IEEE P802.11
Wireless LANs

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| Proposed Spec TextSensing Measurement Setup |
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Abstract

This submission proposes spec text for sensing measurement setup procedure and frame format to be incorporated into 802.11bf D0.1

Revisions:

* Rev 0: Initial version of the document.

The proposed texts are based on the following motions

An optional negotiation process in the sensing measurement setup is defined that allows for a sensing initiator and a sensing responder to exchange and agree on operational attributes associated with a sensing measurement instance (Motion 17, 20/0370r1; Motion 23, 21/0644r4; Motion 29, 21/1543r1). The operational attributes may include initiator’s and responder’s roles, measurement report types, and other operational parameters (Motion 29, 21/1543r1).

The type of measurement result reported in a WLAN sensing procedure shall be decided by its initiator (Motion 13, 21/0147r3; Motion 29, 21/1543r1).

(Motion 36, 21/1736r2) During a sensing measurement setup, the role(s) of a sensing responder shall be determined as one of following:

* Sensing receiver
* Sensing transmitter
* Sensing transmitter and sensing receiver

The Measurement Setup ID may be used to identify attributes of the sensing measurement instances (Motion 24, 21/0644r4).

Measurement Setup ID is set by sensing initiator, the tuple <Sensing Initiator’s MAC address, Measurement Setup ID> is used to identify a specific Measurement Setup. (Motion 54, 21/ 1941r1).

(Motion 41, 21/1735r3; Motion 51, 21/1828r4) The sensing measurement setup procedure consists of:

* The transmission of a sensing measurement setup request frame by the sensing initiator to a sensing responder with which it intends to perform a sensing measurement setup, followed by the transmission of an Ack frame by the intended sensing responder; and
* The transmission of a sensing measurement setup response frame by the intended sensing responder to the sensing initiator which transmitted the sensing measurement setup request frame to accept or reject the sensing measurement setup, followed by the transmission of an Ack frame by the sensing initiator.

(Motion 52, 21/1828r4) In a sensing measurement setup procedure, if the sensing responder intends to reject the assigned operational parameters included in the sensing measurement setup request frame, it may provide its preferred operational parameters in the sensing measurement setup response frame. For the accept case, whether the sensing responder may provide its preferred operational parameters or not is TBD.

(Motion 41, 21/1735r3) Sensing Measurement Setup Request and Response frames, which allow to perform a sensing measurement setup, are defined.

* The subtype of Sensing Measurement Setup Request and Response frames are Action and those are individually addressed.
* Formats of the Sensing Measurement Setup Request and Response frames are TBD.

***Editing instructions formatted like this are intended to be copied into the TGbf Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbf Editor: Editing instructions preceded by “TGbf Editor” are instructions to the TGbf editor to modify existing material in the TGbf draft. As a result of adopting the changes, the TGbf editor will execute the instructions rather than copy them to the TGbf Draft.***

***TGbf editor: Please note that the baseline is 802.11REVme D1.0***

***TGbf editor: Please add a new subclause 11.21.x.y (Sensing Measurement Setup Procedure) under clause 11 as follows:***

11.21.x WLAN sensing (SENS) procedure

11.21.x.y Sensing Measurement Setup Procedure

Sensing measurement setup allows for a sensing initiator and a sensing responder to exchange and agree on operational attributes associated with a sensing measurement instance.

To perform a sensing measurement setup, a sensing initiator may transmit a Sensing Measurement Setup Request frame to a sensing responder with which it intends to perform a sensing measurement setup, followed by the transmission an Ack frame by the intended sensing responder.

After receiving the sensing measurement setup request frame, the sensing responder shall transmit a Sensing Measurement Setup Response frame to the sensing initiator which transmitted the Sensing Measurement Setup Request frame, followed by the transmission of an Ack frame by the sensing initiator, according to the following rules:

* If the sensing responder accepts the requested sensing measurement setup in the received Sensing Measurement Setup Request frame, it shall set the Status Indication field to 0 in the Sensing Measurement Setup Response frame.
* Otherwise, the sensing responder shall set the Status Indication field to 2 or 3 in the Sensing Measurement Setup Response frame. If it is set to 3, the sensing responder provides its preferred sensing measurement parameters in the Sensing Measurement Setup Response frame.

During a sensing measurement setup, the role(s) of a sensing responder shall be determined as a sensing receiver, a sensing transmitter one of following (see 9.4.2.x (Sensing Measurement Parameters element)):

* Sensing receiver
* Sensing transmitter
* Sensing transmitter and sensing receiver

NOTE- The role(s) of a sensing initiator is determined by the role(s) of a sensing responder. If the sensing responder is a sensing transmitter and/or a sensing receiver, the sensing initiator is a sensing receiver and/or a sensing transmitter.

The sensing transmitter and sensing receiver role(s) of a STA corresponding to a measurement setup ID until the sensing measurement setup is terminated shall be fixed as determined during the sensing measurement setup.

The measurement report type of a STA corresponding to a measurement setup ID until the sensing measurement setup is terminated shall be fixed as determined during the sensing measurement setup.

9.4.2 Elements

9.4.2.1 General

***TGbf editor: Please insert the following new row to Table 9-128 (Element IDs):***

**Table 9-128—Element IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** | **Fragmentable** |
| Sensing Measurement Parameters (see 9.4.2.x (Sensing Measurement Parameters element)) | 255 | <ANA> | Yes | TBD |

***TGbf editor: add a new subclause 9.4.2.x (Sensing Measurement Parameters element) under subclause 9.4.2 as follows.***

9.4.2.x Sensing Measurement Parameters element

The Sensing Measurement Parameters element indicates operational attributes of the corresponding sensing measurement instances. The format of the Sensing Measurement Parameters element is shown in Figure 9-xxx (Sensing Measurement Setup element format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Measurement Setup ID | Status Indication | Sensing MeasurementParameters(Optional) | TBD |
| Octets: | 1 | 1 | 1 | TBD | TBD | 0 or TBD | TBD |

Figure 9-xxx– Sensing Measurement Parameters element format

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

The Measurement Setup ID field indicates a measurement setup ID to identify operational attributes of the corresponding sensing measurement instances. The measurement setup ID is set by a sensing initiator, the tuple <Sensing initiator’s MAC address, Measurement Setup ID> is used to identify a specific measurement setup.

The Measurement Setup ID in the Sensing Measurement Setup Response frame transmitted by a sensing responder is set to the value in the corresponding Sensing Measurement Setup Request frame that it received.

The Status Indication field indicates the sensing responder’s response to the Measurement Setup Request frame. The encoding of the Status Indication field is shown in Table 9-xxx (Status Indication field values).

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| --- |
| Table 9-xxx – Status Indication field values |
| Value | Description |
| 0 | Reserved |
| 1 | Request accepted |
| 2 | Request rejected because the requested sensing measurement setup is unacceptable. |
| 3 | Request rejected, because the requested sensing measurement setup is unacceptable, but provides a preferred sensing measurement parameters that will be acceptable |

The Status Indication field is reserved in a Sensing Measurement Setup Request frame.

The format of the Sensing Measurement Parameters field is shown in 9-xxx (Sensing Measurement Parameters field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Role | Measurement Report Type | ImmediateFeedback | TBD |
| Bits: | 2 | TBD | 1 | TBD |

Figure 9-xxx– Sensing Measurement Parameters field format

If the Status Indication is set to 1 or 2, the Sensing Measurement Parameters field is not present in the Sensing Measurement Parameters element. Otherwise, it is present in the Sensing Measurement Parameters element.

The Role subfield determines the role(s) of sensing responder in one or more sensing measurement instance(s) corresponding to the measurement setup ID, and is set to 0 if the role of sensing responder is a sensing transmitter. It is set to 1 if the role of sensing responder is a sensing receiver. It is set to 2 if the roles of sensing responder are both of sensing transmitter and sensing receiver.

The Measurement Report Type subfield indicates the type of measurement result reported in one or more sensing measurement instance(s) corresponding to the measurement setup ID. If the sensing initiator is a sensing receiver, it is reserved.

The Immediate Feedback subfield indicates if the measurement results from the current measurement exchange are reported immediately by setting it to 0 or delayed by setting it to 1 when the sensing initiator is a sensing transmitter. When the sensing initiator is a sensing receiver, it is reserved by setting it to 0.

* Action frame format details

9.6.7 Public Action details

9.6.7.1 Public Action frames

***TGbf editor: Please insert the following new row to Table 9-447 (Public Action field values):***

**Table 9-447 – Public Action field values**

|  |  |
| --- | --- |
| Public Action field value | Description |
| <ANA> | Sensing Measurement Setup Request |
| <ANA> | Sensing Measurement Setup Response |
| <ANA> | Reserved |

***TGbf editor: add new subclauses 9.6.7.x (Sensing Measurement Request frame format) and 9.6.7.x (Sensing Measurement Response frame format) under subclause 9.6.7 as follows.***

9.6.7.x Sensing Measurement Setup Request frame format

The Sensing Measurement Setup Request frame is transmitted by a sensing initiator to request a sensing measurement setup. The format of the Sensing Measurement Setup Request frame Action field is shown in Table 9-xxx (Sensing Measurement Setup Request frame Action field format).

|  |
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| Table 9-xxx – Sensing Measurement Setup Request frame Action field format |
| Order | Information |
| 0 | Category  |
| 1 | Public Action  |
| 2 | Dialog Token |
| 4 | Sensing Measurement Parameters Element |

The Category field is defined in 9.4.1.11 (Action field).

The Public Action field is defined in 9.6.7.1 (Public Action frames).

The Dialog Token field is defined in 9.4.1.12 (Dialog Token field) and set by the requesting sensing initiator.

The Sensing Measurement Parameters Element is defined in 9.4.2.x (Sensing Measurement Parameters Element)

9.6.7.y Sensing Measurement Setup Response frame format

The Sensing Measurement Setup Response frame is transmitted by a sensing responder in response to a Sensing Measurement Setup Request frame. The format of the Sensing Measurement Setup Response frame Action field is shown in Table 9-xxx (Sensing Measurement Setup Response frame Action field format).

|  |
| --- |
| Table 9-xxx – Sensing Measurement Setup Response frame Action field format |
| Order | Information |
| 0 | Category  |
| 1 | Public Action  |
| 2 | Dialog Token |
| 3 | Sensing Measurement Parameters Element |

The Category field is defined in 9.4.1.11 (Action field).

The Public Action field is defined in 9.6.7.1 (Public Action frames).

The Dialog Token field is defined in 9.4.1.12 (Dialog Token field) and set it to the value in the corresponding Sensing Measurement Setup Request frame.

The Sensing Measurement Parameters Element is defined in 9.4.2.x (Sensing Measurement Parameters Element)