**IEEE P802.15**

**Wireless Specialty Networks**

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| Project | IEEE P802.15 Working Group for Wireless Specialty Networks (WSNs) |
| Title | **Remaining items to address for the UWB PHY** |
| Date Submitted | February 20th, 2023 |
| Source | Marco Hernandez1,2, Ryuji Kohno1,3, Takumi Kobayashi1,3, Minsoo Kim1, Daisuke Anzai4 | 1YRP-IAI, Japan, 2CWC Oulu Univ. Finland, 3YNU, Japan, 4Nagoya I.T., Japan |
| Abstract | Call for Proposals |
| Purpose | Announce Call for Proposals to develop the IEEE 802.15.6ma standard specification. |
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The remaining items to address for the 15.6ma revision UWB PHY are as follows:

**1. Harmonization (4ab) of PSDU construction**

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| 15.6 | Scrambler + FEC + Interleaver + UWB symbol-modulation  |
|  |  |
| 15.6ma | Scrambler + **FEC** + Interleaver + *External FEC* + **UWB symbol-modulation**  |
| 15.6ma | Scrambler + HARQ + **UWB symbol-modulation** |

**Bold:** compatible with 4ab.

**4ab agreement:** PSDU data rates: 1.95 Mb/s, 7.8 Mb/s, 31.2 Mb/s, **62.4 Mb/s** and **124.8 Mb/s**.

**4ab agreement FEC:**

Mode-A: PSDU data rate > 7.8 Mb/s use either **BCC** or LDPC.

Mode-B: PSDU data rate =1.95 Mb/s use **BCC** only and data rate > 1.95 Mb/s use either BCC or LDPC.

Mode-C: PSDU data rate ≥1.95 Mb/s use either **BCC** or LDPC.

**6ma adopted:** UWB symbol-modulation, R=**62.4 Mb/s** and **124.8 Mb/s**, BCC and optionally LDPC.

**Observation:** same radio interface for coexistence level 0.

**TBD:** External FEC. Check: Interleaver. Complementary data rates.

**2. Harmonization (4ab) of SHR**

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| 15.6 | Preamble sequences (Kasami) + SFD |
|  |  |
| 15.6ma |  ?  |

**Especially important for awareness of 4ab transmissions.**

4ab discussions: 4z Ipatov. New preambles: extended Ipatov, m-sequence, CZC.

**4ab agreement:** Ipatov 91 (communications) and PSR (preamble symbol repetition) or SYNC length.

**TBD:** performance of Ipatov vs Kasami. Collaboration from 4ab.

**Maybe:** define one set of sequences for 4ab and another set of sequences for 6ma?

**Observation:** The intention of using the 4ab preamble sequences is for awareness of 4ab transmission as CCA with only energy detection is unreliable. There is no intention of decoding 4ab information.

**3. PHR**

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| 15.6 | PHR frame + HCS + FEC (Shortened BCH parity bits) |
|  |  |
| 15.6ma |  New PHR frame + HCS + ?  |

**TBD:** evaluation of **BCC**. Check if 6ma can accommodate the PHR1 and PHR2 discussed in 4ab.

**4. MAC**

6ma is working out a simple MAC:

1. *Data channel*

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| Network management | CFP | CAP | Inactive |

1. *Control channel*

And the use of a Control channel in another frequency band for management of BANs within transmission range.

The MAC does not seem to require harmonization.

**Observation:** Upon detection of 4ab transmissions, the MAC may trigger coexistence mechanism, like random back off, use of HARQ, change of frequency band, etc.

**5. Potential deprecation in 15.6ma**

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| Differentially encoded PSK modulation |  |
| Type II HARQ |  |
| FM-UWB |  |
| Pulse shapes | Only the spectral mask requires specification. Pulse shapes are implementation dependent. |