**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **Resolution to sponsor ballot comment CID 157** | |
| Date Submitted | 19 September, 2011 | |
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| Re: |  | |
| Abstract | Suggested resolution to sponsor ballot CID 157. | |
| Purpose | Present a resolution to the BRC for consideration. | |
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**Replace the text in 16.3 with the following text:**

The multi-rate and multi-regional offset quadrature phase-shift keying (MR-O-QPSK) PHY supports multiple PSDU data rates within each supported frequency band (see Table 66), employing a concatenation of outer FEC coding, interleaving, and spreading. Selection of the data rate is specified by the variable RateMode, as described in 16.3.2.4 and 16.3.2.5.

For all frequency bands, spreading is obtained by direct sequence spread spectrum (DSSS) applying various spreading factors. For the 780 MHz, 915 MHz, 917 MHz, and 2450 MHz frequency bands, the MR-O-QPSK PHY may support an alternative spreading mode for the PSDU, called multiplexed direct sequence spread spectrum (MDSSS). Selection of the spreading mode is specified by the variable SpreadingMode, which is further explained in 16.3.2.4 and 16.3.2.5.

For the 780 MHz, 915 MHz, and 2450 MHz frequency bands, the MR-O-QPSK PHY supports communication with legacy devices according to the specifications in Clause 10, as described in 16.3.3.

An MR-O-QPSK compliant device shall support at least one of the frequency bands designated in Table 66.

An example of encoding a frame for the MR-O-QPSK PHY is given in Annex L.

**Add the following text to the end of the first paragraph of 16.3.2.4:**

An MR-O-QPSK compliant device shall implement at least RateMode zero with SpreadingMode set to DSSS, see 16.3.2.4. All other possible combinations of RateMode and SpreadingMode (see 16.3.2.4 and 16.3.2.5) are optional.

**Add the following paragraph to the end of 16.3.2.4:**

The relationship between the RateMode variable and the DataRate parameter of the MCPS-DATA.request primitive is described in Table 46.

**Add the following text to the end of the first paragraph of 16.3.2.5:**

Thecombinations of RateMode and SpreadingMode described in this subclause are optional.

**Add the following paragraph to the end of 16.3.2.5:**

The relationship between the SpreadingMode variable and the DataRate parameter of the MCPS-DATA.request primitive is described in Table 46.

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**In order to improve text flow and better match the flow of 16.3.2.5, re-organize the paragraphs in 16.3.2.4 as shown below. Note that there were several other comments submitted on this text which are not considered here.**

Figure 141 shows the signal flow when DSSS is applied on PSDU (SpreadingMode set to DSSS). The supported PSDU parameters for SpreadingMode DSSS are shown in Table 147. An MR-O-QPSK compliant device shall implement at least RateMode zero with SpreadingMode set to DSSS, see 16.3.2.4. All other possible combinations of RateMode and SpreadingMode (see 16.3.2.4 and 16.3.2.5) are optional.

The PSDU information bits, b = {b0, b1, ..., b8 x LENGTH-1}, with frame length of PSDU in octets (LENGTH) shall be first processed by FEC as described in 16.3.2.6, delivering a sequence of code-bits. The code-bits shall be interleaved as described in 16.3.2.7. Depending on the frequency band and RateMode, spreading by DSSS with different spreading factors shall be applied.

The first DSSS method applies BDE (see 16.3.2.8) of the interleaved code-bits and subsequently (*N*,1)-bit-to- chip mapping as described in 16.3.2.9. The second DSSS method applies (*N*,4)-bit-to-chip mapping of the interleaved code-bits as described in 16.3.2.9. In this case, BDE shall not be applied (see Table 147). The highest PSDU data rate is obtained by bypassing BDE and spreading (see Figure 141 and Table 147).

Depending on the frequency band and RateMode, the output sequence of the bit-to-chip mapper shall be whitened (see 16.3.2.11).

The relationship between the RateMode variable and the DataRate parameter of the MCPS-DATA.request primitive is described in Table 46.