**IEEE P802.15**

**Wireless Personal Area Networks**

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| Abstract | IEEE 802.15.4 Coexistence Document |
| Purpose | Document coexistence analysis |
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# 802.15.6 UWB systems

Coexistence mechanisms available in IEEE Std 802.15.6-2012 and P802.15.6ma are discussed in [38].

The UWB PHY operate in the same frequency ranges. The channel BAN UWB channel plan is identical to the HRP PHY channels as defined in IEEE Std 802.15.4-2024. The channel plan overlaps the LRP PHY channel plan in the range 5624.32–10 435.2 MHz. P802.15.4ab does not introduce any changes to LRP.

The potential for interference between HRP, LRP and BAN UWB exists when operating in overlapping frequencies. Do to the extremely low transmit power of UWB, the likely of interference decreases rapidly with separation distance (e.g. approximately 48 dB at 1 meter of free space path loss). The basic operation of an IR-UWB radio is that it depends on specific preamble patterns to detect such low level signals. Each standard includes multiple preamble patterns designed to maximize separation between devices using

P802.15.4ab introduces optional channelization that covers the same frequency range as the current channel plan, providing partial channel offsets. As was demonstrated in [SPARK], this can improve performance both ways when the UWB channel center frequency is offset by even a partial channel width. This provides an additional mechanism to use to improve coexistence in some conditions. The P802.5.4ab channel plans enable use of channel diversity as an interference mitigation technique. IEEE Std 802.15.4-2024 includes channel scanning capability which enables scanning for UWB activity. Because the signal structure of the BAN UWB PHY can use the same signal structure, preamble codes and packet structure as 802.15.4 HRP UWB, it is possible to use the MLME-SCAN primitive to detect the presence of a BAN UWB device(s) operating in reception range.

As noted in [38], P802.15.6ma includes some mechanisms to detect 802.15.4 HRP UWB systems operating in the same channel. This enables exchange between P802.15.6ma devices about other systems detected.

P802.15.4ma includes additions to the UWB PHY to enable packet level exchange with 802.15.4 HRP UWB devices. This makes possible coordinated coexistence via information exchange between the devices. P02.15.6ma provides a scan procedure that can detect beacons transmitted by 802.15.4 UWN devices. This mechanism relies on detecting beacon frames. Popular uses of 802.15.4 UWB do not use beacon frames. However, an 802.15.4 HRP UWB device may transmit beacon frames, which may make it detectable by a BAN UWB device doing a scan.

# 802.15.6 Narrow Band

Coexistence mechanisms available in IEEE Std 802.15.6-2012 and P802.15.6ma are discussed in [38]. The narrow band PHY operates in the following frequency bands:

* 402 MHz to 405 MHz
* 420 MHz to 450 MHz
* 863 MHz to 870 MHz
* 902 MHz to 928 MHz
* 950 MHz to 958 MHz
* 2360 MHz to 2400 MHz
* 2400 MHz to 2483.5 MHz

P802.15.4ab introduces no changes to the operation of IEEE Std 802.15.4 compliant devices in any of these frequency bands. There are no changes to coexistence characteristics for these bands introduced in the amendment for the IEEE Std 802.15.6-2012 narrow band PHY.