

CLAIMS

1. A communication apparatus comprising:
circuitry, which, in operation, generates a transmission signal comprising a
5 first signal field and a second signal field, wherein the first signal field comprises
punctured channel information and the second signal field comprises supplemental
punctured channel information, wherein when the transmission signal is used for
punctured single-user (SU) or multi-user (MU) multiple input multiple output (MIMO)
transmission and the punctured channel information is able to indicate a channel
10 puncturing pattern that is applied to the transmission signal, the second signal field
does not comprise the supplemental punctured channel information; and
a transmitter, which, in operation, transmits the transmission signal.
2. The communication apparatus of claim 1, wherein the punctured channel
15 information is able to indicate all channel puncturing patterns that are allowed for up
to a determined bandwidth.
3. The communication apparatus of claim 1, wherein the punctured channel
information is able to indicate all channel puncturing patterns that are allowed for up
20 to a determined bandwidth and a part of channel puncturing patterns for bandwidths
which are larger than the determined bandwidth.
4. The communication apparatus of claim 1, wherein when the transmission
signal is used for punctured SU or MU-MIMO transmission and the punctured
25 channel information is not able to indicate a channel puncturing pattern that is
applied to the transmission signal, the second signal field comprises the
supplemental punctured channel information that, together with the punctured
channel information, indicates a channel puncturing pattern that is applied to the
transmission signal.
30
5. The communication apparatus of claim 1, wherein the punctured channel
information and bandwidth information are indicated in a single signalling field of the
first signal field.
- 35 6. The communication apparatus of claim 1, wherein the punctured channel
information and bandwidth information are indicated in two signalling fields of the first
signal field, respectively.

7. The communication apparatus of claim 1, wherein when the transmission signal is used for punctured Orthogonal Frequency Division Multiple Access (OFDMA) transmission and the punctured channel information is not able to indicate
5 a channel puncturing pattern that is applied to the transmission signal, the second signal field comprises the supplemental punctured channel information that, together with the punctured channel information, indicates a channel puncturing pattern that is applied to the transmission signal.
- 10 8. A communication apparatus comprising:
a receiver, which, in operation, receives a transmission signal comprising a first signal field and a second signal field, wherein the first signal field comprises punctured channel information and the second signal field comprises supplemental punctured channel information, wherein when the transmission signal is used for
15 punctured single-user (SU) or multi-user (MU) multiple input multiple output (MIMO) transmission and the punctured channel information is able to indicate a channel puncturing pattern that is applied to the transmission signal, the second signal field does not comprise the supplemental punctured channel information; and
circuitry, which, in operation, processes the transmission signal.
- 20 9. The communication apparatus of claim 8, wherein the punctured channel information is able to indicate all channel puncturing patterns that are allowed for up to a determined bandwidth.
- 25 10. The communication apparatus of claim 8, wherein the punctured channel information is able to indicate all channel puncturing patterns that are allowed for up to a determined bandwidth and a part of channel puncturing patterns for bandwidths which are larger than the determined bandwidth.
- 30 11. The communication apparatus of claim 8, wherein when the transmission signal is used for punctured SU or MU-MIMO transmission and the punctured channel information is not able to indicate a channel puncturing pattern that is applied to the transmission signal, the second signal field comprises the supplemental punctured channel information that, together with the punctured
35 channel information, indicates a channel puncturing pattern that is applied to the transmission signal.

12. The communication apparatus of claim 8, wherein the punctured channel information and bandwidth information are indicated in a single signalling field of the first signal field.

5 13. The communication apparatus of claim 8, wherein the punctured channel information and bandwidth information are indicated in two signalling fields of the first signal field, respectively.

10 14. The communication apparatus of claim 8, wherein when the transmission signal is used for punctured Orthogonal Frequency Division Multiple Access (OFDMA) transmission and the punctured channel information is not able to indicate a channel puncturing pattern that is applied to the transmission signal, the second signal field comprises the supplemental punctured channel information that, together with the punctured channel information, indicates a channel puncturing pattern that is
15 applied to the transmission signal.

15. A communication method comprising:
generating a transmission signal comprising a first signal field and a second signal field, wherein the first signal field comprises punctured channel information
20 and the second signal field comprises supplemental punctured channel information, wherein when the transmission signal is used for punctured single-user (SU) or multi-user (MU) multiple input multiple output (MIMO) transmission and the punctured channel information is able to indicate a channel puncturing pattern that is applied to the transmission signal, the second signal field does not comprise the supplemental
25 punctured channel information; and
transmitting the transmission signal.