IEEE P802.11
Wireless LANs

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| PDT MAC Co-BF and Co-SR Part 2 |
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 Abstract

This document contains Proposed Draft Text (PDT) for the part 2 of coordinated beamforming and coordinated spatial reuse protocol of the TGbn (UHR, Ultra High Reliability) amendment to the 802.11 standard.

Revisions:

* Rev 0: Initial version of the document.
* **Introduction**

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbn Draft. The abstract, revision information, introduction, explanation of the proposed changes and references sections are not part of the adopted material.

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

**Explanation of the proposed changes:**

The proposed changes to the 802.11 TGbn draft within this document are based on the following motions adopted by the TGbn task group:

**Relevant passed motions for Co-BF:**

 **[Motion #135]**

**The sharing AP, that transmits a Trigger frame as part of a transmission sequence in a Multi-AP coordinated transmission scheme, identifies the shared AP via an AP ID carried in the AID12 field of the User Info field of the frame**

* **Note: the name of "sharing AP" and "shared AP" are TBD**
* **Note: Multi-AP coordinated transmission schemes are Co-SR, Co-BF and Co-TDMA**

**[Motion #311]**

**The Co-BF Sync frame carries the following information**

* + **How to indicate the information is TBD**

|  |  |
| --- | --- |
| Category | Information |
| Control | ‘Co-BF Sync’ |
| PHY Common Info | Length |
| PHY Version Identifier |
| Bandwidth |
| Punctured Channel Information |
| BSS Color 1, BSS Color 2 |
| TXOP |
| Number of UHR-SIG Symbols |
| GI+LTF Size |
| Number Of UHR-LTF Symbols |
| Number of Co-BF Users |
| Per-User Info in Both BSS | STA ID |
| BSS Color Indication |
| MCS |
| Spatial Configuration |
| 2xLDPC |

**[Motion #327]**

**The Co-BF Invite frame carries the following information.**

* + **How to indicate the information is TBD.**

|  |  |
| --- | --- |
| Category | Information |
| Control | ‘Co-BF Invite’ |
| PHY Common Info | Minimum Number of Data OFDM Symbols |
| Maximum Number of Data OFDM Symbols |
| PHY Version Identifier |
| Bandwidth |
| Punctured Channel Information |
| GI+LTF Size |
| Maximum Total Nss Allowed for shared AP |
| Number of Co-BF Users in sharing BSS |
| Per-User Info in Sharing BSS | STA ID |
| Nss |

**[Motion #328]**

**The Co-BF Response frame carries at least the following information.**

* + **How to indicate the information is TBD.**

|  |  |
| --- | --- |
| Category | Information |
| Control | ‘Co-BF Acceptance’ |
| PHY Common Info | Suggested Number of Data OFDM Symbols |
| PHY Version Identifier |
| Extra LTF Allowed |
| Number of CoBF Users in shared BSS |
| Per-User Info in Shared BSS | STA ID |
| MCS |
| Nss |
| 2xLDPC |

**[Motion #448]**

**An AP shall use the BSRP NTB Trigger frame variant for the CoBF Invite frame**

* + **The CoBF Response frame shall be M-BA**
	+ **TBD whether there’s another frame variant allowed for the CoBF Invite/Response frame**

**[Motion #480]**

**A Shared (Responding) AP may reject a Co-BF/Co-SR transmission or Co-BF sounding invitation received from a Sharing (Initiating) AP.
In case of rejection, the Shared (Responding) AP can include the reason for rejection in the Co-BF/Co-SR Response or Co-BF Sounding Response frame.
Reasons for rejecting a Co-BF/Co-SR transmission or Co-BF sounding invitation are TBD.**

**[Motion #486]**

**SP1:Do you support to use the following CoBF transmission sequence to support STAs requiring ICF/ICR before data frame exchanges?**

* **The frame sequence consists of:**
	+ **A CoBF Invite/CoBF Response frame exchange between the sharing and shared APs.**
	+ **Follows ICF/ICR frame exchanges between the APs and their associated STAs happening sequentially across the two APs; sharing AP then shared AP.**
		- **The presence of the ICF/ICR frame exchange from each AP is conditional on the CoBF PPDU being addressed to one or more STAs requiring ICF.**
		- **The presence of the ICF/ICR frame exchange from each AP is indicated in the CoBF Invite/Response frames.**
		- **The duration of the ICF/ICR frame exchange from each AP is indicated in the CoBF Invite/Response frames**
		- **ICF1-ICR1 are exchanged between the sharing AP and its STAs**
		- **ICF2-ICR2 are exchanged between the shared AP and its STAs**
	+ **Finally, a CoBF Trigger frame preceding the data PPDUs that are sent by the two APs simultaneously.**
	+ **Frame sequence for Ack information polling is TBD.**
* **Whether the CoBF-invite and ICF1 can be merged and CoBF-response and ICF2 can be merged as below is TBD.**

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**[Motion #522]**

**A Co-BF coordinating AP and a Co-BF coordinated AP may use a sequential Ack procedure to avoid Ack collision.**

**In the sequential Ack procedure, at least the Co-BF coordinated AP shall set the Ack policy Indicator subfield of the QoS Control field in the Co-BF DL PPDU to either "No Ack" or "Block Ack".**

**Note: This applies to the Co-SR as well.**

**[Related SP]**

**SP:Do you support to use the following sequence for acknowledgement information polling from STAs scheduled in a Co-BF transmission sequence?**

* **MU-BAR/BA frame exchanges are used by each AP separately, i.e., sequentially.**
* **The duration of MU-BAR/BA frame exchange between the Sharing AP and its associated non-AP STAs is indicated in the Co-BF Trigger frame.**

**NOTE-The first MU-BAR frame (transmitted by the sharing AP) can be replaced with a basic trigger that is aggregated with the DL PPDU as in baseline.**

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**Relevant passed motions for Co-SR:**

**[Motion #135]**

**The sharing AP, that transmits a Trigger frame as part of a transmission sequence in a Multi-AP coordinated transmission scheme, identifies the shared AP via an AP ID carried in the AID12 field of the User Info field of the frame**

* **Note: the name of "sharing AP" and "shared AP" are TBD**
* **Note: Multi-AP coordinated transmission schemes are Co-SR, Co-BF and Co-TDMA**

 **[Motion #253]**

**In Coordinated Spatial Reuse:**

* **A sharing AP that intends to initiate a Coordinated Spatial Reuse transmission shall transmit a Trigger frame to initiate concurrent Co-SR transmissions with one (whether to allow more is TBD) other AP within its obtained TXOP BW;**
* **When all addressed non-AP STAs are UHR STAs, the concurrent Co-SR transmission starts SIFS after the Trigger frame**
* **Which trigger frame is TBD**

**[Motion #254]**

**In Coordinated Spatial Reuse, the following information shall be carried in the Trigger frame that initiates concurrent CSR transmissions of the 2 APs**

* **The duration of the data PPDU transmitted by the sharing AP and of the data PPDU transmitted by the shared AP, which are the same, after the Trigger frame**
* **Other parameters TBD**

**[Motion #429]**

**In Coordinated Spatial Reuse, the following information shall be carried in the Trigger frame that initiates concurrent CSR transmissions:**

* **The transmit power limit of the shared AP**
	+ **The shared AP Tx power limitation indicated by the sharing AP should not be lower than the minimum TX power indicated by the shared AP in its request.**
* **The transmit power of the sharing AP**

**[Motion #455]**

**During Co-SR invite and Co-SR response exchange, sharing AP indicates single intended PHY version for its own PPDU in the upcoming Co-SR transmission. Shared AP responds with single intended PHY version for its own PPDU in the upcoming Co-SR transmission, if it accepts the invitation.**

**[Motion #456]**

**In Co-SR Trigger frame, the PHY version of PPDU 1 and the PHY version of PPDU 2 are indicated.**

* **How to signal is TBD**

**[Motion #460]**

**COBF/COSR use a common frame exchange design.**

* **There will be a COSR Invite/ Response/ Sync before the COSR data transmission.**
* **Note: ICF/ICR (between Response and Sync), if present, will be discussed in MAC**

**[Motion #472]**

**When Co-SR Invite frame indicates 2x LTF type and indicates the intended number of LTF symbols in Co-SR Invite frame, then in the Co-SR Response frame, AP2 could reject the invitation due to the number of LTF limitation.**

* **The existence of a rejection reason in the CO-SR Response frame is TBD and if a rejection reason field is adopted in TGbn, the presence of a specific rejection reason for LTF limitation is also TBD**

**[Motion #477]**

**The invite frame for CoSR will carry the following**

* **GI+LTF combination**
* **Number of LTF symbols**

**[Motion #478]**

**The CoSR length indication will be done as follows:**

* **Invite frame signals**
	+ **Min and Max number of data OFDM symbols**

**Response frame signals**

* **Suggested number of data OFDM symbols**

**Sync frame signals**

* **L-SIG length**

**The same 9 bit encoding as COBF shall be used for the following 3 fields**

* **Min and Max number of data OFDM symbols in invite**
* **Suggested number of data OFDM symbols in response**
	+ **Value 511 (‘111111111’) indicates “No suggestion”**

**[Motion #491]**

**Do you support that Co-BF and Co-SR transmission TXOP shall follow the same frame exchange sequence framework?**

* **Co-SR does not need to support EHT eMLSR non-AP STA**

# TGbn Editor: please adopt the changes in this document listed below

# Text to be adopted begins here:

**37.15 Multi-AP coordination framework**

**37.15.2 Procedures for specific Multi-AP coordination schemes**

# 37.15.2.1 Coordinated beamforming

**37.15.2.1.1 General**

The objective of coordinated beamforming (Co-BF) is to allow more efficient medium usage by enabling concurrent transmissions of two APs with multiple antennas to (#2457)non-AP STAs associated with the two APs respectively, whereby each AP transmits to its associated non-AP STA(s) within its BSS while minimizing interference to (#777) the non-AP STA(s) associated with the other AP by using the CSI of the channels between each AP and the recipient STAs of the other AP of the Co-BF transmission. The number of participating APs in a Co-BF transmission shall be 2. The maximum number of spatial streams for each recipient STA of the Co-BF transmission shall be 2. (#984)The APs shall obtain the CSI required for performing the Co-BF transmission as described in 37.7 (UHR sounding operation).

(#1578)(M#300)A Co-BF coordinating AP is an AP with dot11CoBFOptionImplemented equal to true that obtains a TXOP and transmits a Co-BF Invite frame to invite another AP to perform Co-BF transmission. A Co-BF coordinated AP is an AP with dot11CoBFOptionImplemented equal to true that receives a Co-BF Invite frame from the Co-BF coordinating AP to perform Co-BF transmission. The Co-BF transmission sequence shall be initiated by the Co-BF coordinating AP. A STA with dot11CoBFOptionImplemented equal to false or with dot11CoBFOptionImplemented equal to true but has disabled the Co-BF operation shall not be scheduled in a Co-BF sounding sequence or a Co-BF transmission sequence by its associated AP. (M#452)A non-AP STA with dot11CoBFOptionImplemented equal to true may enable or disable the Co-BF operation by following the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

(#1578)An AP shall not initiate Co-BF transmission sequence with another AP unless the two APs have established a MAPC agreement for Co-BF according to the procedure defined in 37.13.2.1.2 (Co-BF negotiation) or by other means outside of the scope of this standard.

# (#1578) 37.15.2.1.2 Co-BF negotiation

A MAPC requesting AP that follows the rules defined in 37.13.1.3 (MAPC agreement negotiation) to establish, update, or tear down a Co-BF agreement with a MAPC responding AP shall additionally follow the rules defined in this subclause. An AP that responds to a MAPC requesting AP in a MAPC agreement negotiation for a Co-BF agreement that follows the rules defined in 37.13.1.3 (MAPC agreement negotiation) shall additionally follow the rules defined in this subclause.

A MAPC requesting AP shall include a Co-BF profile in the MAPC element carried in the MAPC Negotiation Request frame initiating the MAPC agreement negotiation for a Co-BF agreement. The Co-BF profile shall include one MAPC Scheme Request field.

A MAPC responding AP shall include a Co-BF profile in the MAPC element carried in the MAPC Negotiation Response frame when responding to a MAPC requesting AP in a MAPC agreement negotiation for a Co-BF agreement. The Co-BF profile shall include one MAPC Scheme Request field.

A MAPC requesting AP shall not set the MAPC Operation Type field to 1 or 2 if there is no established Co-BF agreement between the MAPC requesting AP and the MAPC responding AP. A MAPC requesting AP shall not set the MAPC Operation Type field to 0 if a Co-BF agreement is already established between the MAPC requesting AP and the MAPC responding AP.

The MAPC responding AP shall not set the MAPC Operation Type field, carried in the MAPC Scheme Request field of the Co-BF profile included in the MAPC Negotiation Response frame, to 5.

# 37.15.2.1.3 Frame exchange sequence for Co-BF

 (#199)A Co-BF coordinating AP shall initiate Co-BF transmission with a Co-BF coordinated AP by transmitting a Co-BF Invite frame to the Co-BF coordinated AP. The Co-BF Invite frame shall be a BSRP NTB Trigger frame as defined in 9.3.1.22.14 (BSRP Trigger frame format). The TA field of the Co-BF Invite frame shall be set to the MAC address of the Co-BF coordinating AP, and the RA field of the Co-BF Invite frame shall be set to the MAC address of the Co-BF coordinated AP. The Co-BF invite frame solicits a Co-BF response frame from the Co-BF coordinated AP addressed by the Co-BF invite frame.

(#199)A Co-BF coordinated AP that receives a Co-BF Invite frame shall transmit a Co-BF Response frame to the Co-BF coordinating AP aSIFSTime after the end of the PPDU carrying the Co-BF Invite frame. The Co-BF Response frame shall be a Multi-STA BlockAck frame as defined in 9.3.1.8.6 (Multi-STA BlockAck variant). The TA field of the Co-BF Response frame shall be set to the MAC address of the Co-BF coordinated AP, and the RA field of the Co-BF Response frame shall be set to the MAC address of the Co-BF coordinating AP.

The Co-BF coordinating or the Co-BF coordinated APs shall include an ICF-ICR frame exchange in the Co-BF transmission frame sequence whenever any of the AP’s associated STAs being scheduled for Co-BF transmission in the current TXOP operates in a mode that requires preceding frame exchanges with an ICF transmission. This is the case for DPS enabled non-AP STAs, and for non-AP STAs affiliated with an EMLSR non-AP MLD that the Co-BF transmission will immediately follow on any of its EMLSR links. The ICF frame shall not include any non-AP STA that will not be scheduled for Co-BF transmission in the next Co-BF DL PPDU.

If the ICF and ICR frame exchange is included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, the Co-BF coordinating AP shall transmit the ICF aSIFSTime after the end of the PPDU carrying the Co-BF Response frame that accepts the Co-BF invite. The non-AP STAs associated with the Co-BF coordinating AP that received the ICF shall follow the rules defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) and 37.15.1 (Dynamic power save (DPS) operation) to respond ICR.

If the ICF and ICR frame exchange is not included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinated AP shall transmit the ICF aSIFSTime after the end of the PPDU carrying the Co-BF Response frame that accepts the Co-BF invite.

If the ICF and ICR frame exchange is included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinated AP shall transmit the ICF 2\*aSIFSTime plus the duration of the ICF and ICR frame exchange between the Co-BF coordinating AP and its associated recipient STAs that is indicated in the Co-BF Invite frame after the end of the PPDU carrying the Co-BF Response frame that accepts the Co-BF invite.

The non-AP STAs associated with the Co-BF coordinated AP that received the ICF shall follow the rules defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) and 37.15.1 (Dynamic power save (DPS) operation) to respond ICR.

A Co-BF coordinating or a Co-BF coordinated AP transmitting any ICF frame during the Co-BF transmission phase to an associated non-AP STA shall include an indication to that STA to use an extended timeout period for the following cases:

* The STA is a DPS enabled non-AP STA in which case the extended timeout period corresponds to the time the DPS STA stays in the HC mode before switching to LC mode when it is not included in any frame transmission or reception.
* The STA is operating on an EMLSR link of its affiliated non-AP MLD in which case the extended timeout period corresponds to the non-AP MLD’s switch back to listening operation event on that EMLSR link.

The duration of the extended timeout period shall be explicitly indicated by the Extended Timeout Duration field in the Feedback User Info field included in the ICF frame addressing the associated STA. The AP shall indicate a duration for the extended timeout period that is longer than the longest inactivity period the associated non-AP STA(s) will experience within the Co-BF transmission sequence.

A STA that is operating on an EMLSR link of its affiliated non-AP MLD during the Co-BF transmission phase shall follow the rules defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) for switching back to listening operation except for the following:

* It uses extended timeout period instead of aSIFSTime + aSlotTime + aRxPHYStartDelay as timeout interval starting at the end of the PPDU transmitted by the non-AP STA affiliated with the non-AP MLD as a response to the most recently received frame from the AP affiliated with the AP MLD or starting at the end of the reception of the PPDU containing a frame for the non-AP STA from the AP affiliated with the AP MLD that does not require immediate acknowledgement.
* During the extended timeout period, it shall not switch back to the listening operation.

After the Co-BF coordinating or Co-BF coordinated AP receives an ICR from its associated non-AP STA operating on an EMLSR link during the Co-BF transmission phase, the other AP(s) affiliated with the AP MLD shall not transmit frames to the other non-AP STA(s) affiliated with the non-AP MLD on the other EMLSR link(s) during the extended time-out period.

When an AP transmits an ICF frame to a DPS STA that is scheduled in a Co-BF sequence, the ICF shall not be an RTS frame.

(#1578)The Co-BF coordinating AP shall transmit a Co-BF Trigger frame to the Co-BF coordinated AP prior to the two data PPDUs transmitted simultaneously by the Co-BF coordinating and Co-BF coordinated APs.

If the ICF and ICR frame exchange is not included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is not included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinating AP shall transmit the Co-BF Trigger frame a aSIFSTime time after the end of the PPDU carrying the Co-BF Response frame that accepts the Co-BF invite.

If the ICF and ICR frame exchange is included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is not included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinating AP shall transmit the Co-BF Trigger frame aSIFSTime after the end of the PPDU carrying the ICR transmitted by the non-AP STA(s) associated with the Co-BF coordinating AP.

If the ICF and ICR frame exchange is not included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinating AP shall transmit the Co-BF Trigger frame 2\*aSIFSTime plus the duration of the ICF and ICR frame exchange between the Co-BF coordinated AP and its associated recipient STAs after the end of the PPDU carrying the Co-BF Response frame that accepts the Co-BF invite. The duration of the ICF and ICR frame exchange between the Co-BF coordinated AP and its associated recipient STAs is indicated in the Co-BF Response frame.

If the ICF and ICR frame exchange is included before Co-BF transmission between the Co-BF coordinating AP and its associated recipient STAs, and the ICF and ICR frame exchange is included before the Co-BF transmission between the Co-BF coordinated AP and its associated recipient STAs, the Co-BF coordinating AP shall transmit the Co-BF Trigger frame 2\*aSIFSTime plus the duration of the ICF and ICR frame exchange between the Co-BF coordinated AP and its associated recipient STAs after the end of the PPDU carrying the ICR transmitted by the non-AP STA(s) associated with the Co-BF coordinating AP. The duration of the ICF and ICR frame exchange between the Co-BF coordinated AP and its associated recipient STAs is indicated in the Co-BF Response frame.

[M#522]After simultaneously transmitting the two data PPDUs, if the acknowledgement procedure is needed, the Co-BF coordinating AP and the Co-BF coordinated AP may use a sequential acknowledgement procedure to solicit the receiving status of the MSDUs/A-MSDUs in the data PPDUs from the recipient STA(s), where the acknowledgement procedure shall be performed by the Co-BF coordinating AP first. The ACK policy of the A-MPDU in the data PPDU transmitted by the Co-BF coordinating AP shall not be set to Normal ACK or Implicit BAR. The ACK policy of the A-MPDU in the data PPDU transmitted by the Co-BF coordinated AP shall be set to either No Ack or Block Ack.

In the sequential acknowledgement procedure, the Co-BF coordinating AP shall transmit an MU-BAR to its associated recipient STA(s) SIFS after the end of the data PPDU if the ACK policy of the A-MPDU in the data PPDU transmitted by the Co-BF coordinating AP is Block Ack. The Co-BF coordinated AP shall transmit an MU-BAR to its associated recipient STA(s) 2\*aSIFSTime plus the duration of the MU-BAR and BA frame exchange between the Co-BF coordinating AP and its associated recipient non-AP STAs after the end of the data PPDU, if the ACK policy of the A-MPDU in the data PPDU transmitted by the Co-BF coordinated AP is Block Ack. The duration of the MU-BAR and BA frame exchange between the Co-BF coordinating AP and its associated recipient STAs is indicated in the Co-BF Trigger frame.

# 37.15.2.1.4 Co-BF transmission procedure

In order to perform Co-BF transmission, a Co-BF coordinating AP and a Co-BF coordinated AP shall follow the rules defined in 37.13.2.1.3 (Frame Exchange sequence for Co-BF), and shall additionally follow the rules defined in this subclause.

 (M#480) If the Co-BF coordinated AP rejects the Co-BF invite, the Co-BF Response frame should include the reason for rejection as defined in Table9-40b1 (Co-BF Status Code field encoding).

(M#312)In each of the Co-BF Invite and Co-BF Response frames, if there is information for more than one user, the users are ordered according to the number of spatial streams in non-increasing order.

(M#311)The Co-BF Trigger frame is used to ensure time and frequency synchronization between the two data PPDUs, and conveys the information needed to construct a common preamble for the two data PPDUs. The Co-BF Trigger frame shall include the following information:

* The value to be set in the Length field in the L-SIG field of the PPDU of the Co-BF transmission
* The PHY version of the Co-BF transmission
* The bandwidth of the Co-BF transmission
* The puncturing pattern of the Co-BF transmission
* The BSS color of the Co-BF coordinating AP
* The BSS color of the Co-BF coordinated AP
* The TXOP duration to be set in the TXOP field in the U-SIG of the Co-BF transmission
* The number of UHR-SIG symbols of the Co-BF transmission
* The GI and the LTF size of the Co-BF transmission
* The number of UHR-LTF symbols of the Co-BF transmission
* The total number of recipient STAs of the Co-BF transmission
* The STA ID of each recipient STA of the Co-BF transmission
* Which BSS each recipient STA of the Co-BF transmission belongs to

NOTE-the BSS is identified by the BSS color

* The MCS of each recipient STA of the Co-BF transmission
* The spatial configuration of each recipient STA of the Co-BF transmission
* Whether 2xLDPC will be used for each recipient STA of the Co-BF transmission
* The duration of the MU-BAR/BA frame exchange between the Co-BF coordinating AP and its associated non-AP STAs

(M#316)The order of user information in the Co-BF Trigger frame shall be the same as the order of users in the UHR-SIG User field for the Co-BF transmission. The ordering of user information follows the rules described in 38.3.15.9.6 (User Specific field). In addition to the above rules, the order of user information of the users associated with the Co-BF coordinating AP in the Co-BF Trigger frame shall be the same as that in the Co-BF Invite frame. The order of user information of the users associated with the Co-BF coordinated AP in the Co-BF Trigger frame shall be the same as that in the Co-BF Response frame.

(M#469)The user information in the Co-BF Trigger frame and in the UHR-SIG of the Co-BF transmission corresponds to all the recipient STAs that are indicated in the Co-BF Invite and Co-BF Response frames. The number of spatial streams for each recipient STA interpreted from the spatial configuration in the Co-BF Trigger frame shall be the same as the number of spatial streams for the same STA that is indicated in the Co-BF Invite and Co-BF Response frames. The MCS and 2xLDPC bit for each recipient STA indicated in the Co-BF Trigger frame shall be the same as the MCS and 2xLDPC bit indicated in the Co-BF Response frame

(M#298)The Co-BF coordinating AP and the Co-BF coordinated AP shall follow the rules defined in 38.3.24 (Transmit requirement for UHR Co-BF sounding sequence and Co-BF transmission) to apply frequency pre-correction to the PPDUs containing the Co-BF Trigger frame and the Co-BF data frames.

# 37.15.2.2 Coordinated spatial reuse

**37.15.2.2.1 General**

The objective of coordinated spatial reuse (Co-SR) is to allow more efficient medium usage by concurrent transmissions (#Editorial)from multiple APs using transmit power control. (#416) The number of participating APs in a Co-SR transmission shall be 2. (#747) (#3784)

(#747) A Co-SR coordinating AP is an AP with dot11CoSROptionImplemented equal to true that obtains a TXOP and initiates Co-SR transmission with another AP. A Co-SR coordinated AP is an AP with dot11CoSROptionImplemented equal to true that participates in Co-SR transmission initiated by the Co-SR coordinating AP. The Co-SR transmission shall be initiated by the Co-SR coordinating AP. An AP shall not perform a Co-SR transmission to a STA with dot11CoSROptionImplemented equal to false or with dot11CoSROptionImplemented equal to true but has disabled the Co-SR operation. (M#452)A non-AP STA with dot11CoSROptionImplemented equal to true may enable or disable the Co-SR operation by following the procedure defined in 37.27 (Procedure for operating mode and parameter updates).

(#1477) An AP shall not initiate Co-SR transmission with another AP unless the two APs have established a MAPC agreement for Co-SR according to the procedure defined in 37.8.2.2.2 (Co-SR negotiation) or by other means outside of the scope of this standard.

# (#1477) 37.15.2.2.2 Co-SR negotiation

A MAPC requesting AP that follows the rules defined in 37.8.1.3 (MAPC agreement negotiation) to establish, update, or tear down a Co-SR agreement with a MAPC responding AP shall additionally follow the rules defined in this subclause. A MAPC responding AP that responds to a MAPC requesting AP in a MAPC agreement negotiation for Co-SR agreement that follows the rules defined in 37.8.1.3 (MAPC agreement negotiation) shall additionally follow the rules defined in this subclause.

A MAPC requesting AP shall include a Co-SR profile in the MAPC element carried in the MAPC Negotiation Request frame initiating the MAPC agreement negotiation for a Co-SR agreement. The Co-SR profile shall include one MAPC Scheme Request field.

A MAPC responding AP shall include a Co-SR profile in the MAPC element carried in the MAPC Negotiation Response frame when responding to a MAPC requesting AP in a MAPC agreement negotiation for a Co-SR agreement. The Co-SR profile shall include one MAPC Scheme Request field.

A MAPC requesting AP shall not set the MAPC Operation Type field to 1 or 2 if there is no established Co-SR agreement between the MAPC requesting AP and the MAPC responding AP. A MAPC requesting AP shall not set the MAPC Operation Type field to 0 if a Co-SR agreement is already established between the MAPC requesting AP and the MAPC responding AP.

The MAPC responding AP shall not set the MAPC Operation Type field, carried in the MAPC Scheme Request field of the Co-SR profile included in the MAPC Negotiation Response frame, to 5.

# 37.15.2.2.3 Frame Exchange sequence for Co-SR

Co-SR follows the same frame exchange sequence as Co-BF as defined in 37.13.2.1.3 (Frame Exchange sequence for Co-BF), where

* The rules defined for Co-BF coordinating AP shall be applied to Co-SR coordinating AP,
* The rules defined for Co-BF coordinated AP shall be applied to Co-SR coordinated AP,
* Co-BF Invite frame shall be replaced by Co-SR Invite frame,
* Co-BF Response frame shall be replaced by Co-SR Response frame,
* Co-BF Trigger frame shall be replaced by Co-SR Trigger frame,
* Co-BF transmission shall be replaced by Co-SR transmission.

#  (M#253) 37.15.2.2.4 Co-SR transmission

In order to perform Co-SR transmission, a Co-SR coordinating AP and a Co-SR coordinated AP shall follow the rules defined in 37.13.2.1.3 (Frame Exchange sequence for Co-SR), and shall additionally follow the rules defined in this subclause.

(M#480) If the Co-SR coordinated AP rejects the Co-SR invite, the Co-SR Response frame should include the reason for rejection as defined in Table9-40b2 (Co-SR Status Code field encoding). (M#472)When the Co-SR Invite frame indicates 2x LTF type and the intended number of LTF symbols, the Co-SR coordinated AP may reject the Co-SR invitationby setting the Co-SR Status Code field to REJECTED\_NUMBER\_OF\_LTF\_LIMITATION in the Co-SR Response frame.

(M#253)The Co-SR Trigger frame shall include the following information:

* (M#254)The duration of the data PPDU transmitted by the Co-SR coordinating AP and the duration of the data PPDU transmitted by the Co-SR coordinated AP, which shall be the same.
* (M#429)The transmit power limit of the Co-SR coordinated AP. The value of the transmit power limit shall not be lower than the value indicated by the Co-SR coordinated AP in the MAPC Negotiation Request frame or MAPC Negotiation Response frame during the MAPC agreement establishment procedure as defined in 37.8.2.2.2 (Co-SR negotiation).
* (M#429)The transmit power of the Co-SR coordinating AP.
* (M#456)The PHY version of the data PPDU transmitted by the Co-SR coordinating AP and the PHY version of the data PPDU transmitted by the Co-SR coordinated AP.
* The duration of the MU-BAR/BA frame exchange between the Co-SR coordinating AP and its associated non-AP STAs

(M#135)(#3784)The Co-SR Trigger frame shall include one User Info field that corresponds to the Co-SR coordinated AP. The User Info field shall be set as follows:

* The AID12 field shall be set to the AP ID of the Co-SR coordinated AP, which is assigned by the Co-SR coordinating AP during the MAPC agreement establishment procedure as defined in 37.8.2.2.2 (Co-SR negotiation).

(M#254)After transmitting the Co-SR Trigger frame, the Co-SR coordinating AP shall transmit a data PPDU where the TXVECTOR parameters shall be set as follows:

* The L\_LENGTH parameter is set to the value indicated in the Co-SR Trigger frame

(M#254)After receiving the Co-SR Trigger frame, the Co-SR coordinated AP shall transmit a data PPDU where the TXVECTOR parameters shall be set as follows:

* The L\_LENGTH parameter is set to the value indicated in the Co-SR Trigger frame
* The TXPWR\_LEVEL\_INDEX parameter is set to a value that leads to a transmit power less than or equal to the transmit power indicated in the Co-SR Trigger frame

# 9.3.1.8.6 Multi-STA BlockAck variant

|  |
| --- |
| * Feedback Type subfield encoding
 |
| Feedback Type | Feedback subfield type |
| 0 | Unavailability feedback |
| 1 | Low latency feedback |
| 2 | Co-BF Response feedback  |
| 3 | Co-TDMA feedback |
| 4 | Co-SR Response feedback |
| 5-15 | Reserved |

**……**

More than one Per AID TID info field may be present in a Multi-STA BlockAck frame to report different
types of feedback information.

If the Feedback Type field of the Feedback Per AID TID Info field is not equal to 2 or 4, the format of the Block Ack Starting Sequence Control field in the Feedback Per AID TID Info field is shown in Figure 9-60b (Block Ack Starting Sequence Control subfield format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is not equal to 2 or 4).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B3 | B4 B11 | B12 B15 |
|  | Fragment Number | Reserved | Feedback Type |
| Bits: | 4 | 8 | 4 |

**Figure 9-60b—Block Ack Starting Sequence Control field format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is not equal to 2 or 4**

The Multi-STA BlockAck frame is a Co-BF Response frame if the BA Information field of the Multi-STA BlockAck frame comprises one Per AID TID Info that carries Co-BF Response feedback as defined in 9.3.1.8.6.3 (Co-BF Response feedback).

The Multi-STA BlockAck frame is a Co-SR Response frame if the BA Information field of the Multi-STA BlockAck frame comprises one Per AID TID Info that carries Co-SR Response feedback as defined in 9.3.1.8.6.4 (Co-SR Response feedback).

*TGbn Editor: please add the following contents at the end of this subclause*

**9.3.1.8.6.3 Co-BF Response feedback**

If the Feedback Type field is set to 2, the format of the Block Ack Starting Sequence Control field in the Feedback Per AID TID Info field is shown in Figure 9-60e1 (Block Ack Starting Sequence Control subfield format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is equal to 2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B19 | B10 B11 | B12 B15 |
|  | Fragment Number | Co-BF Status Code | Reserved | Feedback Type |
| Bits: | 4 | 6 | 2 | 4 |

**Figure 9-60e1—Block Ack Starting Sequence Control field format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is equal to 2**

The Co-BF Status Code field indicates whether the Co-BF coordinated AP accepts the Co-BF invite from the Co-BF coordinating AP, and indicates the reason for rejection if the Co-BF invite is not accepted. The encoding of the Co-BF Status Code field is shown in Table 9-40b1 (Co-BF Status Code field encoding).

Table9-40b1 Co-BF Status Code field encoding

|  |  |  |
| --- | --- | --- |
| Co-BF Status Code | Name | Meaning |
| 0 | SUCCESS | Successful |
| 1 | REJECTED\_REASON\_UNSPECIFIED | Unspecified failure |
| 2-63 | reserved | reserved |

If the Co-BF Status Code field is equal to 0, the Feedback field has the format defined in Figure 9-60f (Feedback subfield format if the Feedback Type subfield is set to 2). Otherwise, the Feedback field is not present.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | Co-BF Response Common Info | Co-BF Response User Info List | Reserved |
| Bits: | 32 | variable | variable |

**Figure 9-60f Feedback subfield format if the Feedback Type subfield is set to 2**

The format of the Co-BF Response Common Info field is defined in Figure 9-60f1 (Co-BF Response Common Info field format).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B8 | B9 B11 | B12 | B13 | B14 B20 | B21 B22 | B23 B31 |
|  | Suggested Number Of Data OFDM Symbols | PHY Version Identifier | Extra LTF Allowed | ICF/ICR Included | ICF/ICR Duration | Number of Co-BF Users in Coordinated BSS | Reserved |
| Bits: | 9 | 3 | 1 | 1 | 7 | 2 | 9 |

**Figure 9-60f1 Co-BF Response Common Info field format**

The Suggested Number Of Data OFDM Symbols field indicates the suggested number of data OFDM symbols of the Co-BF transmission by the Co-BF coordinated AP that is equal to the value of the field plus 1.

The PHY Version Identifier field indicates the PHY version of the data PPDU in the Co-BF transmission. The PHY Version Identifier subfield is set to 1 for UHR. Other values are reserved.

The Extra LTF Allowed field indicates whether extra LTF to be used in the Co-BF transmission is allowed by the Co-BF coordinated AP.

The ICF/ICR Included field indicates whether ICF and ICR frame exchange is included between the Co-BF coordinated AP and its associated recipient STAs before Co-BF transmission. It is set to 1 if the ICF and ICR frame exchange is included between the Co-BF coordinated AP and its associated recipient STAs before Co-BF transmission, and is set to 0 otherwise.

The ICF/ICR Duration field indicates the duration of the ICF and ICR frame exchange between the Co-BF coordinated AP and its associated recipient STAs before Co-BF transmission, in units of 4us. It includes the duration of the PPDU carrying the ICF and the duration of the PPDU carrying the ICR, together with the SIFS between the ICF and the ICR. This field is reserved when the ICF/ICR Included field is set to 0.

The Number of Co-BF Users in Coordinated BSS field indicates the number of recipient STAs of the Co-BF transmission that are associated with the Co-BF coordinated AP that is equal to the value of the field plus 1.

The Co-BF Response User Info List field contains one or more Co-BF Response User Info fields.

The Co-BF Response User Info field is defined in Figure 9-60f2 (Co-BF Response User Info field format).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B10 | B11 B15 | B16 B17 | B18 | B19 B23 |
|  | AID11 | MCS | Nss | 2xLDPC | Reserved |
| Bits: | 11 | 5 | 2 | 1 | 5 |

**Figure 9-60f2 Co-BF Response User Info field format**

The AID11 field indicates the AID of the recipient STA of the Co-BF transmission that is associated with the Co-BF coordinated AP.

The MCS field indicates the modulation and coding schemes used in the Co-BF transmission that is intended to the recipient STA identified by the AID11 field.

The Nss field indicates the number of spatial streams for the recipient STA of the Co-BF transmission identified by the AID11 field that is associated with the Co-BF coordinated AP.

The 2xLDPC field indicates whether 2xLDPC will be used for the recipient STA of the Co-BF transmission identified by the AID11 field that is associated with the Co-BF coordinated AP

**9.3.1.8.6.4 Co-SR Response feedback**

If the Feedback Type field is set to 4, the format of the Block Ack Starting Sequence Control field in the Feedback Per AID TID Info field is shown in Figure 9-60f3 (Block Ack Starting Sequence Control subfield format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is equal to 4).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B9 | B10 B11 | B12 B15 |
|  | Fragment Number | Co-SR Status Code | Reserved | Feedback Type |
| Bits: | 4 | 6 | 2 | 4 |

**Figure 9-60f3—Block Ack Starting Sequence Control field format if the AID11 subfield is not 2045 and if the Ack Type subfield is equal to 0 and the TID subfield is equal to 13 and if the Feedback Type field is equal to 4**

The Co-SR Status Code field indicates whether the Co-SR coordinated AP accepts the Co-SR invite from the Co-SR coordinating AP, and indicates the reason for rejection if the Co-SR invite is not accepted. The encoding of the Co-SR Status Code field is shown in Table 9-40b2 (Co-SR Status Code field encoding).

Table9-40b2 Co-SR Status Code field encoding

|  |  |  |
| --- | --- | --- |
| Co-BF Status Code | Name | Meaning |
| 0 | SUCCESS | Successful |
| 1 | REJECTED\_REASON\_UNSPECIFIED | Unspecified failure |
| 2 | REJECTED\_NUMBER\_OF\_LTF\_LIMITATION | Rejected due to number of LTF limitation |
| 3-63 | reserved | reserved |

If the Co-SR Status Code field is equal to 0, the Feedback field has the format defined in Figure 9-60g (Feedback subfield format if the Feedback Type subfield is set to 4). Otherwise, the Feedback field is not present.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B8 | B9 B11 | B12 | B13 B19 | B20 B31 |
|  | Suggested Number Of Data OFDM Symbols | PHY Version Identifier | ICF/ICR Included | ICF/ICR Duration | Reserved |
| Bits: | 9 | 3 | 1 | 7 | 12 |

**Figure 9-60g Feedback subfield format if the Feedback Type subfield is set to 4**

The Suggested Number Of Data OFDM Symbols field indicates the suggested number of data OFDM symbols of the Co-BF transmission by the Co-SR coordinated AP that is equal to the value of the field plus 1.

The PHY Version Identifier field indicates the intended PHY version of the Co-SR coordinated AP’s PPDU in the upcoming Co-SR transmission. The PHY Version Identifier subfield is set to 0 for EHT, and is set to 1 for UHR. Other values are reserved.

The ICF/ICR Included field indicates whether ICF and ICR frame exchange is included between the Co-SR coordinated AP and its associated recipient STAs before Co-SR transmission. It is set to 1 if the ICF and ICR frame exchange is included between the Co-SR coordinated AP and its associated recipient STAs before Co-SR transmission, and is set to 0 otherwise.

The ICF/ICR Duration field indicates the duration of the ICF and ICR frame exchange between the Co-SR coordinated AP and its associated recipient STAs before Co-SR transmission, in units of 4us. It includes the duration of the PPDU carrying the ICF and the duration of the PPDU carrying the ICR, together with the SIFS between the ICF and the ICR. This field is reserved when the ICF/ICR Included field is set to 0.

# 9.3.1.22 Trigger Frame Format

**9.3.1.22.7 Feedback User Info field**

……

The Feedback Type field indicates the type of feedback information included in the Feedback user Info field and follows the encoding shown in Table 9-46m5.

|  |
| --- |
| Table 9-46m5 Feedback Type subfield encoding |
| Feedback Type | Feedback subfield type |
| 0 | Unsolicited Unavailability feedback |
| 1 | Extended Timeout feedback |
| 2 | Co-BF Invite feedback |
| 3 | Co-TDMA feedback |
| 4 | Co-SR Invite feedback |
| 5-15 | Reserved |

……

**9.3.1.22.7.xx1 Extended Timeout Feedback User Info field**

A Feedback User Info field is an Extended Timeout Feedback User Info field if the Feedback Type field in the Feedback User Info field is equal to 1.

An Extended Timeout Feedback User Info field shall be included in the BSRP Trigger frame and MU-RTS Trigger frame that is addressed to one or more EMLSR or DPS STAs within a Co-BF transmission frame sequence or a Co-SR transmission frame sequence.. The format of the Feedback Information field of the Extended Timeout Feedback User Info field is shown in Figure 9-90j6.

|  |  |  |
| --- | --- | --- |
|  | B0   B7 | B8    B23 |
|  | Extended Timeout Duration | Reserved |
| Bits: | 8 | 16 |

**Figure 9-90j6 Feedback Information field format if the Feedback Type field is set to 1**

The Extended Timeout Duration field indicates the duration that the recipient STA(s) wait before initiating a switch back procedure, in units of 4 us. Switch back procedures can be either switching back to listen mode on the link of operation for EMLSR STAs or switching back to LC mode for DPS STAs. The value 0 indicates that an EMLSR STA follows the EMLSR switch back procedures defined in 35.3.17 (Enhanced multi-link single-radio (EMLSR) operation) and a DPS STA follows the switch back procedures defined in 37.17.1.2 (DPS operation for Non-AP STAs).

**9.3.1.22.7.xx2 Co-BF Invite Feedback User Info field**

A Feedback User Info field is a Co-BF Invite Feedback User Info field if the Feedback Type field in the Feedback User Info field is equal to 2.

If a Co-BF Invite Feedback User Info field is the first Co-BF Invite Feedback User Info field in a frame, the format of the Feedback Information field in the Co-BF Invite Feedback User Info field is shown in Figure 9-cc1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B8 | B9 B17 | B18 B20 | B21 B23 |
|  | Minimum number of Data OFDM Symbols | Maximum number of Data OFDM Symbols | PHY Version Identifier | BW |
| Bits: | 9 | 9 | 3 | 3 |

**Figure 9-cc1** **Feedback Information field of the first Feedback User info field in the Co-BF Invite frame**

The Minimum number of Data OFDM Symbols field indicates the minimum number of data OFDM symbols of the Co-BF transmission that is equal to the value of the field plus 1.

The Maximum number of Data OFDM Symbols field indicates the maximum number of data OFDM symbols of the Co-BF transmission that is equal to the value of the field plus 1.

The PHY Version Identifier field indicates the PHY version of the data PPDU in the Co-BF transmission. The PHY Version Identifier subfield is set to 1 for UHR. Other values are reserved.

The BW field indicates the bandwidth of the data PPDU in the Co-BF transmission.

If a Co-BF Invite Feedback User Info field is the second Co-BF Invite Feedback User Info field in a frame, the format of the Feedback Information field in the Co-BF Invite Feedback User Info field is shown in Figure 9-cc2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B4 | B5 | B6 B12 | B13 B14 | B15 B16 | B17 B18 | B19 B23 |
|  | Punctured Channel Information | ICF/ICR Included | ICF/ICR Duration | GI+LTF Size | Maximum Total Nss Allowed For Coordinated AP | Number Of Co-BF Users In Coordinating BSS | Reserved |
| Bits: | 5 | 1 | 7 | 2 | 2 | 2 | 5 |

**Figure 9-cc2 Feedback Information field of the second Feedback User info field in the Co-BF Invite frame**

The Punctured Channel Information field indicates the puncturing pattern of the data PPDU in the Co-BF transmission, as shown in Table 36-30 (Definition of the Punctured Channel Information field in the U-SIG for an EHT MU PPDU using non-OFDMA transmissions).

The ICF/ICR Included field indicates whether ICF and ICR frame exchange is included between the Co-BF coordinating AP and its associated recipient STAs before Co-BF transmission. It is set to 1 if the ICF and ICR frame exchange is included between the Co-BF coordinating AP and its associated recipient STAs before Co-BF transmission, and is set to 0 otherwise.

The ICF/ICR Duration field indicates the duration of the ICF and ICR frame exchange between the Co-BF coordinating AP and its associated recipient STAs before Co-BF transmission, in units of 4us. It includes the duration of the PPDU carrying the ICF and the duration of the PPDU carrying the ICR, together with the SIFS between the ICF and the ICR. This field is reserved when the ICF/ICR Included field is set to 0.

The GI+LTF Size field indicates the GI duration and UHR-LTF size of the data PPDU in the Co-BF transmission. It is set to 0 to indicate 2× LTF + 0.8 µs GI, is set to 1 to indicate 2× LTF + 1.6 µs GI, and is set to 2 to indicate 4× LTF + 3.2 µs GI. The value 3 of this field is reserved.

The Maximum Total Nss Allowed For Coordinated AP field indicates the maximum total number of spatial streams allowed for the Co-BF coordinated AP of the Co-BF transmission that is equal to the value of the field plus 1.

The Number Of Co-BF Users In Coordinating BSS field indicates the number of recipient STAs of the Co-BF transmission that are associated with the Co-BF coordinating AP that is equal to the value of the field plus 1.

If a Co-BF Invite Feedback User Info field is neither the first nor the second Co-BF Invite Feedback User Info field in a frame, the format of the Feedback Information field in the Co-BF Invite Feedback User Info field is shown in Figure 9-cc3

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B10 | B11 B12 | B13 B23 |
|  | AID11 | Nss | Reserved |
| Bits: | 11 | 2 | 11 |

**Figure 9-cc3 Feedback Information field of the first Feedback User info field in the Co-BF Invite frame**

The AID11 field indicates the AID of the recipient STA of the Co-BF transmission that is associated with the Co-BF coordinating AP.

The Nss field indicates the number of spatial streams for the recipient STA of the Co-BF transmission identified by the AID11 field that is associated with the Co-BF coordinating AP.

**9.3.1.22.7.xx3 Co-SR Invite Feedback User Info field**

A Feedback User Info field is a Co-SR Invite Feedback User Info field if the Feedback Type field in the Feedback User Info field is equal to 4.

If a Co-SR Invite Feedback User Info field is the first Co-SR Invite Feedback User Info field in a frame, the format of the Feedback Information field in the Co-SR Invite Feedback User Info field is shown in Figure 9-dd1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B8 | B9 B17 | B18 B20 | B21 B23 |
|  | Minimum number of Data OFDM Symbols | Maximum number of Data OFDM Symbols | PHY Version Identifier | Reserved |
| Bits: | 9 | 9 | 3 | 3 |

**Figure 9-dd1 Feedback Information field of the first Feedback User info field in the Co-SR Invite frame**

The Minimum number of Data OFDM Symbols field indicates the minimum number of data OFDM symbols of the Co-SR transmission that is equal to the value of the field plus 1.

The Maximum number of Data OFDM Symbols field indicates the maximum number of data OFDM symbols of the Co-SR transmission that is equal to the value of the field plus 1.

The PHY Version Identifier field indicates the intended PHY version of the Co-SR coordinating AP’s PPDU in the upcoming Co-SR transmission. The PHY Version Identifier subfield is set to 0 for EHT, and is set to 1 for UHR. Other values are reserved.

If a Co-SR Invite Feedback User Info field is the second Co-SR Invite Feedback User Info field in a frame, the format of the Feedback Information field in the Co-SR Invite Feedback User Info field is shown in Figure 9-dd2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B4 | B5 | B6 B12 | B13 B14 | B15 B16 | B17 B23 |
|  | Reserved | ICF/ICR Included | ICF/ICR Duration | GI+LTF Size | Number of LTF Symbols | Reserved |
| Bits: | 5 | 1 | 7 | 2 | 2 | 7 |

**Figure 9-dd2 Feedback Information field of the second Feedback User info field in the Co-SR Invite frame**

The ICF/ICR Included field indicates whether ICF and ICR frame exchange is included between the Co-SR coordinating AP and its associated recipient STAs before Co-SR transmission. It is set to 1 if the ICF and ICR frame exchange is included between the Co-SR coordinating AP and its associated recipient STAs before Co-SR transmission, and is set to 0 otherwise.

The ICF/ICR Duration field indicates the duration of the ICF and ICR frame exchange between the Co-SR coordinating AP and its associated recipient STAs before Co-SR transmission, in units of 4us. It includes the duration of the PPDU carrying the ICF and the duration of the PPDU carrying the ICR, together with the SIFS between the ICF and the ICR. This field is reserved when the ICF/ICR Included field is set to 0.

The GI+LTF Size field indicates the GI duration and UHR-LTF size of the data PPDU in the Co-SR transmission. It is set to 0 to indicate 2× LTF + 0.8 µs GI, is set to 1 to indicate 2× LTF + 1.6 µs GI, and is set to 2 to indicate 4× LTF + 3.2 µs GI. The value 3 of this field is reserved.

The Number of LTF Symbols field indicates the number of LTF symbols of the data PPDU in the Co-SR transmission that is equal to the value of the field plus 1.

**9.3.1.22.14 BSRP Trigger frame format**

TGbn Editor: please add the following contents in this subclause as below:

The BSRP NTB Trigger frame is a Co-BF Invite frame if the Feedback Type fields of all the Feedback User info fields are equal to 2. The Co-BF Invite frame includes at least three Feedback User info fields with the format defined in Figure 9-99b. The Feedback Information field of the first Feedback User info field is defined in Figure 9-cc1. The Feedback Information field of the second Feedback User info field is defined in Figure 9-cc2. The Feedback Information field(s) of other Feedback User info field(s) are defined in Figure 9-cc3.

The BSRP NTB Trigger frame is a Co-SR Invite frame if the Feedback Type fields of all the Feedback User info fields are equal to 4. The Co-SR Invite frame includes two Feedback User info fields with the format defined in Figure 9-aa. The Feedback Information field of the first Feedback User info field is defined in Figure 9-dd1. The Feedback Information field of the second Feedback User info field is defined in Figure 9-dd2.