**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | D0 Text Input – Kookmin Univ. PHY modes on table summary |
| Date Submitted | 17 May 2016 |
| Source | Kookmin Univeristy | Voice: [ ]Fax: [ ]E-mail: [ yjang@kookmin.ac.kr] |
| Re: | [If this is a proposed revision, cite the original document.][If this is a response to a Call for Contributions, cite the name and date of the Call for Contributions to which this document responds, as well as the relevant item number in the Call for Contributions.][Note: Contributions that are not responsive to this section of the template, and contributions which do not address the topic under which they are submitted, may be refused or consigned to the “General Contributions” area.] |
| Abstract | [Description of document contents.] |
| Purpose | [Description of what the author wants P802.15 to do with the information in the document.] |
| Notice | This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. |

**PHY Layer Operating mode(s)**

**PHY A modes**

Table 1: Kookmin PHY A modes

|  |
| --- |
| **PHY Operating Modes** |
| **Modulation** | **RLL Code** | **Optical Clock Rate** | **FEC** | **Data Rate** |
| **Outer code**(Mismatched Frame rates FEC) | **Inner code** |
| S2-PSK | No | 200Hz | Repeat code(symbol/sec) | Code rate = (N-1)/N | Uncoded data rate is equal to the symbol rate Rbit = (bit/symbol) x (symbol rate) = (K) x 10 |
| S8-PSK | Yes | 200Hz | Repeat code(symbol/sec) | Code rate = (N-1)/Nbad-sampling code rate = 1 | Uncoded data rate is triple the symbol rateRbit = (bit/symbol) x (symbol rate) = (3×K/4) x 10 |
| DS8-PSK | No | 1600×n Hz | Repeat code(symbol/sec) | Code rate = (N-1)/Nbad-sampling code rate = 1 | Uncoded data rate is triple the symbol rateRbit = (bit/symbol) x (symbol rate) = (3×K/8) x 10 |

symbol = (data + its repetition)

K is the number of data LEDs

**PHY B modes**

|  |
| --- |
| **Table. Flicker-free Rolling Shutter PHY 5 Operating Modes** |
| **Modulation** | **RLL Code** | **Tx****optical Clock Rate** | **Rx****frame rate** | **Frame Length** | **FEC** | **OH** | **PHY SAP throughput (bps)** |
| C-OOK | Manchester | Clock rate = 2.2 kHzSymbol rate = **10** | Rx(fps) >Tx (1) | DS=**100**(2) | None | Preamble+Ab | 60 |
| 4B6B | DS=6**0**(4) | None | 150 |
| Manchester | Clock rate = 4.4 kHzSymbol rate = **20** | Rx(fps) ~ Tx(3) | DS=**60**(4) | Outer code(5) | Preamble+2.Ab | 580  |
| 4B6B | DS=**60**(4) | 700 |
| **Modulation** | **Coding** | **Tx** **(freq.# /symbol rate)** | **Rx****frame rate** | **FEC** | **OH** | **PHY SAP throughput (bps)** |
| CM-FSK | None | #\_of\_Freq. = 32Symbol rate = 10 | Rx(fps) ≥ 2.Tx  | None | Ab(per symbol) | 40 |
| 2-PSK | 50 |
| 4-PSK | #\_of\_Freq. = 64Symbol rate = 10 | Outer FEC code(6)  | 70 |

Table 2.1: Kookmin PHY B modes

|  |
| --- |
| **PHY Operating Modes** |
| **Mod.** | **RLL Code** | **Optical Clock Rate** | **FEC** | **Data Rate**PHY SAP throughput (bps) |
| **Outer code**(to solve **frame rate variation** and the **time gap** between Images) | **Inner code**(images fusion + frame drop error detection) |
| OOK | Manchester | 2.2 kHz | Repeat DS=100 | Images fusion code (single Ab frame)Code rate = (N-2)/N | 60 |
| 4B6B | 2.2 kHz | Repeat DS=60 | 150 |
| Manchester | 4.4 kHz | Repreat DS=60 | 2/3 missed frames detection code (2 Ab frame)Code rate = (N-4)/N | 580  |
| 4B6B | 4.4 kHz | Repreat DS=60 | 700 |

Table 2.2

|  |
| --- |
| **PHY Operating Modes** |
| **Mod.** | **RLL Code** | **Optical Clock Rate** | **FEC** | **Data Rate**PHY SAP throughput (bps) |
| **Outer code** | **Inner code**(**Mismatched frame rates code**) |
| FSK | 32-FSK | Variable | Repeat code(symbol/sec) | Code rate = 4/5 | 40 |
| 32-FSK/2-PSK | Repeat code(symbol/sec) | Code rate = 5/6 | 50 |
| 62-FSK/4-PSK | Repeat code(symbol/sec) | Code rate = 7/8 | 70 |

**PHY C modes**

Table 3.1: Kookmin PHY C modes (color code)

|  |
| --- |
| **PHY C Operating Modes** |
|  |  | **FEC** |  |
| **Modulation** | **RLL code** | **Outer code** | **Inner code** | **Data Rate** |
| 2D-sequential code | None |  | Code rate = data / (data +clock information)= N/(N+4)Spatial coding | (symbol rate) x (#\_data LEDs)  |
| 4 color 2D-sequential code | (symbol rate) x 2.(#\_data LEDs)  |
| 8 color 2D-sequential code | (symbol rate) x 3.(#\_data LEDs) |
| QR-ISC code | RQR code- (some data for clock transmission)  |

Table 3.2: Kookmin Invisible code