ROBUST 10-Mbps PHY:
INTRODUCTION

John H. Cafarella
MICRILOR, Inc.
Wakefield, MA

INTRODUCTION

Technology Development

TOPICS

• Robust 10-Mbps Modulation
• MSK: Low Current Drain for PC Cards
• Need for TRANSEC
Robust 10-Mbps in Multipath

• Direct-Sequence Spread-Spectrum
  – Uses 16 Chips/Symbol
  – Provides 12 dB Processing Gain
• Bi-Orthogonal Modulation
  – Expand Data Bandwidth to SS Bandwidth
  – Approximately 7 dB $E_b/N_0$
• Natural Combination for DSSS

Robustness Features

• MAC-Level Retransmissions
  – Low Latency
• Retransmission Protocol also Controls
  – Forward Error Correction
  – Antenna Selection Diversity
  – Adaptive P-CSMA
• PN Codes Optimized for Multipath
Other Features

• Rapid Acquisition
  – Small Preamble Overhead
  – High Data Throughput
  – P-Persistent CSMA Channel Access

• Transmission Security (TRANSEC)
  – Symbol-to-Symbol DSSS Code Changing

MICRILOR Development

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<tbody>
<tr>
<td>US Army</td>
<td>simulation study</td>
<td>Clarion</td>
<td>M10 Bridge Modem</td>
<td>(transparent encapsulation of 802.3)</td>
<td>prod</td>
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<td>US Army</td>
<td>DUWL</td>
<td>3&amp;1 Mbps</td>
<td>Clarion P10</td>
<td>PCMCIA/802.11</td>
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• Clarion M10 in Production
  – Robust 10-Mbps Transmission and DSSS Privacy (TRANSEC)
  – >7.5 Mbps throughput @100m Indoors (P_t=40 mW)
  – >6 Mbps throughput @20 mi. (high-gain ant.)

• Clarion P10 in Development
  – PC Card . . . Low Current Drain and Small Form-Factor
  – AP10 Access Point with DSSS Authentication and BSS Isolation
  – Conforms to 802.11 MAC
Relationship Between 2- and 10-Mbps Standards?

• System Solution
  – Multiple Access Points
  – Dual-Media Access Point

• Product Solution
  – Dual-Mode Wireless NIC

• Standard Constraint
  – Limit Performance for Backward Compatibility?
  – What About Future, Higher Data Rates?