Completing the Random Backoff Time Specification

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The Random Backoff Time specification of draft 2 is notably deficient, in that it doesn't define the exact calculation of the Backoff Time. Unless all STAs use exactly the same calculation there can't be even an appearance of fairness of access. This paper proposes text that might be more acceptable. **[Bold comments in brackets are not part of the proposed text and are included for explanation only.]**

6.2.5 Random Backoff Time

STA desiring to initiate transfer of asynchronous MPDUs shall utilize the carrier sense function to determine the state of the media. If the media is busy, the STA shall defer until after a DIFS gap is detected, then generate a random backoff period for an additional deferral time before transmitting. This process resolves contention between multiple STA that have been deferring to the same MPDU occupying the medium.

Backoff Time = INT(CW*Random())*Slot Time

where

CW = An integer between CW_{min} and CW_{max}
Random() = Pseudo random number between 0 and 1
Slot Time = ~~Transmitter turn-on delay + medium propagation delay + medium busy detect response time (including MAC delay) and is~~ A PHY dependent value provided by the PHY MIB parameter. **[Since the MAC no longer calculates this value based on some physical characteristics of the PHY it is not appropriate to include the basis for slot time value here.]**

The Contention Window (CW) parameter shall ~~contain~~take an initial value of CW_{min} for every MPDU queued for transmission. The CW shall ~~double~~take the next value in the series at every retry to send a particular MPDU until it reaches CW_{max}. A retry is defined as the entire sequence of frames sent to attempt to deliver an MPDU. The CW will remain at CW_{max} for the remaining ~~of the~~ retries. This is done to improve the stability of the access protocol under high load conditions. See Figure 6-5. **[These changes are made for more exactness.]**

The set of CW values are: 7 (CW_{min}), 15, 31, 63, 127, 255 (CW_{max}). **[These values are proposed based on some simulation work thrown together at the Schaumburg meeting. It shows marked improvement in channel utilization with lower CW numbers in lightly**

loaded BSSs. It also showed that the max value should be large to clear congestion for heavy traffic situations.]

[EDITOR: Figure 6-5 must be changed to reflect the new set of CW values.]

~~CW_{min} and CW_{max} are MAC constants that should be fixed for all MAC implementations, because they effect the access fairness between stations.~~ **[This sentence states the obvious and is not necessary with this proposed text.]**