IEEE P802.11
Wireless LANs

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| PDT MAC Co-RTWT |
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Abstract

This document contains Proposed Draft Text (PDT) for the Coordinated Restricted Target Wake Up Time (CR-TWT) feature of the proposed TGbn (UHR, Ultra High Reliability) amendment to the 802.11 standard.

# Revision information

The following is a summary of the important changes that occurred within each revision of this document:

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| **Revision** | **Major changes** |
| 0 | Initial revision |
| 1 | First revision. Incorporates comments received up to 2024-12-06. A summary of changes is hereby provided:* Replacement the acronym “C-RTWT” with “Co-RTWT”,
* Addition of Motions #50, #51, #147, #148 to the list of relevant passing motions,
* Addition of subclause 3.2 (Definitions specific to IEEE Std 802.11) and inclusion of several definitions for Co-RTWT,
* Population of subclause 37.11.2 (Co-RTWT negotiations) according to relevant passing motions,
* Addition of subclause 37.11.3 (Co-RTWT announcement rules) and population according to relevant passing motions,
* Addition of subclause 37.11.4 (Channel access rules for Co-RTWT SPs) and population according to relevant passing motions.
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| 2 | Second revision. Incorporates comments received up to 2024-12-10. A summary of changes is hereby provided:* Fixed a typo (DCN) in the document’s header,
* Fixed list of authors,
* Replaced the MIB variable “dot11CRTwtOptionImplemented” with “dot11CoRTwtOptionImplemented” to align with the acronym “Co-RTWT”,
* Clarified the description of “Co-RTWT requesting AP” in 37.11.1 (General),
* Clarified the description of the feature in 37.11.1 (General) to highlight that Co-RTWT involves OBSS APs,
* Clarified the role of “Co-RTWT negotiations” in 37.11.1 (General),
* Clarified that an AP may signal “enablement of Co-RTWT negotiations” in 37.11.2 (Co-RTWT negotiations), as opposed to “its willingness to participate in Co-RTWT negotiations”),
* Other editorials
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# 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 passing motions:

[Motion #48, [1]]

* Define mechanisms that enable APs to coordinate their rTWT schedule(s) and/or to ensure that one AP provides the protection of the rTWT schedule(s) of the other AP.
* NOTE – TBD mechanisms including negotiation between 2 APs and advertisement.

[Motion #50, [1]]

* 11bn defines a common framework of a M-AP Coordination for various coordination schemes.
	+ Note - Coordination schemes such as (but not limited to): Co-SR (TXOP-based with power control), Co-BF, Co-TDMA , C-RTWT, etc.

[Motion #51, [1]]

* 11bn defines a common framework of a M-AP Coordination that can enable the following procedures:
	+ M-AP Coordination Discovery procedure
	+ M-AP Coordination agreement negotiation procedure
* Note: Details of the procedures and whether the above procedures are mandatory/optional - TBD

[Motion #147, [1]]

* APs that intend to participate in M-AP coordination can use management frames to advertise/discover the capabilities and/or parameters of individual schemes.

[Motion #148, [1]]

* APs that discovered each other and want to establish agreement(s) for M-AP coordination scheme(s), can use individually addressed management frames to establish the agreement(s) and negotiate parameters
	+ Note: The management frame can be a Public Action and/or new Action frames, and so on.

[Motion #149, [1]]

* If an AP extends the protection of the rTWT schedule of another AP, following negotiation or through other means, then:
	+ The AP shall ensure its TXOP ends before the start time of the corresponding OBSS rTWT SP(s)
	+ The AP, if it has at least one associated STA that is capable of rTWT, shall advertise in the beacon frames it transmits the OBSS rTWT schedule so that its associated STAs supporting rTWT follow the baseline rTWT rules for the OBSS rTWT schedule.

# Text to be adopted begins here:

***TGbn editor: Please add the following to subclause 3.2 Definitions specific to IEEE Std 802.11:***

3.2 Definitions specific to IEEE Std 802.11

coordinated restricted target wake time (TWT): [Co-RTWT] A procedure that enables an AP to coordinate its R-TWT schedule(s) with OBSS AP(s) and/or extend protection to R-TWT schedule(s) of OBSS AP(s).

coordinated restricted target wake time (Co-RTWT) agreement: [Co-RTWT agreement] An agreement established via a successful Co-RTWT negotiation between a Co-RTWT requesting AP and a Co-RTWT responding AP.

coordinated restricted target wake time (Co-RTWT) coordinated access point (AP): [Co-RTWT coordinated AP] An AP that extends protection to the R-TWT schedule(s) that are requested by a Co-RTWT requesting AP.

coordinated restricted target wake time (Co-RTWT) negotiation: [Co-RTWT negotiation] A procedure that enables a Co-RTWT requesting AP to establish Co-RTWT agreement(s) with a Co-RTWT responding AP.

coordinated restricted target wake time (Co-RTWT) requesting access point (AP): [Co-RTWT requesting AP] An AP that requests protection for one or more of its R-TWT schedules.

coordinated restricted target wake time (Co-RTWT) responding access point (AP): [Co-RTWT responding AP] An AP that responds to a Co-RTWT requesting AP that initiates a Co-RTWT negotiation.

coordinated restricted target wake time (Co-RTWT) service period (SP): [Co-RTWT SP] A period of time during which Co-RTWT coordinated APs extend protection to a corresponding R-TWT schedule of a Co-RTWT requesting AP.

coordinated restricted target wake time (Co-RTWT) service period (SP) start time: [Co-RTWT SP start time] The value of the timing synchronization function (TSF) at the beginning of a Co-RTWT SP.

***TGbn editor: Please add the following new subclause 37.11 Coordinated R-TWT to the 802.11bn draft D0.1:***

37.11 Coordinated R-TWT

37.11.1 General

Coordinated restricted target wake time (Co-RTWT) operations described in subclause 37.11 (Coordinated Restricted TWT (Co-RTWT)) enable an AP to coordinate its R-TWT schedule(s) with OBSS AP(s) and/or extend protection to R-TWT schedule(s) of OBSS AP(s).

A Co-RTWT requesting AP is an AP with dot11CoRTwtOptionImplemented equal to true that requests protection for one or more of its R-TWT schedules. A Co-RTWT requesting AP may request protection for its R-TWT schedule(s) either via Co-RTWT negotiations or via other means.

A Co-RTWT responding AP is an AP with dot11CoRTwtOptionImplemented equal to true that responds to a Co-RTWT requesting AP that has initiated a Co-RTWT negotiation.

Co-RTWT negotiation(s) to establish Co-RTWT agreement(s) are performed by exchanging TBD individually addressed Management frames that carry R-TWT schedule(s) for which protection is requested by following the rules defined in 37.11.2 (Co-RTWT negotiations). After successfully establishing Co-RTWT agreement(s) for R-TWT schedule(s) requested by the Co-RTWT requesting AP, a Co-RTWT responding AP becomes a Co-RTWT coordinated AP and shall extend protection to the R-TWT schedule(s).

A Co-RTWT coordinated AP is an AP with dot11CoRTwtOptionImplemented equal to true that extends protection to R-TWT schedule(s) that are requested by a Co-RTWT requesting AP, either via Co-RTWT negotiations or via other means, according to the rules defined in 37.11.3 (Co-RTWT announcement rules) and 37.11.4 (Channel access rules for Co-RTWT SPs).

37.11.2 Co-RTWT negotiations

An AP with dot11CoRTwtOptionImplemented equal to true may advertise the enablement of Co-RTWT negotiations and other TBD Co-RTWT parameters by using TBD Management frames. How to advertise the capability of Co-RTWT negotiations and other TBD Co-RTWT parameters in a TBD Management frame is TBD.

NOTE—An AP with dot11CoRTwtOptionImplemented equal to true can participate in Co-RTWT as a Co-RTWT requesting AP or as a Co-RTWT coordinated AP by means that do not involve negotiations.

A Co-RTWT requesting AP may request a Co-RTWT responding AP to extend protection to its R-TWT schedule(s) by including the R-TWT schedule(s) in a transmitted TBD individually addressed Management frame that initiates the Co-RTWT negotiation. How to include the R-TWT schedule(s) in the TBD individually addressed Management frame is TBD.

A Co-RTWT responding AP that receives a request from a Co-RTWT requesting AP to protect its R-TWT schedule(s) in a TBD individually addressed Management frame shall follow the rules defined in this subclause to establish Co-RTWT agreement(s). The rules to establish Co-RTWT agreement(s) are TBD.

37.11.3 Co-RTWT announcement rules

When a Co-RTWT coordinated AP extends protection to one or more R-TWT schedules requested by a Co-RTWT requesting AP, the Co-RTWT coordinated AP shall advertise the R-TWT schedule(s) in its transmitted Beacon frames if the Co-RTWT coordinated AP has at least one associated STA that supports R-TWT. The Co-RTWT coordinated AP’s associated STA(s) that support R-TWT shall follow the rules defined in 35.8.4.1 (TXOP and backoff procedure rules for R-TWT SPs) for the R-TWT schedule(s).

37.11.4 Channel access rules for Co-RTWT SPs

When a Co-RTWT coordinated AP extends protection to R-TWT schedule(s) of a Co-RTWT requesting AP, the Co-RTWT coordinated AP as a TXOP holder shall ensure that its TXOP ends before the start time of any active Co-RTWT SP for which protection is extended.

# Text to be adopted ends here.

**References:**

1. [11-24-0171r21](https://mentor.ieee.org/802.11/dcn/24/11-24-0171-21-00bn-tgbn-motions-list-part-1.pptx): 11-24-0171-21-00bn-tgbn-motions-list-part-1, Alfred Asterjadhi (Qualcomm Technologies Inc.)