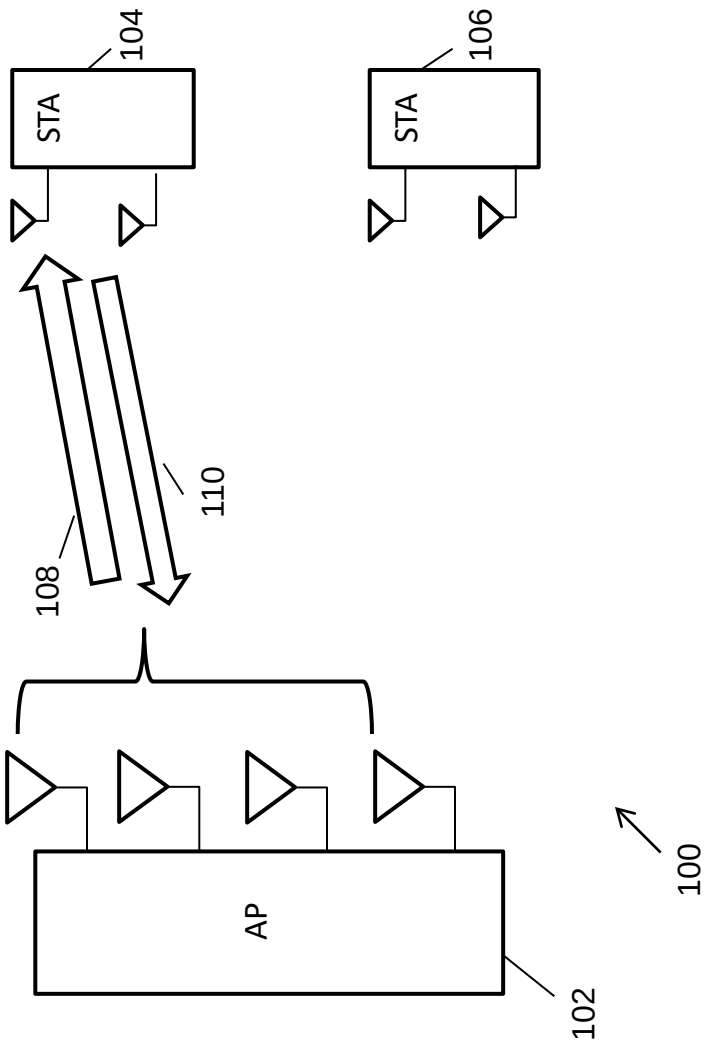


Figure 1

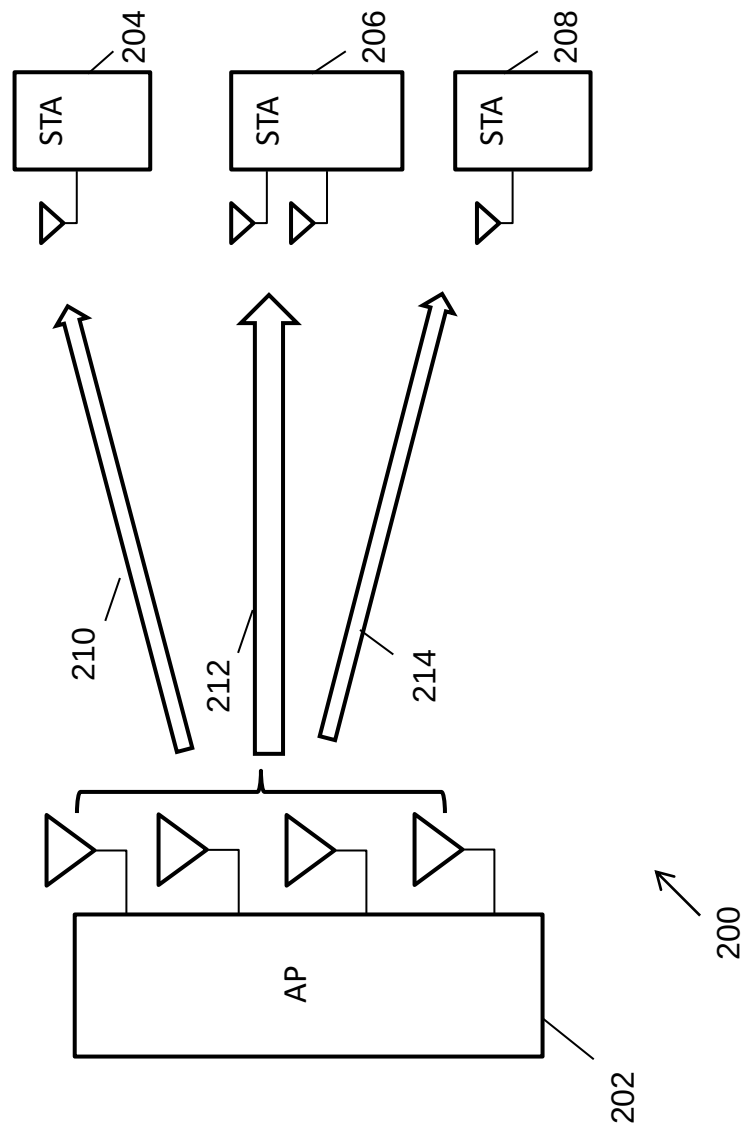


Figure 2

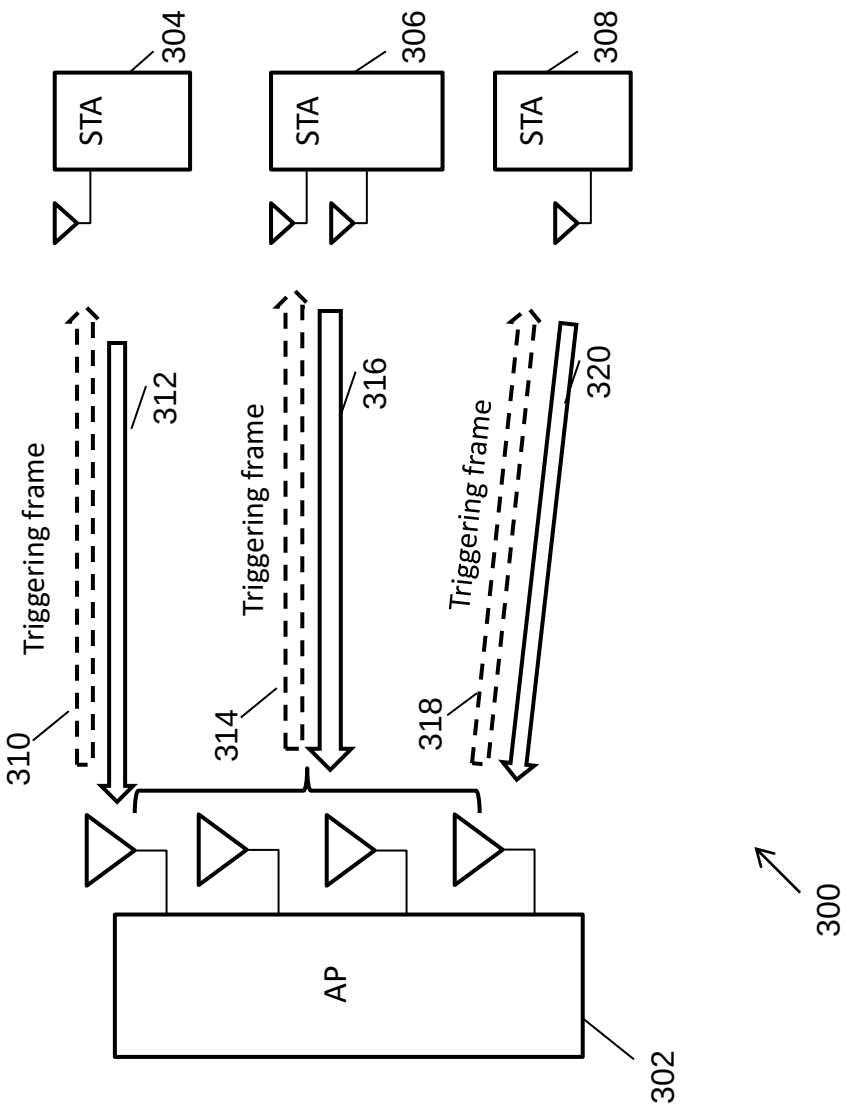

STA
304
STA
306
STA
308
Triggering frame
310
312
Triggering frame
314
316
Triggering frame
318
320
AP
302
300

Figure 3

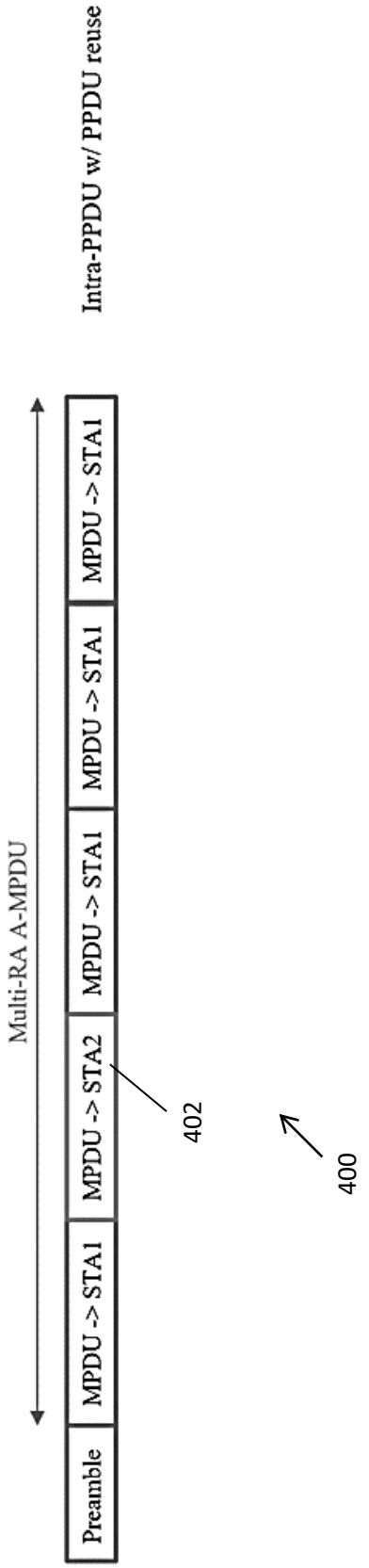

Intra-PPDU w/ PPDU reuse
Multi-RA A-MPDU
Preamble
MPDU -> STA1
MPDU -> STA2
MPDU -> STA1
MPDU -> STA1
MPDU -> STA1
402
400

Figure 4



Figure 5A

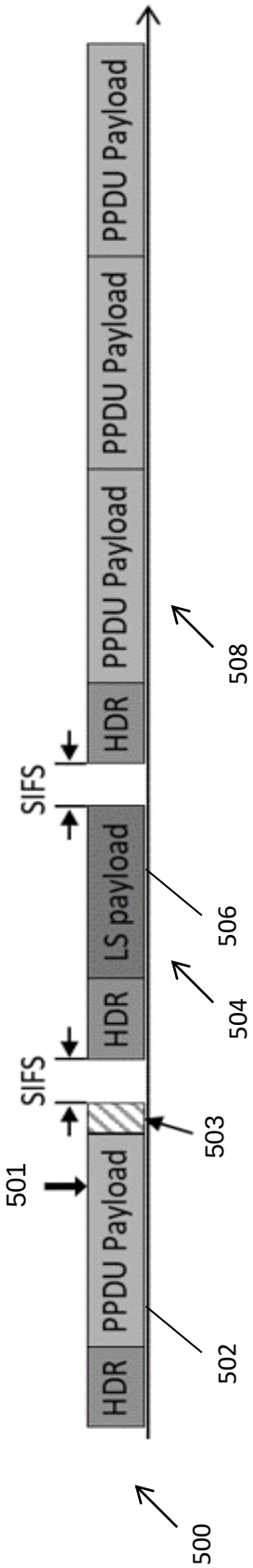


Figure 5B

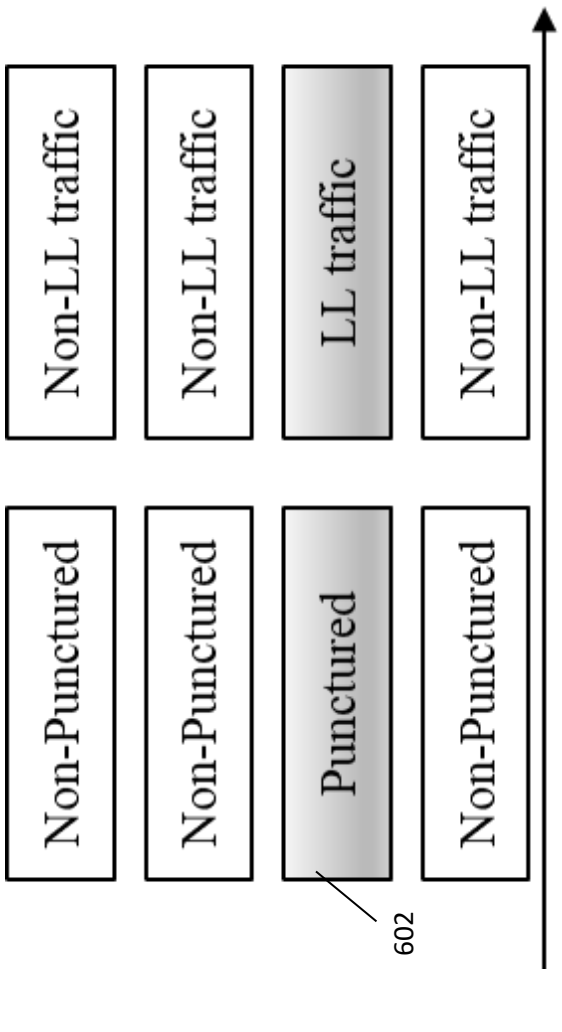

Non-LL traffic
Non-LL traffic
LL traffic
Non-LL traffic
Non-Punctured
Non-Punctured
Punctured
Non-Punctured
602
600

Figure 6

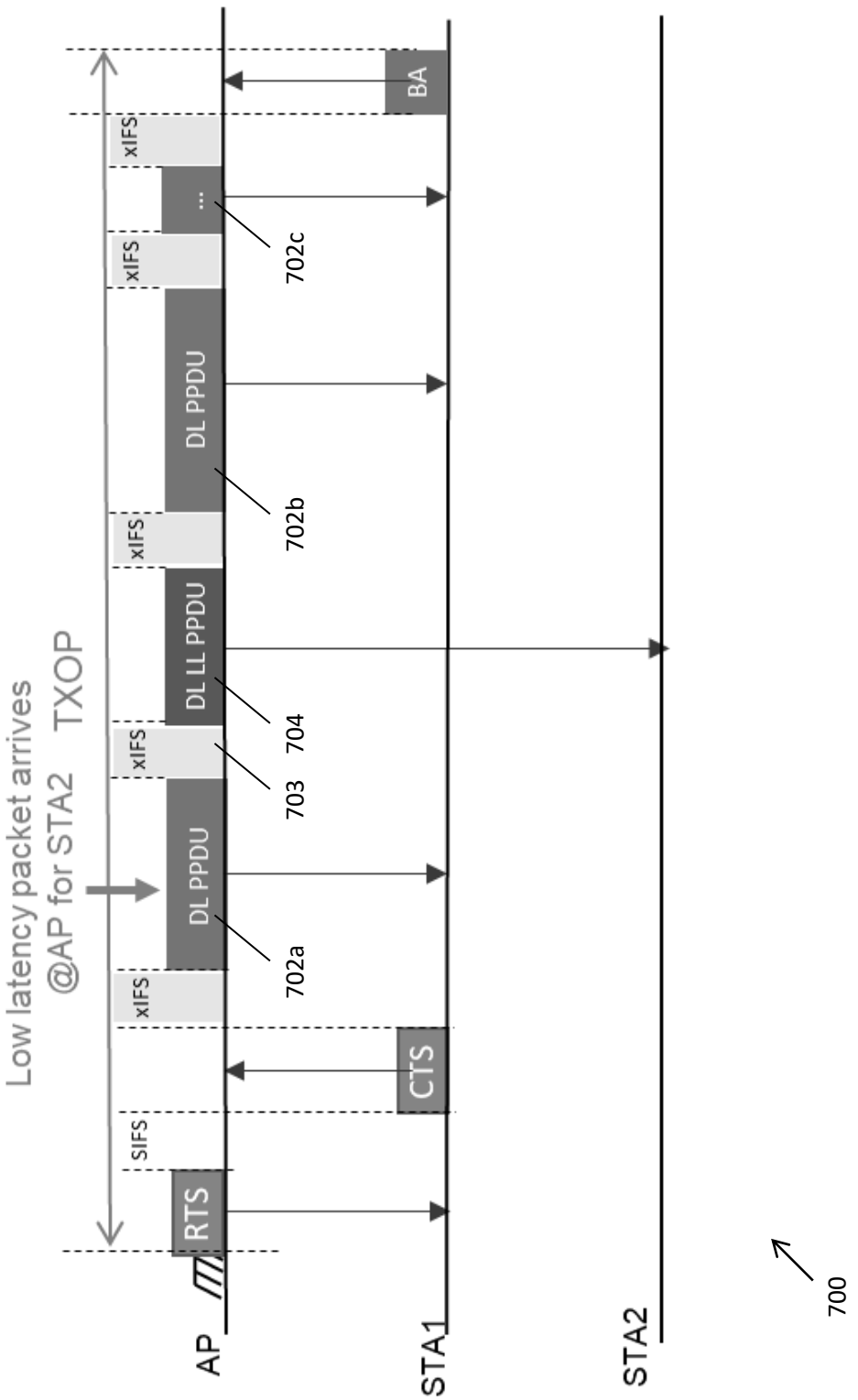
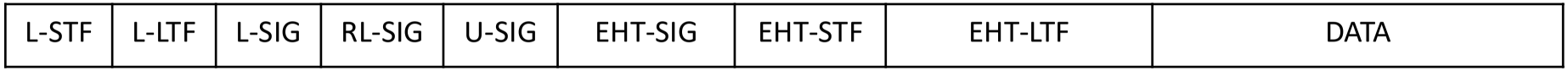

Low latency packet arrives
@AP for STA2
TXOP
AP
STA1
STA2
RTS
SIFS
CTS
xIFS
DL PPDU
DL LL PPDU
...
BA
702a
703
704
702b
702c
700

Figure 7



800

Figure 8

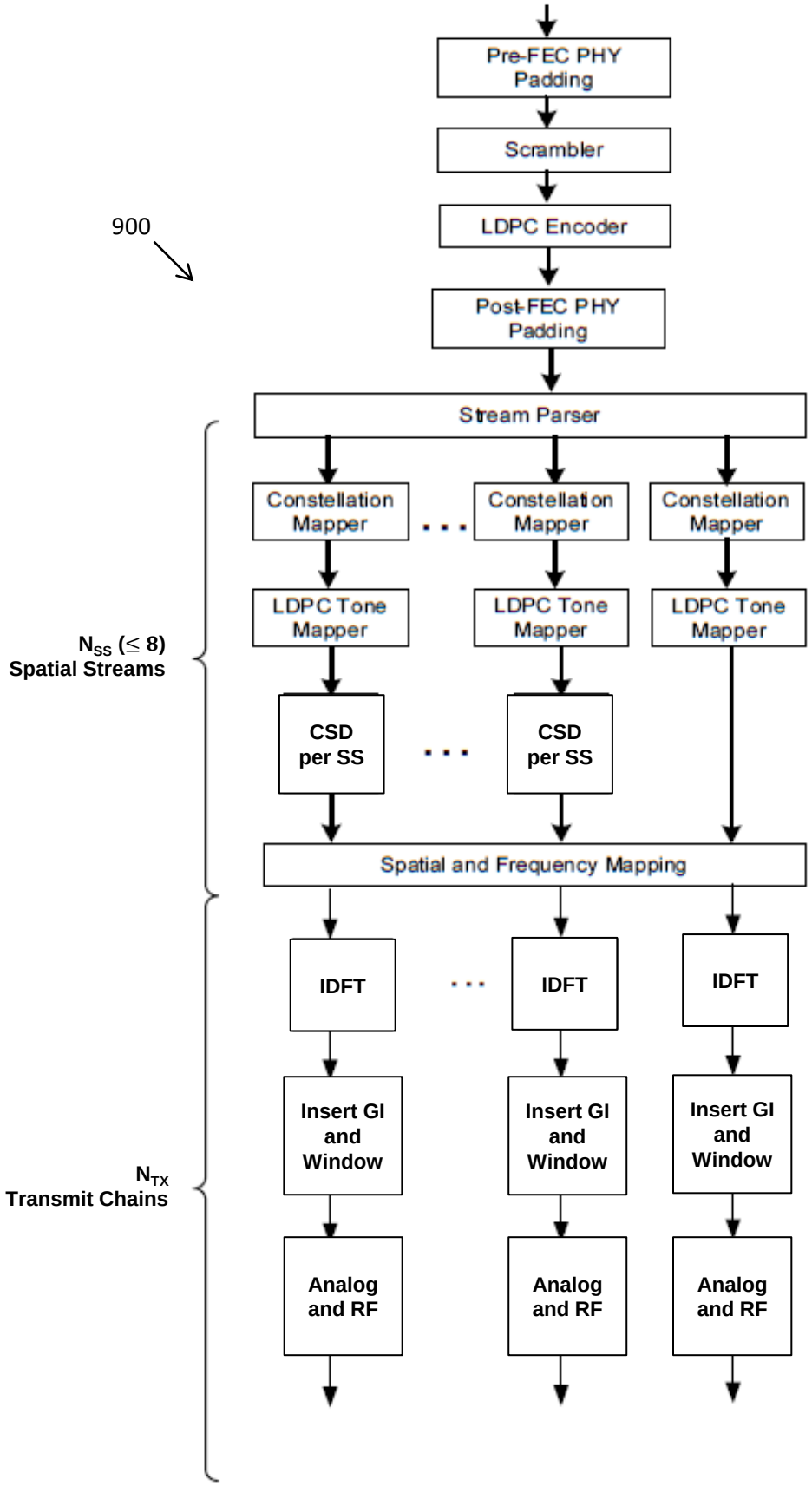

900
Pre-FEC PHY Padding
Scrambler
LDPC Encoder
Post-FEC PHY Padding
Stream Parser
Constellation Mapper
Constellation Mapper
Constellation Mapper
LDPC Tone Mapper
LDPC Tone Mapper
LDPC Tone Mapper
CSD per SS
CSD per SS
Spatial and Frequency Mapping
IDFT
IDFT
IDFT
Insert GI and Window
Insert GI and Window
Insert GI and Window
Analog and RF
Analog and RF
Analog and RF
N_SS (≤ 8) Spatial Streams
N_TX Transmit Chains

Figure 9

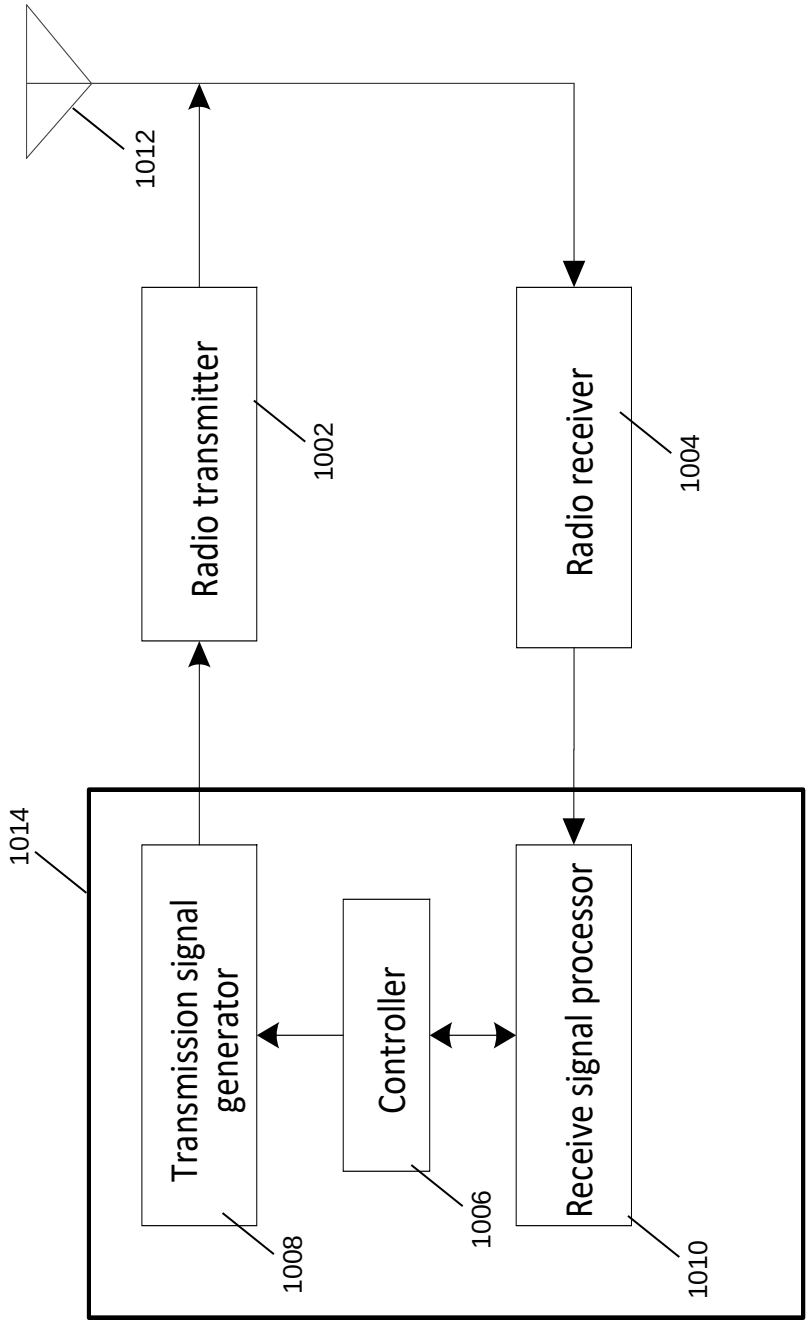

1012
Radio transmitter
1002
Radio receiver
1004
1014
Transmission signal generator
Controller
Receive signal processor
1008
1006
1010
1000

Figure 10

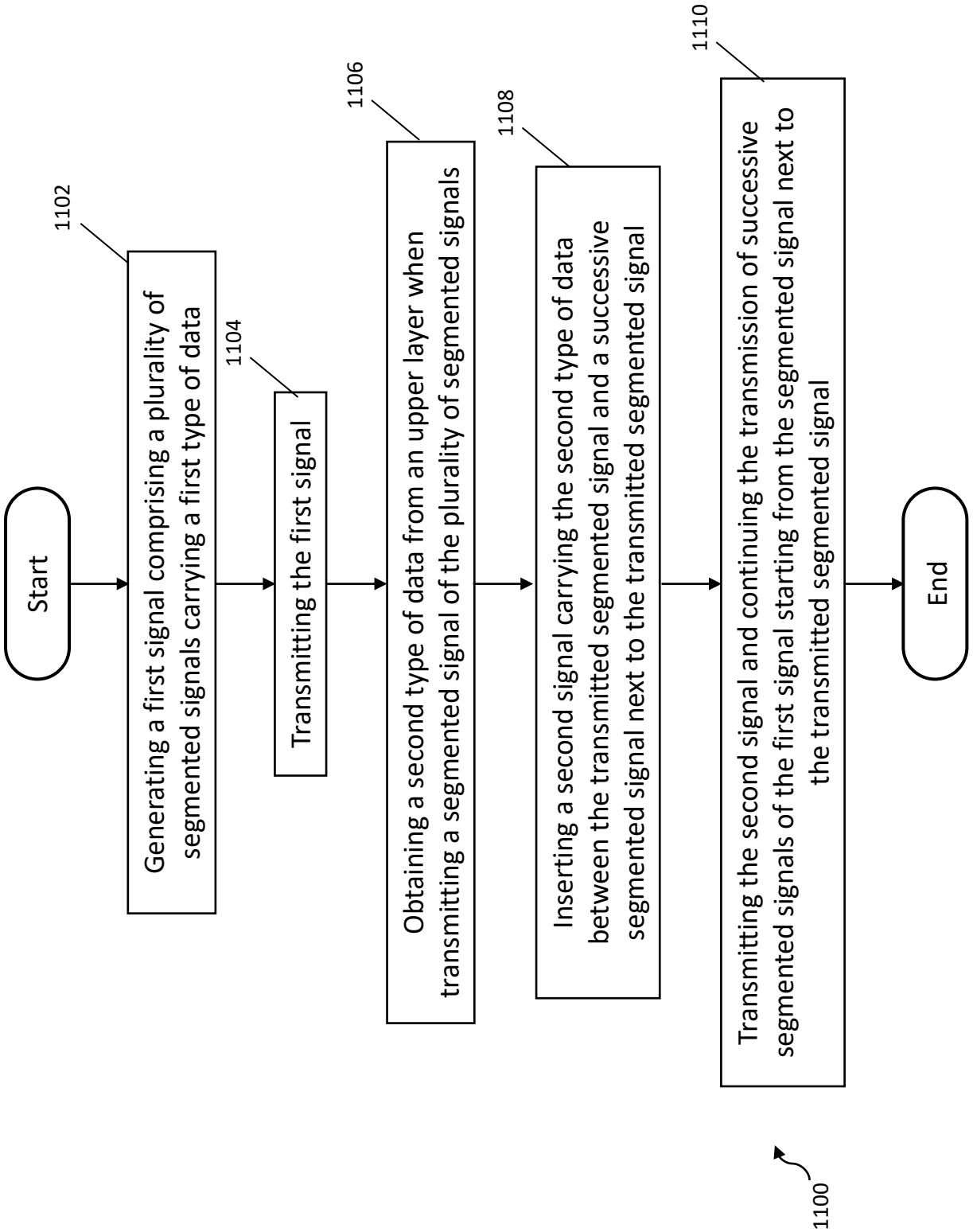

Start
1102
Generating a first signal comprising a plurality of segmented signals carrying a first type of data
1104
Transmitting the first signal
1106
Obtaining a second type of data from an upper layer when transmitting a segmented signal of the plurality of segmented signals
1108
Inserting a second signal carrying the second type of data between the transmitted segmented signal and a successive segmented signal next to the transmitted segmented signal
1110
Transmitting the second signal and continuing the transmission of successive segmented signals of the first signal starting from the segmented signal next to the transmitted segmented signal
End
1100

Figure 11

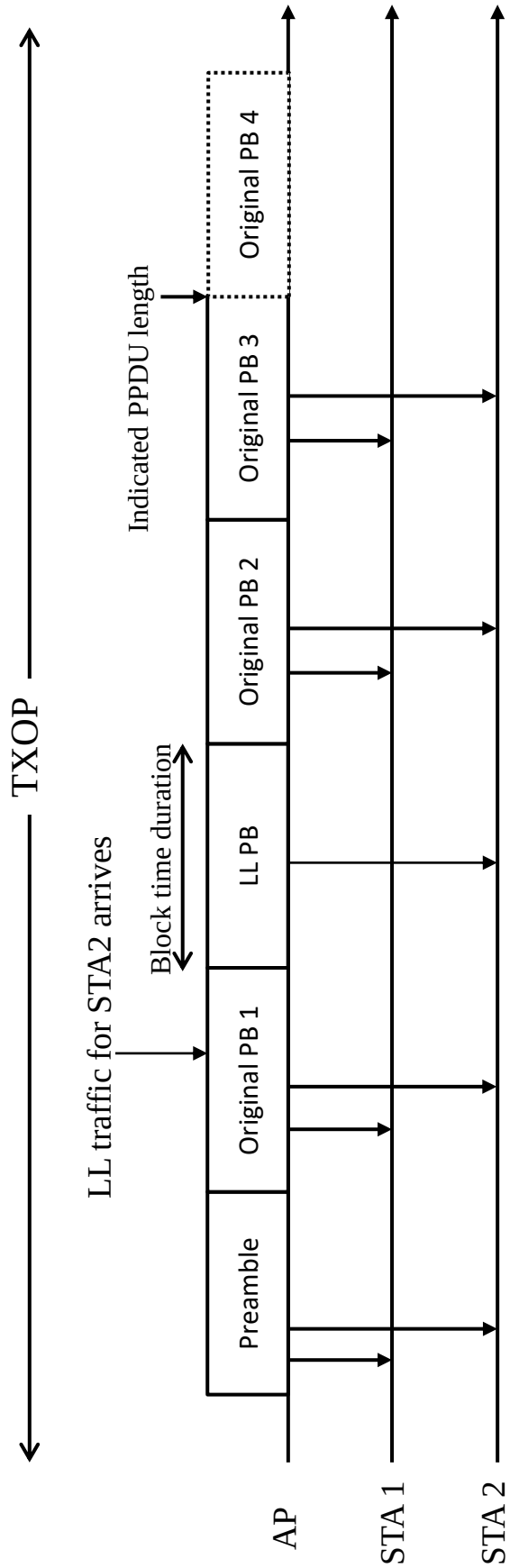

TXOP
LL traffic for STA2 arrives
Block time duration
Indicated PPDU length
Preamble
Original PB 1
LL PB
Original PB 2
Original PB 3
Original PB 4
AP
STA 1
STA 2
1200

Figure 12

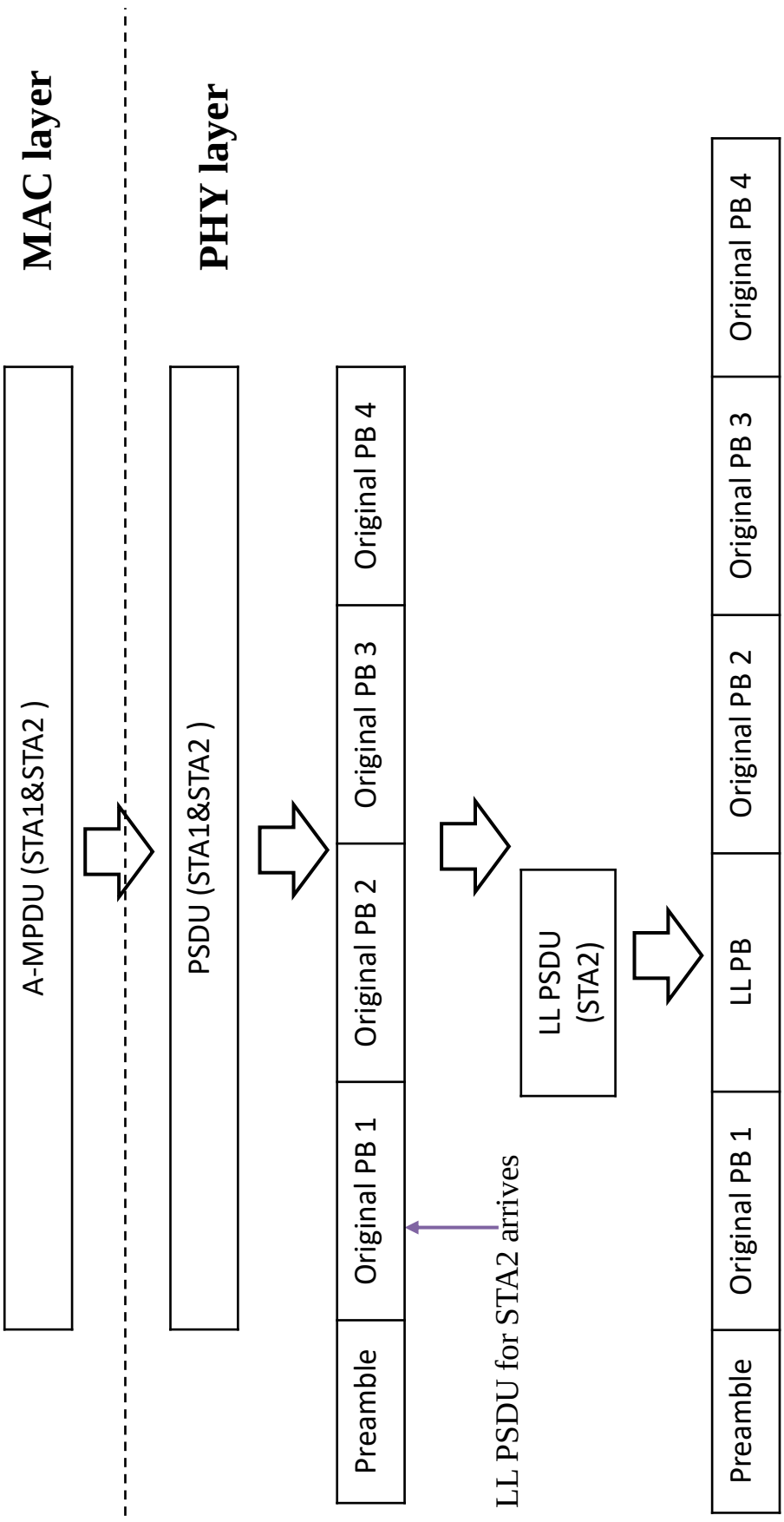

MAC layer
PHY layer
A-MPDU (STA1&STA2)
PSDU (STA1&STA2)
Preamble
Original PB 1
Original PB 2
Original PB 3
Original PB 4
LL PSDU for STA2 arrives
LL PSDU (STA2)
LL PB
1300

Figure 13

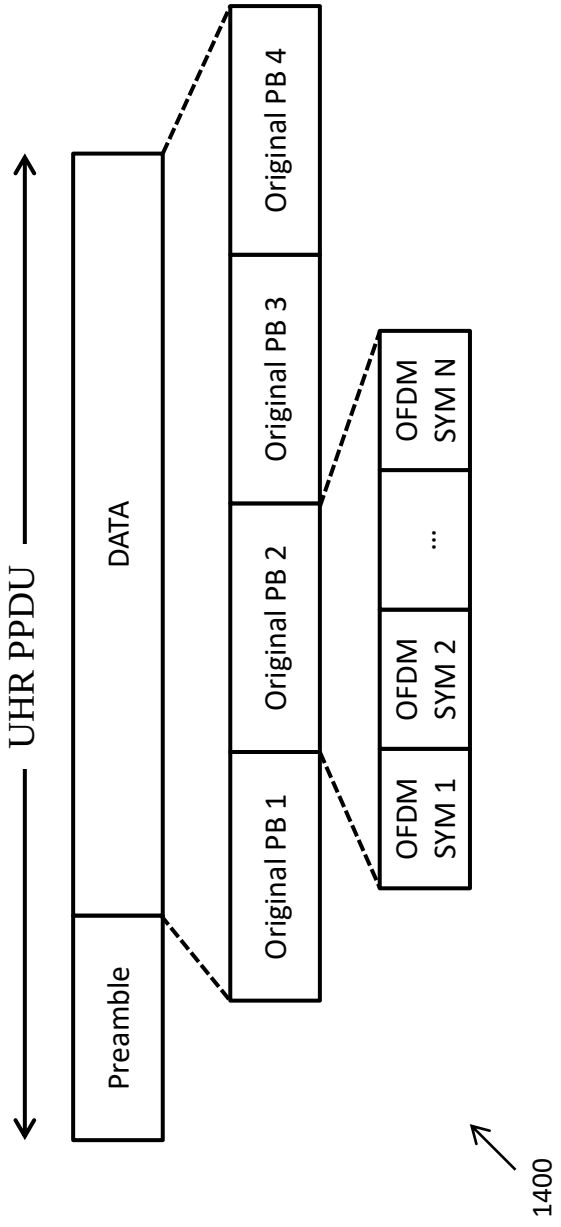

UHR PPDU
Preamble
DATA
Original PB 1
Original PB 2
Original PB 3
Original PB 4
OFDM SYM 1
OFDM SYM 2
...
OFDM SYM N
1400

Figure 14

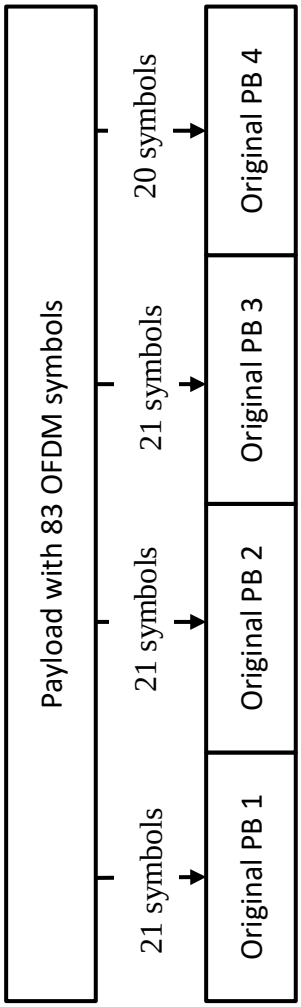

Payload with 83 OFDM symbols
21 symbols
21 symbols
21 symbols
20 symbols
Original PB 1
Original PB 2
Original PB 3
Original PB 4
1500

Figure 15

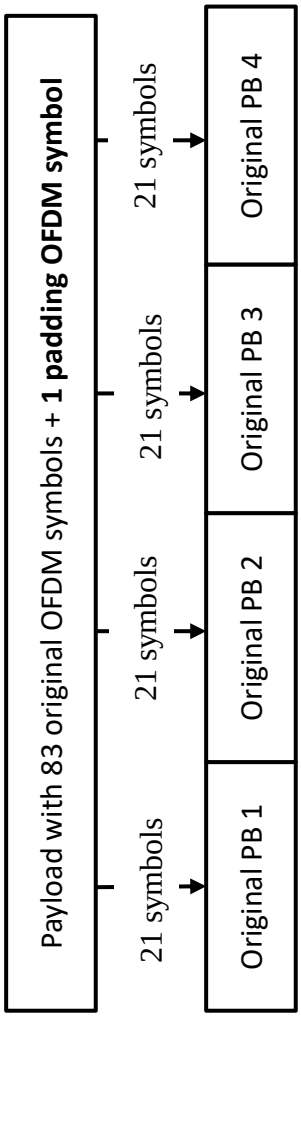

Payload with 83 original OFDM symbols + **1 padding OFDM symbol**
21 symbols
21 symbols
21 symbols
Original PB 1
Original PB 2
Original PB 3
Original PB 4
1600

Figure 16

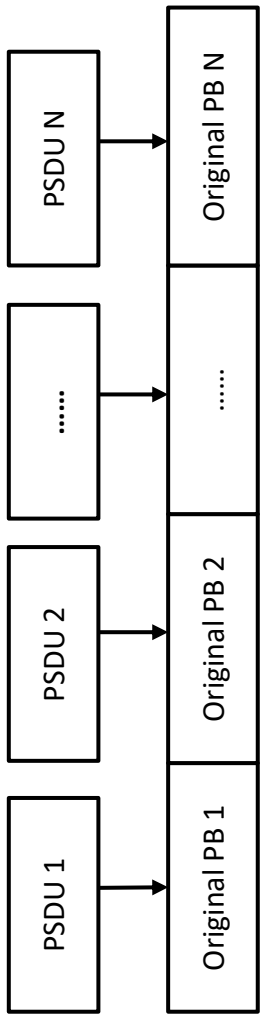

PSDU 1
PSDU 2
.....
PSDU N
Original PB 1
Original PB 2
.....
Original PB N
1700

Figure 17

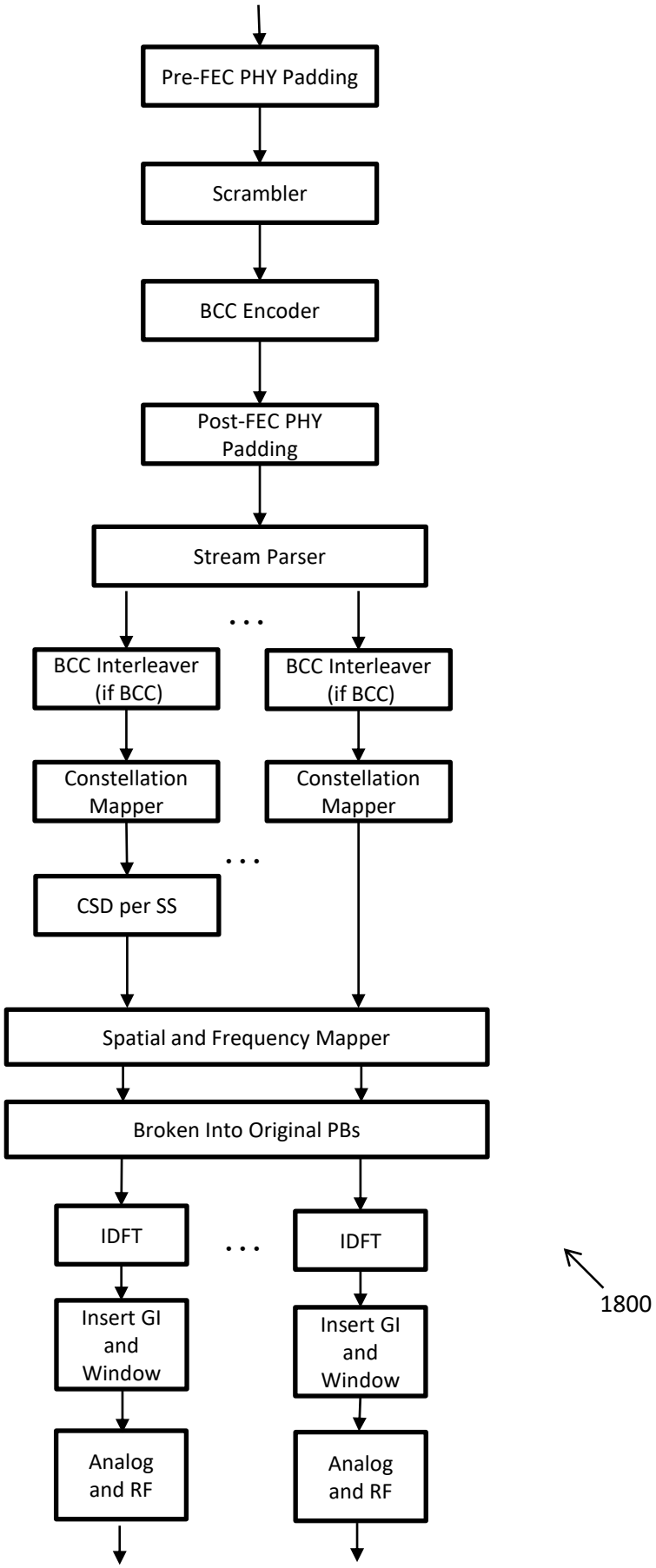

Pre-FEC PHY Padding
Scrambler
BCC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
BCC Interleaver (if BCC)
Constellation Mapper
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
Broken Into Original PBs
IDFT
IDFT
Insert GI and Window
Insert GI and Window
Analog and RF
Analog and RF
1800

Figure 18

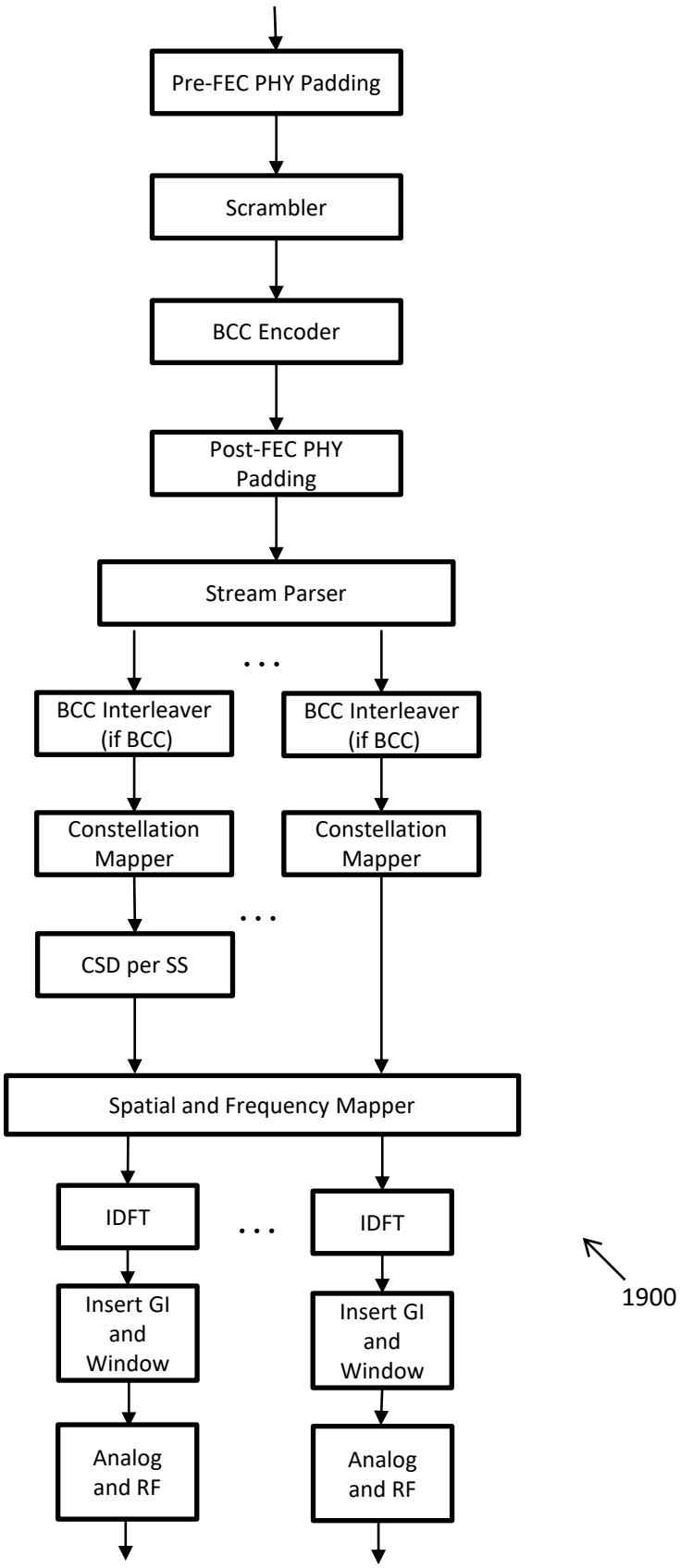
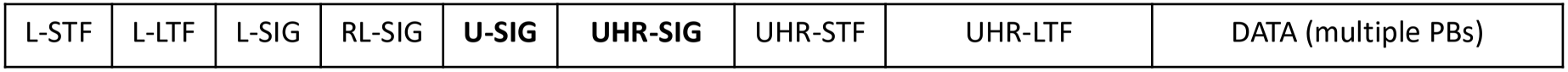

Pre-FEC PHY Padding
Scrambler
BCC Encoder
Post-FEC PHY Padding
Stream Parser
BCC Interleaver (if BCC)
BCC Interleaver (if BCC)
Constellation Mapper
Constellation Mapper
CSD per SS
Spatial and Frequency Mapper
IDFT
IDFT
Insert GI and Window
Insert GI and Window
Analog and RF
Analog and RF
1900

Figure 19



2000

Figure 20

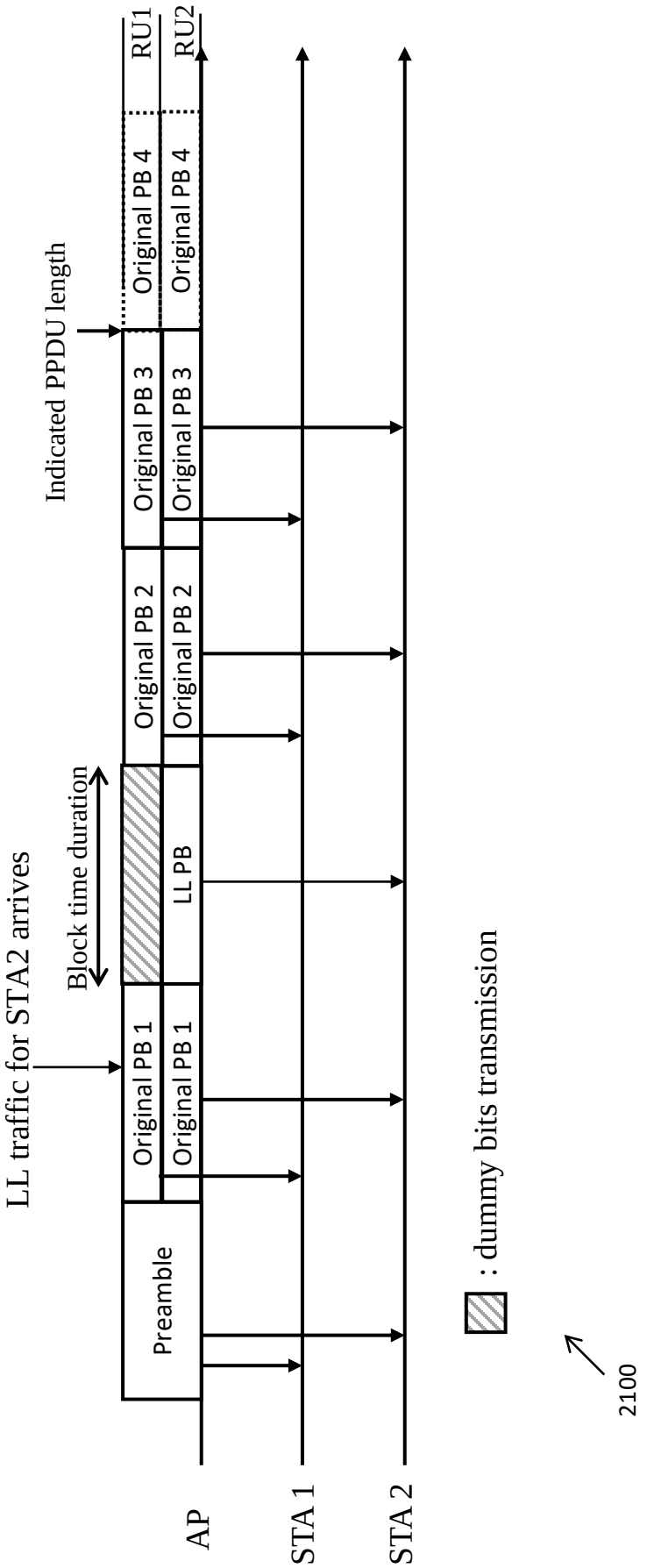

AP
STA 1
STA 2
Preamble
Original PB 1
Original PB 1
LL PB
Original PB 2
Original PB 2
Original PB 3
Original PB 3
Original PB 4
Original PB 4
RU1
RU2
Indicated PPDU length
Block time duration
LL traffic for STA2 arrives
: dummy bits transmission
2100

Figure 21

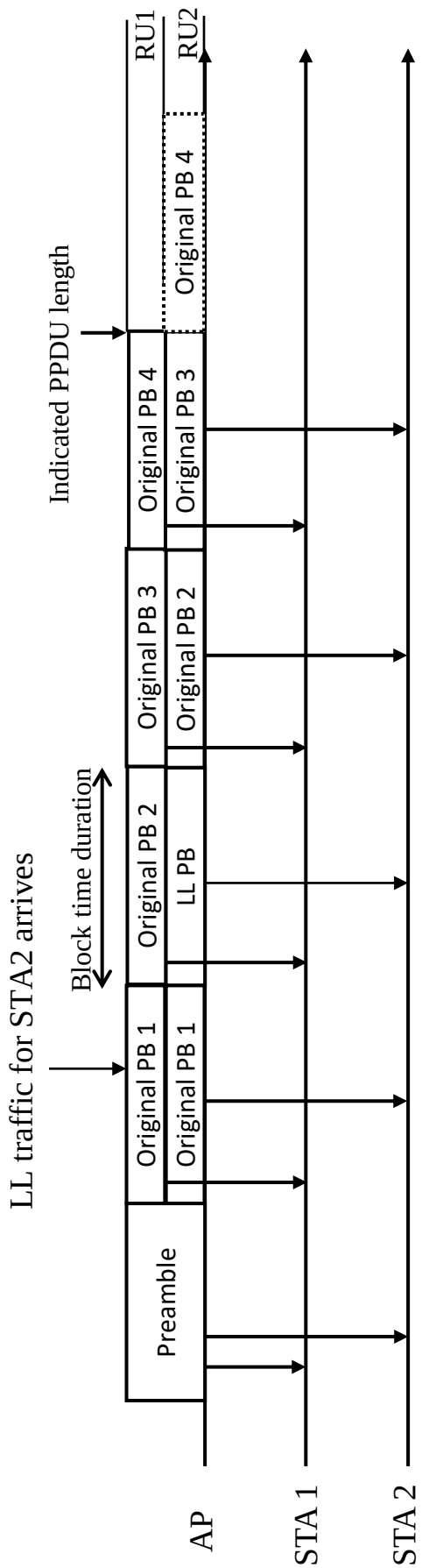

AP
STA 1
STA 2
Preamble
Original PB 1
Original PB 1
Original PB 2
LL PB
Original PB 3
Original PB 2
Original PB 4
Original PB 3
Original PB 4
RU1
RU2
Block time duration
LL traffic for STA2 arrives
Indicated PPDU length
2200

Figure 22

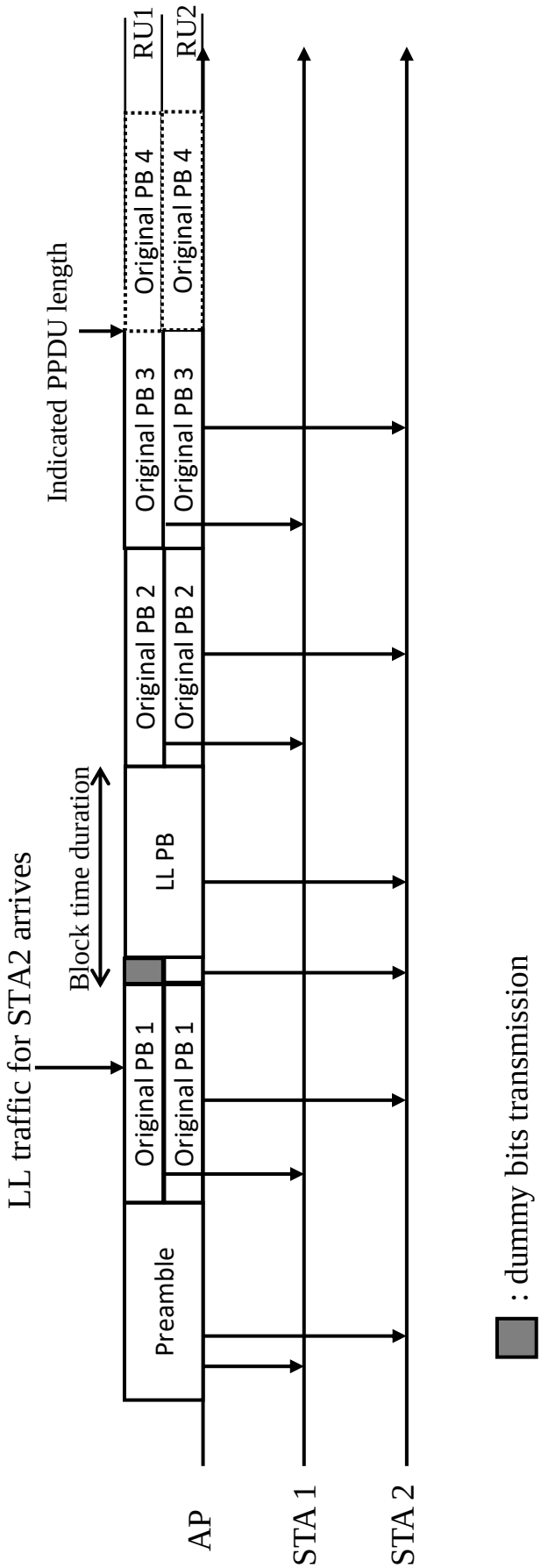

RU1
RU2
Original PB 4
Original PB 4
Original PB 3
Original PB 3
Original PB 2
Original PB 2
LL PB
Original PB 1
Original PB 1
Preamble
Indicated PPDU length
Block time duration
LL traffic for STA2 arrives
AP
STA 1
STA 2
: dummy bits transmission
2300

Figure 23

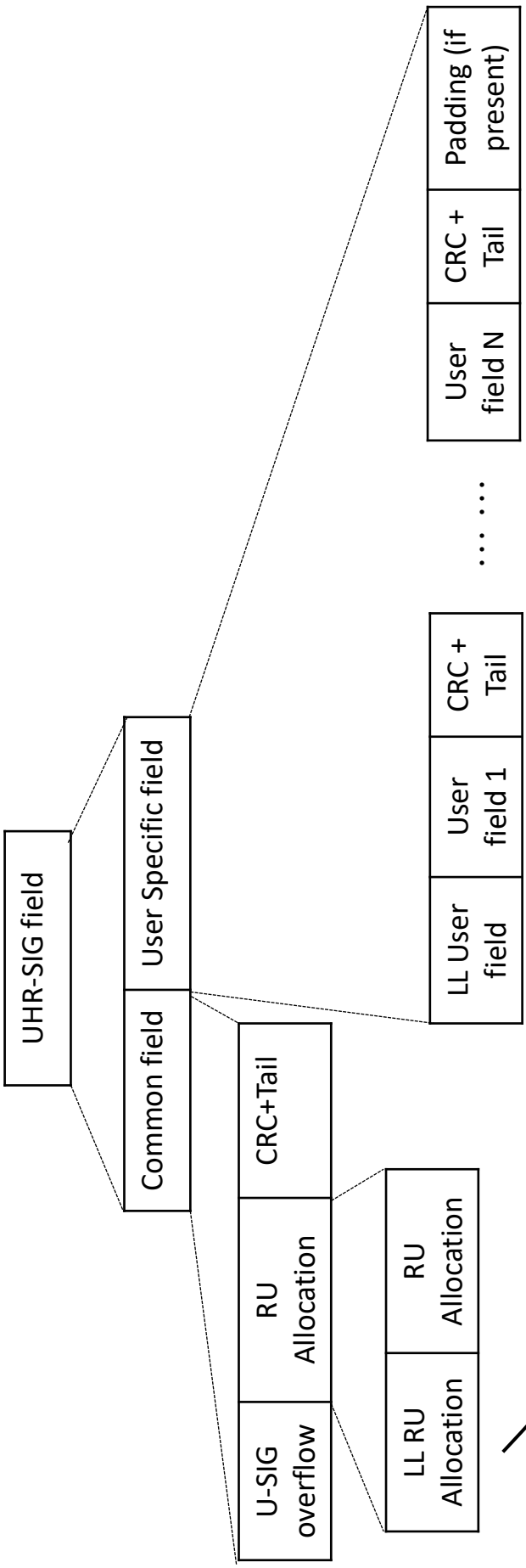

UHR-SIG field
Common field
User Specific field
U-SIG overflow
RU Allocation
CRC+Tail
LL RU Allocation
RU Allocation
LL User field
User field 1
CRC + Tail
User field N
CRC + Tail
Padding (if present)
2402
2400

Figure 24

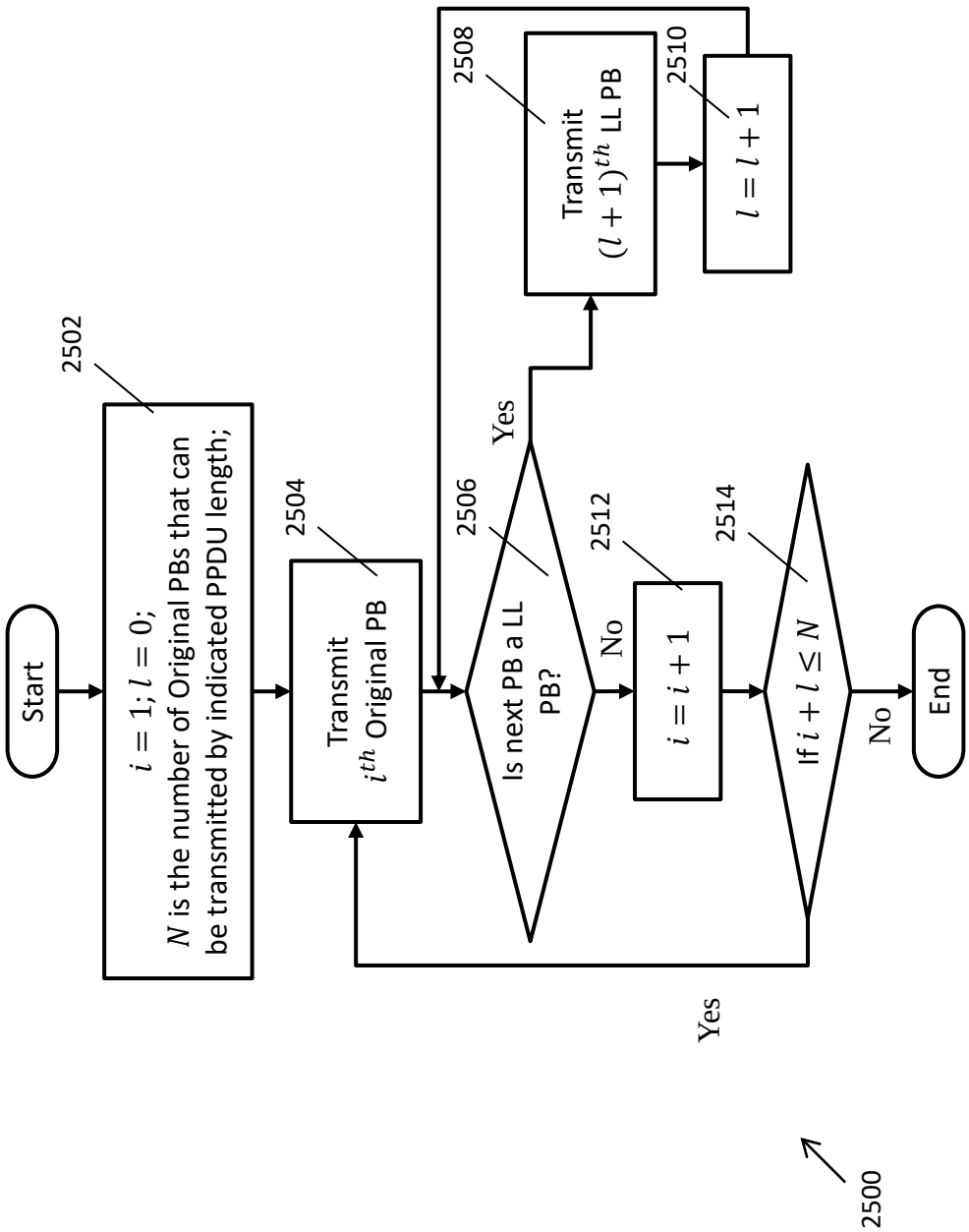

Start
2502
$i = 1; l = 0;$
N is the number of Original PBs that can be transmitted by indicated PPDU length;
2504
Transmit i^{th} Original PB
2506
Is next PB a LL PB?
Yes
2508
Transmit $(l+1)^{th}$ LL PB
2510
$l = l + 1$
No
2512
$i = i + 1$
2514
If $i + l \leq N$
Yes
No
End
2500

Figure 25

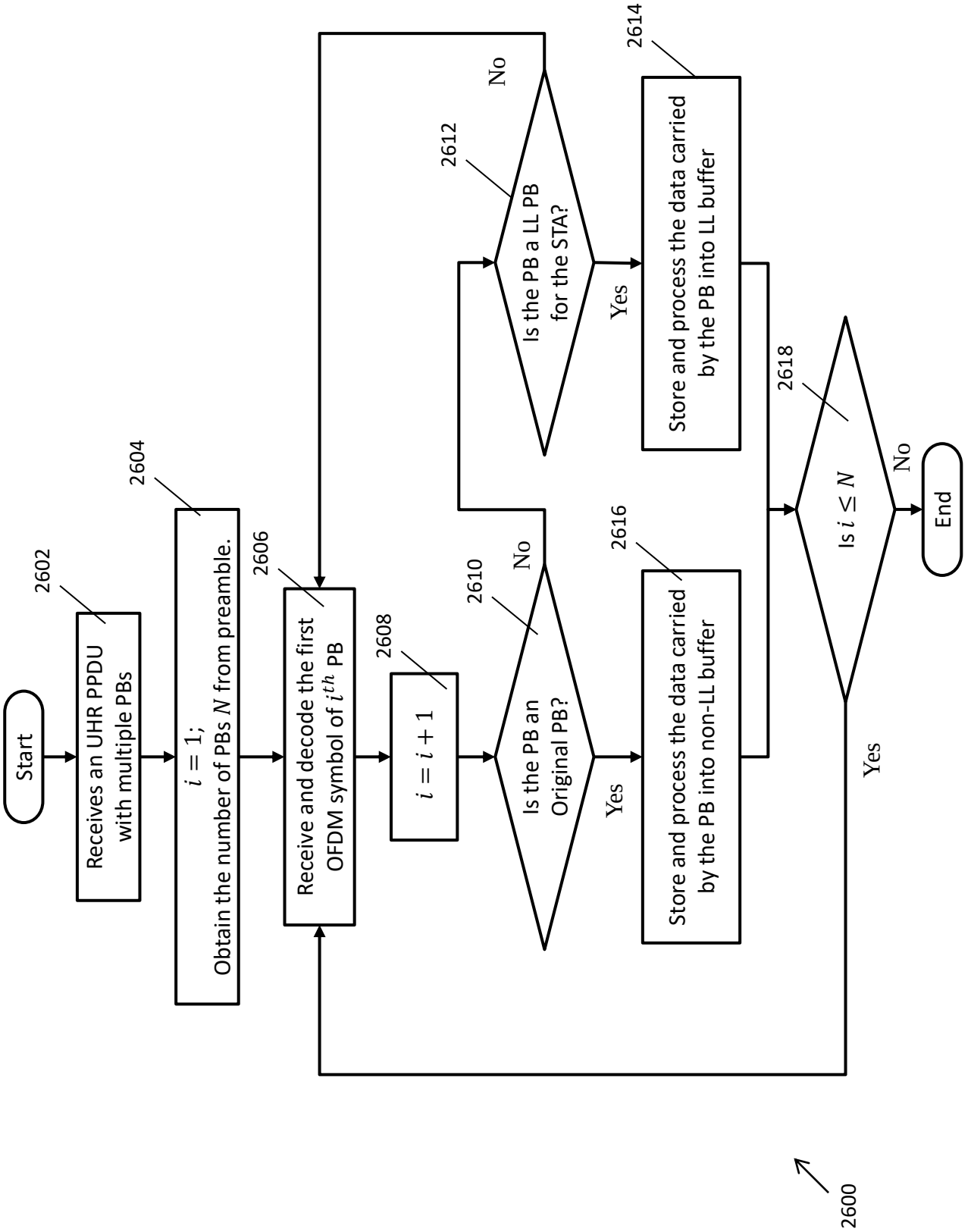

Start
2602
Receives an UHR PPDU with multiple PBs
2604
$i = 1$;
Obtain the number of PBs N from preamble.
2606
Receive and decode the first OFDM symbol of i^{th} PB
2608
$i = i + 1$
2610
Is the PB an Original PB?
No
Yes
2612
Is the PB a LL PB for the STA?
No
Yes
2614
Store and process the data carried by the PB into LL buffer
2616
Store and process the data carried by the PB into non-LL buffer
2618
Is $i \leq N$
Yes
No
End
2600

Figure 26

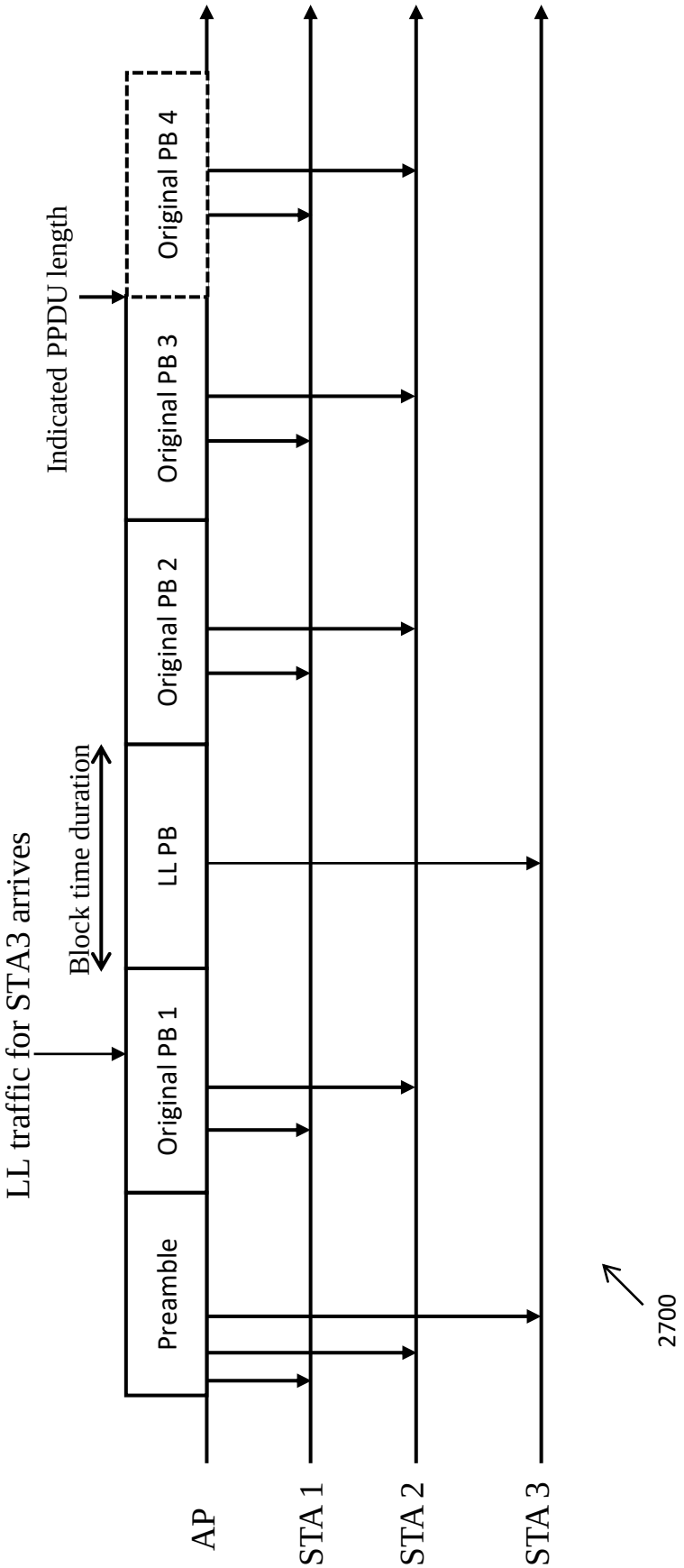

AP
STA 1
STA 2
STA 3
Preamble
Original PB 1
LL PB
Original PB 2
Original PB 3
Original PB 4
LL traffic for STA3 arrives
Block time duration
Indicated PPDU length
2700

Figure 27

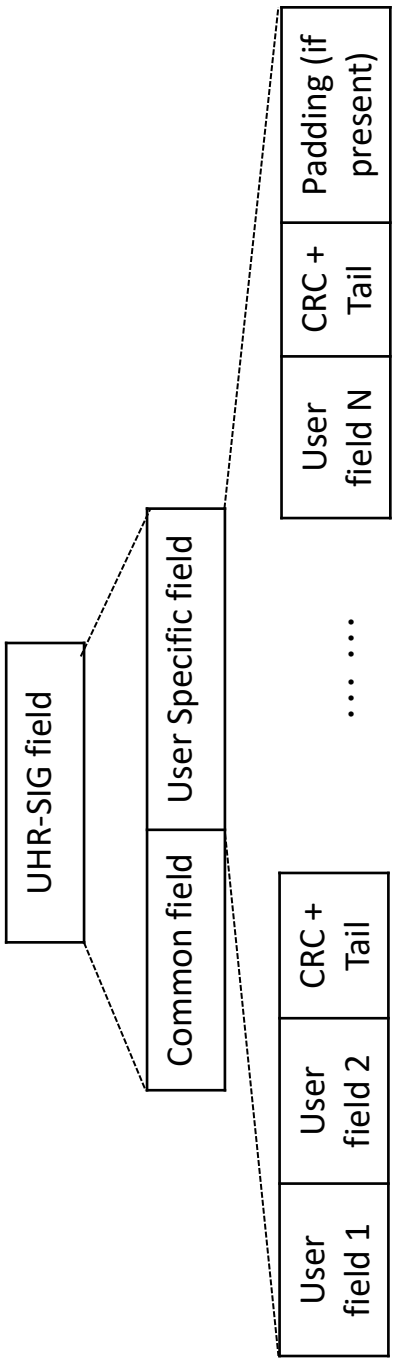

UHR-SIG field
Common field
User Specific field
User field 1
User field 2
CRC + Tail
. . . . . .
User field N
CRC + Tail
Padding (if present)
2800

Figure 28

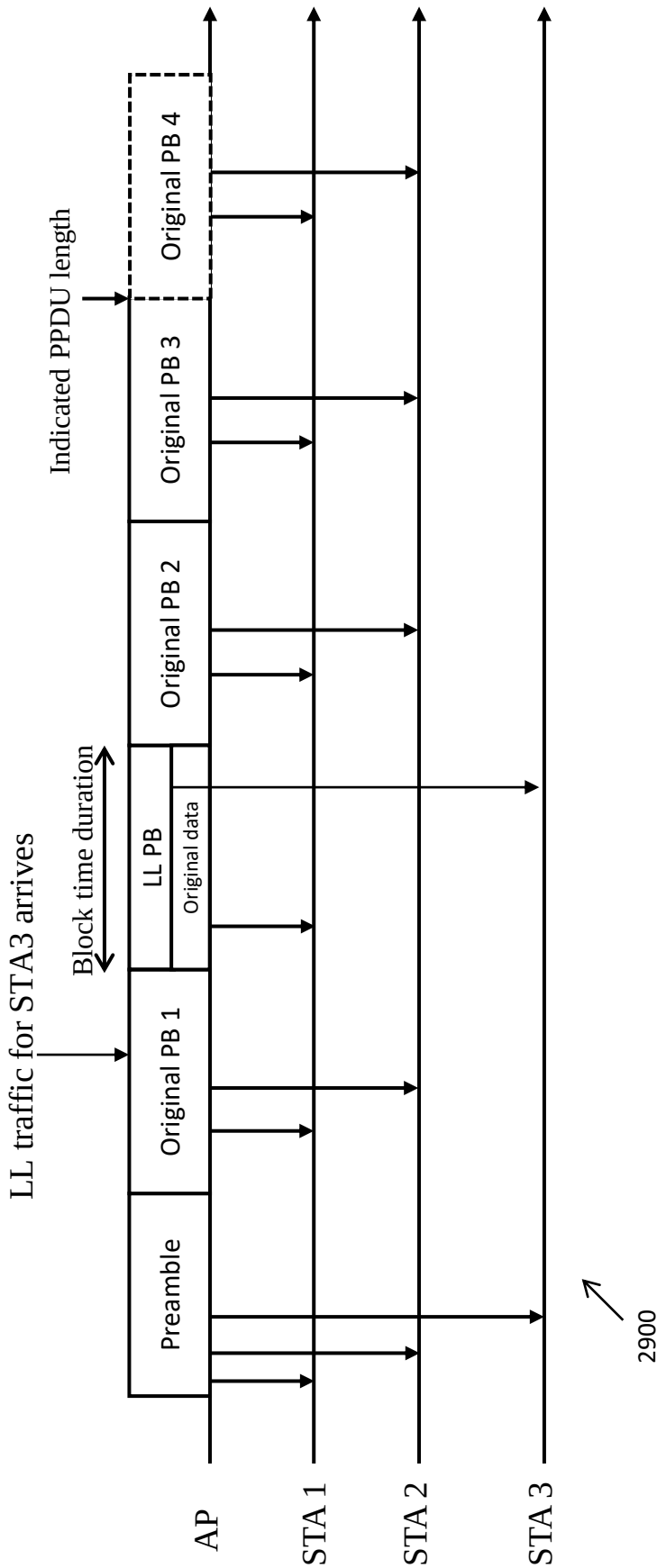

AP
STA 1
STA 2
STA 3
Preamble
Original PB 1
LL PB
Original data
Original PB 2
Original PB 3
Original PB 4
LL traffic for STA3 arrives
Block time duration
Indicated PPDU length
2900

Figure 29

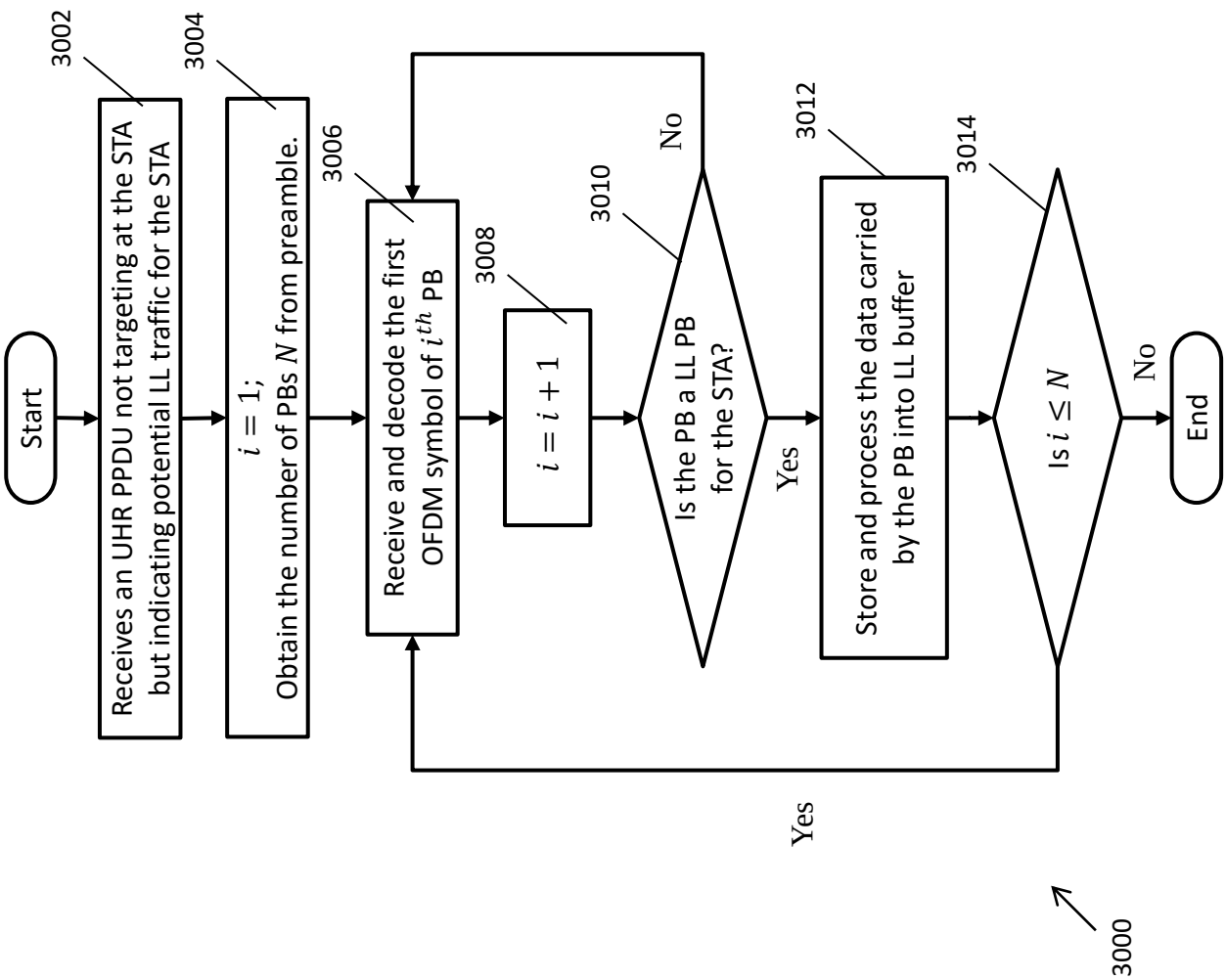

Start
3002
Receives an UHR PPDU not targeting at the STA but indicating potential LL traffic for the STA
3004
$i = 1$;
Obtain the number of PBs N from preamble.
3006
Receive and decode the first OFDM symbol of i^{th} PB
3008
$i = i + 1$
3010
Is the PB a LL PB for the STA?
No
Yes
3012
Store and process the data carried by the PB into LL buffer
3014
Is $i \leq N$
No
Yes
End
3000

Figure 30

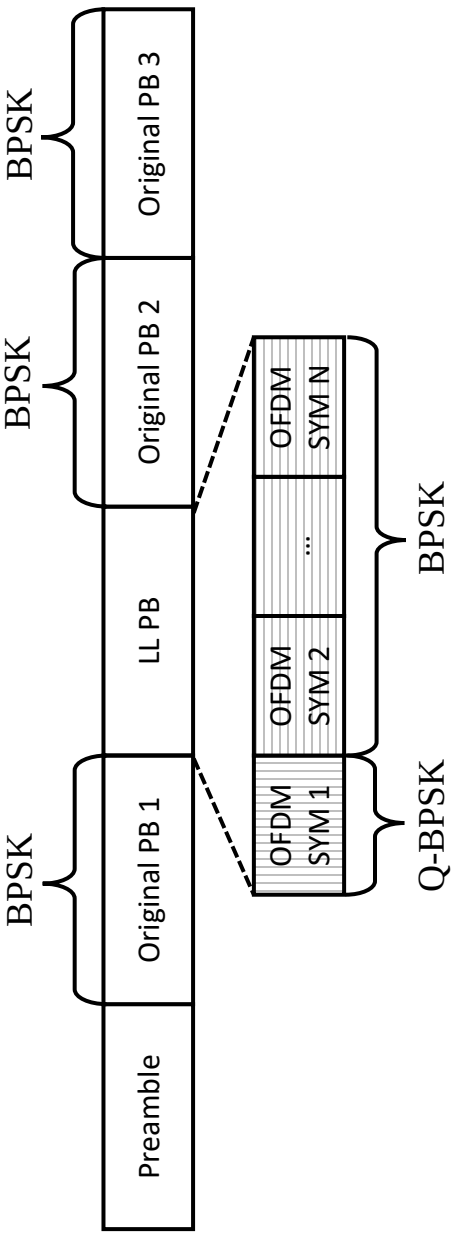

Preamble
BPSK
Original PB 1
LL PB
BPSK
Original PB 2
BPSK
Original PB 3
OFDM SYM 1
OFDM SYM 2
...
OFDM SYM N
Q-BPSK
BPSK
3100

Figure 31

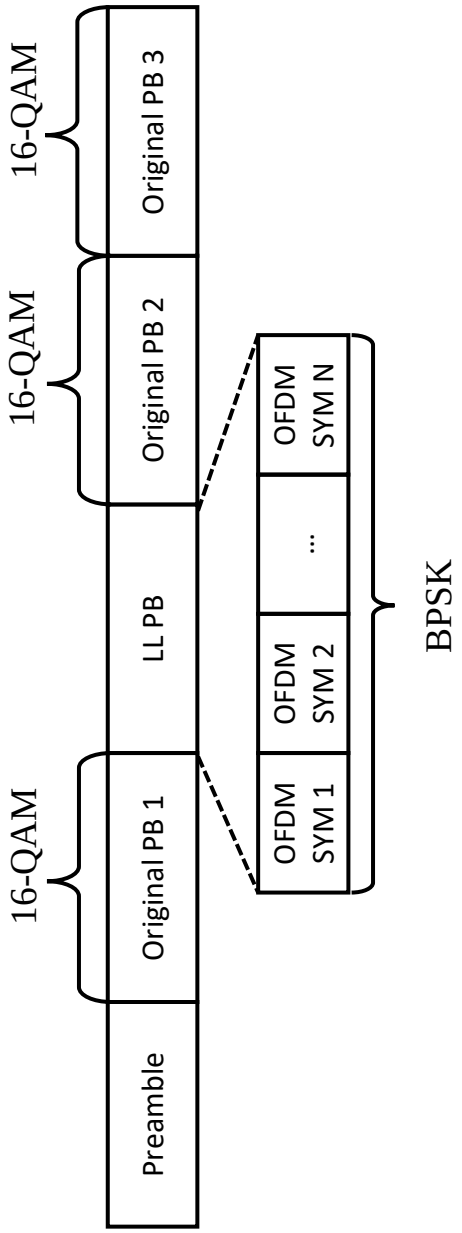

16-QAM
16-QAM
16-QAM
Preamble
Original PB 1
LL PB
Original PB 2
Original PB 3
OFDM SYM 1
OFDM SYM 2
...
OFDM SYM N
BPSK
3200

Figure 32

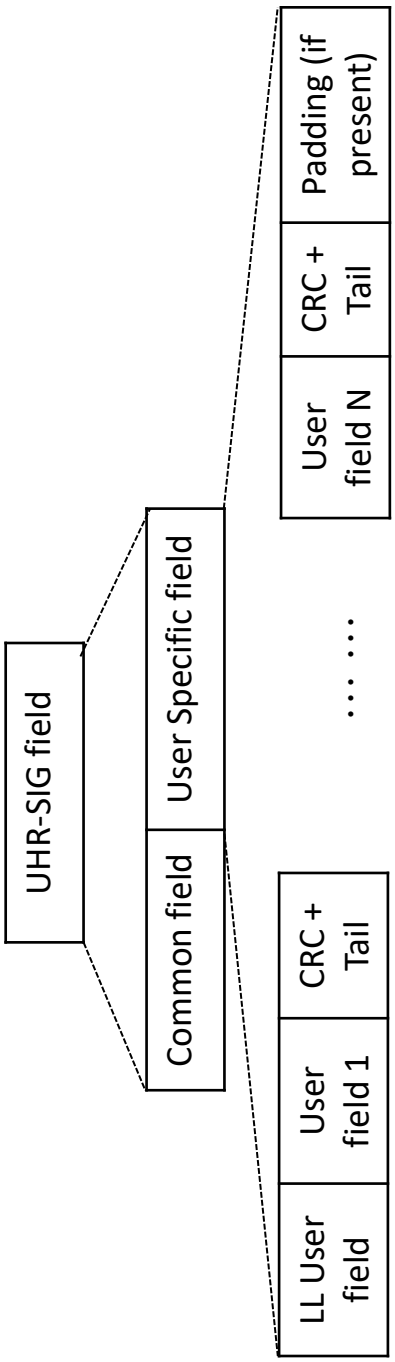

UHR-SIG field
Common field
User Specific field
LL User field
User field 1
CRC + Tail
. . . . . .
User field N
CRC + Tail
Padding (if present)
3300

Figure 33

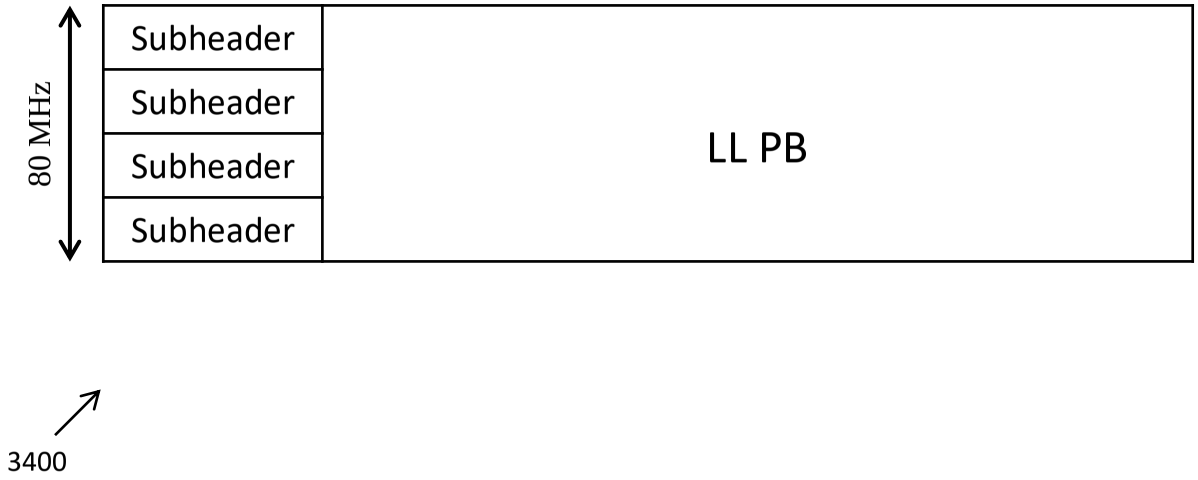


Figure 34

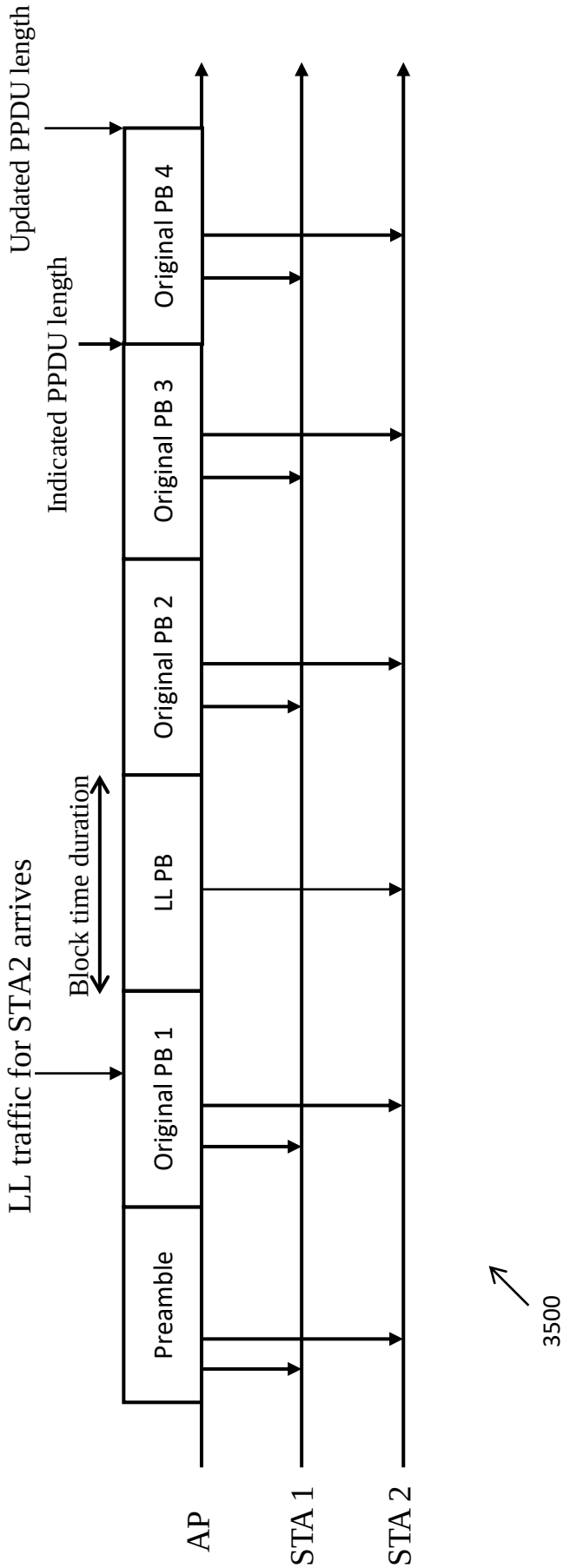

Updated PPDU length
Indicated PPDU length
Original PB 4
Original PB 3
Original PB 2
LL PB
Original PB 1
Preamble
Block time duration
LL traffic for STA2 arrives
AP
STA 1
STA 2
3500

Figure 35

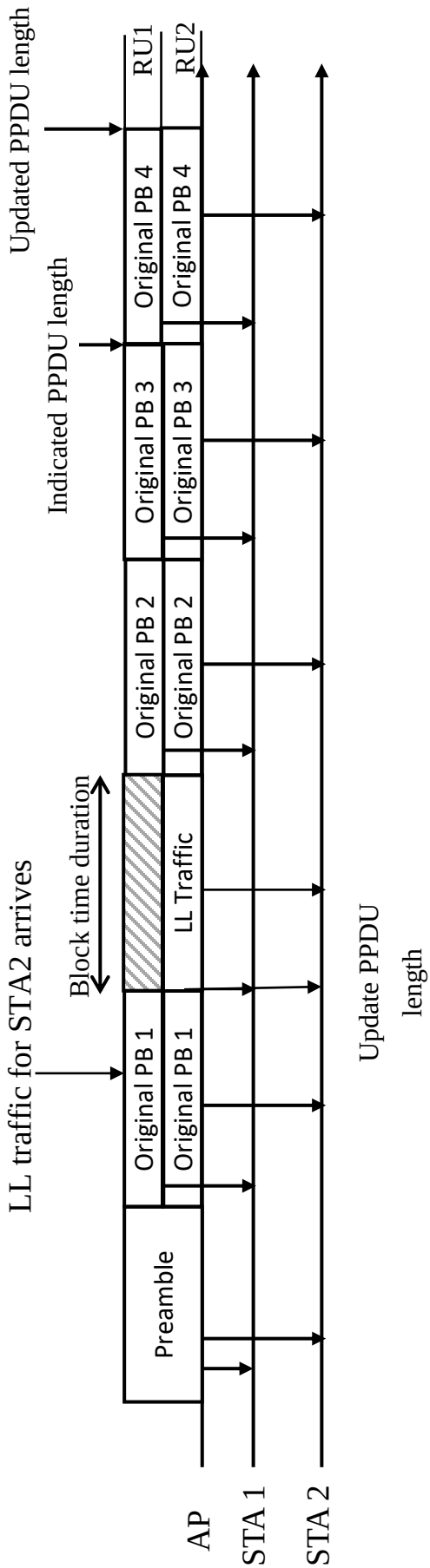

Updated PPDU length
Indicated PPDU length
RU1
RU2
Original PB 4
Original PB 4
Original PB 3
Original PB 3
Original PB 2
Original PB 2
Original PB 1
Original PB 1
LL traffic for STA2 arrives
Block time duration
LL Traffic
Update PPDU length
Preamble
AP
STA 1
STA 2
: dummy bits transmission
3600

Figure 36

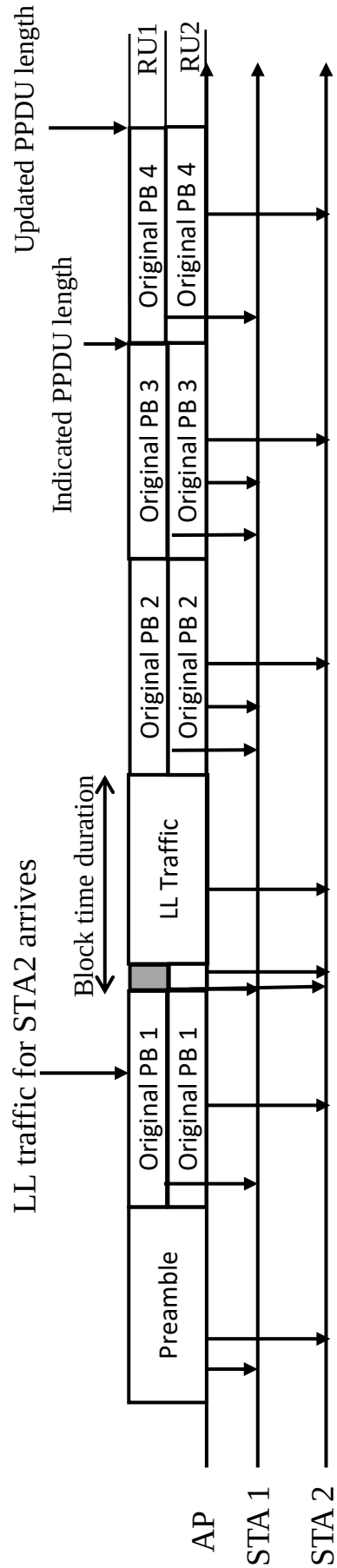

Updated PPDU length
Indicated PPDU length
RU1
RU2
Original PB 4
Original PB 4
Original PB 3
Original PB 3
Original PB 2
Original PB 2
Original PB 1
Original PB 1
LL Traffic
Preamble
LL traffic for STA2 arrives
Block time duration
Update PPDU length
AP
STA 1
STA 2
: dummy bits transmission
3700

Figure 37

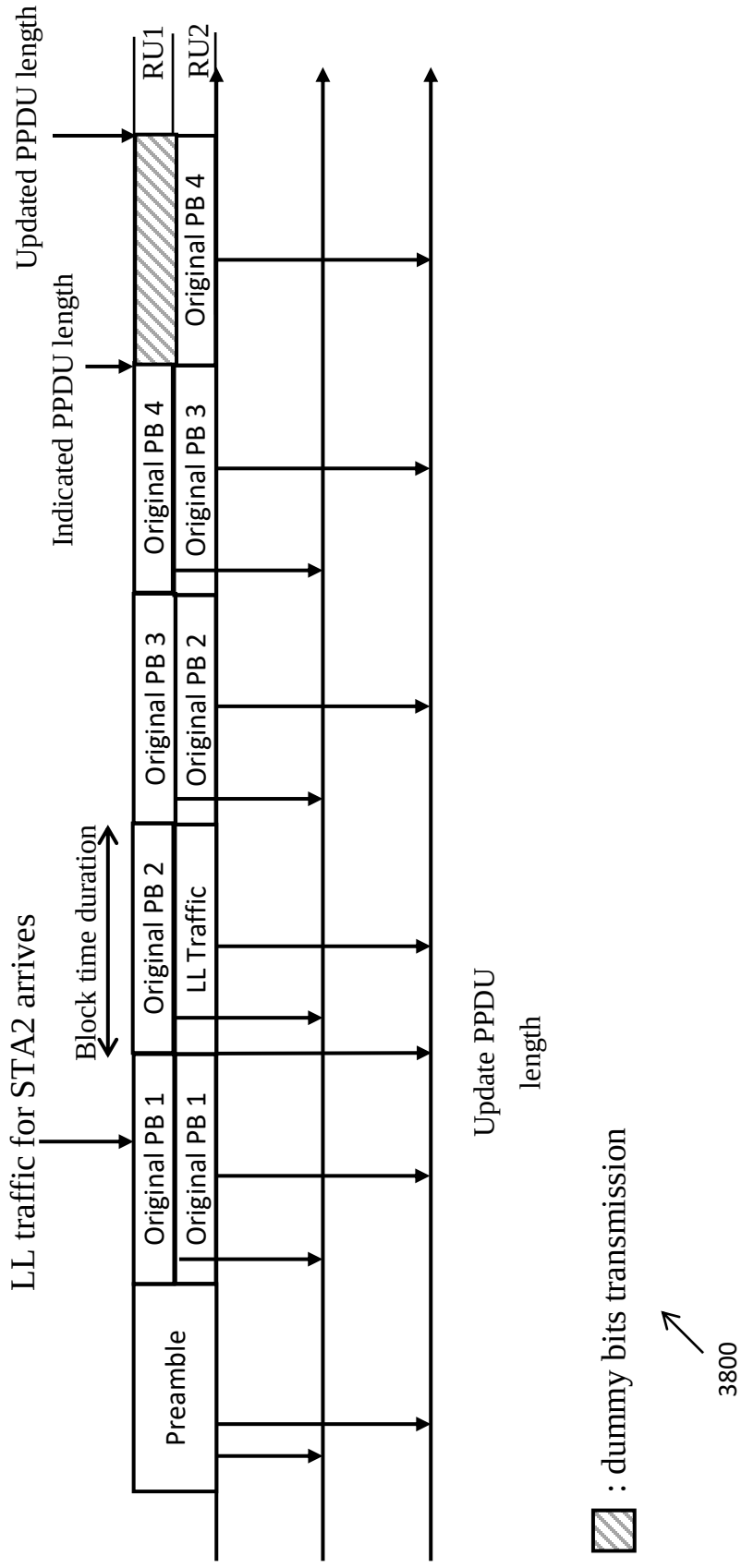

AP
STA 1
STA 2
Preamble
Original PB 1
Original PB 1
Original PB 2
LL Traffic
Original PB 3
Original PB 2
Original PB 4
Original PB 3
Original PB 4
RU1
RU2
LL traffic for STA2 arrives
Block time duration
Indicated PPDU length
Updated PPDU length
Update PPDU length
: dummy bits transmission
3800

Figure 38

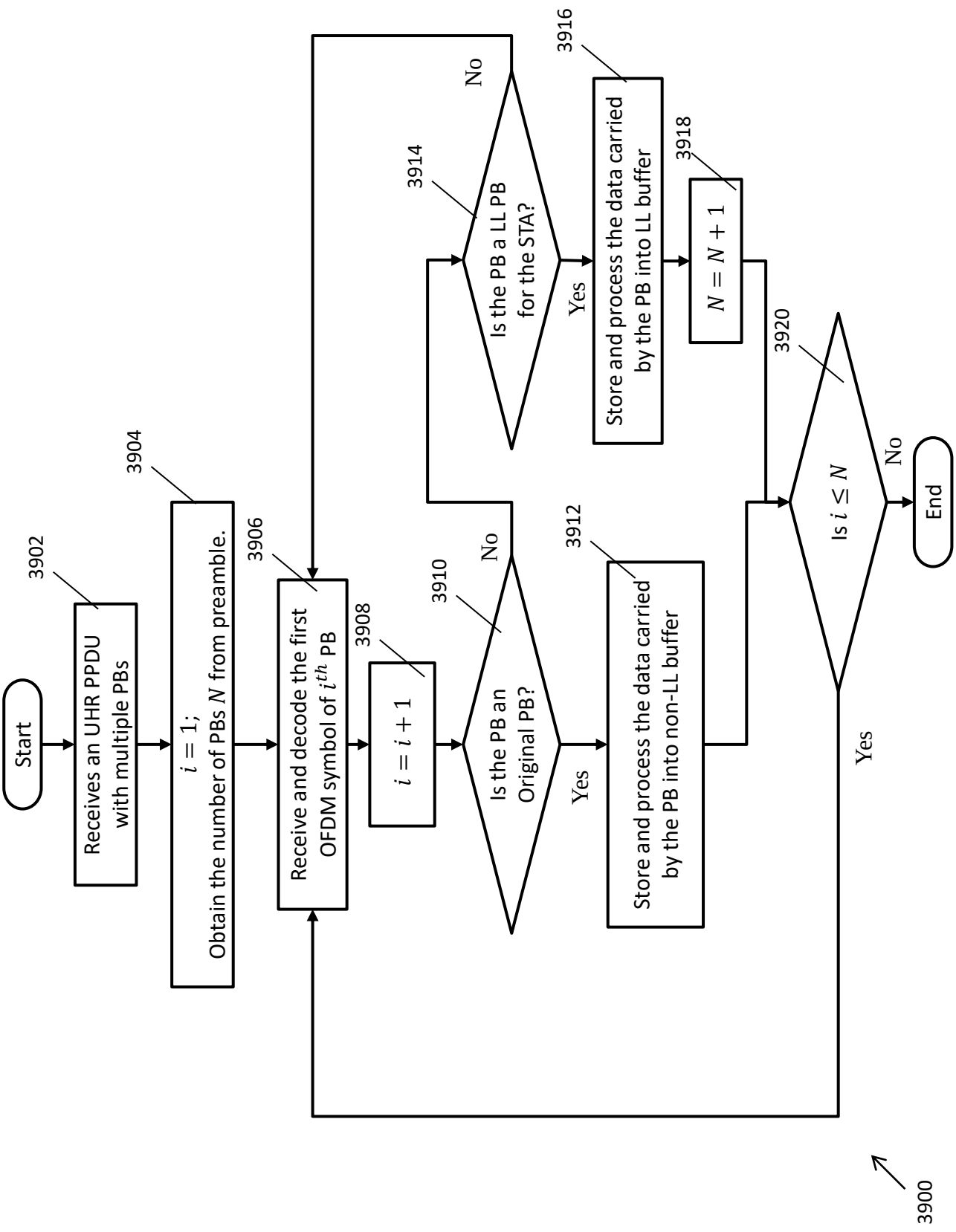

Start
3902
Receives an UHR PPDU with multiple PBs
3904
$i = 1$;
Obtain the number of PBs N from preamble.
3906
Receive and decode the first OFDM symbol of i^{th} PB
3908
$i = i + 1$
3910
Is the PB an Original PB?
No
Yes
3912
Store and process the data carried by the PB into non-LL buffer
3914
Is the PB a LL PB for the STA?
No
Yes
3916
Store and process the data carried by the PB into LL buffer
3918
$N = N + 1$
3920
Is $i \leq N$
Yes
No
End
3900

Figure 39

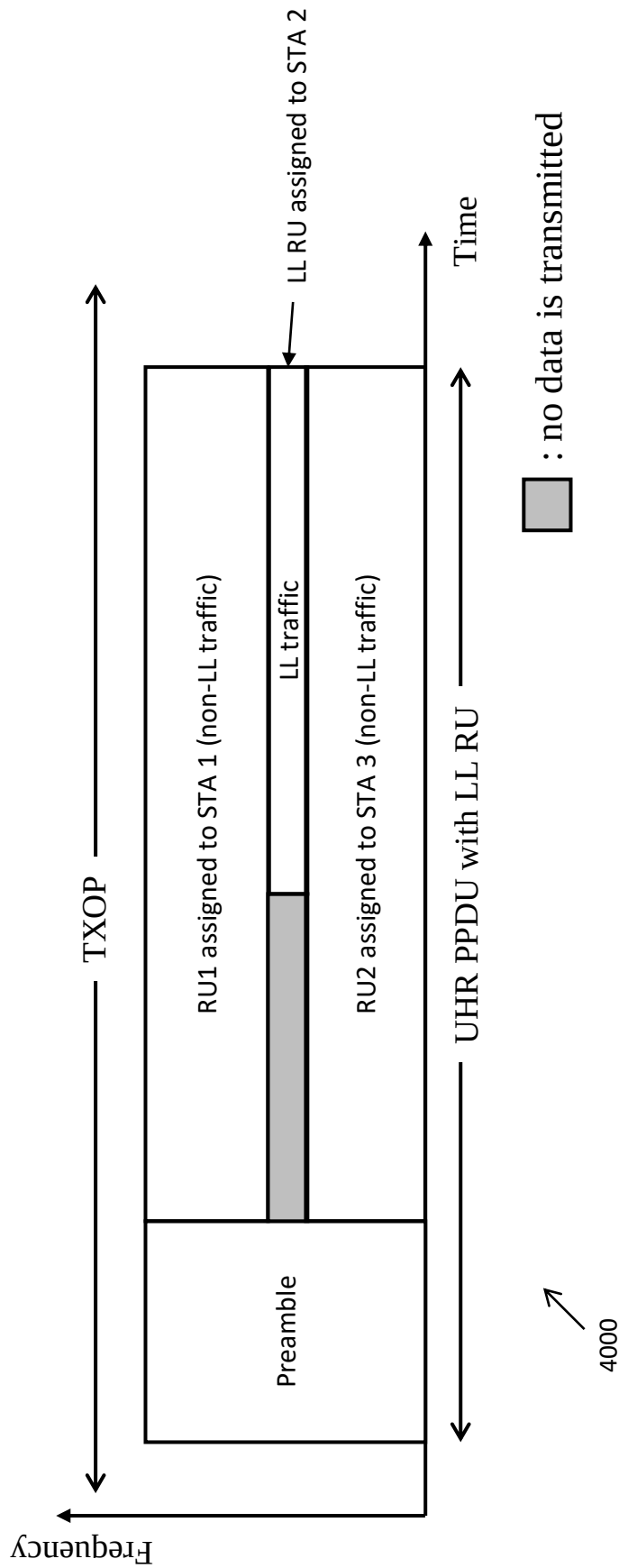

Frequency
TXOP
Time
LL RU assigned to STA 2
RU1 assigned to STA 1 (non-LL traffic)
LL traffic
RU2 assigned to STA 3 (non-LL traffic)
Preamble
UHR PPDU with LL RU
: no data is transmitted
4000

Figure 40

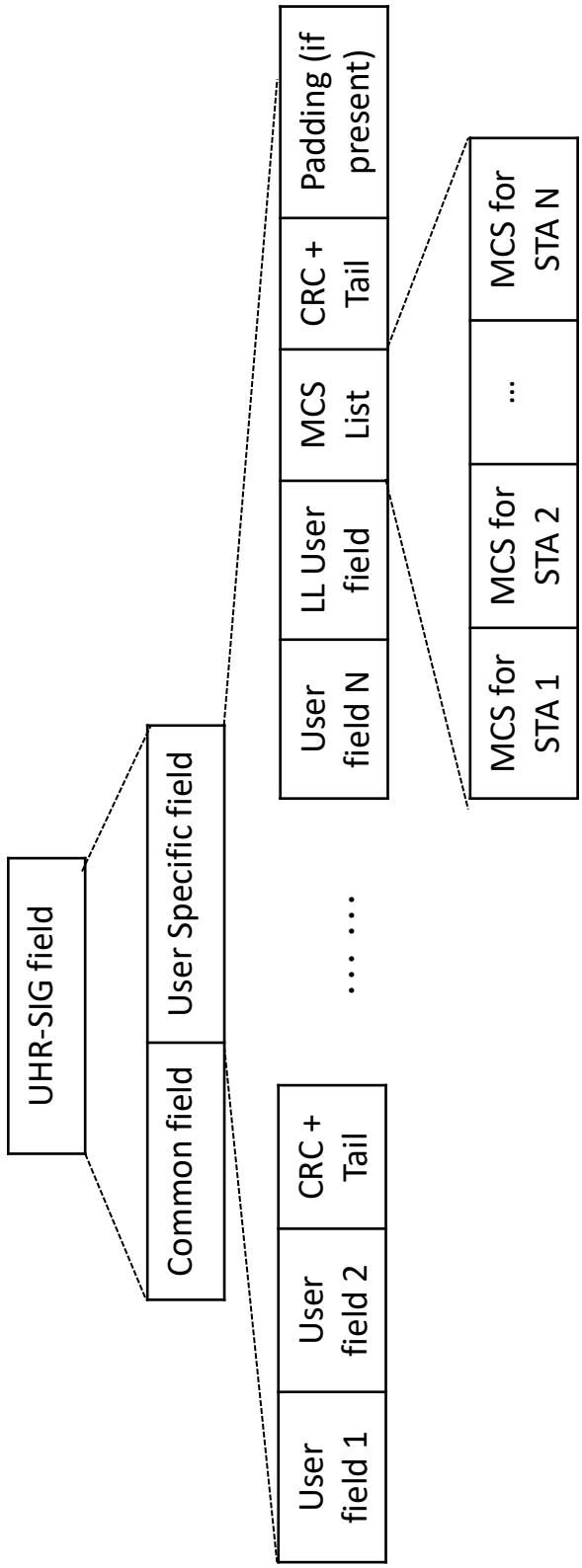

UHR-SIG field
Common field
User Specific field
User field 1
User field 2
CRC + Tail
... ...
User field N
LL User field
MCS List
CRC + Tail
Padding (if present)
MCS for STA 1
MCS for STA 2
...
MCS for STA N
4100

Figure 41

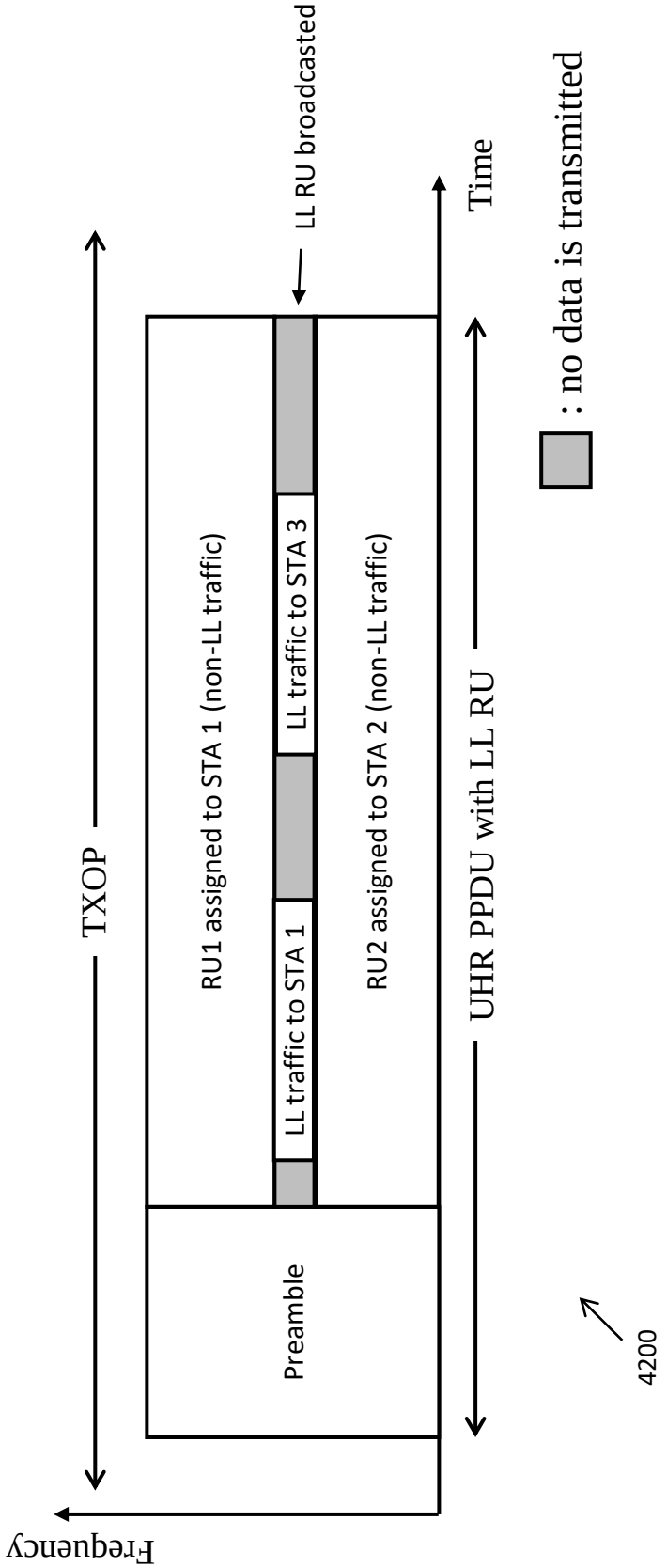

Frequency
TXOP
Preamble
RU1 assigned to STA 1 (non-LL traffic)
LL traffic to STA 1
LL traffic to STA 3
RU2 assigned to STA 2 (non-LL traffic)
LL RU broadcasted
Time
UHR PPDU with LL RU
: no data is transmitted
4200

Figure 42

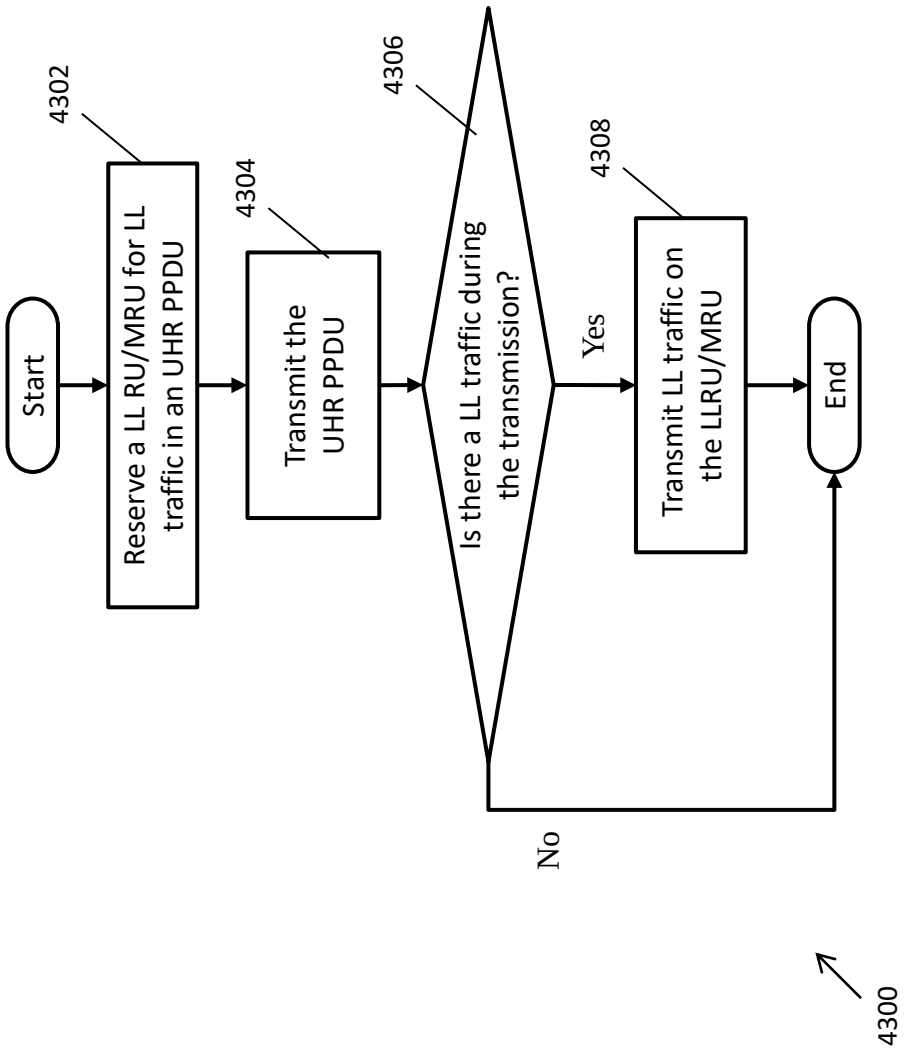

Start
Reserve a LL RU/MRU for LL traffic in an UHR PPDU
4302
Transmit the UHR PPDU
4304
Is there a LL traffic during the transmission?
4306
Yes
No
Transmit LL traffic on the LLRU/MRU
4308
End
4300

Figure 43

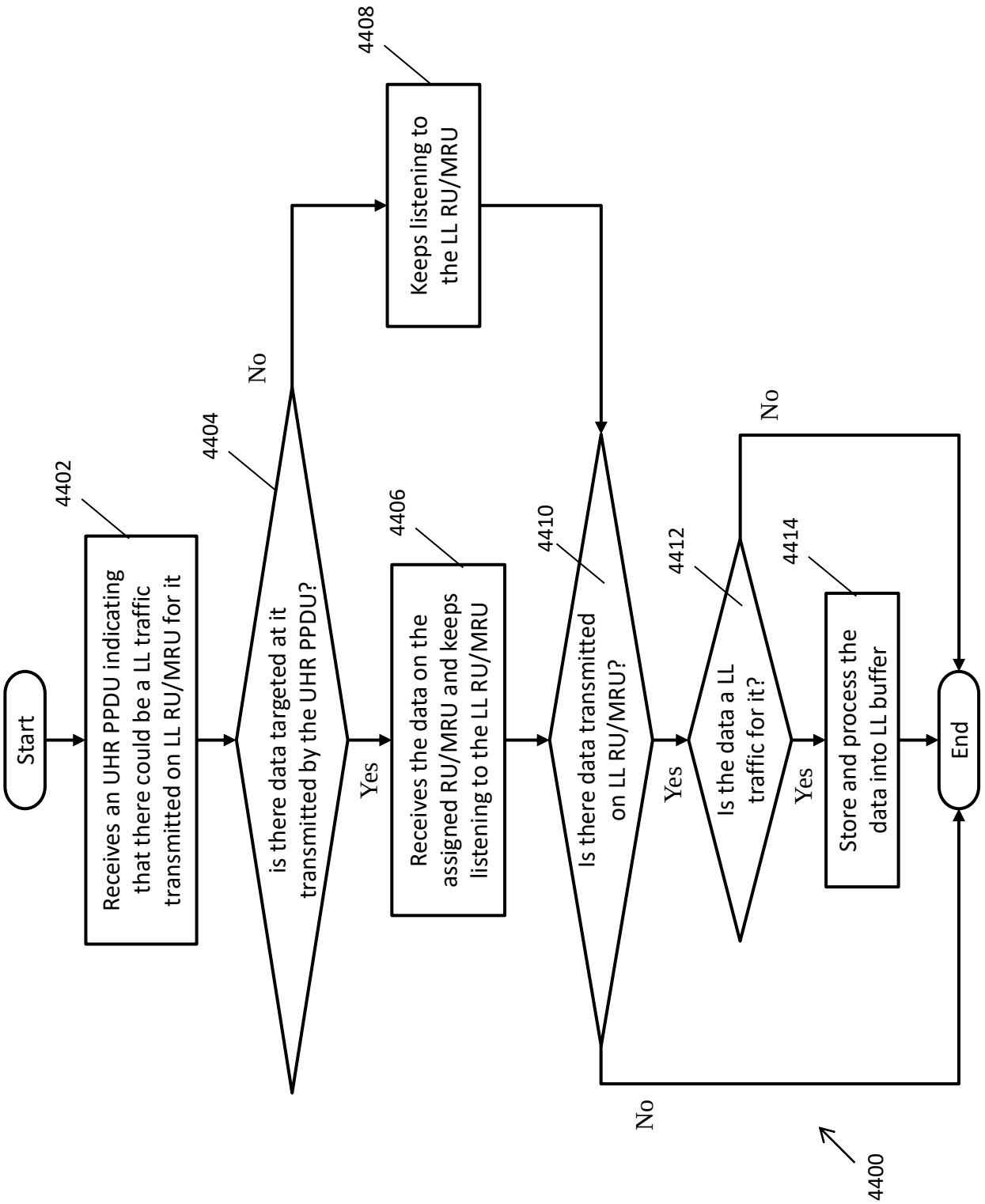

Start
Receives an UHR PPDU indicating that there could be a LL traffic transmitted on LL RU/MRU for it
4402
is there data targeted at it transmitted by the UHR PPDU?
4404
No
Yes
Keeps listening to the LL RU/MRU
4408
Receives the data on the assigned RU/MRU and keeps listening to the LL RU/MRU
4406
Is there data transmitted on LL RU/MRU?
4410
No
Yes
Is the data a LL traffic for it?
4412
No
Yes
Store and process the data into LL buffer
4414
End
4400

Figure 44

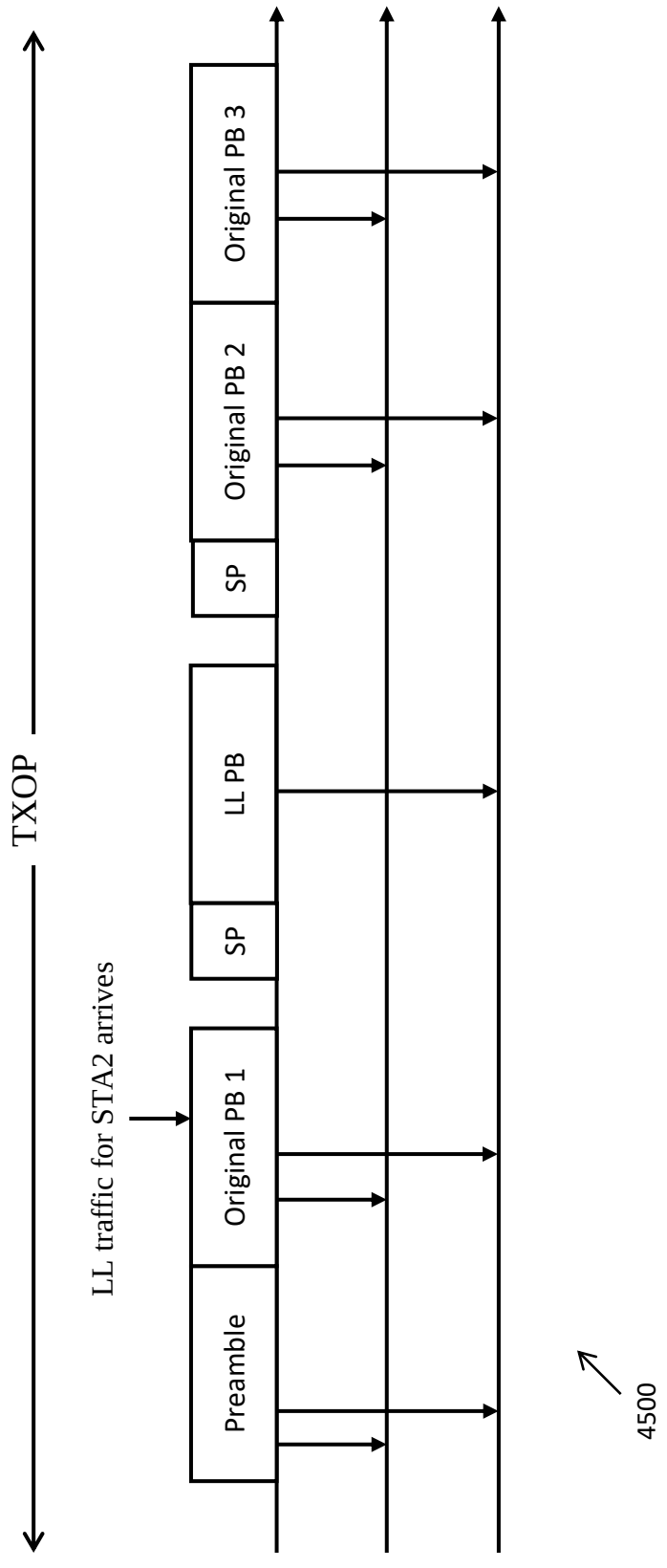

TXOP
LL traffic for STA2 arrives
Preamble
Original PB 1
SP
LL PB
SP
Original PB 2
Original PB 3
AP
STA 1
STA 2
4500

Figure 45

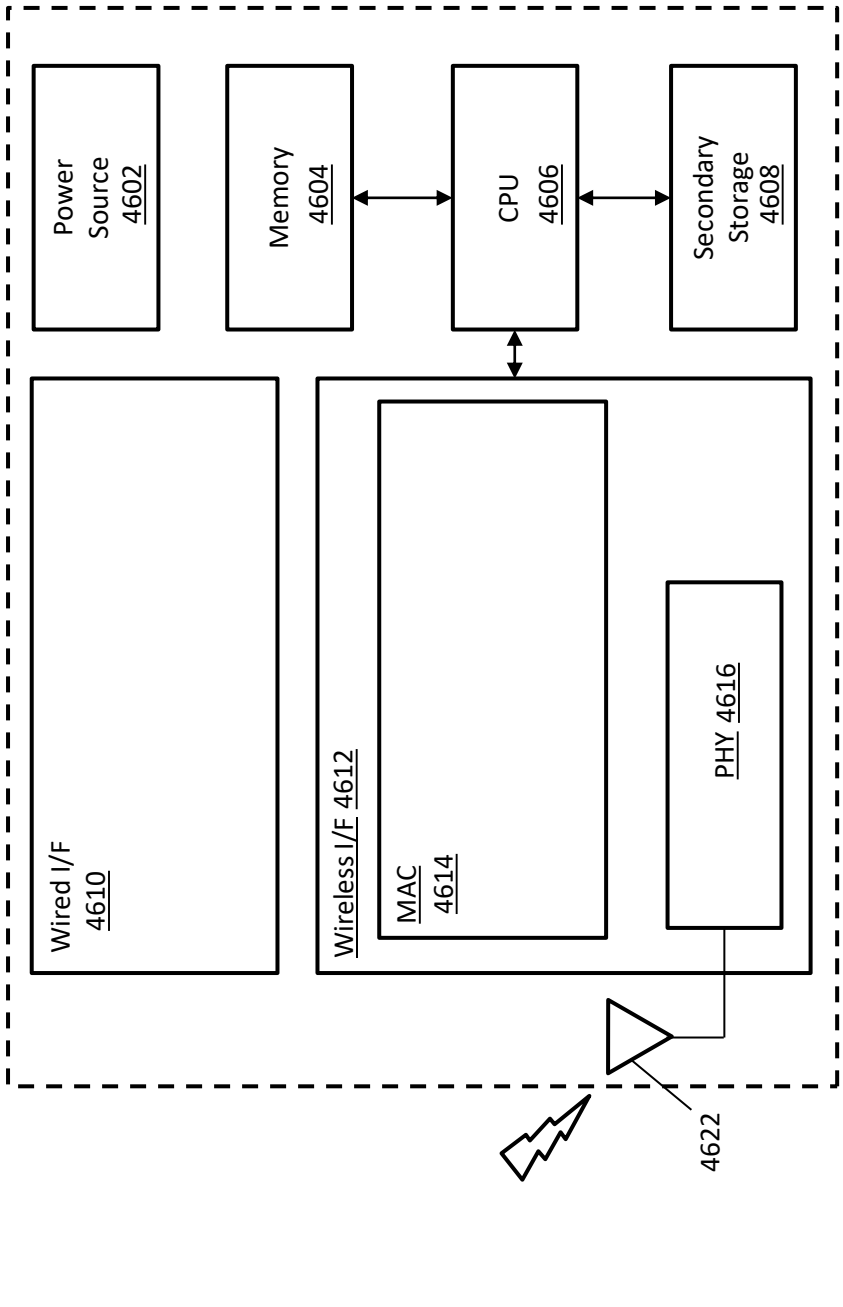

Power Source 4602
Memory 4604
CPU 4606
Secondary Storage 4608
Wired I/F 4610
Wireless I/F 4612
MAC 4614
PHY 4616
4622
4600

Figure 46