**IEEE P802.15**

**Wireless Personal Area Networks**

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| Re: |  | |
| Abstract | This is the draft version of 802.15.8 PAC Low Energy Service Discovery PHY Document. | |
| Purpose |  | |
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# Overview

The 802.15.8 specification shall be developed according to the P802.15.8 Peer Aware Communication (PAC) project authorization request (PAR), document number 15-12-0063r2 and Five Criteria (5c), document number 15-12-0064r1, which were approved by the IEEE-SA in March of 2012.

# Definitions

# Abbreviations and acronyms

PD PAC Device

LESD Low Energy Service Discovery

# General descriptions

This clause provides the basic framework of PDs. The framework serves as a guideline in developing the functionalities of PDs and their interactions specified in detail in the subsequent clauses.

## Concepts and architecture

## Topology

## Reference model

# MAC layer

## MPDU structure

## Multiple access

e.g. Contention-based access, Contention-free access

## Synchronization procedure

## Discovery procedure

## Peering procedure

## Scheduling

## QoS

## Interference management

## Transmit power control

## Multicast

## Broadcast

## Multi-hop operation

## Relative positioning

## Power management

## Security

## Coexistence

## Higher layer interaction

# Physical layer

## Channelization

### Operating frequency bands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Band(MHz) | Modulation | Modulation index | Channel spacing  (kHz) | Data rate  (kb/s) |
| Sub-GHz | Filtered 2FSK | 1 | 200 | 50 |

## Duplex schemes

## Multiplex schemes

(e.g. CDMA, OFDMA)

## Frame structure

### Discovery frame structure

The LESD Mode PPDU shall be formatted as illustrated.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Octets | |
|  |  | 1 | Variable |
| Preamble | SFD | PHY Header | PHY Payload |
| SHR | | PHR | PSDU |

#### Preamble field

The Preamble field shall contain multiples of the 8-bit sequence “01010101”.



#### SFD

The SFD shall be the selected 16-bit sequence selected from the list of values shown in the following Table.

|  |  |  |
| --- | --- | --- |
| Message type | SFD value for uncoded (PHR+PSDU) | SFD value for coded (PHR+PSDU) |
| Request | 1011 0001 1001 1100 | 1011 0001 1011 0001 |
| Response | 0100 1110 1001 1100 | 0100 1110 0100 1110 |
| Notification | 0110 0011 1001 1100 | 0110 0011 0110 0011 |

Devices that support FEC shall support the SFD associated with coded (PHR + PSDU) and Devices that do not support FEC shall support the SFD associated with uncoded (PHR + PSDU).

#### PHR

The format of the PHR is shown in the following Table.

If the frame type is not “preamble”, the Frame Length field (L5–L0) specifies the total number of octets contained in the PSDU (prior to FEC encoding, if enabled). Otherwise, The field (L5–L0) represents the remaining time of repeated preamble set.

|  |  |  |
| --- | --- | --- |
| **Bit string index** | **0–1** | **2–7** |
| **Bit mapping** | T1–T0 | L5–L0 |
| **Field name** | Frame Type | Frame Length / Remaining time |

|  |  |
| --- | --- |
| **(T1 T0)** | **Frame Type** |
| **0 0** | Request |
| **0 1** | Response |
| **1 0** | Notification |
| **1 1** | Preamble(No PSDU field) |

#### PSDU field

The PSDU field carries the data of the PPDU.

### Data frame structure

## Modulation and coding scheme (MCS)

### Data rates

### Discovery mode

The modulation for the LESD Mode is a 2-level filtered FSK.

The following Table shows the modulation and channel parameters for the LESD Mode PHY.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frequency Band  (MHz) | Modulation | Modulation index | Channel spacing  (kHz) | Data rate  (kb/s) |
| Sub-GHz | Filtered 2FSK | 1 | 200 | 50 |

a Data rates shown are over-the-air data rates (the data rate transmitted over the air regardless of whether the FEC is enabled).

## Multiple antennas