

**JCTVC-G203**

# CE6b: Intra Prediction Mode Coding

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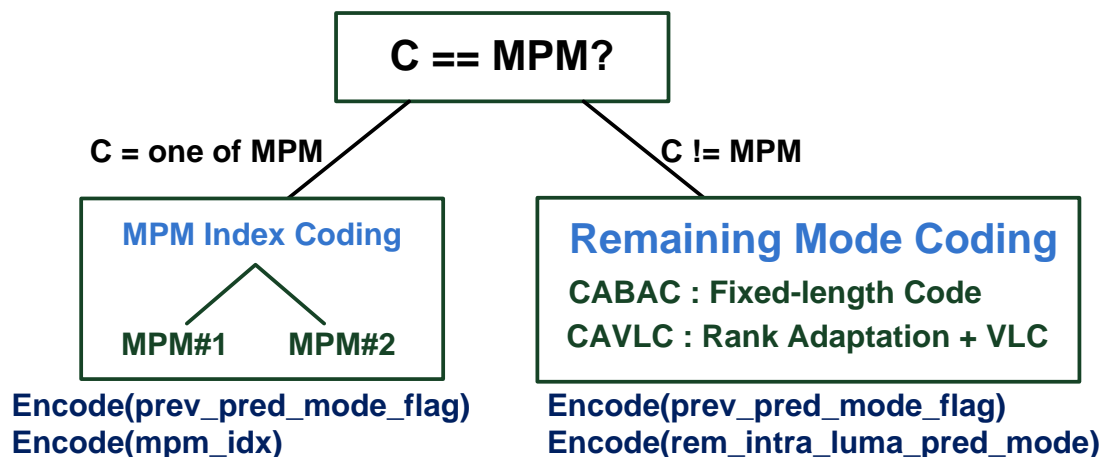
# Overall Summary

- A two-level luma intra prediction mode coding with 3 most probable remaining modes (MPRMs)
  - 1<sup>st</sup>-level : 2 MPM coding (the same as HM4.0)
  - 2<sup>nd</sup>-level : Select 3 MPRMs according to Mode A and Mode L
  - One mode, (Hor.+6), is added for Intra\_4x4 coding
- A modified chroma intra prediction mode coding
  - The Ver., Hor., and DC modes are replaced by two modes adjacent to DM mode and one mode perpendicular to DM mode
- 0.4% of luma bit rate reduction and 0.4-0.7% of chroma bit rate reduction are observed

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
All	-0.4	-0.4	-0.5	-0.4	-0.7	-0.7

# Intra Prediction Mode Coding in HM-4.0

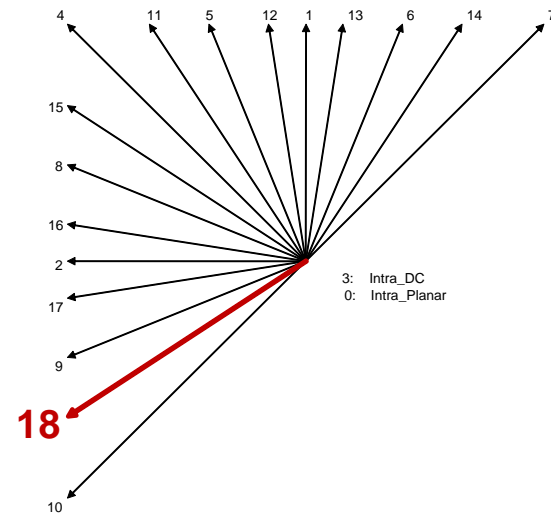
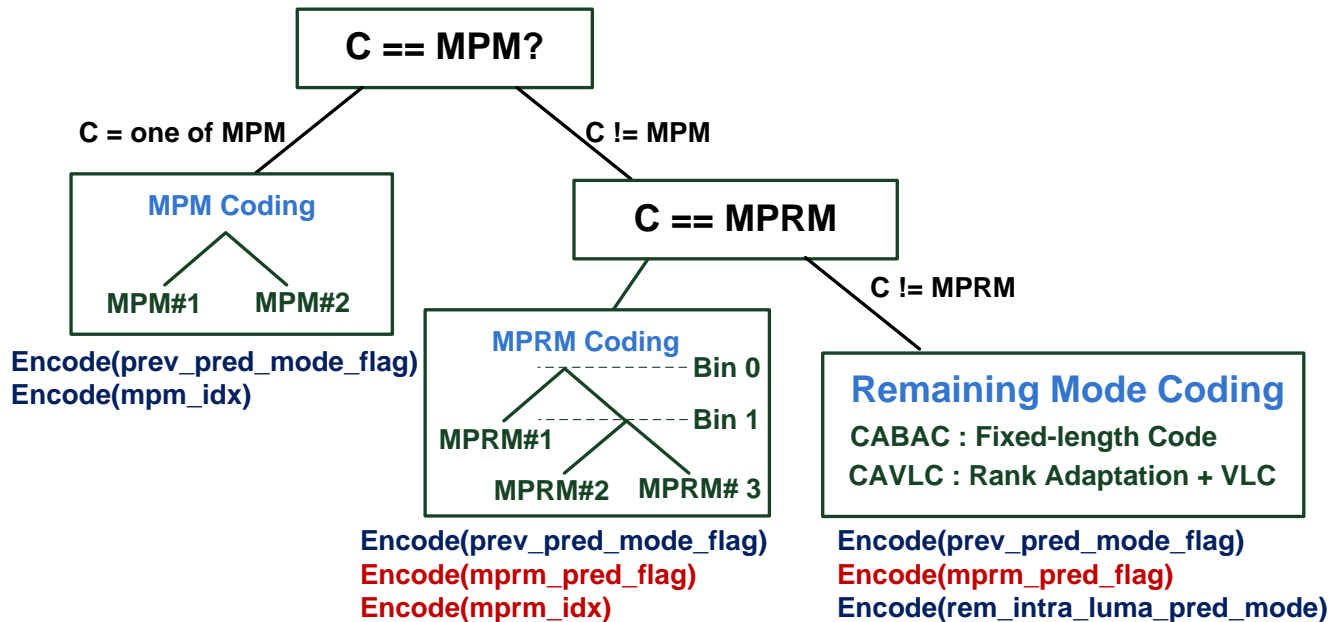
- Luma intra prediction mode coding
  - Only two modes are selected as most probable modes (MPMs)
  - Two MPMs are not enough. The direction of current modes are usually close to the direction of MPMs
- Chroma intra prediction mode coding
  - 6 modes are used
  - The Ver., Hor, and DC are rarely selected than others



Chroma Mode
DM
LM
Planar
Ver.
Hor.
DC

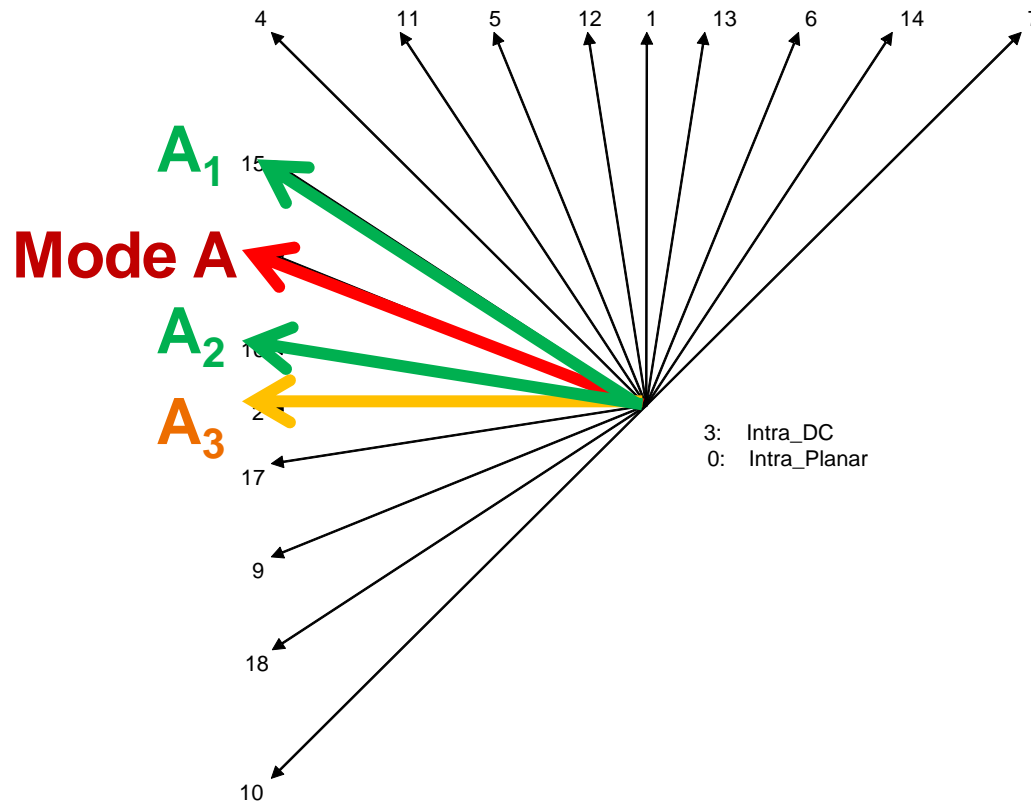
# Proposed Luma Intra Prediction Mode Coding

- 1<sup>st</sup>-level : the same with the MPM coding in HM 4.0
- 2<sup>nd</sup>-level : select 3 most probable remaining modes (MPRMs) according to Mode A and Mode L
- One mode, (Hor.+6), is added for Intra\_4x4 coding



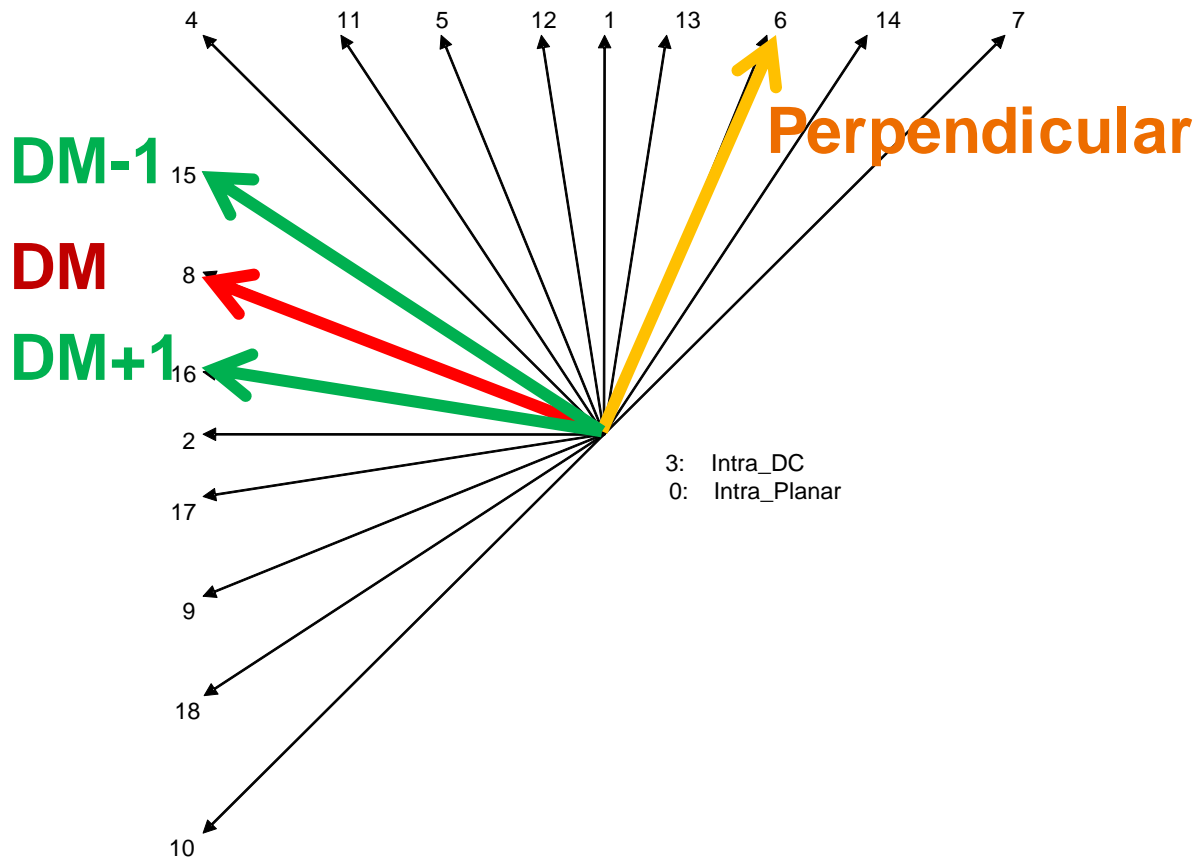
# MPRM Selection

- Select  $\{A_1, A_2, A_3\}$  from Mode A
  - $A_1$  and  $A_2$  are two closet modes.  $A_3$  is the 2<sup>nd</sup> closet mode or DC
- Select  $\{L_1, L_2, L_3\}$  from Mode L
- Pick the first three non-redundant modes in the set of  $\{A_1, L_1, A_2, L_2, A_3, L_3\}$  as MPRMs



# Proposed Chroma Intra Prediction Mode Coding

- The Ver., Hor., and DC modes are replaced by two modes adjacent to DM mode (DM+1, DM-1) and one mode perpendicular to DM mode



Chroma Mode
DM
LM
Planar
DM + 1
DM - 1
Perpendicular

# Simulation Results

- 0.4% of luma bit rate reduction and 0.4-0.7% of chroma bit rate reduction are observed

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	-0.3%	0.0%	0.0%	-0.3%	-0.3%	-0.2%
Class B	-0.3%	-0.4%	-0.5%	-0.4%	-0.7%	-0.7%
Class C	-0.4%	-0.7%	-0.7%	-0.5%	-1.0%	-0.9%
Class D	-0.3%	-0.6%	-0.6%	-0.4%	-0.7%	-0.8%
Class E	-0.6%	-0.3%	-0.5%	-0.6%	-0.8%	-0.8%
<b>Overall</b>	<b>-0.4%</b>	<b>-0.4%</b>	<b>-0.5%</b>	<b>-0.4%</b>	<b>-0.7%</b>	<b>-0.7%</b>
	-0.4%	-0.4%	-0.5%	-0.4%	-0.7%	-0.7%
Enc Time[%]	100%			101%		
Dec Time[%]	101%			101%		

# Cross Verification

- We thank JVC KENWOOD, Canon, and SCU for crosschecking our proposal
  - JCTVC-G186, JCTVC-G252, and JCTVC-G276
- BD-rates and run times are confirmed



# Conclusions

- Propose a two-level luma intra prediction mode coding
  - 3 MPRMs derived from Mode A and Mode L are added
  - One mode, (Hor.+6), is added for Intra\_4x4 coding
- Propose a modified chroma intra prediction mode coding
  - The Ver., Hor., and DC modes are replaced by two modes adjacent to DM mode and one mode perpendicular to DM mode
- 0.4% of luma bit rate reduction and 0.4-0.7% of chroma bit rate reduction