IEEE P802.11  
Wireless LANs

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| Resolutions for Instance Comments in LB272 - Part 2: TB sensing measurement instance | | | | |
| Date: 2023-04-13 | | | | |
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Abstract

This submission proposes resolutions to the following comments submitted in LB272 under Instance topic. The CIDs are referring to D1.0. The text used as reference is D1.0.

CIDs: 1030 1121 1122 1123 1127 1128 2096 1130 1348 1349 1450 1504 1601 1721 ~~1604~~ 1722 1724 1726 1727 1760 1761 2251 1999 2025 1773 1895 1896 1897 2026 2199 1898 2024 2027 ~~2150 2196~~ 2152 2153 2252 ~~2283~~

Revision history:

R0: Original version

R1: Revised based on offline comments received.

R2: Revised based on feedback received at the TGbf call on May 4th and removed CID 1604 and CID 2283 from the document for further discussions.

R3: Revosed based on feedback received at the TGbf call on May 8th.

R4: Removed CID 2150 and 2196 from the document because one member identified a bug in Table 11-29b.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1030 | 11.55.1.5.2.2 | 178.56 | The polling phase seems to allow polled STA to not respond to a trigger frame, potentially creating non continuous signal as some RUs will not be used. In terms of energy detection, this can cause other STAs to consider the medium free while it is not ... It would be better to have a polled STA not wanting to participate to a sensing measurement instance to respond with a frame in its allocated RU, like a Null Data Frame or an ACK or whatever to avoid gaps | As in comment |

**Proposed resolution**: Rejected.

**Discussion**: The contributor suggests rejecting CID 1030 due to the following reasons:

1. One of the reasons why some STAs cannot respond to the Sensing Polling Trigger frame is exactly because these STAs cannot do any transmission in response to the Sensing Polling Trigger frame. For example, the STA may be involved in other transmissions, or its NAV has already been set by other nearby transmissions. In this case, we cannot ask the STA to still transmit something (Null Data Frame or an Ack) to indicate its unavailability to participate in sensing measurement.
2. The scenario raised by the commenter is no different than the scenario where the AP allocates RUs for data transmission to a non-AP STA, but the non-AP STA is not able to fill the RUs for whatever reason. There is never a guarantee that the STA is available to fill the RUs regardless of expecting transmission of other type PPDUs.
3. The same polling mechanism is used and adopted by IEEE 802.11az spec and will be incorporated into REVme soon.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1121 | 11.55.1.5.2.1 | 176.29-176.32 | Meaning of the word "scenarios" might be ambiguous to some. | Replace "It is applicable to scenarios where..." with "It is applicable to sensing measurement setups in which..." |

**Proposed resolution**: Revised.

**Discussion**: We will need to apply similar changes to 11.55.1.5.3 (Non-TB sensing measurement instance) too.

***TGbf editor, make the following change in D1.0:***

Section 11.55.1.5.2.1, 1st paragraph

TB sensing measurement instance is the trigger-based variant of a sensing measurement instance. It is applicable to ~~scenarios~~ sensing measurement sessions in which an AP is the sensing initiator, and one or more non-AP STAs are the sensing responders.

Section 11.55.1.5.3.1, 1st paragraph

Non-TB sensing measurement instance is the non-trigger-based variant of a sensing measurement instance. It is applicable ~~in scenarios~~ to sensing measurement sessions in which a non-AP STA is the sensing initiator, and an AP is the sensing responder. A non-AP STA acting as a sensing initiator shall participate in a non-TB sensing measurement instance as a sensing transmitter, a sensing receiver, or both a sensing transmitter and a sensing receiver. Whenever the medium is available, the non-AP STA may initiate a non-TB sensing measurement instance. The AP may limit the frequency with which the non-AP STA can initiate a non-TB sensing measurement instance, by assigning a minimum time interval between two consecutive non-TB sensing measurement instances.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1122 | 11.55.1.5.2.1 | 176.63-176.65 | Sentence "The STA that is assigned... corresponding TB sensing measurement instance." is unclear (partially because it lacks details). | Suggest deleting this sentence. The point being made in this sentence is addressed with normative text in what follows. |
| 1123 | 11.55.1.5.2.1 | 177.65 | Sentence in 176.65-177.2 is ambiguous ("any STA", word "Respectively" missing at the end of the sentence?) | Suggest deleting this sentence. The point being made in this sentence is addressed with normative text in what follows. |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1127 | 11.55.1.5.2.1 | 178.1 | Suggestion to improve writing | Replace "after the Sensing NDP Announcement frame, where STA 4 is a" with "after the Sensing NDP Announcement frame. In this example, STA 4 is a" |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1128 | 11.55.1.5.2.1 | 178.4 | Text appears twice | Delete one of the "In the TF sounding phase, the AP... to solicit SR2SI NDP transmissions," |
| 2096 | 11.55.1.5.2.1 | 178.3 | In the TF sounding phase, the AP sends ...' is repeated. | As in comment. |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1130 | 11.55.1.5.2.2 | 178.56 | Word missing? | "... to avoid \*unnecessary\* resource allocation..." |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1348 | 11.55.1.5.2.1 | 176.40 | Table 11-29b shows the reporting phase is not included in the first four enteries of the table. If no report is indicated what is the value of these combinations? | As in comment. Please clarify |

**Proposed resolution**: Rejected.

**Discussion**: The contributor suggests rejecting CID 1348 due to the following reasons:

1. This is an invalid comment in the first place based on the comment resolution guideline provided in <https://mentor.ieee.org/802.11/dcn/13/11-13-0230-05-0000-comment-resolution-tutorial.ppt>. Because the comment is asking a question/clarfication instead of proposing a change.
2. If the sensing initiator is also the sensing receiver, there is no need for sensing measurement reporting. As a result, for a TB sensing measurement instance, if there is only NDPA sounding, the reporting phase will not be present.
3. Even if the sensing initiator is also the sensing transmitter, sensing measurement reporting may not be needed if the Sensing Measurement Report Requested field in the Sensing Measurement Request frame is set to 0. As a result, for a TB sensing measurement instance, if TF sounding is present, the reporting phase may not be present.
4. The combinations without the reporting phase are still valid because the responders will still provide the report locally to its MLME.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1349 | 11.55.1.5.2.1 | 177.7 | Figure 11-74c is a good example for the proocol overhead built into sensing. It seems that the only necessary phases are the NDPA sounding phase and the reporting phase. The rest of the phases are useless overhead. Why Polling phase is needed if the NDPA frame includes STA Info fields? Why TF Sounding phase is needed when NDPA sounding phase is present? | It would be good if the TG examines the protocol overhead needed to achieve the sensing function. It would also be good if a justification is given to specify a heavy protocol as is currently the case. |

**Proposed resolution**: Rejected.

**Discussion**: The contributor suggests rejecting CID 1349 due to the following reasons:

1. This is an invalid comment in the first place based on the comment resolution guideline provided in <https://mentor.ieee.org/802.11/dcn/13/11-13-0230-05-0000-comment-resolution-tutorial.ppt>. Because the comment is asking a question/clarification instead of proposing a change.
2. In a TB sensing measurement instance, NDPA sounding only works if the sensing initiator is the sensing transmitter. If the sensing initiator is the sensing receiver, TF sounding phase will be there because only TF sounding phase can solicit SR2SI NDP transmission from the sensing responder to the sensing initiator. As a result, the commenter’s statement “only necessary phases are the NDPA sounding phase and the reporting phase” is incorrect.
3. Polling phase is necessary because some sensing responders may not be available for the subsequent sensing measurement due to various reasons, for example, power save, busy with other transmissions, or silenced by other transmissions. This is particularly necessary for unassocaited sensing responders because the AP has no information about their availabilities. Otherwise, the AP may end up allocating resources to a sensing responder which is not available for sensing measurement.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1450 | 11.55.1.5.2.1 | 178 | In Fig 11-74d, why is sensing report trigger frame sent to STA4, because STA4 is already set as receiver not assigned to transmit measurement report frame. |  |

**Proposed resolution**: Revised.

**To TGbf editor:** Delete the arrow for the Sensing Report Trigger frame from the AP to STA4.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1504 | 11.55.1.5.2.2 | 179.15 | The text suggests the AP shall attempt to schedule one or more extra TB sensing measurment instances. Stating one or more has no limit. There should be a limit on maximum number of extra TB sensing measurement instances. | Add a NOTE clarifiing the maximum number (limit) of extra TB sensing measurement instances. |

**Proposed resolution**: Rejected.

**Discussion**:

1. The sentence reads “If the AP does not poll all STAs assigned to be polled in the sensing availability window using a single Sensing Polling Trigger frame, the AP shall attempt to schedule one or more extra TB sensing measurement instances where each TB sensing measurement instance begins with a polling phase within the same sensing availability window.” So, it is clearly stated that the AP can only schedule additional TB sensing measurement instances in the same sensing availability window, which has a limited duration. Therefore, it is already obvious that the AP cannot schedule arbitrary number of TB sensing measurement instances because all of them have to be in a sensing availability window.
2. Determining a hard limit of number of TB sensing measurement instances is not feasible. Because there are many variables, including the duration of the availability window, number of available STAs, presence of NDPA sounding, TF sounding, and reporting phase. However, as long as the rule holds that the AP can only schedule TB sensing measurement instances within the availability window, the AP will bound the number of TB sensing measurement instances accordingly.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1601 | 11.55.1.5.2.1 | 177.1 | STAs are addressed by STA Info fields in the Sensing NDP Announcement frame | Change the text to " ... addressed by a User Info field in a Sensing Trigger frame or a STA Info field in a Sensing NDP Announcement frame ... " |
| 1721 | 11.55.1.5.2.1 | 177.1 | Change the text "User info field in a Sensing Trigger frame or Sensing NDP Announcement frame" to | User info field in a Sensing Trigger frame or STA Info field in a Sensing NDP Announcement frame |

**Proposed resolution**: Revised.

Note: This sentence will be removed based on the proposed resolution to CID 1123.



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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1724 | 11.55.1.5.2.1 | 177.51 | Replace the text "The TB sensing measurement instance initiated by an AP optionally allows at least one sensing responder to perform a sensing measurement based on an NDP transmitted by another sensing responder" with | During the TF sounding phase of TB sensing measurement instance AP may allow at least one sensing responder to perform a sensing measurement based on an NDP transmitted by another sensing responder |

**Proposed resolution**: Revised.

**Discussion:** The contributor generally agrees with the proposed change by the commenter, but would like to provide some minor editorial revision.

***TGbf editor, make the following change in the following paragprah in 11.55.1.5.2 in D1.0:***

~~The TB sensing measurement instance initiated by an AP optionally allows~~ During the TF sounding phase of a TB sensing measurement instance, the AP may allow at least one sensing responder to perform a sensing measurement based on an NDP transmitted by another sensing responder, as described in 11.55.1.5.2.5 (TF sounding phase - SR2SR variant).

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1726 | 11.55.1.5.2.2 | 178.64 | Change the text "the current sensing availability window" to | “the sensing availability window associated with the corresponding measurement setup ID”  as it should apply to all sensing availability window |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1727 | 11.55.1.5.2.2 | 179.12 | Change the text "a SIFS after the NDPA sounding and/or TF sounding phase" to | a SIFS after the NDPA sounding phase |

**Proposed resolution**: Rejected.

**Discussion:** If both NDPA sounding phase and TF sounding phase are present, and if reporting is required, the reporting phase will be SIFS after the TF sounding phase. If only NDPA sounding phase is present, and if reporting is required, the reporting phase will be SIFS after the NDPA sounding phase. Therefore, the proposed change is not technically correct.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1760 | 11.55.1.5.2.1 | 177.22 | the text "if the polling phase is also present, ..." can be improved as "if both the polling phase and TF sounding phase are present, ..." | as in comment |

**Proposed resolution**: Rejected.

**Discussion:** The proposed change is not technically correct. Because if both the polling phase and TF sounding phase are present does not necessarily mean the TF sounding phase shall start a SIFS after the polling phase. Only when the TF sounding phase is the only sounding phase, i.e., there is no NDPA sounding phase, the TF sounding phase shall start a SIFS after the polling phae. The current text is technically correct in this sense.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1761 | 11.55.1.5.2.1 | 177.27 | need to clarify the text "NOTE--In a TB sensing measurement instance that starts with polling phase and receives no CTS-to-self frame from any of the non-AP STAs can proceed without NDPA and/or TF sounding phase..." which phase should be followed in this case if both NDPA and TF sounding phases are not present. | as in comment |
| 2251 | 11.55.1.5.2.1 | 177.27 | The sentence is grammally incorrect. What is the subject in this sentence? What subject can proceed without NDPA and/or TF sounding phase? | Please add the subject. |
| 1999 | 11.55.1.5.2.1 | 177.28 | In the first sentence of the Note the subject is missing. Please add between "non-AP STAs" and "can" "the TB sensing measurement instance". | As in comment |
| 2025 | 11.55.1.5.2.1 | 177.27 | Correct sentence. Change "In a TB sensing measurement" to "A TB sensing measurement" | See comment |
| 1722 | 11.55.1.5.2.1 | 177.28 | Change the text "the non-AP STAs can proceed without NDPA and/or TF sounding phase" to | the non-AP STAs does not proceed with NDPA and/or TF sounding phase |

**Proposed resolution**: CID 2025: Accepted. Other CIDs: Revised.

**Discussion**: The commenters are correct that the current sentence is grammally incorrect. The contributor proposes to adopt the resolution suggested in CID 2025.

***TGbf editor, make the following change in 11.55.1.5.2.1 in D1.0:***

NOTE—~~In a~~ A TB sensing measurement instance that starts with polling phase and receives no CTS-to-self frame from any of the non-AP STAs does not proceed with NDPA and/or TF sounding phase if all STAs are assigned to be polled in the current sensing availability window. In this case, the AP can also start a new back off to access the channel and send another Sensing Polling Trigger frame.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1773 | 11.55.1.5.2.1 | 177.56 | The example is generally nice to get an idea, but it was hard to figure out what is different about STA6 from the figure until reading the full paragraph | Suggest mentioning earlier in the paragraph that STA 6 exists (and maybe add in figure), is a sensing responder and that it doesn't need to be polled. |
| 1895 | 11.55.1.5.2.1 | 177.56 | Figure 11-74d has STA6, but the first part of this paragraph (before In the NDPA sounding phase") doesn't mention it. | Include STA6 in the description for the figure |
| 1896 | 11.55.1.5.2.1 | 178.1 | "where STA4 is a sensing receiver that is not assigned to transmit Sensing Measurement Report frame" should be put at the end of this paragraph with a new sentence about Sensing Report Trigger frame. | As in comment. |

**Proposed resolution**: Revised to all.

**Discussion**: Agree with the commenters that we need to add some text for STA6 when describing the example illustrated in Figure 11-74d.

***TGbf editor, make the following change in 11.55.1.5.2.1 in D1.0:***

Figure 11-74d (Example of TB sensing measurement instance) shows an example of a TB sensing measurement instance consisting of a polling phase, an NDPA sounding phase, a TF sounding phase, and a reporting phase. In the polling phase, the AP polls five STAs (i.e., STA1 to STA5) that are assigned to be polled, where STA 1, STA2, and STA 3 are sensing transmitters and STA 4 and STA 5 are sensing receivers. STA6 is a sensing responder and sensing receiver but is not assigned to be polled. Except for STA3, four STAs (i.e., STA1, STA2, STA4, and STA5) respond to the AP with CTS-to-self, so both TF sounding phase and NDPA sounding phase are present. STA3 does not respond to the AP with CTS-to-self skips the corresponding TB sensing measurement instance. In the NDPA sounding phase, the AP sends a Sensing NDP Announcement frame to STA4, STA5, and STA 6, and transmits an SI2SR NDP a SIFS after the Sensing NDP Announcement frame~~, where STA4 is a sensing receiver that is not assigned to transmit Sensing Measurement Report frame that result from the sensing measurement setup and STA6 is a sensing receiver that is not assigned to be polled~~. In the TF sounding phase, the AP sends an SR2SI Sounding Trigger frame to STA1 and STA 2 to solicit SR2SI NDP transmissions, In the TF sounding phase, the AP sends an SR2SI Sounding Trigger frame to STA1 and STA 2 to solicit SR2SI NDP transmissions, where SR2SI NDPs from STA1 and STA2 are multiplexed in the spatial stream domain covering the full bandwidth. In the reporting phase, STA5 to STA6 send the sensing measurement results obtained in a TB sensing measurement instance to AP, whereas STA4 is not assigned to transmit Sensing Measurement Report frame.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1897 | 11.55.1.5.2.1 | 178.29 | The arrow from "Sensing Report Trigger frame To STA5-6" box to STA 4 should be removed. | As in comment. |
| 2026 | 11.55.1.5.2.1 | 178.1 | "... where STA4 is a sensing receiver that is not assigned to transmit Sensing Measurement Report frame ...". Figure 11-74d shows Sensing Report Trigger frame going to STA4, contradicting this statement. | Correct Figure |
| 2199 | 11.55.1.5.2.1 | 178.13-178.37 | In the reporting phase, the Sensing Report Trigger frame is sent to STA 5 and STA 6. But the arrow shows that the frame is also sent to STA 4 in Figure 11-74d. | Remove the line and arrow from the Sensing Report Trigger frame to STA 4 in Figure 11-74d. |

**Proposed resolution**: CID 1897, 2199: Accepted. CID 2026: Revised.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 1898 | 11.55.1.5.2.1 | 178.36 | STA 6 should also be polled in the polling phase | Add an arrow from "Sounding Polling Trigger frame to STA1-6" box to the line for STA 6. Add CTF-to-self on the line for STA 6 and an arrow point back to AP. |

**Proposed resolution**: Rejected.

**Discussion**: In the description of the example in Figure 11-74d, it is specified that STA6 is not assigned to be polled.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2024 | 11.55.1.5.2.1 | 176.34 | This looks like the first time terms like "polling phase", "NDPA sounding phase", ... are used. | Add references to the appropriate sections, e.g., 11.55.1.5.2.2 for Polling phase, ... |

**Proposed resolution**: Revised.

**Discussion**: Agree with the commenter that we should add references in this sentence.

***TGbf editor, make the following change in 11.55.1.5.2.1 in D1.0:***

A TB sensing measurement instance includes polling phase (see 11.55.1.5.2.2 Polling phase), NDPA sounding phase (see 11.55.1.5.2.3 NDPA sounding phase), Trigger frame (TF) sounding phase (see 11.55.1.5.2.4 TF sounding phase – SR2SI variant and 11.55.1.5.2.5 TF sounding phase – SR2SR variant), and reporting phase (see 11.55.1.5.2.6 Reporting phase) with relevant combinations as shown in Table 11-29b (Combinations of different phases present in a TB sensing measurement instance).

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2027 | 11.55.1.5.2.2 | 178.56 | "it shall not send a CTS-to-self". I assume the more precise expectation is that it doesn't send anything at all. | Change "it shall not send a CTS-to-self" to "it shall not send a response" |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2152 | 11.55.1.5.2.1 | 178.7 | The phrase "spatial stream domain" should be replaced with "spatial domain" | Delete "stream" |

**Proposed resolution**: Accepted.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2153 | 11.55.1.5.2.1 | 185.35 | Replace "STA5 to STA6" with "STA5 and STA6" | Replace "STA5 to STA6" with "STA5 and STA6" |

**Proposed resolution**: Accepted.

Stop here on May 4th.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 2252 | 11.55.1.5.2.2 | 179.20 | What is the time between two TB sensing measurement instances within the same TXOP | Need to add the time requirement between two TB sensing measurement instances within the same TXOP |

**Proposed resolution**: Revised.

**Discussion**: Multiple TB sensing measurement instances within the same TXOP should be separated by SIFS.

***TGbf editor, make the following change in L20-L25 11.55.1.5.2.2 in D1.0:***

The extra TB sensing measurement instance may occur in the same TXOP within the same sensing availability window (see Figure 11-74e (Example of a sensing availability window with two TB sensing measurement instances within a single TXOP)), and if it occurs in the same TXOP, it shall be a SIFS after the previous TB sensing measurement instance. It may also occur in a separate TXOP within the same sensing availability window (see Figure 11-74f (Example of a sensing availability window with two TB sensing measurement instances in separate TXOPs)).



## SP

Do you support the proposed resolutions to the CIDs and incorporate the text changes into the latest TGbf draft?

Y/N/A