HIPERLAN-2 PHY Status

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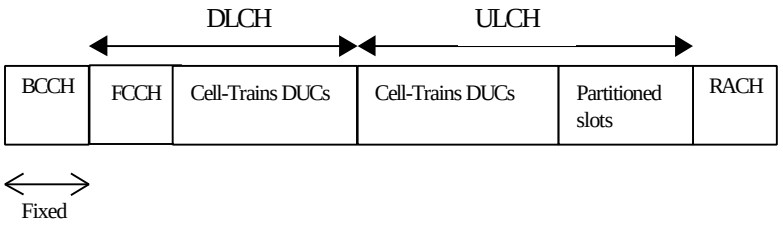
Outline

- Preamble issue
- Other decisions

Preamble - I

- A simplified HIPERLAN-2 MAC-Frame structure



Preamble - II

- Three different preambles for HIPERLAN-2 due to the centralised DLC protocol applied to HIPERLAN-2
  - One for the beginning of MAC-Frame (for BCCH)
    - short symbols for AGC setting, (coarse) frequency acquisition as well as timing acquisition and long symbols for channel estimation (and fine frequency acquisition).
    - Currently no need for the IEEE PLCP Header, because the signalling of LENGTH, PHY mode and SERVICE are performed in the other part of protocol (in FCCH)
  - One for each downlink burst and one for each uplink burst including long symbols C64 (T1/T2 in IEEE 802.11a). Not agreed yet:
    - symbols for coarse frequency and timing acquisition for downlink bursts needed? (most likely NOT)
    - symbols for coarse frequency and timing acquisition and/or AGC symbol(s) in uplink bursts.

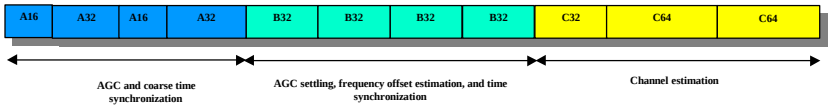
Preamble - III

- HIPERLAN-2 preamble structure for BroadCast Channel (BCCH)

- Currently two proposals exists
- The issue will be resolved in BRAN#13 meeting on April 13-16, in Stockholm

BCCH Preamble

- A preamble introduced at the IEEE/BRAN joint meeting in Orlando by Ericsson/Nokia



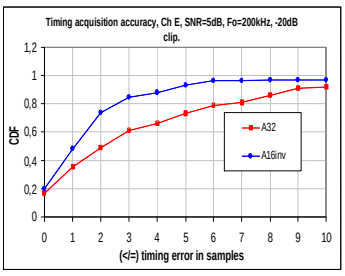
- A preamble proposed by SONY based on 1/4 symbols for A part

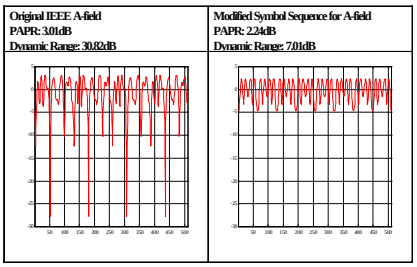
SONY proposal - I

- 6 repetitive symbols of length 16
- Last pattern is phase-shifted by 180° (sign-bit flipped)
- Advantages (SONY claims!!)
  - Auto-correlation receiver implementation:
    - Higher synchronization accuracy
    - Maintains excellent False Alarm/Detection Failure rates
  - Cross-correlation receiver implementation:
    - Clear identification of last repetition (CC-peak phase shift) for length 16 cross correlation
    - Clear CC peak in case of length 32 cross-correlation
  - High commonality to IEEE802.11 preamble

SONY proposal - II

- New sequence proposal for A16, sub-carrier mapping, generation same as in IEEE (see [BRAN12.5, HL12.5SON2.a])
  - Minimize Peak-to-Average-Power-Ratio and dynamic range to improve AGC lock-in speed and reduce nonlinear distortion
    - IEEE: PAPR=3dB, Dynamic Range=30.8dB
    - A16 proposal: PAPR=2.2dB, Dynamic Range=7.0dB





Contact: Ralf Boehnke (boehnke@sony.de)

March 1999 doc.: IEEE 802.11-99/081

Other Decisions

- C64 symbol
  - The content of T1/T2 symbol in 802.11a is used.
- Data interleaving
  - The same block size and permutation rule as 802.11a
- PHY data scrambling
  - A MAC-frame synchronous scrambler with the generator polynomial used in 802.11a. Only 16 initial states are needed which are defined by the first four bits of BCCH.
- Convolutional code and puncturing patterns
  - A rate-1/2 "mother code" with generator polynomials g_0=133 and g_1=171 in octal representation as used in 802.11a
  - for code rate 3/4 the same pattern as 802.11a (2/3 is currently not used in HIPERLAN-2)