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

Submission Title: Comment Resolution related to TPC and CID-7127

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Abstract: Comment Resolution.

Purpose: Comment Resolution for CID 7024, 7030, 7037 and 7127

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CID 7024:**Comment:**

Using the TX Power Change has the potential to cause many problems. It is much safer to send the actual received power estimate (in dBm).

Proposed change:

Change TX Power Change (dB) to RX Power Estimate (dBm).

Resolution:

Revised: The commenter is right in that a change in transmit power may not always be desirable, however, received power estimate (in dBm) is not a good measure for link quality since receivers in the network may not all have the same sensitivity. Instead of receive power estimate it may be better to report the available link margin at the receiver. Change “RS-GFSK TPC IE” to “RS-GFSK Link Margin IE”. In addition, to avoid problems related to power control the Link Margin should be defined such that ample link margin is assured. Use equation: "Link Margin \leq ED - 20". Exact edits are provided on slides 5 and 6.

CID 7030:**Comment:**

If the TX Power Control IE is sent unsecured, this could lead to network instability issues.

Proposed change:

Provide a mechanism that prevents the TX Power Control IE from easily being used inappropriately to essentially mute all transmissions.

Resolution:

Revised: There is already a security mechanism defined on page 5, line 1 and 2. However to reduce risks of a high priority message being lost, the transmitting device should have an option to ignore the RS-GFSK Link Margin IE. On line 10, page 4 change the word "shall" into "may". In addition a higher security level in the Enh-Ack should be allowed: Change sentence on page 5, line 1 and 2 to: "If the security level, as described in 9.4.1.1, of the incoming Enh-Ack frame containing the RS-GFSK Link Margin IE is lower than the security level of the frame being acknowledged then the RS-GFSK Link Margin IE shall be ignored." Exact edits are provided on slides 5 and 6.

CID 7037:**Comment:**

"If the security..." is vague. Do we mean "if the SecurityLevel, macSecurityEnabled, Security Enabled field, or something else?"

Proposed change:

Clarify

Resolution:

Revised: The security mentioned on page 5, line 2 should be changed to "security level". In addition, a reference is needed to the sub clause where the security level is described. See also the resolution of CID7030. Exact edits are provided on slides 5 and 6.

Revised text to implement resolutions of CID 7024, 7030 and 7037 (changes highlighted in red), part 1 of 2:

- Sub clause 3.2, remove “**TPC Transmit Power Control**”
- Sub clause 5.2.4.3, Table 4c, Replace “**Transmit Power Control**” with “**Link Margin**”
- Sub clause 5.1.2.7 (the entire new sub clause 5.1.2.7 is presented below):

5.1.2.7 RS-GFSK **Link Margin IE** in a PAN

A device may include a RS-GFSK **Link Margin IE** within an enhanced acknowledgement. The RS-GFSK **Link Margin IE** shall only be transmitted as part of an enhanced acknowledgement. If a device receives an enhanced acknowledgement containing a RS-GFSK **Link Margin IE** and the destination address matches that of the receiving device then it may adjust its Transmit Power within its power control range in all following GTS transmissions directed to the originating device. ~~In non-GTS transmissions the RS-GFSK TPC IE shall be ignored. The transmit power control shall ignore the RS-GFSK Link Margin IE when transmitting non-GTS frames.~~ The RS-GFSK **Link Margin IE** is described in 5.2.4.38. If an acknowledgement for a transmission to a particular device is not received, the transmit power for transmission to that device may be increased for the next transmission attempt. The decision to transmit the RS-GFSK **Link Margin IE** is taken at a higher layer. The **TPC** algorithm acting on the **RS-GFSK Link Margin IE** is outside the scope of this standard. If the security level, as described in 9.4.1.1, of the incoming Enh-Ack frame containing the RS-GFSK **Link Margin IE** ~~does not match~~ is lower than the security level of the frame being acknowledged then the RS-GFSK **Link Margin IE** shall be ignored.

Revised text to implement resolutions of CID 7024, 7030 and 7037 (changes highlighted in red), part 2 of 2:

- **Sub clause 5.2.4.38 (the entire new sub clause 5.2.4.28 is presented below):**

5.2.4.38 RS-GFSK **Link Margin IE**

The RS-GFSK **Link Margin IE** is optional and shall only be used in enhanced acknowledgment frames that use the RS-GFSK PHY. The IE Content field of the RS-GFSK **Link Margin IE** shall be formatted as illustrated in Figure 48nag.

In Table 48nag change “TX Power Change” to “Link Margin”. Change “Transmit Power Control” in the title of Table 48nag to: “Link Margin”.

The **Link Margin** field shall be set to the ~~requested change in available link margin~~, represented as a two’s-complement number, defining the **Link Margin** in dB with a range from -31 dB to 32 dB, in steps of 1dB. **The Link Margin field shall comply with the following equation:**

$$\text{Link Margin} \leq \text{ED} - 20$$

Where ED is the Energy Detect value of the received frame preceding the transmission of the RS-GFSK **Link Margin IE**. ED is described in 10.2.5.

- **Sub clause 5.2.4.39:**
 - **Table 48nai: Change “TPC” to “Link Margin”**
 - **Page 5, line 22 to 24:** “The **Link Margin** field in Table 48nai shall be set to one if acting on the RS-GFSK **Link Margin IE**, as described in 5.1.2.7, is supported and shall be set to zero otherwise. **When set to one** ~~This means that~~ the device shall be responsive to the received RS-GFSK **Link Margin IE** as described in 5.2.4.38. when its ~~power~~-control range allows this.

CID 7127:**Comment:**

On page 34 on line 16. Whitening of the PHR breaks the compatibility with MR-FSK PHY.

Proposed change:

On page 34, line 16, change sentence to: "When FEC is not used, data whitening shall be applied over the PSDU, as described in 23.2.9. When FEC is used, data whitening shall be applied over the PHR and the PSDU". Also change Figure 176: Remove PHR at the input of the data whitening block. Add a "PHR generation" block. Add a switch and connect the input of the switch to the output of the "PHR generation" block and control the switch by PhyFskFecEnabled. When FEC is disabled the switch will route the PHR to the Concatenator block to concatenate the PHR with the SHR. Add a second Concatenator block with an input connected to the output of the PSDU generation. When FEC is enabled the added switch will route the PHR to a second input of the added Concatenator. The output of the added Concatenator will be connected to the input of the Data Whitening block.

CID 7127:**Resolution (part 1 of 2):**

Revised: Text changes are accepted → On page 34, line 16, change sentence to: "When FEC is not used, data whitening shall be applied over the PSDU, as described in 23.2.9. When FEC is used, data whitening shall be applied over the PHR and the PSDU".

CID 7127:

Resolution (part 2 of 2):

The suggested changes to Figure 176 are provided in the figure below:

