**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Further HRP Comment Resolutions Vol3** |
| Date Submitted | [19 September, 2019] |
| Source | Frank Leong (NXP Semiconductors) |
| Re: | [If this is a proposed revision, cite the original document.][If this is a response to a Call for Contributions, cite the name and date of the Call for Contributions to which this document responds, as well as the relevant item number in the Call for Contributions.][Note: Contributions that are not responsive to this section of the template, and contributions which do not address the topic under which they are submitted, may be refused or consigned to the “General Contributions” area.] |
| Abstract | [Further 802.15.4z HRP UWB comment resolutions] |
| Purpose | [Resolve 802.15.4z HRP UWB comments] |
| Notice | This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. |

**This document provides resolutions to comments r1-0054, r1-0087, r1-0437, r1-0438, r1-0495, r1-0506, r1-0519, r1-0522, r1-0684, r1-0720, r1-0782, r1-0783, r1-0784, r1-0785, r1-0786, r1-0787, r1-0788, r1-0789, r1-0790, r1-0791, r1-0793, r1-0800, r1-0801, r1-0810, r1-0811.**

**The following resolution applies to r1-0054.**

***Add the following at the end of 6.9.1.7:***

For example: 0x79 means ci x 4, ci = 3 ns, cl = 20 %.

**The following resolution applies to r1-0087.**

***In 6.9.6.1, change Lines 3-8 on Page 16 as follows:***

Irrespective of whether the timestamps are coming from an RDEV or an ERDEV, the same procedures apply, (i.e., any reference to RDEVs also applies to ERDEVs), however ~~in the case of the~~an ERDEV provides additional primitives based on which the higher layer ~~may~~can modify the action it takes (e.g., replying in a ranging exchange, or considering the ranging result as good) depending on its validation of the timestamp result. For example, in the case of the HRP-ERDEV this may be done using the RangingStsS1Fom parameter(s) of the MCPS-DATA.indication primitive.

**The following resolution applies to r1-0437, r1-0438.**

***In 7.4.4.34, replace Figure 48 as follows:***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits: 2 | 2 | 2 | 1 | 1 | 1 | 6 | 1 | Octets: 1 | 0/3 | 0/1 | 0/2 | 0/4 |
| Multi-node Mode | Ranging Round Usage | STS Packet Config | Schedule Mode | Deferred Mode | Time Structure Indicator | RCM Validity Rounds | MMRCR | Content Control | Ranging Block Duration | Ranging Round Duration | Ranging Slot Dusration | Session ID |

**Figure 48 - ARC IE Content field format**

***In 7.4.4.34, add the following after Line 14 on Page 67:***

The Content Control field contains sub-fields, formatted as per Figure AD1, indicating presence or not of other fields in the ARC IE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bits: 1 | 1 | 1 | 1 | 4 |
| RBDP | RRDP | RSDP | SIP | Reserved |

**Figure AD1 – Content Control field of the ARC IE**

The RBDP field when 1 indicates the presence of the Ranging Block Duration field, or not present when 0.

The RRDP field when 1 indicates the presence of the Ranging Round Duration field, or not present when 0.

The RSDP field when 1 indicates the presence of the Ranging Slot Duration field, or not present when 0.

The SIP field when 1 indicates the presence of the Session ID field, or not present when 0.

***In 7.4.4.34, add the following after Line 14 on Page 67:***

The Session ID field contains a 4-octet session identifier which is unique to a session, where a session encompasses all messages sent within one running block or interval time structure configuration. A separate set of STS seeds should be associated with each session.

**The following resolution applies to r1-0495.**

***In 7.4.4.38, change Lines 3-8 on Page 70 as follows:***

The RCPS IE provides the slot indices for the various phases of the Ranging Round when Schedule Mode is Contention-based. If the RCPS IE is not included in RCM, then all the remaining slots are used for contention based ranging, according to a slot phase assignment that is coordinated using out-of-band signaling and/or custom messages. The content field of the RCPS IE shall be formatted as shown in Figure 53.

**The following resolution applies to r1-0506.**

***In 7.4.4.40, change the name of the IE as follows:***

Ranging STS Key and ~~IV~~Data IE (RSK~~I~~D IE).

**The following resolution applies to r1-0519.**

***In 7.4.4.40, change field names (all instances) as follows:***

Change “IVCP” to “VCP”

Change “IV1P” to “V1P”

Change “IV2P” to “V2P”

Change “IV3P” to “V3P”

Change “IV Counter” to “V Counter”

Change “IV1” to “V1”

Change “IV2” to “V2”

Change “IV3” to “V3”

***In 7.4.4.40, change Lines 18-19 on Page 71 as follows:***

The RSK~~I~~D IE ~~may~~can be used to convey and align the seed~~,~~ (i.e., key and data ~~IV~~)~~,~~ used for STS generation. The content field of the RSK~~I~~D IE shall be formatted as shown in Figure 56.

***In 7.4.4.40, change Lines 10-13 on Page 72 as follows:***

The ~~I~~V Counter field, if present, contains a 4-octet string to set the counter portion of the ~~IV~~STS generation data.

The ~~I~~V1 field, if present, contains a 4-octet string to set bits 32 to 63 of the ~~IV~~STS generation data.

The ~~I~~V2 field, if present, contains a 4-octet string to set bits 64 to 95 of the ~~IV~~STS generation data.

The ~~I~~V3 field, if present, contains a 4-octet string to set bits 96 to 127 of the ~~IV~~STS generation data.

V Counter, V1, V2, and V3 can be transmitted separately to facilitate synchronization between ranging nodes.

**The following resolution applies to r1-0522.**

**Resolution detail:**

The Checksum field allows the next higher layer to authenticate the STS Key and Data separately, for example when the means to generate FCS are known to a large number of nodes.

**The following resolution applies to r1-0684, r1-0782, r1-0783, r1-0784, r1-0785, r1-0786, r1-0787, r1-0788, r1-0789, r1-0790, r1-0791, r1-0793, r1-0800, r1-0801, r1-0810, r1-0811.**

**Resolution detail:**

Having STS-related PIB attributes is clearer than relating all associated PHY sections to a primitive.

**The following resolution applies to r1-0720.**

***In 8.3.3, change Lines 9-12 on Page 103 as follows:***

The next higher layer can estimate the relative clock offset between the remote transmitter and the local reference clock at the receiver based on the reported SRMARKER receive ranging counter values for one or more STS segments. This allows estimation of individual clock offsets per subsystem, in case different subsystems are used to transmit or receive different STS segments, e.g., in ranging nodes featuring antenna diversity. For example, to determine the relative clock offset via the first STS segment, the following calculation can be used: