

Operation in an Interference Limited Environment

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Abstract:

This submission addresses the issue of high capacity system applications. In such applications, cellular and microcellular systems become interference limited. This paper suggest that the Mac State Machine be amended to allow IEEE 802.11 hardware to operate efficiently in an interference limited environment..

Interference Limited Environments

In a three dimensional office building scenario of WLAN applications, it is apparent that some stations will be so positioned as to receive low level signals from many BSS's. For instance, an Access Point might be located at the intersection of hallways. As such, it is able to receive signals from remote BSS's but typically at low levels. With respect to signals from its own BSS, which are in fact intended for this specific Access Point, these arrive at much greater signal level. Because of the amplitude difference between the desired strong signals and the undesired weaker signals, the strong signals are recoverable.

As the demand for capacity grows, more Access Points are introduced which reduce the size of the cells or BSS's. Such cell subdivision, which is characteristic of cellular system, for instance, leads to the condition of interference limited operation. In interference limited operation, there is such prevalent reuse of frequencies that in hours of peak use there is frequently a low level signal present on all or many frequencies or channels.

It should be anticipated, therefore, that in successful IEEE 802.11 installations, interference limited conditions will be presented. Unless the Mac is designed to anticipate such conditions of operation, the system may fail to operate satisfactorily.

Consider the situation depicted in Figure #1 where Station S receives first a weak signal, A, which is followed by a stronger signal, B. In this scenario, the header of a low level signal, A, which was transmitted by remote station R is received. Assume that this low level signal, A, is not intended for station S.

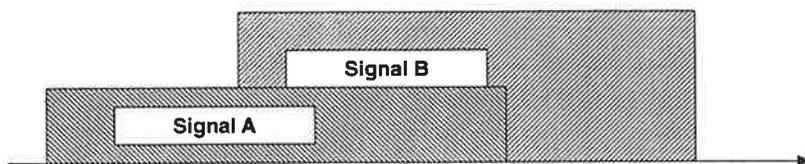


Figure #1

It is of critical importance that Signal B, which is intended for station S be received.

Conclusion:

The purpose of this submission is to request that the Mac State Machine be specific so as to allow rejection of a signal immediately following reception of the Mac header, if the Mac destination ID does not correspond to the station in question. In this way, the Mac state machine may return to the mode where it is awaiting the arrival of a new signal. If this proposal is accepted, the IEEE 802.11 systems will be able to operate effectively in an interference limited condition.

Motion:

The Mac State Machine provide the option for a receiving station to reject an incoming compliant IEEE 802.11 transmission as soon as the receiving station determines that the packet is not intended for the station it. Once rejected, the station is free to receive another signal even if that signal begins before the scheduled end of the rejected signal.