IEEE P802.11
Wireless LANs

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| LB258 Misc CIDs |
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Abstract

This submission proposes resolutions for the following comments from comment collection on P802.11-REVme D1.0:

2011, 2060, 1377, 1378

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

# CID 2011, 2060, 1377, 1378

|  |  |  |
| --- | --- | --- |
| **CID****Clause****Page.Line** | **Comment** | **Proposed Change** |
| 2011N/AN/A | The RCPI definition is missing for the VHT, TVHT and S1G PHYs | Copy the definition from the HT PHY |
| 2060N/AN/A | "The allowed values for the RCPI parameter are in the range 0 to 255, as defined in 9.4.2.37 (RCPI element)."; "The allowed values for the RCPI parameter are in the range 0 to 255, as defined in 17.3.10.7 (Received Channel Power Indicator Measurement)." and whatever 25.3.13 Received channel power indicator (RCPI) measurement ends up saying | The RCPI parameter in the PHY SAP should just be a power in dB with a resolution of 0.5 dB, without any particular encoding |
| 137715.2.3.33417.63 | "RSSI is intended to be used in a relative manner" -- it's useless to know just that signal A is stronger than signal B, without knowing how strong signal A and signal B are, or even just the difference in power between signal A and signal B | Delete Subclause 15.2.3.3 |
| 137815.2.3.33417.63 | "RSSI is intended to be used in a relative manner" -- it's useless to know just that signal A is stronger than signal B, without knowing how strong signal A and signal B are, or even just the difference in power between signal A and signal B | Clarify how a unitless RSSI is to be used |

**Discussion**

If we want to expand the RCPI to additional PHYs, then we should first fix some issues in the existing RCPI definition.

In some cases, the RCPI is defined to be the received power over the entire PPDU, while in other cases, RCPI is the received power over the ‘preamble’. In practice, it is more practical for receivers to measure the received power at the preamble, hence the proposed resolution unifies the definition of RCPI to be measured over the preamble.

Also, the definition of RCPI has a requirement of measure the power over “channel bandwidth multiplied by 1.1”. For example,

REVme D1.3 P3447:

|  |
| --- |
| RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver. The received RF power shall be determined assuming a receiver noise equivalent bandwidth equal to the channel bandwidth multiplied by 1.1. |

This means that, for example, we need to measure the received power over 160\*1.1 = 176 MHz when measuring RCPI for 160 MHz PPDUs. This is clearly not practical the additional 16 MHz is well into the adjacent channels. Therefore, the proposed resolution also removes the requirement of measuring over channel bandwidth multiplied by 1.1.

Regarding CID 2060, agree with the commenter that there is no need for the PHY subclause to have the RXVECTOR RCPI in the format of the MAC RCPI field encoding specified in 9.4.2.37. Hence, the proposed resolution removed reference to 9.4.2.37 from PHY clauses.

Finally, regarding CIDs 1377 and 1378, RSSI has been defined since the beginning of 802.11 to be a unitless value. Noting that we are not fixing and expanding the RCPI to additional PHY clauses, there is no need to change the RSSI at this point.

**Proposed Resolution: CID 2011**

REVISED

**Note to commenter:**

The instruction to editor below adds the RCPI definition to VHT, TVHT, S1G, HE and WUR PHYs.

**Instruction to TGme Editor:**

Implement the proposed text updates for CIDs 2011 and 2060 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0990-00-000m-lb258-misc-cids.docx>

**Proposed Resolution: CID 2060**

REVISED

**Note to commenter:**

The instruction to editor below removes the reference to 9.4.2.37 for the encoding of the RXVECTOR parameter RCPI.

**Instruction to TGme Editor:**

Implement the proposed text updates for CIDs 2011 and 2060 in <https://mentor.ieee.org/802.11/dcn/22/11-22-0990-00-000m-lb258-misc-cids.docx>

**Proposed Resolution: CIDs 1377, 1378**

REJECTED

Whether the information that signal A is stronger than signal B is useful or not, and how it might be used is implementation specific.

**Proposed Text Updates: CIDs 2011, 2060**

*Instruction to TGme Editor: Update REVme D1.3 P3447L39 as shown below.*

**15.4.6.6 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the PHY SYNC field of the received PPDU or by other equivalent means that meet the specified accuracy.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P3476L51 as shown below.*

**16.3.8.6 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the PHY SYNC field of the received frame or by other equivalent means that meet the specified accuracy.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P3480L54 as shown below.*

**17.2.3 RXVECTOR parameters**

**Table 17-2—RXVECTOR parameters**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Associated primitive** | **Value** |
| … | … | … |
| RCPI(see NOTE) | PHY-RXEND.indication | See 17.3.10.7 |

*Instruction to TGme Editor: Update REVme D1.3 P3515L20 as shown below.*

**17.3.10.7 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the PHY SYNC field of the received PPDU or by other equivalent means that meet the specified accuracy.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P3623L10 as shown below.*

**19.3.19.7 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the HT-STF or HT-LTF field of the received PPDU. The received power shall be the average of the power in all active receive chains.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P3660L20 as shown below.*

**20.3.10 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the preamble of the received PPDU.

RCPI shall equal the received RF power with an accuracy of ± 5 dB with 95% confidence interval within the specified dynamic range of the receiver. The relative error between RF power measurements made within a one second interval should be less than ± 1 dB.

*Instruction to TGme Editor: Add the following at REVme D1.3 P3796L35.*

**21.3.18.7 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the VHT-STF or VHT-LTF field of the received PPDU. The received power shall be the average of the power in all active receive chains.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Add the following at REVme D1.3 P3869L49.*

**22.3.18.8 Received channel power indicator (RCPI) measurement**

See 21.3.18.7 with “TVHT” replacing “VHT”.

*Instruction to TGme Editor: Add the following at REVme D1.3 P3991L23.*

**23.3.18.7 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the STF or LTF fields of the received PPDU. The received power shall be the average of the power in all active receive chains.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P4070L63 as shown below.*

**25.3.13 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received frame. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the data portion of the received frame.

RCPI shall equal the received RF power with an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver. The relative error between RF power measurements made within a one second interval should be less than ± 1 dB.

*Instruction to TGme Editor: Add the following at REVme D1.3 P4482L30.*

**27.3.20.7 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power in the selected channel for a received PPDU. This parameter shall be a measurement by the PHY of the received RF power in the channel measured over the HE-STF or HE-LTF field of the received PPDU. The received power shall be the average of the power in all active receive chains.

RCPI shall equal the received RF power within an accuracy of ± 5 dB (95% confidence interval) within the specified dynamic range of the receiver.

*Instruction to TGme Editor: Update REVme D1.3 P4621L24 as shown below.*

**28.3.9.2 Received channel power indicator (RCPI) measurement**

The RCPI is a measure of the received RF power (in dBm) in the selected channel as measured at the DMG antenna output, including the antenna gain that is used to receive the PPDU. This parameter shall be measured by the PHY over the preamble of a received PPDU, that is, L-STF or L-CEF, or both, or, if present, EDMG-STF or EDMG-CEF. The measurement shall be done over the same bandwidth as the PSDU of the PPDU. When multiple RF chains are used to receive the PPDU, RCPI is measured per each RF chain.

The RCPI for each RF chain shall be equal to the received RF power at each RF chain with an accuracy of ± 5 dB with 95% confidence interval within the specified dynamic range of the receiver. The relative error between RCPI measurements made per RF chain within a one second interval should be less than ± 1 dB.

*Instruction to TGme Editor: Update REVme D1.3 P4921L2 as shown below.*

**30.3.15 WUR receive procedure**

RCPI measurement is made during the reception of the WUR-Sync field as described in 19.3.19.7 (Received channel power indicator (RCPI) measurement).

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