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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  9th Meeting: Geneva, CH, 27 April – 7 May 2012 | Document: JCTVC-I0607r2 |

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| *Title:* | **On allocation of NAL unit types** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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# Abstract

This document proposes an allocation scheme of NAL unit types, as well as restrictions on decoding order of NAL unit types with an access unit.

# Current allocation of NAL unit types

Table 7‑1 – NAL unit type codes and NAL unit type classes

|  |  |  |
| --- | --- | --- |
| **nal\_unit\_type** | **Content of NAL unit and RBSP syntax structure** | **NAL unit type class** |
| 0 | Unspecified | non-VCL |
| 1 | Coded slice of a non-IDR, non-CRA and non-TLA picture slice\_layer\_rbsp( ) | VCL |
| 2 | Reserved | n/a |
| 3 | Coded slice of a TLA picture  slice\_layer\_rbsp( ) | VCL |
| 4 | Coded slice of a CRA picture  slice\_layer\_rbsp( ) | VCL |
| 5 | Coded slice of an IDR picture slice\_layer\_rbsp( ) | VCL |
| 6 | Supplemental enhancement information (SEI) sei\_rbsp( ) | non-VCL |
| 7 | Sequence parameter set seq\_parameter\_set\_rbsp( ) | non-VCL |
| 8 | Picture parameter set pic\_parameter\_set\_rbsp( ) | non-VCL |
| 9 | Access unit delimiter access\_unit\_delimiter\_rbsp( ) | non-VCL |
| 10-11 | Reserved | n/a |
| 12 | Filler data filler\_data\_rbsp( ) | non-VCL |
| 13 | Reserved | n/a |
| 14 | Adaptation parameter set aps\_rbsp( ) | non-VCL |
| 15-23 | Reserved | n/a |
| 24..63 | Unspecified | non-VCL |

# Summary of current NAL unit type allocation and restrictions

* Unspecified: 0, 24..63
  + shall not precede the first VCL NAL unit of the coded picture
* Reserved: 2, 10, 11, 13, 15..23
  + 15..18: may start a new access unit
  + 20..23: shall not precede the first VCL NAL unit of the coded picture
  + 2, 10, 11, 13: no order restriction specified
* Other (specified and not reserved) NAL unit types: 1, 3..9, 12, 14
  + 1, 4..9, 14: may start a new access unit
    - 6 (SEI): shall precede the first VCL NAL unit of the coded picture
    - 9 (AUD): shall be the first NAL unit in an access unit
  + 12 (FD): shall not precede the first VCL NAL unit of the coded picture

# Proposed allocation of NAL unit types

Table 3‑1 – NAL unit type codes and NAL unit type classes

|  |  |  |
| --- | --- | --- |
| **nal\_unit\_type** | **Content of NAL unit and RBSP syntax structure** | **NAL unit type class** |
| 0 | Unspecified | non-VCL |
| 1 | Coded slice of a non-RAP, non-TLA and non-TFD picture slice\_layer\_rbsp( ) | VCL |
| 2 | Coded slice of a TFD picture  slice\_layer\_rbsp( ) | VCL |
| 3 | Coded slice of a non-TFD TLA picture slice\_layer\_rbsp( ) | VCL |
| 4 | Coded slice of a CRA picture with TFD pictures slice\_layer\_rbsp( ) | VCL |
| 5 | Coded slice of a CRA picture without TFD pictures slice\_layer\_rbsp( ) | VCL |
| 6 | Coded slice of BLC picture with TFD pictures slice\_layer\_rbsp( ) | VCL |
| 7 | Coded slice of BLC picture without TFD pictures slice\_layer\_rbsp( ) | VCL |
| 8 | Coded slice of an IDR picture slice\_layer\_rbsp( ) | VCL |
| 9..24 | Reserved | n/a |
| 25 | Video parameter set video\_parameter\_set\_rbsp( ) | non-VCL |
| 26 | Sequence parameter set seq\_parameter\_set\_rbsp( ) | non-VCL |
| 27 | Picture parameter set pic\_parameter\_set\_rbsp( ) | non-VCL |
| 28 | Adaptation parameter set aps\_rbsp( ) | non-VCL |
| 29 | Access unit delimiter access\_unit\_delimiter\_rbsp( ) | non-VCL |
| 30 | Filler data filler\_data\_rbsp( ) | non-VCL |
| 31 | Supplemental enhancement information (SEI) sei\_rbsp( ) | non-VCL |
| 32..47 | Reserved | n/a |
| 48..63 | Unspecified | non-VCL |

# Summary of proposed NAL unit type allocation and restrictions

* Unspecified: 0, 48..63
  + shall not precede the first VCL NAL unit of the access unit
    - The 16 NAL unit types 48..63 are "Unspecified" and cannot be used future extensions, as they can be used in external specifications, such as HEVC RTP payload format and HEVC file format
* Reserved: 9..24
  + (These 16 NAL unit types are "Reserved" potentially for use as VCL NAL units in future extensions, but we don't need to say this now)
  + shall not precede the first VCL NAL unit of the access unit
* Reserved: 33..47
  + (These 15 NAL unit types are "Reserved" potentially for use as non-VCL NAL units in future extensions, but we don't need to say this now)
  + 33..43 may start a new access unit
  + 44..47 shall not precede the first VCL NAL unit of the coded picture
    - These 16 NAL unit types are "Reserved" for use as VCL NAL units in future extensions
* Other (specified and not reserved) NAL unit types: 1..9
  + 1..8: VCL NAL units
  + 25..32 (VPS, SPS, PPS, APS, AUD, FD, SEI)
    - As currently specified for VPS, SPS, PPS, APS, AUD, FD and SEI

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