Spectrum Aggregation in EUHT

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START

Working Bandwidth

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- The working bandwidth (Working_BW) of each component carrier is obtained through the working bandwidth mode in SICH(refer to section 8.4.1 in EUHT specification) and the working bandwidth value in BCF's fixed part (refer to section 6.3.4.1 in EUHT specification).

Table 55 **System Information field definition**

Bit	Definition	Notes
$b_7b_6\cdots b_0$	The lowest 8 bits of this CAP MAC address	CAP identifier and scrambling code seed
$b_{10}b_9b_8$	CAP Working bandwidth set	For sub-6GHz band: 000: 5/10/20M working bandwidth mode 001: 10/20/40M working bandwidth mode 010: 15/30/60M working bandwidth mode 011: 20/40/80M working bandwidth mode 100: 25/50/100M working bandwidth mode For mmWave mode, 000: 50M working bandwidth mode 001: 100M working bandwidth mode 010: 200M working bandwidth mode 011: 400M working bandwidth mode Others: reserved

Table 3 **Fixed part of BCF frame body**

Information	Length/ bit	Remarks
CAP-MAC address	48	Unique identifier of the CAP
Working channel number	8	The minimum channel number occupied by the CAP
work bandwidth	2	Working bandwidths for broadcasting CAP: 0: working bandwidth 1 in working bandwidth mode; 1: working bandwidth 2 in working bandwidth mode; 2: working bandwidth 3 in working bandwidth mode; 3: Reserved

- Combing the indication in SICH and BCF, EUHT can support the following bandwidth for each component carrier
  - ✓ 5~100 MHz in Sub-6GHz band
  - ✓ 50~400 MHz in mmWave band

Carrier Aggregation working mode

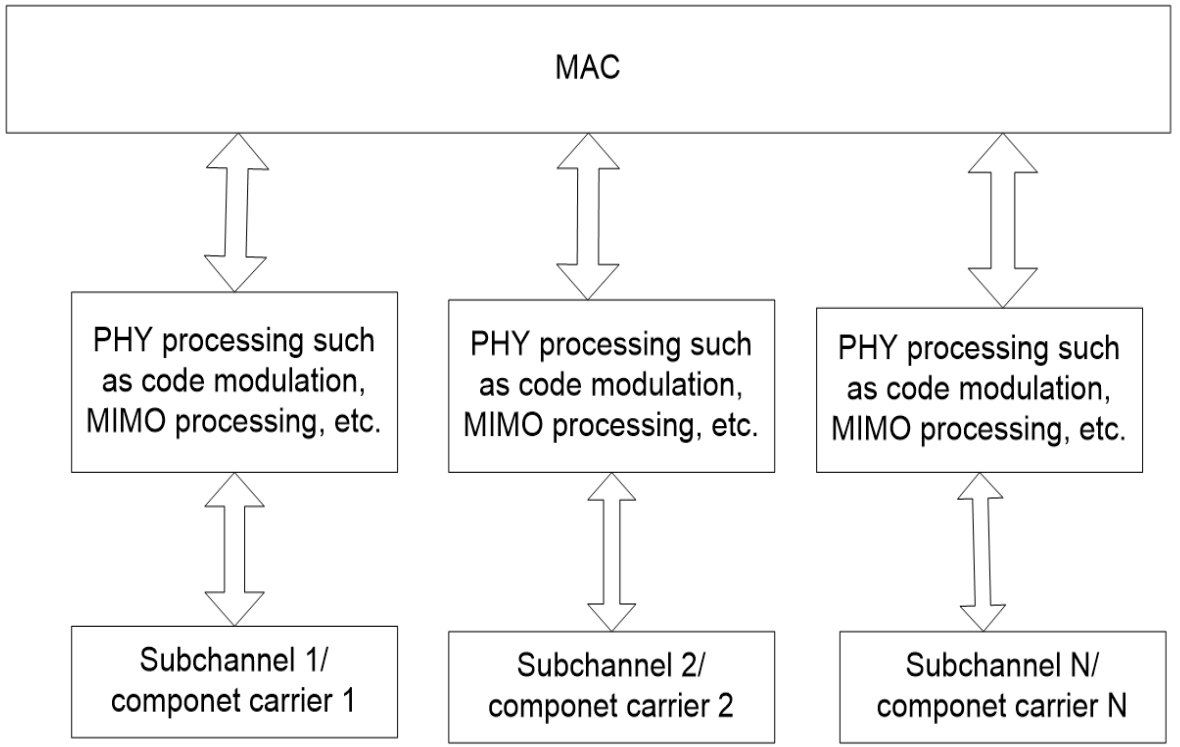

Figure 57 Multi-carrier and multichannel working mode of EUHT system

- As shown by Fig 57 in EUHT specification, spectrum aggregation is defined. Each component carrier is independently processed in physical layer. All the component carriers are processed by a single MAC layer entity.

Management in MAC Layer

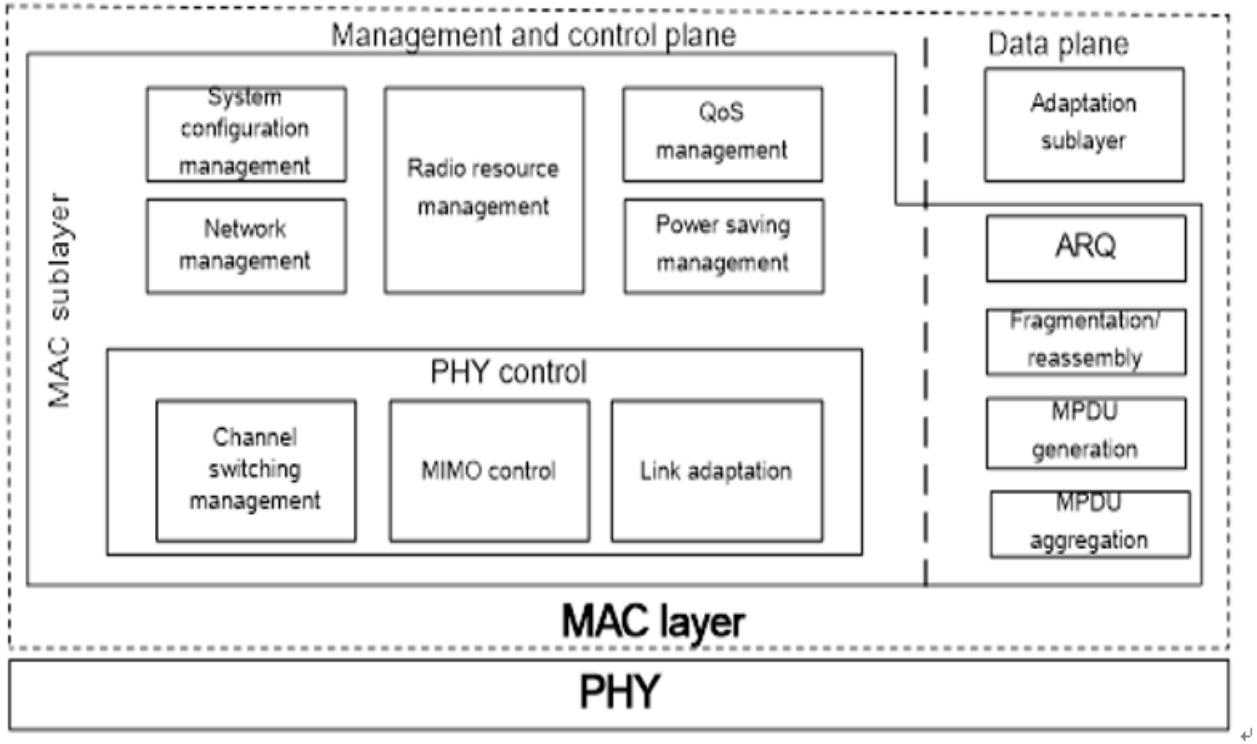

Figure 2 **Functions of MAC layer**

- As shown by Fig.2 in EUHT specification, The MAC layer entity function includes a radio resource management module. One of the function of radio resource management is to divide and aggregate data packets onto/from multiple component carriers. The detailed method of packet processing is implementation related.

Mangement in PHY Layer

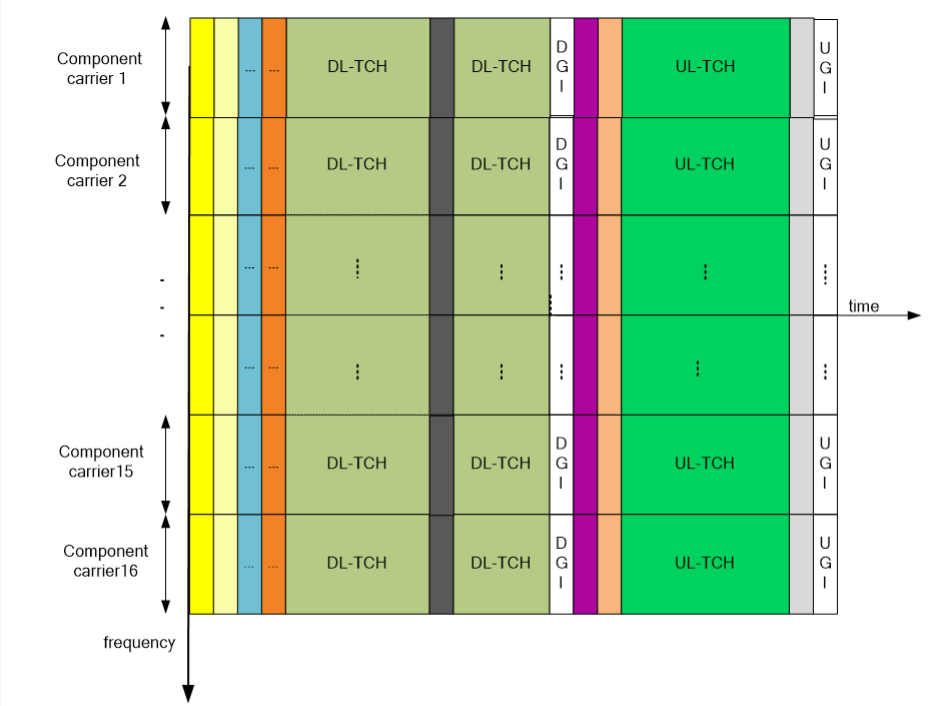

Figure 84 Spectrum aggregation mode

- In section 8.11, CCH and TCH in each component carrier can be different. In the figure above, there are 16 aggregated component carriers. each CC have its own SICH/CCH/TCH channel respectively, which means the resource allocation and data transmission in time/frequency/spatial domain can be accomplished for each CC independently.

Procedure

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1. CAP broadcast starting frequency (EUHT-ARFCN) of each component carrier (up to 16) in BCF TLV as below, the frequency value is defined as F_start for later use(refer to TLV frame of section 6.3.4.1 in EUHT specification).

Table G.1-3: EUHT_ARFCN

Frequency range	ΔF (KHz)	F_{Offs} (MHz)	$N_{chn\text{-}Offs}$	Range of N_{chn}
0 - 6000 (MHz)	78.125	0	0	0-76799
6000-24250(MHz)	78.125	6000	76800	76800-310399
24250-100000(MHz)	390.625	24250	310400	310400-504319

The frequency is calculated by below equation:

$$F = F_{Offs} + \Delta F * (N_{chn} - N_{chn\text{-}Offs})$$

The Data field with TLV_type=0 of BCF_TLV frame is defined in table below.

Name	Length/ bit	Value
starting frequency of carrier #1	19	Indicates starting frequency of carrier #1, i.e frequency when channel number=0. Refer to Annex G for EUHT-ARFCN
starting frequency of carrier #2	19	Same as above while carrier #2 corresponds to channel number 1
starting frequency of carrier #3	19	Same as above while carrier #3 corresponds to channel number 2
starting frequency of carrier #4	19	Same as above while carrier #4 corresponds to channel number 3
starting frequency of carrier #5	19	Same as above while carrier #5 corresponds to channel number 4
starting frequency of carrier #6	19	Same as above while carrier #6 corresponds to channel number 5
starting frequency of carrier #7	19	Same as above while carrier #7 corresponds to channel number 6
starting frequency of carrier #8	19	Same as above while carrier #8 corresponds to channel number 7

2. CAP broadcast the relative working channel number in BCF frame. The working channel number is defined WCN as for later use(refer to fixed part of section 6.3.4.1 in EUHT specification).

Table 3 **Fixed part of BCF frame body**

Information	Length/ bit	Remarks
CAP-MAC address	48	Unique identifier of the CAP
Working channel number	8	The minimum channel number occupied by the CAP

Procedure

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3. The working bandwidth (Working_BW) of each component carrier is obtained through the working bandwidth mode in SICH(refer to section 8.4.1 in EUHT specification) and the working bandwidth value in BCF's fixed part (refer to section 6.3.4.1 in EUHT specification).

$b_{10}b_9b_8$	CAP Working bandwidth set	For sub-6GHz band: 000: 5/10/20M working bandwidth mode 001: 10/20/40M working bandwidth mode 010: 15/30/60M working bandwidth mode 011: 20/40/80M working bandwidth mode 100: 25/50/100M working bandwidth mode For mmWave mode, 000: 50M working bandwidth mode 001: 100M working bandwidth mode 010: 200M working bandwidth mode 011: 400M working bandwidth mode Others: reserved

Table 3 **Fixed part of BCF frame body**

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4. The center frequency value of each component carrier can be calculated as below

$$F\_center = F\_start + (WCN + 0.5)*Working\_BW;$$

Procedure

5. STA reports its capability to support CA or not in STA capability request frame(refer to Table 7 of section 6.3.4.4 in EUHT specification). If STA selects to support CA, then it should support all the component carriers broadcasted by CAP.

STA supporting spectrum aggregation	2	0: Not supported; 1: Support spectrum aggregation mode; 2~3: reserved

6. CAP notifies the STA to activate/deactivate the CA mode in STA capability response frame(refer to Table 8 of section 6.3.4.5 in EUHT specification).

Spectrum aggregation mode	2	0: No aggregation; 1: Aggregation mode; 2~3: reserved

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Thank You

END