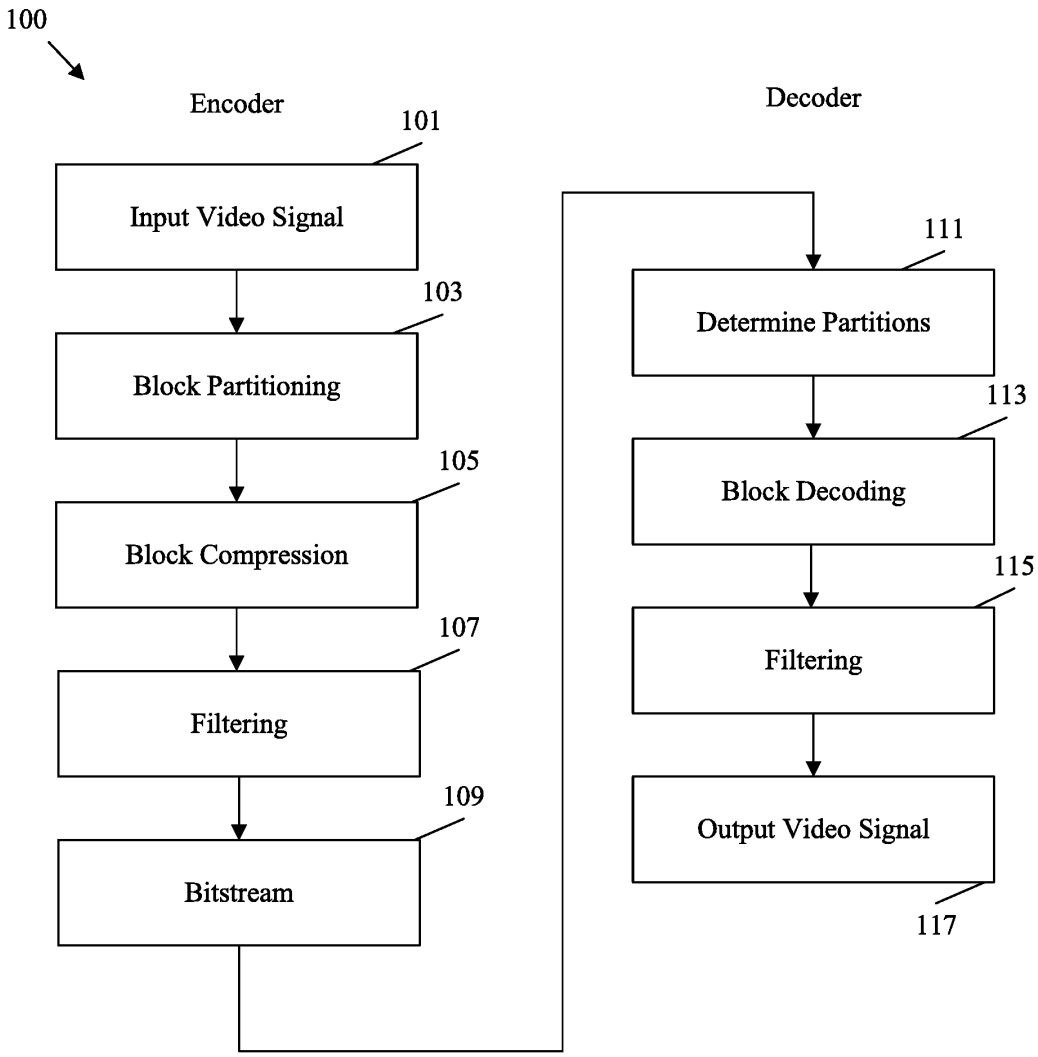
100
Encoder
Decoder
101
Input Video Signal
103
Block Partitioning
105
Block Compression
107
Filtering
109
Bitstream
111
Determine Partitions
113
Block Decoding
115
Filtering
Output Video Signal
117

FIG. 1

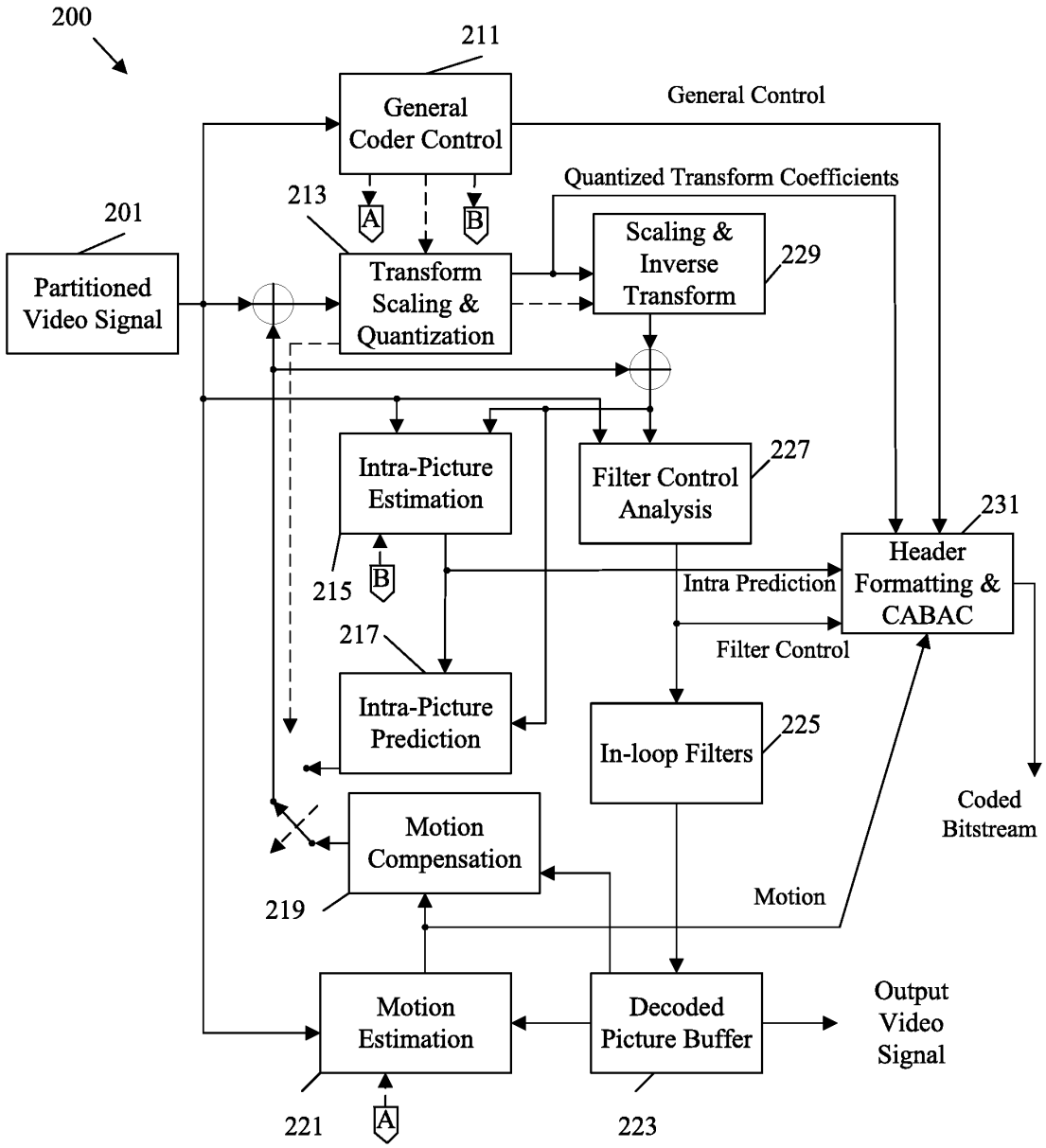
200
211
General Coder Control
General Control
Quantized Transform Coefficients
213
A
B
201
Partitioned Video Signal
Transform Scaling & Quantization
Scaling & Inverse Transform
229
Intra-Picture Estimation
Filter Control Analysis
227
231
Header Formatting & CABAC
215
B
Intra Prediction
Filter Control
217
Intra-Picture Prediction
In-loop Filters
225
Coded Bitstream
Motion Compensation
219
Motion
Motion Estimation
Decoded Picture Buffer
Output Video Signal
221
A
223

FIG. 2

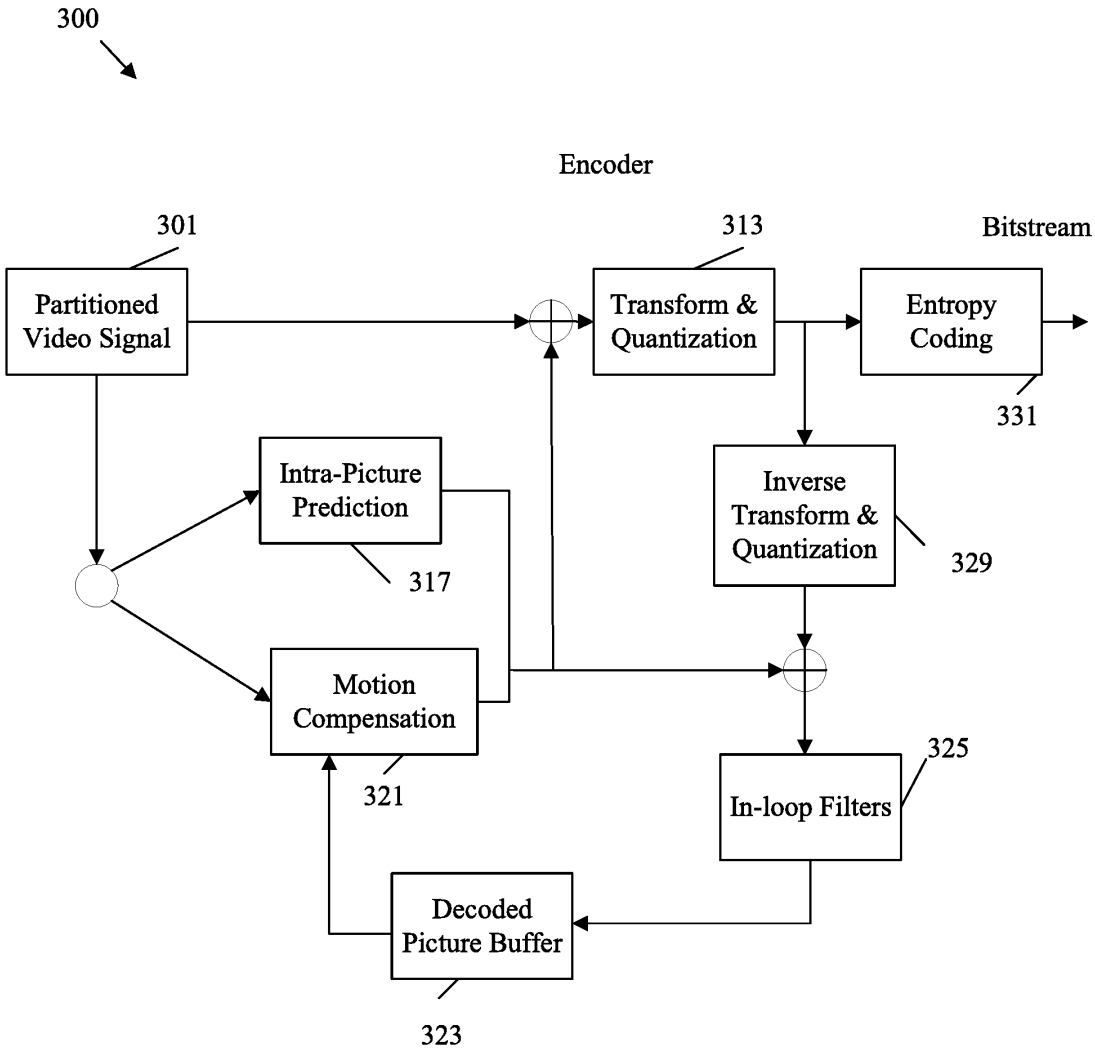
300
Encoder
301
Partitioned Video Signal
313
Transform & Quantization
Bitstream
Entropy Coding
331
Intra-Picture Prediction
317
Inverse Transform & Quantization
329
Motion Compensation
321
325
In-loop Filters
Decoded Picture Buffer
323

FIG. 3

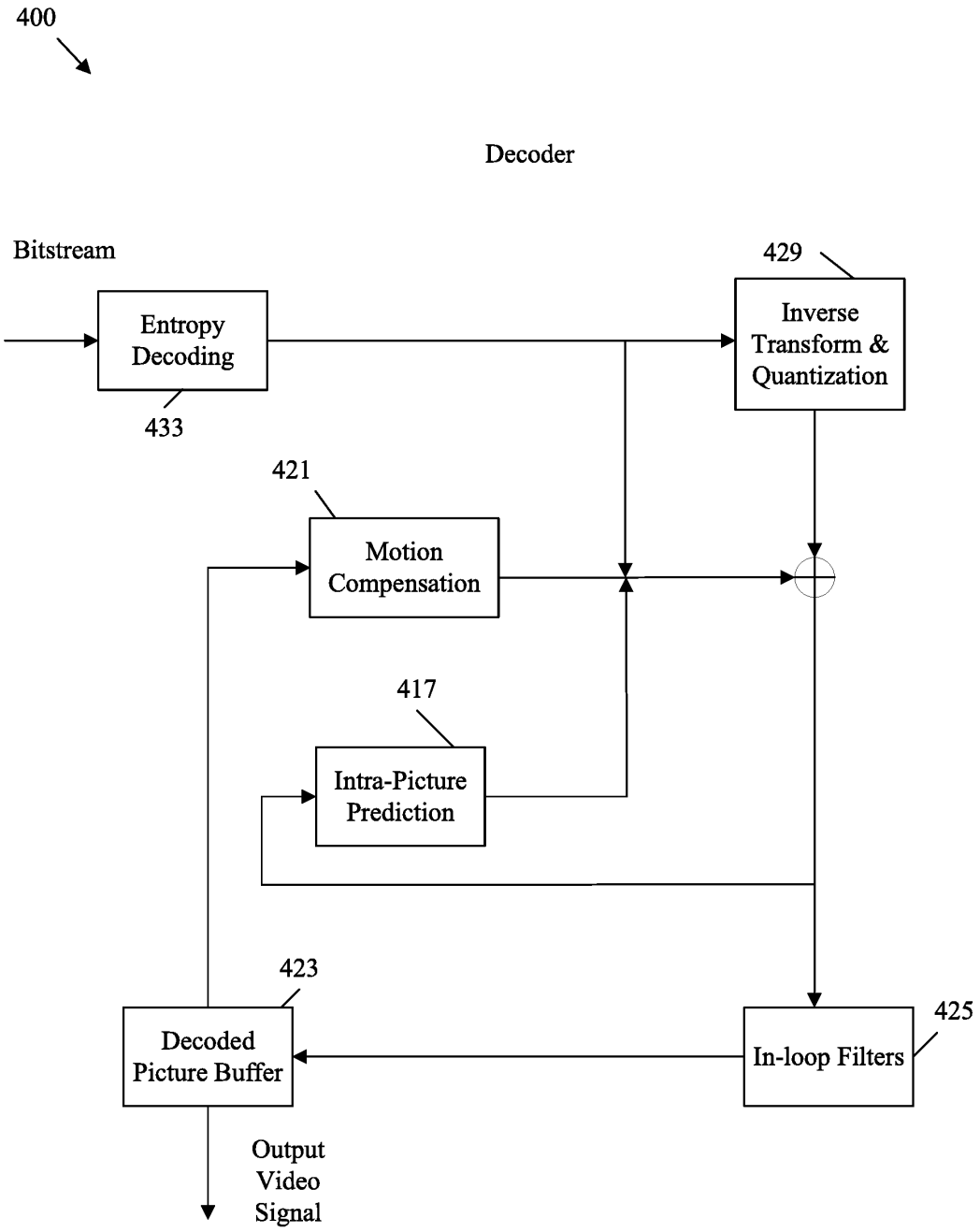
400
Decoder
Bitstream
Entropy Decoding
433
429
Inverse Transform & Quantization
421
Motion Compensation
417
Intra-Picture Prediction
423
Decoded Picture Buffer
425
In-loop Filters
Output Video Signal

FIG. 4

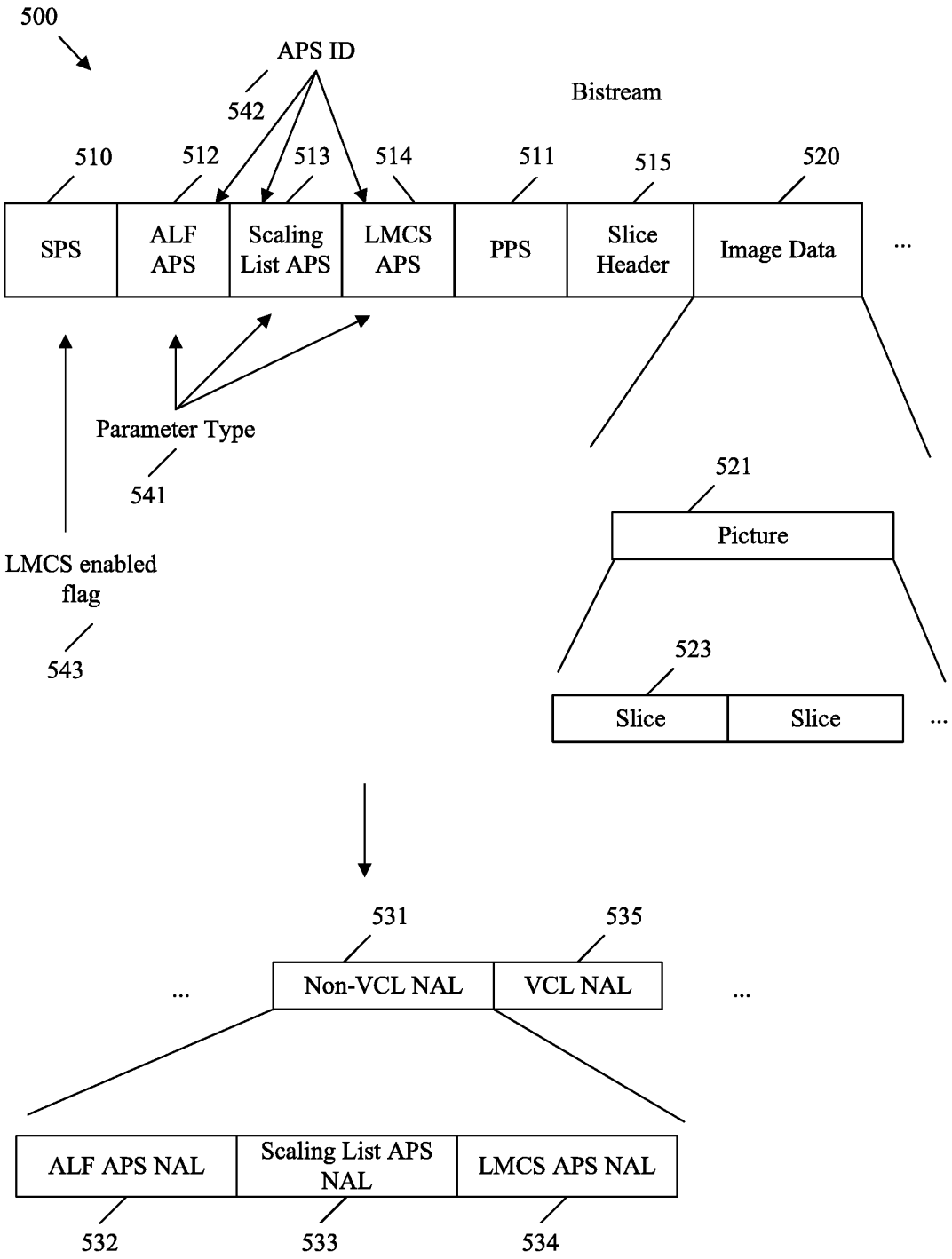
500
APS ID
542
Bistream
510
512
513
514
511
515
520
SPS
ALF APS
Scaling List APS
LMCS APS
PPS
Slice Header
Image Data
...
Parameter Type
541
LMCS enabled flag
543
521
Picture
523
Slice
Slice
...
531
535
...
Non-VCL NAL
VCL NAL
...
ALF APS NAL
Scaling List APS NAL
LMCS APS NAL
532
533
534

FIG. 5

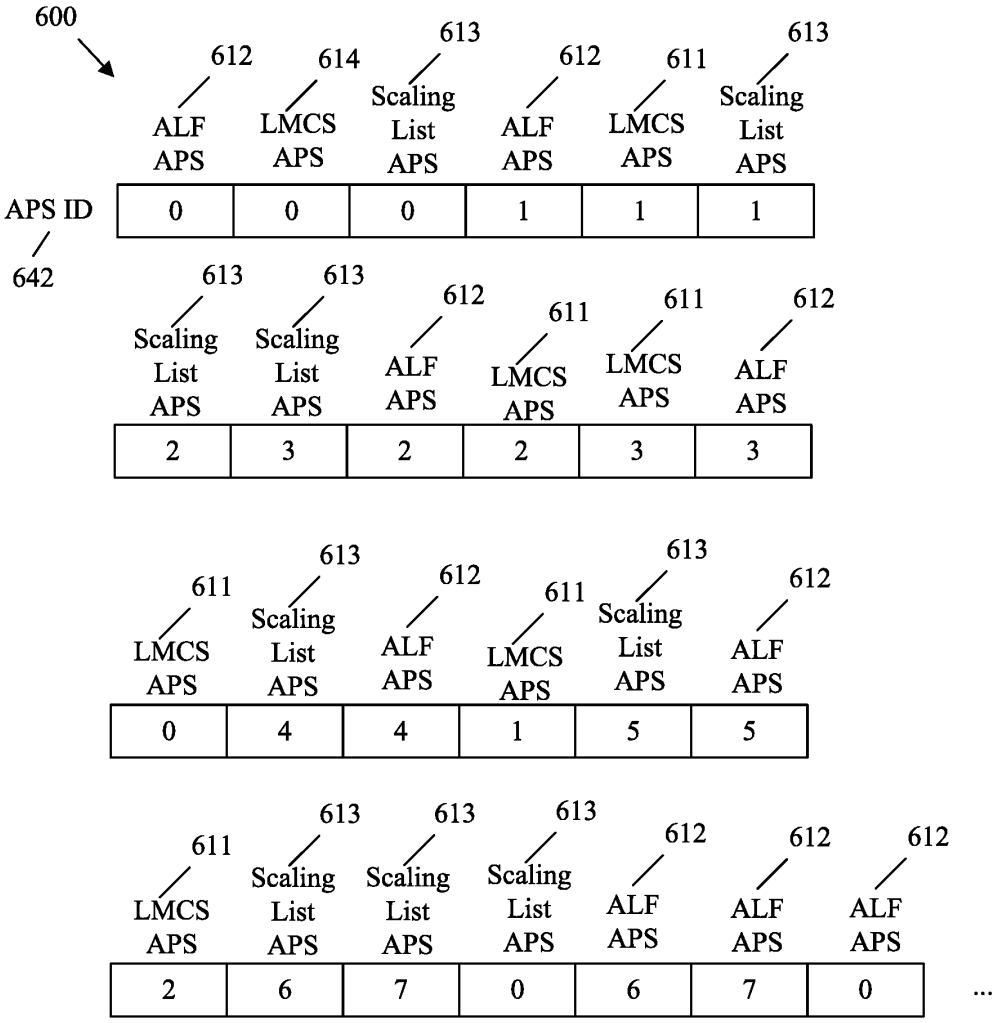
600
612
614
613
612
611
613
ALF APS
LMCS APS
Scaling List APS
ALF APS
LMCS APS
Scaling List APS
APS ID
642
0 0 0 1 1 1
613
613
612
611
611
612
Scaling List APS
Scaling List APS
ALF APS
LMCS APS
LMCS APS
ALF APS
2 3 2 2 3 3
611
613
612
611
613
612
LMCS APS
Scaling List APS
ALF APS
LMCS APS
Scaling List APS
ALF APS
0 4 4 1 5 5
611
613
613
613
612
612
612
LMCS APS
Scaling List APS
Scaling List APS
Scaling List APS
ALF APS
ALF APS
ALF APS
2 6 7 0 6 7 0
...

FIG. 6

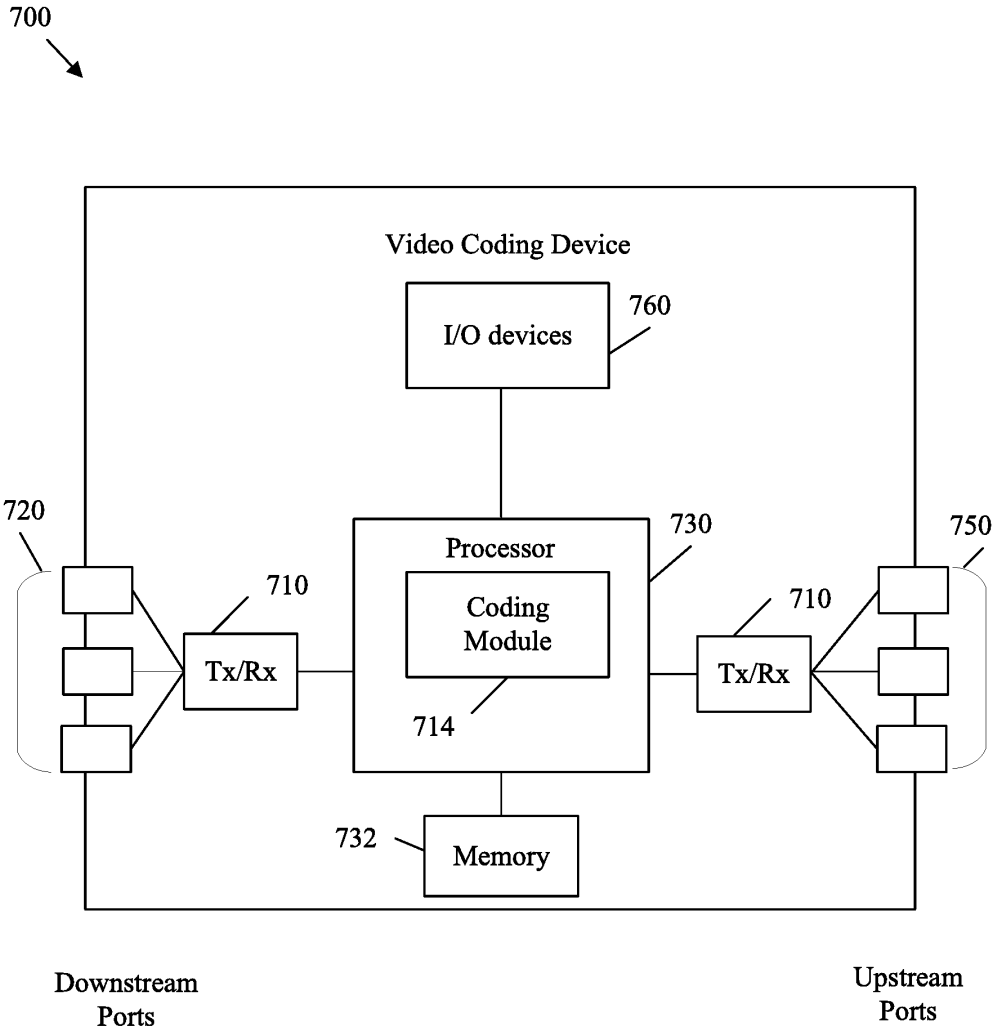
700
Video Coding Device
I/O devices
760
720
Processor
730
750
710
Coding
Module
710
Tx/Rx
Tx/Rx
714
732
Memory
Downstream
Ports
Upstream
Ports

FIG. 7

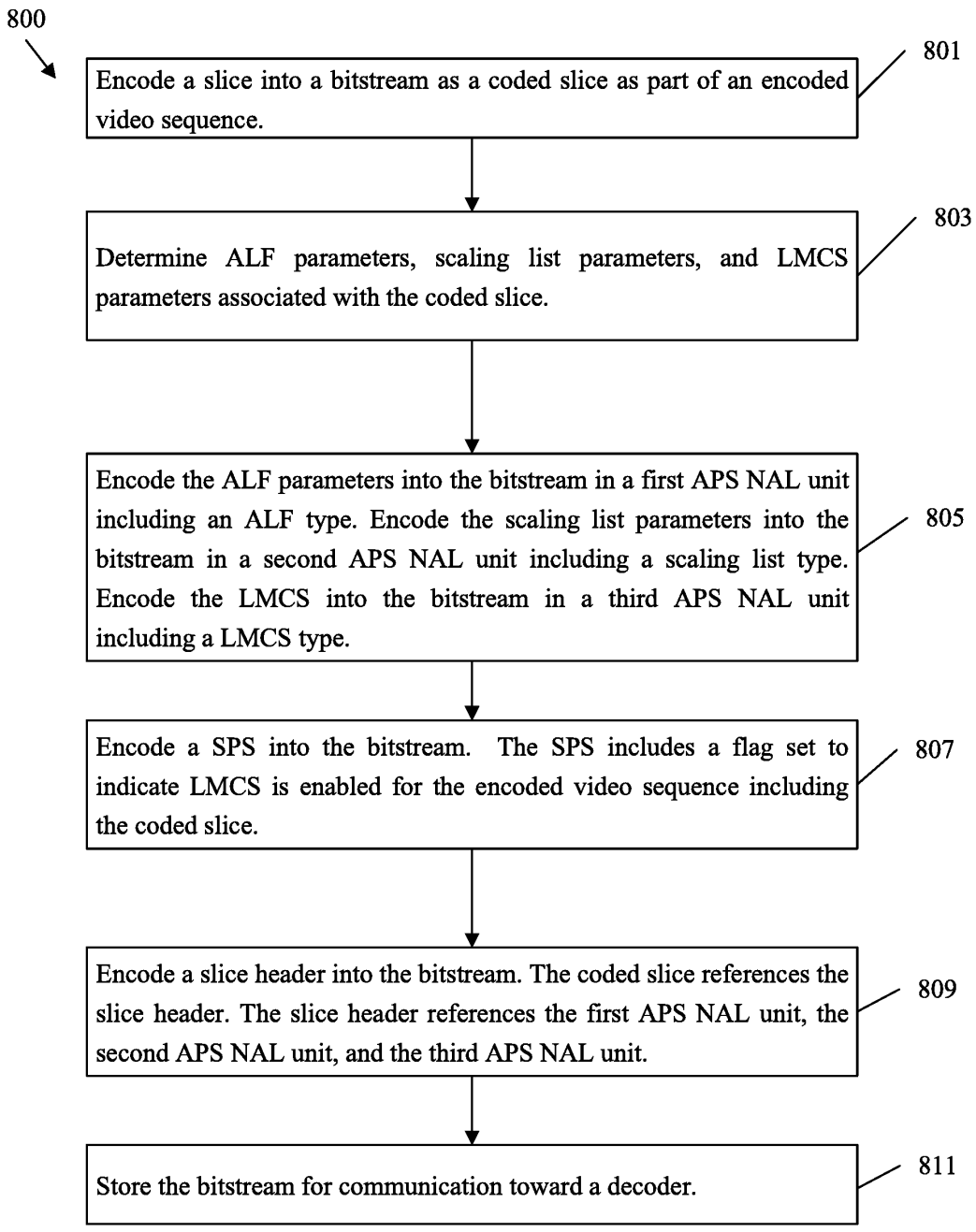
800
Encode a slice into a bitstream as a coded slice as part of an encoded video sequence.
801
Determine ALF parameters, scaling list parameters, and LMCS parameters associated with the coded slice.
803
Encode the ALF parameters into the bitstream in a first APS NAL unit including an ALF type. Encode the scaling list parameters into the bitstream in a second APS NAL unit including a scaling list type. Encode the LMCS into the bitstream in a third APS NAL unit including a LMCS type.
805
Encode a SPS into the bitstream. The SPS includes a flag set to indicate LMCS is enabled for the encoded video sequence including the coded slice.
807
Encode a slice header into the bitstream. The coded slice references the slice header. The slice header references the first APS NAL unit, the second APS NAL unit, and the third APS NAL unit.
809
Store the bitstream for communication toward a decoder.
811

FIG. 8

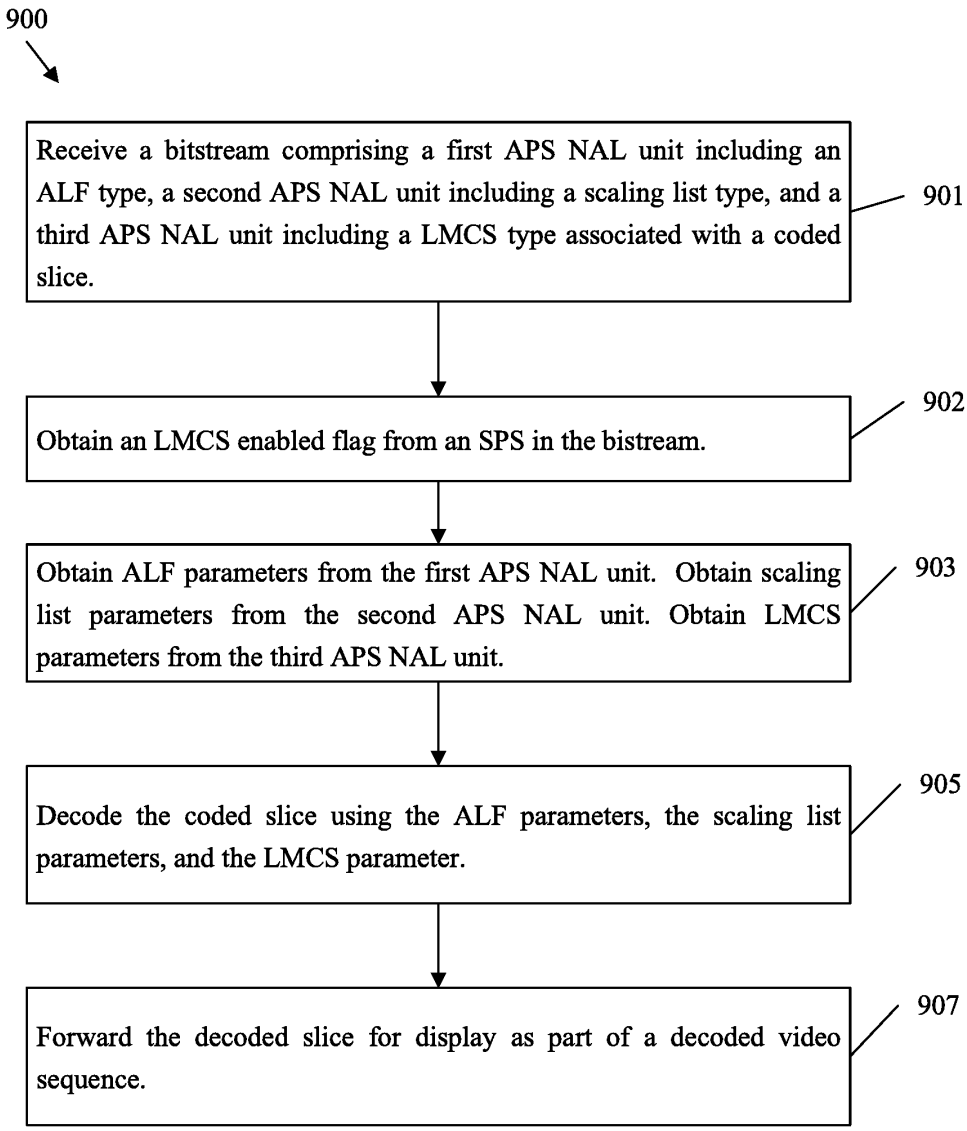
900
Receive a bitstream comprising a first APS NAL unit including an ALF type, a second APS NAL unit including a scaling list type, and a third APS NAL unit including a LMCS type associated with a coded slice.
901
Obtain an LMCS enabled flag from an SPS in the bistream.
902
Obtain ALF parameters from the first APS NAL unit. Obtain scaling list parameters from the second APS NAL unit. Obtain LMCS parameters from the third APS NAL unit.
903
Decode the coded slice using the ALF parameters, the scaling list parameters, and the LMCS parameter.
905
Forward the decoded slice for display as part of a decoded video sequence.
907

FIG. 9

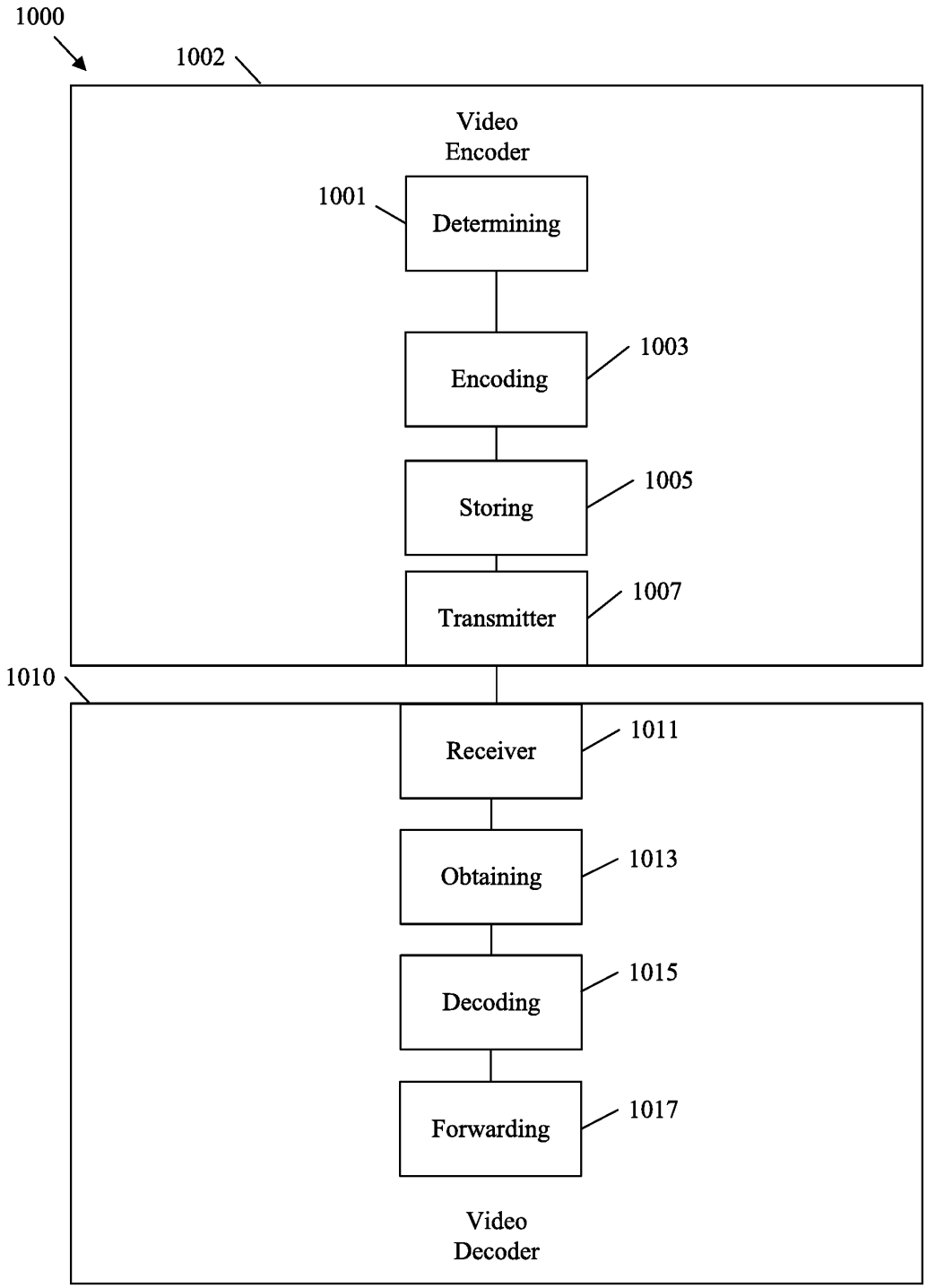
1000
1002
Video Encoder
1001
Determining
Encoding
1003
Storing
1005
Transmitter
1007
1010
Receiver
1011
Obtaining
1013
Decoding
1015
Forwarding
1017
Video Decoder

FIG. 10