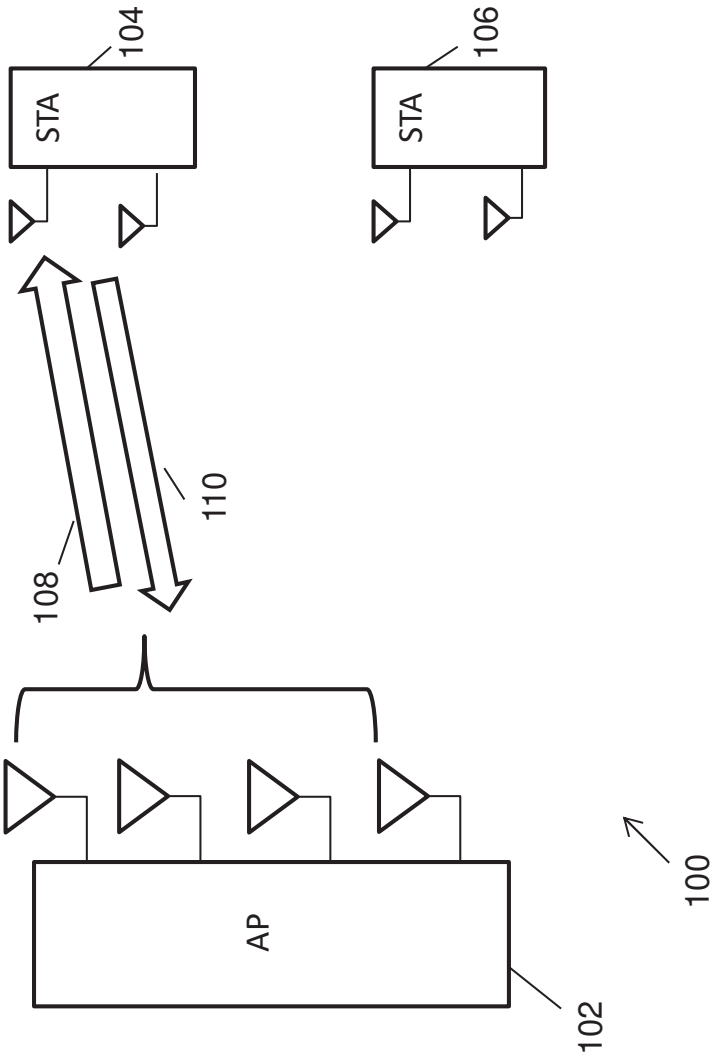


Figure 1

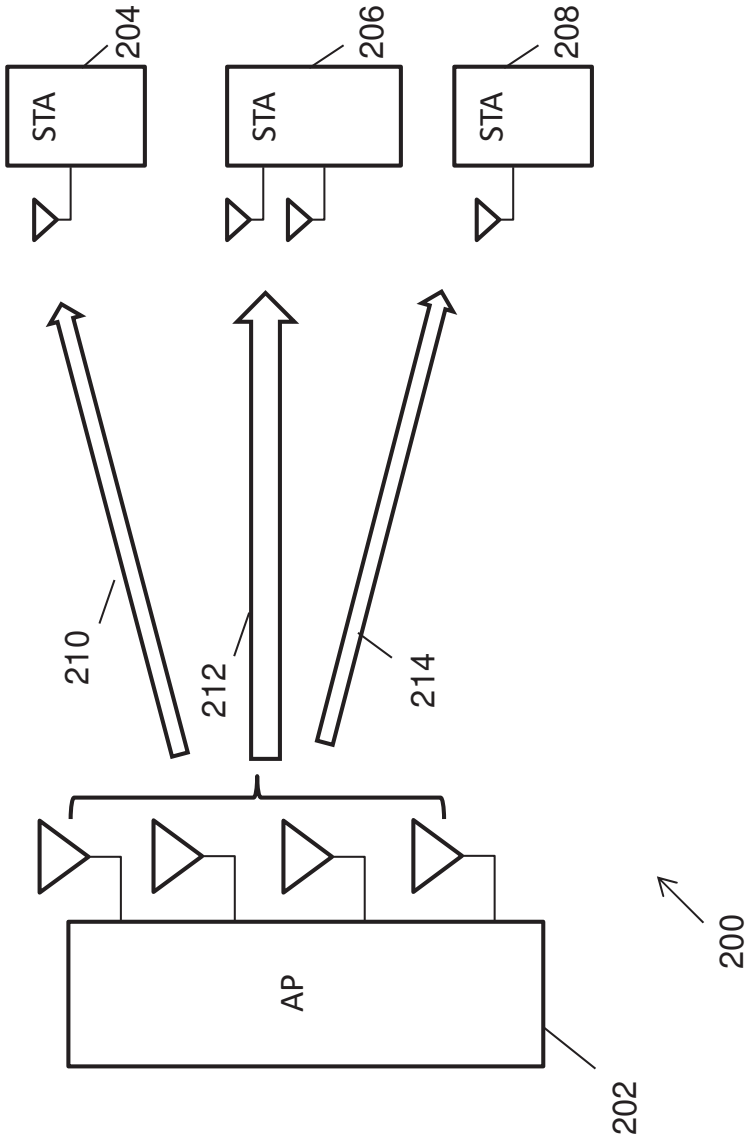


Figure 2

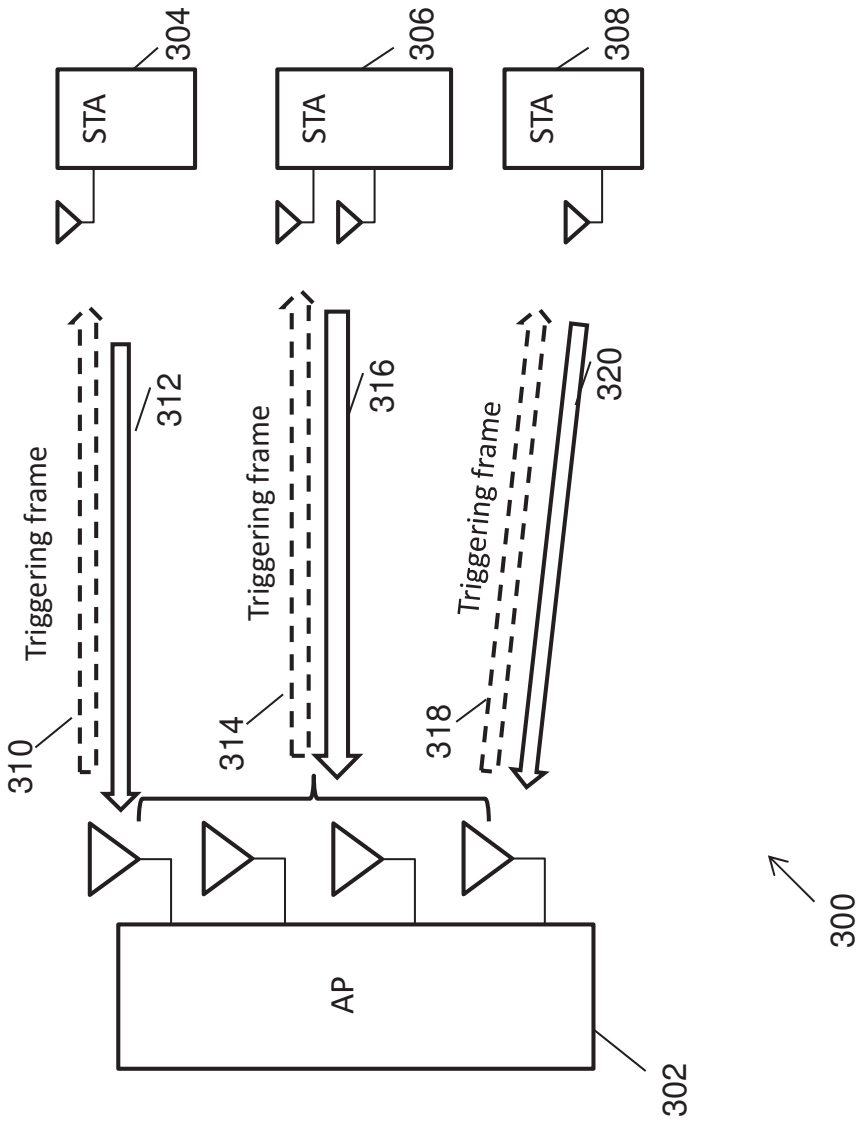

STA
304
STA
306
STA
308
Triggering frame
312
Triggering frame
316
Triggering frame
320
310
314
318
AP
302
300

Figure 3

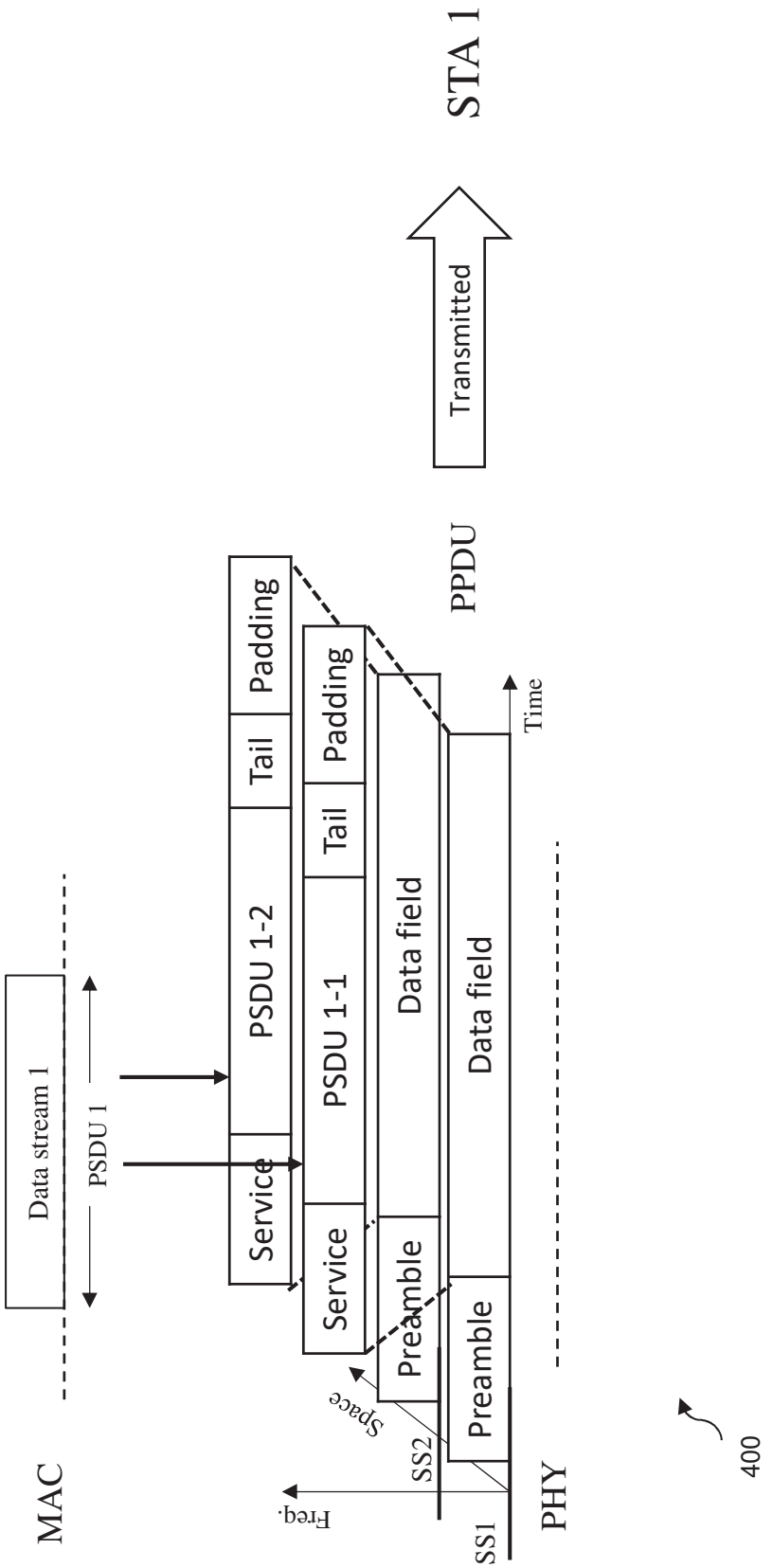

STA 1
Transmitted
PPDU
MAC
PHY
Data stream 1
PSDU 1
Service
PSDU 1-2
Tail
Padding
Service
PSDU 1-1
Tail
Padding
Preamble
Data field
Preamble
Data field
Space
SS2
SS1
Freq.
Time
400

Figure 4

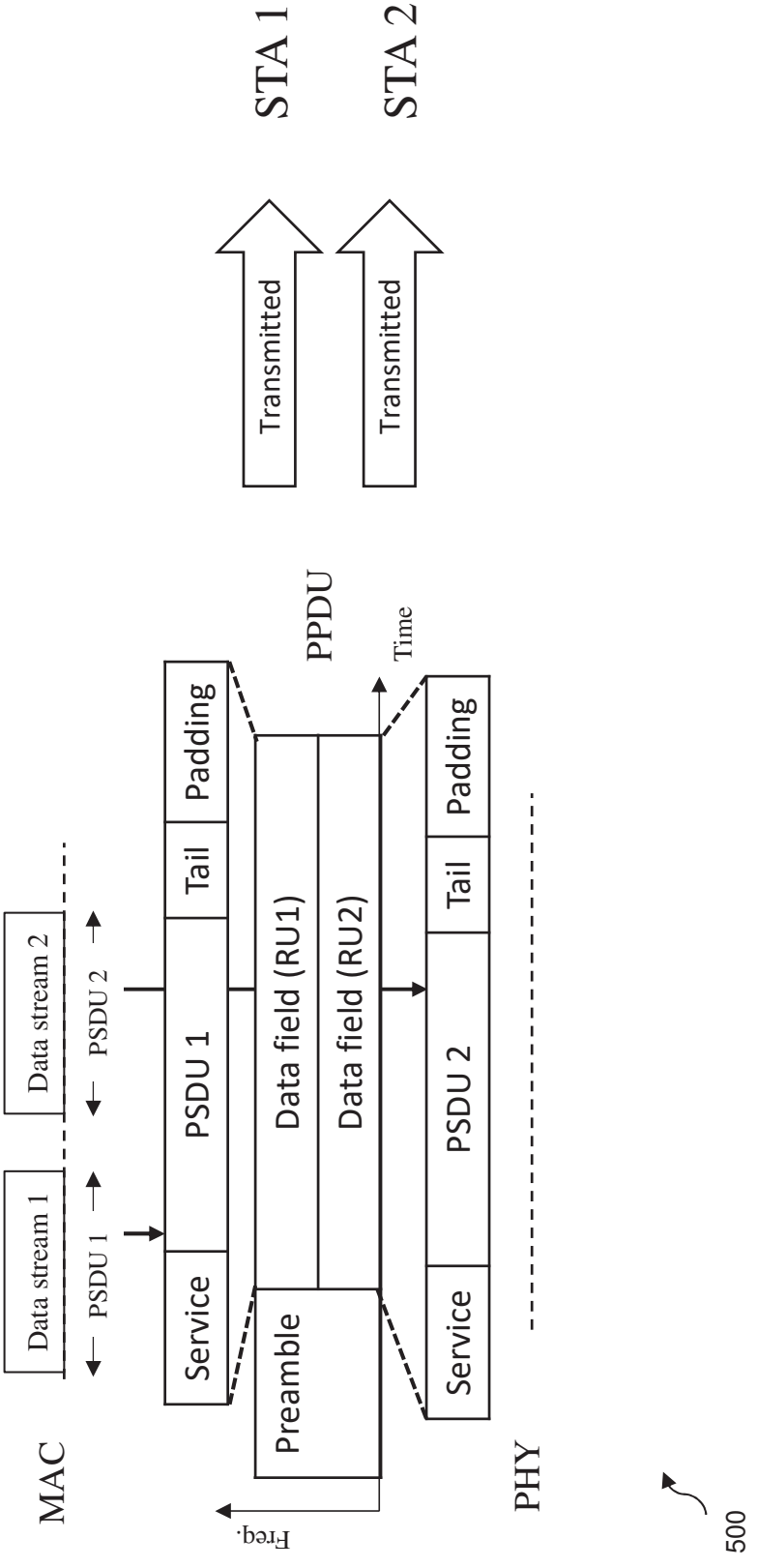

STA 1
STA 2
Transmitted
Transmitted
PPDU
Time
MAC
PHY
Data stream 1
Data stream 2
PSDU 1
PSDU 2
Service
PSDU 1
Tail
Padding
Preamble
Data field (RU1)
Data field (RU2)
Service
PSDU 2
Tail
Padding
Freq.
500

Figure 5

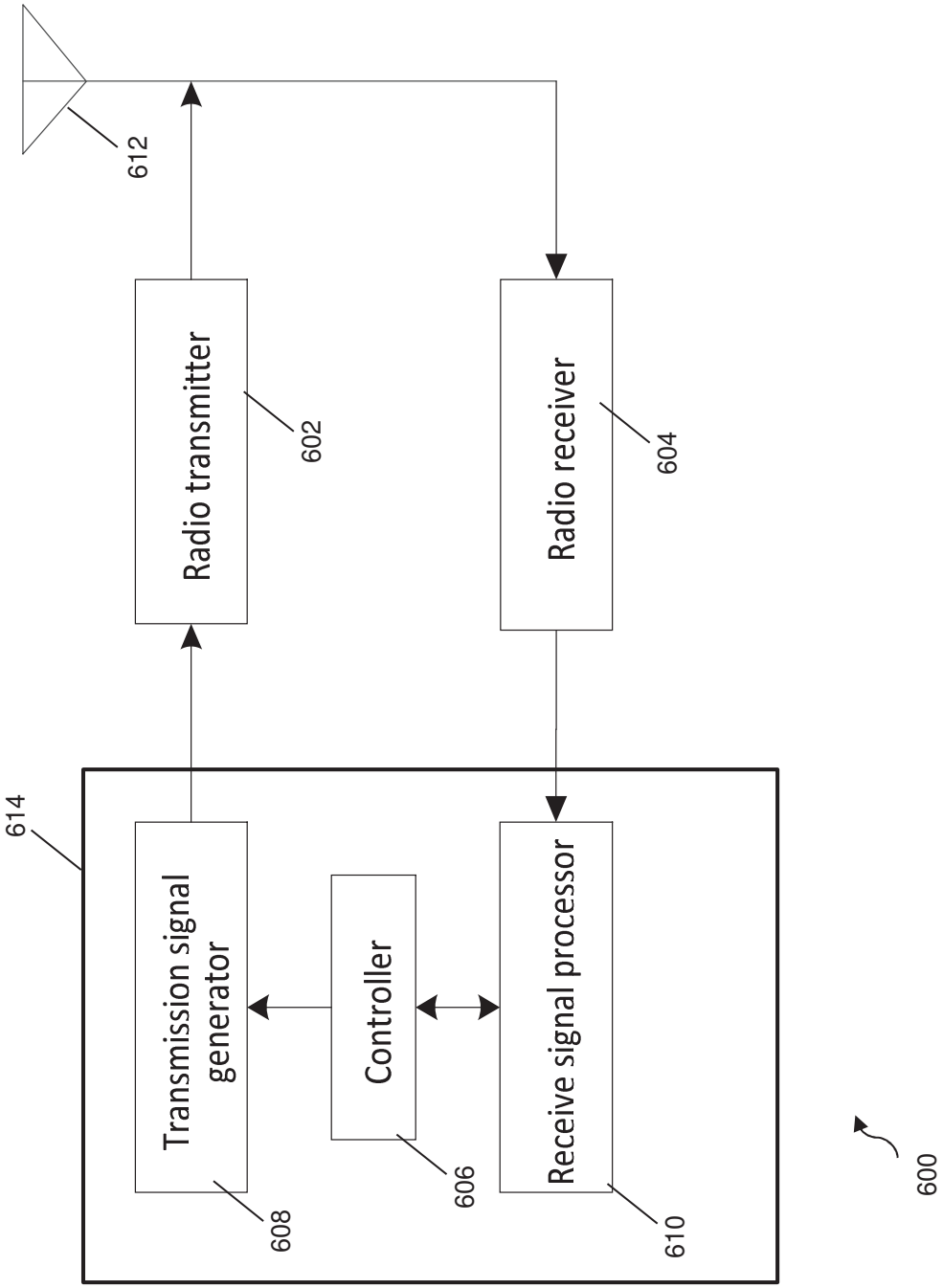

612
Radio transmitter
602
Radio receiver
604
614
Transmission signal generator
608
Controller
606
Receive signal processor
610
600

Figure 6

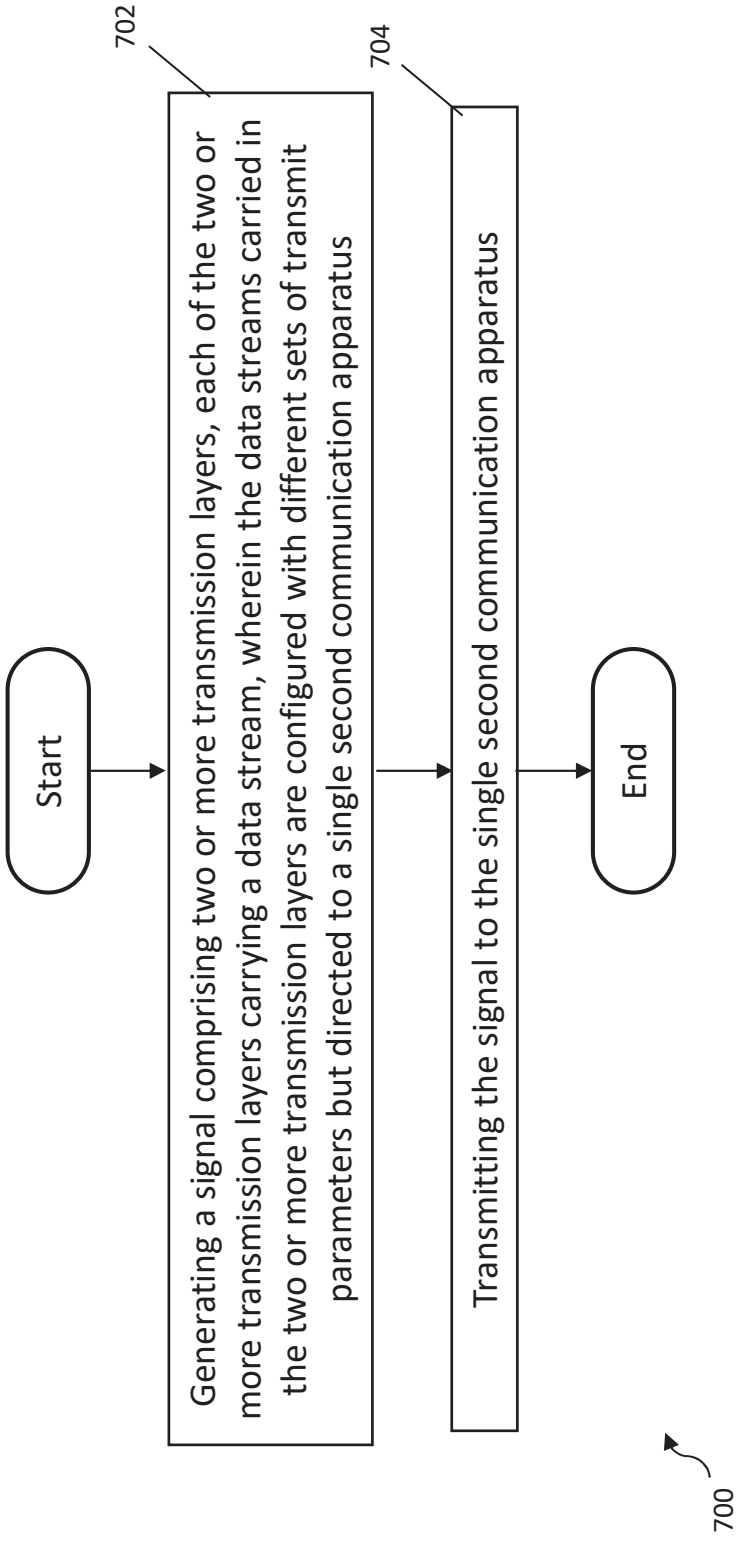

Start
Generating a signal comprising two or more transmission layers, each of the two or more transmission layers carrying a data stream, wherein the data streams carried in the two or more transmission layers are configured with different sets of transmit parameters but directed to a single second communication apparatus
Transmitting the signal to the single second communication apparatus
End
702
704
700

Figure 7

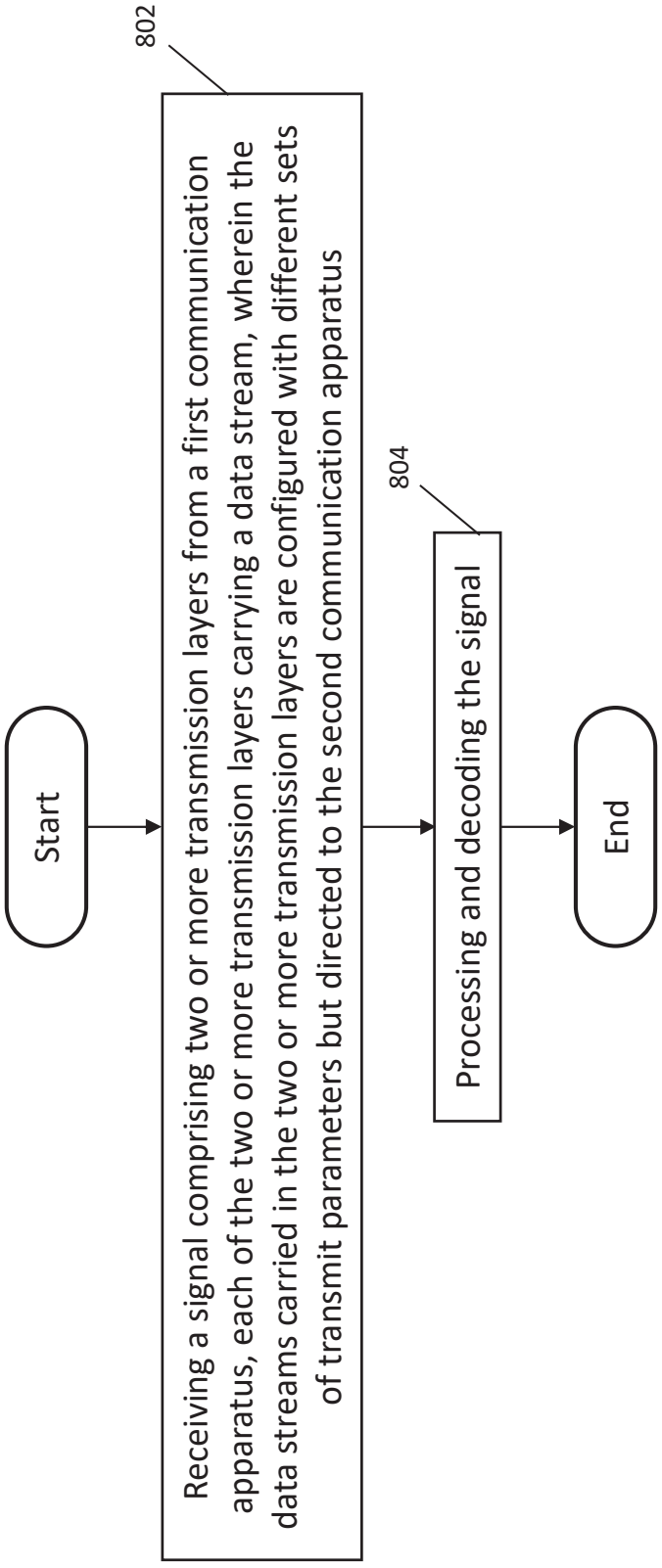

802
Start
Receiving a signal comprising two or more transmission layers from a first communication apparatus, each of the two or more transmission layers carrying a data stream, wherein the data streams carried in the two or more transmission layers are configured with different sets of transmit parameters but directed to the second communication apparatus
804
Processing and decoding the signal
End
800

Figure 8

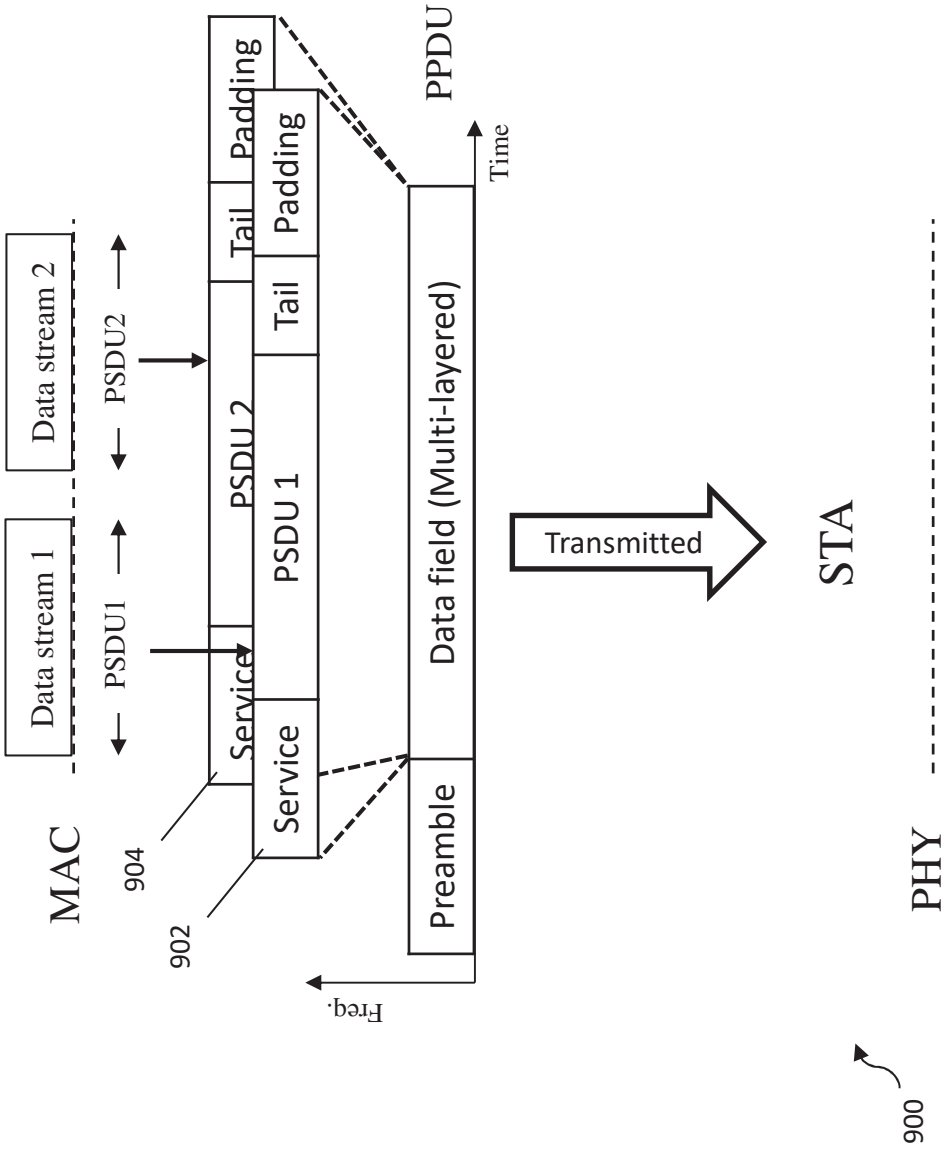

MAC
Data stream 1
Data stream 2
PSDU1
PSDU2
904
902
Service
PSDU 1
PSDU 2
Tail
Padding
Tail
Padding
Preamble
Data field (Multi-layered)
PPDU
Time
Freq.
Transmitted
STA
PHY
900

Figure 9

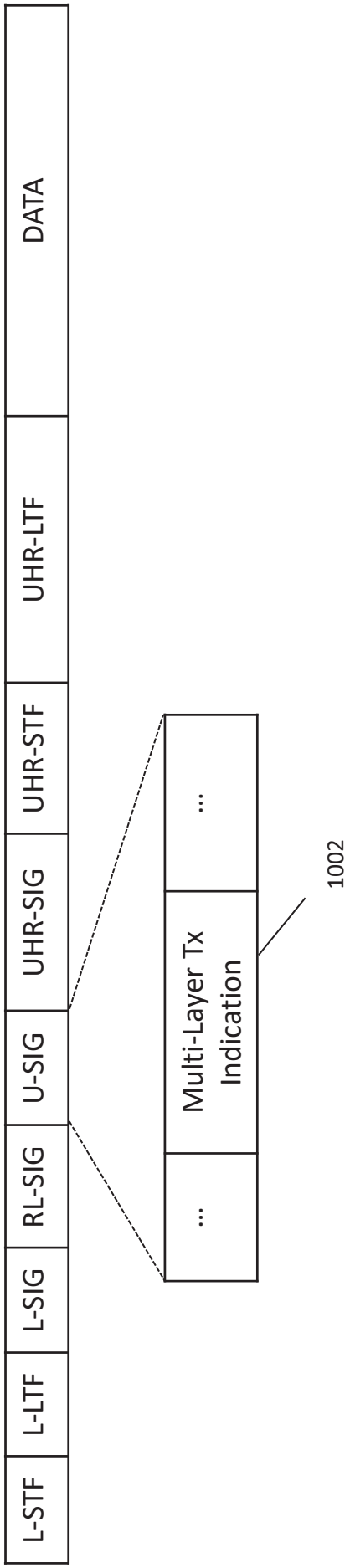

L-STF
L-LTF
L-SIG
RL-SIG
U-SIG
UHR-SIG
UHR-STF
UHR-LTF
DATA
...
Multi-Layer Tx Indication
...
1002
1000

Figure 10

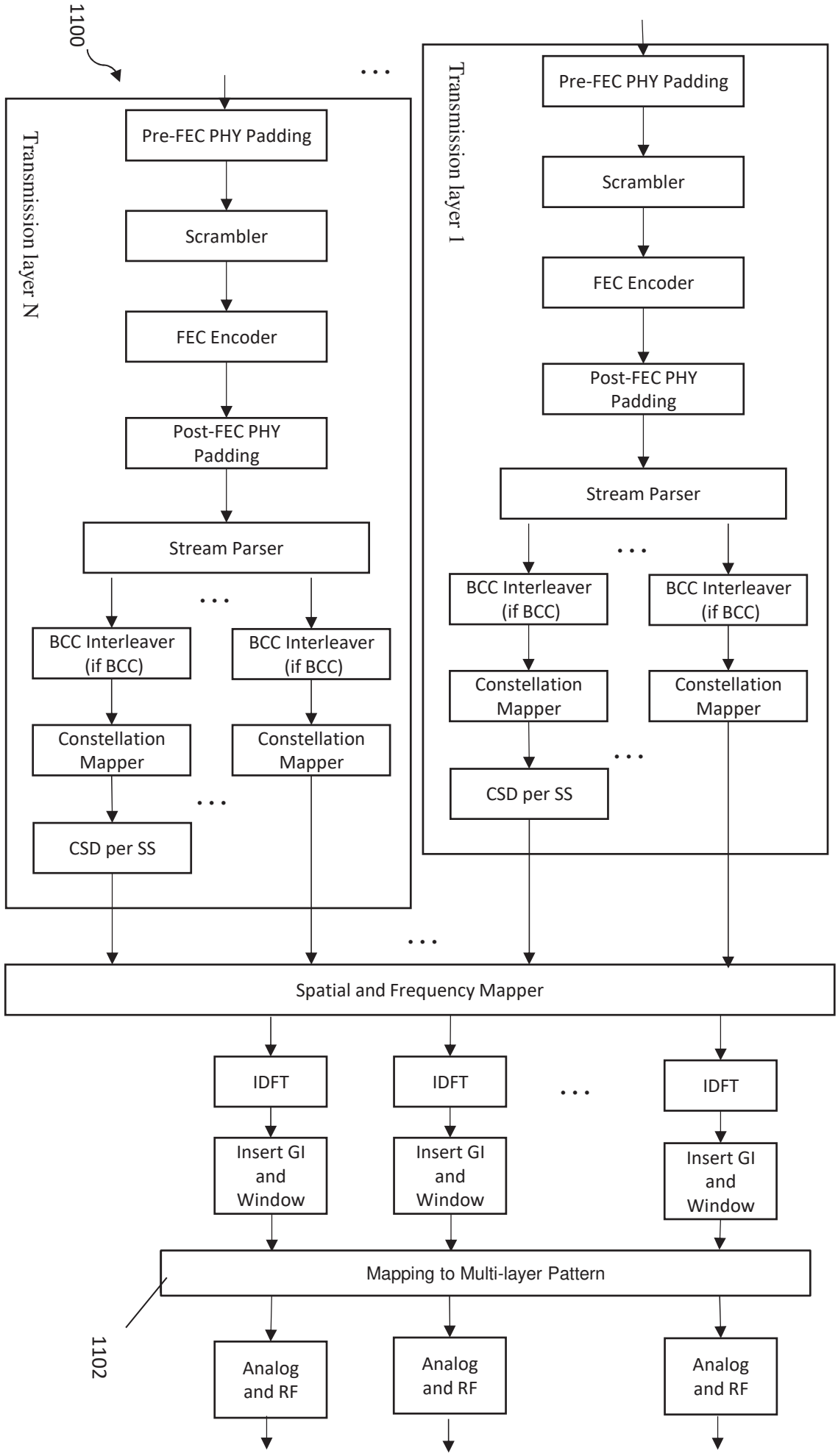

1100
Transmission layer N
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
BCC Interleaver (if BCC)
Constellation Mapper
Constellation Mapper
CSD per SS
Transmission layer 1
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
BCC Interleaver (if BCC)
Constellation Mapper
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
IDFT
IDFT
IDFT
Insert GI and Window
Insert GI and Window
Insert GI and Window
Mapping to Multi-layer Pattern
1102
Analog and RF
Analog and RF
Analog and RF

Figure 11

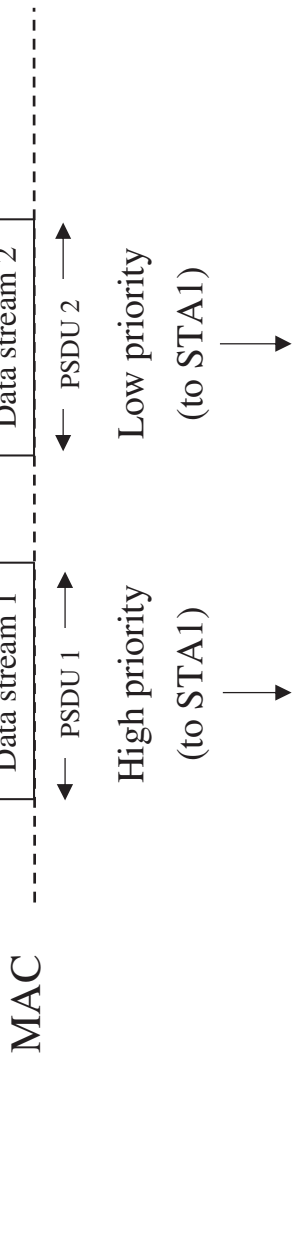

MAC
Data stream 1
PSDU 1
High priority
(to STA1)
Data stream 2
PSDU 2
Low priority
(to STA1)
1200

Figure 12

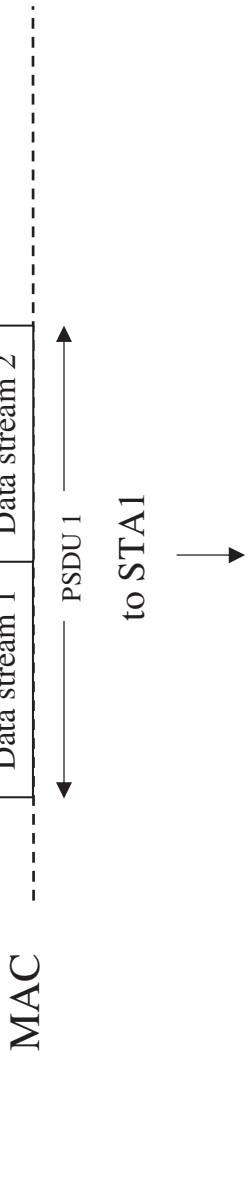


Figure 13

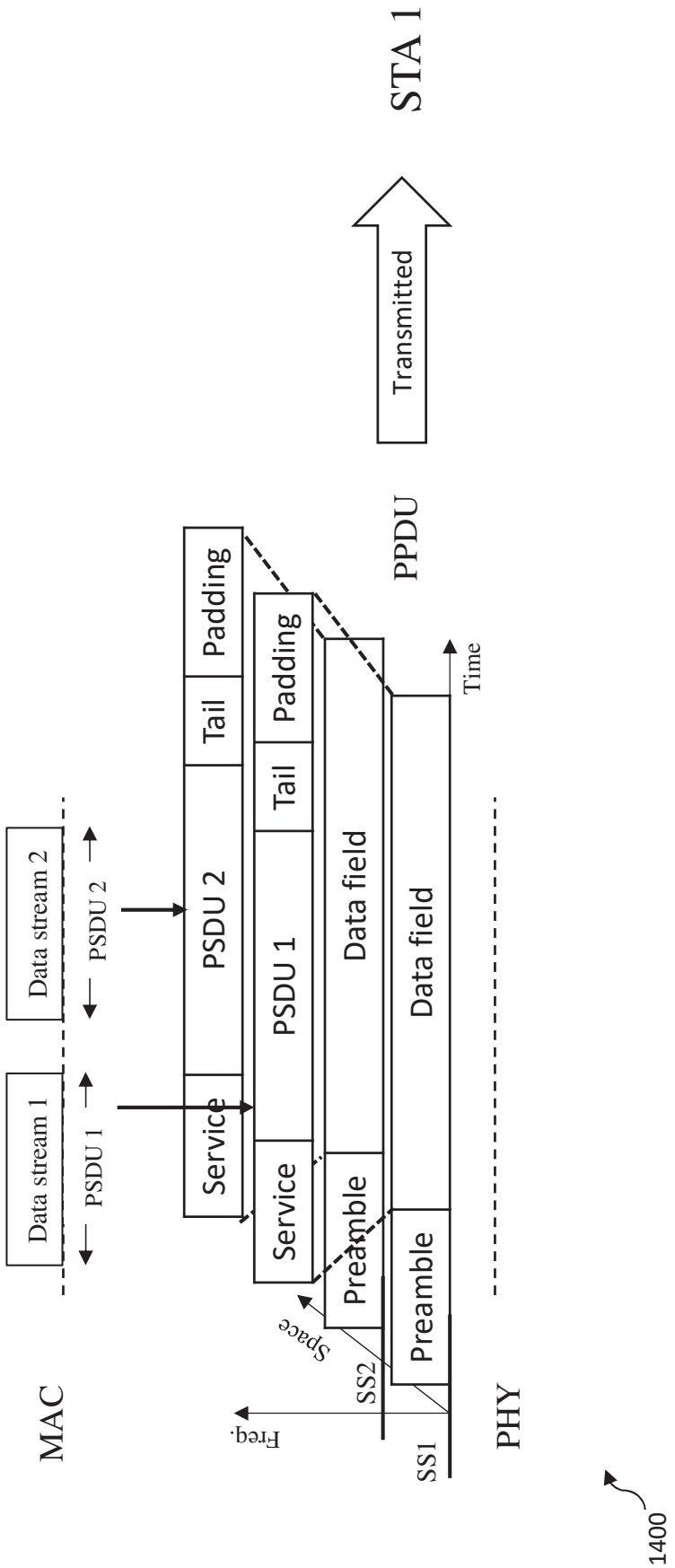

STA 1
Transmitted
PPDU
Time
MAC
PHY
Data stream 1
Data stream 2
PSDU 1
PSDU 2
Service
PSDU 2
Tail
Padding
Service
PSDU 1
Tail
Padding
Preamble
Data field
Preamble
Data field
Space
Freq.
SS2
SS1
1400

Figure 14

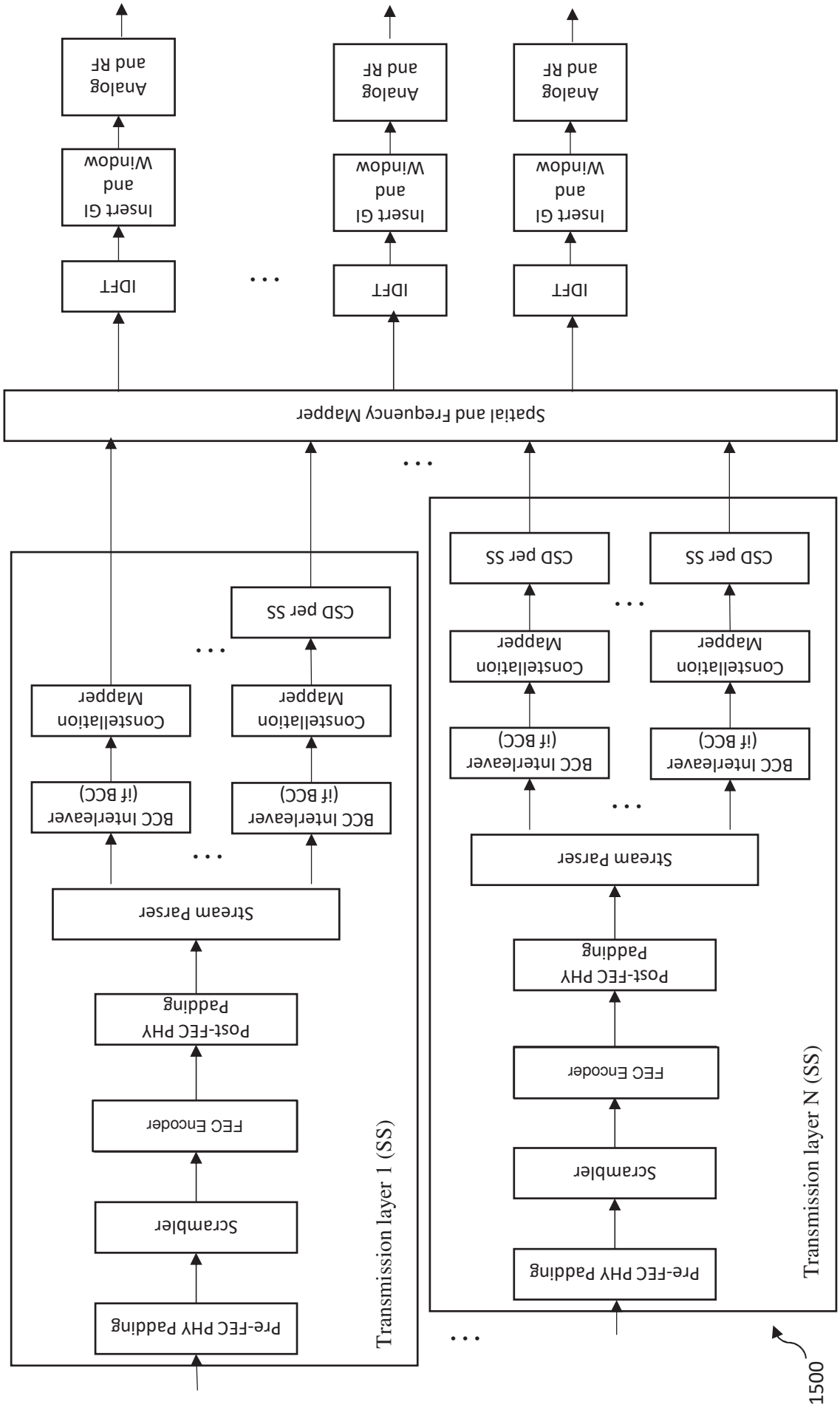

1500
Transmission layer N (SS)
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
Constellation Mapper
CSD per SS
Transmission layer 1 (SS)
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
IDFT
Insert GI and Window
Analog and RF

Figure 15

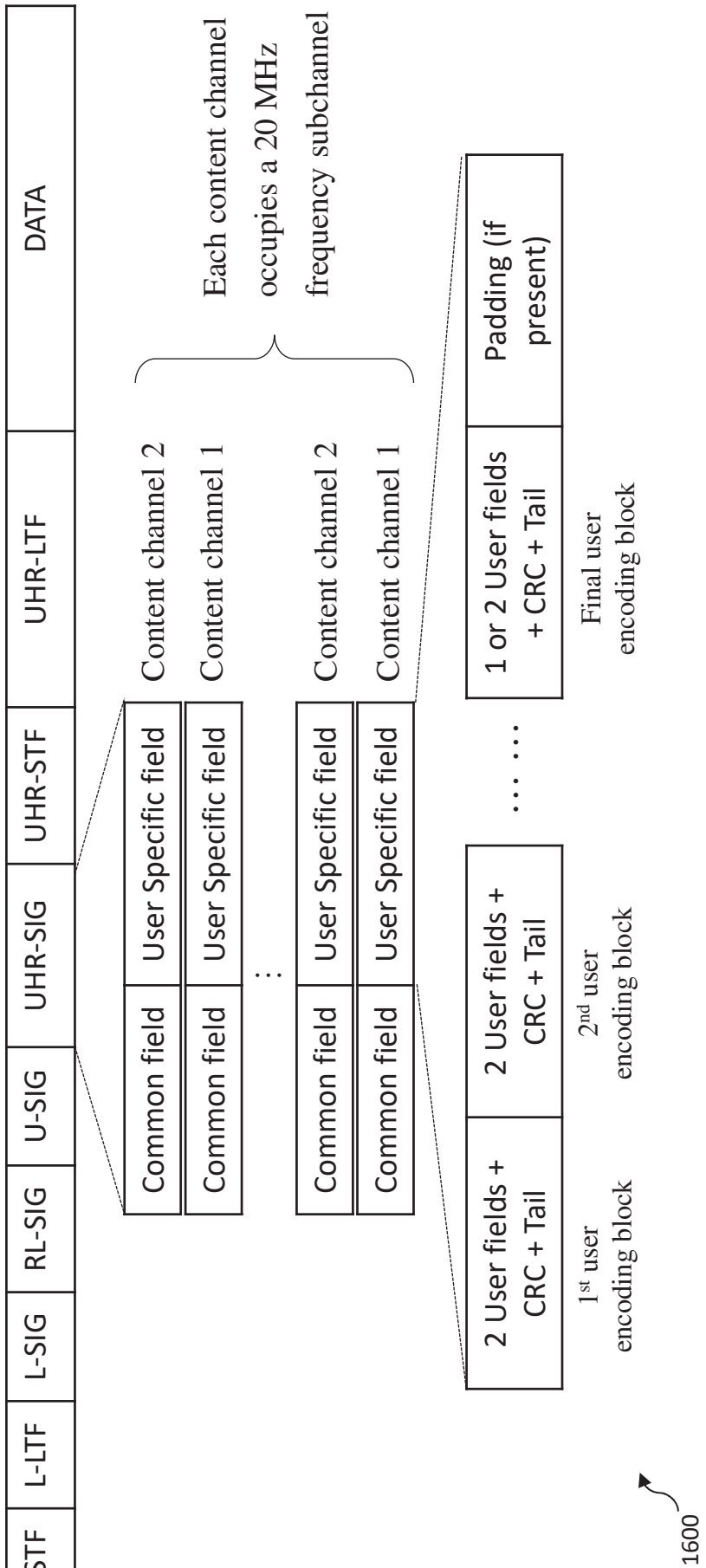

L-STF
L-LTF
L-SIG
RL-SIG
U-SIG
UHR-SIG
UHR-STF
UHR-LTF
DATA
Content channel 2
Content channel 1
Content channel 2
Content channel 1
Each content channel occupies a 20 MHz frequency subchannel
Common field
User Specific field
Common field
User Specific field
Common field
User Specific field
Common field
User Specific field
2 User fields + CRC + Tail
2 User fields + CRC + Tail
1 or 2 User fields + CRC + Tail
Padding (if present)
1st user encoding block
2nd user encoding block
Final user encoding block
1600

Figure 16

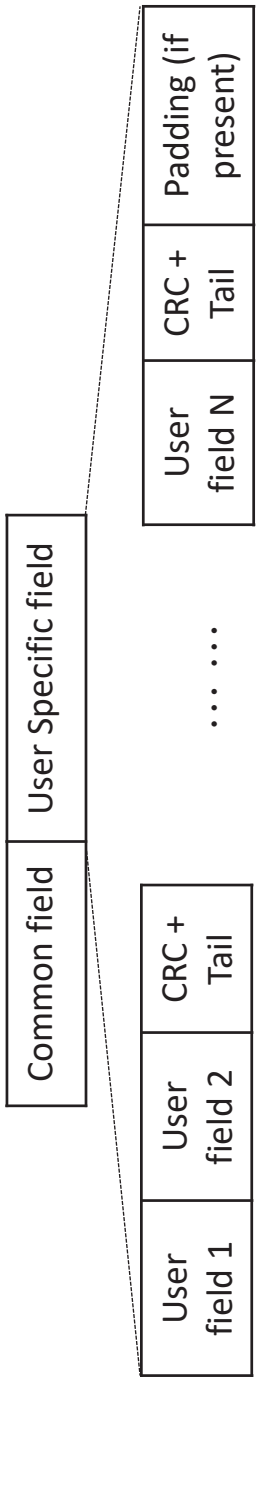

Common field
User Specific field
User field 1
User field 2
CRC + Tail
. . . . . .
User field N
CRC + Tail
Padding (if present)
1700

Figure 17

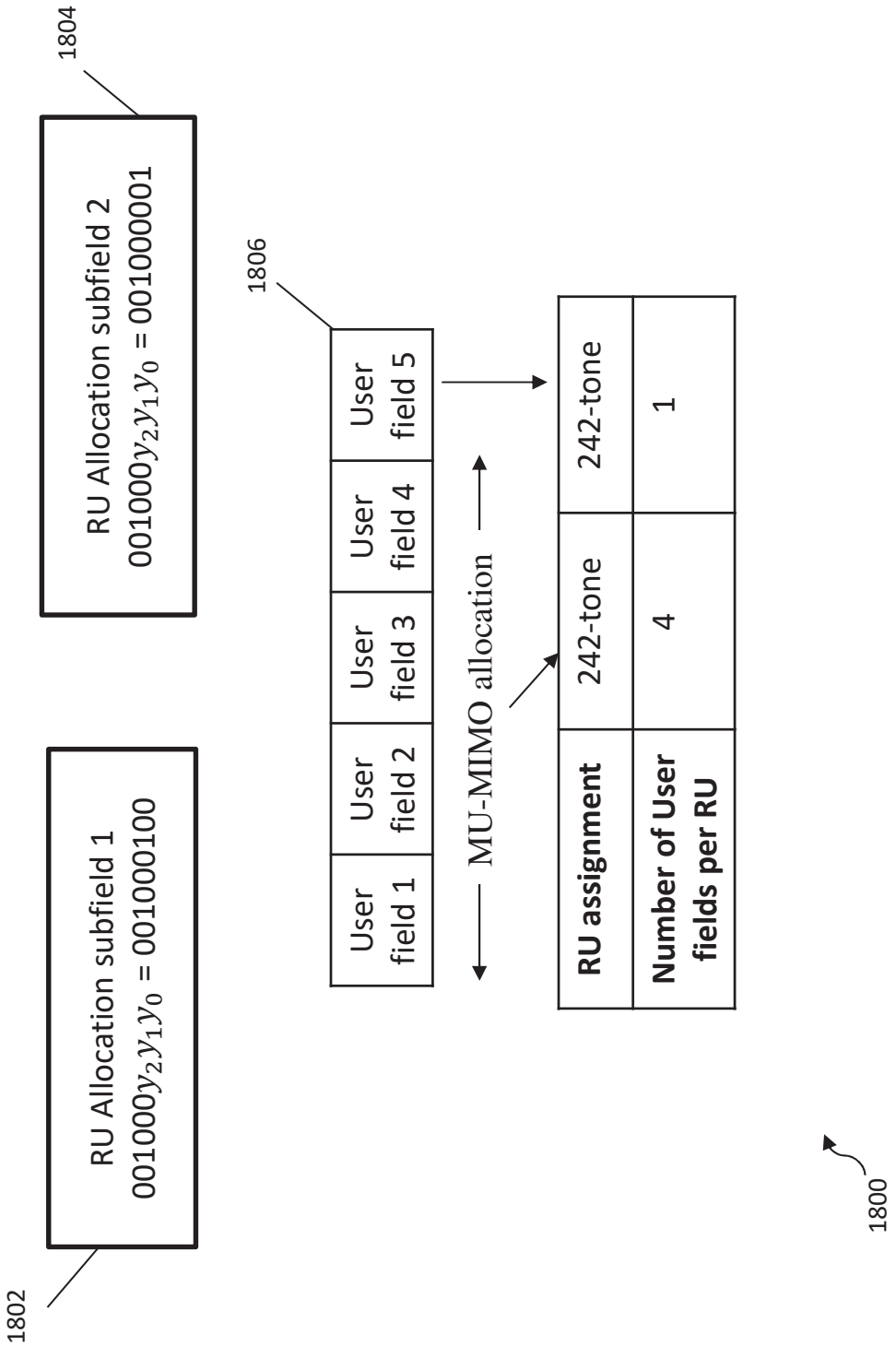

1804
RU Allocation subfield 2
001000$y_2y_1y_0$ = 001000001
1806
User field 1
User field 2
User field 3
User field 4
User field 5
MU-MIMO allocation
RU assignment
242-tone
242-tone
Number of User fields per RU
4
1
1802
RU Allocation subfield 1
001000$y_2y_1y_0$ = 001000100
1800

Figure 18

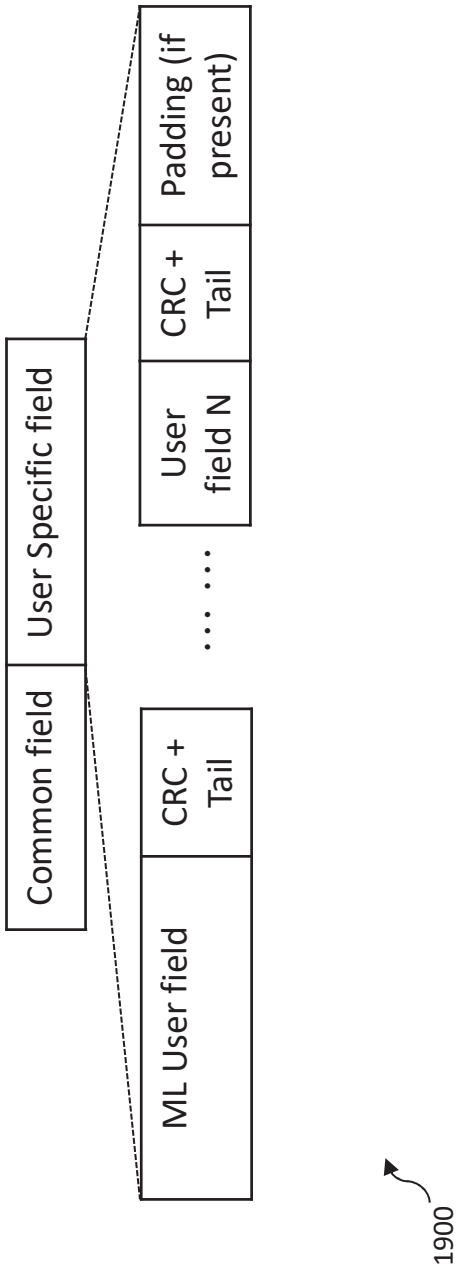

Common field
User Specific field
ML User field
CRC + Tail
User field N
CRC + Tail
Padding (if present)
1900

Figure 19

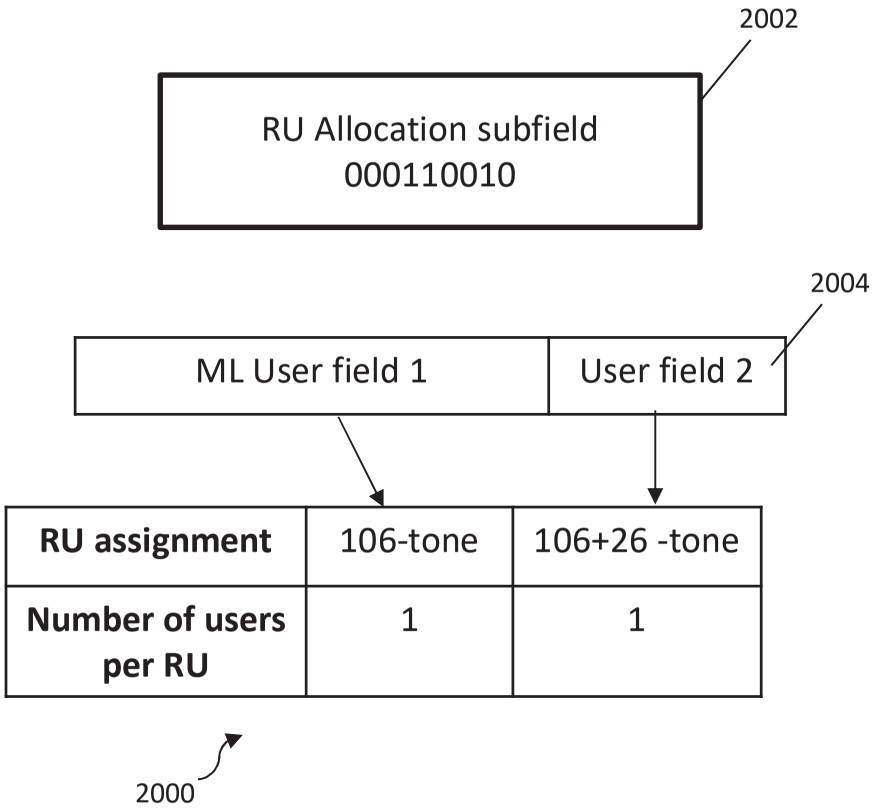


Figure 20A

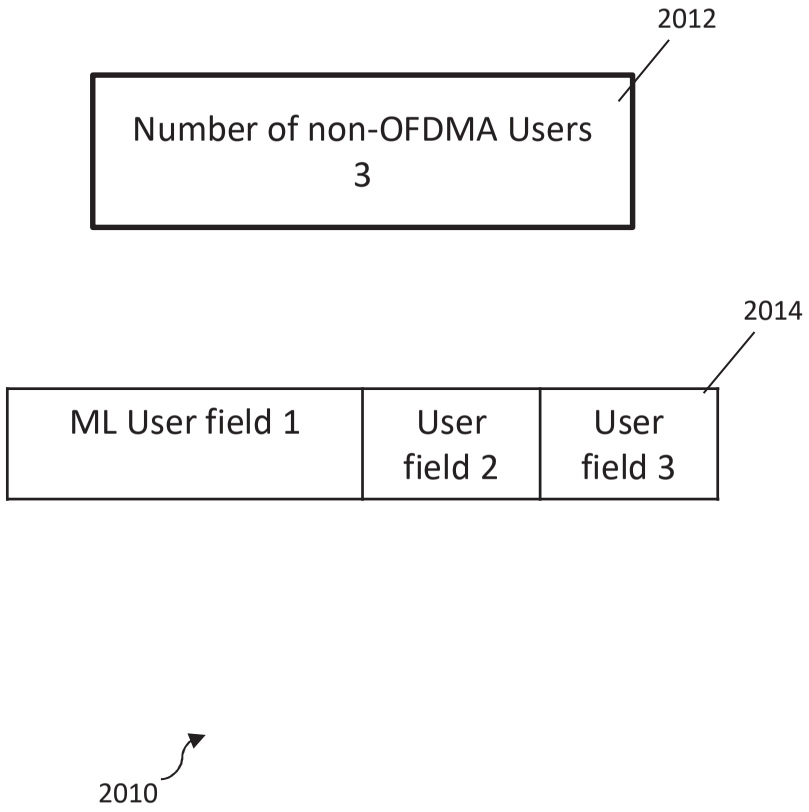


Figure 20B

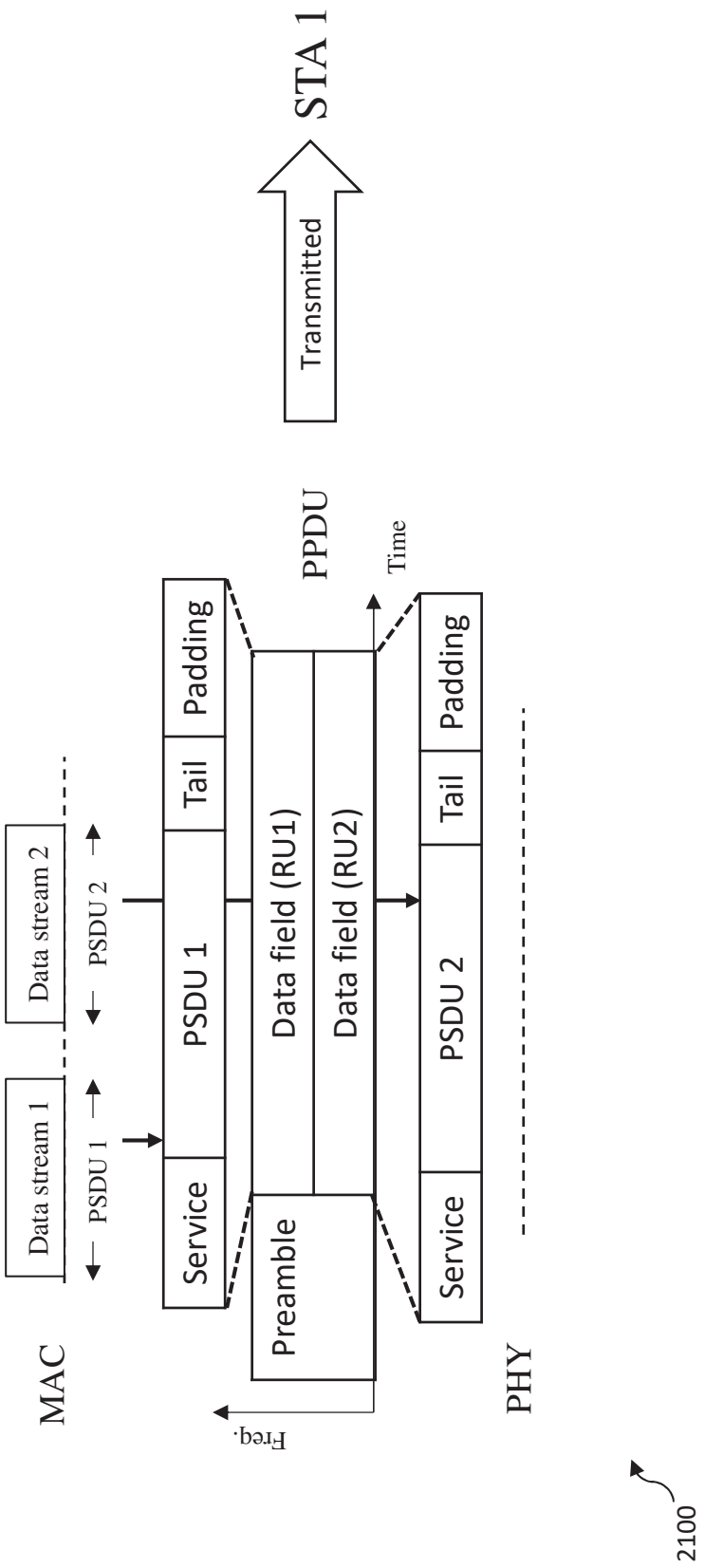

STA 1
Transmitted
PPDU
Time
MAC
PHY
Data stream 1
PSDU 1
Data stream 2
PSDU 2
Service
PSDU 1
Tail
Padding
Preamble
Data field (RU1)
Data field (RU2)
Service
PSDU 2
Tail
Padding
Freq.
2100

Figure 21

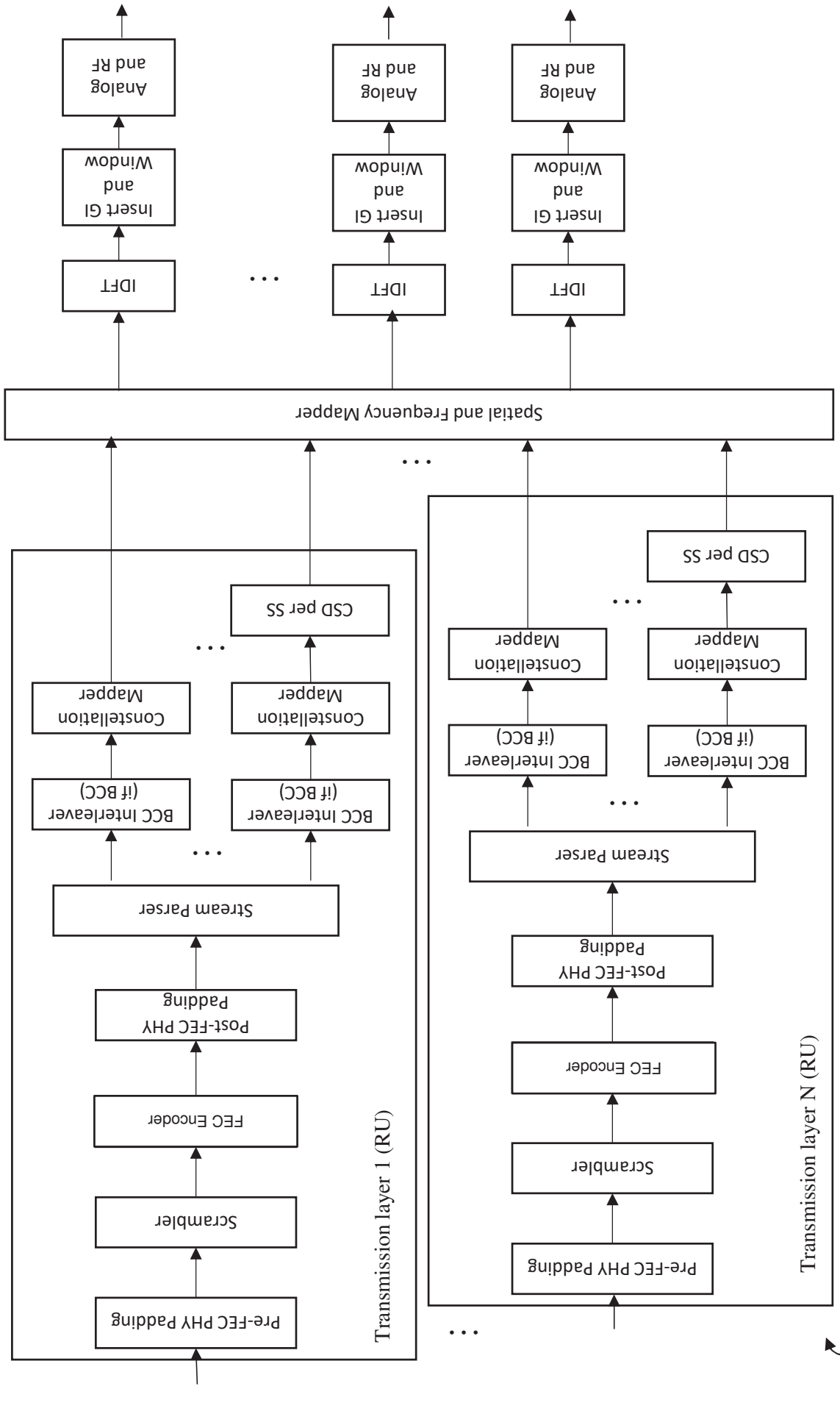

2200
Transmission layer 1 (RU)
Transmission layer N (RU)
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
IDFT
Insert GI and Window
Analog and RF

Figure 22

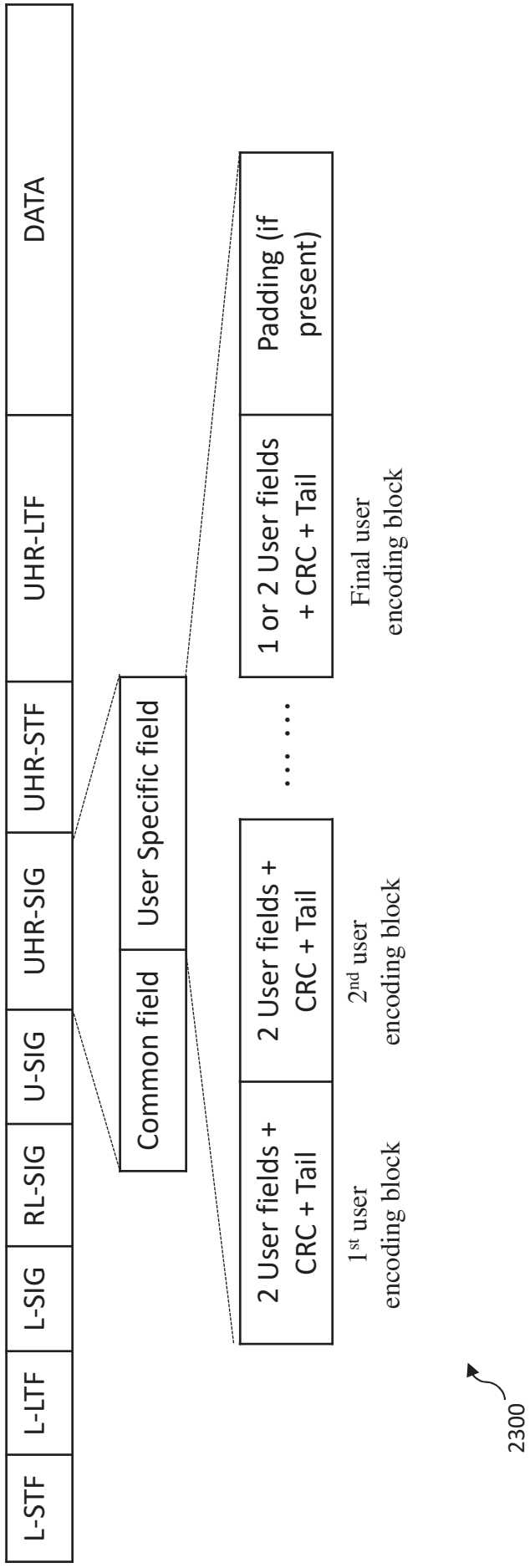

L-STF
L-LTF
L-SIG
RL-SIG
U-SIG
UHR-SIG
UHR-STF
UHR-LTF
DATA
Common field
User Specific field
2 User fields + CRC + Tail
2 User fields + CRC + Tail
. . . . . .
1 or 2 User fields + CRC + Tail
Padding (if present)
1st user encoding block
2nd user encoding block
Final user encoding block
2300

Figure 23

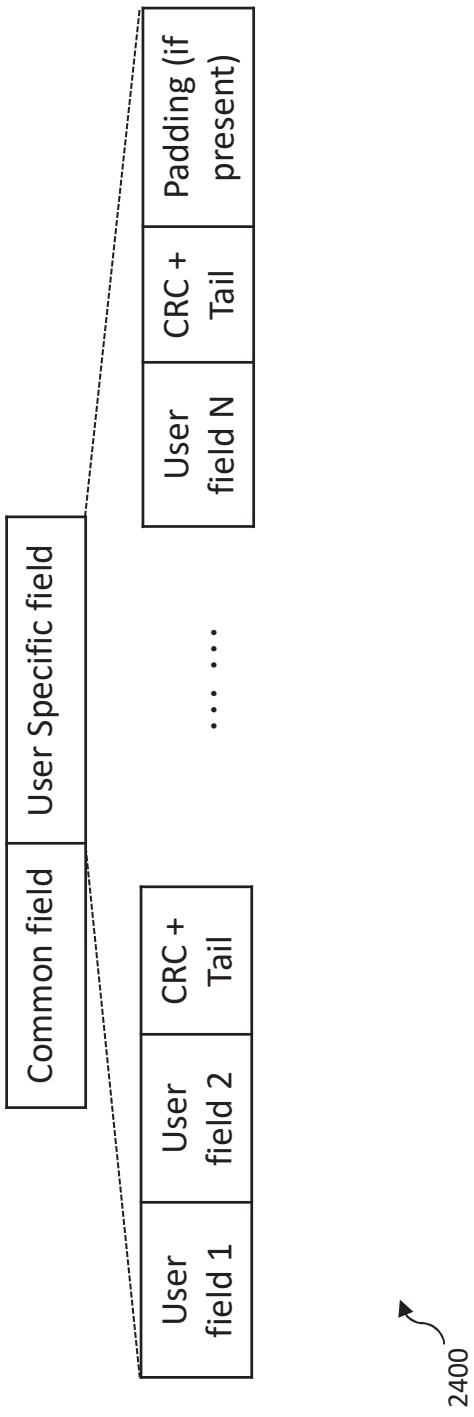

Common field
User Specific field
User field 1
User field 2
CRC + Tail
. . . . . .
User field N
CRC + Tail
Padding (if present)
2400

Figure 24

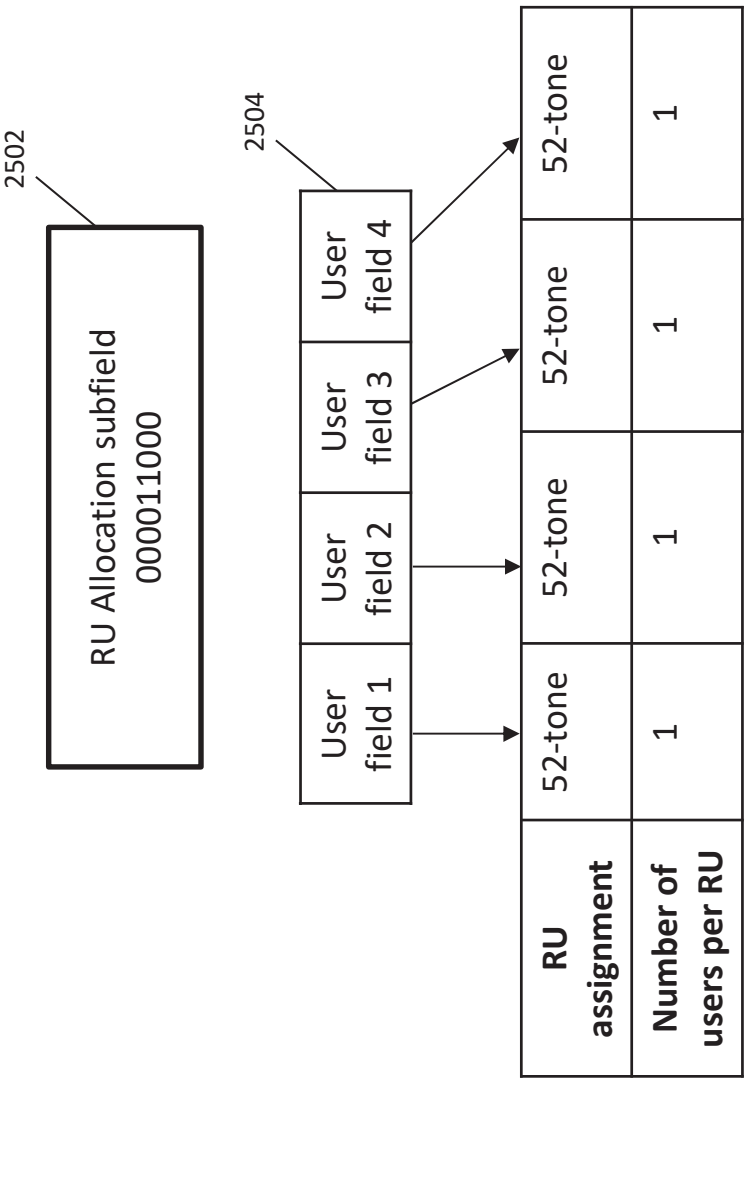

2502
RU Allocation subfield
00001100
2504
User field 1
User field 2
User field 3
User field 4
RU assignment
Number of users per RU
52-tone
1
52-tone
1
52-tone
1
52-tone
1
2500

Figure 25

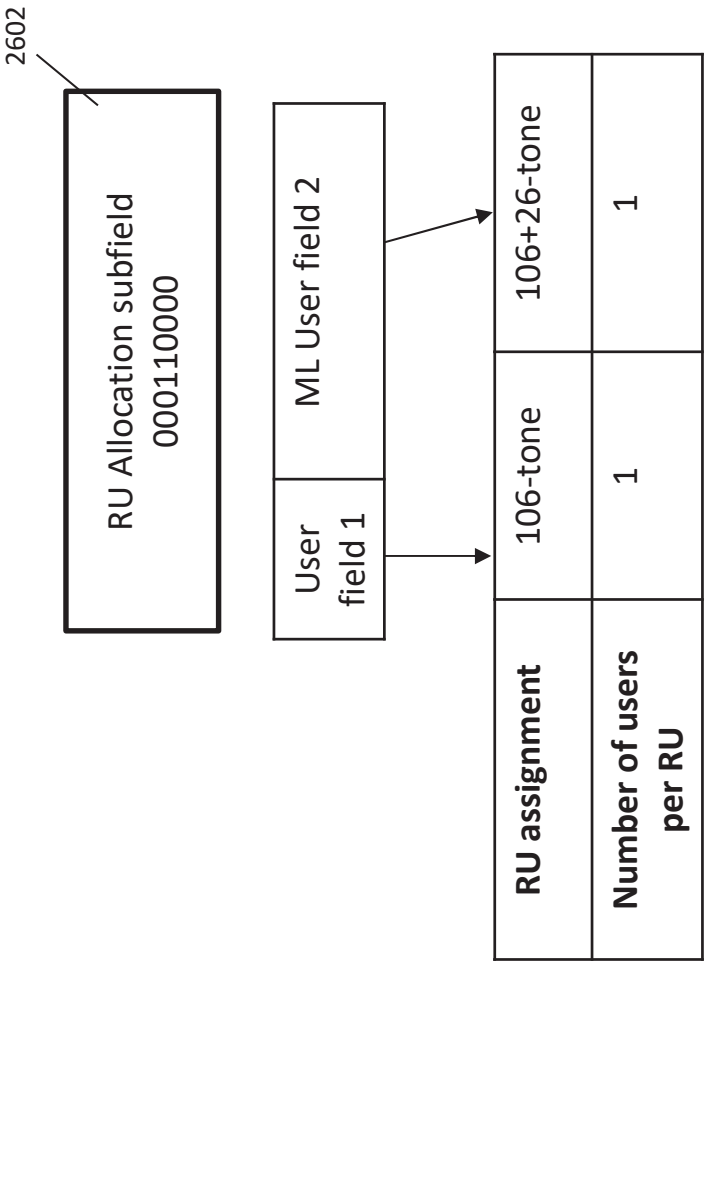

2602
RU Allocation subfield
000110000
User field 1
ML User field 2
RU assignment
106-tone
106+26-tone
Number of users per RU
1
1
2600

Figure 26

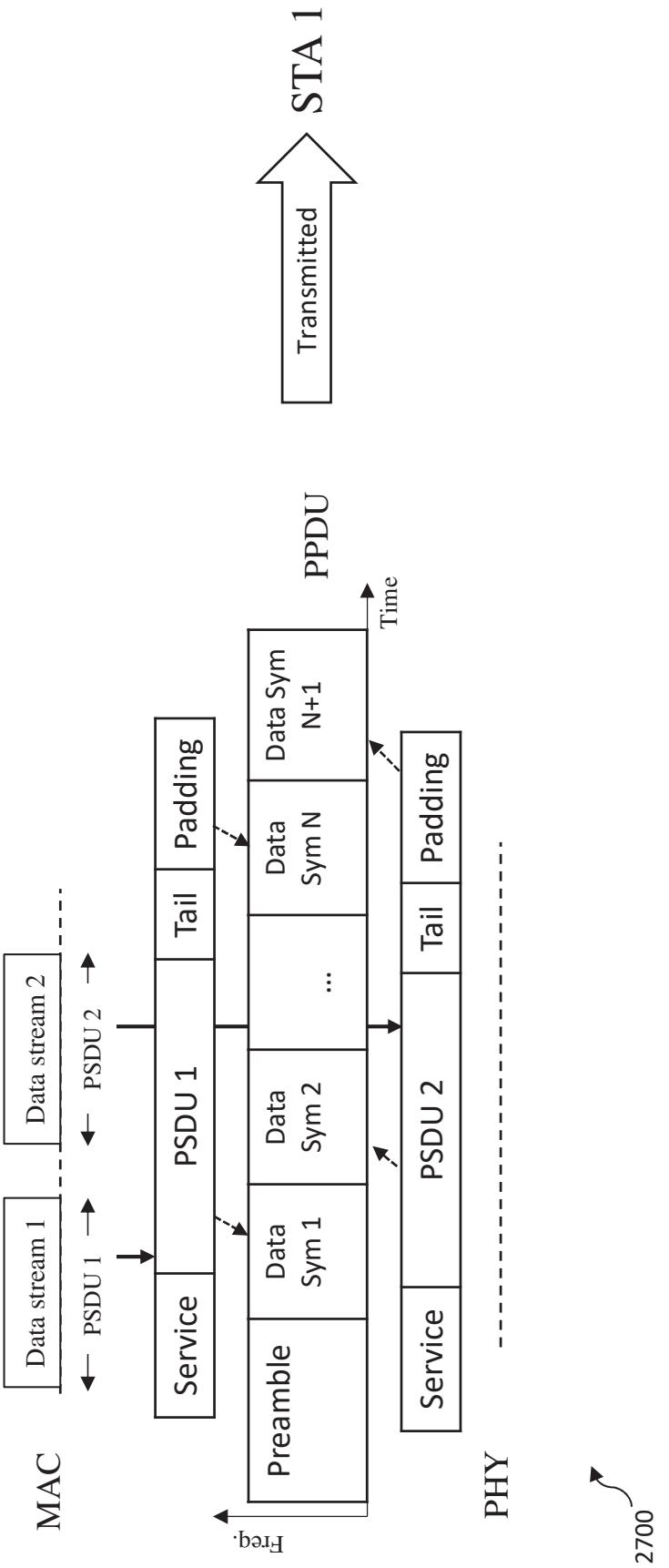

STA 1
Transmitted
PPDU
Time
MAC
Data stream 1
Data stream 2
PSDU 1
PSDU 2
Service
PSDU 1
Tail
Padding
Preamble
Data Sym 1
Data Sym 2
...
Data Sym N
Data Sym N+1
Service
PSDU 2
Tail
Padding
PHY
Freq.
2700

Figure 27

2800
Transmission layer N (time units)
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
Constellation Mapper
CSD per SS
Transmission layer 1 (time units)
Pre-FEC PHY Padding
Scrambler
FEC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
IDFT
Insert GI and Window
Mapping to Multi-layer Pattern
Analog and RF
to a user

Figure 28

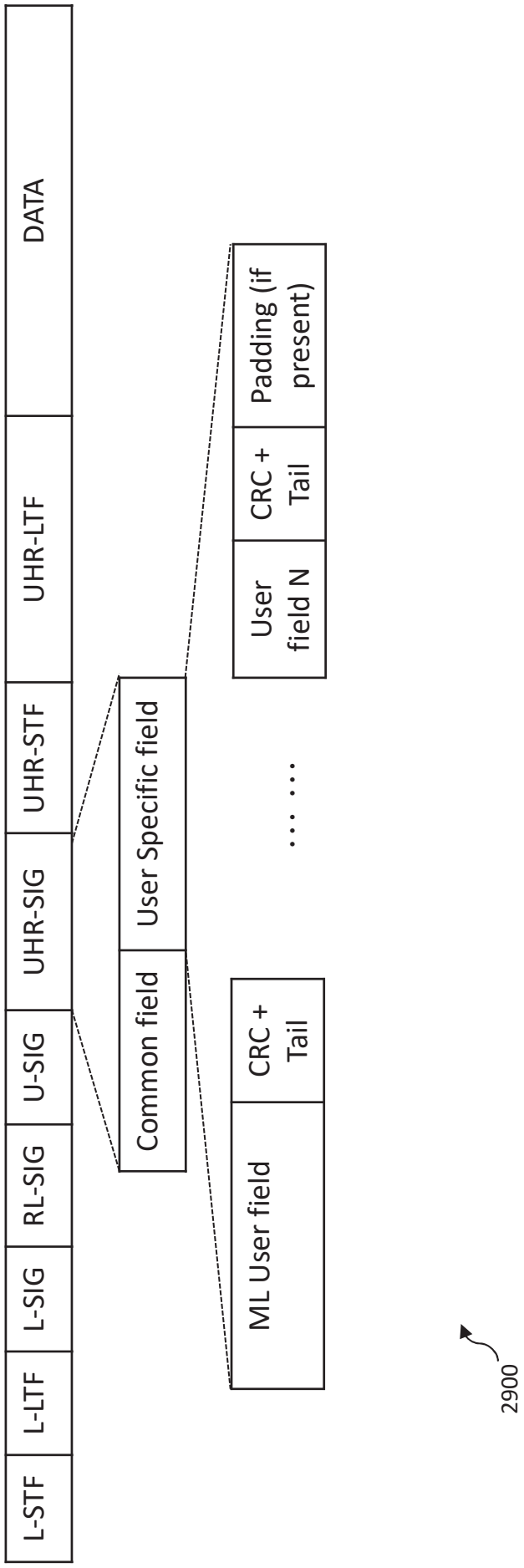

L-STF
L-LTF
L-SIG
RL-SIG
U-SIG
UHR-SIG
UHR-STF
UHR-LTF
DATA
Common field
User Specific field
ML User field
CRC + Tail
. . . . . .
User field N
CRC + Tail
Padding (if present)
2900

Figure 29



Figure 30A

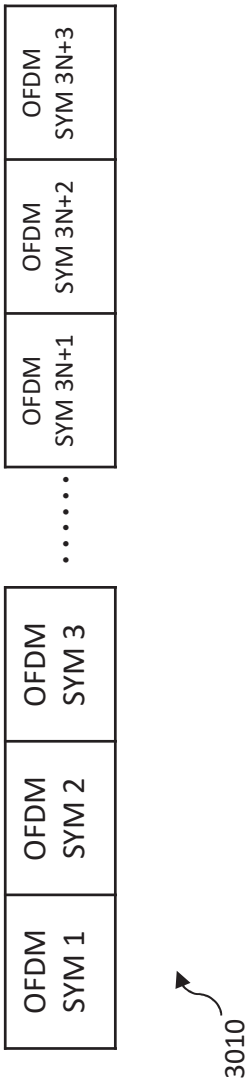


Figure 30B

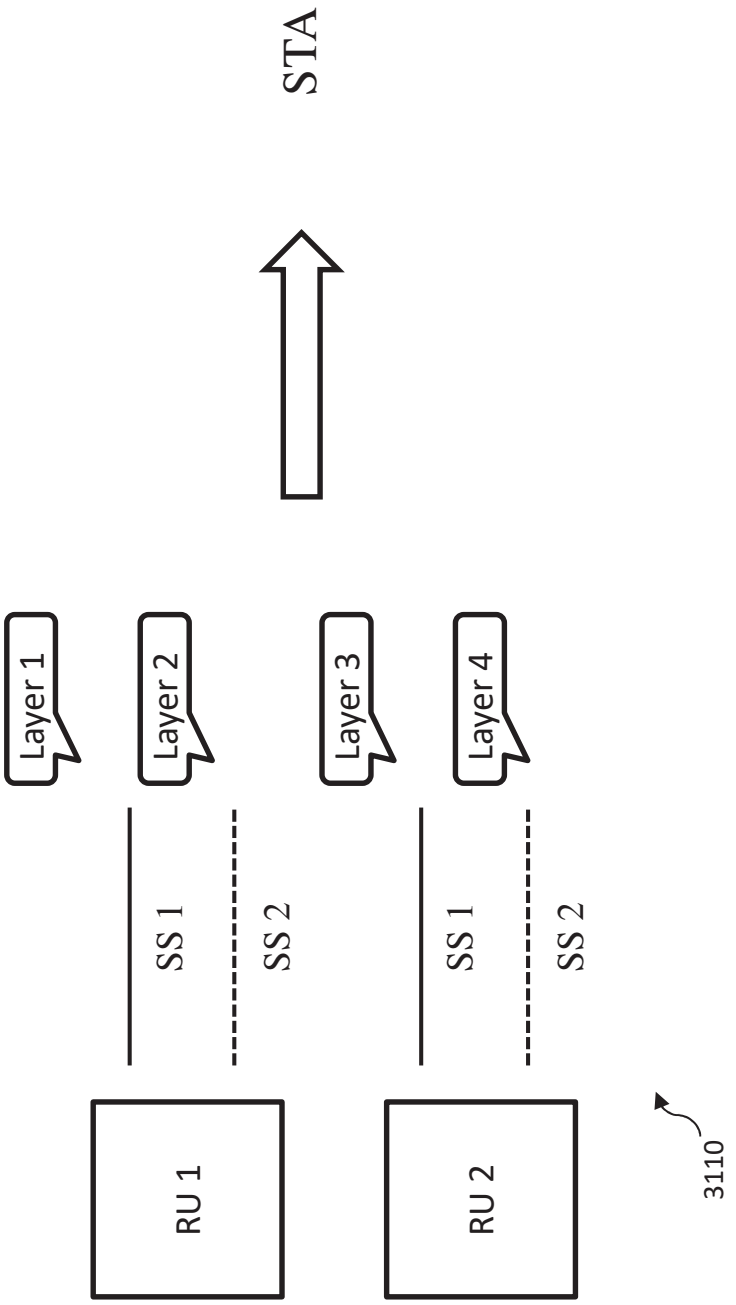


Figure 31