
IEEE P802.11
Wireless LANs

Co-existence and Sharing Rules

Date: September 15, 1998**Author:** Hitoshi Takanashi
NTT Wireless Systems Laboratories
1-1 Hikarino-oka, Yokosuka, Kanagawa 239-847
Phone: 011 81 468 59 3471
Fax: 011 81 468 55 1172
e-Mail: **Error! Bookmark not defined.**

1. What's "Co-Existence"?

Same frequency or band is equally shared by two or more systems operating in the same or within an interference area.

2. Conditions of co-existence with other systems

(a) Same sharing rule and CSMA/CA

Equally sharing is the bottom line. The same sharing rule is required in order to share the limited resource equally. The IEEE802.11 MAC has a sharing rule based on the CSMA/CA with detail and restrict definitions that shall be followed by the all systems operating in the same area. If a collision free SIFS is not offered, IEEE802.11 MAC won't work.

(b) RTS/CTS

Efficient sharing will be appreciated. In order not to have any hidden terminal problems, having the same RTS/CTS(NAV) function is recommended.

1. Dedicated Carrier to A System in an area

Each frequency can be dedicated to a system. An appropriate carrier sense algorithm shall be equipped. The IEEE802.11 packets may be sent after a long interval between packets. A beacon may be transmitted with a certain delay due to the medium busy. The interval of the beacon is not guaranteed. The carrier sense algorithm shall detect the IEEE802.11 packets that have the above characteristics.

2. Carrier Spacing

In order to have a solid carrier sense and efficient co-existence, the same carrier spacing is necessary.

If the carrier spacing is different from each other:

(a) one channel occupation may cause that two channels of other systems are busy.

(b) serious throughput degradation due to interference may be observed in spite of low interference. (frequency selective interference may occur)

1. Throughput v.s. number of sharing cells

If one carrier is shared by many cells, throughput will be degraded due to interference. Half (available) number of channels gives half or less throughput. The CFP (option) may not be guaranteed. Further study may be needed.

2. Conclusions

(a) The same channel sharing with other systems that have different carrier sense scheme will NOT be possible.

(b) The same band sharing among different systems will be possible with a carrier sense rule.

- (c) A carrier will be used by one system in an area. An appropriate carrier sense, which detects the IEEE802.11 packets that do not have a certain interval between packet transmissions, is indispensable in order to share the same BAND (not the same carrier).
- (d) More number of carriers will be appreciated in terms of having dedicated carrier to a system.
- (e) If other systems are not deployed (operating) in the same area, the same channel plan is not necessary, however, having the same channel plan decreases the PHY cost.
(if it spreads out,,)