IEEE P802.11
Wireless LANs

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| Resolution to CIDs related to TDD Scheduling-Part 2 |
| Date: 2018-05-07 |
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Abstract

This submission proposes resolutions to 19 CIDs related to TDD scheduling. These CIDs include:

1290, 1384, 1592, 1745, 1754, 2002, 2246, 1743, 1744, 1770, 1774, 1798, 1939, 2148, 2155, 2161, 2162, 2163, 2164.

The CIDs are in reference to Draft IEEE P802.11ay/D1.0. The resolutions are in reference to Draft IEEE P802.11ay/D1.1.

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| CID | Clause | Comment | Proposed change |
| 1290 | 10.38.9 | Missing a method to break Beamforming training in the middle of a packet and continue later. This may be important in TDD-SP where a long BRP frame with a TRN field may not fit in the assigned slot | submission will be provided |

**Proposed resolution:** Rejected.

1. The contribution “11-18-0410-01-00ay-draft-text-brp-mm-wave-distribution-network” that passed the motion in March IEEE already addressed some amendments of BRP in TDD SP.
2. The duration of each TDD slot is configurable. When an AP assigns a TDD slot to a STA for BRP frame, it shoud consider the length of the BRP frame and allocate a TDD slot with appropriate duration in the first place.

**Proposed resolution:** Rejected

1. The corresponding technical contribution is not provided for this CID

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| CID | Clause | Comment | Proposed change |
| 1384 | 9.4.2.130 | "If the last received PPDU was not a BRP-TX PPDU, an EDMG BRP-TX packet or an EDMG BRP-RX/TX packet, this field is set to 0." - This is too limiting, may be a problem in TDD SP networks | Add a qualifier that the last PPDU from the same TX STA have been a BRP-TX PPDU  |

**Proposed resolution:** Revised

*Change P70L19-20 as follows:*

If the last received PPDU was not a BRP-TX PPDU, an EDMG BRP-TX packet or an EDMG BRP-RX/TX packet from the same STA, this field is set to 0.

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| CID | Clause | Comment | Proposed change |
| 1592 | 9.4.2.267 | "... to indicate that the duration of the TDD SP is unlimited across consecutive BIs." Does this mean we have TDD SP with unlimited length? | Please clarify/ revise. Add/ reference constraints. |
| 1745 | 9.4.2.132 | It is not clear what other fields in the Extended Schedule element indicate when TDD Applicable SP subfield is set to 1. When TDD Applicable SP subfield is 1, TDD Slot Structure element is used as well. There are duplicate fields in both elements and it is not clear fields in Extended Schedule element will indicate the allocation of the SP. | Please clarify. |
| 1754 | 9.4.2.267 | The TDD Slot Structure element is used together with the Extended Schedule element. The Slot Structure Start Time field and Allocation Block Duration field are defined in Extended Schedule element as well. They seems to be duplicated. | Remove Slot Structure Start Time field and Allocation Block Duration field from the TDD Slot Structure element, and refer to these fields in Extended Schedule element. |
| 2002 | 9.4.2.267 | It is not clear for "if the duration of the SP is limited to the value of the Allocation Block Duration field". Because an SP may comprise multiple Allocation Blocks. Clarify what is the "duration of the SP". | As in Comment |
| 2246 | 9.4.2.267 | Not clear what is the use of Allocation Block Duration field when the Extended Schedule Element with the same allocation id has another Allocation Block Duration | Either remove this field or clarify the purpose of this field |

**Discussion:**

1. Allocation Block Duration field within TDD Slot Structure element

TDD Slot Structure element is not necessarily sent together with Extended Schedule element since these two elements can be sent with different periodicity. Moreover, the main function of the Allocation Block Duration field within Extended Scehdule element is to notify legacy STAs that this period of time is for TDD devices. For TDD devices, this duration information in TDD Slot Structure elment can be shorter than or equal to the duration indicated in Extended Schedule element.

As a result, we need to include the TDD SP duration information in TDD Slot Structure element in case a STA misses the Extended Schedule element and therefore not able to understand the timing structure included in TDD Slot Structure element. In order to avoid confusion, suggest to change the field name from “Allocation Block Duration” to “TDD SP Block Duration”

1. Slot Structure Start Time field within TDD Slot Structure element

This field is different with the Allocation Start field. The Slot Structure Start Time field indicates when the associated timing structure of a TDD SP takes effect. This time is not necessarily the same as the Alocation Start time.

1. Allocation ID field within TDD Slot Structure element

The Allocation ID is needed here. When there are more than one TDD SPs allocated in the BI, the Allocation ID would be used to associate a TDD SP with its structure.

1. Allocation Block Duration Validity field within TDD Slot Structure element

Agree that this field can be removed.

**Proposed resolution:** Revised.

*Change Figure 78 in D1.1 as follows:*

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | Slot Structure Control | Slot Structure Start Time | TDD SP Block Duraiton | Slot Schedule |
| Octets | 1 | 1 | 1 | 4 | 4 | 2 | M |

*Change Figure 79 in D1.1 as follows:*

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|  | Number of TDD Slots per TDD Interval | GT1 Duration | GT2 Duration | GT3 Duration | Allocation ID |  | Reserved |  |
| Bits | 4 | 5 | 5 | 5 |  |  | 9 |  |

*Remove the definitions of the deleted field “Allocation Block Duratin Validity”*

*Change P110L6 in D1.1 as follows:*

The TDD SP Block Duration field indicates the duration, in microseconds, of the TDD SP.

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| CID | Clause | Comment | Proposed change |
| 1743 | 9.4.2.128.2 | TDD Channel Access Supported subfield should be set to a value depending on a MIB variable, which is missing. | Define a MIB variable controlling TDD Channel Access mode operation at the STA. Set TDD Channel Access Supported subfield and any other normative behaviors based on this MIB value. |

**Proposed resolution:** Rejected

1. It is not necessary to always refer the capability value to a MIB variable.

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| CID | Clause | Comment | Proposed change |
| 1744 | 9.4.2.128.2 | Is TDD Channel Access Supported subfield contained in DMG STA Capabilities element instead of EDMG Capabilities element? Dependencies of TDD channel access STA is still very unclear. There should be a subclause explaining in which circumstances TDD channel access can be activated by STA. | Please add a new subclause explaining the rationale of the TDD channel access mode under clause 4 General Description. |

**Proposed resolution:** Rejected

1. TDD Channel Access Supported subfield is contained in DMG STA Capabilities element.
2. The activation of TDD channel access is very clear. If the TDD Channel Access Supported subfield is set to 1, then the STA supports and therefore can activate TDD channel access.

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| CID | Clause | Comment | Proposed change |
| 1770 | 10.36.6.2.2 | If TDD channel access is operated, receiving STA cannot respond with transmission immediately. We have to define a protocol to accommodate ARQ procedures without immediate response. | Please consider to integrate ARQ procedures for TDD channel access. 11-17/1647 should be a feasible approach. |

**Discussion:**

1. The contribution “11-18-0069-02-00ay-mmwave-distributed-network-tdd-ack-text” that has been adopted into 11ay D1.1 is exactly the corresponding draft text contribution of 11-17/1647, which is also the suggested resolution by the commenter.

**Proposed resolution:** Accepted.

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| CID | Clause | Comment | Proposed change |
| 1774 | 10.36.6.2.2 | It is not clear how Distribution Nodes in 11-17/1321 will fit with the current 802.11 architecture. | At least, an example implementation practice should be shown somewhere in the spec (maybe in Annex) |

**Proposed resolution:** Rejected

1. There is no definitions of “Distribution Nodes” or “Client Nodes” in 802.11 spec, and we will not define such terms in 11ay. As a result, such example implementation practice is not needed.

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| CID | Clause | Comment | Proposed change |
| 1798 | 10.61.1 | Distributed scheduling protocol is a nice feature to address concerns on interference from neighboring OBSSs. I should be compatible with TDD channel access mode. | Please clarify how distributed scheduling works with TDD channel access mode. |

**Proposed resolution:** Rejected

1. TDD channel acess happens in TDD SPs, where TDD SPs are also SPs. As a result, if distributed scheduling protocol described in 10.61 is used with TDD channel access mode, there should be no change to the existing protocol defined.

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| CID | Clause | Comment | Proposed change |
| 1939 | 10.36.6.2.2 | "A DMG AP or DMG PCP shall transmit a TDD Slot Structure element to each DMG STA that is expected to transmit or receive during a TDD SP." inconsistent with following normative text that strictly defines interaction between AP/PCP STA and non-AP/PCP STA. The mentioned DMG STA shall clearly defined as non-PCP/AP STA | A DMG AP or DMG PCP shall transmit a TDD Slot Structure element to each non-AP and non-PCP DMG STA that is expected to transmit or receive during a TDD SP. |

**Proposed resolution:** Accepted

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| CID | Clause | Comment | Proposed change |
| 2148 | 9.4.2.267 | We should provide an exact recommendation for setting "Allocation Block Duration". For example, if we have 15 Slots per TDD Interval, GTX Duration equal to 31 us, TDD Slot Duration of 255us, the "Allocation Block Duration" should only be allowed to be an integer multiple of 3825us+496 = 4321. | As in comment |

**Proposed resolution:** Rejected

1. The configuration of all these durations (Allocation duration, TDD slot duration, GT1-3 durations) are all coupled.
2. The structure of the TDD SP is clearly shown in Figure 101 in D1.1. All the configurations can therefore be performed according to the structure.

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| CID | Clause | Comment | Proposed change |
| 2155 | 9.4.2.267 | We should allow for the "Allocation Block Duration" value to be greater than 65.535ms. Consider having 3 octets to cover an SP that is 1 second long. Alternatively, if adding an octet to this field is too cumbersome, consider specifying the value of P (in Figure 89) instead, while maintain the 2 octet allocation. | As in comment |

**Proposed resolution:** Rejected

1. There is no need to make the value of “Allocation Block Duration” to be larger than 65.535ms, because by setting the Allocation Block Duration and Number of Blocks appropriately, we can already schedule a TDD SP with a duration as long as 1 second.

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| CID | Clause | Comment | Proposed change |
| 2161 | 10.36.6.2.2 | What does "shall be beamformed" mean? Is quasi-omni RX not allowed? We should remove this restriction or clarify. | As in comment |
| 2162 | 10.36.6.2.2 | What does "shall be beamformed" mean? Is quasi-omni RX not allowed? should remove this restriction or clarify. | As in comment |

**Proposed resolution:** Rejected

1. This is coming from the requirement of the use case model. For this use case where the devices are fixed, directional reception provides more gains. There is no reason to use quasi-omni RX.

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| CID | Clause | Comment | Proposed change |
| 2163 | 10.36.6.2.2 | In this sentence, it is necessary to define the clear procedure when the slot schedule element transmitted or not | define the procedure of slot schedule element clearly |
| 2164 | 10.36.6.2.2 | Since there is a procedure in the slot structure that uses the last received information until it receives the updated information, is it applicable to the slot schedule in the same way? | define the procedure of transmitting slot schedule element and EDMG STA same as slot structure element |

**Proposed resolution:** Rejected.

**Discussion:**

1. The difference between TDD Slot Structure element and TDD Slot Schedule element is that TDD slot structure is relatively static and can remain the same for a long time, while slot schedule/assignment is more dynamic and can change frequently between different TDD intervals. As a result, it is not reasonable to ask the STA to use the last received slot schedule information. The fact is, if a STA does not receive a new TDD Slot Schedule element, it is more likely that it is not scheduled to any TDD slot in the first place.
2. Current D1.0 spec clearly states the following:

“A DMG STA shall not transmit during a TDD SP unless it receives a TDD Slot Schedule element that indicates it is assigned to at least one TDD slot within the TDD SP by the DMG AP or DMG PCP. The DMG AP or DMG PCP shall transmit the TDD Slot Schedule element to each DMG STA that is assigned to access the TDD SP through an Announce frame or Association Response frame before the time indicated by the value of the Slot Schedule Start Time within the element”.

From these two sentences, it is clearly indicated that a) A STA shall not access a TDD slot if it does not receive a corresponding TDD Slot Schedule element; b) If a STA is scheduled in a TDD slot, the DMG AP or DMG PCP shall transmit the TDD Slot Schedule element to this STA before the schedule takes effect. As a result, it is not appropriate to require the STA to adopt the previously received slot schedule information if it does not receive a new TDD Slot Schedule element.

**Straw Poll:**

* **Do you agree to accept comment resolutions as proposed in doc 11-18/0721r0?**