Field	Size (bits)	Meaning
SNR in receive chain 1	8	Signal-to-noise ratio in the first receive chain of the STA sending the report.
...		
SNR in receive chain *Nr*	8	Signal-to-noise ratio in the *Nr*'th receive chain of the STA sending the report.
CSI Matrix for carrier –28	3+2× *Nb*×*Nc*×*Nr*	CSI matrix (see Figure 9-112 (CSI matrix coding))
...		
CSI Matrix for carrier –1	3+2× *Nb*×*Nc*×*Nr*	CSI matrix
CSI Matrix for carrier 1	3+2× *Nb*×*Nc*×*Nr*	CSI matrix
...		
CSI Matrix for carrier 28	3+2× *Nb*×*Nc*×*Nr*	CSI matrix

100

Table 9-56—CSI Report field (20 MHz)

Figure 1A

CSI Field Parameters	Meaning	Range of Values
Nb	Number of Bits for I or Q	{4, 5, 6, 8}
Nc	Number of Columns	0 to 3
Nr	Number of Rows	1 to 4
Ng	Grouping	{1, 2, 4}

102

Figure 1B

Table 9-91e—Subcarrier indices for compressed beamforming feedback matrix

Channel width	*Ng*	Superset of subcarrier indices (*scidx*)
20 MHz	4	–122, –120, –116, …, –8, –4, –2, 2, 4, 8, …, 116, 120, 122
	16	–122, –116, –100, …, –20, –4, –2, 2, 4, 20, …, 100, 116, 122
40 MHz	4	–244, –240, …, –8, –4, 4, 8, …, 240, 244
	16	–244, –228, …, –20, –4, 4, 20, …, 228, 244
80 MHz	4	–500, –496, …, –8, –4, 4, 8, …, 496, 500
	16	–500, –484, …, –20, –4, 4, 20, …, 484, 500
160 MHz	4	–1012, –1008, …, –520, –516, –508, –504, …, –16, –12, 12, 16, …, 504, 508, 516, 520, …, 1008, 1012
	16	–1012, –996, …, –532, –516, –508, –492, …, –28, –12, 12, 28, …, 492, 508, 516, 532, …, 996, 1012
80+80 MHz	4	–500(L), –496(L), …, –8(L), –4(L), 4(L), 8(L), …, 496(L), 500(L), –500(H), –496(H), …, –8(H), –4(H), 4(H), 8(H), …, 496(H), 500(H)
	16	–500(L), –484(L), …, –20(L), –4(L), 4(L), 20(L), …, 484(L), 500(L), –500(H), –484(H), …, –20(H), –4(H), 4(H), 20(H), …, 484(H), 500(H)

NOTE 1—*x*(L) denotes subcarrier index *x* in the frequency segment lower in frequency, and *x*(H) denotes subcarrier index *x* in the frequency segment higher in frequency.

NOTE 2—"…" denotes an arithmetic progression in *Ng* increments.

NOTE 3—Pilot subcarriers are not skipped.

200

Figure 2

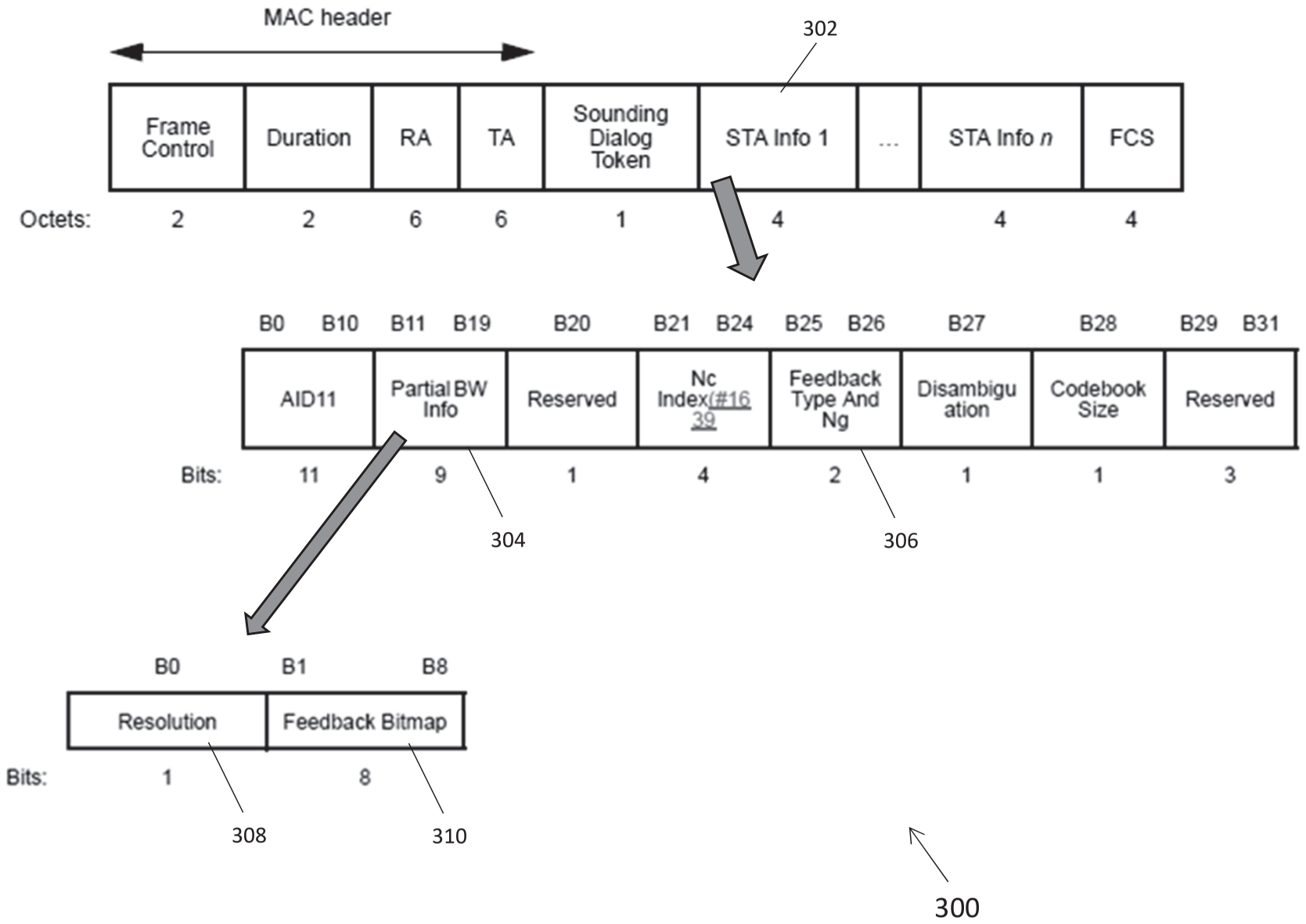

MAC header
302
Frame Control
Duration
RA
TA
Sounding Dialog Token
STA Info 1
...
STA Info n
FCS
Octets: 2 2 6 6 1 4 4 4
B0 B10 B11 B19 B20 B21 B24 B25 B26 B27 B28 B29 B31
AID11
Partial BW Info
Reserved
Nc Index(#1639
Feedback Type And Ng
Disambiguation
Codebook Size
Reserved
Bits: 11 9 1 4 2 1 1 3
304
306
B0 B1 B8
Resolution
Feedback Bitmap
Bits: 1 8
308
310
300

Figure 3

Feedback Type And Ng		Codebook Size	Description
B25	B26	B28	
0	0	0	SU, $Ng = 4$, quantization resolution $(\phi, \psi) = \{4, 2\}$
0	0	1	SU, $Ng = 4$, quantization resolution $(\phi, \psi) = \{6, 4\}$
0	1	0	SU, $Ng = 16$, quantization resolution $(\phi, \psi) = \{4, 2\}$
0	1	1	SU, $Ng = 16$, quantization resolution $(\phi, \psi) = \{6, 4\}$
1	0	0	MU, $Ng = 4$, quantization resolution $(\phi, \psi) = \{7, 5\}$
1	0	1	MU, $Ng = 4$, quantization resolution $(\phi, \psi) = \{9, 7\}$
1	1	0	CQI
1	1	1	MU, $Ng = 16$, quantization resolution $(\phi, \psi) = \{9, 7\}$



Figure 4

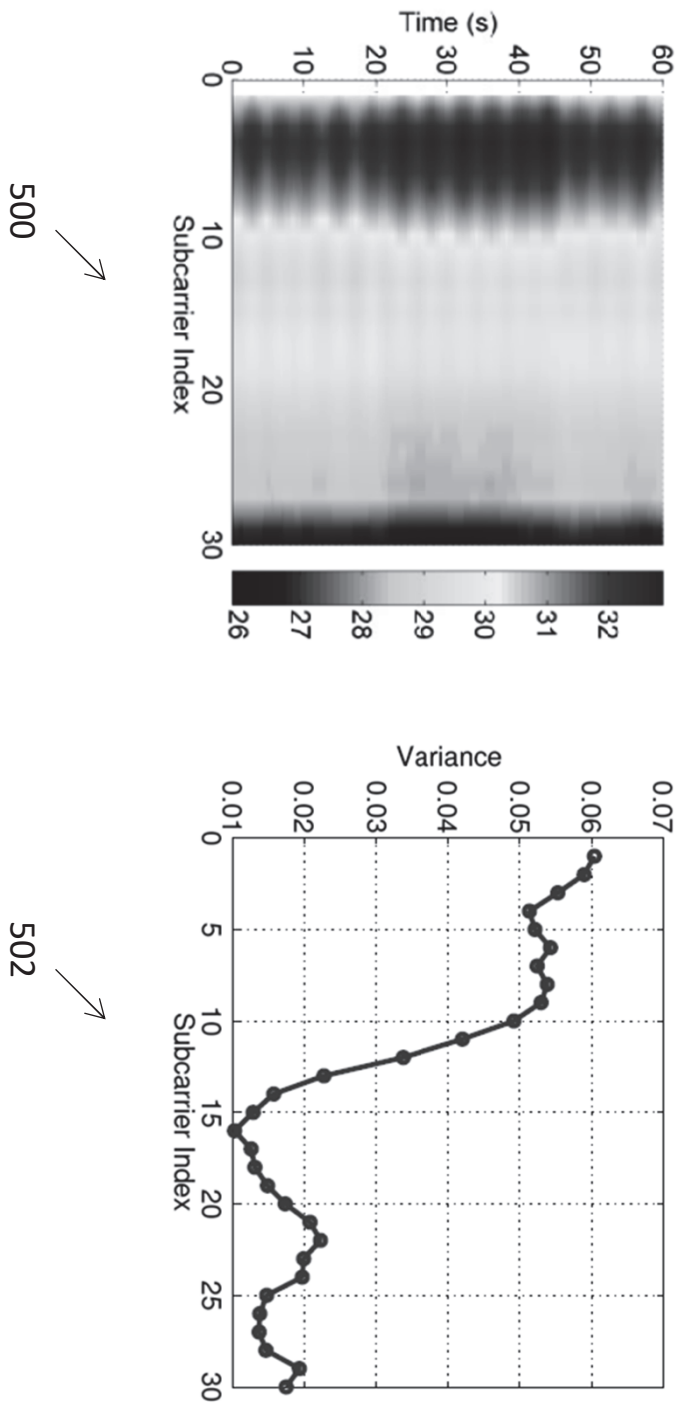

500
Time (s)
0
10
20
30
40
50
60
Subcarrier Index
0
10
20
30
26
27
28
29
30
31
32
502
Variance
0.01
0
0.02
0.03
0.04
0.05
0.06
0.07
Subcarrier Index
0
5
10
15
20
25
30

Figure 5

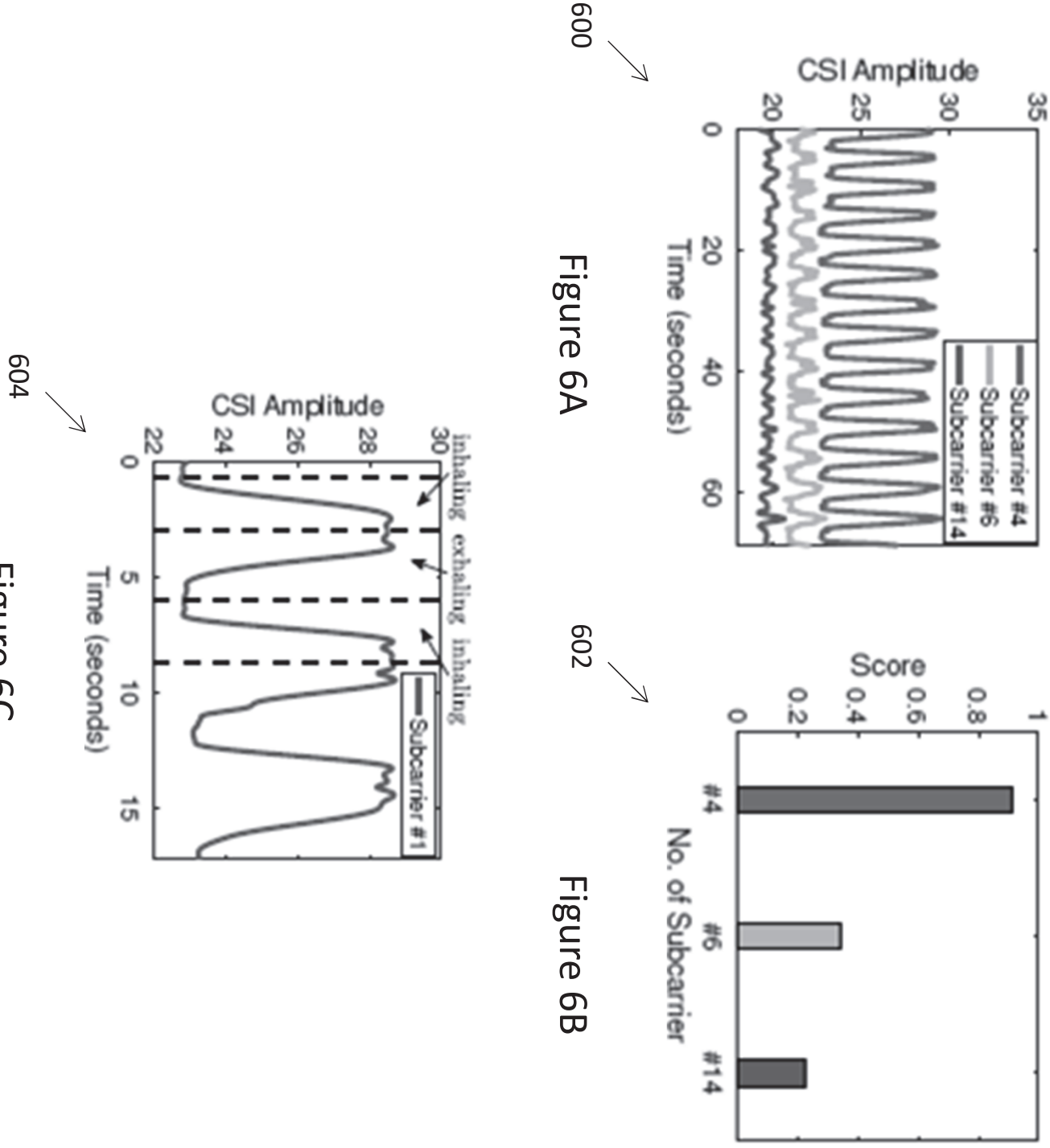
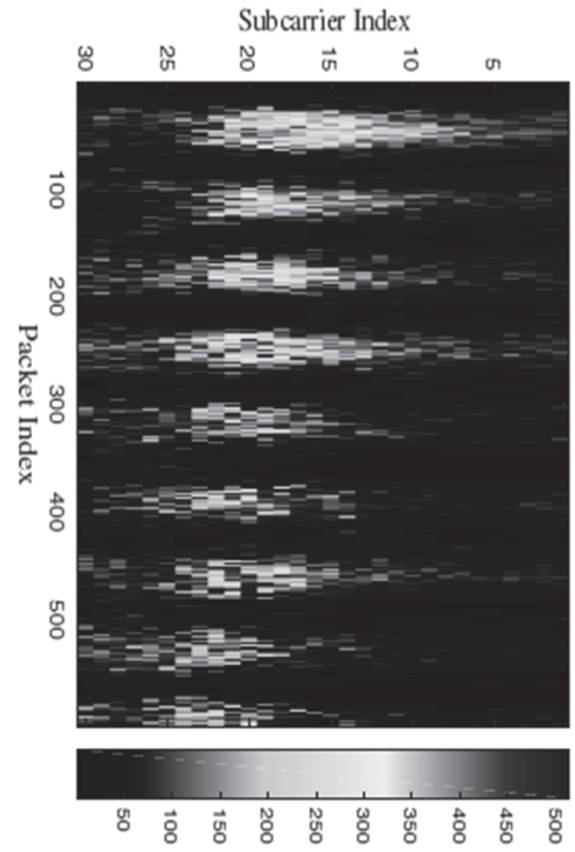


Figure 6A

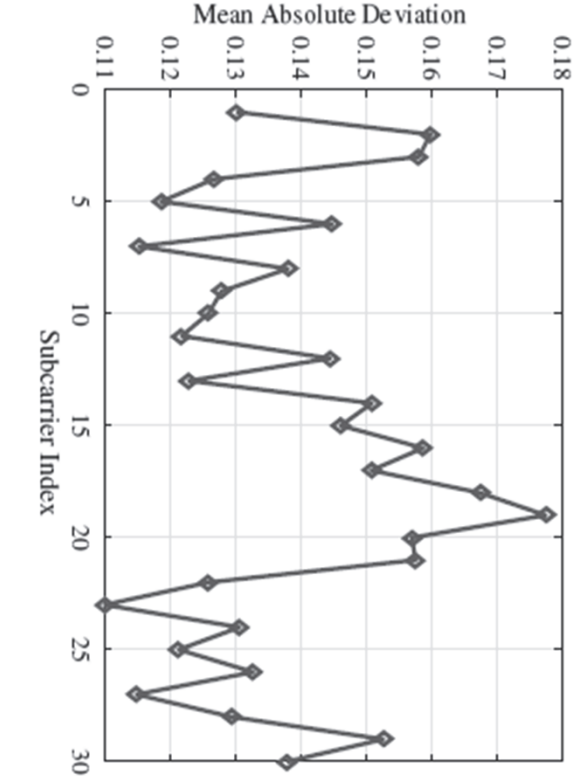
Figure 6B

Figure 6C



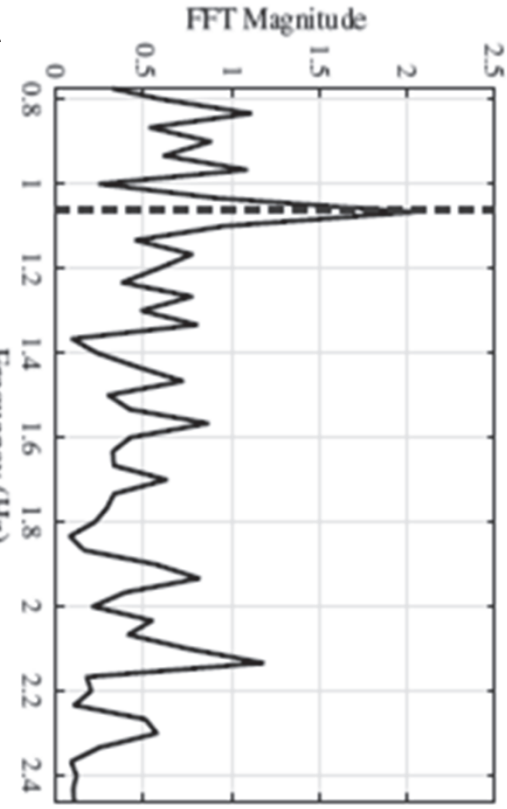
700

Figure 7A



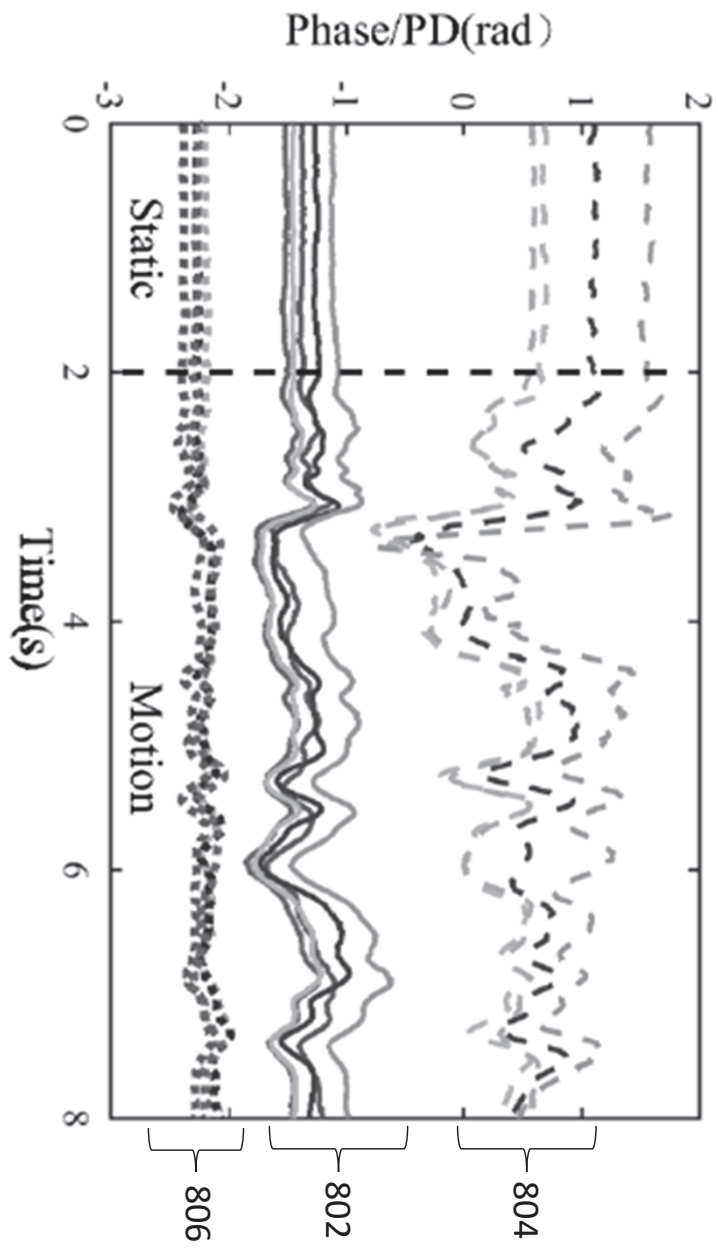
702

Figure 7B



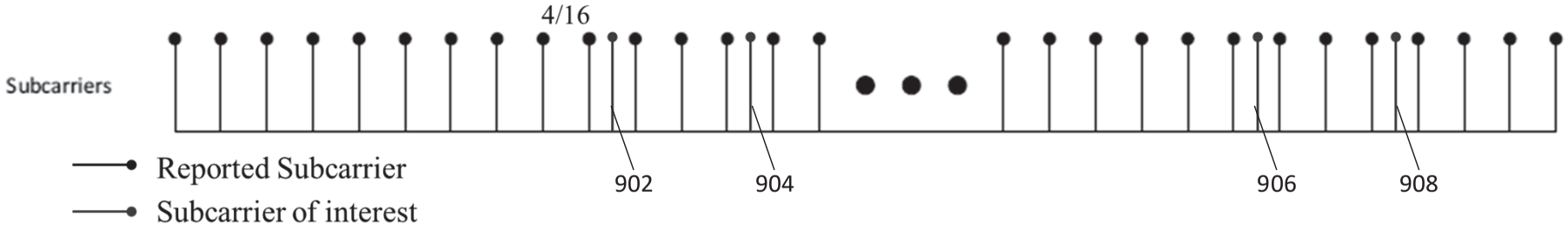
704

Figure 7C



800

Figure 8


Subcarriers
Reported Subcarrier
Subcarrier of interest
902
904
906
908

900

Figure 9

Table – Subcarrier indices for CSI/Amplitude/Phase matrices		
Channel Width	***Ng***	**Superset of subcarrier indices (scidx)**
320 MHz	1	-2036, -2035, -2034, -2033, -2032, -2031, …, -1, 1, …, 2031, 2032, 2033, 2034, 2035, 2036
	2	-2036, -2034, -2032, -2030, -2028, -2026, …, -2, 2, …, 2026, 2028, 2030, 2032, 2034, 2036
	4	-2036, -2032, -2028, -2024, -2020, -2016, …, -4, 4, …, 2016, 2020, 2024, 2028, 2032, 2036
	8	-2036, -2028, -2020, -2012, -2004, -1996, …, -8, 8, …, 1996, 2004, 2012, 2020, 2028, 2036
	16	-2036, -2020, -2004, -1988, -1972, -1956, …, -12, 12, …, 1956, 1972, 1988, 2004, 2020, 2036
	32	-2036, -2004, -1972, -1940, -1908, -1876, …, -32, 32, …, 1876, 1908, 1940, 1972, 2004, 2036
	64	-2036, -1972, -1908, -1844, -1780, -1716, …, -64, 64, …, 1716, 1780, 1844, 1908, 1972, 2036
	128	-2036, -1908, -1780, -1652, -1524, -1396, …, -128, 128, …, 1396, 1524, 1652, 1780, 1908, 2036

1000

Figure 10

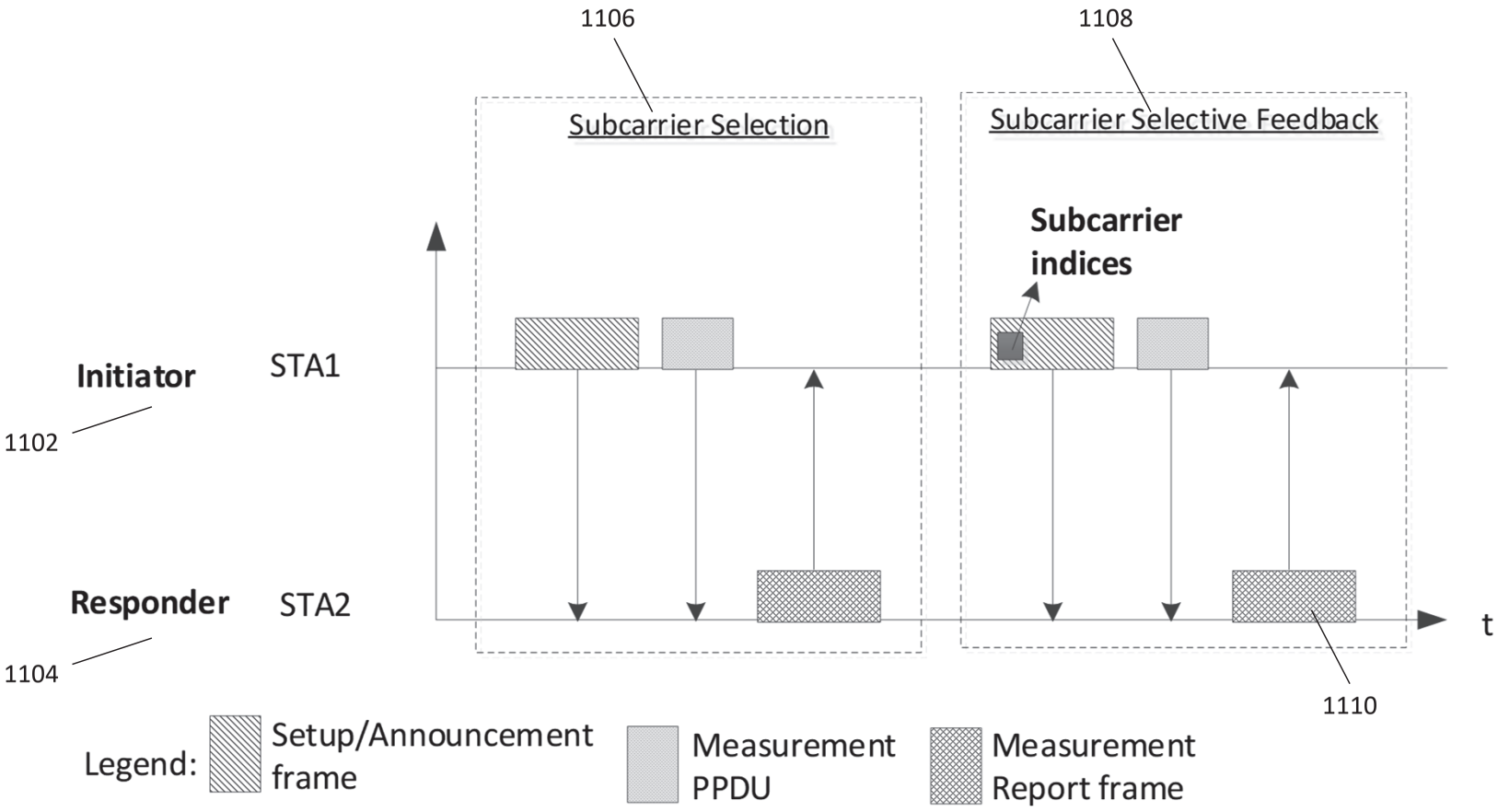

1106
1108
Subcarrier Selection
Subcarrier Selective Feedback
Subcarrier indices
Initiator
STA1
1102
Responder
STA2
1104
t
1110
Legend:
Setup/Announcement frame
Measurement PPDU
Measurement Report frame
1100

Figure 11

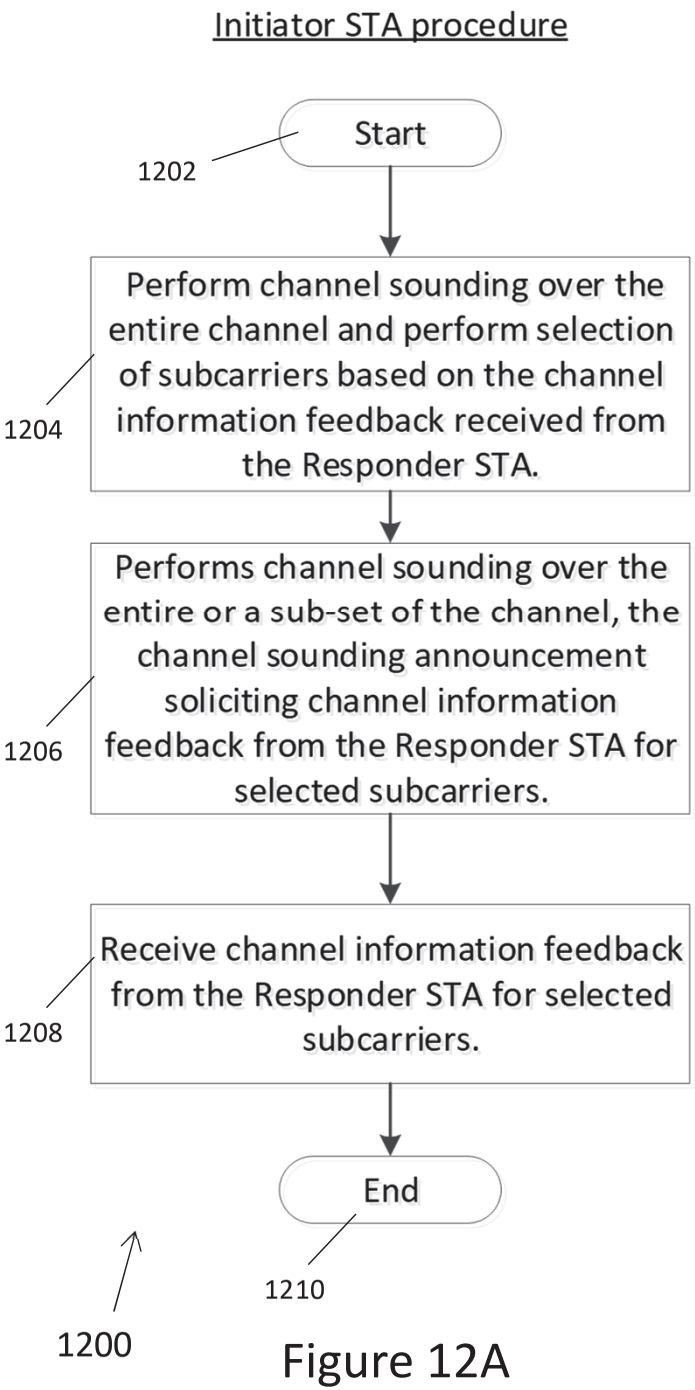


Figure 12A

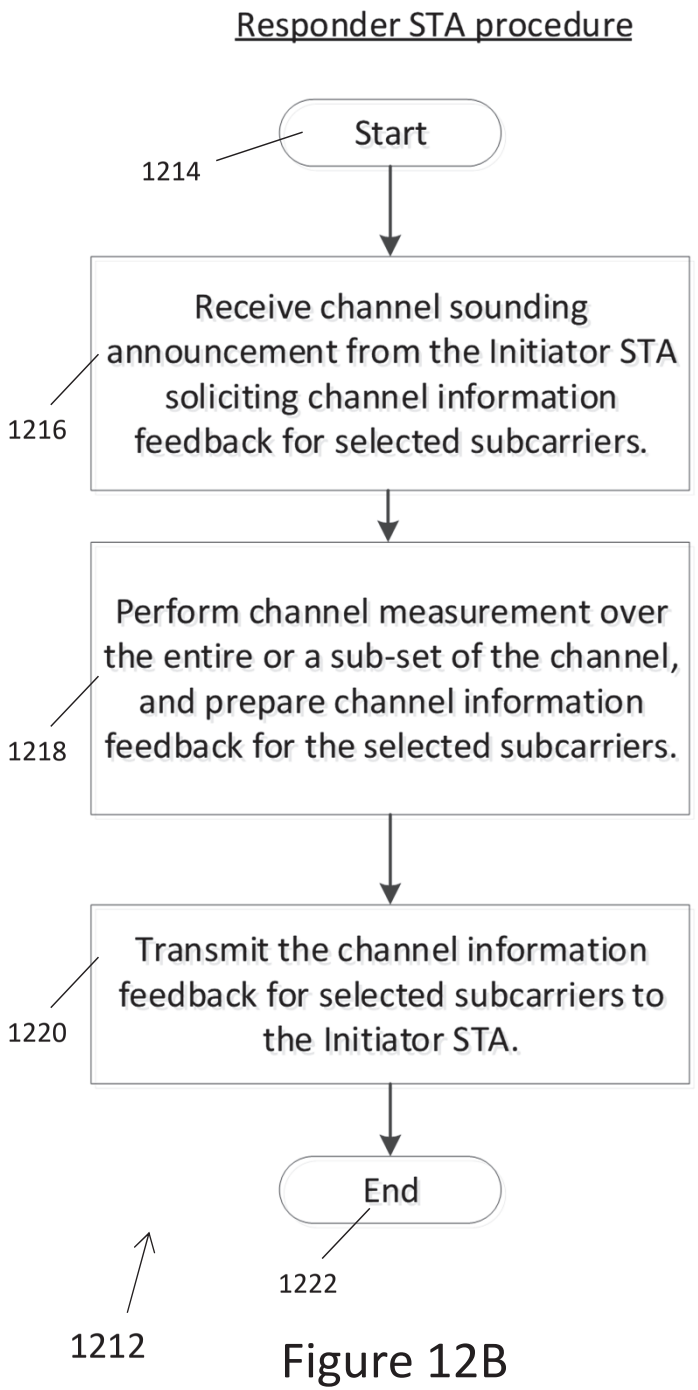
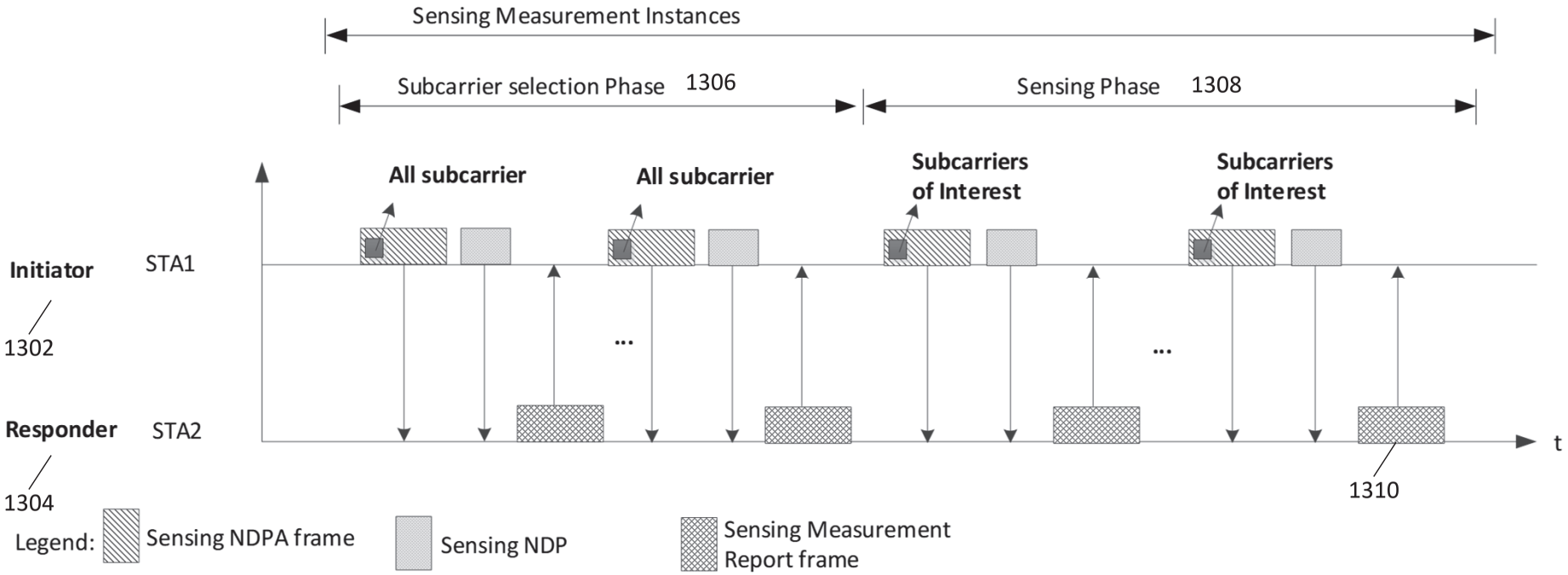


Figure 12B



1300

Figure 13

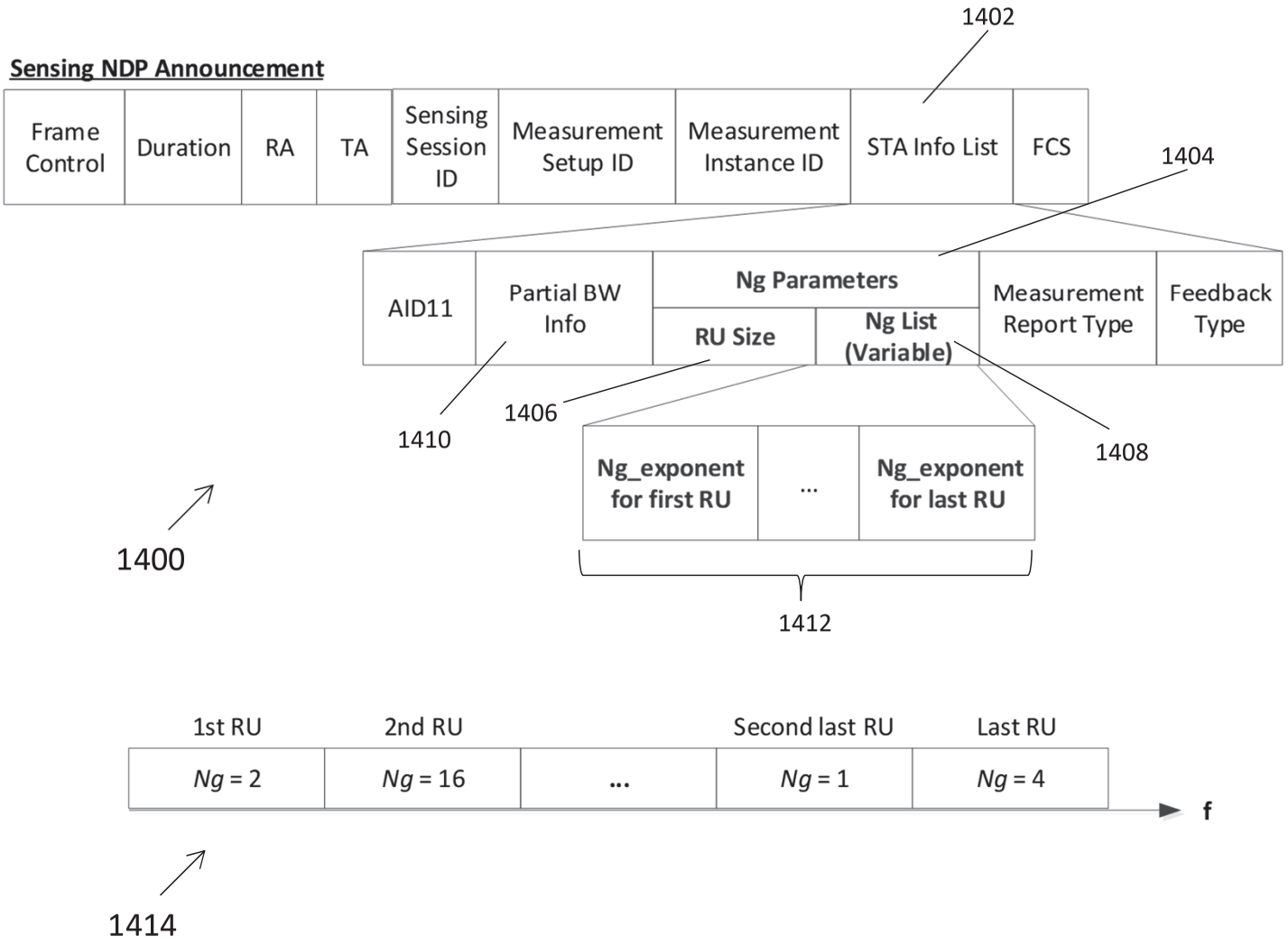

1402
Sensing NDP Announcement
Frame Control
Duration
RA
TA
Sensing Session ID
Measurement Setup ID
Measurement Instance ID
STA Info List
FCS
1404
AID11
Partial BW Info
Ng Parameters
RU Size
Ng List (Variable)
Measurement Report Type
Feedback Type
1410
1406
1408
Ng_exponent for first RU
...
Ng_exponent for last RU
1400
1412
1st RU
2nd RU
Second last RU
Last RU
Ng = 2
Ng = 16
...
Ng = 1
Ng = 4
f
1414

Figure 14

RU Size field	RU Size
0	26
1	52
2	106
3	242
4	484
5	996
6	2*996
7	4*996

1500

Figure 15A

Ng_exponent	*Ng* value
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128

1502

Figure 15B

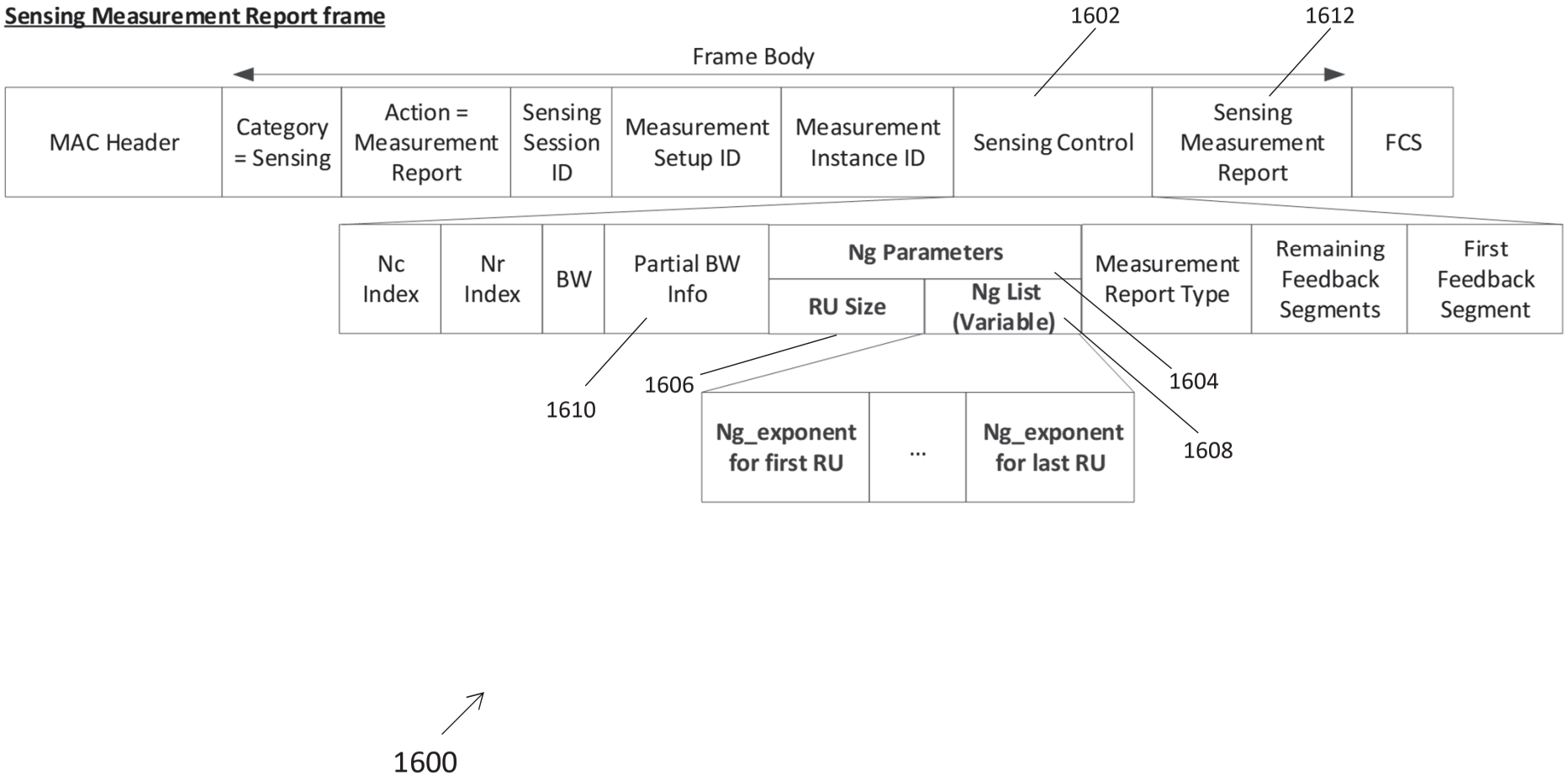

Sensing Measurement Report frame
1602
1612
Frame Body
MAC Header
Category = Sensing
Action = Measurement Report
Sensing Session ID
Measurement Setup ID
Measurement Instance ID
Sensing Control
Sensing Measurement Report
FCS
Nc Index
Nr Index
BW
Partial BW Info
Ng Parameters
RU Size
Ng List (Variable)
Measurement Report Type
Remaining Feedback Segments
First Feedback Segment
1610
1606
1604
1608
Ng_exponent for first RU
...
Ng_exponent for last RU
1600

Figure 16

Sensing Measurement Report field (CSI)		
Field	**Size (bits)**	**Meaning**
SNR/RSSI in receive chain 1	8	Signal-to-noise ratio (SNR) or receive signal strength indicator (RSSI) in the first receive chain of the STA sending the report.
…		
SNR/RSSI in receive chain *Nr*	8	Signal-to-noise ratio (SNR) or receive signal strength indicator (RSSI) in the the *Nr*'th receive chain of the STA sending the report.
CSI matrix for subcarrier *k* = *scidx_1st_Segment(0)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the 1st subcarrier in the 1st segment
…		
CSI matrix for subcarrier *k* = *scidx_1st_Segment(Ns_1 - 1)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the last subcarrier in the 1st segment
…		
CSI matrix for subcarrier *k* = *scidx_nth_Segment(0)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the 1st subcarrier in the *nth* segment
…		
CSI matrix for subcarrier *k* = *scidx_nth_Segment(Ns_n - 1)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the last subcarrier in the *nth* segment

1700

Figure 17

Table – scidx_mth_segment(k) when the segment sizes are 242 tones or 484 tones						
242-tone RU index	**20 MHz**		**40 MHz**	**80 MHz**	**160 MHz**	**320 MHz**
1	*Ng* = 1	[–122:1:–2,–1, 1, 2:1:122]	[–244:*1*:–1]	[–500:*1*: –259]	[–1012:*1*: –771]	[–2036:*1*: –1795]
	Ng = 2	[–122:2:,–2, 2:2:122]	[–244:*2*:–2]	[–500:2: –260]	[–1012:*2*: –772]	[–2036:*2*: –1796]
	Ng = 4	[–122, –120:4:–4,–2, 2, 4:4:120, 122]	[–244:*Ng*:–4]	[–500:*Ng*: –260]	[–1012:*Ng*: –772]	[–2036:*Ng*: –1796]
	…					
	Ng = 16	[–122, –116:16:–4, –2, 2, 4:16:116, 122]				
	…					
2	*Ng* = 1	-	[1:*1*:244]	[–253:*1*: –12]	[–765:*1*: –524]	[–1789:*1*: –1548]
	…	-				
…						
16	*Ng* = 1	-	-	-	-	[1796:*1*: 2036]
	…	-	-	-	-	

1800

Figure 18

Table – scidx_mth_segment(k) when the segment sizes are 996 tones or 2*996 tones				
996-tone RU index	**80 MHz**		**160 MHz**	**320 MHz**
1	*Ng* = 1	[–500:1:–3, 3:1:500]	[–1012:1:–515,–509:1:-12]	[–2036:1:–1539, –1533:1:–1036]
	Ng = 2	[–500:2:–4, 4:2:500]	[–1012:2:–516,–508:2:-12]	[–2036:2:–1540, –1532:2:–1036]
	Ng = 4	[–500:4:–4, 4:4:500]	[–1012:4:–516,–508:4:-12]	[–2036:4:–1540, –1532:4:–1036]
	…			
	Ng = 16	[–500:16:–260,–252:16:–12,–4, 4,12:16:252, 260:16:500]	[–1012:16:–772,–764:16:–524,–516, –508, –500:16:–260,–252:16:–12]	[–2036:16:–1796,–1788:16:–1548,–1540, –1532,–1524:16:–1284,–1276:16:–1036]
	…			
2	*Ng* = 1	-	[12:1:509,515:1:1012]	[–1012:1:–515,–509:1:-12]
	…	-		
3	*Ng* = 1	-	-	[12:1:509,515:1:1012]
	…	-	-	
4	*Ng* = 1	-	-	[1036:1:1532,1540:1:2036]
	…	-	-	

1900

Figure 19

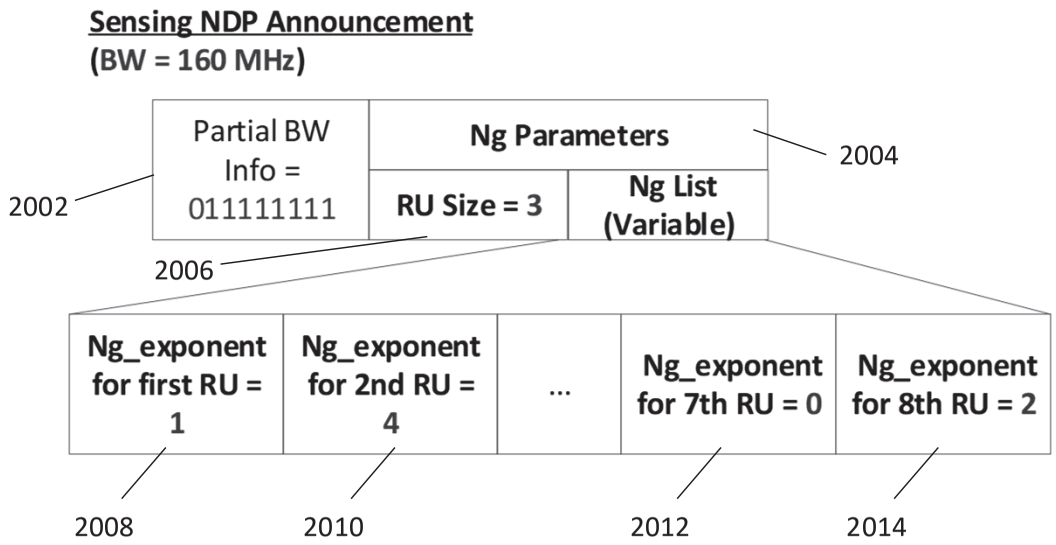


Figure 20A

2000

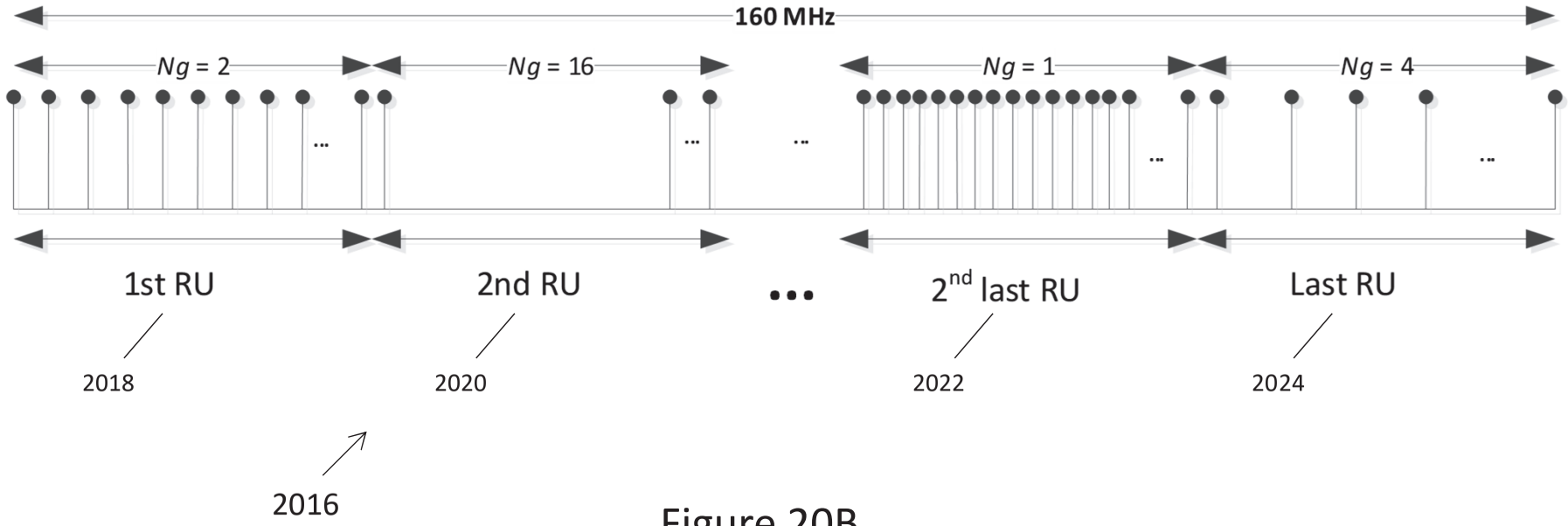


Figure 20B

2016

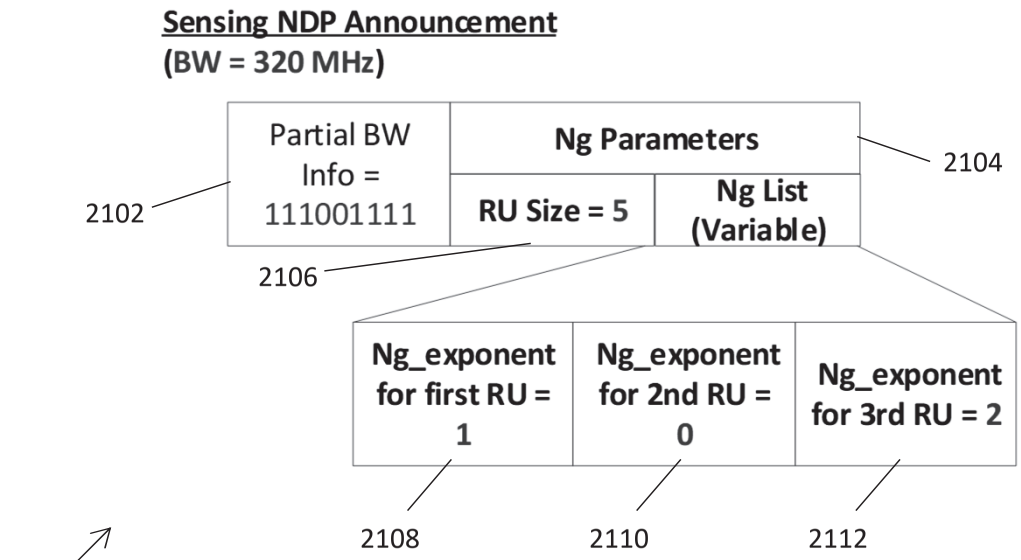


Figure 21A

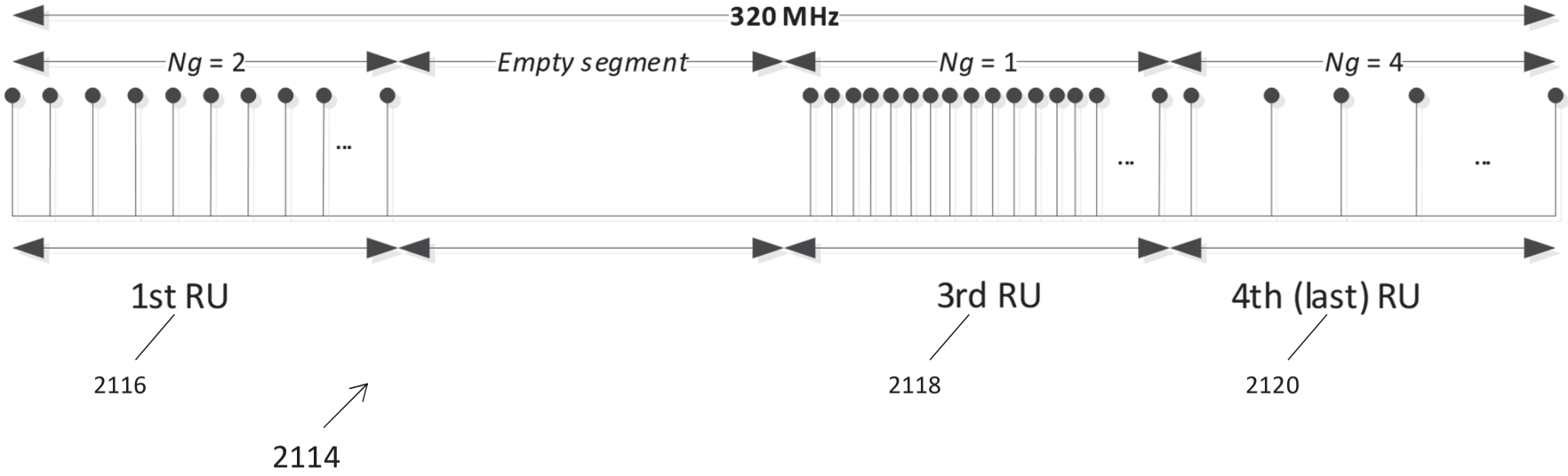


Figure 21B

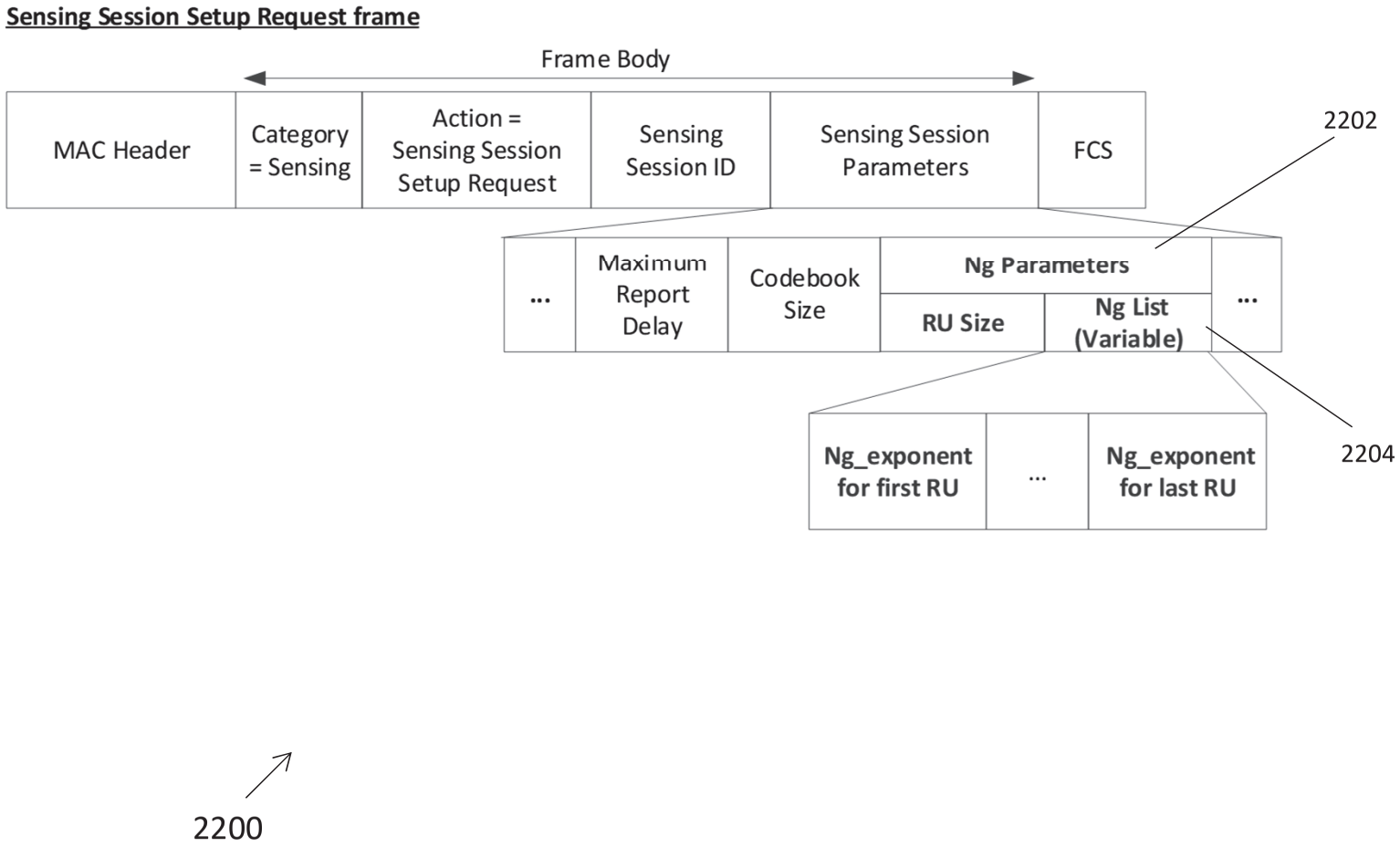

Sensing Session Setup Request frame
Frame Body
MAC Header
Category = Sensing
Action = Sensing Session Setup Request
Sensing Session ID
Sensing Session Parameters
FCS
2202
...
Maximum Report Delay
Codebook Size
Ng Parameters
RU Size
Ng List (Variable)
...
Ng_exponent for first RU
...
Ng_exponent for last RU
2204
2200

Figure 22

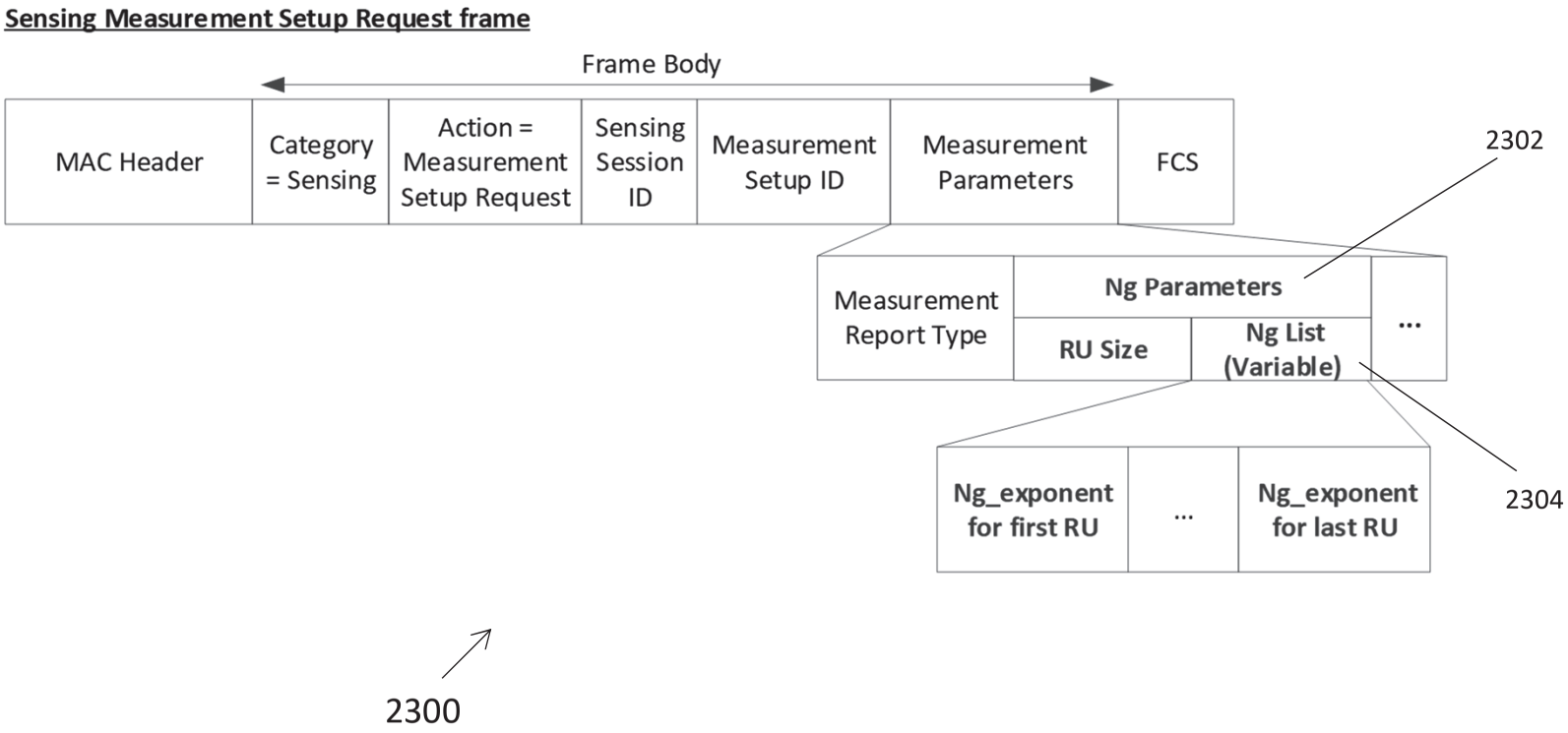

Sensing Measurement Setup Request frame
Frame Body
MAC Header
Category = Sensing
Action = Measurement Setup Request
Sensing Session ID
Measurement Setup ID
Measurement Parameters
FCS
2302
Measurement Report Type
Ng Parameters
RU Size
Ng List (Variable)
...
Ng_exponent for first RU
...
Ng_exponent for last RU
2304
2300

Figure 23

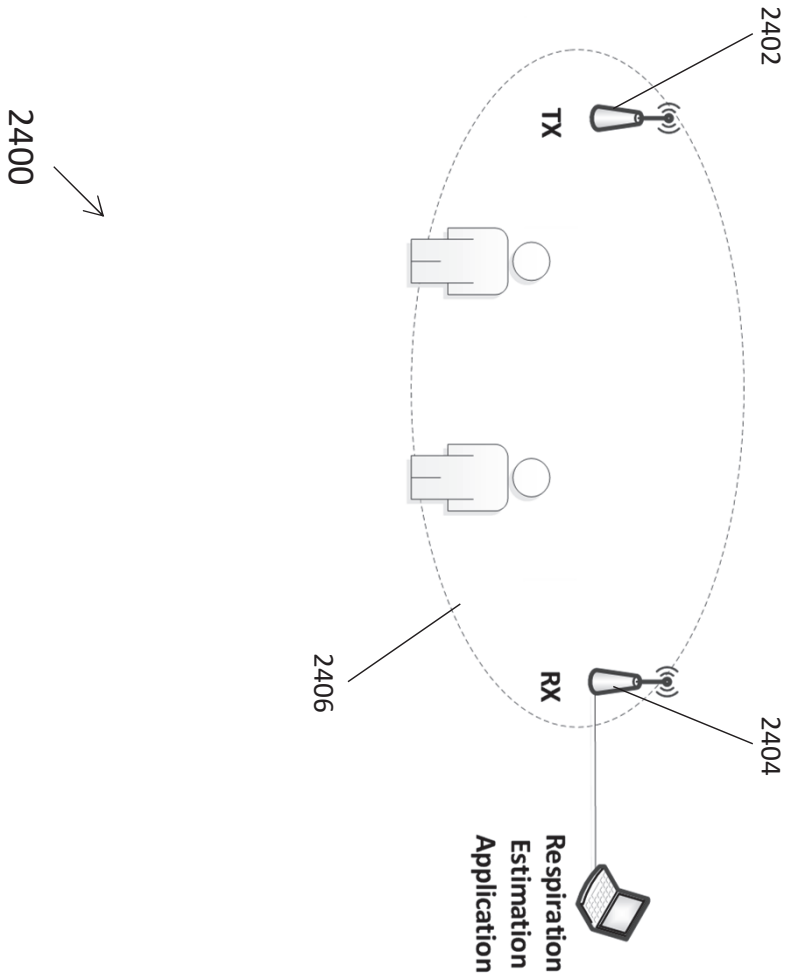
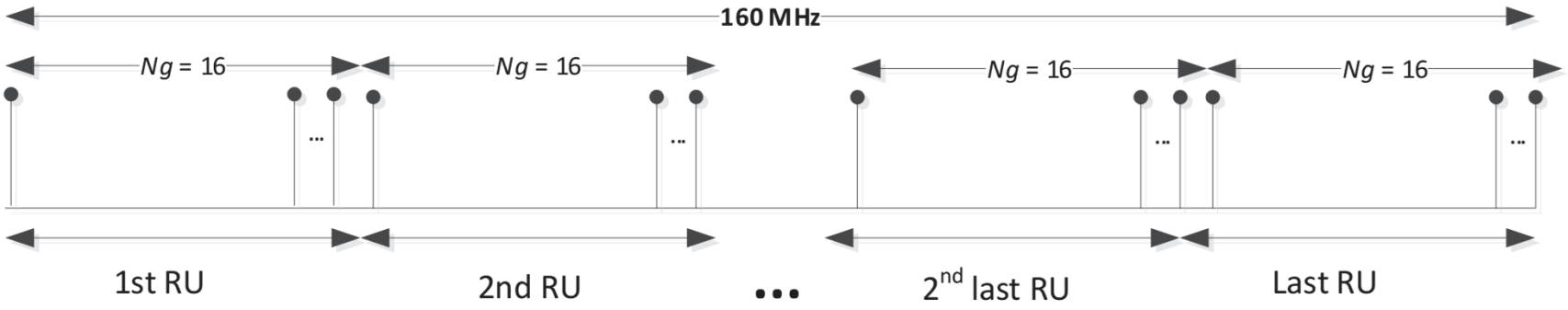

2400
2402
TX
2406
RX
2404
Respiration
Estimation
Application

Figure 24



2500

Figure 25

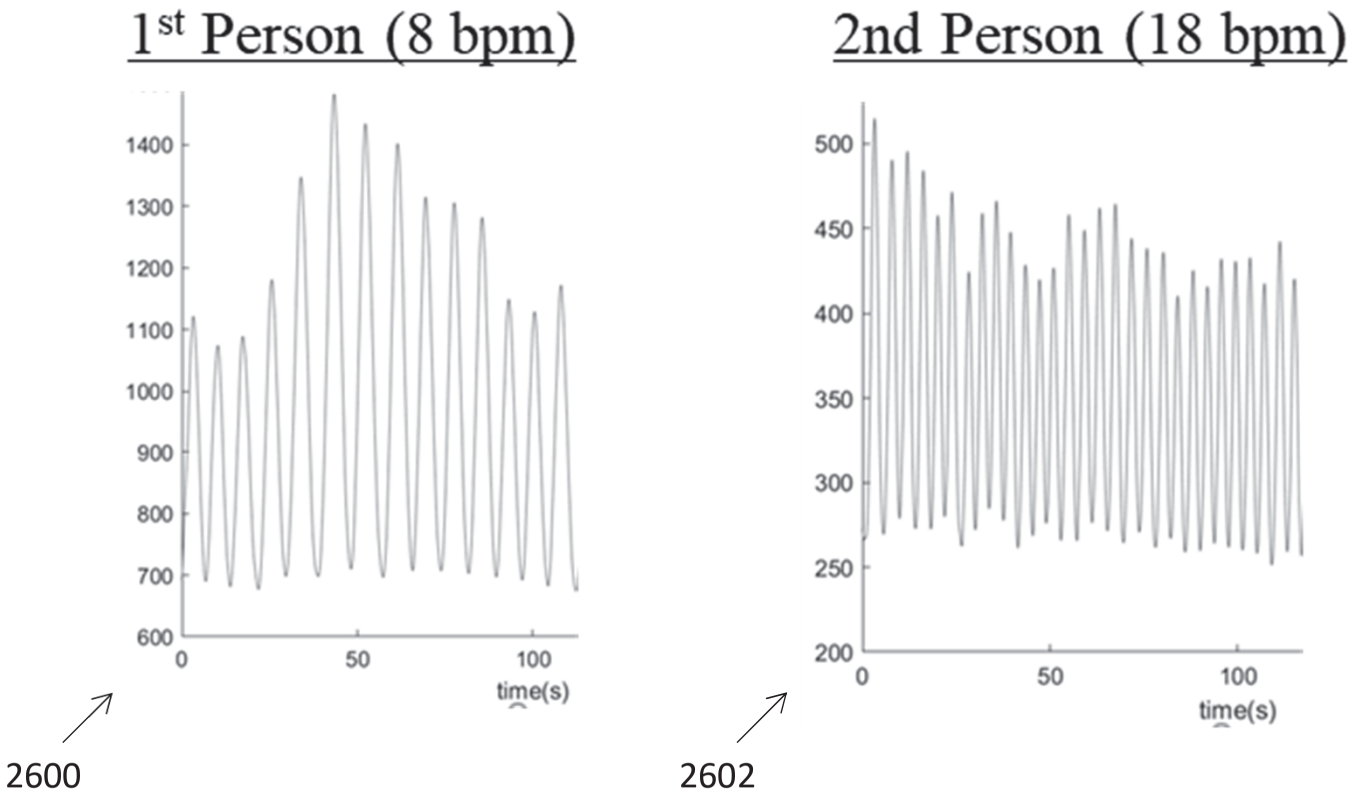
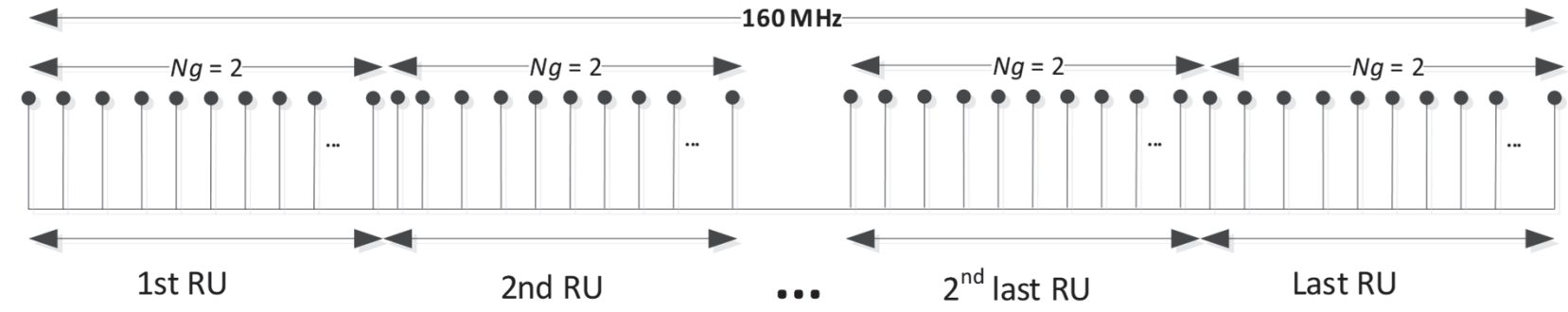
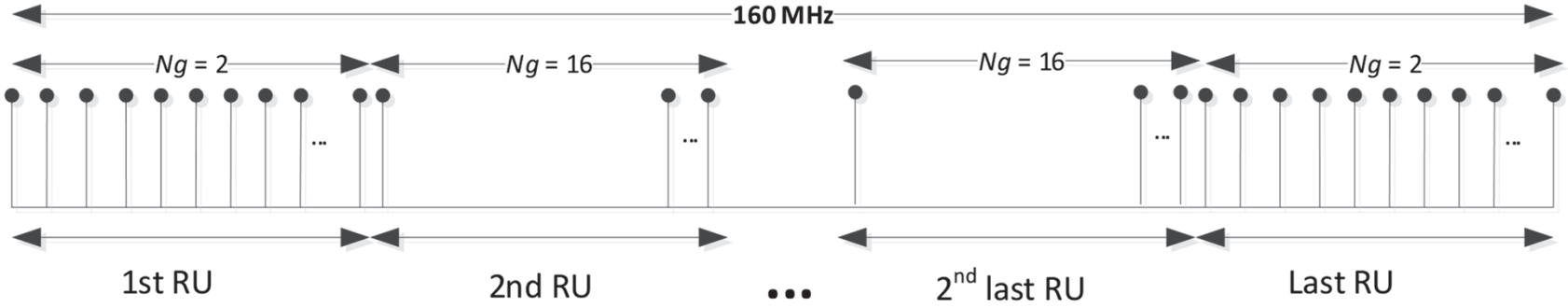

1st Person (8 bpm)
2nd Person (18 bpm)
1400
1300
1200
1100
1000
900
800
700
600
0
50
100
time(s)
500
450
400
350
300
250
200
0
50
100
time(s)
2600
2602
CSI Amplitude curves of a selected subcarrier

Figure 26



2700

Figure 27A



2702

Figure 27B

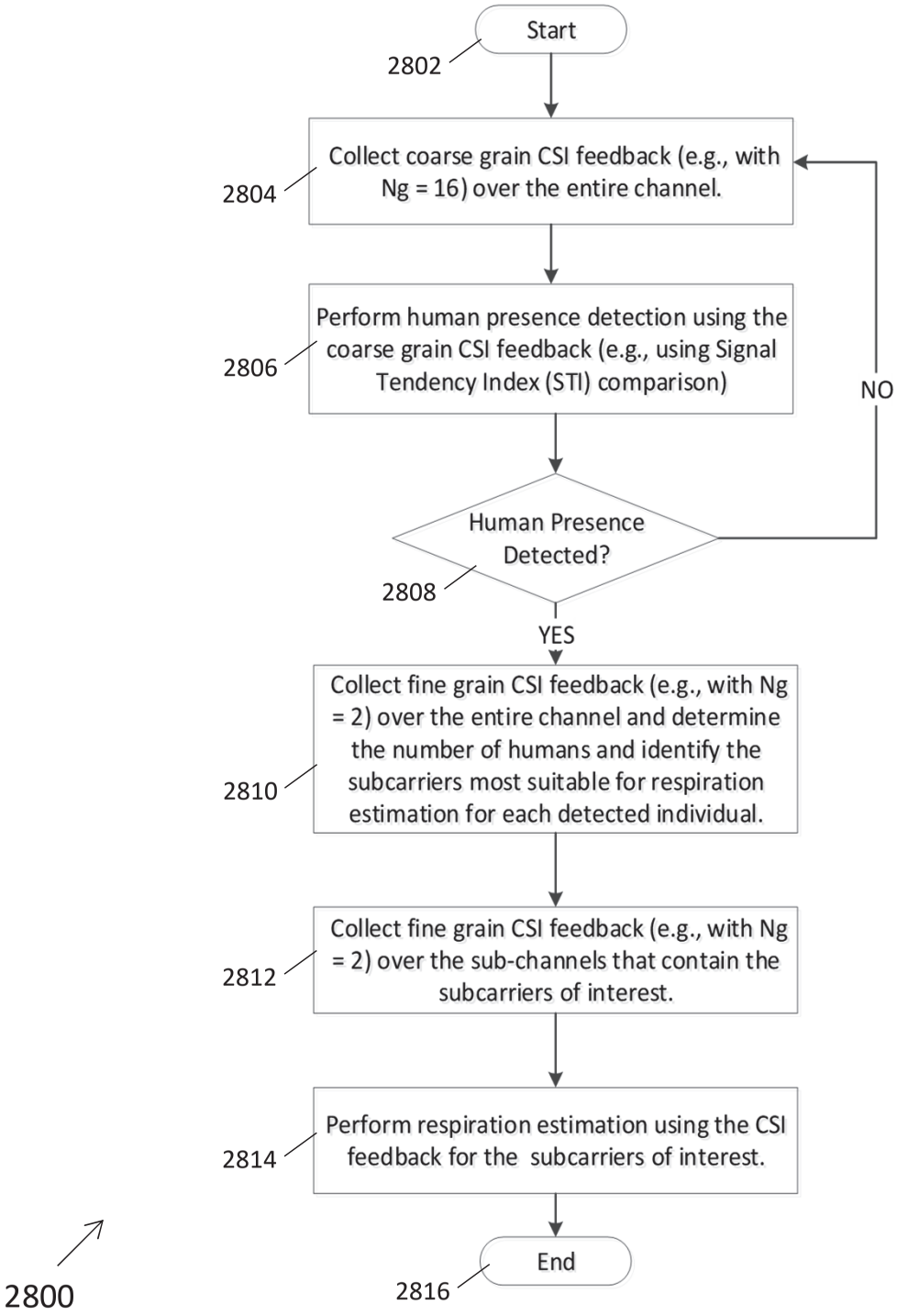

Start
2802
Collect coarse grain CSI feedback (e.g., with Ng = 16) over the entire channel.
2804
Perform human presence detection using the coarse grain CSI feedback (e.g., using Signal Tendency Index (STI) comparison)
2806
Human Presence Detected?
2808
NO
YES
Collect fine grain CSI feedback (e.g., with Ng = 2) over the entire channel and determine the number of humans and identify the subcarriers most suitable for respiration estimation for each detected individual.
2810
Collect fine grain CSI feedback (e.g., with Ng = 2) over the sub-channels that contain the subcarriers of interest.
2812
Perform respiration estimation using the CSI feedback for the subcarriers of interest.
2814
End
2816
2800

Figure 28

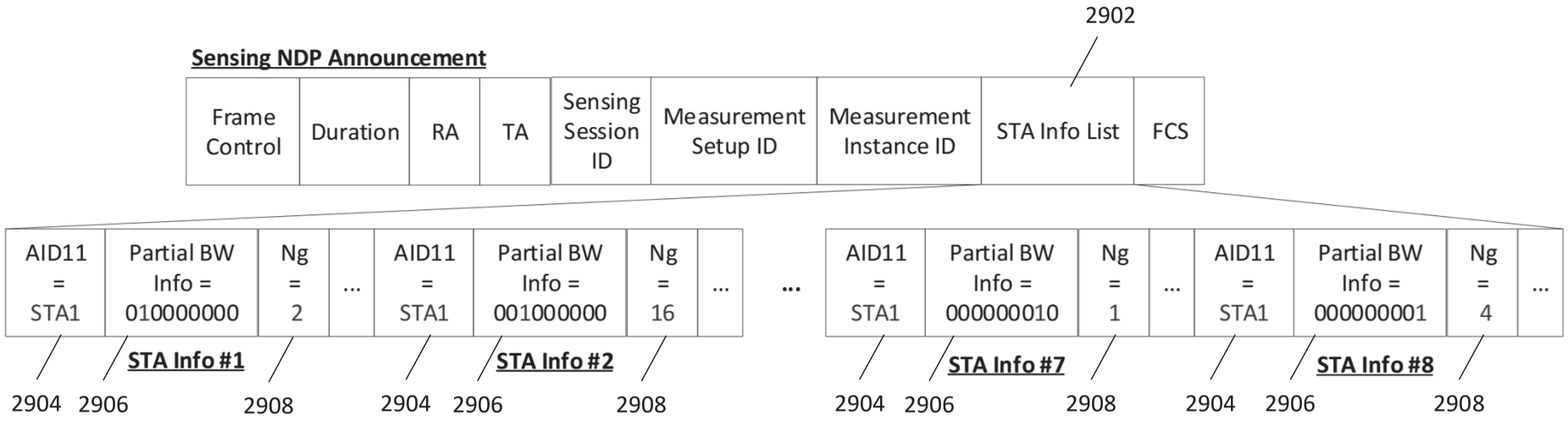


Figure 29A

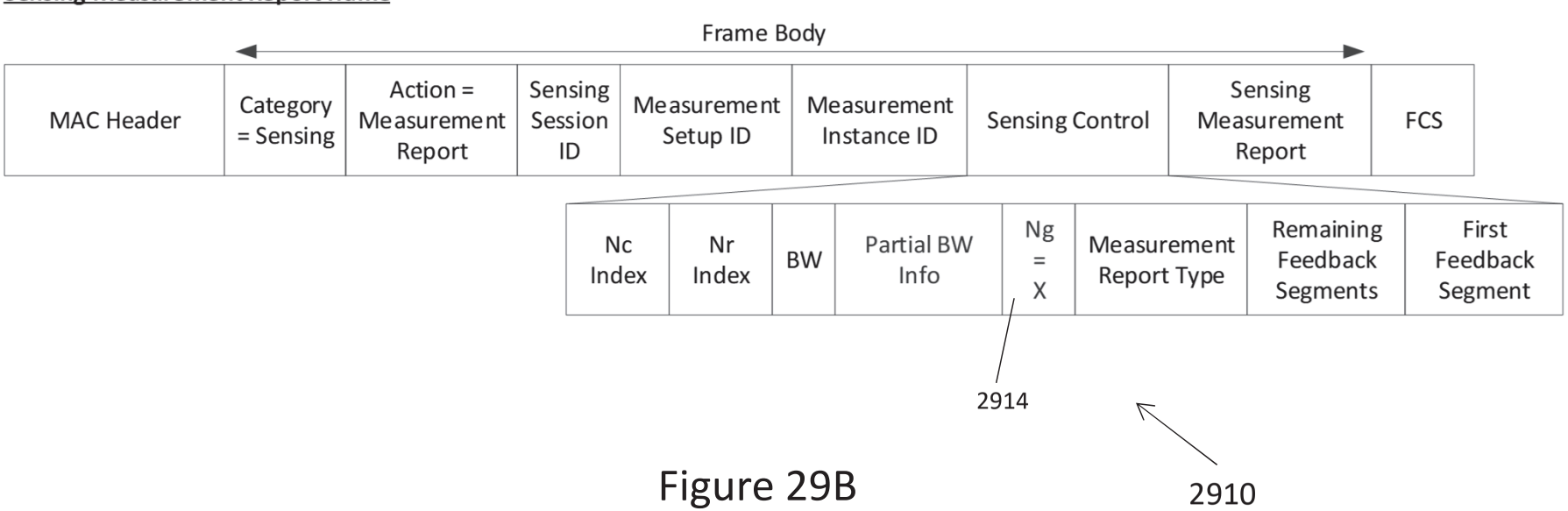


Figure 29B

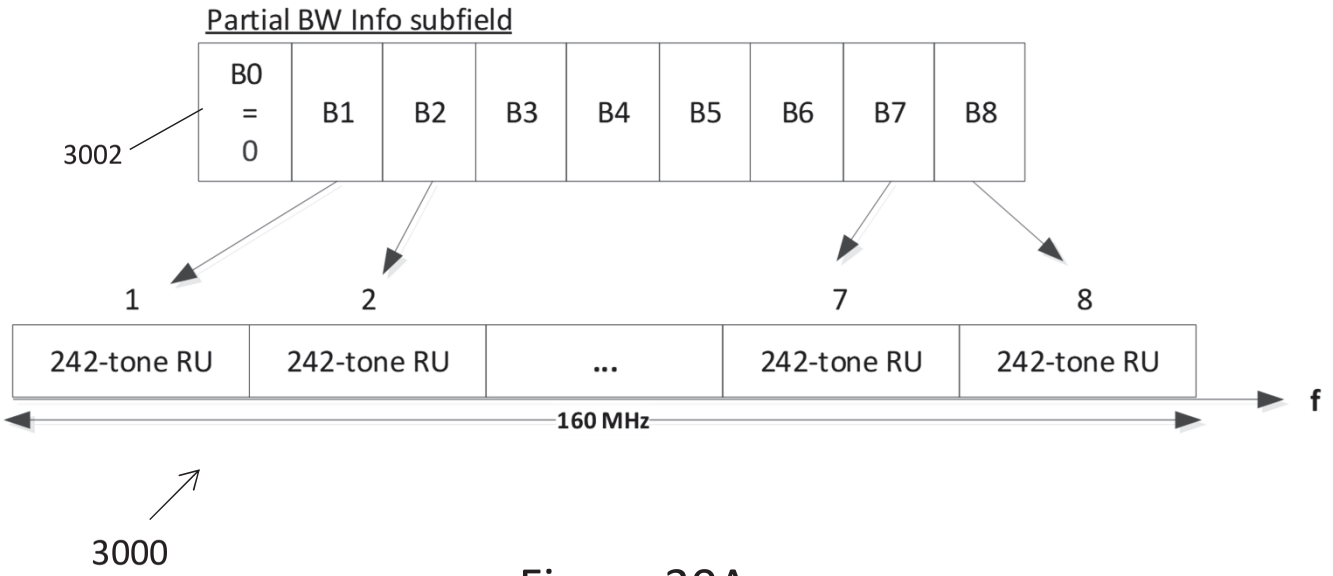


Figure 30A

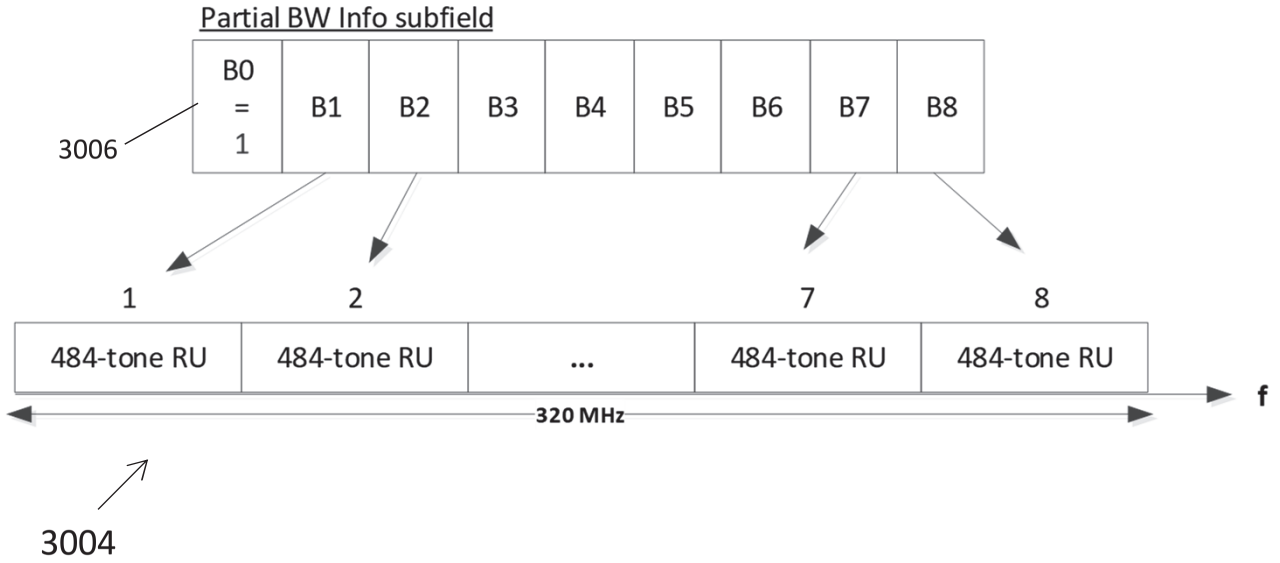


Figure 30B

Table – Example of additional settings for BW, Partial BW Info subfield in the Sensing NDP Announcement frame in addition to the settings already allowed in EHT NDP Announcement frame			
Feedback size	**Bandwidth of the Sensing NDP Announcement frame (MHZ)**	**Partial BW Info subfield values in binary format (B0 B1 B2 B3 B4 B5 B6 B7 B8)**	**Operating channel width of the Sensing Responder (MHz)**
2 x 242-tones	80	010100000, 010010000, 001100000, 001010000	80, 160, 320
	160	010001000, 010000100, 010000010, 010000001, 001001000, … , 000000101, 000000110	160, 320
	320	Same as 484 feedback RU size in EHT NDP Announcement frame	320
3 x 242-tones	80	Same as 484+242 feedback RU size in EHT NDP Announcement frame	80, 160, 320
	160	011001000, 011000100, 011000010, 011000001, 001101000, … , 000010011	160, 320
4 x 242-tones	160	011001100, 011000011, 000111100, 000110011, 010001110, 01001101, 010000111, 001001110, … , 000010111	160, 320
	320 (2 x 484-tones)	110001000, 110000100, 110000010, 110000001, 101001000, … , 100000101, 100000110	320
…			
6 x 242-tones	160	011111010, 011111001, 011110110, 011110101, 011101110, …, 001011111	160, 320
	320 (3 x 484-tones)	111001000, 111000100, 111000010, 111000001, 101101000, … , 100010011	320
…			
6 x 484-tones	320	111111001, 111111010, 111110101	320



Figure 31

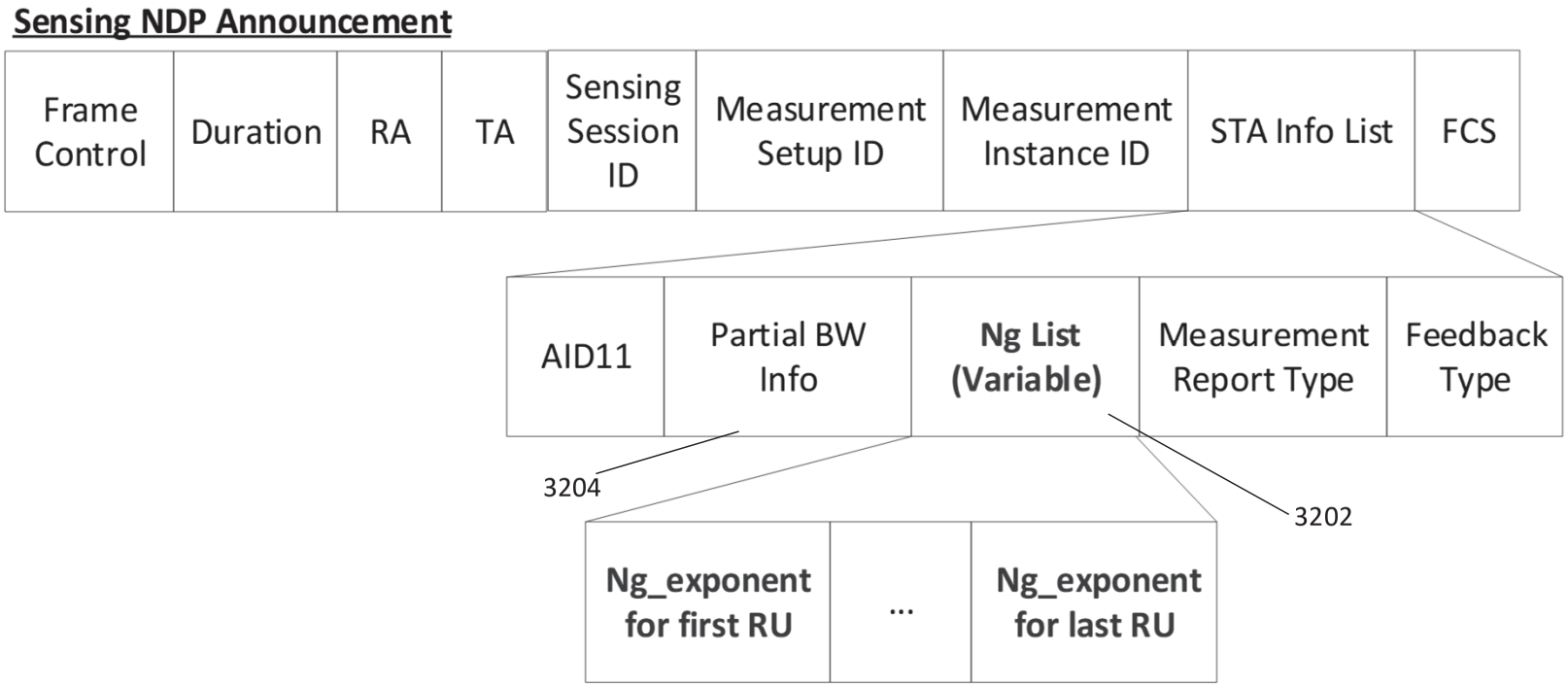
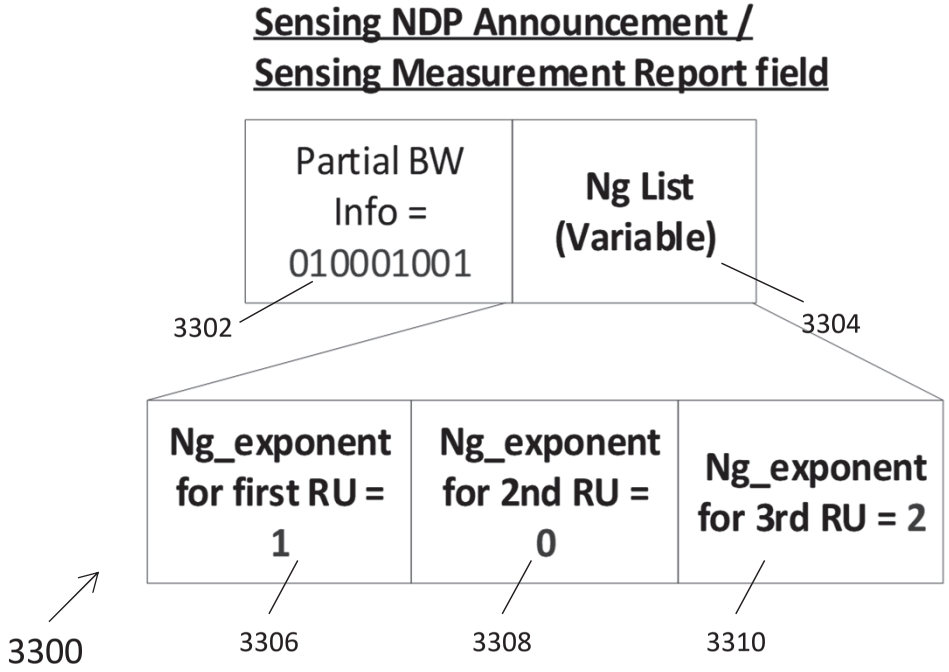

Sensing NDP Announcement
Frame Control
Duration
RA
TA
Sensing Session ID
Measurement Setup ID
Measurement Instance ID
STA Info List
FCS
AID11
Partial BW Info
Ng List (Variable)
Measurement Report Type
Feedback Type
3204
3202
Ng_exponent for first RU
...
Ng_exponent for last RU
3200

Figure 32


Sensing NDP Announcement /
Sensing Measurement Report field
Partial BW Info = 010001001
Ng List (Variable)
3302
3304
Ng_exponent for first RU = 1
Ng_exponent for 2nd RU = 0
Ng_exponent for 3rd RU = 2
3300
3306
3308
3310

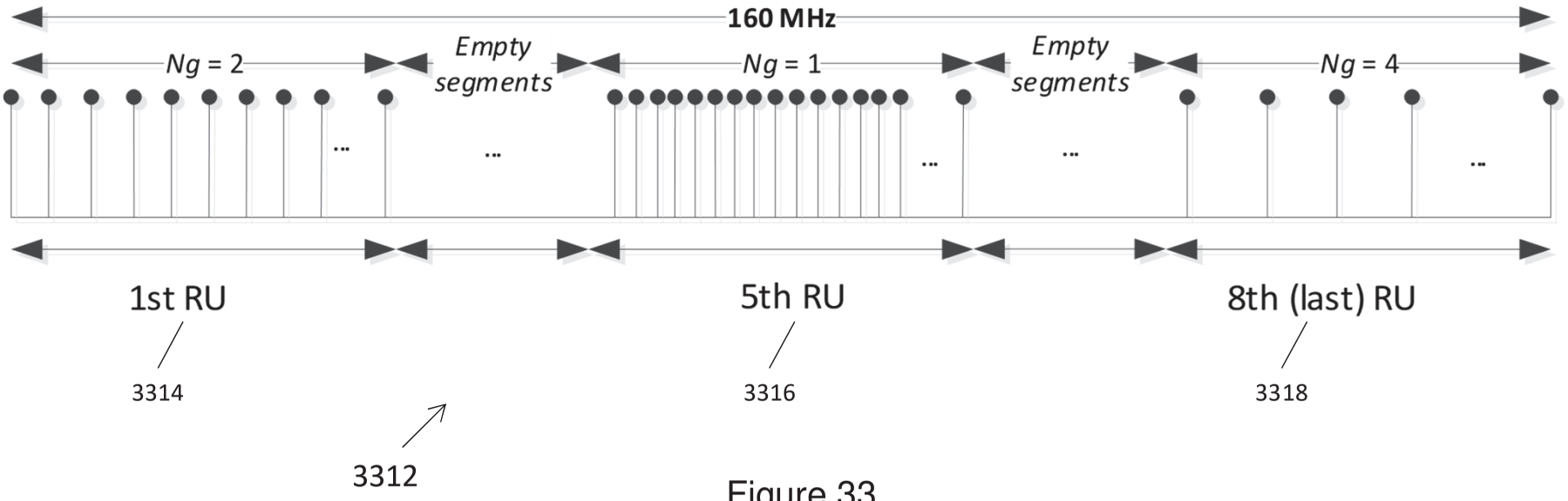
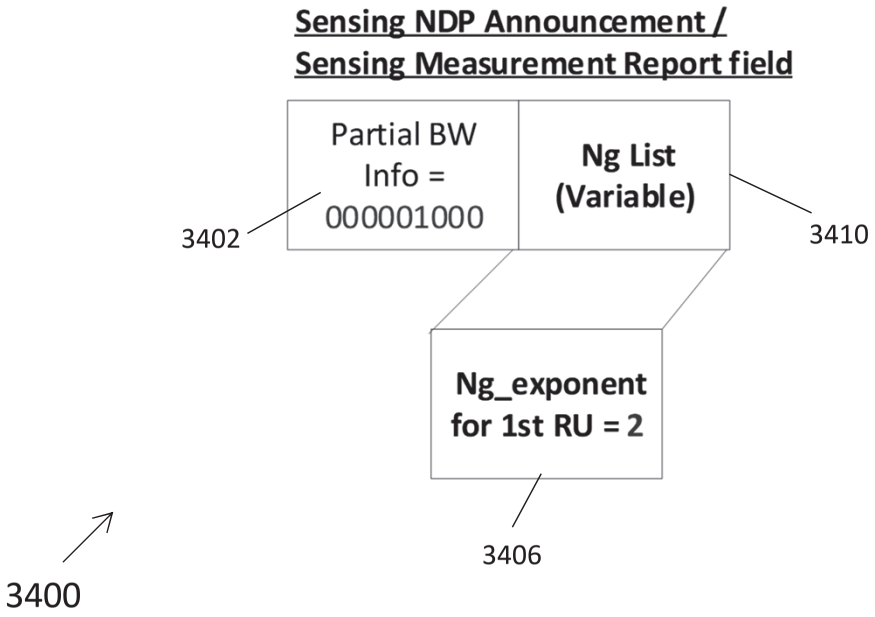

160 MHz
Ng = 2
Empty segments
Ng = 1
Empty segments
Ng = 4
1st RU
5th RU
8th (last) RU
3314
3316
3318
3312

Figure 33


Sensing NDP Announcement /
Sensing Measurement Report field
Partial BW Info = 000001000
Ng List (Variable)
3402
3410
Ng_exponent for 1st RU = 2
3406
3400

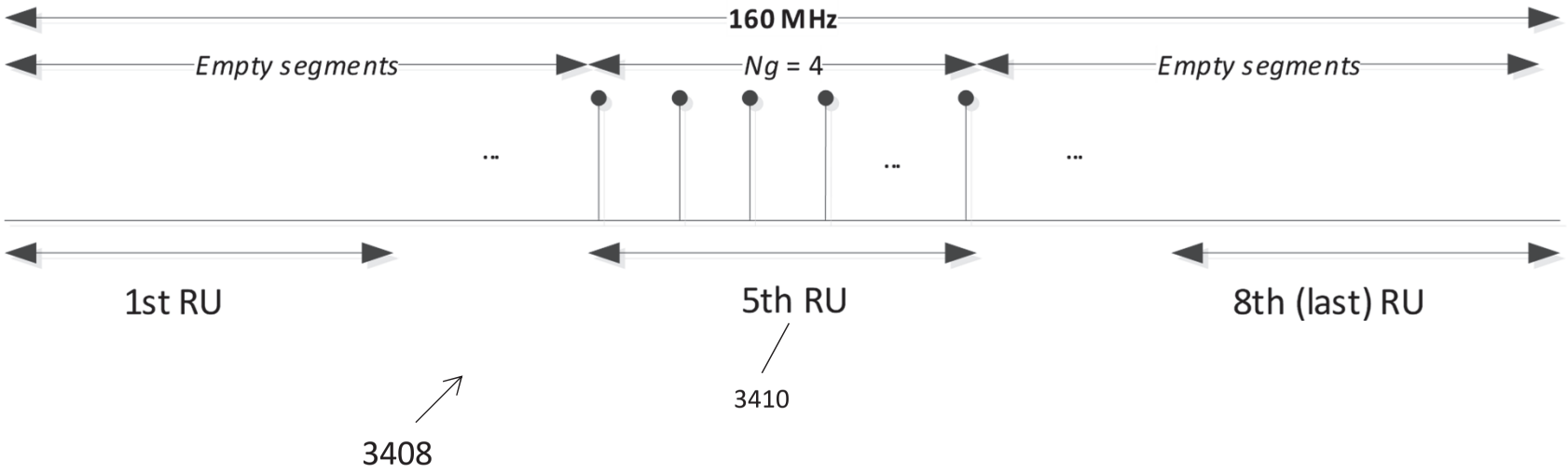

160 MHz
Empty segments
Ng = 4
Empty segments
1st RU
5th RU
8th (last) RU
3410
3408

Figure 34

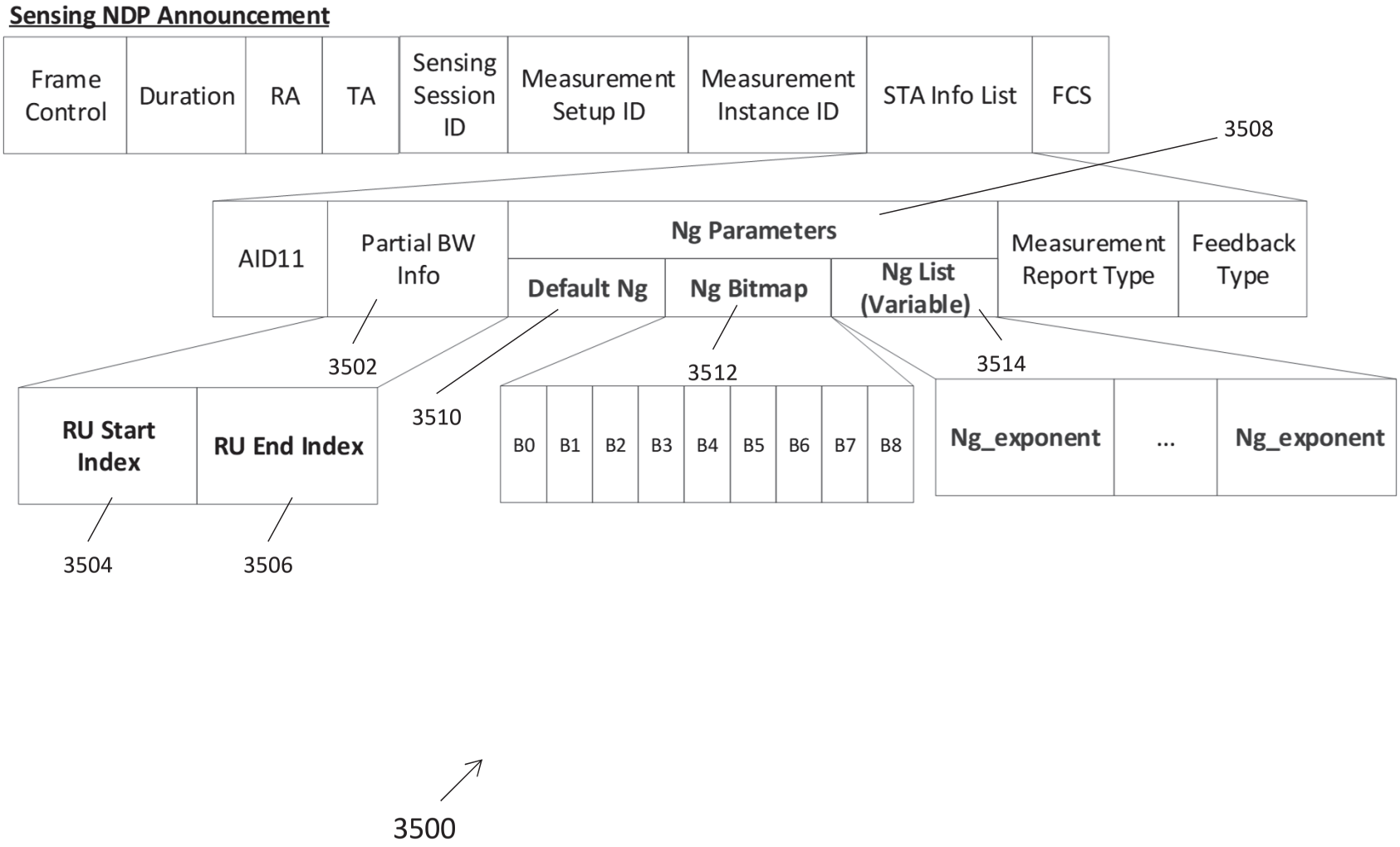

Sensing NDP Announcement
Frame Control
Duration
RA
TA
Sensing Session ID
Measurement Setup ID
Measurement Instance ID
STA Info List
FCS
3508
AID11
Partial BW Info
Ng Parameters
Default Ng
Ng Bitmap
Ng List (Variable)
Measurement Report Type
Feedback Type
3502
3510
3512
3514
RU Start Index
RU End Index
B0
B1
B2
B3
B4
B5
B6
B7
B8
Ng_exponent
...
Ng_exponent
3504
3506
3500

Figure 35

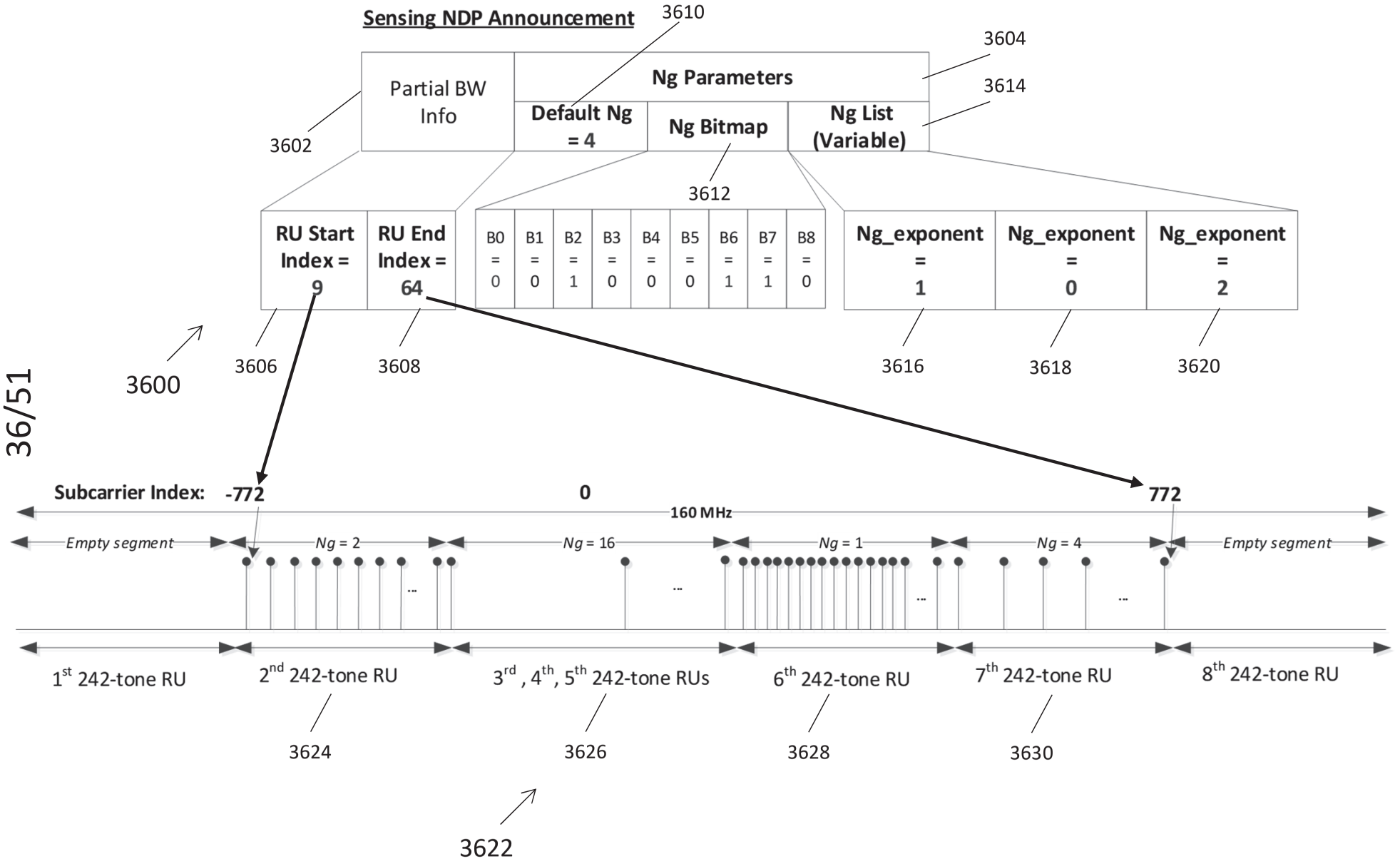
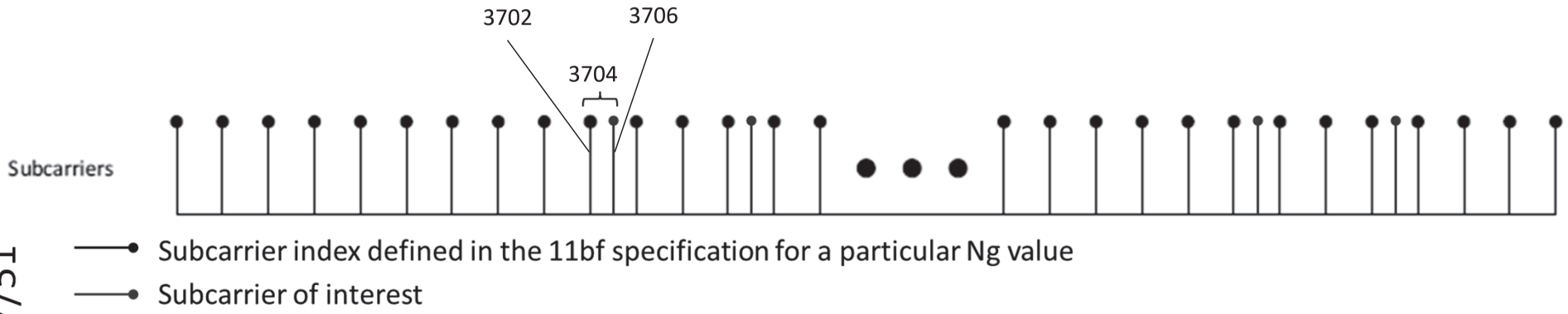

Sensing NDP Announcement
3610
3604
Partial BW Info
Ng Parameters
3614
Default Ng = 4
Ng Bitmap
Ng List (Variable)
3602
3612
RU Start Index = 9
RU End Index = 64
B0 = 0
B1 = 0
B2 = 1
B3 = 0
B4 = 0
B5 = 0
B6 = 1
B7 = 1
B8 = 0
Ng_exponent = 1
Ng_exponent = 0
Ng_exponent = 2
3600
3606
3608
3616
3618
3620
Subcarrier Index: -772
0
772
160 MHz
Empty segment
Ng = 2
Ng = 16
Ng = 1
Ng = 4
Empty segment
1st 242-tone RU
2nd 242-tone RU
3rd , 4th, 5th 242-tone RUs
6th 242-tone RU
7th 242-tone RU
8th 242-tone RU
3624
3626
3628
3630
3622

Figure 36



3700

Figure 37

	80 MHz			
996-tone RU index	**Scidx()**		**Scidx_new() when subcarrier_offset = 2**	**Scidx_new() when subcarrier_offset = 8**
1	*Ng* = 4	[–500:4:–4, 4:4:500]	[-498:4:-2, 2:4:498]	-
	Ng = 16	[–500:16:–260,–252:16:–12,–4, 4,12:16:252, 260:16:500]	[–498:16:–258,–250:16:–10,–2, 2,10:16:250, 258:16:498]	[–492:16:–252,–244:16:–4, 4:16:244, 252:16:492]

3800

Figure 38

Sensing NDP Announcement

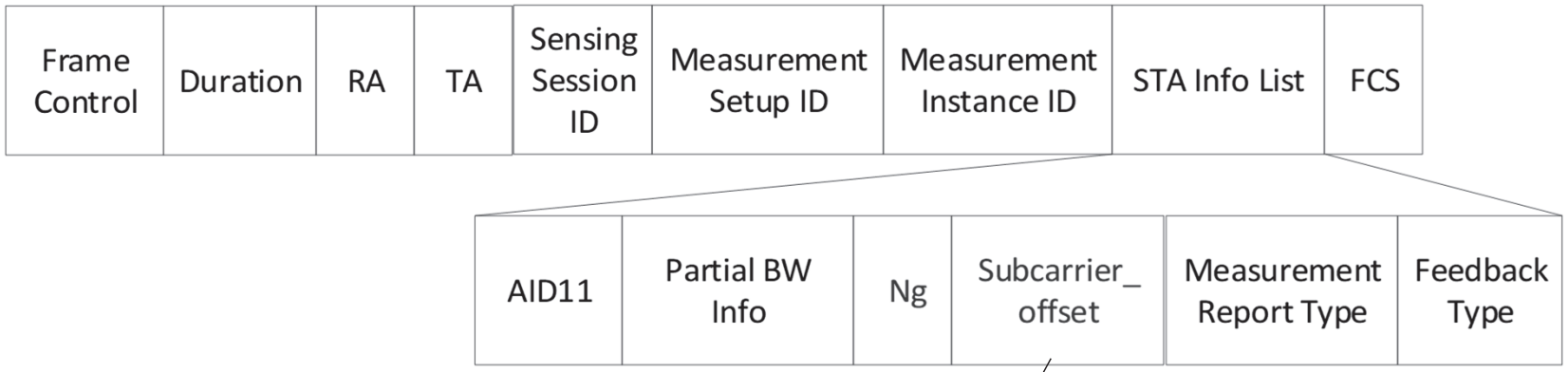


Figure 39A

Sensing Measurement Report frame

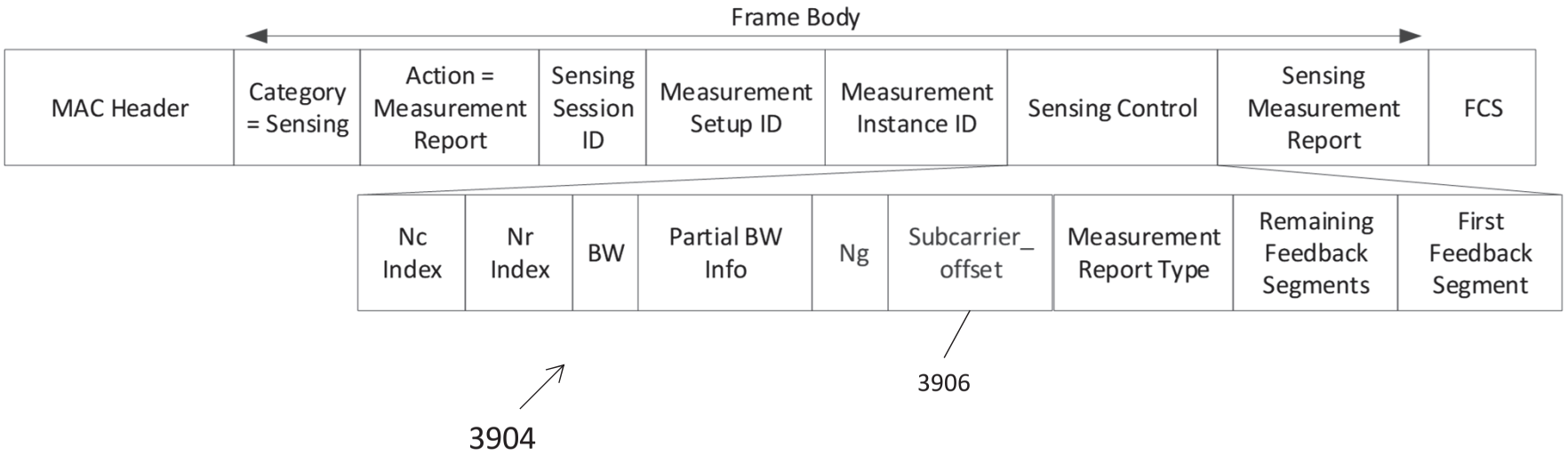


Figure 39B

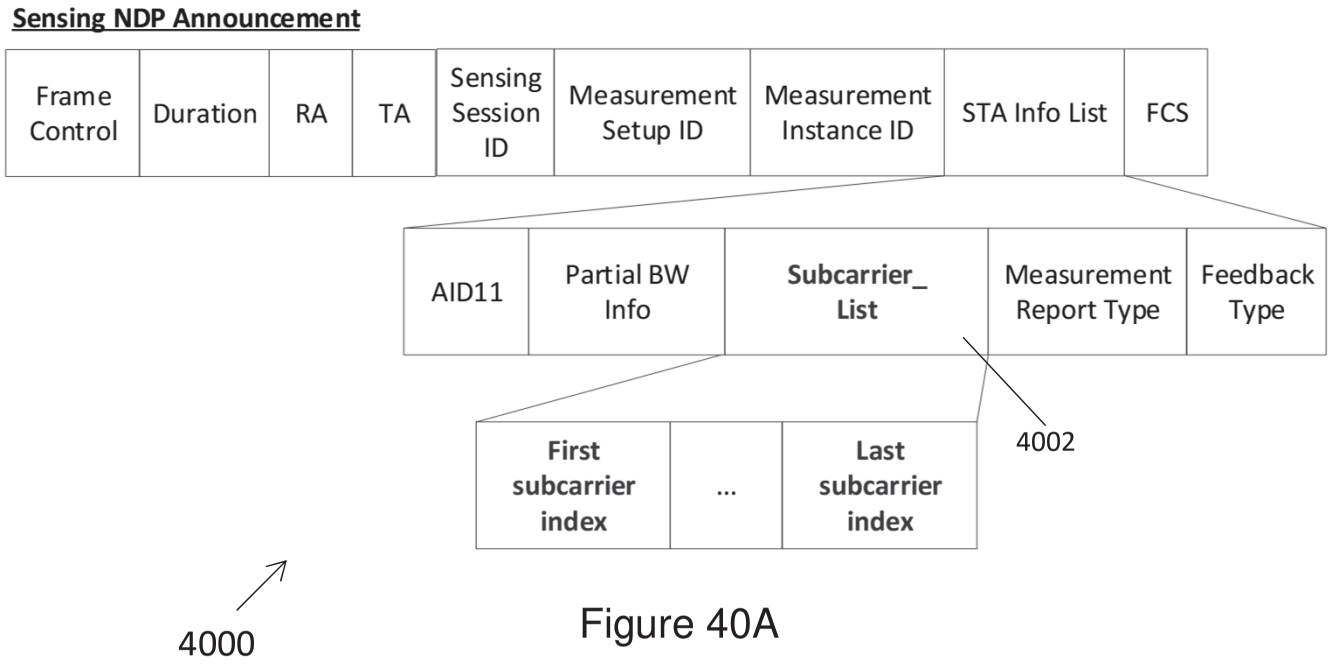


Figure 40A

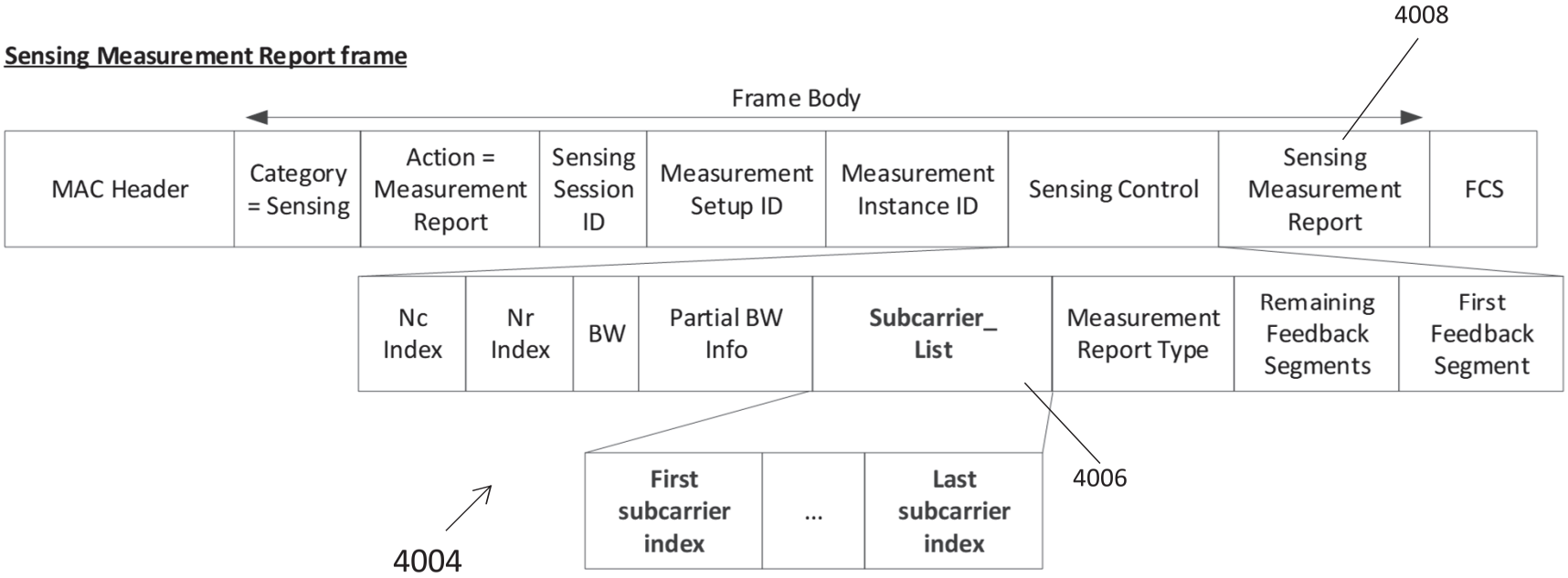


Figure 40B

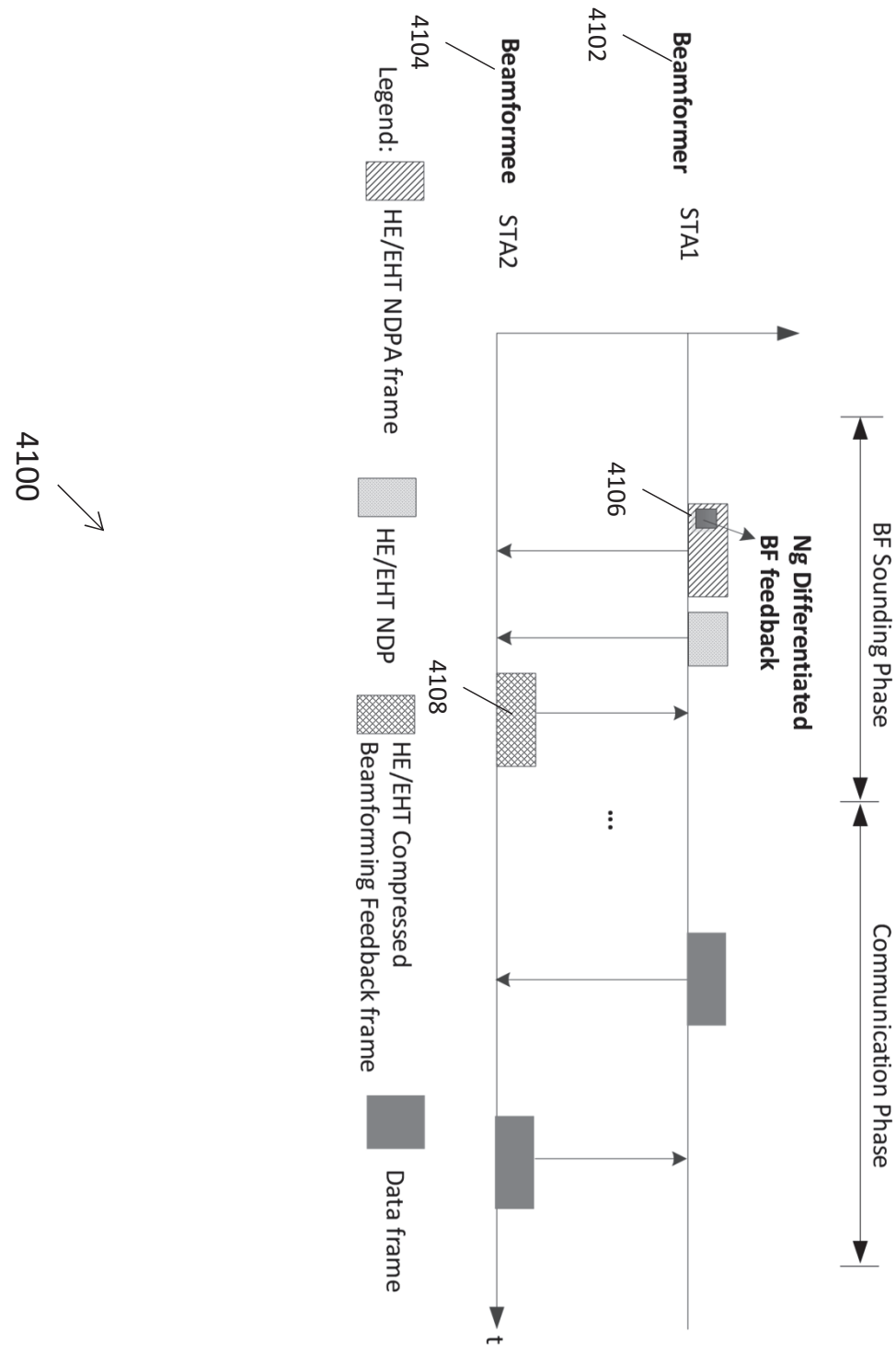

4100
4102
Beamformer STA1
4104
Beamformee STA2
Legend:
HE/EHT NDPA frame
HE/EHT NDP
HE/EHT Compressed Beamforming Feedback frame
Data frame
4106
Ng Differentiated BF feedback
4108
...
t
BF Sounding Phase
Communication Phase

Figure 41

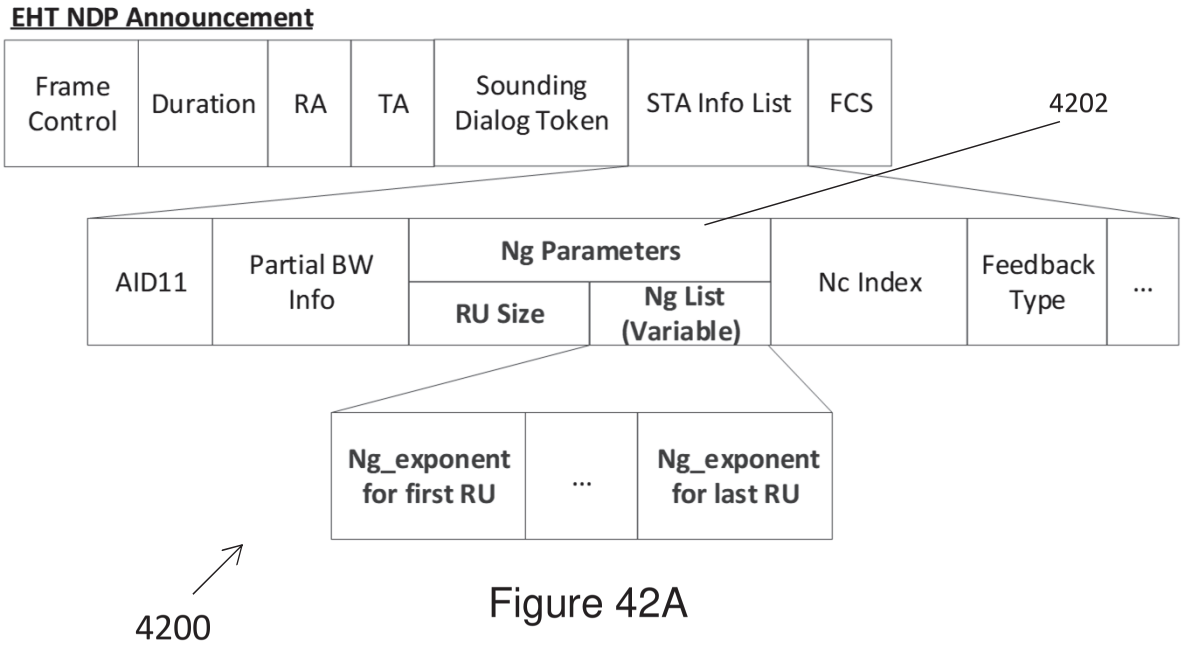


Figure 42A

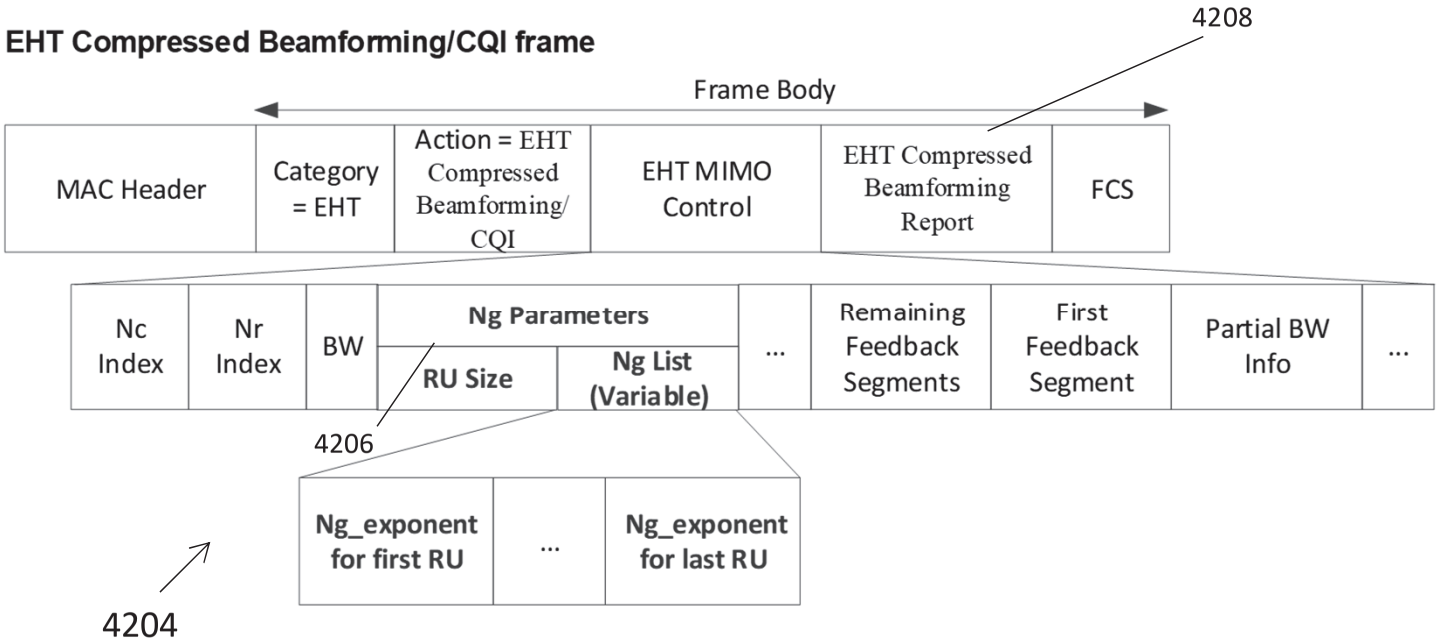


Figure 42B

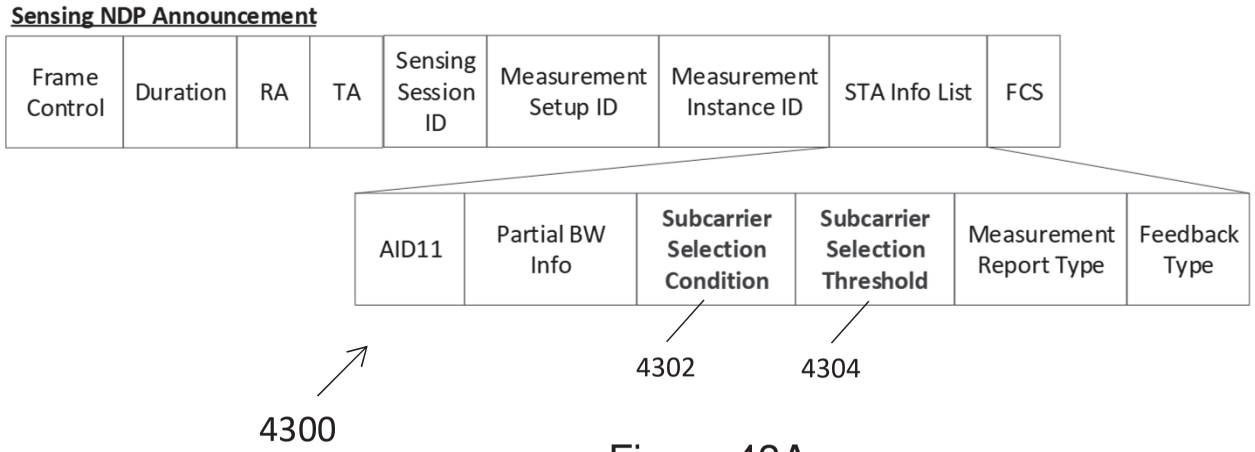


Figure 43A

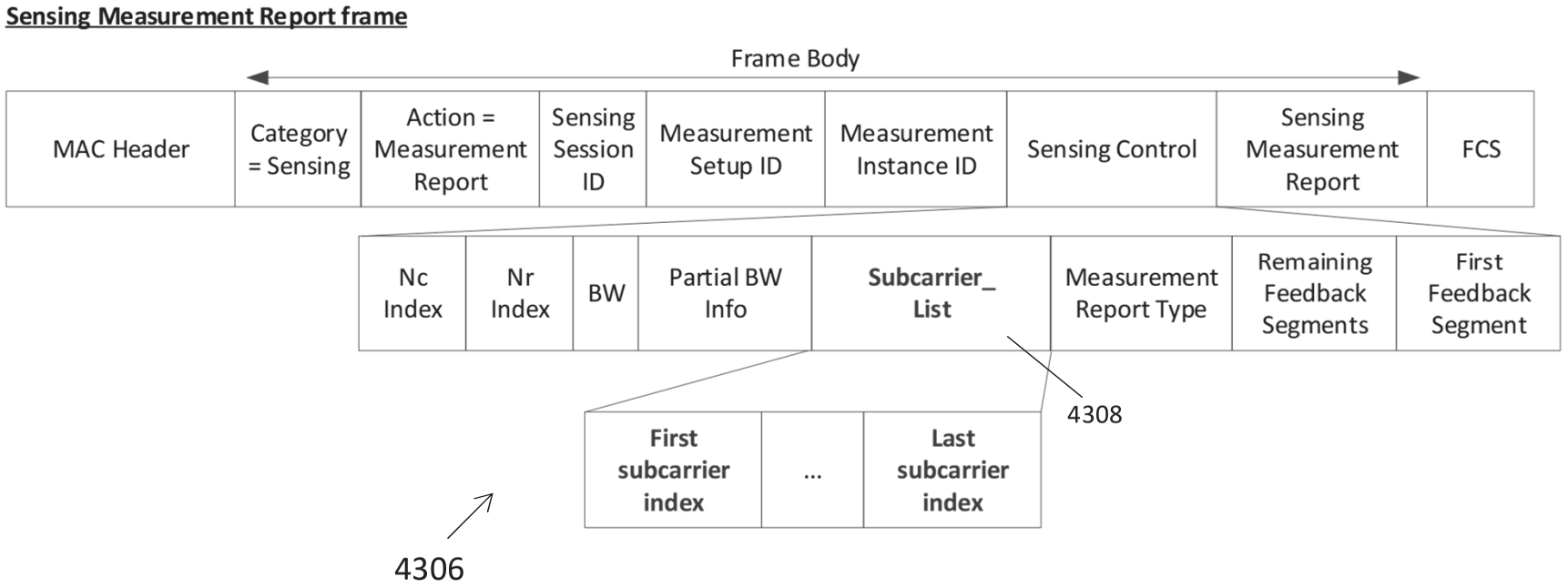


Figure 43B

Table - Example encoding of Subcarrier Selection Condition field (2 bits)

Subcarrier Selection Condition	Meaning
0	All subcarrier as per Ng
1	Subcarriers with I & Q values whose difference from a previous measurement is above the threshold value.
2	Subcarriers with Amplitude values whose difference from a previous measurement is above the threshold value.
3	Subcarriers with phase values whose difference from a previous measurement is above the threshold value.



Figure 44

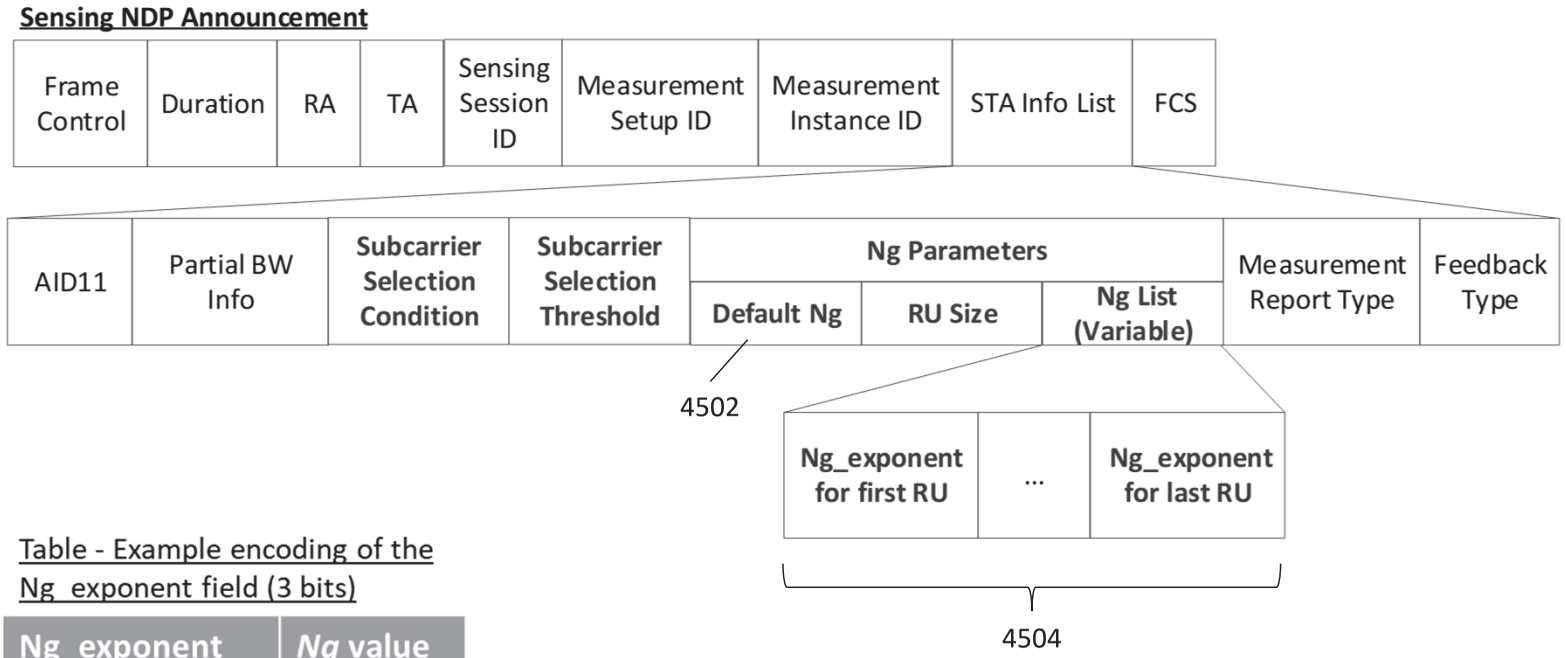


Table - Example encoding of the Ng_exponent field (3 bits)

Ng_exponent	*Ng* value
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	Dynamic Grouping

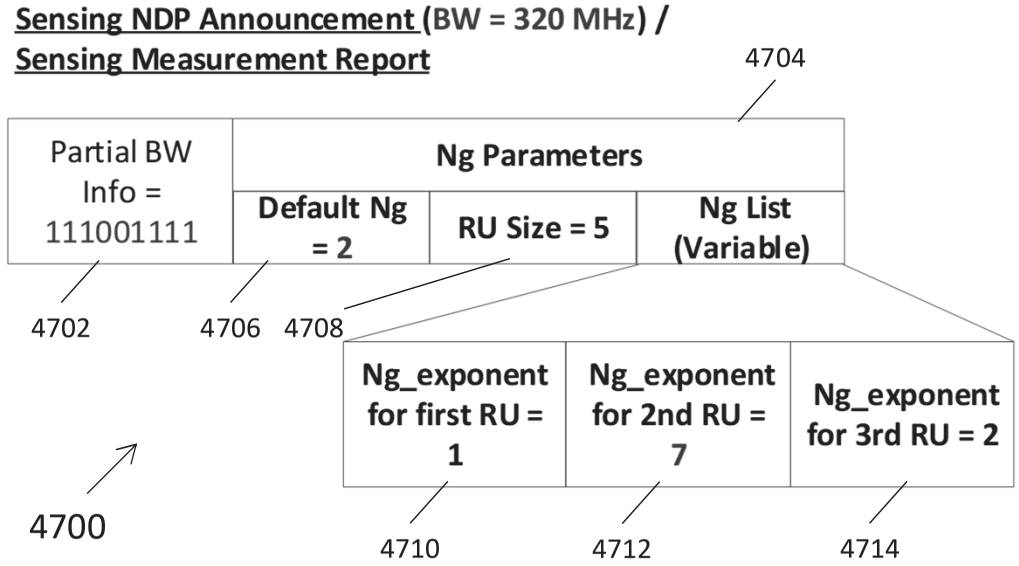
4506

Figure 45

Table – Sensing Measurement Report field (CSI)		
Field	**Size (bits)**	**Meaning**
…		
CSI matrix for subcarrier *k* = *scidx_1st_Segment(0)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the 1st subcarrier in the 1st segment (see Figure E1-F1 (CSI Matrix coding))
…		
CSI matrix for subcarrier *k* = *scidx_1st_Segment(Ns_1 - 1)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the last subcarrier in the 1st segment
…		
CSI matrix for subcarrier *k* = *scidx_nth_Segment(0)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the 1st subcarrier in the *nth* segment
…		
CSI matrix for subcarrier *k* = *scidx_nth_Segment(Ns_n - 1)*	3 + 2 x *Nb* x *Nc* x *Nr*	CSI matrix for the last subcarrier in the *nth* segment
Differential subcarrier index for mth segment *scidx_mth_Segment(0) – scidx_mth_Segment(1)*	3	Only present for the mth segment with dynamic grouping. Set to j to indicate the distance between the subcarrier indices *scidx_mth_Segment(0) – scidx_mth_Segment(1)* as 2^j
…		
Differential subcarrier index for mth segment *scidx_mth_Segment(Ns_m - 2) – scidx_mth_Segment(Ns_m - 1)*	3	Only present for the mth segment with dynamic grouping. Set to j to indicate the distance between the subcarrier indices *scidx_mth_Segment(Ns_m - 2) – scidx_mth_Segment(Ns_m - 1)* as 2^j

4600

Figure 46


Sensing NDP Announcement (BW = 320 MHz) /
Sensing Measurement Report
4704
Partial BW Info = 111001111
Ng Parameters
Default Ng = 2
RU Size = 5
Ng List (Variable)
4702
4706
4708
Ng_exponent for first RU = 1
Ng_exponent for 2nd RU = 7
Ng_exponent for 3rd RU = 2
4700
4710
4712
4714

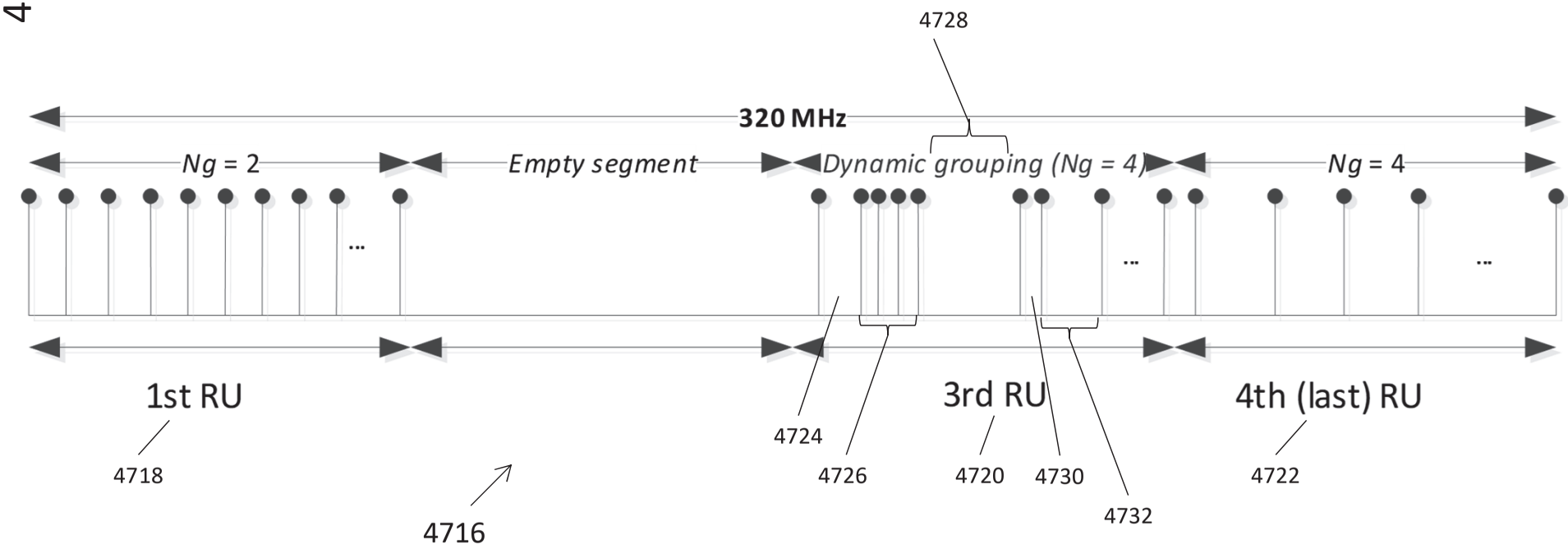

4728
320 MHz
Ng = 2
Empty segment
Dynamic grouping (Ng = 4)
Ng = 4
1st RU
3rd RU
4th (last) RU
4718
4716
4724
4726
4720
4730
4732
4722

Figure 47

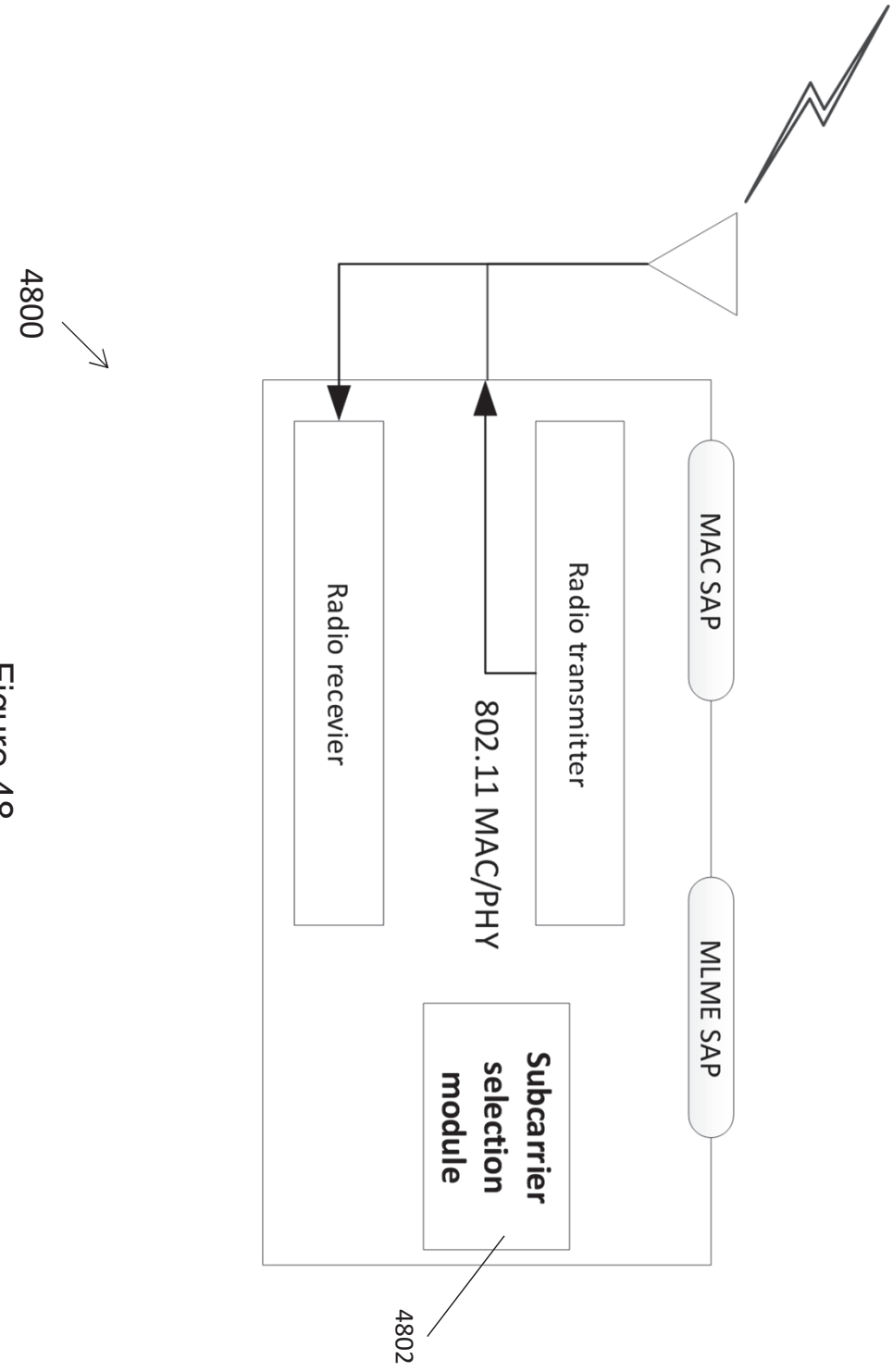

4800
MAC SAP
Radio transmitter
Radio recevier
802.11 MAC/PHY
MLME SAP
Subcarrier selection module
4802

Figure 48

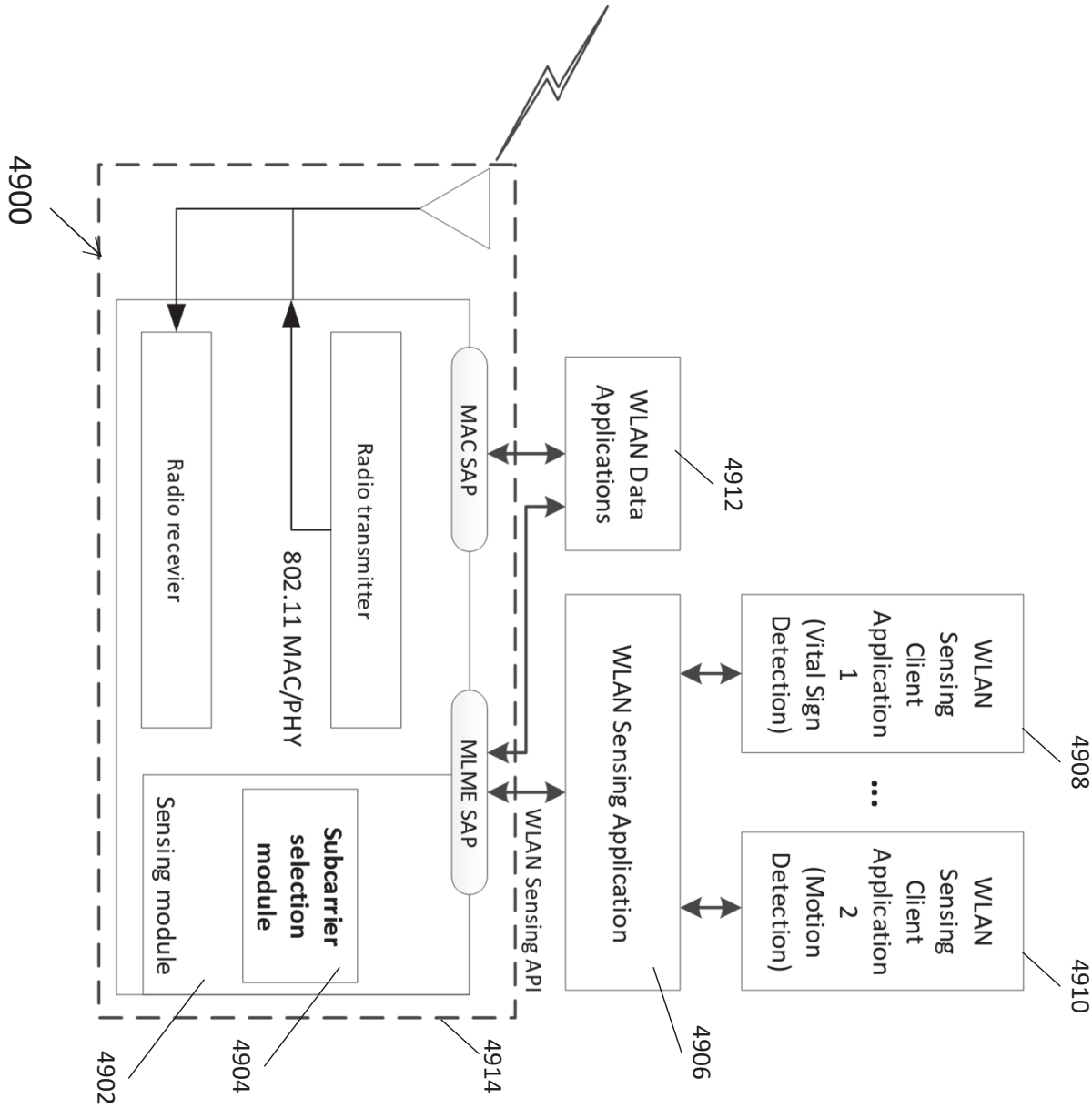

4900
WLAN Data Applications
4912
MAC SAP
Radio transmitter
802.11 MAC/PHY
Radio recevier
WLAN Sensing Client Application 1 (Vital Sign Detection)
...
WLAN Sensing Client Application 2 (Motion Detection)
4908
4910
WLAN Sensing Application
4906
MLME SAP
WLAN Sensing API
Subcarrier selection module
Sensing module
4914
4904
4902

Figure 49

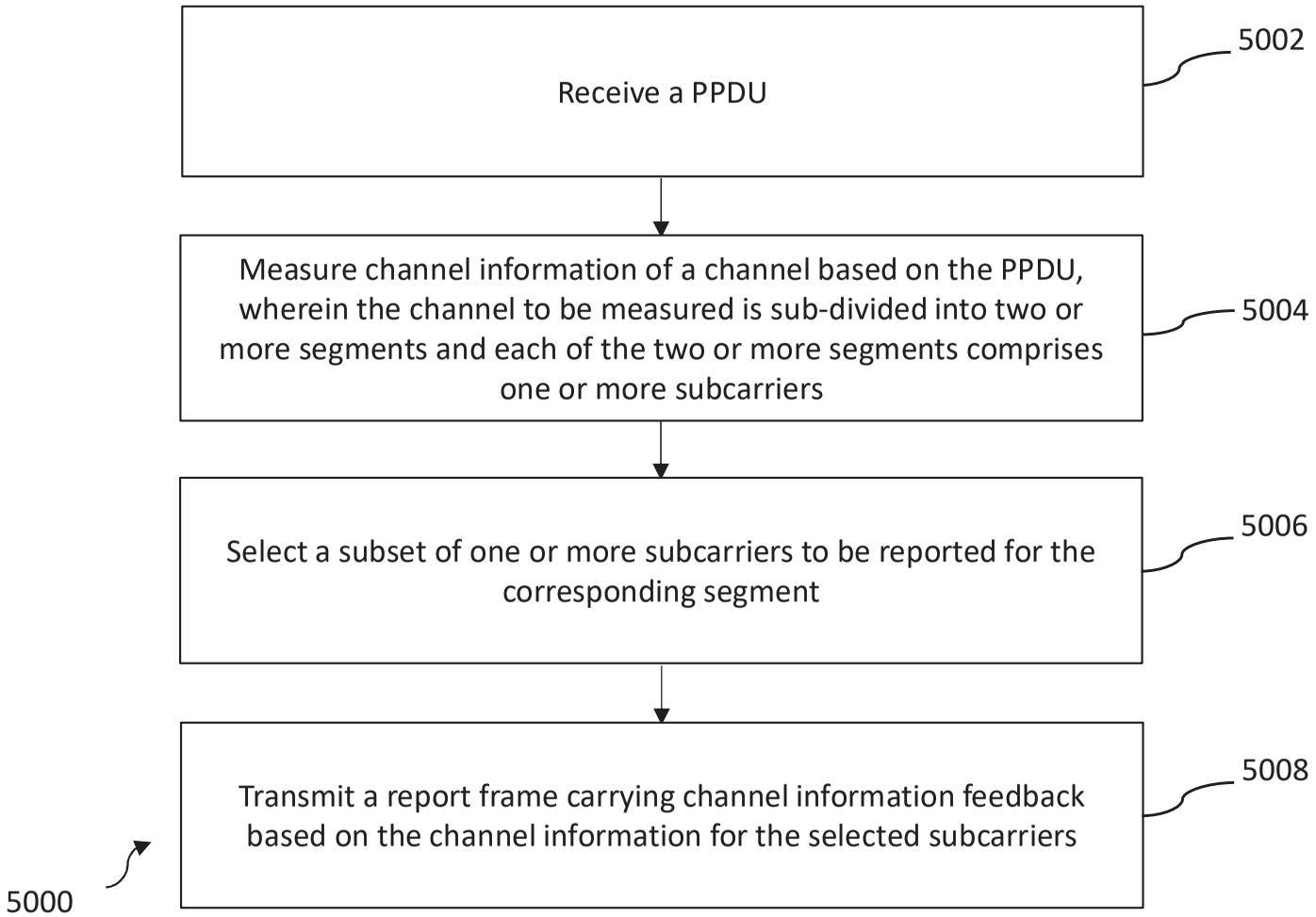

Receive a PPDU
5002
Measure channel information of a channel based on the PPDU, wherein the channel to be measured is sub-divided into two or more segments and each of the two or more segments comprises one or more subcarriers
5004
Select a subset of one or more subcarriers to be reported for the corresponding segment
5006
Transmit a report frame carrying channel information feedback based on the channel information for the selected subcarriers
5008
5000

Figure 50

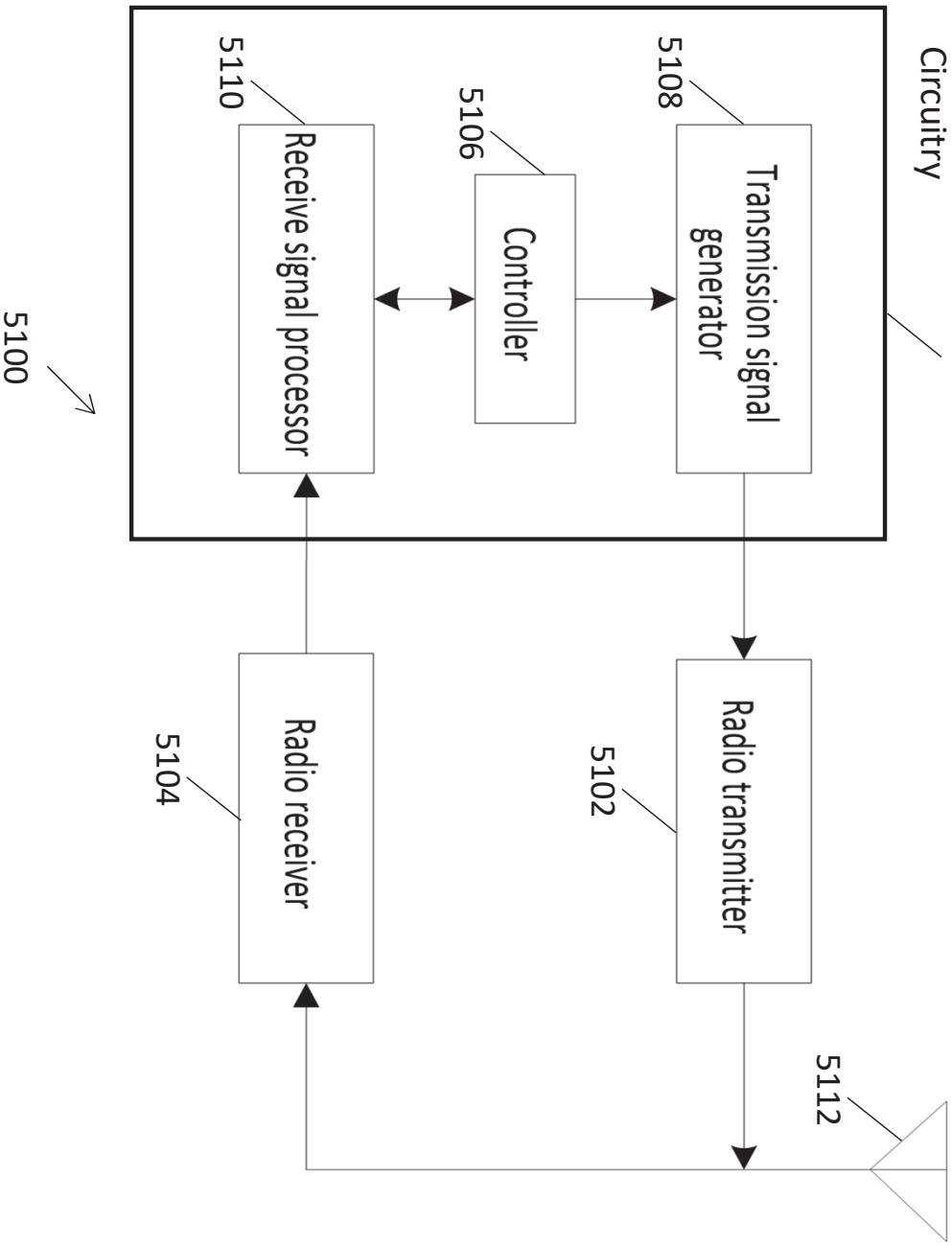

Circuitry
5114
5108
Transmission signal generator
5106
Controller
5110
Receive signal processor
5100
Radio transmitter
5102
Radio receiver
5104
5112

Figure 51