Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Considerations for PHY design of TG3c

Date Submitted: March 13, 2007

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Abstract: Describing the considerations of PHY design

Purpose: To be considered in IEEE802.15.3c Alternative PHY standard

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Considerations for PHY design of TG3c

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Summary

- Channelization:
  - Channel separation $\approx 2$ GHz for channelization of 4 channels / 9 GHz

- Needs for “Common-mode”
  - SC-PHY (Single-Carrier PHY) is promoted fundamentally for UM1 and UM5 applications
  - Market will decide the best air-interface
  - Other air-interfaces are accepted flexibly by “Common-mode”

- Two examples of “Common-mode” level for the multiple PHY support
  - Level 1: Use of PHY-mode oriented channel
  - Level 2: Declaration of the using PHY-mode with SC-based preamble
Overview of Channelization

- Based on SC-PHY
- 4 channels / 9 GHz bandwidth
  - Channel Separation $\cong 2$ GHz
  - 3dB bandwidth examples
    - $\cong 1.6$ GHz for Roll-off factor = 0.25
    - $\cong 1.5$ GHz for Roll-off factor = 0.35
Introduction for multiple PHY support standard

- **SC-PHY** is promoted fundamentally, but other air-interfaces are accepted by “Common-mode” flexibly.

  - Short range file down/up loading
    - Likely to be installed in portable devices
    - Simple, low cost, and low power consumption

    ![SC-PHY](image)

  - Uncompressed video signal transmission
    - High-data-rate
    - Operability in NLOS environment

    ![SC-PHY with FDE](image)

  - Market may employ other air-interfaces such as OFDM or ASK

    “Common-mode”

![Kiosk server (server)](image)
“Common-mode” for multiple PHY support

Why “Common-mode” is needed?
- Market will decide the best air-interface

(Level #1)

PNC uses its PHY-mode oriented channel along with carrier sense

(Level #2)

PNC declares its PHY-mode with “Common-mode” identifier in a preamble (Any type of PHY-mode device can recognize this part by decoder)
Example of “Common-mode” installation in Level #2

Embed a “Common-mode identifier” in PHY preamble to distinguish the using PHY-mode so that every device decoder can distinguish the PHY-mode of received signals.

Figure: PHY frame format example for “Common-mode”
Summary

■ Channel separation \(\cong 2\) GHz for channelization of 4 channels / 9 GHz will be fine

■ “Common-mode” to accept non-SC-PHY air-interfaces
  — SC-PHY is promoted but market will decide the best air-interface

■ Two “Common-mode” levels for the multiple PHY support have been shown as examples
  — Level 1: Use of PHY-mode oriented channel
  — Level 2: Declaration of its PHY-mode with “Common-mode” identifier in a preamble