

## Simulating coexistence between 802.11y and 802.16h systems in the 3.65 GHz band – An amendment for 802.11e

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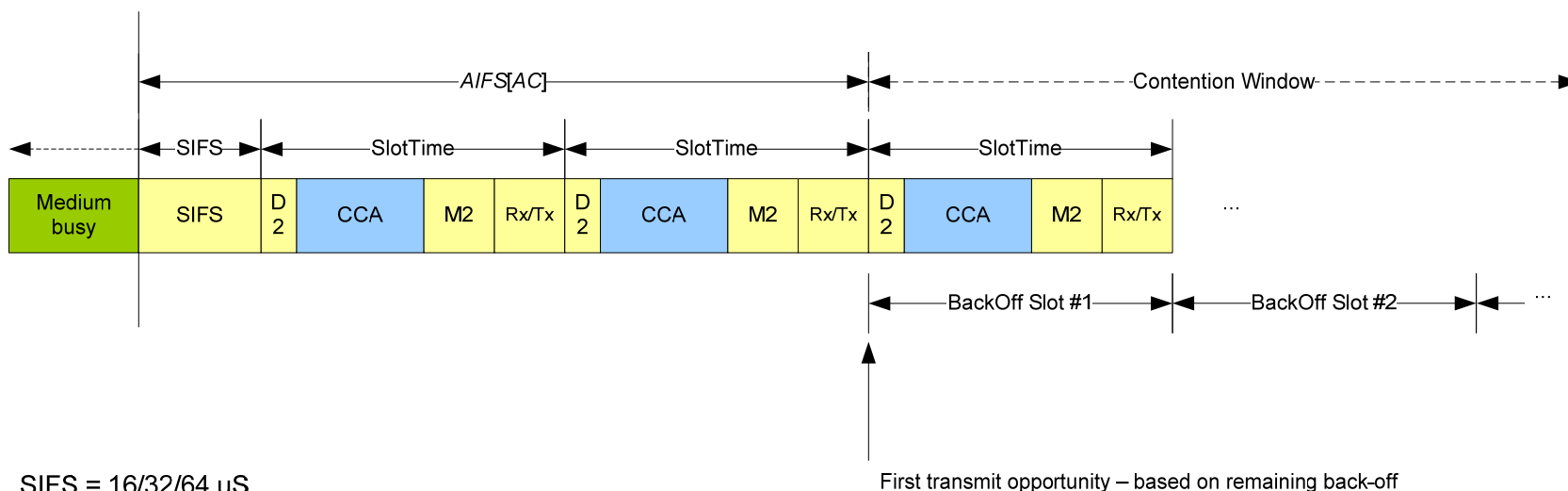
Paul Piggin  
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# Simulation model and starting assumptions

- 802.11y specifies a maximum frame duration of 4ms
- CCA-ED threshold: -72/-75/-78dBm.
- RTS/CTS is implemented (helps with the hidden node problem)
- HCF (Hybrid Coordination Function) is specified in the 802.11e amendment
  - HCF consists of EDCA (Enhanced Distributed Channel Access, distributed function) and HCCA (HCF Controlled Channel Access, centralized function)
  - WMM (Wi-Fi Multimedia) certifies the EDCA and TXOP (Transmit Opportunity) features
  - EDCA and TXOP features enhance the QoS support in 802.11
  - EDCA introduces 4 AC (Access Categories) that prioritizes traffic class access to the air interface
  - TXOPs are used to provide a station with a time period in which to transmit in a non-contended manner
- Changes to the simulation that have been implemented:
  - Comment: *With DCF one does not need to wait DIFS for the first packet of a stream when the medium has been free for a while*
  - DIFS (= SIFS + 2.SlotTime) is replaced by AIFS[AC] (= SIFS + AIFSN[AC].SlotTime, AIFSN[AC] ≥ 2)
  - CWmin is replaced by CWmin[AC]
  - CWmax is replaced by CWmax[AC]
  - TXOPs managed via the traffic model
  - A single AC is used in the simulation => AC\_VO. This represents the AC that will be most aggressive at obtaining the medium and good baseline comparison for 802.16 – traffic model needs to match this



# 802.11y model representation (time domain)



SIFS = 16/32/64 uS

SlotTime = 9/13/21 uS

$AIFS[AC] = SIFS + AIFSN[AC] \times SlotTime$

$AIFSN[AC] = 2$

$AIFS[AC] = 34/58/106 \text{ uS}$

$SlotTime = D2 + CCA + M2 + Rx/Tx$

$D2 (aRxRFDelay + aRxPLCPDelay) = 1/1/1 \text{ uS}$

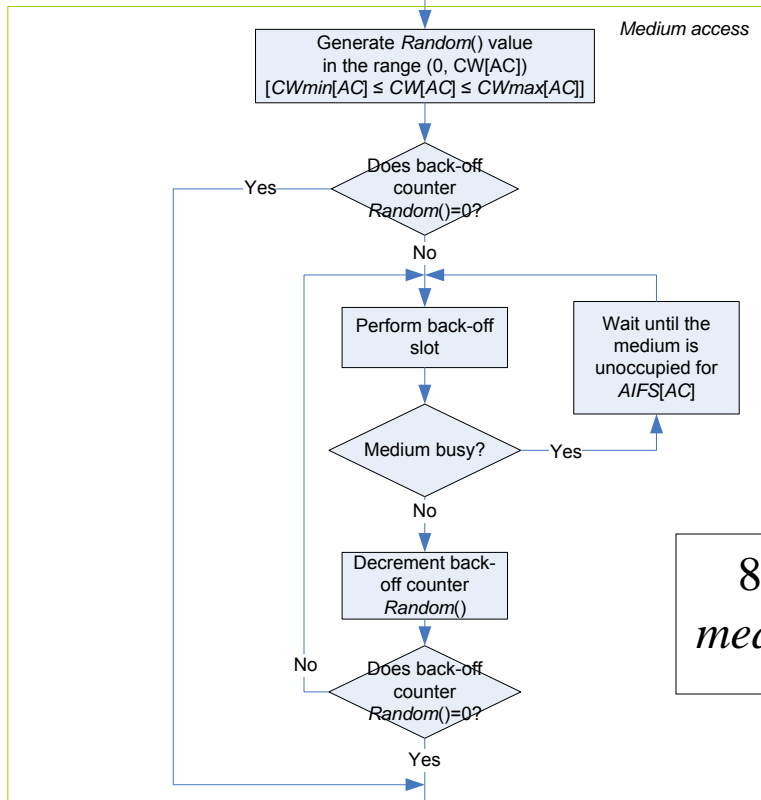
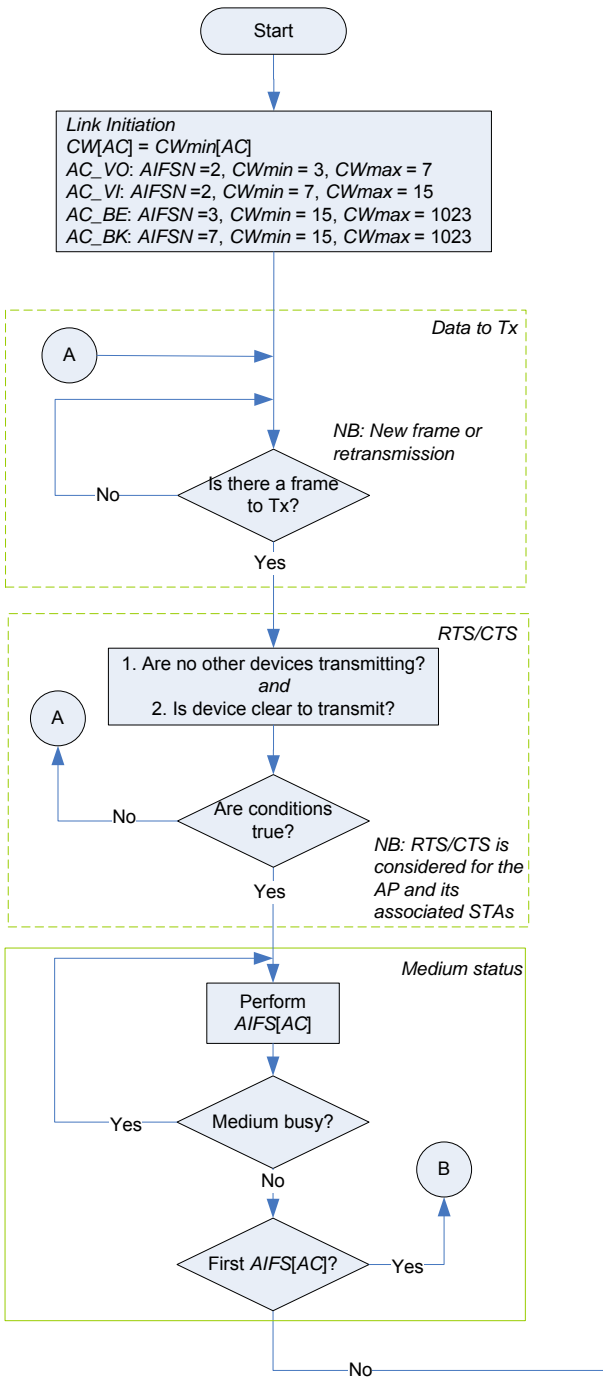
$CCA (Clear Channel Assessment) = 4/8/16 \text{ uS}$

$M2 (aMACProcessingDelay) = 2/2/2 \text{ uS}$

$Rx/Tx (aRXTXTurnaroundTime) = 2/2/2 \text{ uS}$

Legend: 20MHz/10MHz/5MHz Channel Bandwidth

Reference: *Table 147 OFDM PHY characteristics P802.11-REVma*



802.11y model for  
*medium access control*

