IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TXOP Limit Rules Text | | | | |
| Date: 2013-09 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Graham Smith | DSP Group | 1037 Suncast Lane, #112  El Dorado Hills, CA 95762 | 916 358 8725 | Graham.smith@dspg.com |

Abstract

This document contains proposed changes to satisfy CID 0166

**CID 166**

**CID 166**

**Comment**

“The rules for non-zero TXOP Limits are (a) incomprehensible (5 lines with about 26 conditionals separated by a random mix of commas and conjunctions) (b) self-contradictory (STAs shall limit the duration of TXOPs to the TXOP Limit ... The TXOP Limit may be exceeded) and (c) incomplete (to account for e.g. A-MPDUs, PS-Polls, QoS Nulls, etc.)”

“Clarify exactly when the TXOP Limit may be violated (stealing some input from The Other Place, perhaps)”

­­­­­­­­­­­­­­­­­­­­­­­­­­­-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Discussion**

The commenter is correct that even if one could parse the sentences correctly, the existing text does not account for aggregation, PS-Polls or QoS Nulls, etc. The following proposed text is the result of a detailed study of this problem and covers all possible packets that are affected by TXOP Limit.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Proposal**

In Clause 9.19.2.2,

Replace

“STAs shall limit the duration of TXOPs obtained using the EDCA rules to the value specified by the TXOP limit. The duration of a TXOP is the duration during which the TXOP holder maintains uninterrupted control of the medium, and it includes the time required to transmit frames sent as an immediate response to the TXOP holder’s transmissions.

When the TXOP limit is nonzero, a STA shall fragment an individually addressed MSDU so that the transmission of the first MPDU of the TXOP does not cause the TXOP limit to be exceeded at the PHY rate selected for the initial transmission attempt of that MPDU. The TXOP limit may be exceeded, when using a lower PHY rate than selected for the initial transmission attempt of the first MPDU, for a retransmission of an MPDU, for the initial transmission of an MPDU if any previous MPDU in the current MSDU has been retransmitted, or for group addressed MSDUs. When the TXOP limit is exceeded due to the retransmission of an MPDU at a reduced PHY rate, the STA shall not transmit more than one MPDU in the TXOP.

with

“A STA or AP obtaining a TXOP (the TXOP holder) shall, subject to the exceptions below, ensure that the duration of a TXOP does not exceed the TXOP Limit, when non-zero. The duration of a TXOP is the time the TXOP holder maintains uninterrupted control of the medium, and it includes the time required to transmit frames sent as an immediate response to TXOP holder transmissions.

The TXOP Limit may be exceeded only for:

* + Retransmission of an MPDU, not in an A-MPDU consisting of more than one MPDU, when using a lower PHY rate than selected for the initial transmission attempt of the first MPDU,
  + Initial transmission of an MSDU, not in an A-MPDU consisting of more than one MPDU or in an A-MSDU, under a BA agreement
  + Initial transmission of a Control MPDU or a QoS Null MPDU, not in an A‑MPDU consisting of more than one MPDU
  + Initial transmission of a fragment of an MSDU/MMPDU, if a previous fragment of that MSDU/MMPDU was retransmitted
  + Transmission of an MSDU/MMPDU fragmented into 16 fragments
  + Transmission of an A-MPDU consisting of the initial transmission of a single MPDU not containing an A‑MSDU and which is not a unicast Management MPDU
  + Transmission of a group-addressed MPDU, not in an A-MPDU consisting of more than one MPDU
  + Transmission of a Null Data Packet (NDP)

A STA shall fragment an individually addressed MSDU so that the transmission of the first MPDU of the TXOP does not cause the TXOP limit to be exceeded at the PHY rate selected for the initial transmission attempt of that MPDU.

Note that the TXOP Limit is not exceeded for:

* + Initial transmission of an MPDU containing an unfragmented though fragmentable MSDU/MMPDU
  + Initial transmission of the first fragment of a fragmented MSDU/MMPDU, except for an MSDU/MMPDU fragmented into 16 fragments
  + Initial transmission of an A-MSDU
  + Initial transmission of a fragment of a fragmented MSDU/MMPDU, if no previous fragment of that MSDU/MMPDU was retransmitted, except for an MSDU/MMPDU fragmented into 16 fragments
  + Transmission of an A-MPDU consisting of a single MPDU containing an A‑MSDU or unicast Management MPDU, unless this is a retransmission of that MPDU
  + Transmission of an A-MPDU consisting of more than one MPDU, even if some or all of the MPDUs are retransmissions

The TXOP Limit shall not be exceeded by the TXOP holder if it transmits more than one QoS Data, QoS Null or Management MPDU in the TXOP. If the TXOP holder exceeds the TXOP Limit, it should use as high a PHY rate as possible to minimize the duration of the TXOP.

For MSDUs and A-MSDUs that have been downgraded in priority, the TXOP Limit for that access category to which MSDUs/A-MSDUs are downgraded to, applies.”