



# CE11.4.2: Modified NSQT Coefficient Scan

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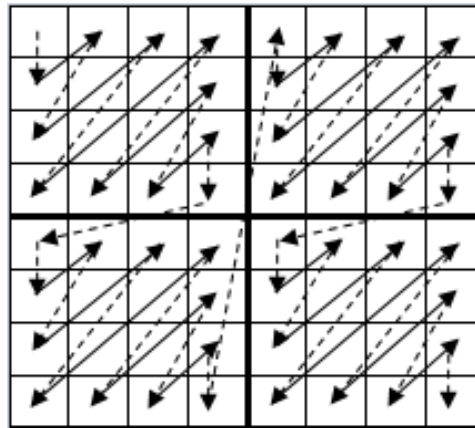
# Overall Summary

- In this contribution, vertical and horizontal scans are used for non-square TUs.
  - The 2-level diagonal scan patterns for non-square TUs in HM-5.0 can be saved.
- A position-based context selection scheme for significance map is used
  - Allow parallel context formation easily
  - Replace neighbor-based scheme for further simplification
- 0.1-0.2% bit rate increase with unchanged run times
- Preserve most of AMP+NSQT gain (1.1%)

# Introduction

- JCTVC-G1038 was adopted for NSQT coefficient coding
  - Non-square TUs are divided into 4x4 sub-blocks
  - A 2-level diagonal scan is used
  - The 2-level significance map coding in JCTVC-G644 was also adopted
  - The significance map of each 4x4 sub-block is coded using a neighbor-based context selection scheme
    - The contexts of 16x16 TU are shared with 16x4 and 4x16 TUs
    - The contexts of 32x32 TU are shared with 32x8 and 8x32 TUs

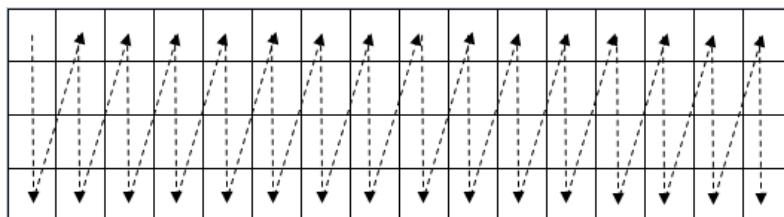
2-level diagonal scan



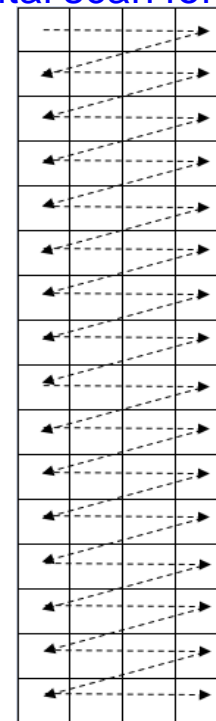
# Proposed Scan

- The 2-level diagonal scan demands extra scan patterns for NSQT
- We propose to use simple scans for non-square TUs
  - Vertical scans for 16x4 and 32x8 TUs
  - Horizontal scans for 4x16 and 8x32 TUs

Vertical scan for 16x4 TU



Horizontal scan for 4x16 TU



# Proposed Context Selection

- We also propose to use simple position-based context selection
  - Reuse 4x4 and 8x8 TUs as follows

context selection look-up table for 4x4 TU

0	1	4	5
2	3	4	5
6	6	8	8
7	7	8	

context selection look-up table for 16x4 TU

0	1	4	5	5	5	5	5	5	5	5	5	5	5	5	5
2	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8

padding



# Simulation Results

- Anchor: HM-5.0
- RA-HE, LB-HE, LP-HE were tested
- 0.1%-0.2% bit rate increases
- The same encoding and decoding times

	Random Access HE		
	Y	U	V
Class A (8bit)	0.1%	0.1%	0.0%
Class B	0.1%	0.2%	0.2%
Class C	0.1%	0.1%	0.2%
Class D	0.1%	-0.1%	0.0%
Class E			
<b>Overall</b>	<b>0.1%</b>	<b>0.1%</b>	<b>0.1%</b>
	0.1%	0.1%	0.1%
Class F	0.0%	0.1%	0.1%
Enc Time[%]	100%		
Dec Time[%]	99%		

	Low Delay B HE		
	Y	U	V
Class A			
Class B	0.3%	0.8%	0.7%
Class C	0.2%	0.0%	0.3%
Class D	0.2%	0.0%	0.4%
Class E	0.1%	0.2%	0.2%
<b>Overall</b>	<b>0.2%</b>	<b>0.3%</b>	<b>0.4%</b>
	0.2%	0.3%	0.4%
Class F	0.0%	0.2%	0.1%
Enc Time[%]	100%		
Dec Time[%]	100%		

	Low Delay P HE		
	Y	U	V
Class A			
Class B	0.2%	0.8%	0.5%
Class C	0.2%	0.0%	-0.1%
Class D	0.2%	0.2%	0.1%
Class E	0.1%	0.5%	0.4%
<b>Overall</b>	<b>0.2%</b>	<b>0.4%</b>	<b>0.2%</b>
	0.2%	0.3%	0.2%
Class F	0.1%	0.2%	0.4%
Enc Time[%]	101%		
Dec Time[%]	99%		

# Conclusions

- For NSQT TUs, we propose to use
  - Vertical and horizontal scans
    - Simplify scan patterns
  - Position-based context selection
    - Simplify context formation
    - Allow parallel context formation
  - 0.1-0.2% bit rate increases
  - No run time change