

19. The method according to claim 16-18, wherein the at least one muting configuration comprises a zero-power Channel State Information Reference Signal, CSI-RS, configuration.

20. The method according to claim 19, wherein the at least one muting configuration covers TFREs of at least one Cell Specific Reference Signal, CRS, configuration and/or all TFREs of an Orthogonal Frequency Division Multiplexing, OFDM, symbol.

21. The method according to claim 16-20, wherein the plurality of muting configurations comprises muting configurations that cover TFREs that are zero-power CSI-RS configurable.

22. The method according to claim 21, wherein the plurality of muting configurations comprises at least one muting configuration that covers TFREs of at least one CRS configuration.

23. The method according to claim 21-22, wherein the plurality of muting configurations comprises at least one muting configuration that covers all TFREs of an OFDM symbol.

24. The method according to claim 16-23, wherein the at least one muting configuration is a muting pattern of TFREs that is adjusted to match a desired muting pattern for one or more specific transmission points that are transmitting to the receiving node (540) in a given instance.

25. The method according to claim 24, wherein the given instance is a current subframe in which the dynamic configuration message is transmitted by the transmitting node (560) and wherein the muting pattern is to be applied by the receiving node (540) for decoding of the information carrying signal in the current subframe.

26. The method according to claim 16-23, wherein the at least one muting configuration identified in the dynamic configuration message transmitted by the transmitting node (560) in a current subframe is to be applied by the receiving node (540) for decoding of the information carrying signal in the current subframe.

27. The method according to claim 16-26, wherein the information carrying signal is transmitted by the transmitting node (560) in a coordinated transmission via one or more transmission points (510, 520, 530).

28. The method according to claim 27, wherein the coordinated transmission is a Coordinated Multi-Point transmission.

29. The method according to claim 17 or 18-28 when dependent from claim 17, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein the at least one muting configuration is determined by the indicator transmitted in the dynamic configuration message, system information of the serving cell of the UE and/or dedicated radio resource control messages from the eNodeB to the UE.

30. The method according to claim 16-28, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein information that specifies resource element mapping of a Physical Downlink Shared Channel includes one or more of: the at least one muting configuration, information on a number of OFDM symbols occupied by a Physical Downlink Control Channel, TFREs occupied by CRS, and configured non-zero power CSI-RS.

31. A receiving node (540, 1100) for receiving an information carrying signal from a transmitting node (560), the receiving node (540, 1100) being configurable to communicate with the transmitting node (560) in a wireless communications system (500) wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540, 1100), the receiving node (540, 1100) comprising:

radio circuitry (1110);

processing circuitry (1120) configured to receive from the transmitting node (560) via said radio circuitry (1110) a dynamic configuration message that identifies, to said

receiving node (540, 1100), at least one muting configuration among a plurality of possible muting configurations, the at least one muting configuration corresponding to a transmission configuration selected from said plurality of transmission configurations by the transmitting node (560) for the transmission of said information carrying signal to said receiving node (540, 1100), the processing circuitry (1120) configured to receive said information carrying signal from the transmitting node (560) via said radio circuitry (1110), and to decode said received information carrying signal taking said at least one muting configuration into account by assuming that no information expected to be decoded by the receiving node (540, 1100) is transmitted on Time-Frequency Resource Elements, TFREs, identified as muted by said at least one muting configuration.

32. A transmitting node (560, 1000) for transmitting an information carrying signal to a receiving node (540), the transmitting node (560, 1000) being configured to be connectable to radio circuitry (1010) for communicating with the receiving node (540) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal via said radio circuitry (1010) to said receiving node (540), the transmitting node (560, 1000) comprising:

processing circuitry (1020) configured to determine a plurality of muting configurations, each muting configuration in said plurality of muting configurations corresponding to at least one transmission configuration in said plurality of transmission configurations, and to select a transmission configuration from said plurality of transmission configurations for transmitting said information carrying signal to said receiving node (540), the processing circuitry (1020) further configured to transmit, to said receiving node (540) via said radio circuitry (1010), a dynamic configuration message identifying, to said receiving node (540), at least one muting configuration out of said plurality of muting configurations that corresponds to said selected transmission configuration, and to transmit, via said radio circuitry (1010), the information carrying signal to said receiving node (540) in a transmission according to the selected transmission configuration, wherein the transmission is muted in accordance with the identified at least one muting configuration.

33. The transmitting node (560, 1000) according to claim 32, wherein the radio circuitry (1010) is comprised in the transmitting node (560, 1000).

CLAIMS

1. A method in a receiving node (540) for receiving an information carrying signal that is transmitted to the receiving node (540) by a transmitting node (560) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540), the method comprising:

receiving (910) from the transmitting node (560) a dynamic configuration message that identifies, to said receiving node (540), at least one muting configuration among a plurality of possible muting configurations, the at least one muting configuration corresponding to a transmission configuration selected from said plurality of transmission configurations by the transmitting node (560) for the transmission of said information carrying signal to said receiving node (540);

receiving (920) said information carrying signal from the transmitting node (560);

decoding (930) said received information carrying signal taking said at least one muting configuration into account by assuming that no information expected to be decoded by the receiving node (540) is transmitted on Time-Frequency Resource Elements, TFREs, identified as muted by said at least one muting configuration.

2. The method according to claim 1, wherein the at least one muting configuration is identified by an indicator in the dynamic configuration message.

3. The method according to claim 2, wherein the indicator comprises one or more bits in a Downlink Control Information, DCI, format.

4. The method according to claim 1-3, wherein the at least one muting configuration comprises a zero-power Channel State Information Reference Signal, CSI-RS, configuration.

5. The method according to claim 4, wherein the at least one muting configuration covers TFREs of at least one Cell Specific Reference Signal, CRS, configuration and/or all TFREs of an Orthogonal Frequency Division Multiplexing, OFDM, symbol.

6. The method according to claim 1-5, wherein the plurality of muting configurations comprises muting configurations that cover TFREs that are zero-power CSI-RS configurable.
7. The method according to claim 6, wherein the plurality of muting configurations comprises at least one muting configuration that covers TFREs of at least one CRS configuration.
8. The method according to claim 6-7, wherein the plurality of muting configurations comprises at least one muting configuration that covers all TFREs of an OFDM symbol.
9. The method according to claim 1-8, wherein the at least one muting configuration is a muting pattern of TFREs that is adjusted to match a desired muting pattern for one or more specific transmission points that are transmitting to the receiving node (540) in a given instance.
10. The method according to claim 9, wherein the given instance is a current subframe in which the dynamic configuration message is received from the transmitting node (560) and wherein the muting pattern is applied for decoding of the information carrying signal in the current subframe.
11. The method according to claim 1-8, wherein the at least one muting configuration identified in the dynamic configuration message received from the transmitting node (560) in a current subframe is applied for decoding of the information carrying signal in the current subframe.
12. The method according to claim 1-11, wherein the information carrying signal is received from the transmitting node (560) in a coordinated transmission via one or more transmission points (510, 520, 530).
13. The method according to claim 12, wherein the coordinated transmission is a Coordinated Multi-Point transmission.

14. The method according to claim 2 or 3-13 when dependent from claim 2, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein the at least one muting configuration is determined from the indicator received in the dynamic configuration message, system information of the serving cell of the UE and/or dedicated radio resource control messages from the eNodeB to the UE.

15. The method according to claim 1-13, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein information that specifies Resource Element mapping of a Physical Downlink Shared Channel includes one or more of: the at least one muting configuration, information on a number of OFDM symbols occupied by a Physical Downlink Control Channel, TFREs occupied by CRS, and configured non-zero power CSI-RS.

16. A method in a transmitting node (560) for transmitting an information carrying signal to a receiving node (540) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540), the method comprising:

determining (940) a plurality of muting configurations, each muting configuration in said plurality of muting configurations corresponding to at least one transmission configuration in said plurality of transmission configurations;

selecting (950) a transmission configuration from said plurality of transmission configurations for transmitting said information carrying signal to said receiving node (540);

transmitting (960) to said receiving node a dynamic configuration message identifying, to said receiving node (540), at least one muting configuration out of said plurality of muting configurations that corresponds to said selected transmission configuration; and

transmitting (970) said information carrying signal to said receiving node (540) in a transmission according to said selected transmission configuration, wherein the transmission is muted in accordance with the identified at least one muting configuration.

17. The method according to claim 16, wherein the at least one muting configuration is identified by an indicator in the dynamic configuration message.

18. The method according to claim 17, wherein the indicator comprises one or more bits in a Downlink Control Information, DCI, format.

19. The method according to claim 16-18, wherein the at least one muting configuration comprises a zero-power Channel State Information Reference Signal, CSI-RS, configuration.

20. The method according to claim 19, wherein the at least one muting configuration covers TFREs of at least one Cell Specific Reference Signal, CRS, configuration and/or all TFREs of an Orthogonal Frequency Division Multiplexing, OFDM, symbol.

21. The method according to claim 16-20, wherein the plurality of muting configurations comprises muting configurations that cover TFREs that are zero-power CSI-RS configurable.

22. The method according to claim 21, wherein the plurality of muting configurations comprises at least one muting configuration that covers TFREs of at least one CRS configuration.

23. The method according to claim 21-22, wherein the plurality of muting configurations comprises at least one muting configuration that covers all TFREs of an OFDM symbol.

24. The method according to claim 16-23, wherein the at least one muting configuration is a muting pattern of TFREs that is adjusted to match a desired muting pattern for one or more specific transmission points that are transmitting to the receiving node (540) in a given instance.

25. The method according to claim 24, wherein the given instance is a current subframe in which the dynamic configuration message is transmitted by the transmitting node (560) and wherein the muting pattern is to be applied by the receiving node (540) for decoding of the information carrying signal in the current subframe.

26. The method according to claim 16-23, wherein the at least one muting configuration identified in the dynamic configuration message transmitted by the transmitting node (560) in a current subframe is to be applied by the receiving node (540) for decoding of the information carrying signal in the current subframe.

27. The method according to claim 16-26, wherein the information carrying signal is transmitted by the transmitting node (560) in a coordinated transmission via one or more transmission points (510, 520, 530).

28. The method according to claim 27, wherein the coordinated transmission is a Coordinated Multi-Point transmission.

29. The method according to claim 17 or 18-28 when dependent from claim 17, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein the at least one muting configuration is determined by the indicator transmitted in the dynamic configuration message, system information of the serving cell of the UE and/or dedicated radio resource control messages from the eNodeB to the UE.

30. The method according to claim 16-28, wherein the receiving node (540) is a User Equipment, UE, served by a serving cell and the transmitting node (560) is an eNodeB and wherein information that specifies resource element mapping of a Physical Downlink Shared Channel includes one or more of: the at least one muting configuration, information on a number of OFDM symbols occupied by a Physical Downlink Control Channel, TFREs occupied by CRS, and configured non-zero power CSI-RS.

31. A receiving node (540, 1100) for receiving an information carrying signal from a transmitting node (560), the receiving node (540, 1100) being configurable to communicate with the transmitting node (560) in a wireless communications system (500) wherein a plurality of transmission configurations are available for transmitting said information carrying signal to said receiving node (540, 1100), the receiving node (540, 1100) comprising:

radio circuitry (1110);

processing circuitry (1120) configured to receive from the transmitting node (560) via said radio circuitry (1110) a dynamic configuration message that identifies, to said

receiving node (540, 1100), at least one muting configuration among a plurality of possible muting configurations, the at least one muting configuration corresponding to a transmission configuration selected from said plurality of transmission configurations by the transmitting node (560) for the transmission of said information carrying signal to said receiving node (540, 1100), the processing circuitry (1120) configured to receive said information carrying signal from the transmitting node (560) via said radio circuitry (1110), and to decode said received information carrying signal taking said at least one muting configuration into account by assuming that no information expected to be decoded by the receiving node (540, 1100) is transmitted on Time-Frequency Resource Elements, TFREs, identified as muted by said at least one muting configuration.

32. A transmitting node (560, 1000) for transmitting an information carrying signal to a receiving node (540), the transmitting node (560, 1000) being configured to be connectable to radio circuitry (1010) for communicating with the receiving node (540) in a wireless communications system (500), wherein a plurality of transmission configurations are available for transmitting said information carrying signal via said radio circuitry (1010) to said receiving node (540), the transmitting node (560, 1000) comprising:

processing circuitry (1020) configured to determine a plurality of muting configurations, each muting configuration in said plurality of muting configurations corresponding to at least one transmission configuration in said plurality of transmission configurations, and to select a transmission configuration from said plurality of transmission configurations for transmitting said information carrying signal to said receiving node (540), the processing circuitry (1020) further configured to transmit, to said receiving node (540) via said radio circuitry (1010), a dynamic configuration message identifying, to said receiving node (540), at least one muting configuration out of said plurality of muting configurations that corresponds to said selected transmission configuration, and to transmit, via said radio circuitry (1010), the information carrying signal to said receiving node (540) in a transmission according to the selected transmission configuration, wherein the transmission is muted in accordance with the identified at least one muting configuration.

33. The transmitting node (560, 1000) according to claim 32, wherein the radio circuitry (1010) is comprised in the transmitting node (560, 1000).