

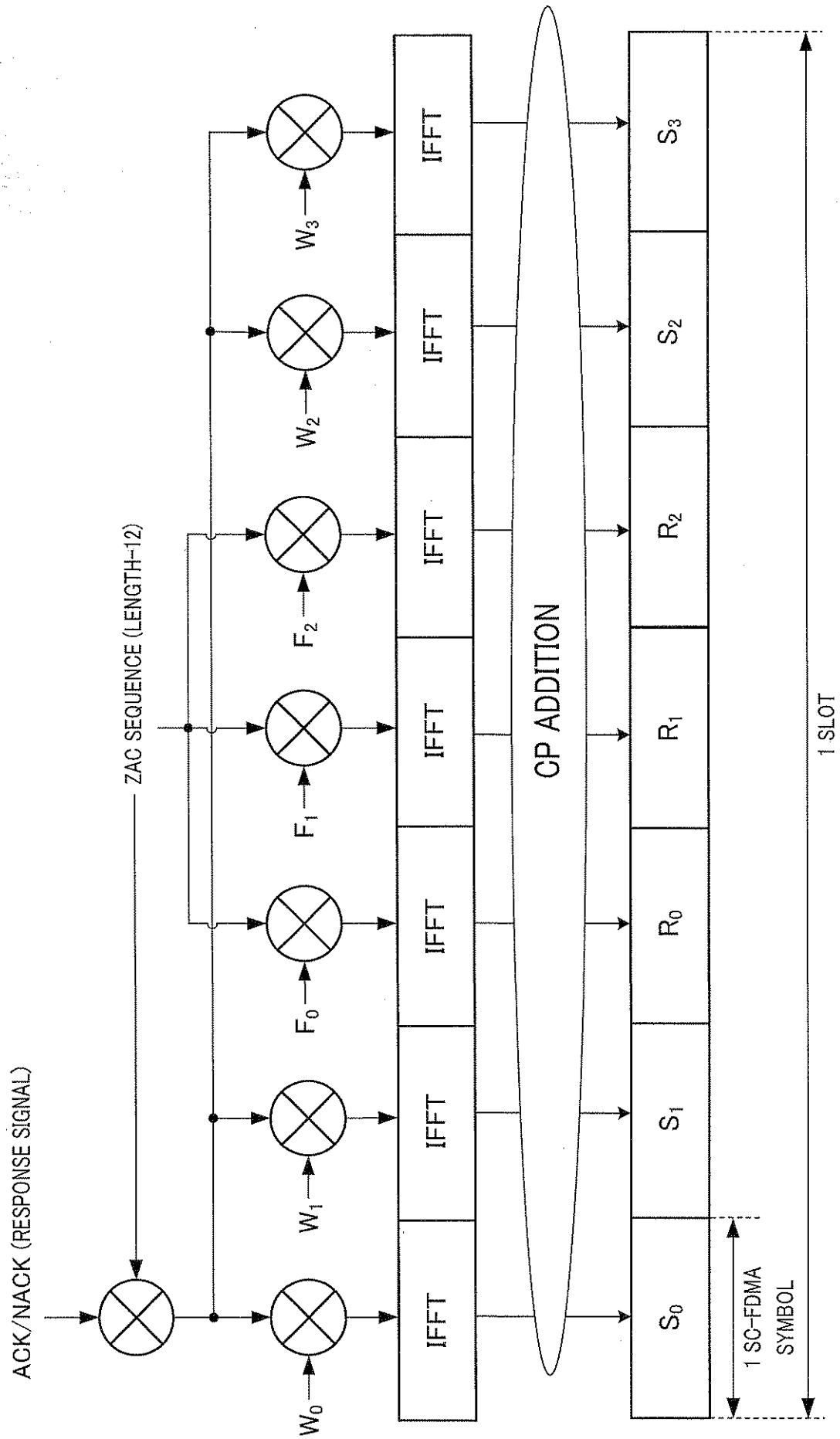


FIG. 1

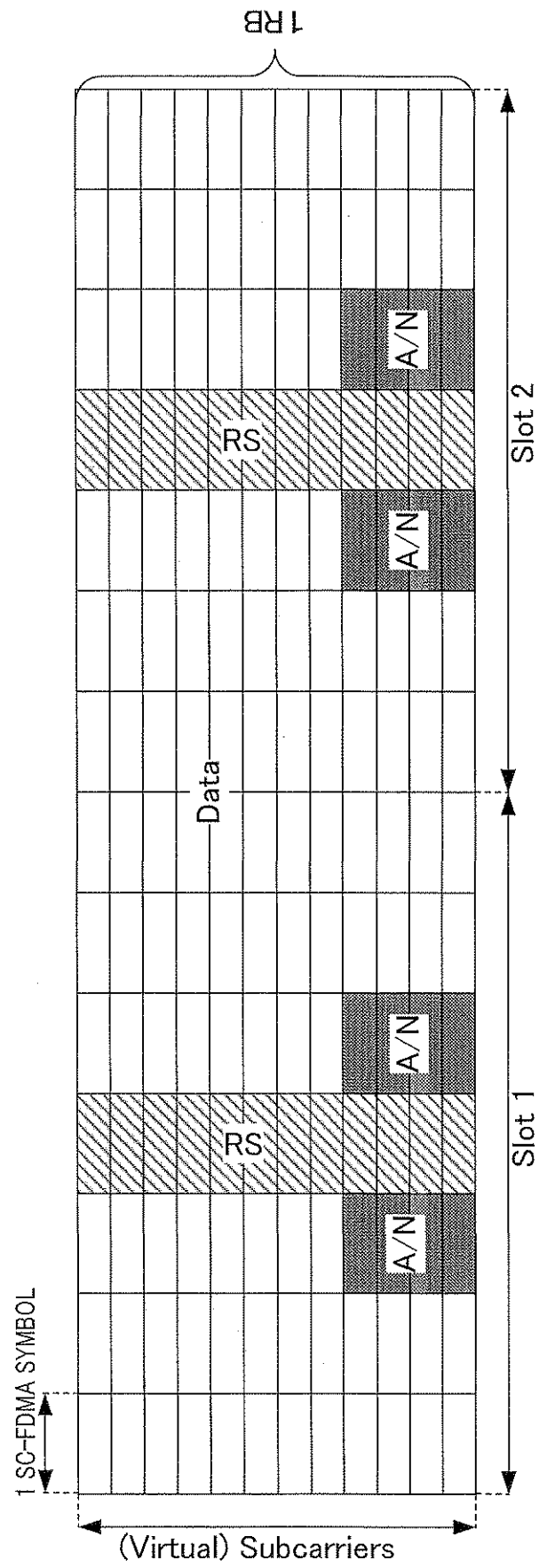


FIG. 2

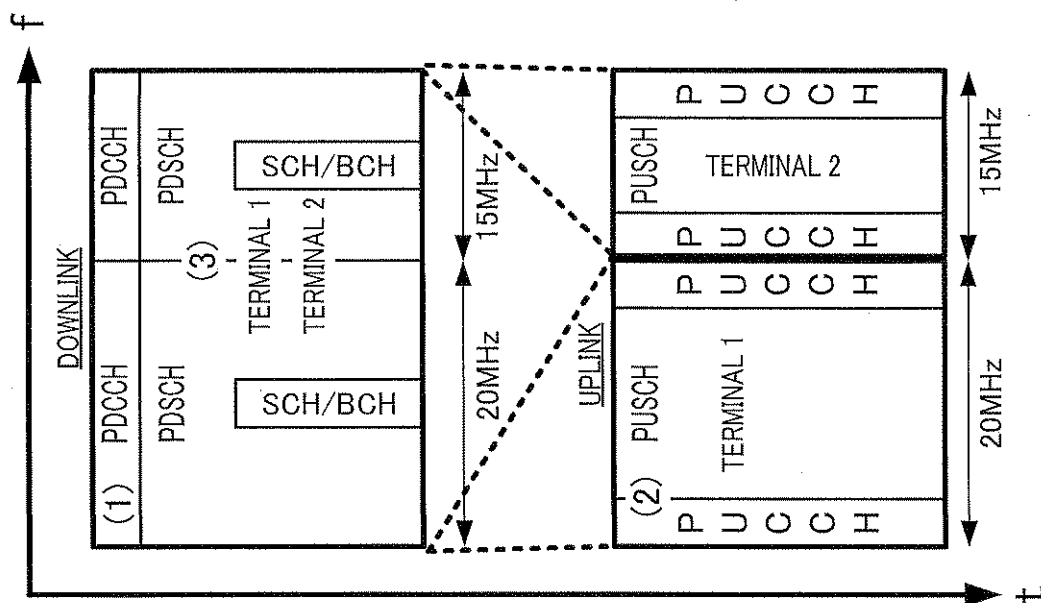


FIG. 3B

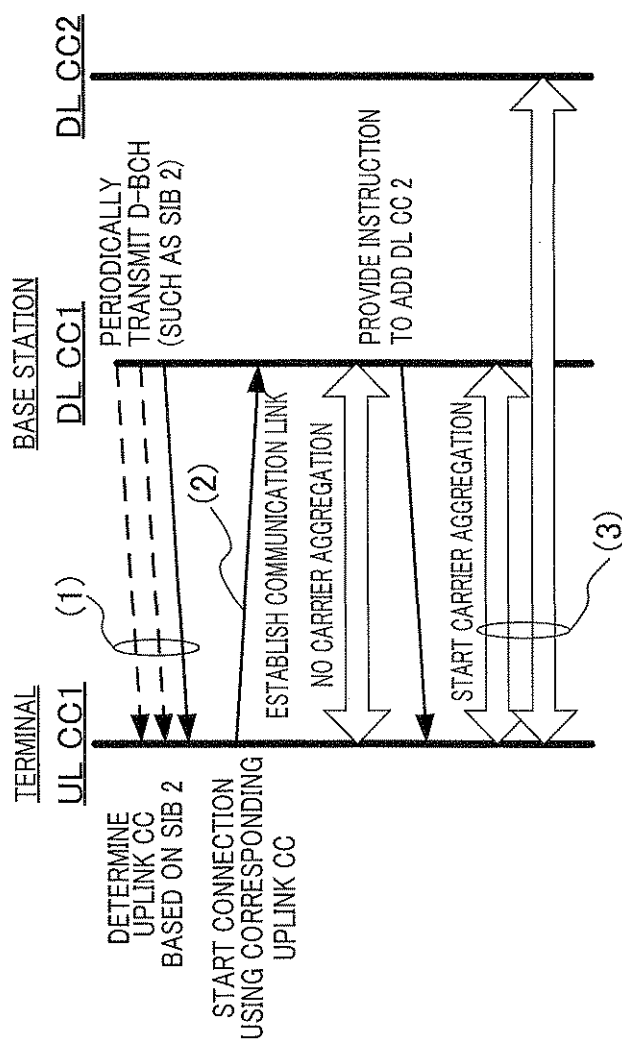


FIG. 3A

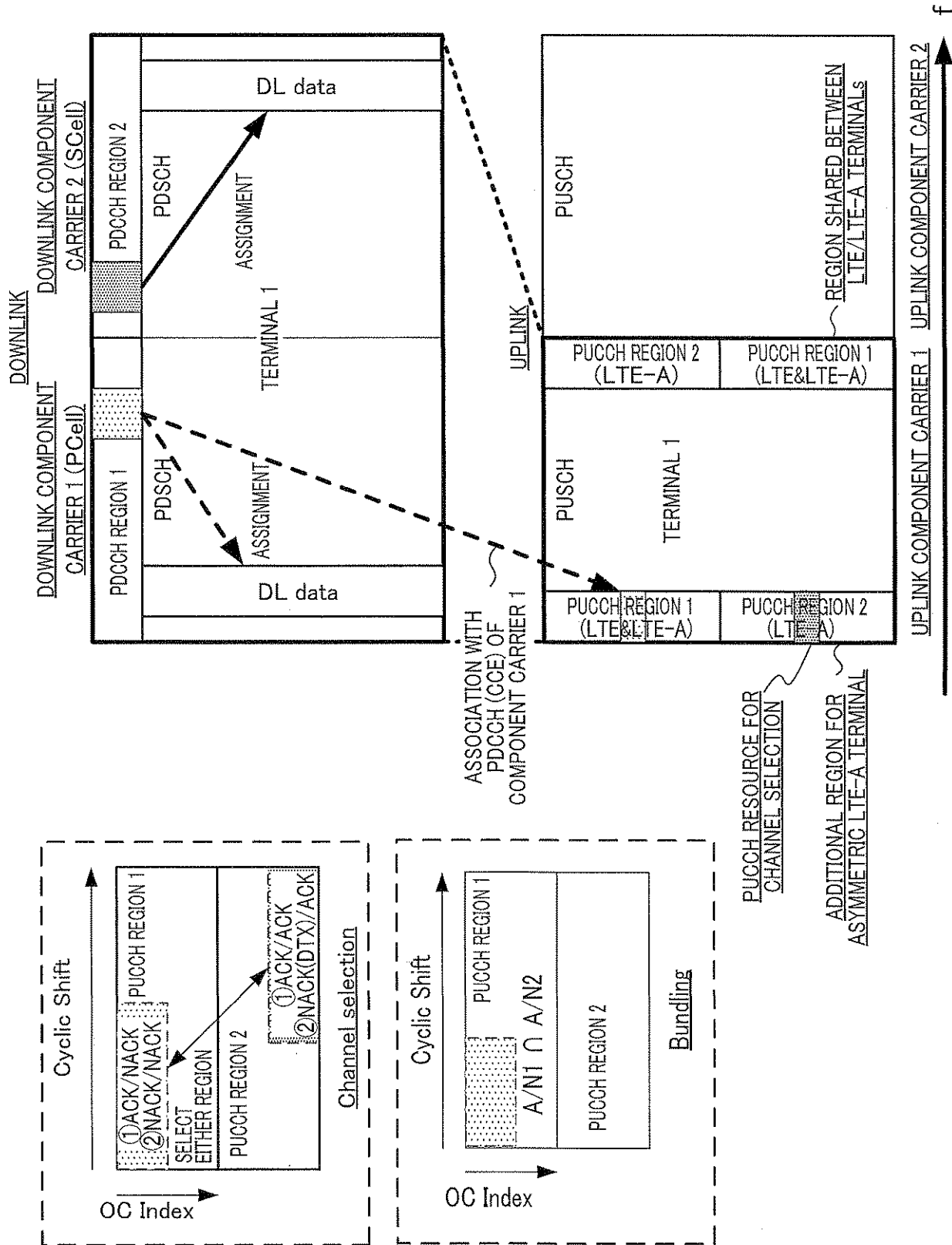


FIG. 4

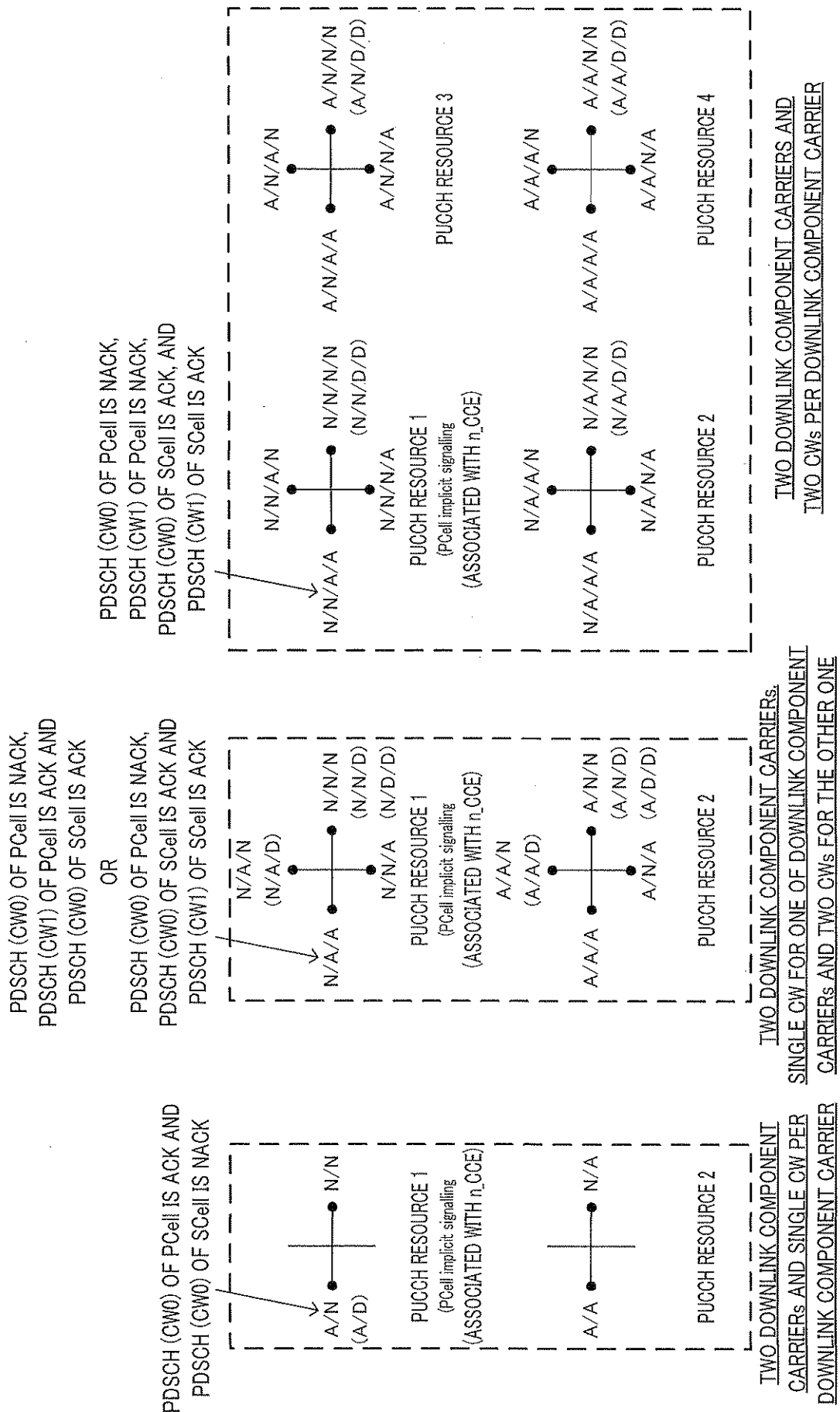


FIG. 5A

FIG. 5B

FIG. 5C

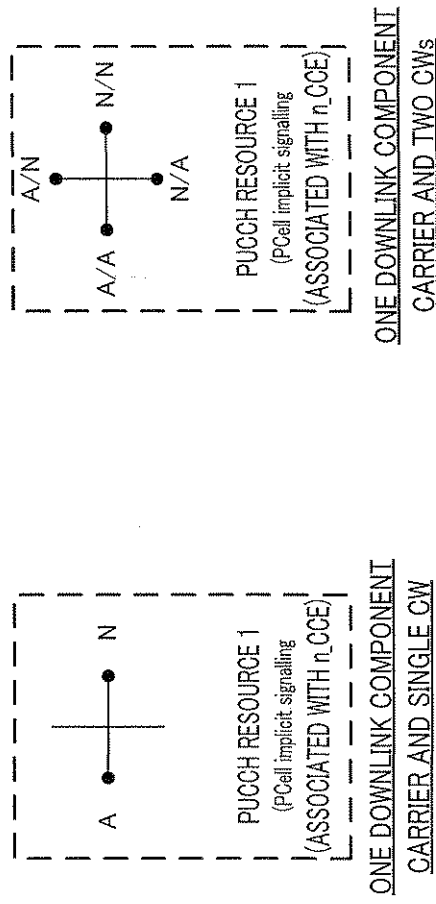


FIG. 6A

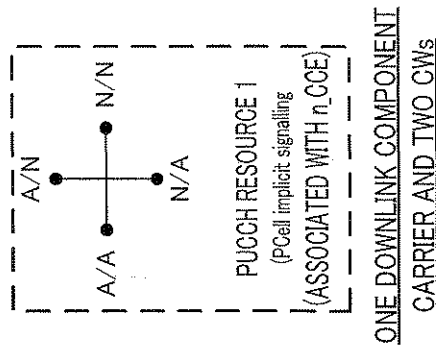


FIG. 6B

Table 5-1: 2 ACK/NAK Bits

	Ch1		Ch2	
	RS	Data	RS	Data
N, N	1	1	0	0
A, N	1	-1	0	0
N, A	0	0	1	1
A, A	0	0	1	-1

- Data applied to SC-FDMA symbols 0, 1, 5, 6
- RS applied to SC-FDMA symbols 2, 3, 4
- Repeated transmission in two slots

Table 5-2: 3 ACK/NAK Bits

	Ch1			Ch2		
	RS	Data	RS	Data	RS	Data
N, N, N	1	1	0	0	0	0
N, N, A	1	-j	0	0	0	0
N, A, N	1	j	0	0	0	0
N, A, A	1	-1	0	0	0	0
A, N, N	0	0	1	1	1	1
A, N, A	0	0	1	1	1	-j
A, A, N	0	0	1	1	1	j
A, A, A	0	0	1	1	1	-1

FIG. 7

Table 6: 4 ACK/NAK Bits

	Ch 1		Ch 2		Ch 3		Ch 4	
	RS	Data	RS	Data	RS	Data	RS	Data
N, N, N, N	1	1	0	0	0	0	0	0
N, N, N, A	1	-j	0	0	0	0	0	0
N, N, A, N	1	j	0	0	0	0	0	0
N, N, A, A	1	-1	0	0	0	0	0	0
N, A, N, N	0	0	1	1	0	0	0	0
N, A, N, A	0	0	1	j	0	0	0	0
N, A, A, N	0	0	1	j	0	0	0	0
N, A, A, A	0	0	1	-1	0	0	0	0
A, N, N, N	0	0	0	0	1	1	0	0
A, N, N, A	0	0	0	0	1	j	0	0
A, N, A, N	0	0	0	0	1	-j	0	0
A, N, A, A	0	0	0	0	1	1	0	0
A, A, N, N	0	0	0	0	0	0	1	1
A, A, N, A	0	0	0	0	0	0	1	-j
A, A, A, N	0	0	0	0	0	0	1	j
A, A, A, A	0	0	0	0	0	0	1	-1

FIG. 8

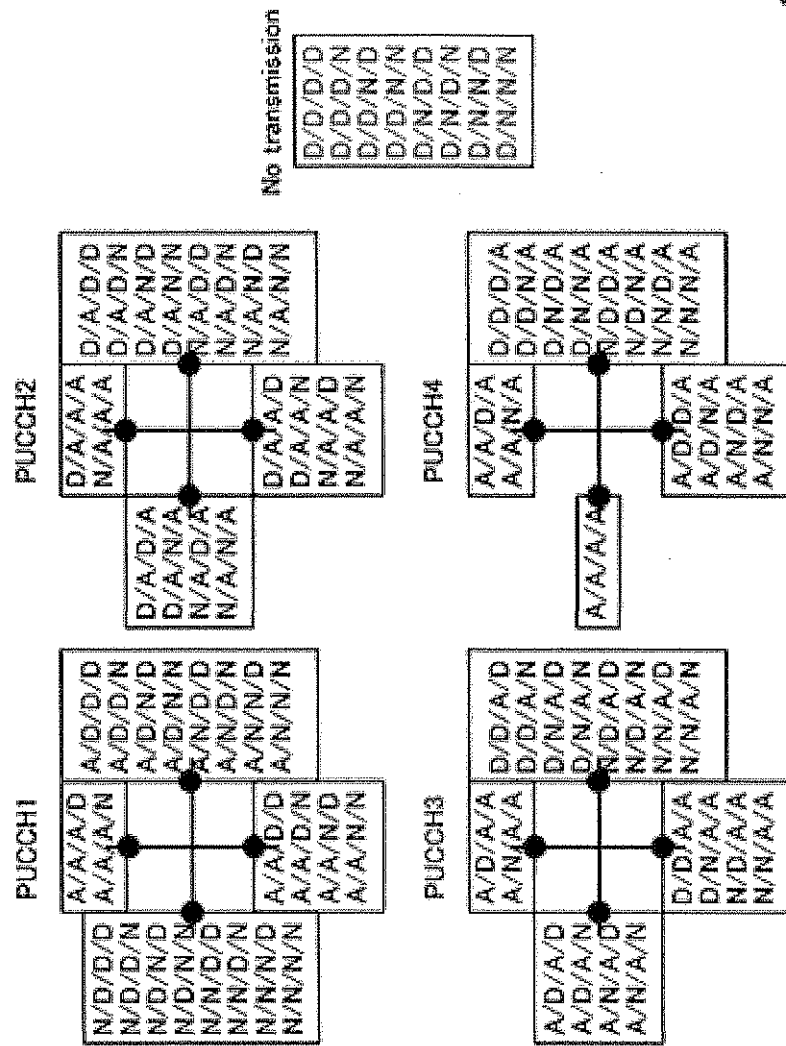
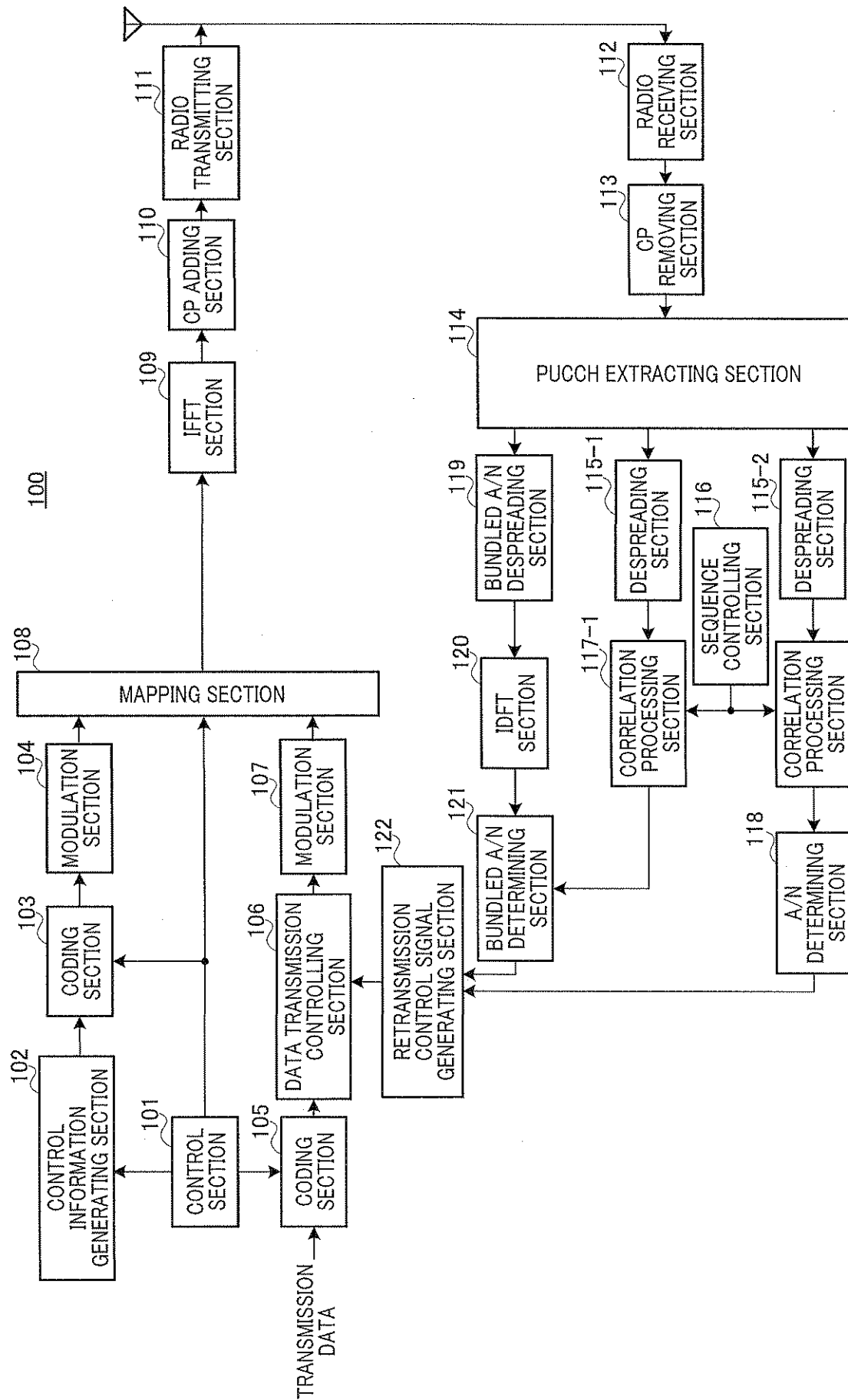


Figure 5 Mapping rules in case that four DL CCs are configured (Alternative 1-2)

FIG. 9



117-2 FIG. 10

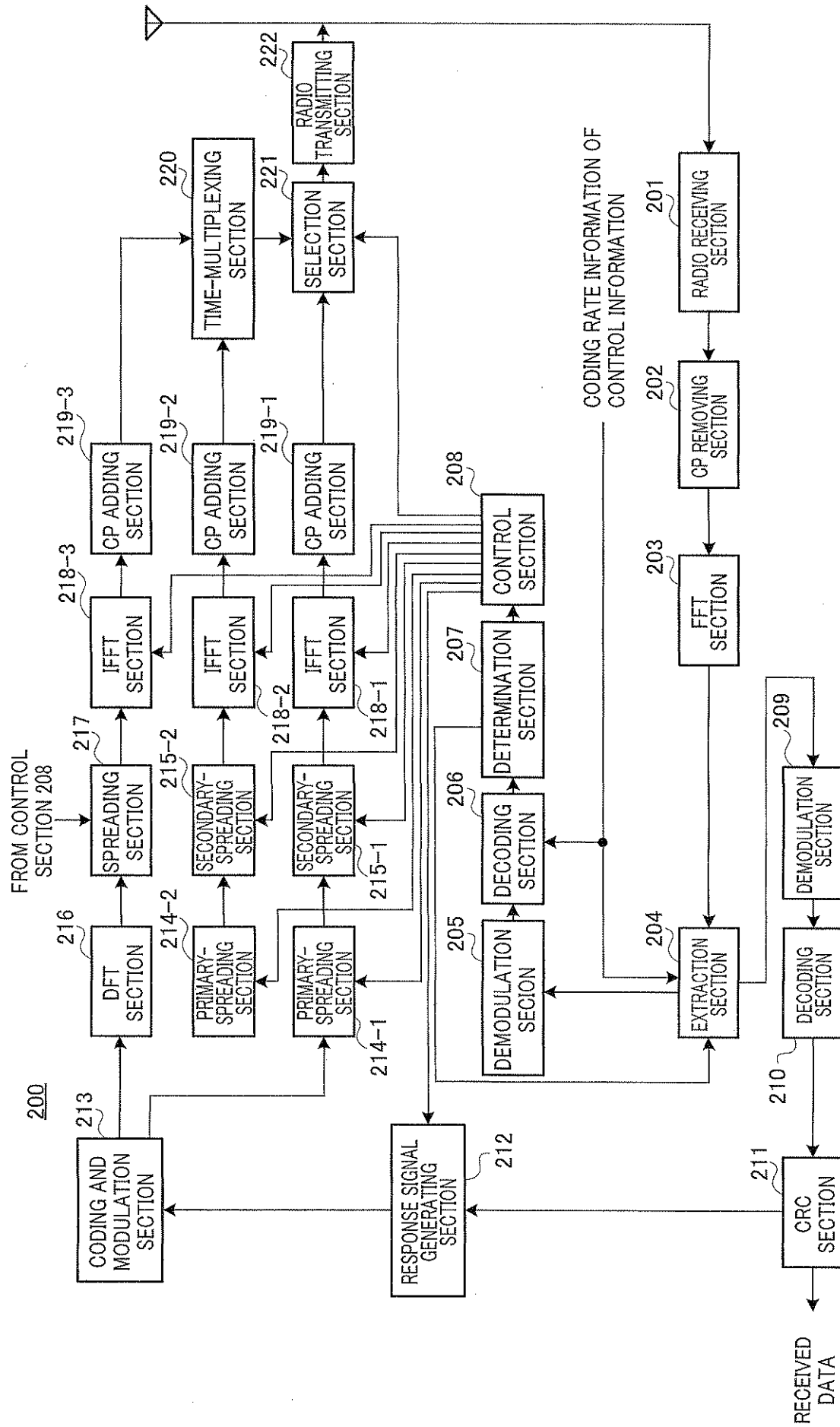


FIG. 11

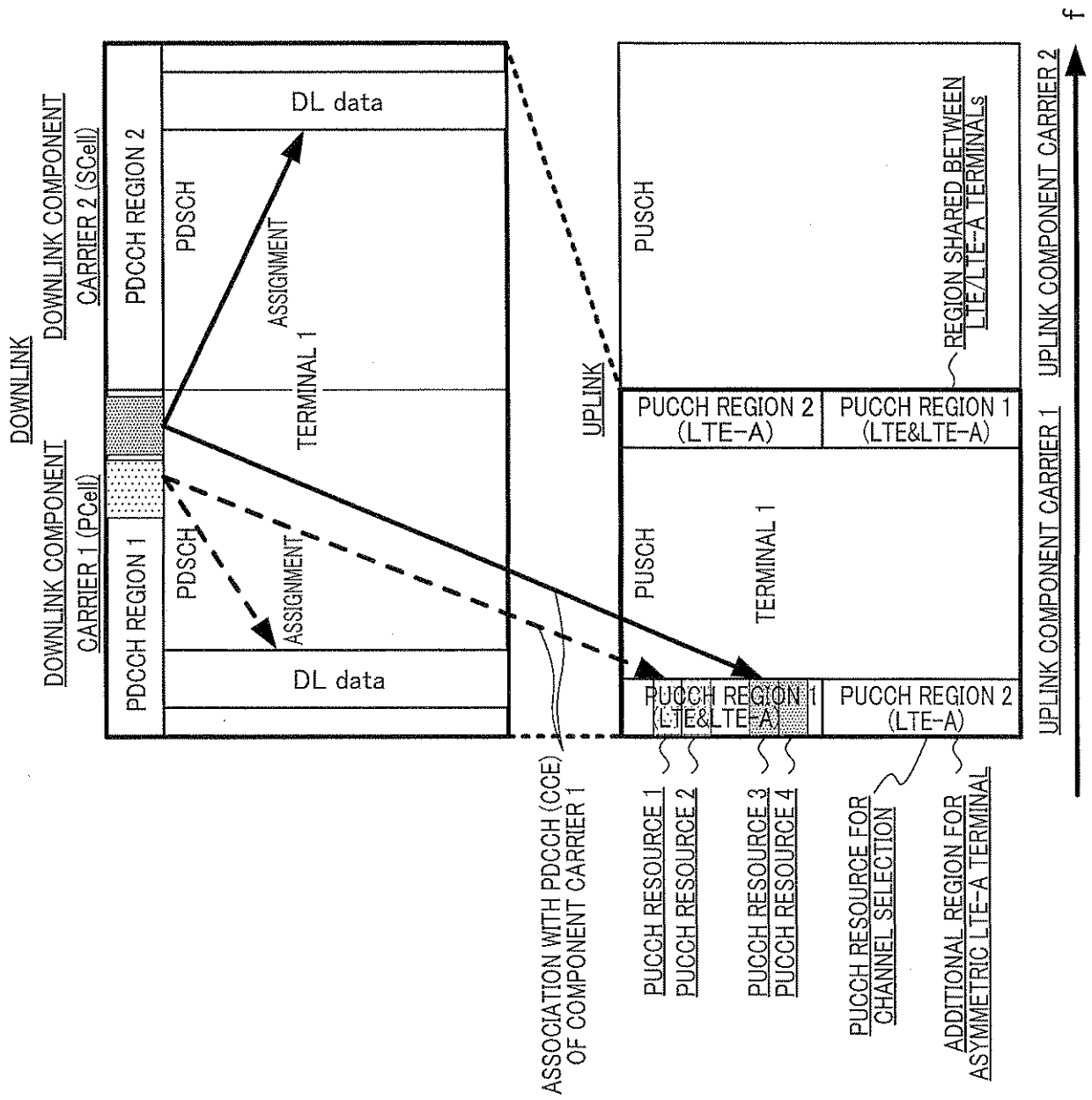


FIG. 12

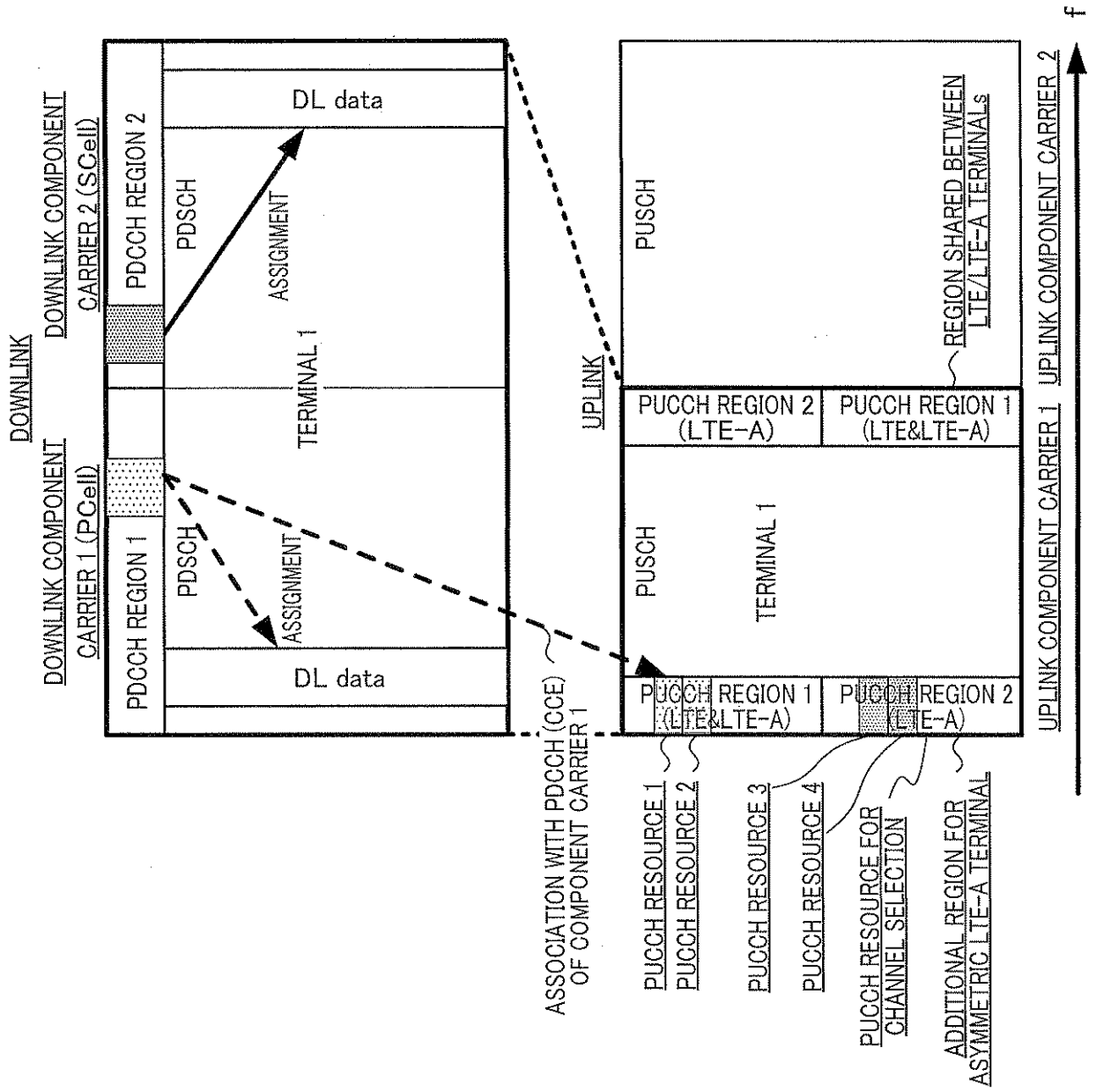


FIG. 13

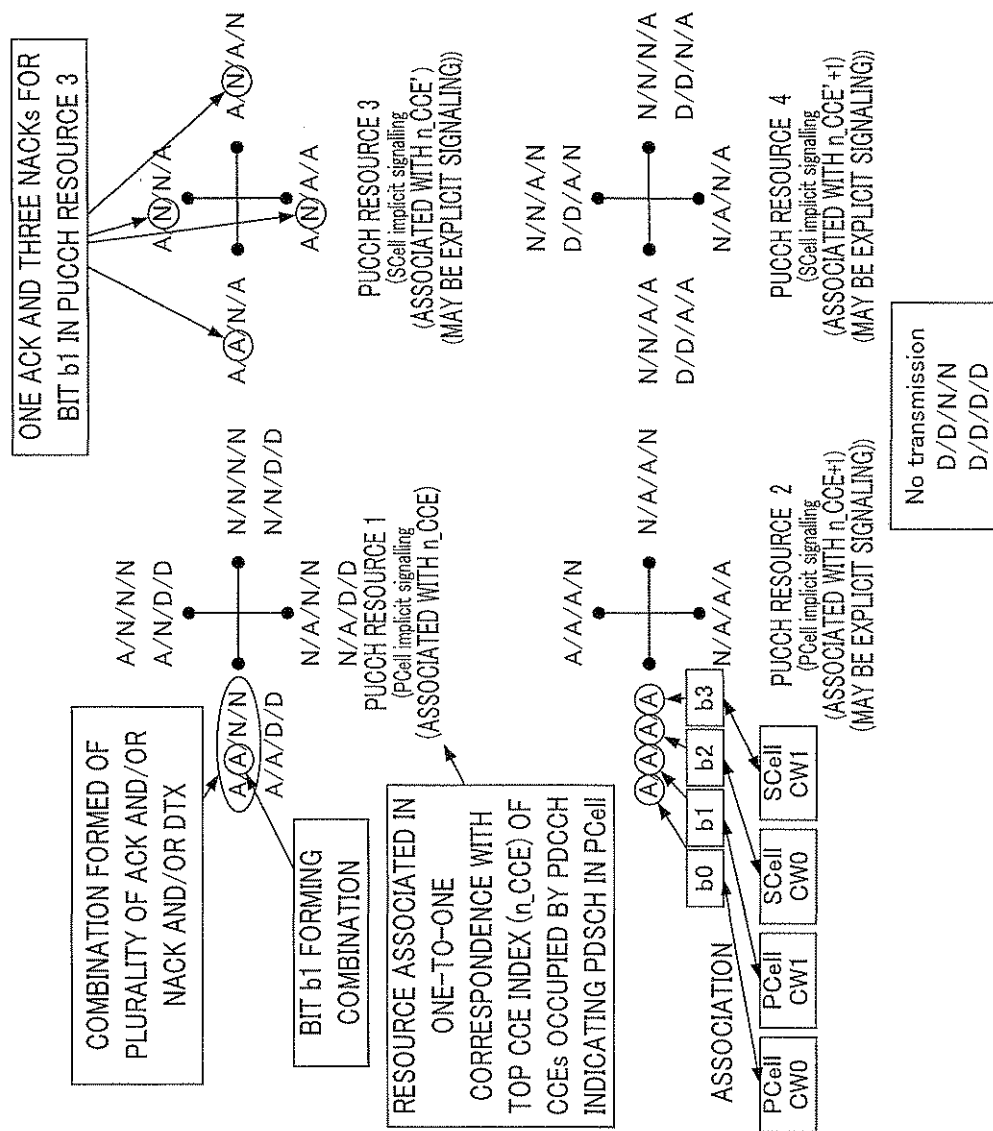


FIG. 14A

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ONE ACK AND THREE NACKs FOR BIT b1 IN PUCCH RESOURCE 3

NUMBER OF COMBINATIONS FOR A:N=1:0 OR 0:1

	PUCCH RESOURCE				CONCENTRATION OF A/N
	1	2	3	4	
b0	A	2	2	4	8
b1	N	2	2	4	8
b2	A	2	2	4	8
b3	N	2	2	4	8
Rel-8 fallback	0	1	2	3	8
	1	2	3	4	FALLBACK TO FORMAT 1b

THERE IS ALWAYS CONCENTRATION OF ACKs OR NACKs FOR EACH BIT IN AT LEAST ONE PUCCH RESOURCE

FIG. 14B

PCell	SCell	PUCCH RESOURCE			
		1	2	3	4
A,A	A,A	-1			
A,N	A,A			-j	
N,A	A,A		-j		
N,N	A,A				-1
A,A	A,N		j		
A,N	A,N			1	
N,A	A,N		1		
N,N	A,N				j
A,A	N,A			-1	
A,N	N,A			j	
N,A	N,A				-j
N,N	N,A				1
A,A	N,N	-1			
A,N	N,N	j			
N,A	N,N	-j			
N,N	N,N	1			
A,A	D,D	-1			
A,N	D,D	j			
N,A	D,D	-j			
N,N	D,D	1			
D,D	A,A				-1
D,D	A,N				j
D,D	N,A				1
D,D	N,N	No transmission			
D,D	D,D	No transmission			

FIG. 15

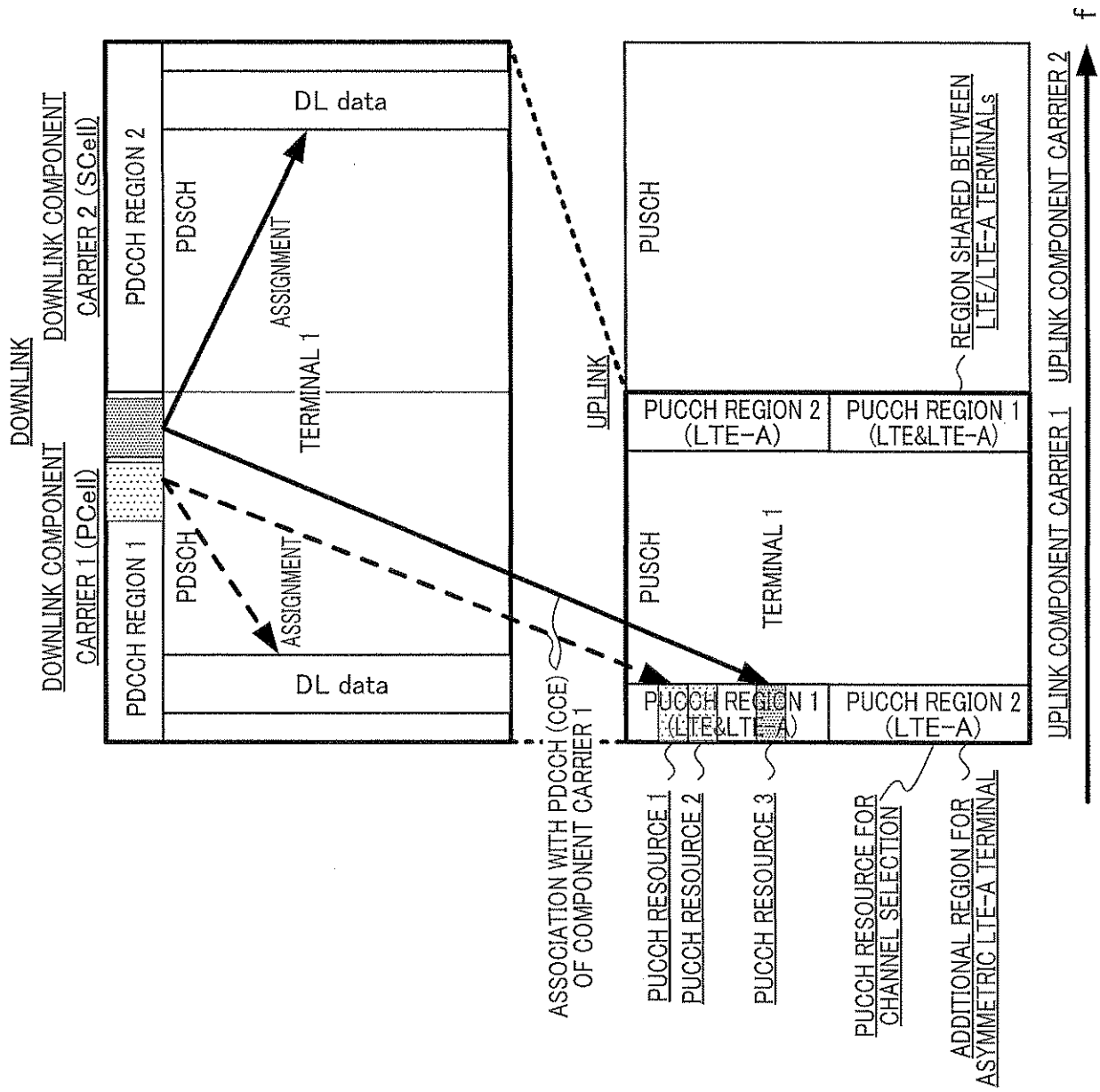


FIG. 16

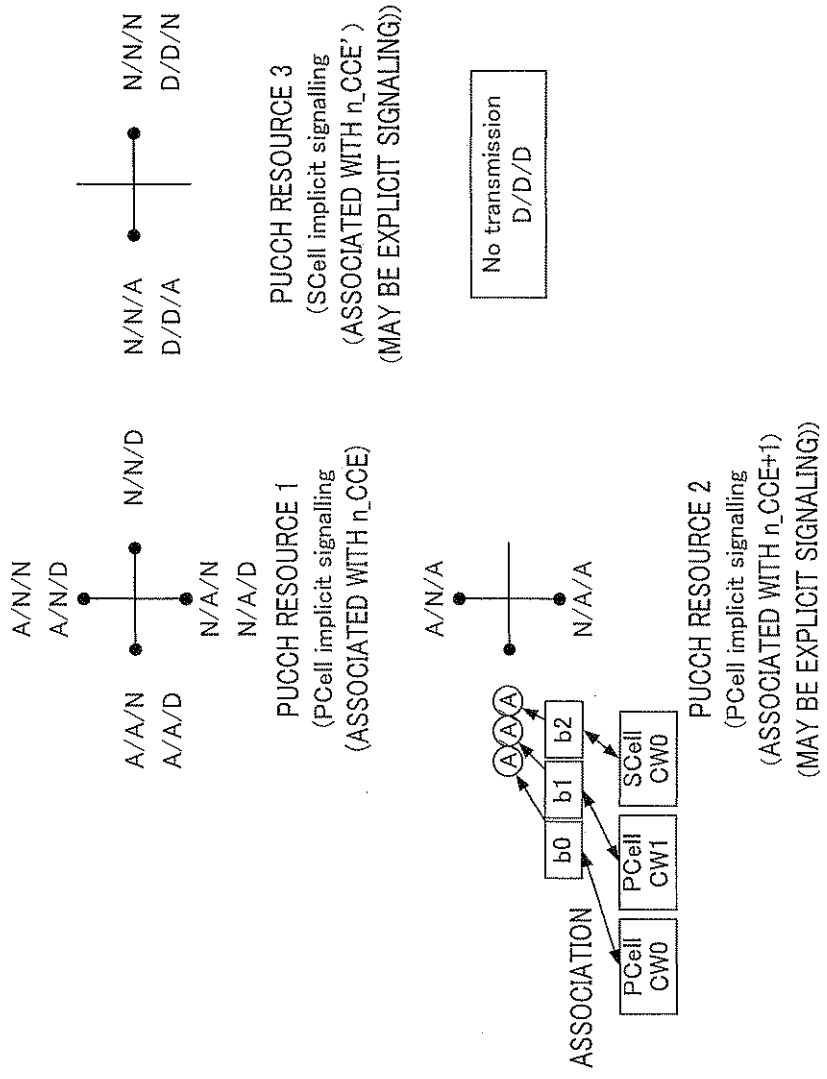


FIG. 17A

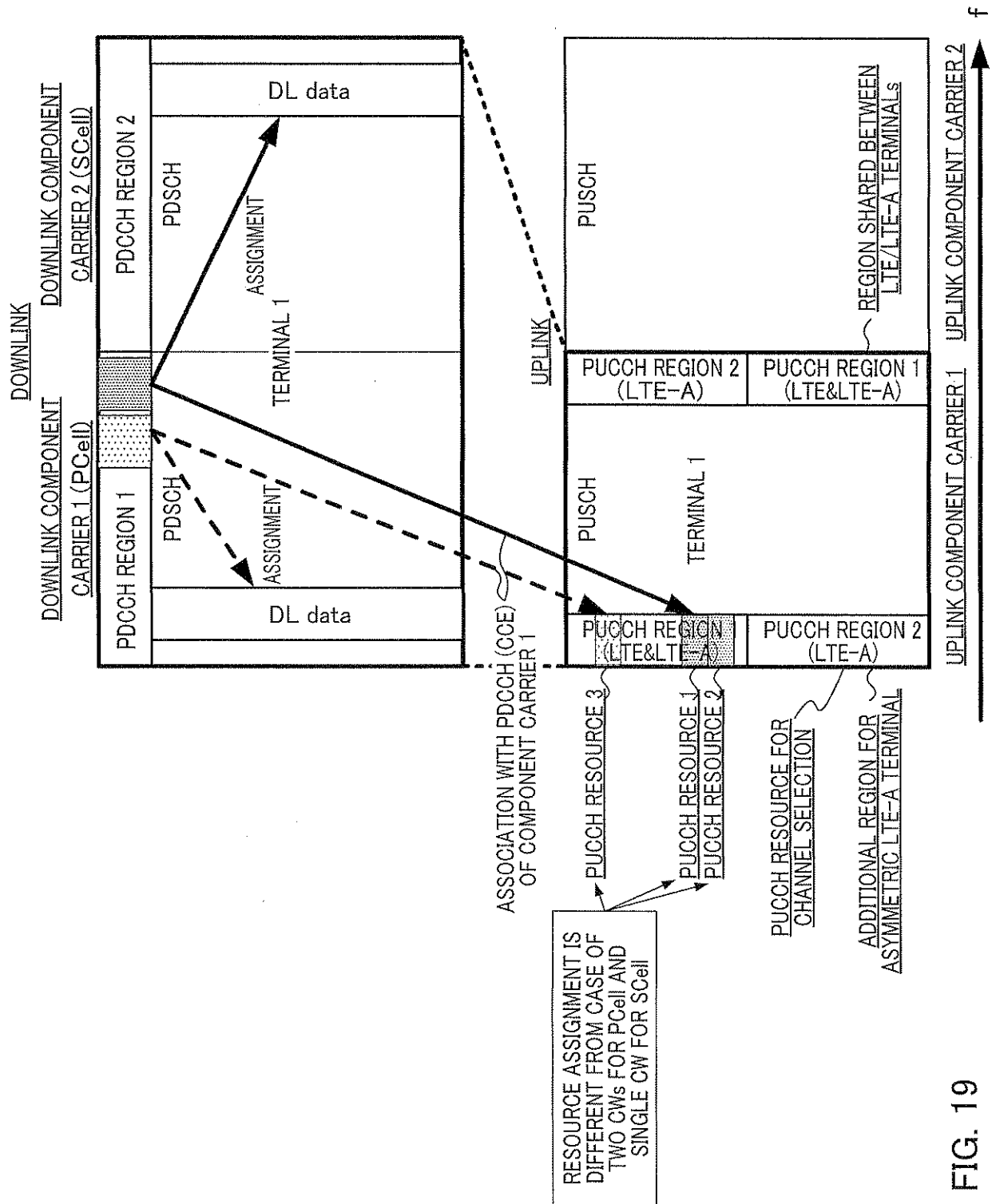
NUMBER OF COMBINATIONS
FOR A:N=1:0 OR 0:1

		PUCCH RESOURCE				CONCENTRATION OF A/N
		1	2	3		
b0	A	2	2	0	1	3
	N	2	1	2		
b1	A	2	2	0	1	3
	N	2	1	2		
b2	A	0	3	1	2	6
	N	3	0	1		
Rel-8 fallback		0	x	x	FALLBACK TO FORMAT 1b	

FIG. 17B

SDM Cell	non-SDM Cell	PUCCH RESOURCE		
		1	2	3
A,A	A		-1	
A,N	A		j	
N,A	A		-j	
N,N	A			-1
A,A	N	-1		
A,N	N	j		
N,A	N	-j		
N,N	N			1
A,A	D	-1		
A,N	D	j		
N,A	D	-j		
N,N	D	1		
D,D	A			-1
D,D	N			1
D,D	D	No transmission		

FIG. 18



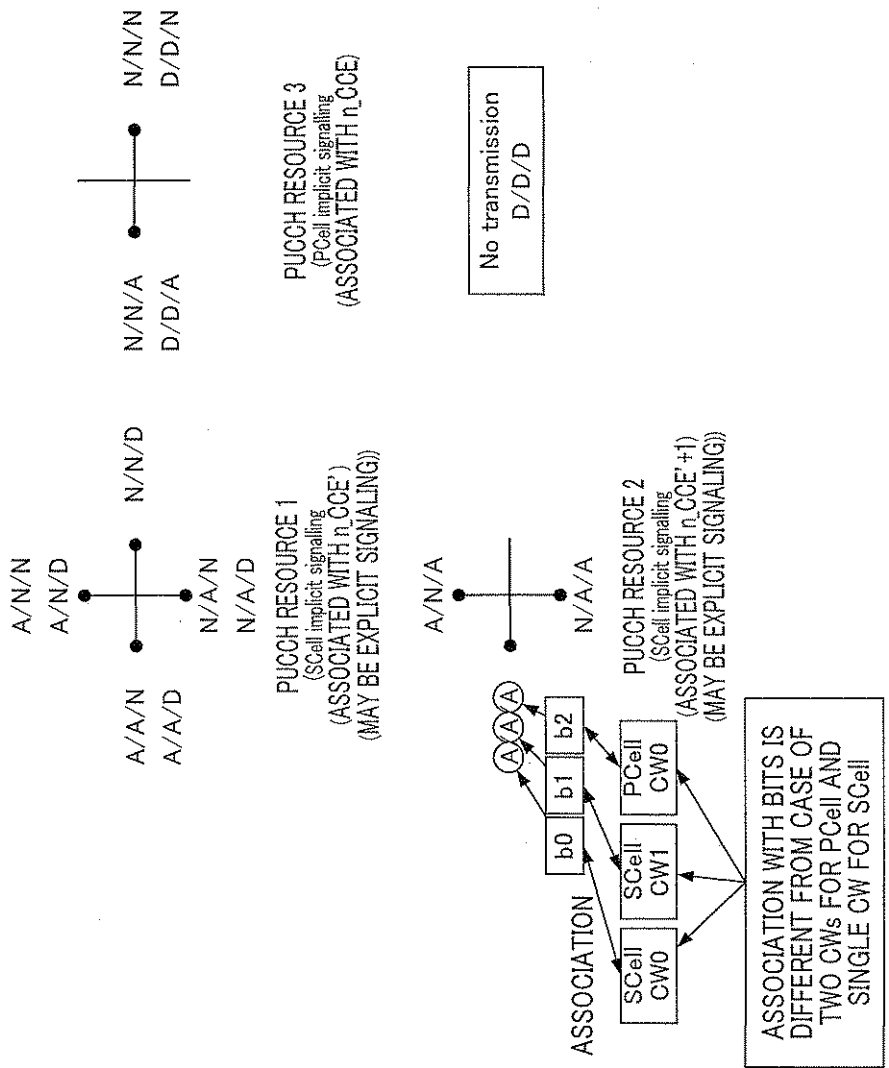


FIG. 20A

NUMBER OF COMBINATIONS
FOR A:N=1:0 OR 0:1

		PUCCH RESOURCE			CONCENTRATION OF A/N
		1	2	3	
b0	A	2	2	0	3
	N	2	1	2	
b1	A	2	2	0	3
	N	2	1	2	
b2	A	0	3	1	6
	N	3	0	1	
Rel-8 fallback		x	x	x	FALLBACK TO FORMAT 1a

FORMAT TO WHICH FALLBACK
IS MADE IS DIFFERENT FROM
CASE OF TWO CWs FOR PCCell
AND SINGLE CW FOR SCCell

FIG. 20B

SDM Cell	non-SDM Cell	PUCCH RESOURCE		
		1	2	3
A,A	A		-1	
A,N	A		j	
N,A	A		-j	
N,N	A			-1
A,A	N	-1		
A,N	N	j		
N,A	N	-j		
N,N	N			1
A,A	D	-1		
A,N	D	j		
N,A	D	-j		
N,N	D	1		
D,D	A			-1
D,D	N			1
D,D	D	No transmission		

FIG. 21

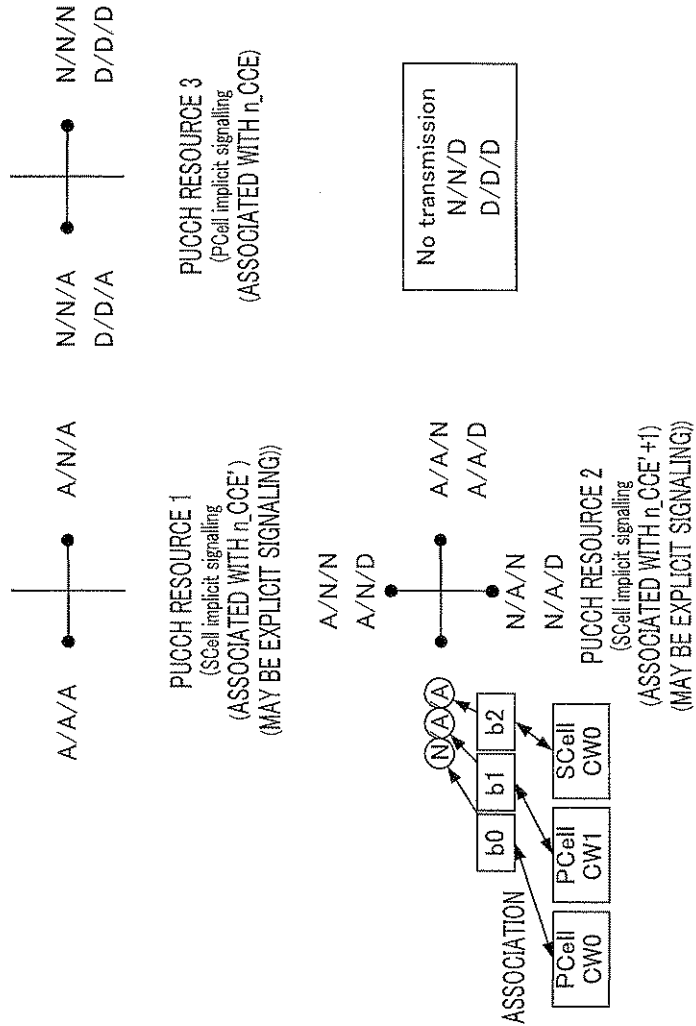


FIG. 22A

NUMBER OF COMBINATIONS
FOR A:N=1:0 OR 0:1

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		PUCCH RESOURCE				CONCENTRATION OF A/N
		1	2	3		
b0	A	2	2	0	2	4
	N	0	2	2		
b1	A	1	3	0	1	4
	N	1	1	2		
b2	A	2	1	1	1	4
	N	0	3	1		
Rel-8 fallback		x	x	x	FALLBACK TO FORMAT 1b	
Rel-8 fallback		x	x	○	FALLBACK TO FORMAT 1a	

FIG. 22B

SDM Cell	non-SDM Cell	PUCCH RESOURCE		
		1	2	3
A,A	A	-1		
A,N	A	1		
N,A	A		-1	
N,N	A			-1
A,A	N		1	
A,N	N		j	
N,A	N		-j	
N,N	N			1
A,A	D		1	
A,N	D		j	
N,A	D		-j	
N,N	D	No transmission		
D,D	A			-1
D,D	N			1
D,D	D	No transmission		

FIG. 23

PCell	SCell	PUCCH resource	
		1	2
A	A		1
A	N	-1	
N	A		-1
N	N	1	
D	A		-1
D	N	No transmission	
A	D	-1	
N	D	1	
D	D	No transmission	

FIG. 24

SDM Cell	non- SDM	PUCCH resource		
		1	2	3
A,A	A		-1	
A,N	A		j	
N,A	A		-j	
N,N	A			-1
A,A	N	-1		
A,N	N	j		
N,A	N	-j		
N,N	N			1
A,A	D	-1		
A,N	D	j		
N,A	D	-j		
N,N	D	1 if PCell is SDM configured, No transmission if PCell is non-SDM configured		
D,D	A			-1
D,D	N			1 if PCell is SDM configured No transmission if PCell is non-SDM configured
D,D	D	No transmission		

FIG. 25

PCell	SCell	PUCCH resource			
		1	2	3	4
A,A	A,A		-1		
A,N	A,A				-j
N,A	A,A		-j		
N,N	A,A			-1	
A,A	A,N		j		
A,N	A,N				1
N,A	A,N		1		
N,N	A,N			j	
A,A	N,A				-1
A,N	N,A				j
N,A	N,A			1	
N,N	N,A			-j	
A,A	N,N	-1			
A,N	N,N	j			
N,A	N,N	-j			
N,N	N,N	1			
A,A	D,D	-1			
A,N	D,D	j			
N,A	D,D	-j			
N,N	D,D	1			
D,D	A,A			-1	
D,D	A,N			j	
D,D	N,A			-j	
D,D	N,N	No transmission			
D,D	D,D	No transmission			

FIG. 26

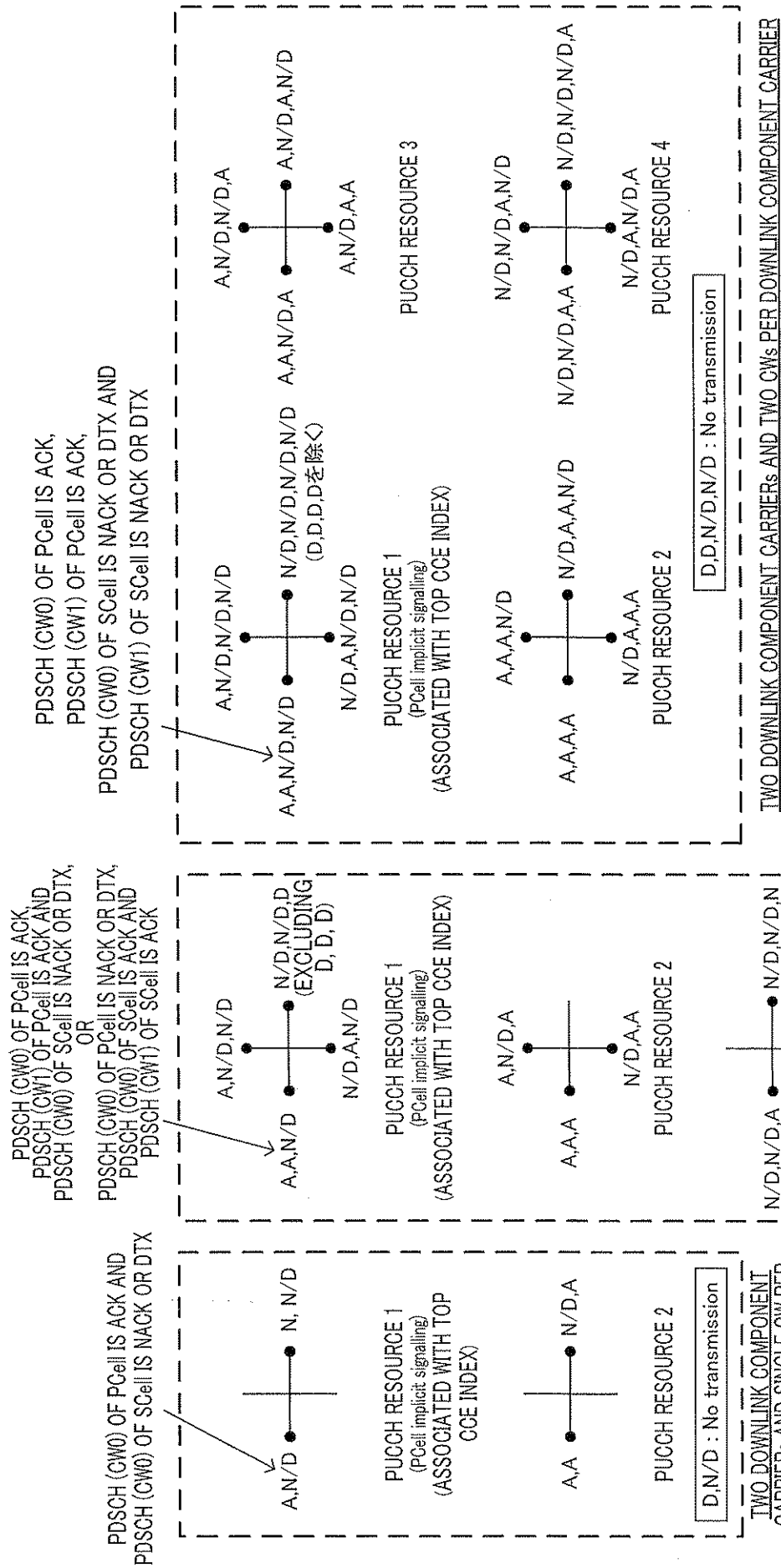


FIG. 27C

FIG. 27A

TWO DOWNLINK COMPONENT CARRIERS, SINGLE
CW FOR ONE OF DOWNLINK COMPONENT
CARRIERS AND TWO CWs FOR THE OTHER ONE

FIG. 27B

MAPPING TABLE WHEN NUMBER
OF ACK/NACK BITS IS TWO

ACK/NACK state		ACK/NACK resource	
b0	b1	Ch1	Ch2
A	A		-1
A	N/D	-1	
N/D	A		+1
N	N/D	+1	
D	N/D	No transmission	

PCell
SCell

FIG. 28A

MAPPING TABLE WHEN NUMBER
OF ACK/NACK BITS IS THREE

ACK/NACK state		ACK/NACK resource		
b0	b1	b2	Ch1	Ch2 Ch3
A	A	A		-1
A	N/D	A		+j
N/D	A	A		-j
N/D	N/D	A		-1
A	A	N/D	-1	
A	N/D	N/D	+j	
N/D	A	N/D	-j	
N/D	N/D	N		+1
D	N	D	+1	
D	D	D	+1	
D	D	D	No transmission	

PCell
SCell

CELL IN WHICH TRANSMISSION
MODE SUPPORTING UP TO TWO-CW
TRANSMISSION IS CONFIGURED
(MIMO Cell)

CELL IN WHICH TRANSMISSION
MODE SUPPORTING SINGLE-CW
TRANSMISSION IS CONFIGURED
(non-MIMO Cell)

FIG. 28B

MAPPING TABLE WHEN NUMBER OF ACK/NACK BITS IS FOUR

ACK/NACK state				ACK/NACK resource			
b0	b1	b2	b3	Ch1	Ch2	Ch3	Ch4
A	A	A	A		-1		
A	N/D	A	A			-j	
N/D	A	A	A		-j		
N/D	N/D	A	A		+j		-1
A	A	A	N/D			+1	
A	N/D	A	N/D				+1
N/D	A	A	N/D		+1		
N/D	N/D	A	N/D				+j
A	A	N/D	A			-1	
A	N/D	N/D	A			+j	
N/D	A	N/D	A				-j
N/D	N/D	N/D	A				+1
A	A	N/D	N/D	-1			
A	N/D	N/D	N/D	+j			
N/D	A	N/D	N/D	-j			
N	N/D	N/D	N/D	+1			
D	N	N/D	N/D	+1			
D	D	N/D	N/D	No transmission			

PCell
SCell

FIG. 28C

Configured CWs on PCell	Configured CWs on SCell1	Configured CWs on SCell2	Configured CWs on SCell3	Number of ACK/NACK
1	1	-	-	2
1	2	-	-	3
2	1	-	-	3
2	2	-	-	4
1	1	1	-	3
1	1	2	-	4
1	2	1	-	4
2	1	1	-	4
1	1	1	1	4

2CCs

3CCs

4CCs

FIG. 29

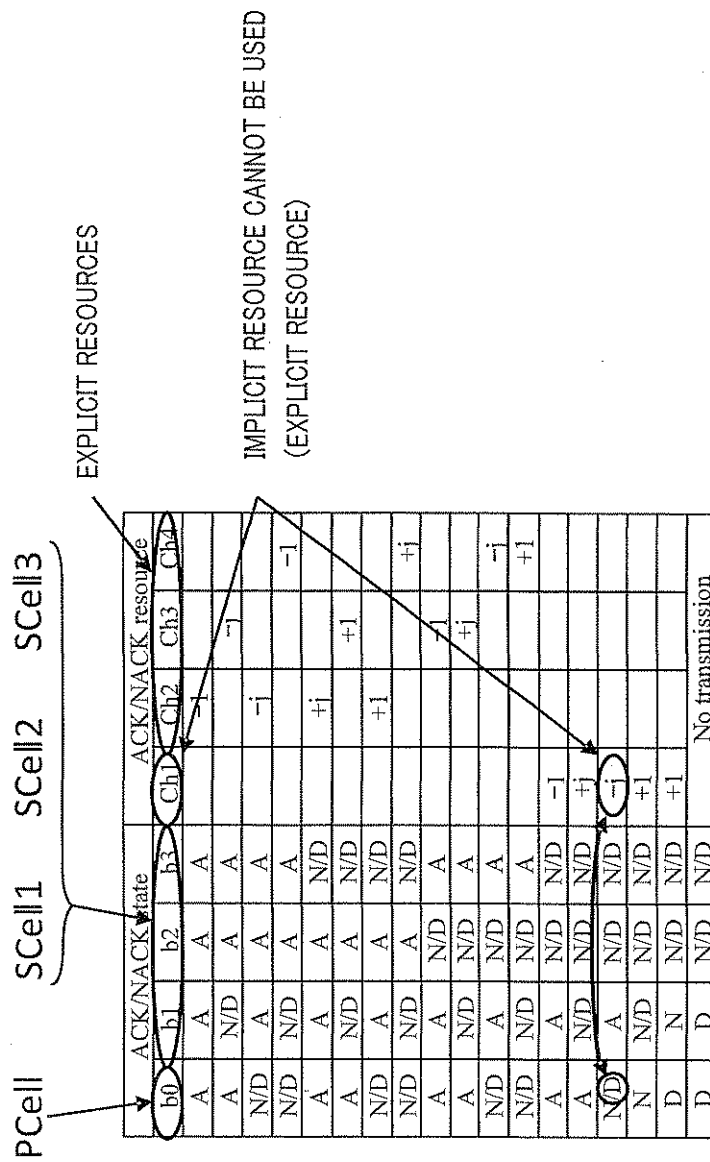


FIG. 30

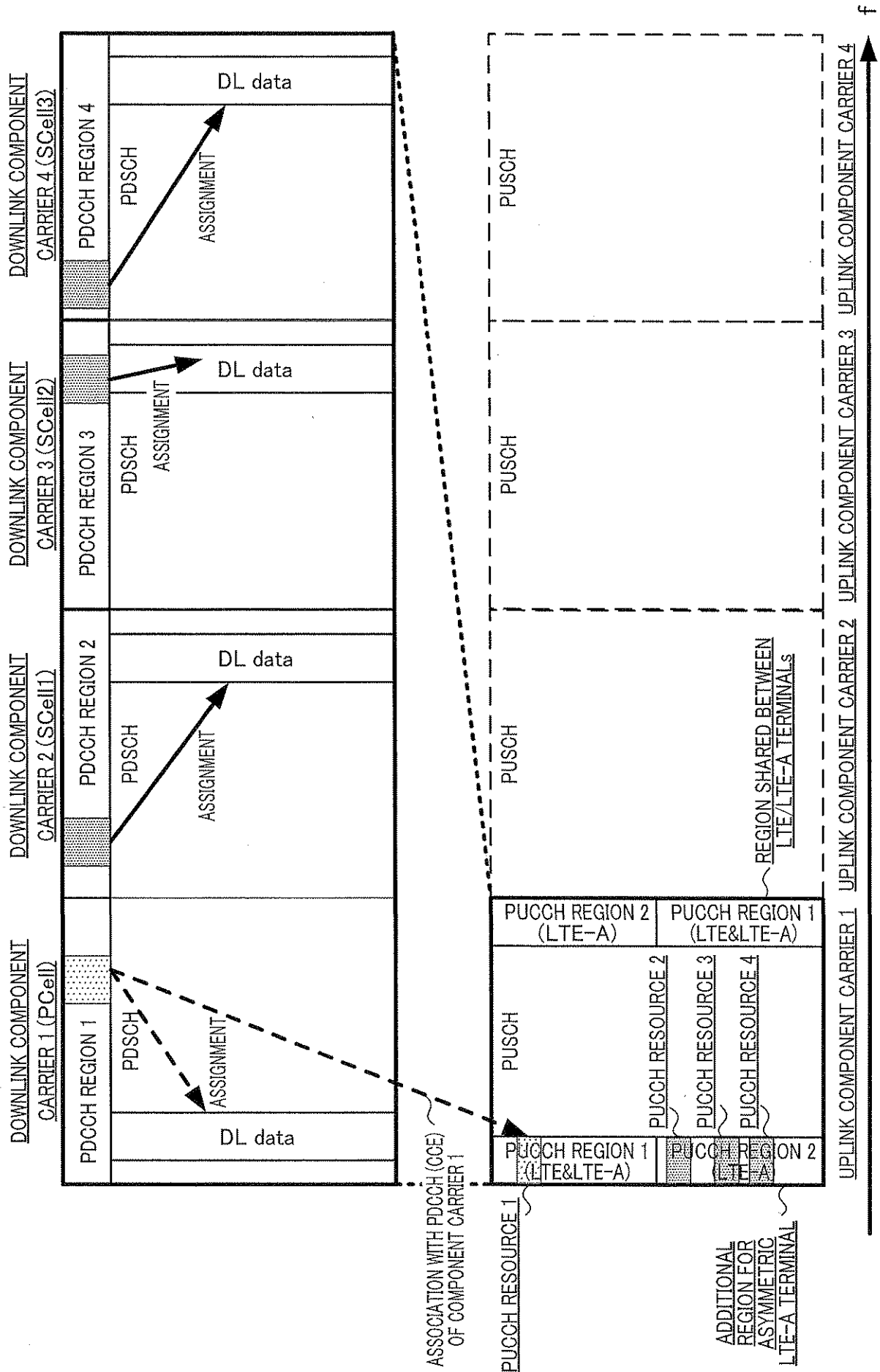
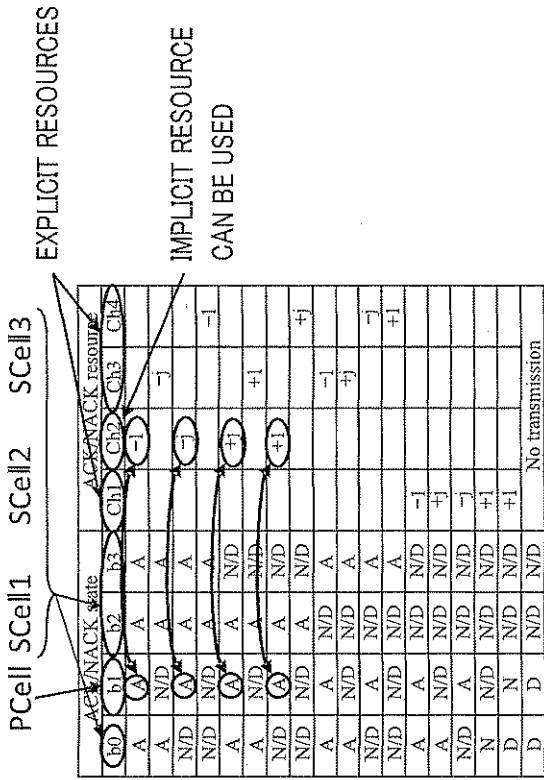
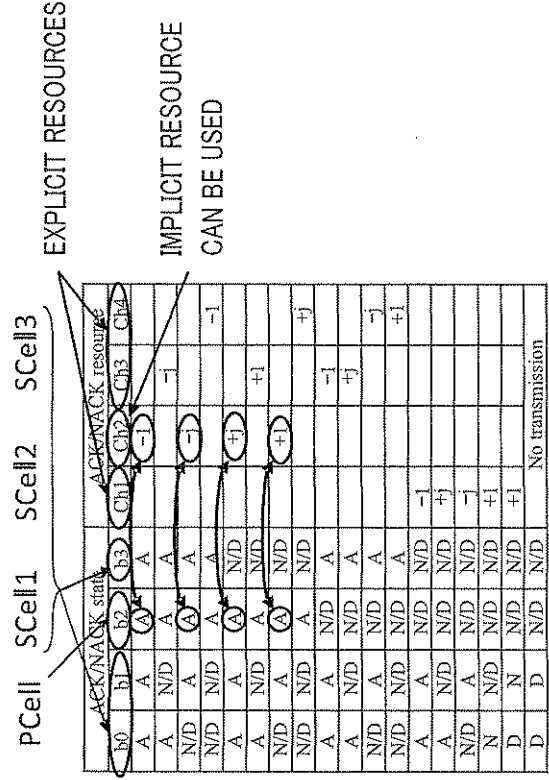


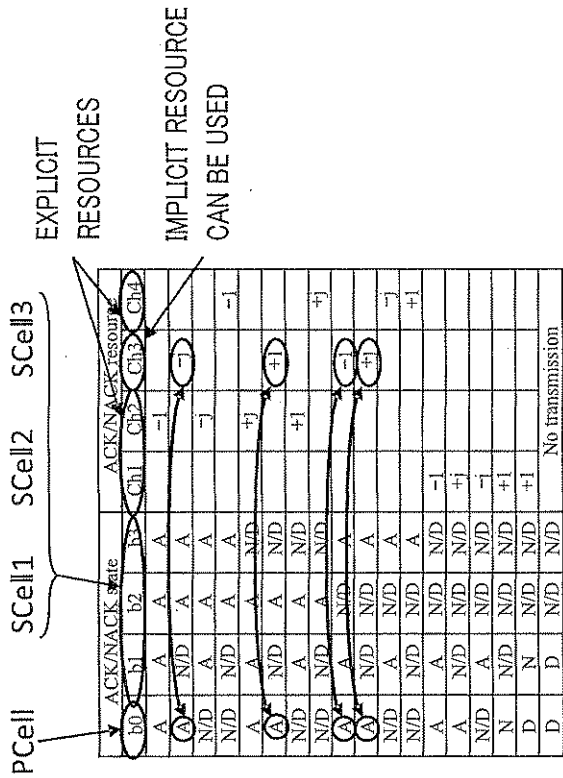
FIG. 31



b1 = ERROR DETECTION RESULT PATTERN ON PDSCH IN PCell
Ch2 = PUCCH RESOURCE TO BE IMPLICITLY SIGNED



b2 = ERROR DETECTION RESULT PATTERN ON PDSCH IN PCell
Ch2 = PUCCH RESOURCE TO BE IMPLICITLY SIGNED



b0 = ERROR DETECTION RESULT PATTERN ON PDSCH IN PCell
Ch3 = PUCCH RESOURCE TO BE IMPLICITLY SIGNED

FIG. 32A

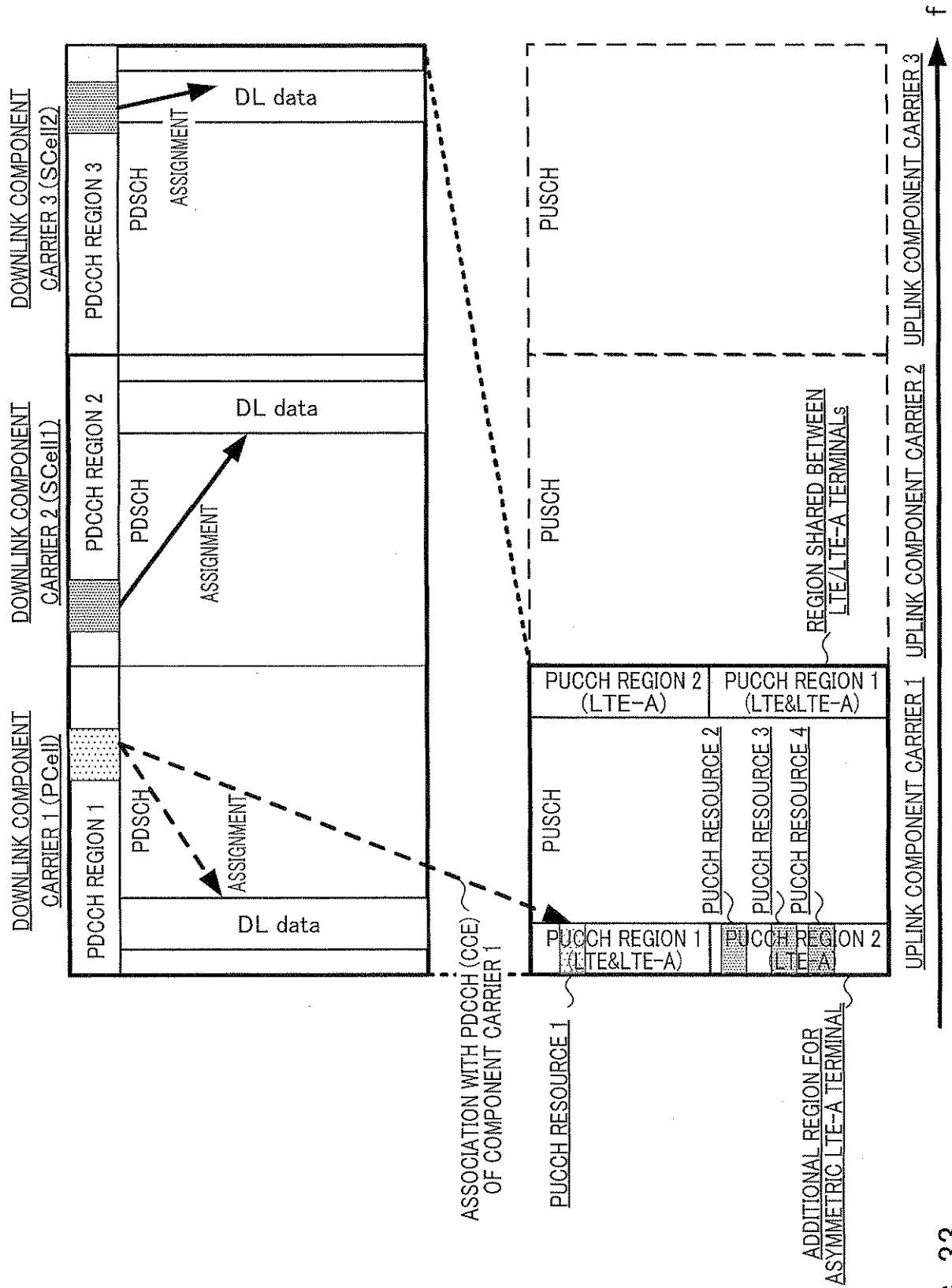
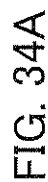
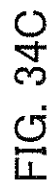


FIG. 33



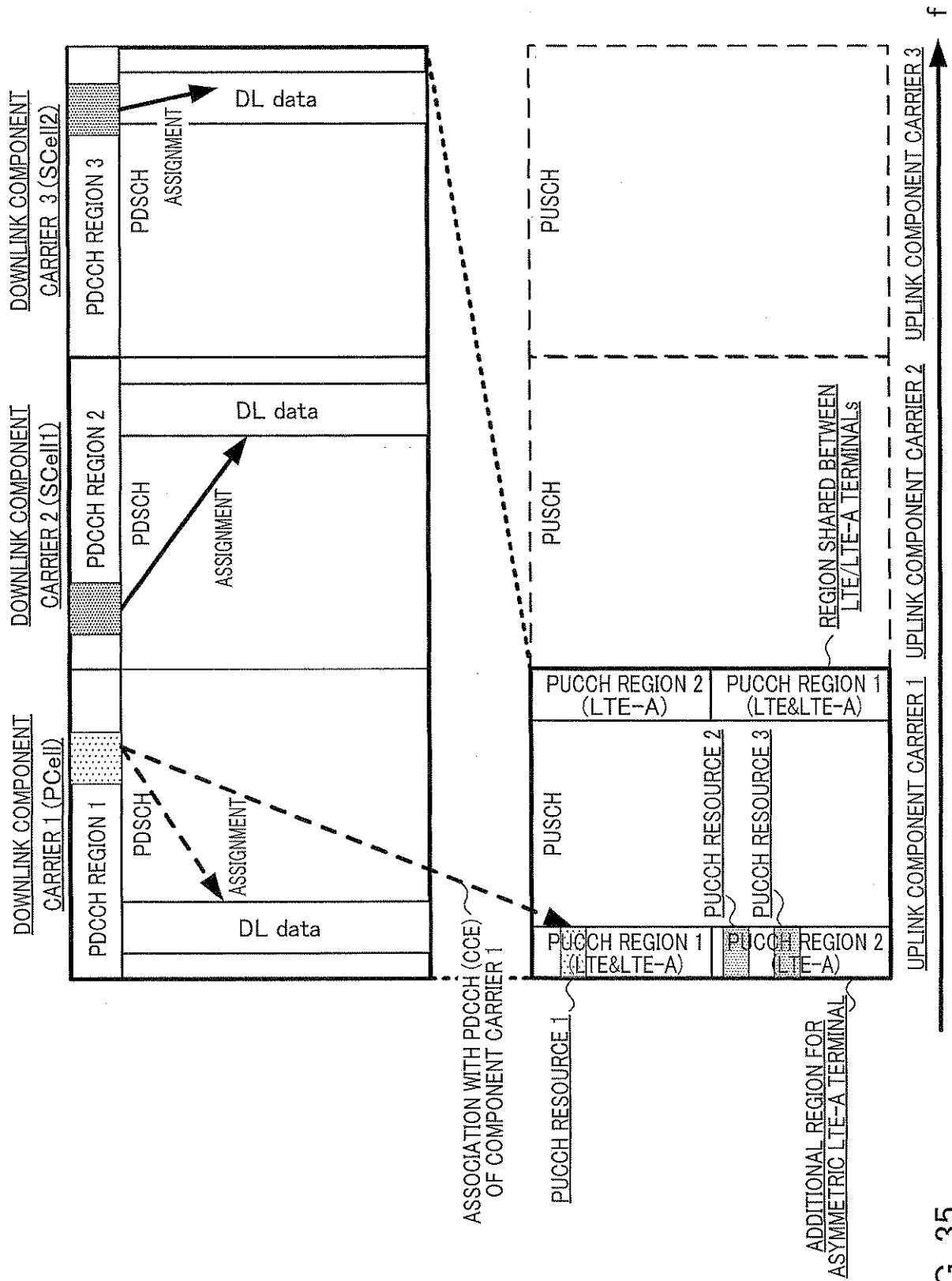


FIG. 35

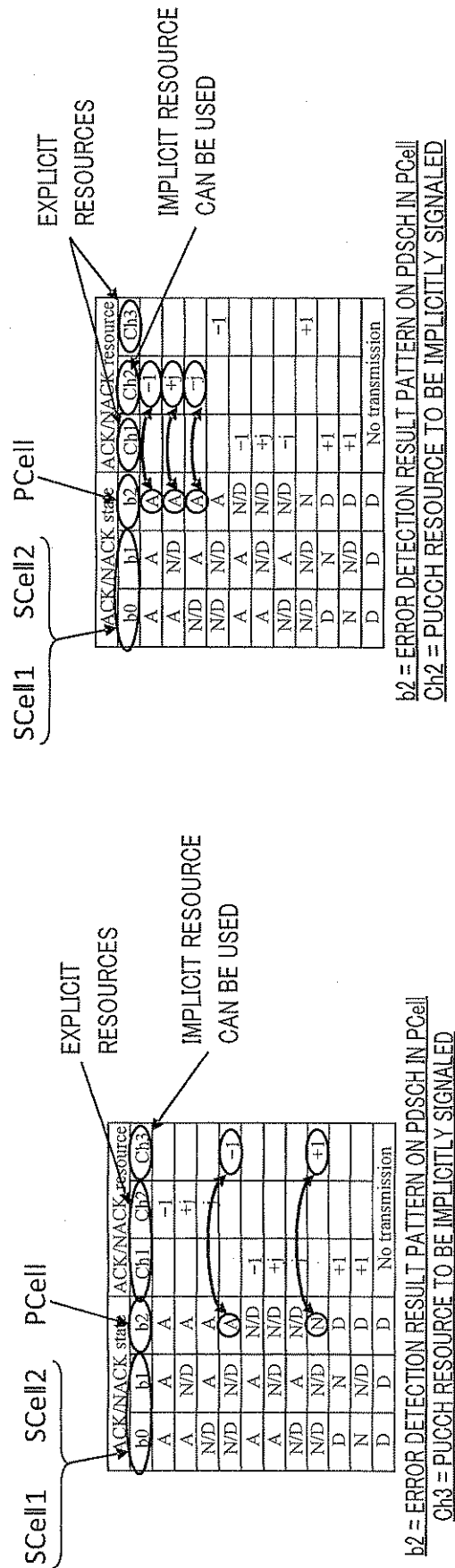


FIG. 36B

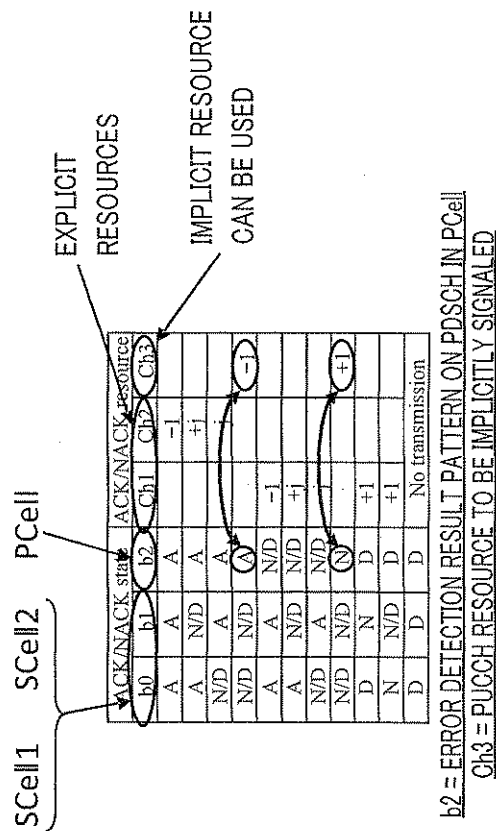


FIG. 36A