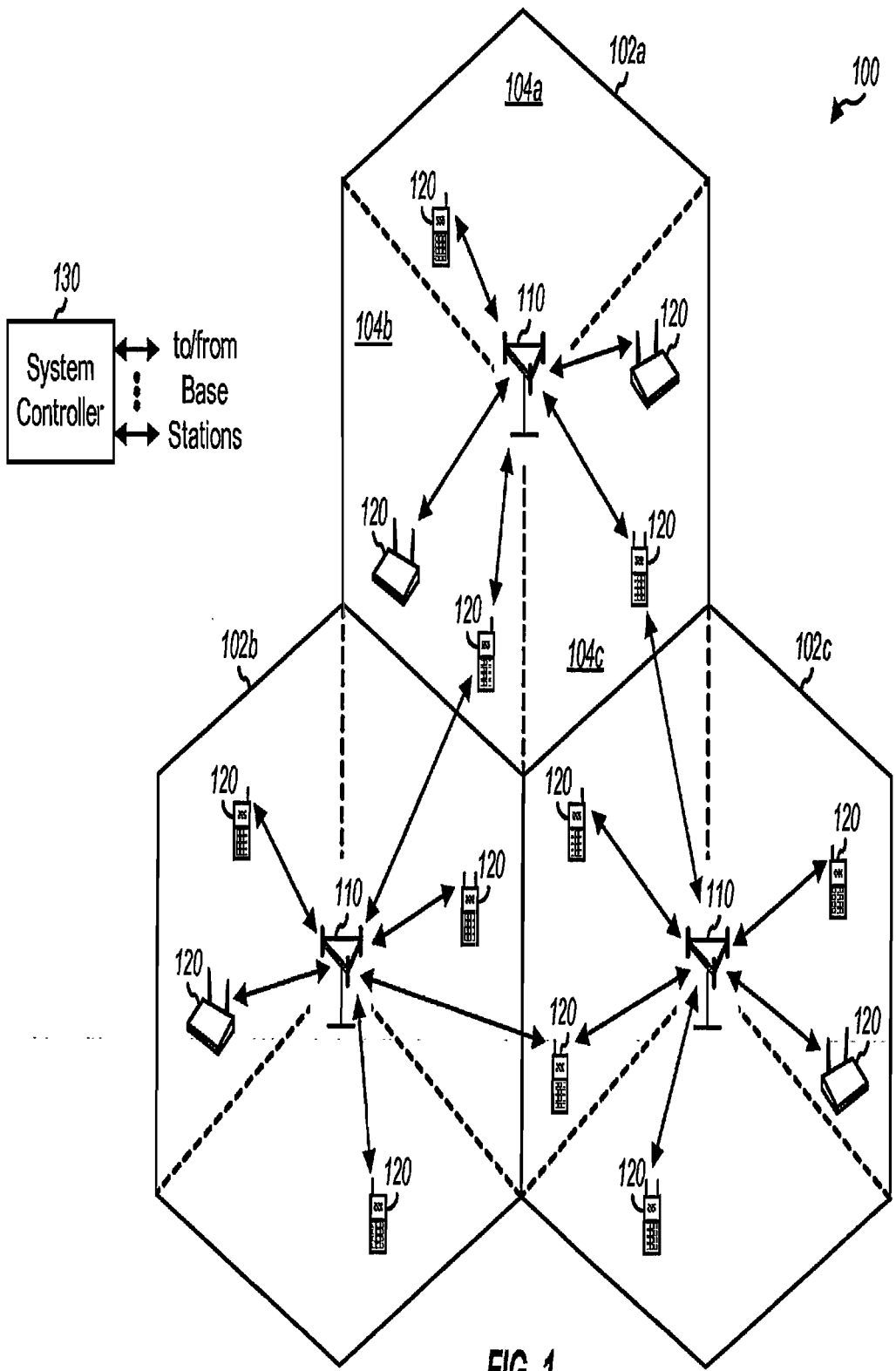

100
102a
104a
102b
104b
102c
104c
110
120
130
System Controller
to/from Base Stations

FIG. 1

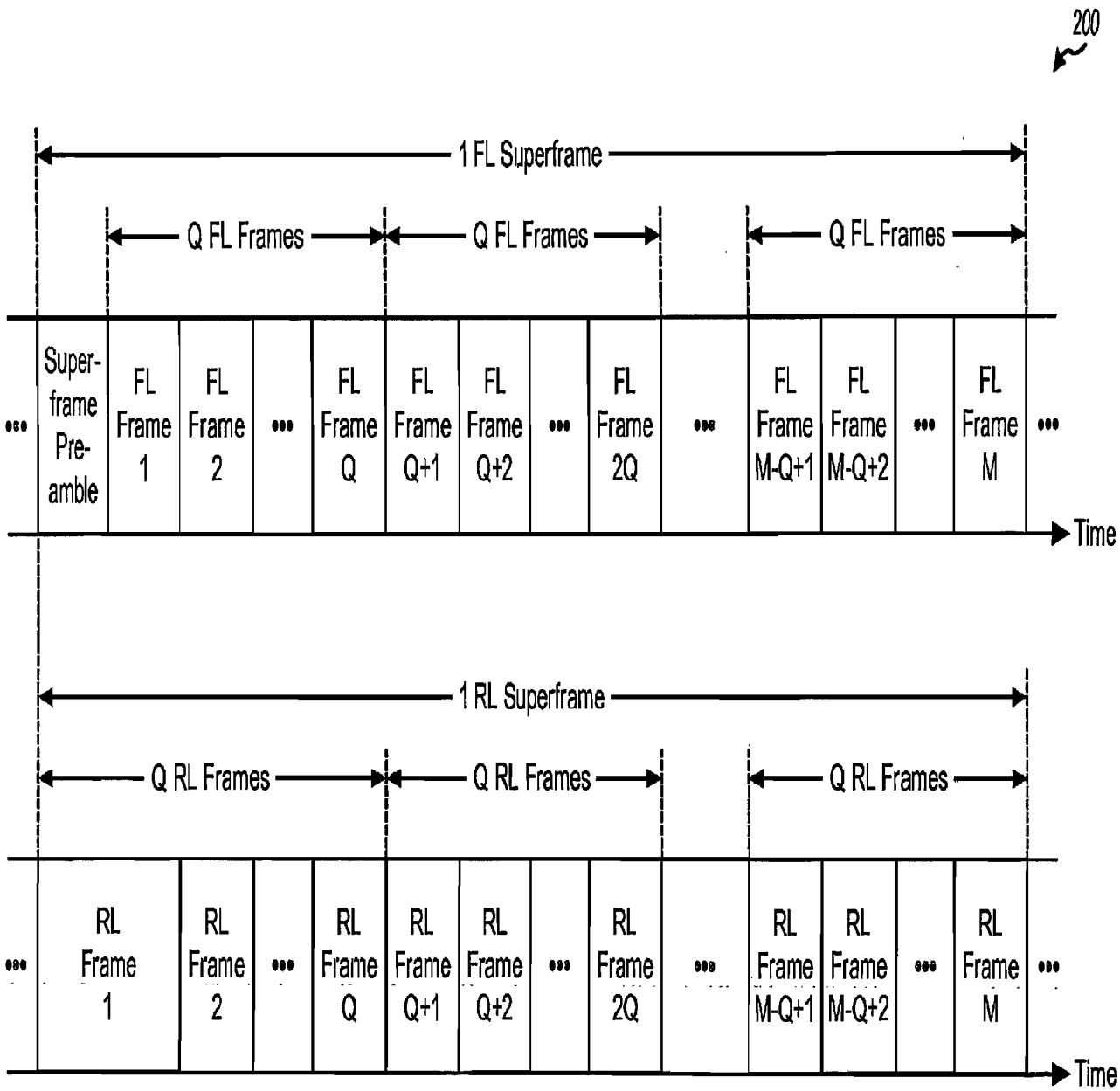

200
1 FL Superframe
Q FL Frames
Q FL Frames
Q FL Frames
Super-frame Pre-amble
FL Frame 1
FL Frame 2
FL Frame Q
FL Frame Q+1
FL Frame Q+2
FL Frame 2Q
FL Frame M-Q+1
FL Frame M-Q+2
FL Frame M
Time
1 RL Superframe
Q RL Frames
Q RL Frames
Q RL Frames
RL Frame 1
RL Frame 2
RL Frame Q
RL Frame Q+1
RL Frame Q+2
RL Frame 2Q
RL Frame M-Q+1
RL Frame M-Q+2
RL Frame M
Time

FIG. 2A

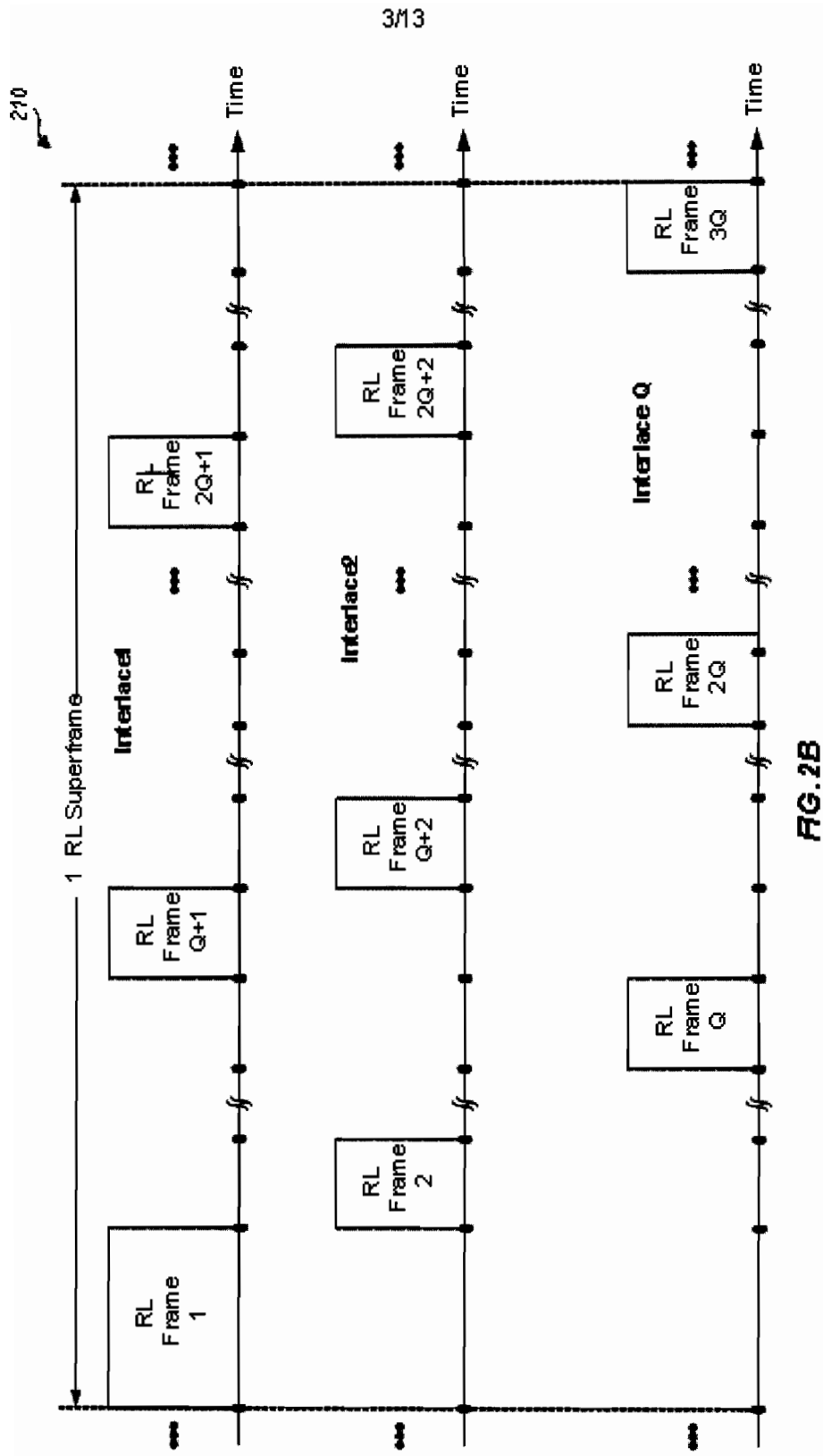

210
1 RL Superframe
Time
Time
Time
Interlace1
Interlace2
Interlace Q
RL Frame 1
RL Frame 2
RL Frame Q
RL Frame Q+1
RL Frame Q+2
RL Frame 2Q
RL Frame 2Q+1
RL Frame 2Q+2
RL Frame 3Q

FIG. 2B

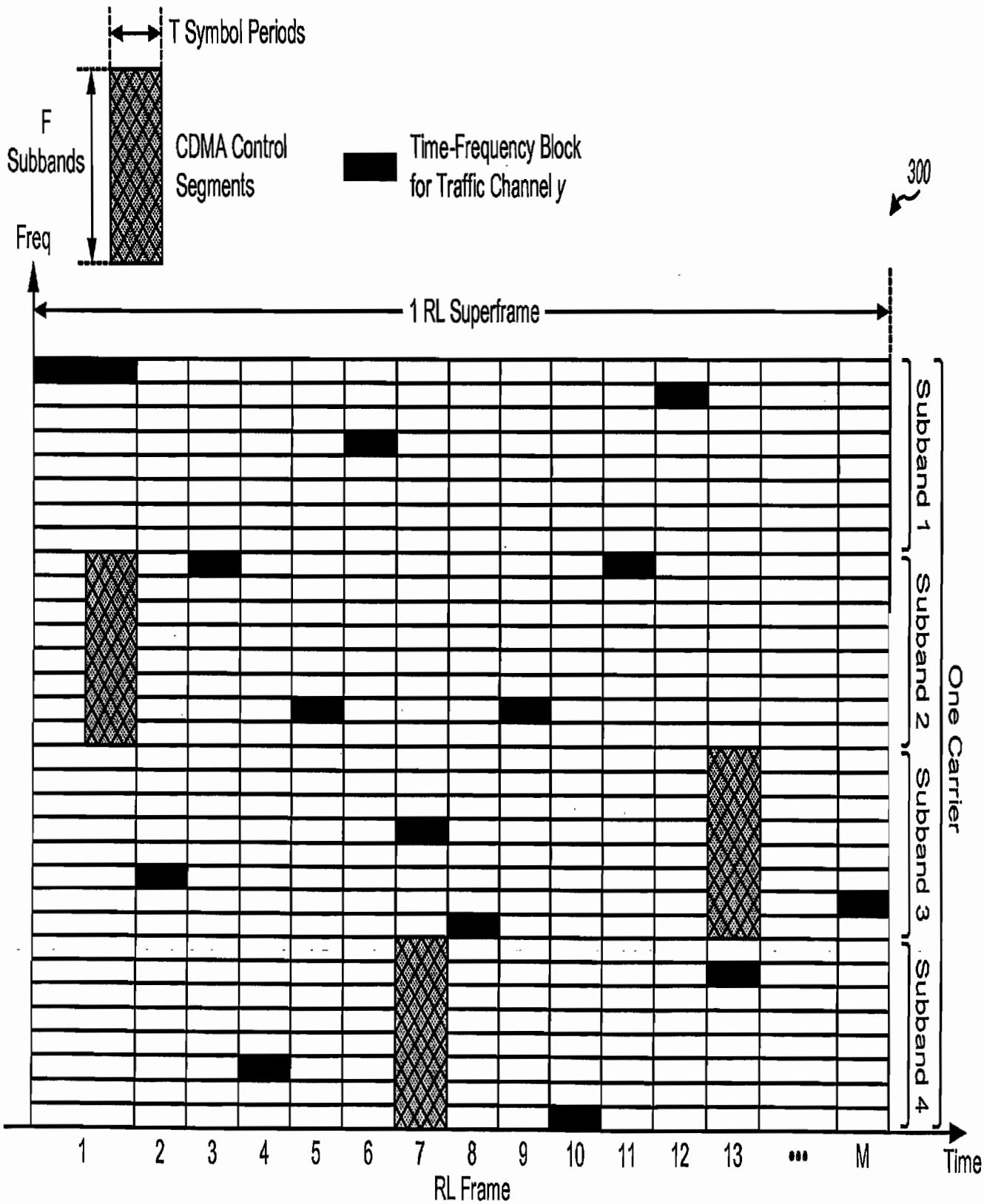

T Symbol Periods
F
Subbands
CDMA Control
Segments
Time-Frequency Block
for Traffic Channel y
300
Freq
1 RL Superframe
Subband 1
Subband 2
Subband 3
Subband 4
One Carrier
1
2
3
4
5
6
7
8
9
10
11
12
13
M
Time
RL Frame

FIG. 3A

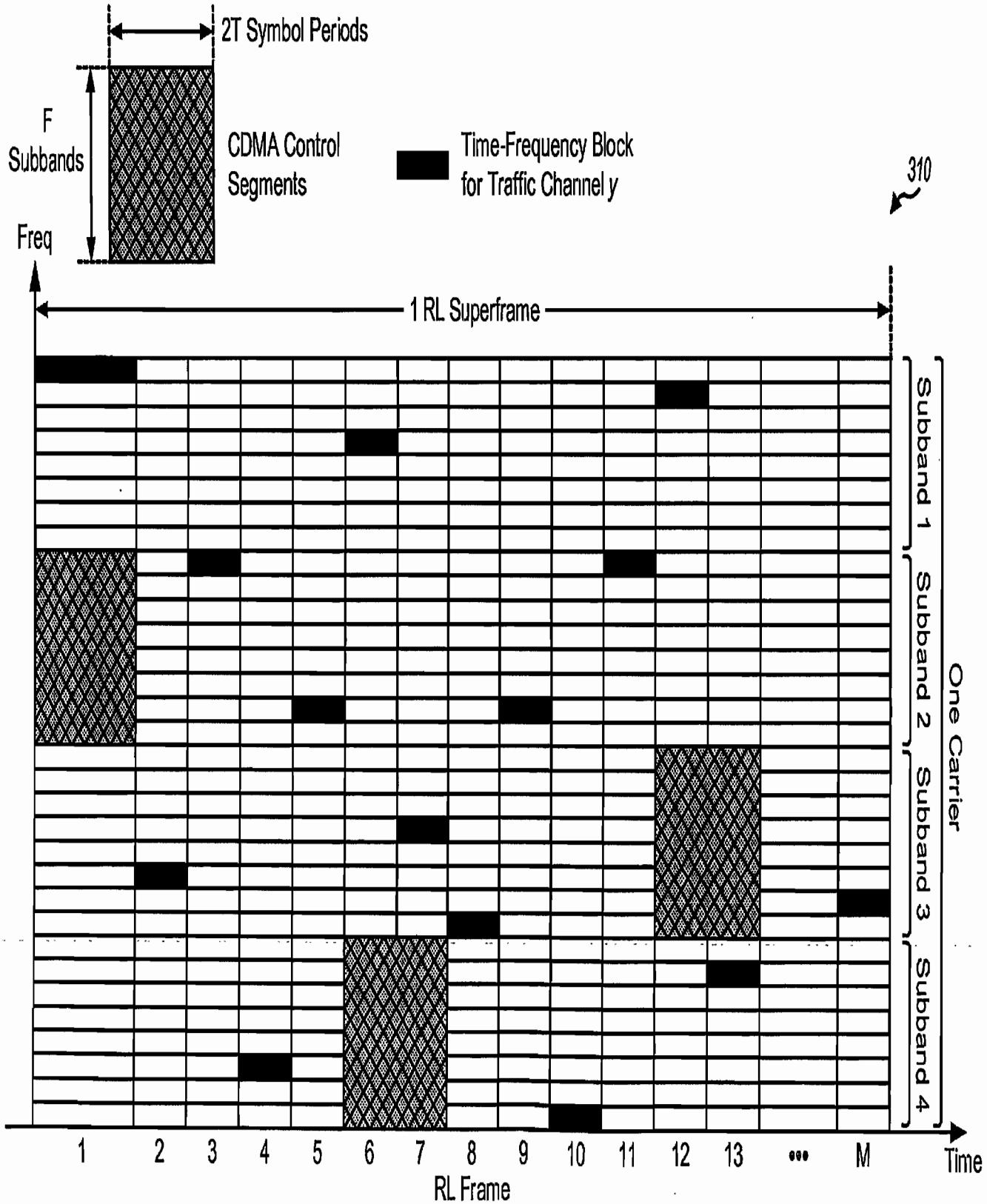

2T Symbol Periods
F Subbands
Freq
CDMA Control Segments
Time-Frequency Block for Traffic Channel y
310
1 RL Superframe
Subband 1
Subband 2
Subband 3
Subband 4
One Carrier
1
2
3
4
5
6
7
8
9
10
11
12
13
...
M
RL Frame
Time

FIG. 3B

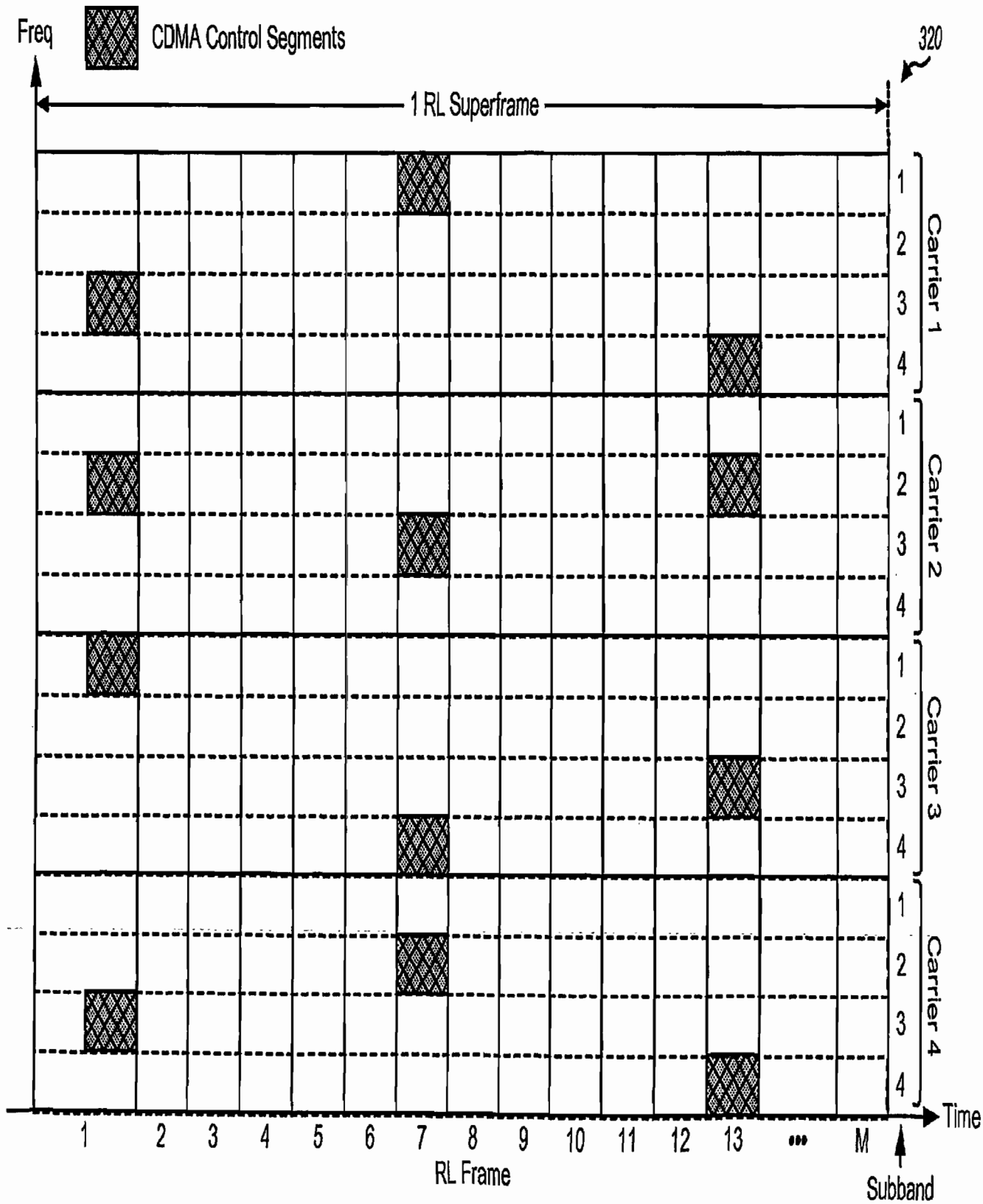

Freq
CDMA Control Segments
320
1 RL Superframe
Carrier 1
Carrier 2
Carrier 3
Carrier 4
1
2
3
4
Time
1 2 3 4 5 6 7 8 9 10 11 12 13 ... M
RL Frame
Subband

FIG. 3C

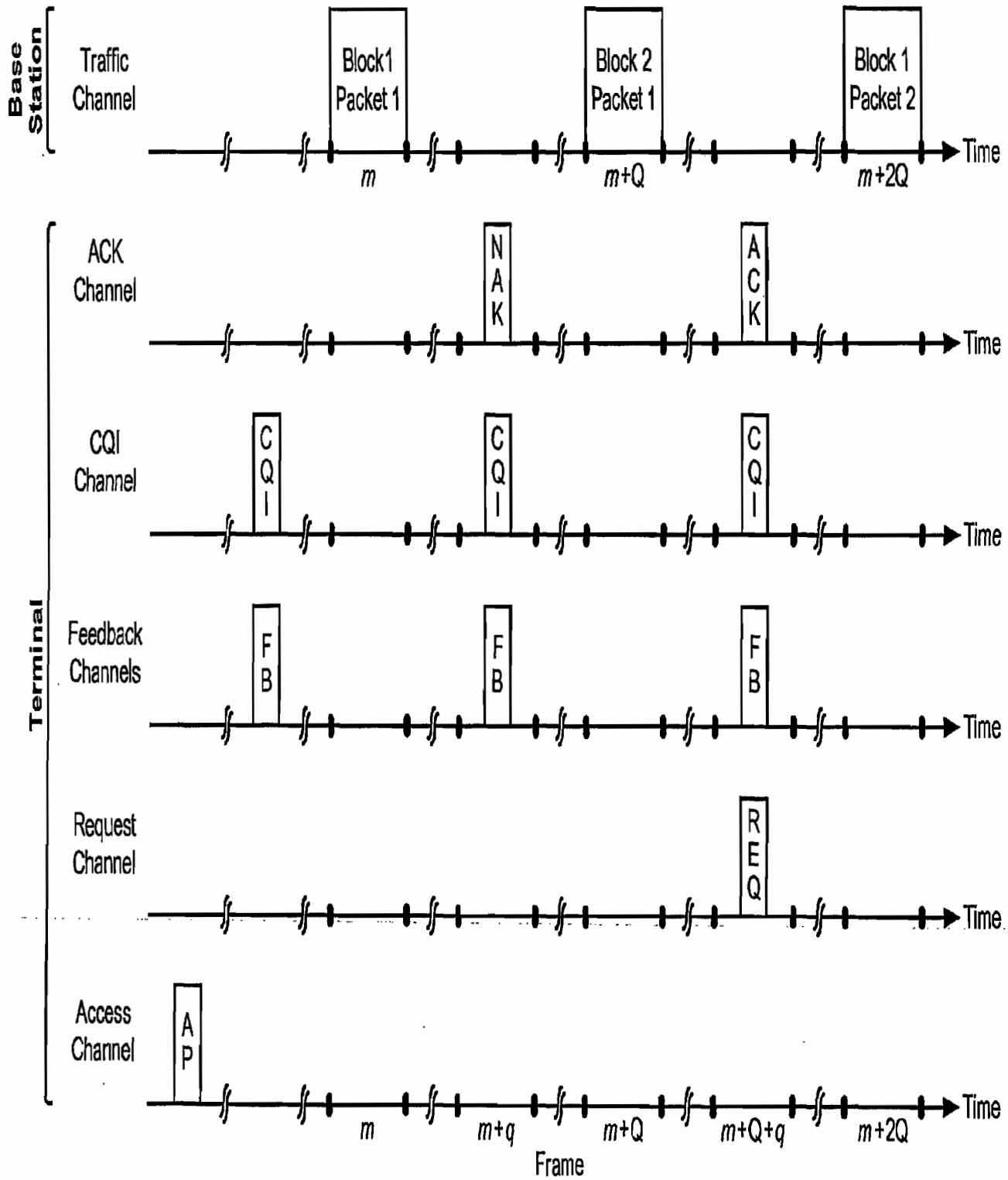

Base Station
Traffic Channel
Block1 Packet 1
Block 2 Packet 1
Block 1 Packet 2
Time
m
m+Q
m+2Q
Terminal
ACK Channel
NAK
ACK
CQI Channel
CQI
Feedback Channels
FB
Request Channel
REQ
Access Channel
AP
m+q
m+Q+q
Frame

FIG. 4

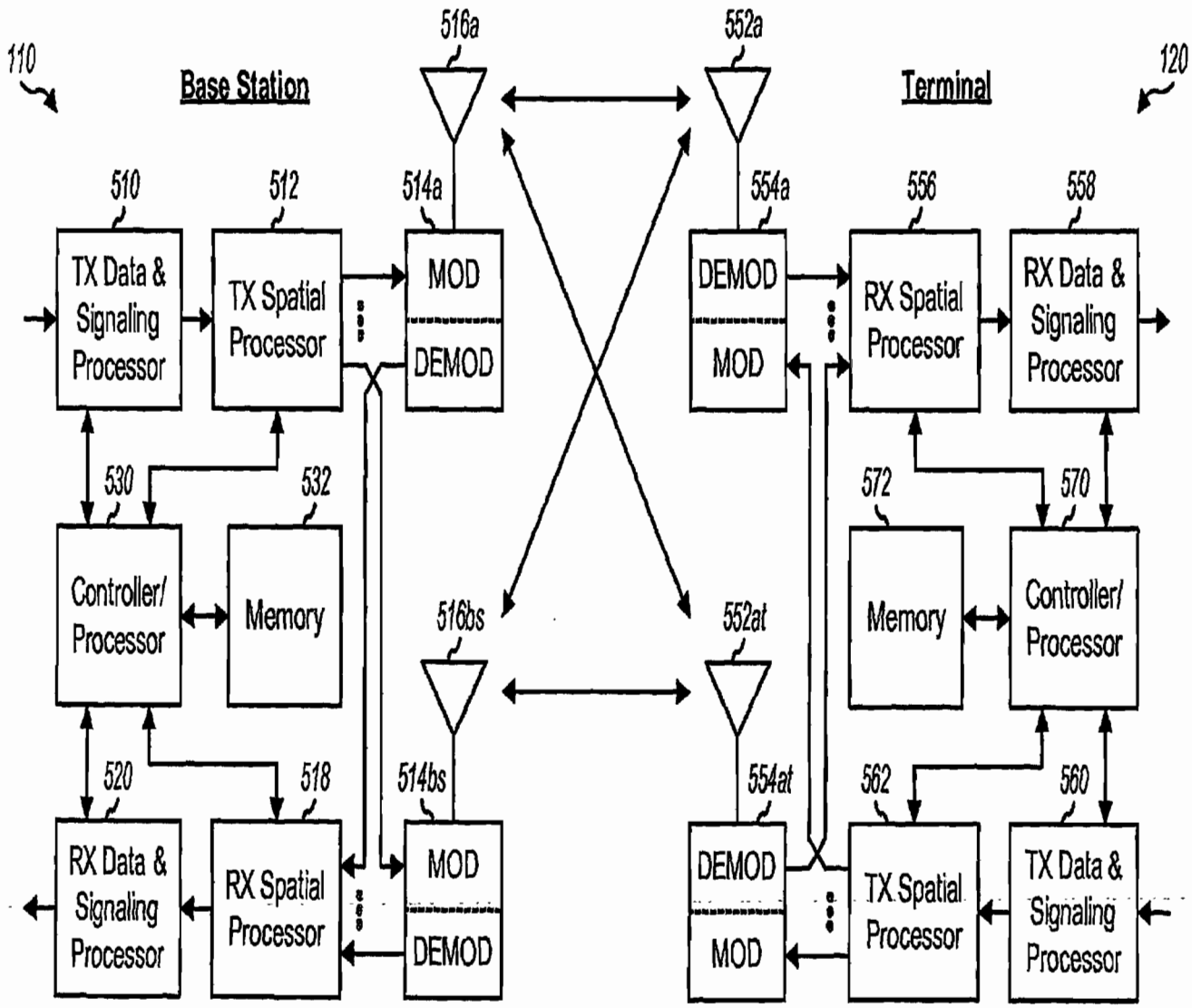

110
Base Station
516a
552a
Terminal
120
510
512
514a
554a
556
558
TX Data & Signaling Processor
TX Spatial Processor
MOD
DEMOD
DEMOD
MOD
RX Spatial Processor
RX Data & Signaling Processor
530
532
572
570
Controller/ Processor
Memory
516bs
552at
Memory
Controller/ Processor
520
518
514bs
554at
562
560
RX Data & Signaling Processor
RX Spatial Processor
MOD
DEMOD
DEMOD
MOD
TX Spatial Processor
TX Data & Signaling Processor

FIG. 5

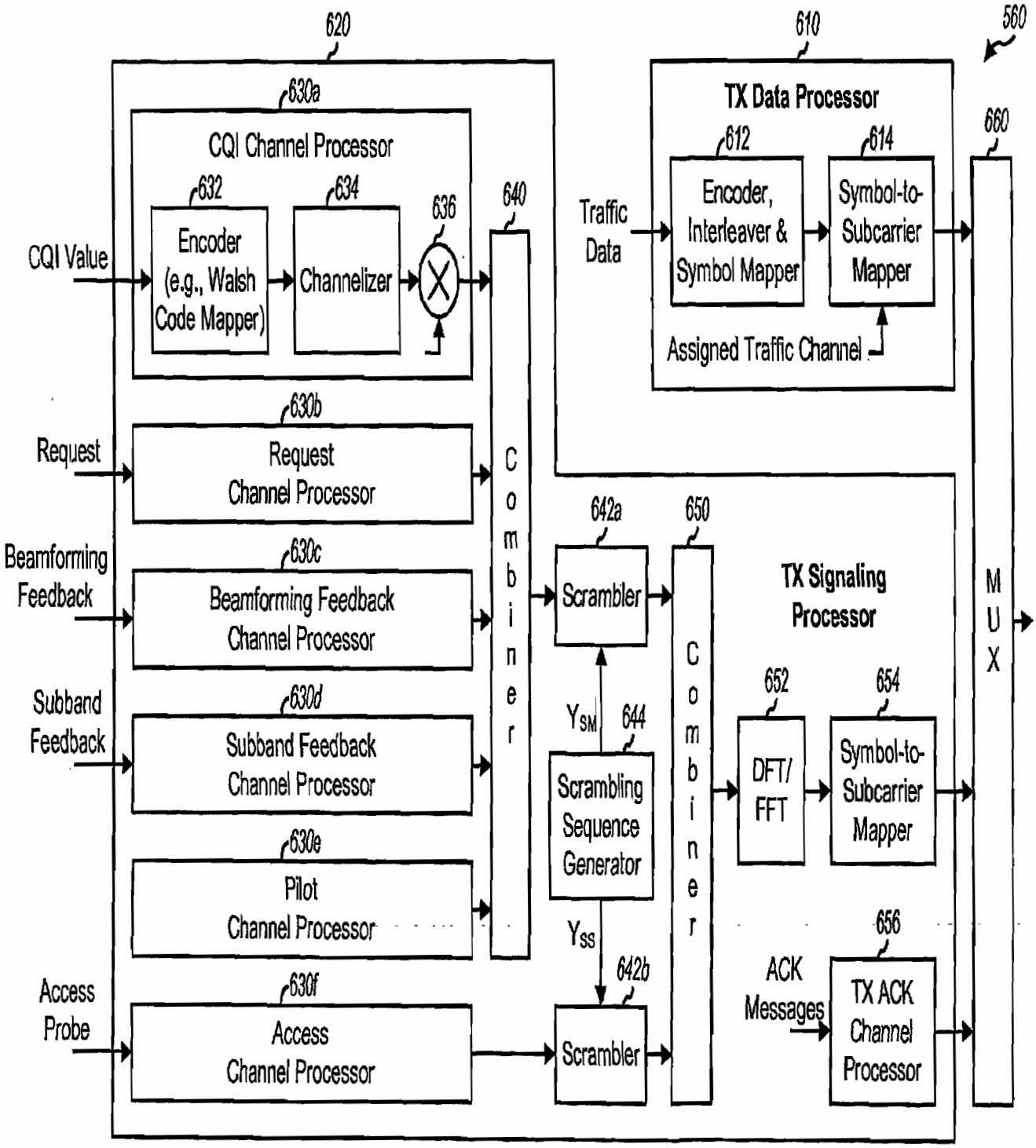

620
610
560
630a
CQI Channel Processor
632
634
636
640
Encoder (e.g., Walsh Code Mapper)
Channelizer
CQI Value
TX Data Processor
612
614
660
Traffic Data
Encoder, Interleaver & Symbol Mapper
Symbol-to-Subcarrier Mapper
Assigned Traffic Channel
630b
Request
Request Channel Processor
Request
C o m b i n e r
642a
650
Scrambler
TX Signaling Processor
630c
Beamforming Feedback Channel Processor
Beamforming Feedback
652
654
630d
Subband Feedback Channel Processor
Subband Feedback
Y_{SM}
644
Scrambling Sequence Generator
DFT/ FFT
Symbol-to-Subcarrier Mapper
630e
Pilot Channel Processor
Y_{SS}
656
642b
630f
Access Channel Processor
Access Probe
Scrambler
ACK Messages
TX ACK Channel Processor
M U X

FIG. 6

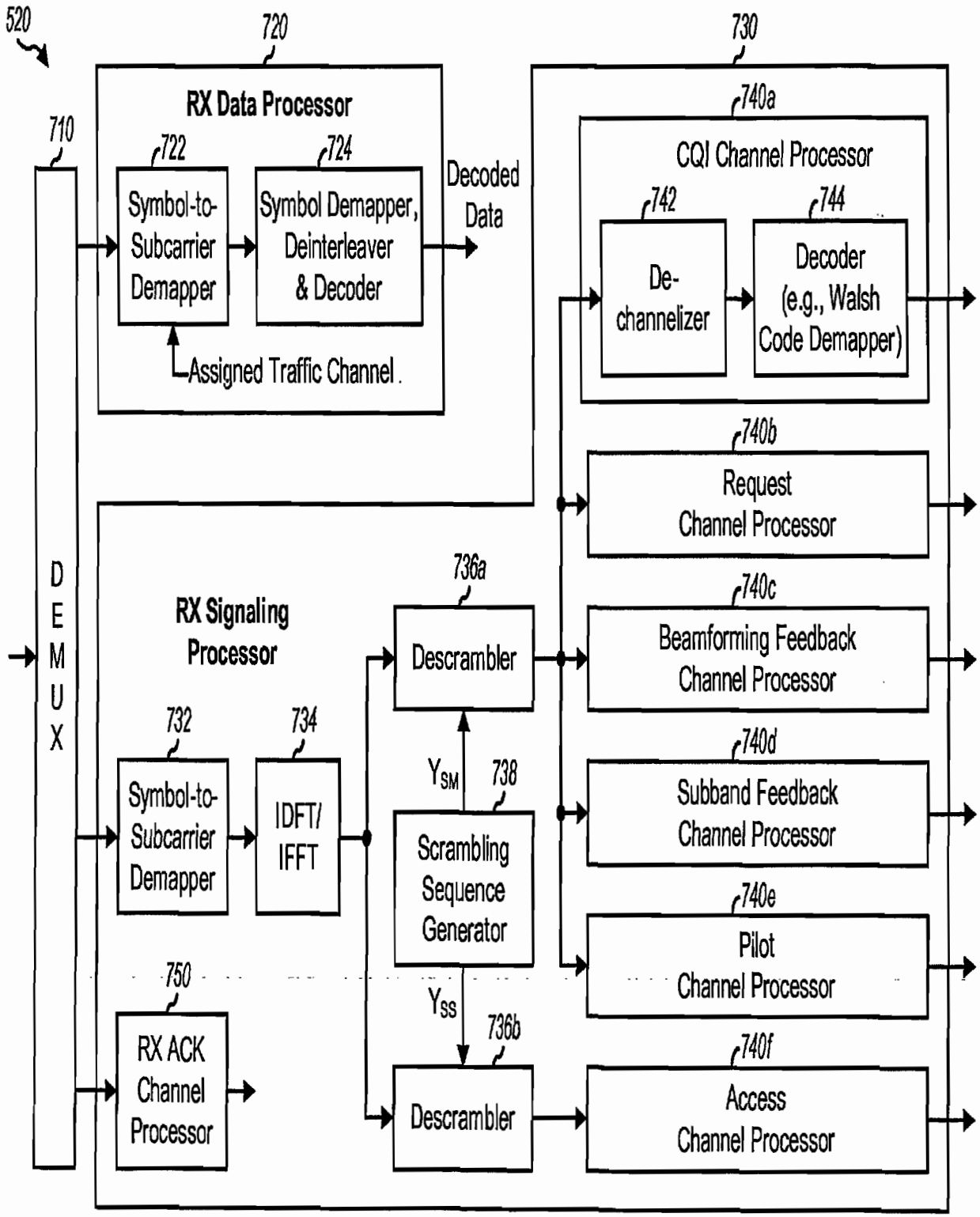

520
720
730
RX Data Processor
710
722
724
740a
CQI Channel Processor
Symbol-to-Subcarrier Demapper
Symbol Demapper, Deinterleaver & Decoder
Decoded Data
742
744
De-channelizer
Decoder (e.g., Walsh Code Demapper)
Assigned Traffic Channel
740b
Request Channel Processor
DEMUX
736a
RX Signaling Processor
Descrambler
740c
Beamforming Feedback Channel Processor
732
734
738
Symbol-to-Subcarrier Demapper
IDFT/ IFFT
Y_{SM}
740d
Subband Feedback Channel Processor
Scrambling Sequence Generator
740e
750
Pilot Channel Processor
Y_{SS}
736b
740f
RX ACK Channel Processor
Descrambler
Access Channel Processor

FIG. 7

800
Start
812
Determine transmission parameters (e.g., the size, interlace, and frequency hopping) for the CDMA control segment for a sector
814
Determine which CDMA signaling channels are enabled for the sector
816
Select an average transmission interval for each enabled CDMA signaling channel for the sector
818
Determine which CDMA signaling channels and reporting mode are enabled for each terminal
820
Send control information indicative of the operation of the CDMA control segment and the enabled CDMA signaling channels to the terminals
End

FIG. 8

900
912
Means for determining transmission parameters (e.g., the size, interlace, and frequency hopping) for the CDMA control segment for a sector
914
Means for determining which CDMA signaling channels are enabled for the sector
916
Means for selecting an average transmission interval for each enabled CDMA signaling channel for the sector
918
Means for determining which CDMA signaling channels and reporting mode are enabled for each terminal
920
Means for sending control information indicative of the operation of the CDMA control segment and the enabled CDMA signaling channels to the terminals

FIG. 9

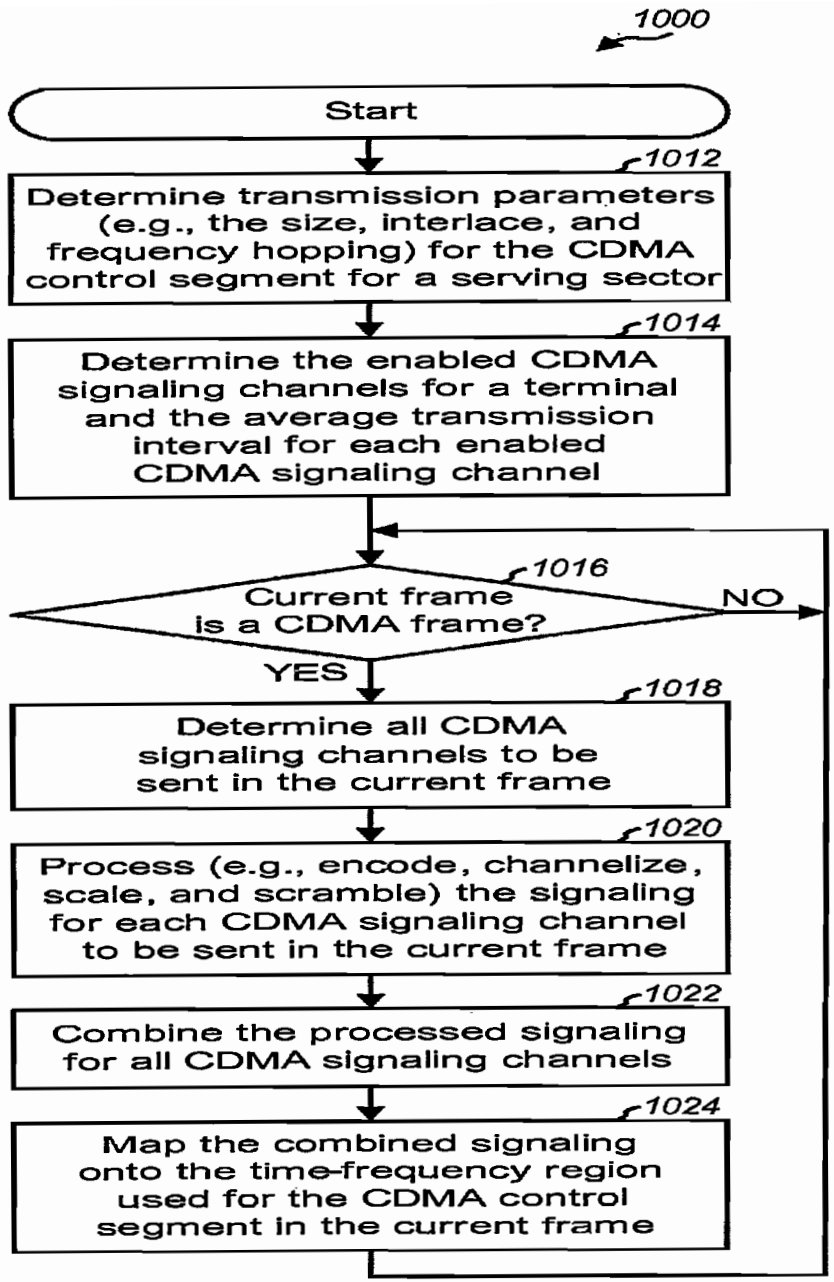

1000
Start
1012
Determine transmission parameters (e.g., the size, interlace, and frequency hopping) for the CDMA control segment for a serving sector
1014
Determine the enabled CDMA signaling channels for a terminal and the average transmission interval for each enabled CDMA signaling channel
1016
Current frame is a CDMA frame?
NO
YES
1018
Determine all CDMA signaling channels to be sent in the current frame
1020
Process (e.g., encode, channelize, scale, and scramble) the signaling for each CDMA signaling channel to be sent in the current frame
1022
Combine the processed signaling for all CDMA signaling channels
1024
Map the combined signaling onto the time-frequency region used for the CDMA control segment in the current frame

FIG. 10

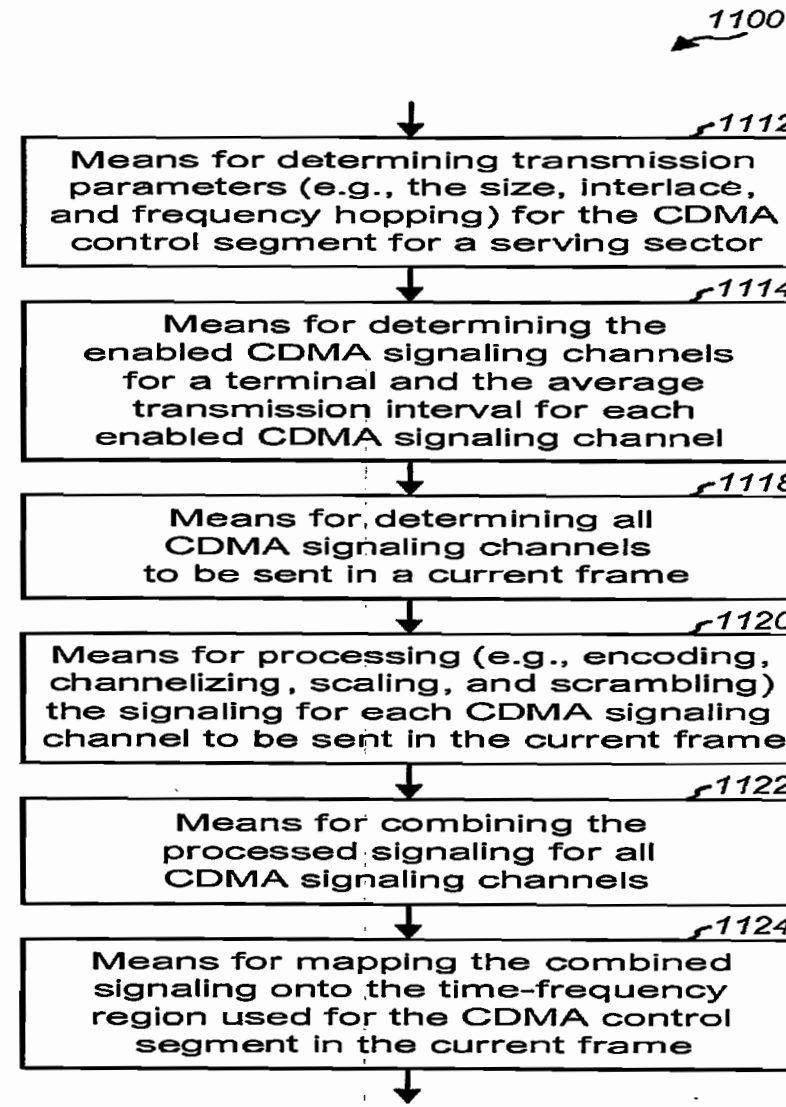

1100
1112
Means for determining transmission parameters (e.g., the size, interlace, and frequency hopping) for the CDMA control segment for a serving sector
1114
Means for determining the enabled CDMA signaling channels for a terminal and the average transmission interval for each enabled CDMA signaling channel
1118
Means for determining all CDMA signaling channels to be sent in a current frame
1120
Means for processing (e.g., encoding, channelizing, scaling, and scrambling) the signaling for each CDMA signaling channel to be sent in the current frame
1122
Means for combining the processed signaling for all CDMA signaling channels
1124
Means for mapping the combined signaling onto the time-frequency region used for the CDMA control segment in the current frame

FIG. 11

1200
Start
Current frame is a CDMA frame?
1212
YES
NO
Extract received symbols from the time-frequency region used for the CDMA control segment in the current frame
1214
Determine all CDMA signaling channels that might be sent by each active terminal in the current frame
1216
Process (e.g., descramble, dechannelize, and decode) the received signaling channel that might be sent by each active terminal to recover the signaling from that CDMA signaling channel
1218
Process (e.g., descramble, dechannelize, and decode) the received symbols for the access channel to recover access probes sent by terminals attempting to access the system
1220

FIG. 12

1300
Means for extracting received symbols from the time-frequency region used for the CDMA control segment in the current frame
1314
Means for determining all CDMA signaling channels that might be sent by each active terminal in the current frame
1316
Means for processing (e.g., descrambling, dechannelizing, and decoding) the received symbols for each CDMA signaling channel that might be sent by each active terminal to recover the signaling from that CDMA signaling channel
1318
Means for processing (e.g., descrambling, dechannelizing, and decoding) the received symbols for the access channel to recover access probes sent by terminals attempting to access the system
1320

FIG. 13