

# CE2: Summary of Core Experiment 2 on Motion Partitioning and OBMC

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# Sub Experiments in CE2

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- Block partitioning
  - ◆ AMP (Asymmetric Motion Partition)
  - ◆ NRMP (Non-Rectangular Motion Partitioning)
- OBMC (Overlapped Block Motion Partitioning)
  - ◆ OBMC for  $2N \times N$  and  $N \times 2N$  partitions
  - ◆ OBMC with Motion Merging
- Non-Square TU
  - ◆ NSQT (Non-Square Quadtree Transform)
- Combination test

# Summary of Modifications in CE2 proposals

Document	Proponents	Tool Description	Cross-checker
F379	Samsung, HiSilicon	AMP without encoder speedup AMP with encoder speedup	HHI
F415	Huawei, HiSilicon, Tsinghua, Technicolor	NRMP	Microsoft
F410	Huawei & HiSilicon, Microsoft, Tsinghua, USTC	NSQT for symmetric partitions	HHI
F412	Huawei & HiSilicon, Microsoft, Tsinghua, USTC, Samsung	AMP + NSQT for asymmetric partitions AMP + NSQT for symmetric and asymmetric partitions	HHI
F049	NCTU, ITRI	OMBC with Motion Merging	Inter
F299	Qualcomm	OBMC for 2NxN and Nx2N	Samsung
F582	Qualcomm, Huawei, Tsinghua	NSQT + OBMC for 2NxN and Nx2N	Samsung
F687	NCTU, ITRI	NSQT + OMBC with Motion Merging	Intel

# Performance Analysis

RA\_HE (■ highest gain, ■ lowest encoder complexity)

subtest	Y-BD-rate [%]	U-BD-rate [%]	V-BD-rate [%]	Enc Time [%]	Dec Time [%]
1. AMP without encoding speed-up (F379)	<b>-0.9</b>	<b>-1.0</b>	<b>-1.0</b>	<b>144%</b>	<b>99%</b>
2. AMP with encoding speed-up (F379)	<b>-0.5</b>	<b>-0.8</b>	<b>-0.7</b>	<b>112%</b>	<b>99%</b>
3. NRMP (F415)	<b>-0.7</b>	<b>-1.2</b>	<b>-1.2</b>	<b>119%</b>	<b>109%</b>
4. NSQT for symmetric partitions (F410)	<b>-0.2</b>	<b>-0.8</b>	<b>-0.7</b>	<b>100%</b>	<b>100%</b>
5. AMP + NSQT for asymmetric partitions (F412)	<b>-0.7</b>	<b>-1.6</b>	<b>-1.6</b>	<b>112%</b>	<b>100%</b>
6. AMP + NSQT for symmetric and asymmetric partitions (F412)	<b>-0.8</b>	<b>-1.8</b>	<b>-1.6</b>	<b>114%</b>	<b>100%</b>
7. OBMC with Motion Merging (F049)	<b>-1.5</b>	<b>-2.4</b>	<b>-2.4</b>	<b>122%</b>	<b>104%</b>
8. OBMC for 2NxN and Nx2N motion partitions (F200)	<b>-0.5</b>	<b>-0.9</b>	<b>-0.9</b>	<b>102%</b>	<b>101%</b>
9. AMP + NSQT + OBMC (F582)	<b>-1.4</b>	<b>-2.6</b>	<b>-2.5</b>	<b>116%</b>	<b>102%</b>
10. OBMC with Motion Merging + NSQT (F687)	<b>-1.7</b>	<b>-3.1</b>	<b>-3.0</b>	<b>128%</b>	<b>102%</b>

LD\_HE (■ highest gain, ■ lowest encoder complexity)

subtest	Y-BD-rate [%]	U-BD-rate [%]	V-BD-rate [%]	Enc Time [%]	Dec Time [%]
1. AMP without encoding speed-up (F379)	<b>-1.3</b>	<b>-1.5</b>	<b>-1.6</b>	<b>144%</b>	<b>99%</b>
2. AMP with encoding speed-up (F379)	<b>-0.8</b>	<b>-1.2</b>	<b>-1.1</b>	<b>111%</b>	<b>100%</b>
3. NRMP (F415)	<b>-0.8</b>	<b>-1.1</b>	<b>-1.1</b>	<b>117%</b>	<b>111%</b>
4. NSQT for symmetric partitions (F410)	<b>-0.9</b>	<b>-2.5</b>	<b>-2.4</b>	<b>100%</b>	<b>101%</b>
5. AMP + NSQT for asymmetric partitions (F412)	<b>-1.6</b>	<b>-3.8</b>	<b>-3.7</b>	<b>111%</b>	<b>101%</b>
6. AMP + NSQT for symmetric and asymmetric partitions (F412)	<b>-1.9</b>	<b>-4.0</b>	<b>-4.1</b>	<b>113%</b>	<b>101%</b>
7. OBMC with Motion Merging (F049)	<b>-1.8</b>	<b>-2.5</b>	<b>-2.6</b>	<b>128%</b>	<b>100%</b>
8. OBMC for 2NxN and Nx2N motion partitions (F200)	<b>-0.8</b>	<b>-0.9</b>	<b>-1.0</b>	<b>101%</b>	<b>103%</b>
9. AMP + NSQT + OBMC (F582)	<b>-2.9</b>	<b>-4.8</b>	<b>-4.9</b>	<b>115%</b>	<b>104%</b>
10. OBMC with Motion Merging + NSQT (F687)	<b>-2.7</b>	<b>-4.9</b>	<b>-5.0</b>	<b>132%</b>	<b>102%</b>

## RA\_LC (■ highest gain, ■ lowest encoder complexity)

subtest	Y-BD-rate [%]	U-BD-rate [%]	V-BD-rate [%]	Enc Time [%]	Dec Time [%]
1. AMP without encoding speed-up (F379)	<b>-0.7</b>	<b>-0.7</b>	<b>-0.7</b>	<b>151%</b>	<b>99%</b>
2. AMP with encoding speed-up (F379)	<b>-0.4</b>	<b>-0.6</b>	<b>-0.5</b>	<b>112%</b>	<b>98%</b>
3. NRMP (F415)	<b>-0.8</b>	<b>-1.1</b>	<b>-1.1</b>	<b>122%</b>	<b>111%</b>
4. NSQT for symmetric partitions (F410)	<b>-0.4</b>	<b>-0.7</b>	<b>-0.5</b>	<b>101%</b>	<b>101%</b>
5. AMP + NSQT for asymmetric partitions (F412)	<b>-0.8</b>	<b>-1.3</b>	<b>-1.2</b>	<b>113%</b>	<b>101%</b>
6. AMP + NSQT for symmetric and asymmetric partitions (F412)	<b>-0.9</b>	<b>-1.4</b>	<b>-1.2</b>	<b>114%</b>	<b>101%</b>
7. OBMC with Motion Merging (F049)	<b>-1.3</b>	<b>-1.8</b>	<b>-1.9</b>	<b>122%</b>	<b>107%</b>
8. OBMC for 2NxN and Nx2N motion partitions (F200)	<b>-0.5</b>	<b>-0.8</b>	<b>-0.7</b>	<b>101%</b>	<b>103%</b>
9. AMP + NSQT + OBMC (F582)	<b>-1.5</b>	<b>-2.1</b>	<b>-2.0</b>	<b>116%</b>	<b>104%</b>
10. OBMC with Motion Merging + NSQT (F687)	<b>-1.7</b>	<b>-2.4</b>	<b>-2.4</b>	<b>128%</b>	<b>105%</b>

LD\_LC (■ highest gain, ■ lowest encoder complexity)

subtest	Y-BD-rate [%]	U-BD-rate [%]	V-BD-rate [%]	Enc Time [%]	Dec Time [%]
1. AMP without encoding speed-up (F379)	<b>-0.9</b>	<b>-0.7</b>	<b>-0.8</b>	<b>150%</b>	<b>99%</b>
2. AMP with encoding speed-up (F379)	<b>-0.6</b>	<b>-0.6</b>	<b>-0.5</b>	<b>111%</b>	<b>99%</b>
3. NRMP (F415)	<b>-0.8</b>	<b>-1.0</b>	<b>-1.2</b>	<b>120%</b>	<b>111%</b>
4. NSQT for symmetric partitions (F410)	<b>-1.6</b>	<b>-2.0</b>	<b>-2.0</b>	<b>101%</b>	<b>102%</b>
5. AMP + NSQT for asymmetric partitions (F412)	<b>-1.8</b>	<b>-2.3</b>	<b>-2.4</b>	<b>112%</b>	<b>101%</b>
6. AMP + NSQT for symmetric and asymmetric partitions (F412)	<b>-2.3</b>	<b>-2.5</b>	<b>-2.6</b>	<b>113%</b>	<b>102%</b>
7. OBMC with Motion Merging (F049)	<b>-2.2</b>	<b>-2.8</b>	<b>-3.0</b>	<b>127%</b>	<b>103%</b>
8. OBMC for 2NxN and Nx2N motion partitions (F200)	<b>-0.8</b>	<b>-0.8</b>	<b>-1.0</b>	<b>99%</b>	<b>103%</b>
9. AMP + NSQT + OBMC (F582)	<b>-3.1</b>	<b>-3.3</b>	<b>-3.4</b>	<b>114%</b>	<b>105%</b>
10. OBMC with Motion Merging + NSQT (F687)	<b>-3.8</b>	<b>-4.6</b>	<b>-4.8</b>	<b>132%</b>	<b>104%</b>



# Thank you!

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