Refinements to the Frequency Hop CCA Criteria

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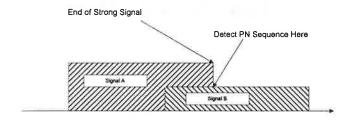708 576 3169
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Problem # 1

- **Section 10.6.23 specifies CCA detection performance with zero-one sync patterns and with random data patterns.**
- **The "random data" aspect provides only very marginal benefit to the CCA detection process, and seriously degrades the false detection probability of equipment compliant to the standard.**
- **If this requirement is not amended, it will undermine the utility of the standard.**

The Random Data Scenario

Note: Signal B must be at least -65 dBm

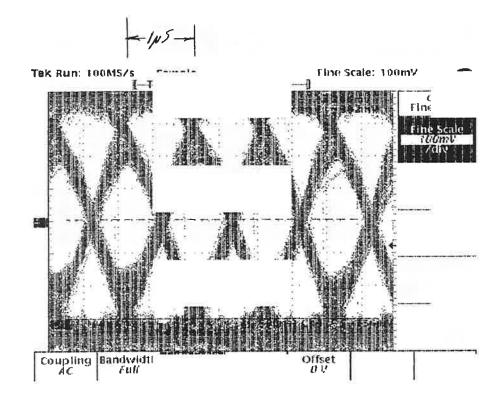# Implementing the Random Data CCA Requirement

- **CCA based on Amplitude Only**
- **CCA based on Amplitude in Combination with Pattern Recognition**
  - **"on channel" two level, 1 Mb/s, 802.11 Frequency Hop signals**
  - **"on channel" four level, 2 Mb/s, 802.11 Frequency Hop signals**
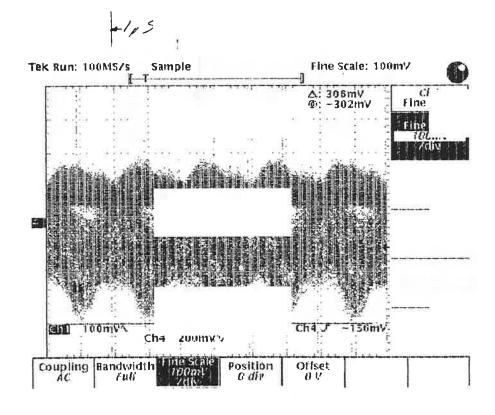
Two level, 1 Mb/s,
"On Channel" Signal

Two level, 1 Mb/s,
"Adj Channel" Signal

3A

Summary

- What feature of the two level and four level signals is distinctive enough for a simple, low cost, receiver to positively identify either waveform?
- The answer escapes the author.
- The requirement for the Frequency Hop PHY to defer to pseudorandom data is a problem in terms of requiring either:
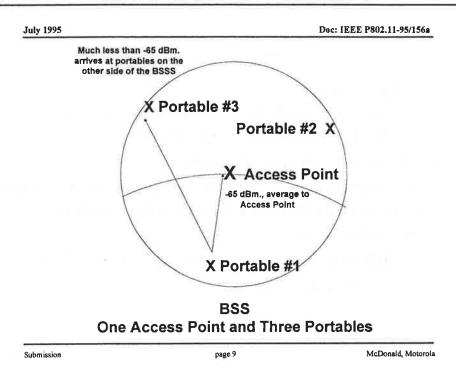 - high cost, high power consumption circuits, or
  - excessive deferrals.

Potential Benefit of the Pseudorandom CCA Requirement

- **Case 1: All Signal sources from the same BSS**
  - If the Access Point is transmitting, then there is no problem
  - If a Portable is transmitting there is a potential for a problem as illustrated on next slide
  - The answer to this problem is RTS/CTS, not CCA

Much less than -65 dBm.
arrives at portables on the
other side of the BSSS

X Portable #3

Portable #2 X

X Access Point

-65 dBm., average to
Access Point

X Portable #1

**BSS
One Access Point and Three Portables**

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- **Portable 1 starts a transmission, Signal A, to the Access Point**

- **Portable 2 doesn't recognize this as requiring CCA deferral, its too low in amplitude**

- **Portable 3 now sees the situation depicted in Figure 1**

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- **Case #2: Interference from another BSS**
  - Not likely that a signal from a remote BSS would be received at an amplitude above -65 dBm.
  - If it above -65 dBm and there is no deferral, then the interference that might result will be short lived since the BSS's use difference Hop patterns.

Conclusion

- **The Pseudorandom CCA Requirement is of little or no benefit in either:**
  - Case #1, or
  - Case #2
- **Moreover, since the Pseudorandom CCA Requirement leads to undesirable deferral in some situations the net impact on system performance is NEGATIVE.**

Motion: 1

- It is moved that the first paragraph of section 10.3.3.2.1 and section 10.6.23 be amended as follows:

- From 10.3.3.2.1

- ....Section 10.6.23 specifies detection performance with zero-one sync patterns ~~and with random data patterns~~..........

- From 10.6.23

- "The PHY shall, in the presence of any 802.11 compliant FH PMD signal above -85 dBm, signal busy with a 90% probability in detection of the preamble within the CCA assessment window. ~~The PHY shall, in the presence of any 802.11 compliant FH PMD signal above -65 dBm, signal busy with a 70% probability for detection of random data within the CCA assessment window~~........

- **Motion 1 Vote**
- **Freq Hop Group**

Problem # 2

- **Consider the following sentence from the first paragraph of 10.3.3.2.1**
- **The PLCP shall be capable of detecting within the slot time an FH PHY conformant signal which is received at the selected antenna up to 20 μs after the start of the slot time with the detection performance specified in section 10.6.23**
- **This sentence is redundant to the requirement of two sentences down which require "an FH PHY conformant signal" to be detected in 16 uSec.**
- **The author recommends that the 20 uSec requirement be removed.**

Motion 2

- **It is moved that the first paragraph of section 10.3.3.2.1 be amended to read as follows:**

- "The carrier sense/clear channel assessment (CS/CCA) state machine is shown in Figure 10-9. The PLCP shall perform a CS/CCA assessment on a minimum of one antenna within a contention backoff slot time of 50 μs. ~~The PLCP shall be capable of detecting within the slot time an FH PHY conformant signal which is received at the selected antenna up to 20 μs after the start of the slot time with the detection performance specified in section 10.6.23.~~ Section 10.6.23 specifies detection performance with zero-one sync patterns and with random data patterns........."

- **Motion 2 Vote**
- **Freq Hop Group**
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