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Re: [Response to LB50 comment resolution]

Abstract: [This document describes color frame usages and how to use it]

Purpose: [To complete the color frame text in D2 draft]

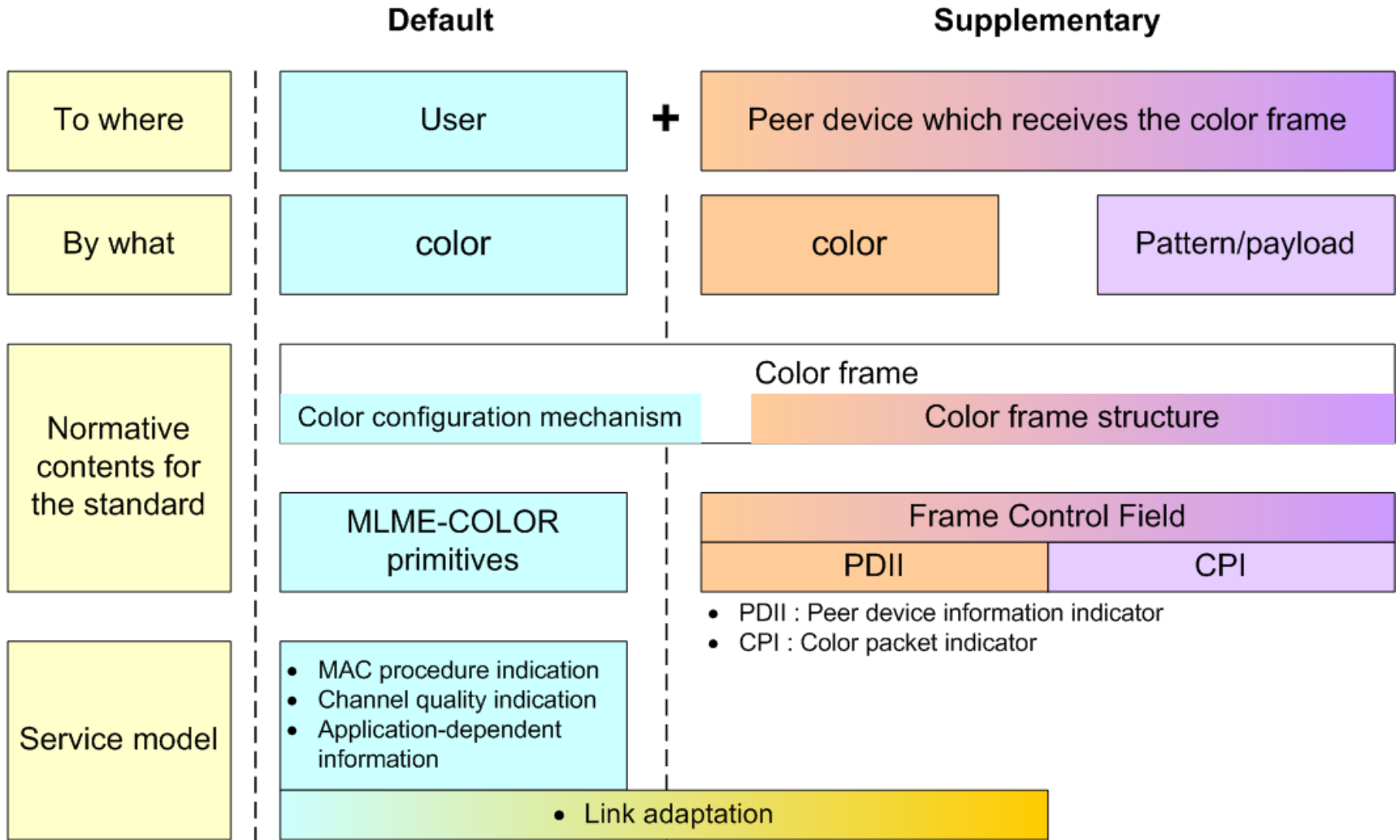
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Understanding of color frame in VLC

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Summary of color frame



Agenda

- **Color configuration mechanism**
 - Table <xx1> / Figure<xx>
 - Table <xx2>
 - Table <xx3>
- Color frame structure (Frame control field)
 - CPI field
 - PDII field

Color configuration mechanism

- How to configure the color of color frame
 - ‘Originator(Color frame transmitter) next higher layer’ need MLME-COLOR primitives to configure the color of color frame
 - MLME-COLOR primitives consists of MLME-COLOR.request and MLME-COLOR.confirm primitive.
 - ‘Originator next higher layer’ sends MLME-COLOR.request primitive to ‘Originator MLME’ using parameters in Table <xx1>

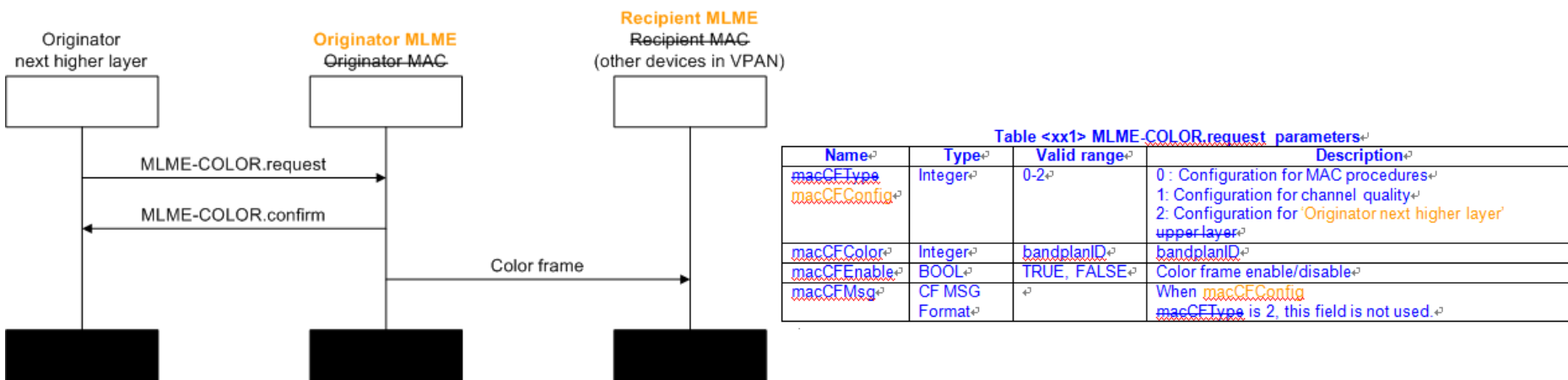


Figure <xx> Message sequence chart for color configuration of color frame

The roles of table <xx1>, <xx2> and <xx3> in color configuration mechanism

- Table <xx1>/Figure<xx> → Color configuration mechanism
- Table <xx2> → Service model-dependent color configuration message only for MAC procedure indication to user
- Table <xx3> → Service model-dependent color configuration message only for Channel quality indication to user
- Therefore, table <xx2> and table <xx3>, respectively, are the parameters of table <xx1>

Descriptions of table <xx2> and table <xx3>

Table <xx2> Color frame packet configuration message format for MAC procedures

Name	Type	Valid range	Description
macDuringASSOCColor	Integer	bandplanID	Color frame is transmitted using macDuringASSOCColor bandplanID between MLME - ASSOCIATE.request and MLME - ASSOCIATE.confirm
macDuringDISASSOCColor	Integer	bandplanID	Color frame is transmitted using macDuringDISASSOCColor bandplanID between MLME - DISASSOCIATE.request and MLME - DISASSOCIATE.confirm
macDuringSYNCColor	Integer	bandplanID	Color frame is transmitted using macDuringSYNCColor bandplanID between MLME - SYNC.request and MLME - SYNC.confirm
macDuringSCANColor	Integer	bandplanID	Color frame is transmitted using macDuringSCANColor bandplanID between MLME - SCAN.request and MLME - SCAN.confirm

Table <xx3> Color frame packet configuration message format for channel quality ACK Frame

Name	Type	Valid range	Description
macACKColor	Integer	bandplanID	Use macACKColor for Color Frame which denotes ACK
macNACKColor	Integer	bandplanID	Use macNACKColor for Color Frame which denotes NACK

Color configuration for MAC procedure indication and channel quality indication to user

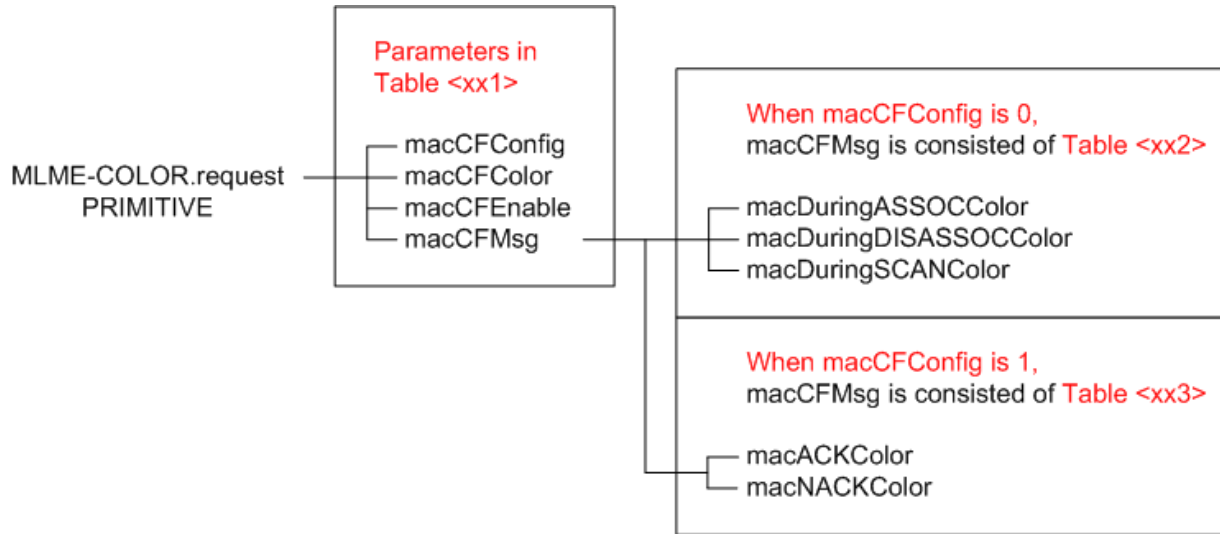


Table <xx1> MLME-COLOR.request parameters

Name	Type	Valid range	Description
macCFType macCFConfig	Integer	0-2	0 : Configuration for MAC procedures 1: Configuration for channel quality 2: Configuration for 'Originator next higher layer' upper layer
macCFColor	Integer	bandplanID	bandplanID
macCFEnable	BOOL	TRUE, FALSE	Color frame enable/disable
macCFMsg	CF MSG Format		When macCFConfig macCFType is 2, this field is not used.

Overview of table <xx1> on color configuration depending on service models

Table <xx1>

macCFConfig	macCFColor	macCFEnable	macCFMsg
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Table <xx1> for MAC procedure indication to user

macCFConfig =0	macCFColor (not used)	macCFEnable (not used)	macCFMsg = Table <xx2>
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Table <xx1> for channel quality indication to user

macCFConfig =1	macCFColor (not used)	macCFEnable (not used)	macCFMsg = Table <xx3>
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Table <xx1> for link adaptation or application dependent information

macCFConfig =2	macCFColor	macCFEnable	macCFMsg (not used)
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Agenda

- Color configuration mechanism
 - Table <xx1> / Figure<xx>
 - Table <xx2>
 - Table <xx3>
- Color frame structure (Frame control field)
 - CPI field
 - PDII field

Color frame structure

Figure xx - Color frame

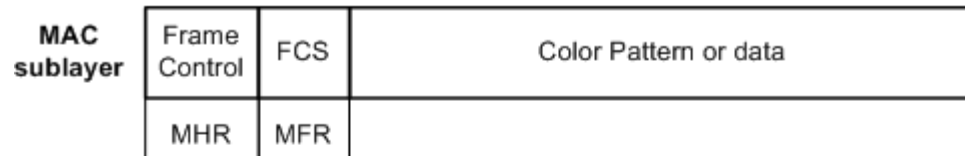


Figure xx1 - Color frame format

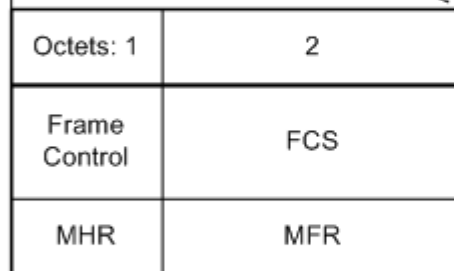


Figure xx2 - Frame control fields



The meaning of field values in figure <xx2>

Figure xx2 – Frame control fields

bits: 0-2	3	4	5-7
Frame Type	CPI	PDII	Reserved

- CPI field, 3 in figure <xx2>, does not mean the number of bits. The number 3 means that 4th bit in frame control field shows the CPI.
- Similarly, PDII field, 4 in figure <xx2>, does not mean the number of bits. The number 4 means that 5th bit in frame control field shows the PDII.
- “Bits: 0-2” for frame type in Figure <xx2> means that first, second and third bits in frame control field show the frame type(color frame is “101”).

PDII field

- PDII indicates ‘Peer Device Information Indicator’.
- PDII field is enabled when the color frame transmits “another information for a peer device” in addition to the instinctive information for a user.
- So, a peer device which receives the color frame can interpret the color of the color frame when PDII field is enabled.
- An example of the PDII field usage is the service model on link adaptation.

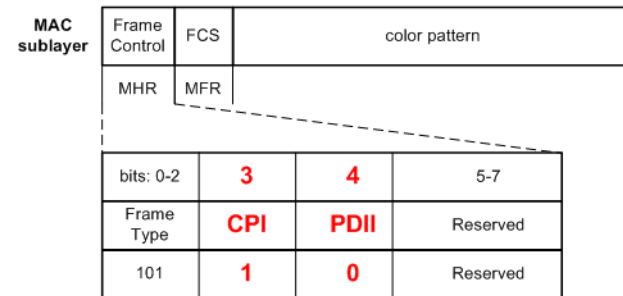
CPI field

- CPI indicates ‘Color Packet Indicator’.
- CPI field is disabled when the color frame transmits “data payload for a peer device” in addition to the instinctive information for a user.
- So, a peer device which receives the color frame can interpret the payload of the color frame when CPI field is disabled.
- CPI field can be used for all service model whenever it is needed.

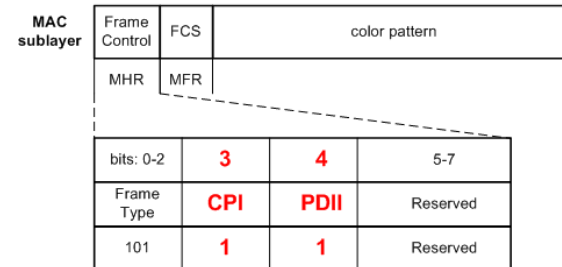
Overview of CPI and PDII setting depending on service models

- MAC procedure indication, channel quality indication or application dependent information only to user
 - Color frame doesn't include payload
 - Color frame doesn't include 'another information for a peer device'
 - So, CPI is set as "1", PDII is set as "0"
- Link adaptation
 - Color frame doesn't include payload
 - Color frame include 'another information for a peer device'
 - So, CPI is set as 1, PDII is set as 1
- Intuitive information for user and data for a peer device
 - Color frame includes payload
 - Color frame doesn't include 'another information for a peer device'
 - So, CPI is set as 0, PDII is set as 0

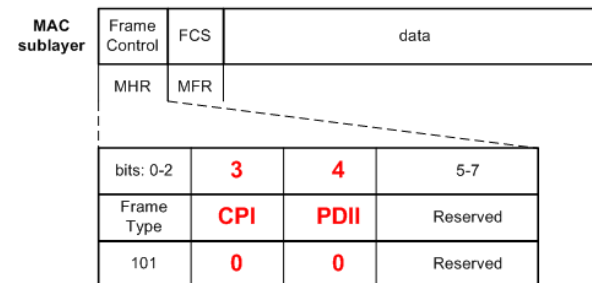
Color frame for MAC procedures or channel quality



Color frame for link adaptation or application



Color frame for transmitting data



Some suggestion

- CPI indicates ‘Color Packet Indicator’ in DCN 10/596/r1.
- It looks better if we use the terminology of CFPI(Color Frame Payload Indicator) instead of CPI because we have already used the color frame instead of color packet.