



RFID Alliance Lab: Gen 1 and Gen 2

May 2-3, 2006

Daniel Deavours
Research Assistant Professor
Director of Research, RFID Alliance Lab
ITTC, University of Kansas
deavours@ittc.ku.edu



Who We Are

RFID Alliance Lab

- ◆ Evaluate RFID products in a *scientific* way
- ◆ Provide useful, timely, credible, and unbiased data to end users of RFID products
- ◆ Constituents
 - ◆ **University of Kansas / ITTC:** Primary research contributor
 - ◆ **RFID Journal:** Initial funding, distributor, advertisement
 - ◆ **Rush Tracking Systems:** Initiator, industry lesion
- ◆ Business model
 - ◆ Sell reports (~\$1,000 / report) to finance future reports
 - ◆ Sponsorships

ITTC/KU Applied Research Labs

- ◆ Helping companies solve hard problems
 - ◆ Tagging small electronics devices
 - ◆ Seknion: direction of travel through portal
 - ◆ Tagging metal assets
- ◆ Adamas: high performance low profile metal tag
- ◆ Basic research
 - ◆ RFID privacy using CDMA
- ◆ We would like to talk with you about your hard problems



Fundamentals

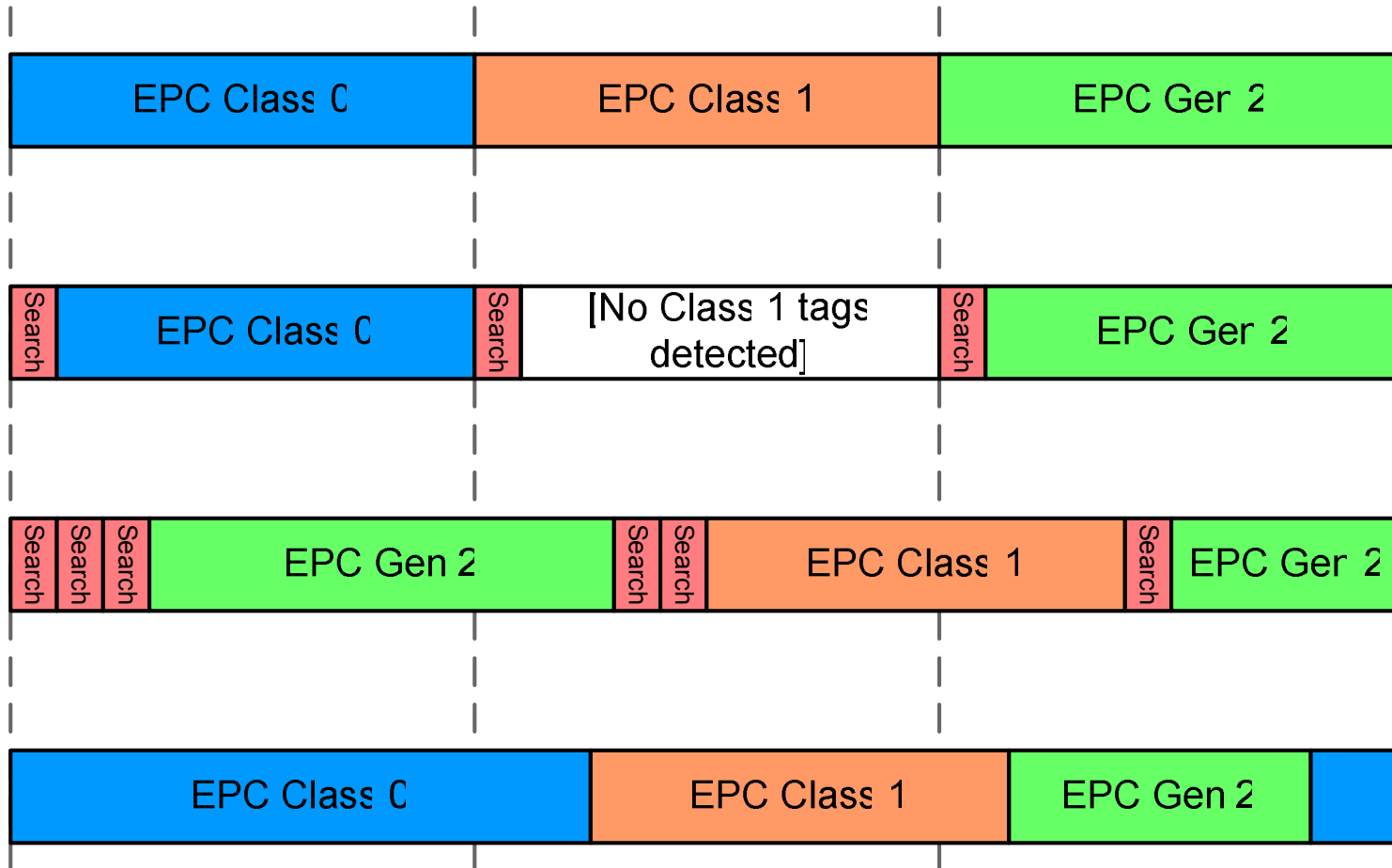
- ◆ Different protocols speak in a different “language”
- ◆ Interrogators can only speak in one “language” at a time
- ◆ Mutli-protocol interrogators work by cycling through protocols



- ◆ How to cycle through protocols
 1. Detect if any tags are present first
 2. Always look, or be quiet if nothing's there
 3. Scheduled time per protocol, or dynamically adjust based on what's present



Illustration of Options





Why Push Only G2?

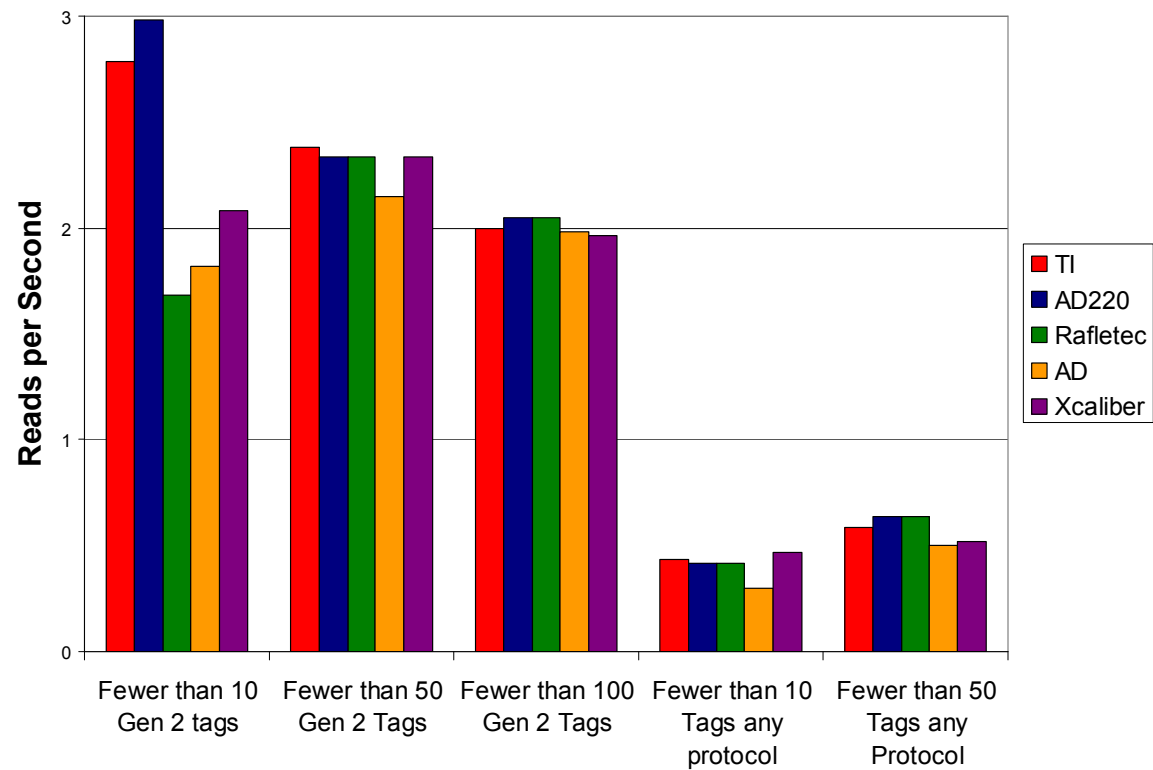
- ◆ Waste of time
- ◆ Waste of spectrum

- ◆ Dense Interrogator Mode (DIM) effective *only* if
 - ◆ All readers operate in DIM
 - ◆ All readers only look for Gen 2 tags



Lab Test Results

Read Speeds





Experiment

- ◆ Place interrogator in “read only Gen 2 tags” mode
 - ◆ Observe reads / second
- ◆ Place interrogator in “read Class 0, Class 1, and Gen 2” mode
 - ◆ Observe reads / second

- ◆ Note: reads / second are computed by reader; unsure of how it counts time



Experiment



Conclusions

- ◆ Multi-protocol readers operate by cycling through protocols
- ◆ Gen 2 speeds reduced
 - ◆ Fewer chances to read
- ◆ Non-Gen 2 protocols can pollute RF spectrum