

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

**Submission Title:** [Resolutions to MR-FSK Comments on Frequency Tolerance]

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**Re:** [MR-FSK Frequency Tolerance Proposal]

**Abstract:** [This document proposes a frequency tolerance for the MR-FSK that is consistent with other design parameters. It is appropriate for use with defined FSK modes as well as Generic PHY modes.]

**Purpose:** [802.15.4g Comment Resolution for LB51.]

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# Comments on Frequency tolerance

- CID 1315, 1316, 1318, 1319:
  - The frequency tolerance is unnecessarily tight and should be increased to +/- 50 ppm
- CID 1369:
  - Radio specifications are incomplete. The receiver sensitivity is not specified with regard to the data rate. Frequency tolerance of +/- 20 ppm is not appropriate for 12.5 kHz channel spacing at 450 - 470 MHz or 200 kHz channel spacing at 2400-2483.5 MHz.

# Proposed Changes

- The specification on frequency tolerance for the MR-FSK PHY should be parameterized to account for design parameters appropriately.
- This would allow the specification of the clock frequency tolerance to be relaxed when possible, such as when larger data rates and frequency deviations are used.
- Conversely, it would allow the clock tolerance specification to be tightened for designs with narrow frequency deviations, low data rates, such as specified in the dedicated use bands.

# Comment Resolutions

Accept in principle: CID 1315, 1316, 1318, 1319, 1369

Insert the following in the section on Radio Specifications for the MR-FSK PHY (6.12a.4):

The single sided clock frequency tolerance  $T$ , in ppm, shall be set according to the following equation:

$$T \leq \min(T_0 \times (R \times h) / (R_0 \times h_0) \times F_0 / F, 50 \text{ ppm})$$

where  $R$  is the symbol rate in ksps,  $h$  is the modulation index and  $F$  is the carrier frequency in MHz.  $R_0$  is 50 ksps,  $h_0 = 1$  and  $F_0$  is 915 MHz. The value of  $T_0$  is set at 30 ppm to derive  $T$  for modes in all bands, except at 2450 MHz for which the value of  $T_0$  is set at 40ppm.

Change the last sentence in Table 6, under “Conditions” as follows:

“For the MR-FSK PHY, FEC is disabled and a preamble length of 16 octets or greater is used.”