

downlink data (a PDSCH signal) from the signal received from FFT section 204 and outputs the downlink data to data demodulating section 206.

[0072] Data demodulating section 206 demodulates the downlink data received from extracting section 205 and outputs the demodulated downlink data to data decoding section 207.

[0073] Data decoding section 207 decodes the downlink data received from data demodulating section 206 and outputs the decoded downlink data to CRC section 208.

[0074] CRC section 208 performs error detection for the downlink data received from data decoding section 207 using CRC, and outputs an error detection result to response signal generating section 212. Further, if the downlink data is judged to be without an error, CRC section 208 outputs the downlink data as receive data.

[0075] Control section 209 performs control of PUSCH transmission based on the control signal inputted from extracting section 205. Specifically, control section 209 specifies resource assignment at the time of PUSCH transmission to signal assigning section 217 based on PUSCH resource assignment information included in the control signal. Further, control section 209 specifies a coding scheme and a modulation scheme at the time of PUSCH transmission to data encoding section 210 and modulating section 213, respectively, based on information about the coding scheme and the modulation scheme included in the control signal. Further, control section 209 decides the number of repetitions at the time of PUSCH repetition transmission based on information about a coverage enhancement level or the number of repetitions required for PUSCH transmission included in the control signal, and specifies information about the decided number of repetitions to repetition section 216. Further, control section 209 specifies frequency hopping for PUSCH repetition to repetition section 216 based on information about a frequency hopping method included in the control signal.

[0076] Further, control section 209 performs control of PUCCH transmission based on

codes of the former half) are orthogonal to each other, and sequences each of which includes two symbols of the latter half (sequences each of which is composed of the two codes of the latter half) are also orthogonal to each other.

[0102] That is, terminal 200 (spreading section 215) spreads an ACK/NACK signal using
 5 any of such a plurality of orthogonal cover code sequences that their partial sequences each of which is composed of codes corresponding to the first two symbols of a subframe (sequences each of which corresponds to two symbols of the former half) are mutually partially orthogonal, and their partial sequences each of which is composed of codes corresponding to the last two symbols (sequences each of which corresponds to two
 10 symbols of the latter half) are mutually partially orthogonal.

[0103] Thereby, by separating two-symbol former halves and two-symbol latter halves, base station 100 can separate a plurality of ACK/NACK signals code-multiplexed by orthogonal cover code sequences. Therefore, even if the last two SC-FDMA symbols (Method 1) or the first two SC-FDMA symbols (Method 2) are punctured in a retuning
 15 subframe to transmit a signal, collapse of orthogonality does not occur between orthogonal cover code sequences which are mutually partially orthogonal to each other. In other words, even if any one of the sequence of the former-half two symbols among four symbols corresponding to a sequence length and the sequence of the latter-half two symbols is punctured, collapse of orthogonality does not occur in the other sequence.

[0104] Here, for example, an orthogonal cover code sequence to be used in an existing LTE terminal (an OCC sequence) is derived from a PUCCH resource index with the following equations.

[0105] [1]

$$n_{oc} = \left\lfloor n' \cdot \Delta_{shift}^{PUCCH} / N' \right\rfloor \quad (1)$$

[0106] [2]

$$N' = \begin{cases} N_{cs}^{(1)} & \text{if } n_{PUCCH}^{(1)} < c \cdot N_{cs}^{(1)} / \Delta_{shift}^{PUCCH} \\ N_{sc}^{RB} & \text{otherwise} \end{cases}$$

$$c = 3 \quad (2)$$

[0107] [3]

$$n' = \begin{cases} n_{PUCCH}^{(1)} & \text{if } n_{PUCCH}^{(1)} < c \cdot N_{cs}^{(1)} / \Delta_{shift}^{PUCCH} \\ (n_{PUCCH}^{(1)} - c \cdot N_{cs}^{(1)} / \Delta_{shift}^{PUCCH}) \bmod (c \cdot N_{sc}^{RB} / \Delta_{shift}^{PUCCH}) & \text{otherwise} \end{cases} \quad (3)$$

[0108] In equations 1 to 3, n_{OC} indicates an OCC index; $n_{OC}=0$ indicates (1, 1, 1, 1);
 5 $n_{OC}=1$ indicates (1, -1, 1, -1); and $n_{OC}=2$ indicates (1, -1, -1, 1). Further, Δ_{shift}^{PUCCH} indicates a gap between adjacent amounts of cyclic shift; $N_{cs}^{(1)}$ indicates an amount of cyclic shift used for PUCCH format 1/1a/1b; N_{sc}^{RB} indicates the number of subcarriers per one RB; and $n_{PUCCH}^{(1)}$ indicates a PUCCH resource index.

[0109] Further, in the above equation, $c=3$ indicates the number of terminals which can
 10 be multiplexed by an orthogonal cover code sequence, that is, the number of candidates for an orthogonal cover code sequence to spread an ACK/NACK signal. Therefore, in the present embodiment, $c=2$ is assumed in the above equation as the number of terminals 200 (MTC terminals) to which frequency hopping is to be applied, and the number of candidates for an orthogonal cover code sequence to spread an ACK/NACK signal can be
 15 restricted to two by deriving OCC indices from PUCCH resource indices.

[0110] As described above, in the present embodiment, in the case where frequency hopping is applied at the time of uplink repetition transmission, terminal 200 punctures the last two SC-FDMA symbols or the first two SC-FDMA symbols of a retuning subframe to transmit a signal. At this time, terminal 200 restricts an orthogonal cover code sequence
 20 to spread an ACK/NACK signal in a PUCCH to two orthogonal cover code sequences which are partially orthogonal to each other. Thereby, it is possible to secure retuning time for changing the 1.4-MHz frequency band which terminal 200 uses to transmit a