IEEE P802.11  
Wireless LANs

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| Clarification on calibration test cases | | | | |
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# Abstract

This contribution provides some clarifications on calibration test cases.

# Scenarios for calibration of MAC simulator

The applicability of each test in this section is TBD.

## Common parameters

|  |  |
| --- | --- |
| **PHY Parameter** | **SUGGESTED VALUES** |
| GI: | [long] |
| Data Preamble: | [11ac] |
| BW | 20 Mhz |

The following parameters are common to the MAC tests unless otherwise stated.

|  |  |
| --- | --- |
| **Parameter** | **SUGGESTED VALUES** |
| Aggregation | A-MPDU  max aggregation size =64  No A-MSDU  immediate BA  (aggregation is assumed to be ON) |
|  |  |
| Max number of retries | 10 |
| Rate adaptation | Fixed MCS |
| EDCA parameters | Default params for best effort (CWmin=15)  AIFSN=3 |

The follwing parameters are common to the traffic model unless otherwise stated.

Transpot protocol- UDP

Traffic model: full buffer

## Test 1a: MAC overhead w/out RTS/CTS

Goal:

designed to verify whether the simulator can correctly handle the basic frame exchange procedure, including AIFS+backoff procedure and A-MPDU+SIFS+BA sequence. Also to make sure the overheads are computed correctly.

Assumptions:

Assumption is that PER is 0

Parameters:

MSDU length:[0:500:2000Bytes]

2 MPDU limit

RTS/CTS off

Data MCS = [0,8] ( to clarify, run a sweep over MSDU length once for MCS 0, and once for MCS 8.

Block ACK MCS=0 (non-HT format)

AIFS=DIFS=34us



Output metric:

(1) MAC layer Throughput

(2) Time trace of transmitting/Receiving event

CP1 ( check point 1) start of A-MPDU

CP2 end of A-MPDU

CP3 start of Block ACK

CP4 end of Block ACK

CP5 start of A-MPDU

|  |  |  |  |
| --- | --- | --- | --- |
| Test Items | Check points | Standard definition | Matching? |
| A-MPDU duration | Tcp2-Tcp1= | ceil((FrameLength\*8)/rate/OFDMsymbolduration) \* OFDMsymbolduration + PHY Header |  |
| SIFS | Tcp3-Tcp2=16 us | 16 us |  |
| Block ACK duration | Tcp4-Tcp3= | ceil((ACKFrameLength\*8)/rate/OFDMsymbolduration) \* OFDMsymbolduration + PHY Header |  |
| Defer & backoff duration | Tcp5-Tcp4= | DIFS(34 us)+backoff (CWmin)  =34us+n\*9us |  |

Tcp is the timestamp related with the corresponding simulation event on the check point (CP)

The following is an example calcultation of TPUT when the MSDU size is 1508, and MCS =0

* Number of MPDUs in AMPDU= 2
* Bytes per MPDU: 1538
  + Bytes from application laye:1472
  + The MSDU size is 1508
    - 28-bytes UDP/IP header and 8 byte LLC packet header
    - So total of 36 bytes are to added to the application packet, making 1508 byte of MSDU size
  + MAC header: 30 bytes
    - FC=2;Duration=2;Addr1=6;Addr2=6;Addr3=6;SeqContrl=2;QoSCntrl=2; FCS=4
    - Note: Assuming HT control field is not used
* MPDU delimiter 4 bytes in each AMPDU subframe
* 2 bytes padding in first MPDU
* Bytes per PSDU: 3086B
  + First AMPDU subframe: 1538+4+2=1544
  + Second AMPDU subframe: 1538+4=1542
* Each PSDU is appended with:
  + Tail bits: 6 bits
  + Service Field: 2 Bytes
* Total bits per PPDU without preamble (i.e, data field in PPDU): (1544+1542+2)\*8+6=24710 bits
* Duration of PPDU w/out preamble= ceil(24710/26)\*4us=3.804ms
* Duration of PPDU w/ preamble= 3.844ms
* Duration of Block ACK: 68 us
* Expected time waiting for the Medium = 110.5 us (SIFS+AIFSN\*slotTime+CW/2\*slotTime=16+3\*9+15/2\*9)
* Expected TPUT= 1472\*8\*2/(3.844ms+68us+16us+110.5us)=5.83Mbps
* (Note this is application layer tput)
* Note: in some simulators, there may be management frame exchanges such as ABBBA request/response and the corresponding ACKs before application data transmission, which may slightly affect the simulation results.