# 1. HEVC/H.265 Codec (Encoder and Decoder)

## 1.1 Production Overview

H.265/HEVC hardware codec(encoder and decoder)is targeted for high-end multimedia devices capable of recording and playing up to 4K HEVC's Main/Main10 video such as camcorders/DSC, digital TVs, set-top boxes, smartphones, tablets, security cameras, and so forth.

HEVC codec is able to encode and/or decode any resolution up to 8192x4096. It guarantees real-time performance for encoding/decoding 4K 30fps based on its sophisticated, latency tolerant architecture. HEVC Codec is highly optimized for memory bandwidth loading and excellent power management.

## 1.2 Architecture



HEVC codec is easy to integrate into a SoC, since it can be connected through the industry standard interfaces : 32-bitAMBA3 APB bus for host CPU system control and 128-bit AMBA3 AXI for data transfer.

## 1.3 HEVC Codec Features

### 1.3.1 HEVC/H.265 Encoder

■ Capable of encoding HEVC Main/Main 10 profile @L5.0 High-tier

■ Max resolution: 8192x4096, Min resolution: 256x128

■ Performance : 3840x2160 30fps @400MHz

■ Input video format

-YUV 4:2:0 8bit

-YUV 4:2:0 10bit

-YUV 4:2:2 8/10bit

■ I/P/B slices

■ CUT64

-support PU size : 32x32, 16x16, 8x8

-support TU size : 32x32 to 4x4

■ High performance CABAC (100Mbps)encoding

■ Low delay coding

-less than 1ms delay for starting encoder with sub-frame synchronization

■ Rate control(frame level and CU level)

-VBR , CBR and ABR

-ROI support

■1/4-pel accuracy motion estimation with search range[+/-128H,+/-64V] in IME base on pmv, and [+/-16H, +/-16V] in FME

■ Sample adaptive offset(SAO)

■ Loop filtering across slice

■ Transform skip

### 1.3.2 HEVC/H.265 Decoder

■ Capable of encoding HEVC Main/Main 10 profile @L5.0 High-tier

■ Max resolution: 8192x4096, Min resolution: 8x8

■ Performance : 3840x2160 30fps @400MHz

■ I/P/B slices

-All intra prediction modes

-All inter prediction modes

■ Variable CTU size: 64x64 to 16x16

-variable PU size : 64x64 to 4x4

-variable TU size : 32x32 to 4x4

■ High performance CABAC(100Mbps) decoding

■ Advanced Motion Vector Prediction(AMVP) and merge mode

■ 1/4 motion compensation with 8 tap filters

■ Uniform reconstruction quantization(URQ)

■ In-loop deblocking filtering

■ Sample adaptive offset(SAO)

■ Loop filtering across slice/tile boundary

■ Sequence change detection