IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB272-DMG-CIDs-phase-report | | | | |
| Date: 2023-03-27 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alecsander Eitan | Qualcomm |  |  | eitana@qti.qualcomm.com |

Abstract

This document proposes resolution to several LB272 DMG CIDs related to adding phase value to DMG Sensing Image report.

The changes are relative to IEEE P802.11-REVme/D1.0, December 2021

Technichal details have been presented in: 11-22-2101-05-00bf-mmwave-phase-feedback.pptx

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Section** | **Page**  **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1031 | 9.4.2.329.3 | P134  L12 | 11bf use cases includes health case remote diagnostics which measures  breathing and heart rates. Reflection phase needs to be included in  reflection element in addition to reflection power in Figure 9-1002ce --  Reflection subelement format for 2 axes | Add a 12 bits subelement for Relection Phase | Revised: TGbf Editor make changes as in:  https://mentor.ieee.org/802.11/dcn/23/11-23-0505-00-00bf-lb272-dmg-cids-phase-report.docx |
| 1174 | 9.4.2.329.3 | P134  L2 | Reflection subelement format need adding phase feedback option for vital signs detection | add phase feedback option in Figure 9-1002ce and Figure 9-1002cf | Revised: TGbf Editor make changes as in:  https://mentor.ieee.org/802.11/dcn/23/11-23-0505-00-00bf-lb272-dmg-cids-phase-report.docx |
| 1209 | 9.4.2.329.3 | P134  L1 | A use case of 11bf is for remote diagnostics where heart and breath rates are measured. In addition to reflection power, reflection phase is also required. | Add a field to carry reflection phase information. | Revised: TGbf Editor make changes as in:  https://mentor.ieee.org/802.11/dcn/23/11-23-0505-00-00bf-lb272-dmg-cids-phase-report.docx |
| 1408 | 9.4.2.329.3 | P134  L20 | 11bf use cases include health case remote diagnostics which measures breathing and heart rates. Reflection phase needs to be included in reflection element in addition to reflection power in Figure 9-1002cf -- Reflection subelement format for 3 axes | Add a 12 bits subelement for Relection Phase | Revised: TGbf Editor make changes as in:  https://mentor.ieee.org/802.11/dcn/23/11-23-0505-00-00bf-lb272-dmg-cids-phase-report.docx |
| 1409 | 9.4.2.329.3 | P133  L8 | In addition to adding Reflection phase in reflection element in Figure 9-1002ce and Figure 9-1002cf, the presence of Reflection phase needs to be signaled. | Add a bit to signal presence of Reflection phase in Figure 9-1002cd--Axis Present field format | Revised: TGbf Editor make changes as in:  https://mentor.ieee.org/802.11/dcn/23/11-23-0505-00-00bf-lb272-dmg-cids-phase-report.docx |

**Discussion:**

The commenters are pointing to the fact that the existing report includes just power value for the Imaging Radar report and the phase is also essential for cases where the initiator is interested in very low Doppler cases or any other post processing of multiple reports.

The request is reasonable and makes sense.

Since the responder processing of the measurements involves complex numbers the power and phase are available to be reported.

Since phase is not always needed and it increases the report size, it will be optional in the report.

Resolution highlights

1. Add a bit in “DMG Sensing Measurement Setup element” to signal that the initiator requests the phase information as well – applicable for DMG Sensing Image cases only.
2. Add a bit in Axis Present field to signal that the Phase value will be included
3. Extend the three Reflection subelement formats to include the Phase field (12 bit)

## *TGbf Editor: Please modify the figure at P122L12 in subclause 9.4.2.325 in D1.0 as follows.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Element  ID | Length | Element ID  Extension | Measurement  Setup Control | Report Type Control | LCI |
| Octets | 1 | 1 | 1 | 1 | 1 | 0 or 16 |

## *TGbf Editor: Please modify the test at P123L25-49 in subclause 9.4.2.325 in D1.0 as follows.*

The Report Type Control field indicates which type of report the sensing initiator expects from the sensing

responder. It comprises of the Report Type field defined in Table 9-401v (Report Type subfield definition) and the Report Phase field.

The Report Phase indicates that the initiator is asking to include the Phase in the Report if the Report type is DMG Sensing Image (2, 3, 4, 5 or 6). The Report Phase field is reserved if the Report Type subfield is not set to 2, 3, 4, 5 or 6.

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B4 | B5 | B6 B7 |
|  | Report Type | Report Phase | Reserved |
| Bits | 5 | 1 | 2 |

Figure 9-yyyyy Report Type Control field format

**Table 9-401v—Report Type subfield definition**

|  |  |
| --- | --- |
| **Value** | **Description** |
| 0 | No report |
| 1 | CSI |
| 2 | DMG Sensing Image Direction |
| 3 | DMG Sensing Image Range-Doppler |
| 4 | DMG Sensing Image Range-Direction |
| 5 | DMG Sensing Image Doppler-Direction |
| 6 | DMG Sensing Image Range-Doppler Direction |
| 7 | Target |
| 8-31 | Reserved |

## *TGbf Editor: Please add the figure at P133L6-10 in subclause 9.4.2.329.3 in D1.0 as follows.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 B7 |
|  | Range Axis  Present | Doppler Axis  Present | Receiver Beam  Index Present | Transmitter Beam  Index Present | Phase Present | Reserved |
| Bits | 1 | 1 | 1 | 1 | 1 | 3 |

## *TGbf Editor: Please add the text at P133L30 in subclause 9.4.2.329.3 in D1.0 as follows.*

The Phase Present field indicates the presence of Phase value in the Reflection Subelement.

## *TGbf Editor: Please modify the figure at P134L11 in subclause 9.4.2.329.3 in D1.0 as follows.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Axis #1 | Axis #2 | Reflection Power | Reflection Phase |
| Bits | S1 | S2 | 12 | 0 or 12 |

## *TGbf Editor: Please modify the figure at P134L20 in subclause 9.4.2.329.3 in D1.0 as follows.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  | Axis #1 | Axis #2 | Axis #3 | Reflection Power | Reflection Phase |
| Bits | S1 | S2 | S3 | 12 | 0 or 12 |

## *TGbf Editor: Please modify the figure at P134L29 in subclause 9.4.2.329.3 in D1.0 as follows.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Axis #1 | Axis #2 | Axis #3 | Axis #4 | Reflection Power | Reflection Phase |
| Bits | S1 | S2 | S3 | S4 | 12 | 0 or 12 |

## *TGbf Editor: Please add the text at P135L10 in subclause 9.4.2.329.3 in D1.0 as follows.*

The Reflection Phase field in the Reflection Subelement is present if the Phase Preset field in Axis Present field is equal to 1.

The Reflection Phase field in the Reflection Subelement represents the reflection received phase in

units of 2\*pi/4096.

## *TGbf Editor: Please add the text at P214L19 in subclause 11.55.3.7 in D1.0 as follows.*

If the sensing initiator requested sensing types 2, 3, 4, 5 or 6 (that is, sensing types that include DMG Sensing Image) and the Report Phase field is equal to 1 in Report Type Control field, the sensing responder shall send the Reflection subelements with Reflection Power and Phase, otherwise the Reflection subelements shall send Reflection Power only.