**IEEE 802.15**

**Wireless Specialty Networks (WSN)**

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| Project | IEEE 802.15 Working Group for Wireless Specialty Networks (WSN) | |
| Title | **IEEE 802.15 TG 4ab (NG-UWB) minutes** | |
| Date Submitted | [13 May, 2024] | |
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| Re: | [May 802.15 Interim Meeting held in Hybrid Mode] | |
| Abstract | [IEEE 802.15 Task Group 4ab minutes] | |
| Purpose | [Official minutes of IEEE 802.15 TG 4ab] | |
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# Monday, 13 May, 2024 – AM2

**Opening**

**10:32 AM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~50 attendees joined the meeting

Chair introduced the hybrid meeting logistics.

Chair reminded the group of registration for 802 LMSC and wireless interim.

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**Announcements**

Chair announced the agenda doc. #15-24-0201-04-04ab for the week. There were some corrections to the agenda. There was no further discuss on the agenda.

Motion #1: Motion to approve agenda contained in document 15-24-0201-05.

* Moved by David Xun Yang (Huawei)
* Second by Clint Chaplin (SRA)

No one objected to approve the motion. It was approved by unanimous consent.

Chair raised the motion of minutes for Mar plenary *(doc. # 15-24-0195-00-04ab)* and telecons between Mar and May 2024 *(doc. # 15-24-0252-01-04ab)*. No discussion heard.

Motion #2: Motion to approve minutes contained in documents 15-24-0195-00 and 15-24-0252-01

* Moved by: David Xun Yang (Huawei)
* Second by: Clint Chaplin (SRA)

No one objected to approve the motion. It was approved by unanimous consent.

Chair introduced the objectives of this week and steps up to Letter Ballot.

**TG Meeting Activity**

Using the agenda *(doc. # 15-24-0201-05-04ab)* Chair proceeded with running the meeting.

**Presentation #1:**

Carlos Aldana (Meta) presented “Response to CoexSC 11-24 360r4”

(*doc. # 15-24-0202-04-04ab*)

There were lots of questions/comments on the details of proposed solutions.

Carlos planned to run straw polls and followed with motions later.

**Presentation #2:**

Alexander Krebs (Apple) presented “DraftC comment resolution - NB channel access - CIDs 149, 161”

(*doc. # 15-24-0226-00-04ab*)

There were discussions on the possible solutions related to CID 161.

**Presentation #3:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Simple (all accept) - CIDs 53, 56, 57, 59, 344, 531”

(*doc. # 15-24-0228-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0228-00-04ab.

**Presentation #4:**

Rojan Chitrakar (Huawei) presented “Proposed Resolutions for PT Data field”

(*doc. # 15-24-0244-00-04ab*)

There were several editorial comments and changes.

There was no objection to the comment resolutions as in doc. # 15-24-0244-01-04ab.

The agenda was updated to doc. # 15-24-0201-09-04ab. The first hour of Tuesday AM1 was for ad hoc on LBT.

Chair recessed the mtg. @ 12:23PM CET, until Mon. PM1.

# Monday, 13 May, 2024 – PM1

**1:34 PM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~50 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the agenda *(doc. # 15-24-0201-09-04ab)* Chair proceeded with running the meeting.

Vice chair Clint Chaplin (SRA) reviewed the unresolved comments in “Consolidated Comments Draft c” (*doc. # 15-24-010-32-04ab*). Chair checked with comment assignees on the resolution timelines. Assignees requested time slots to resolve the remaining comments.

**Presentation #5:**

Zhongxing Yu (Calterah) presented “Time Efficient MMS for one-to-many DS-TWR Ranging”

(*doc. # 15-24-220-00-04ab*)

This presentation is to discuss how to apply time efficient MMS for one-to-many DS-TWR ranging.

There were several questions on the details.

**Presentation #6:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Simple (revise/reject) - CIDs 33, 85, 86, 88, 340, 398, 403, 404, 521, 609, 631, 689, 708, 837”

(*doc. # 15-24-0229-01-04ab*)

**Presentation #7:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Miscellaneous”

(*doc. # 15-24-0230-03-04ab*)

**Presentation #8:**

Rojan Chitrakar (Huawei) presented “Proposed resolutions for MMS - Synchronized Responders”

(*doc. # 15-24-0021-01-04ab*)

Alex Krebs (Apple) uploaded an updated version (*doc. # 15-24-0230-03-04ab*) in the server.

There was no objection to the comment resolutions as in doc. # 15-24-0230-04-04ab.

Chair recessed the mtg. @ 3:33pm CET, until 8:50am Tue. AM1.

# Tuesday, 14 May, 2024 – AM1

**8:51 PM MT** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~50 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the agenda *(doc. # 15-24-0201-10-04ab)* Chair proceeded with running the meeting.

Carlos Aldana (Meta) summarized the LBT breakout report. Discussions followed.

Vice chair Clint Chaplin (Samsung) reminded assignees to present solutions based on *doc. # 15-24-010-32-04ab*.

Chair updated the agenda based on requests. (*doc. # 15-24-0201-11-04ab*)

Alexander Krebs (Apple) updated the offline discussion on “DraftC comment resolution - Simple (revise/reject) - CIDs 33, 85, 86, 88, 340, 398, 403, 404, 521, 609, 631, 689, 708, 837” (*doc. # 15-24-0229-01-04ab*).

There was no objection to the comment resolutions as in doc. # 15-24-0229-01-04ab.

**Presentation #9:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Duplicates & closely related - CIDs 164, 347, 348, 397, 400, 402, 514, 516, 520, 638, 647, 723, 734, 910, 911”

(*doc. # 15-24-0225-00-04ab*)

There were several discussions.

There was no objection to the comment resolutions as in doc. # 15-24-0225-01-04ab.

Rojan Chitrakar (Huawei) presented his updates in “Proposed Resolutions for PT Data field” (*doc. # 15-24-0244-01-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0244-01-04ab.

**Presentation #10:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Compact Frames & RPA - CIDs 497, 507, 508, 509”

(*doc. # 15-24-0223-01-04ab*)

Chair recessed the mtg. @ 10:03am CET, until Tue. PM1.

# Tuesday, 14 May, 2024 – PM1

**1:33 PM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~60 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the updated agenda *(doc. # 15-24-0201-11-04ab)* Chair proceed with running the meeting.

**Presentation #11:**

Rojan Chitrakar (Huawei) presented “Proposed Resolutions for Presence Bitmap”

(*doc. # 15-24-0279-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0279-00-04ab.

**Presentation #12:**

Rojan Chitrakar (Huawei) presented “Proposed resolutions for mms status code”

(*doc. # 15-24-0123-02-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0123-02-04ab.

**Presentation #13:**

Youngwan So (Samsung) presented “Proposed change for hyper block indexing”

(*doc. # 15-24-0271-00-04ab*)

**Presentation #14:**

Alexander Krebs (Apple) presented “DraftC comment resolution - MMS ranging phase offset - CIDs 206, 207, 695”

(*doc. # 15-24-0235-00-04ab*)

**Presentation #15:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Compact Frame MAC primitives - CID 192”

(*doc. # 15-24-0250-03-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0250-03-04ab.

The agenda has been changed due to presenters’ readiness (*doc. # 15-24-0201-12-04ab*).

**Presentation #16:**

Carl Murray (Qorvo) presented “Toward consensus before resolving MMS ranging CIDs”

(*doc. # 15-24-0156-03-04ab*)

There were lots of discussions. Further discussion was deferred to Wednesday afternoon.

Vice chair Clint Chaplin (Samsung) reviewed the progress of comment resolutions. There were around 120 comment left.

Chair recessed the mtg. @ 3:37pm CET, until the 2nd half of Wed. AM1.

# Wednesday, 15 May, 2024 – AM1

**9:05 AM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~60 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the updated agenda *(doc. # 15-24-0201-11-04ab)* Chair proceed with running the meeting.

**Presentation #17:**

Carlos Aldana (Meta) reviewed the updates in “DraftC comment resolution assigned to me - Part 1 (CIDs 152, 153, 178, 179, 200, 232, 233, 234, 235, 236, 294, 313, 677, 678)”

(*doc. # 15-24-0294-00-04ab*)

There were several discussions.

Alexander Krebs (Apple) presented updates in “DraftC comment resolution - MMS ranging phase offset - CIDs 206, 207, 695”

(*doc. # 15-24-0235-01-04ab*)

Discussions on solutions to CID 207.

There was no objection to the comment resolutions as in doc. # 15-24-0235-02-04ab.

Rojan Chitrakar (Huawei) presented updates in “Proposed resolutions for MMS - Synchronized Responders”

(*doc. # 15-24-0021-02-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0021-02-04ab.

**Presentation #18:**

Alexander Krebs (Apple) presented “DraftC comment resolution - Use of SMC\_TLVs - CID 9”

(*doc. # 15-24-0293-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0293-01-04ab.

Alexander Krebs (Apple) presented updates in “DraftC comment resolution - NB channel access - CIDs 149, 161”

(*doc. # 15-24-0226-02-04ab*)

Vice chair Clint briefly introduced the progress of comment resolutions.

Chair recessed the mtg. @ 10:04am CET, until Wed. PM1.

# Wednesday, 15 May, 2024 – PM1

**1:32 PM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~60 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the updated agenda *(doc. # 15-24-0201-12-04ab)* Chair proceed with running the meeting.

**Presentation #19:**

Hongwon Lee (LGE) presented “Proposed resolution for MMS MAC public part3”

(*doc. # 15-24-0262-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0262-00-04ab.

Rojan Chitrakar (Huawei) presented updates in “Proposed resolution for Hyperblock security”

(*doc. # 15-24-0112-03-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0112-03-04ab.

**Presentation #20:**

Aniruddh Rao (Samsung) presented “Resolutions for DraftC CID 102,110,111,673-676”

(*doc. # 15-24-0296-02-04ab*)

Several comments need to be further resolved.

**Presentation #21:**

Pooria Pakrooh (Qualcomm) presented “DraftC\_Proposed comment resolutions for Sensing- Part 2”

(*doc. # 15-24-0298-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0298-00-04ab.

**Presentation #22:**

Carl Murray (Qorvo) continued to present “Toward consensus before resolving MMS ranging CIDs” (*doc. # 15-24-0156-03-04ab*) and “Draft C comment resolution for MMS (CIDs 7, 29, 52, 80, 81, 90, 91, 212, 269, 318, 683, 729, 859-862, 879, 894 and 901)” (*doc. # 15-24-0221-00-04ab*)

There were lots of discussions.

Chair recessed the mtg. @ 3:29pm CET, until Thu. AM2.

# Thursday, 16 May, 2024 – AM2

**10:32 AM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~60 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Chair updated the agenda based on several presentation requests. Using the updated agenda *(doc. # 15-24-0201-14-04ab)* Chair proceed with running the meeting.

Vice chair Clint Chaplin (Samsung) reviewed the progress of comment resolutions based on *doc. # 15-24-010-32-04ab.*

**Presentation #23:**

Youngwan So (Samsung) presented “Proposal for compact frame support for hyper block mode”

(*doc. # 15-24-0309-00-04ab*)

**Presentation #24:**

Youngwan So (Samsung) presented “Proposed comments resolutions”

(*doc. # 15-24-0249-00-04ab*)

Rojan Chitrakar (Huawei) presented the updates in “Proposed resolution for Hyperblock security”

(*doc. # 15-24-0112-04-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0112-04-04ab.

**Presentation #25:**

Vinod Kristem (Apple) presented “CR for HRP UWB PHY CID 274 and 275”

(*doc. # 15-24-0274-00-04ab*)

**Presentation #26:**

Billy Verso (Qorvo) presented “Resolutions for Draft C comments 611 and 211”

(*doc. # 15-24-0307-00-04ab*)

There was no objection to the comment resolutions as in doc. # 15-24-0307-00-04ab.

More requests for presentations were raised. Chair updated the agenda accordingly.

Rojan Chitrakar (Huawei) presented the updates in “Proposed resolution for MMS short-term operating parameters”

(*doc. # 15-24-0110-02-04ab*)

There were discussions on the problems and solutions.

There was no objection to the comment resolutions as in doc. # 15-24-0110-02-04ab.

Carl Murray (Qorvo) continued to present “Toward consensus before resolving MMS ranging CIDs” (*doc. # 15-24-0156-03-04ab*) and “Draft C comment resolution for MMS (CIDs 7, 29, 52, 80, 81, 90, 91, 212, 269, 318, 683, 729, 859-862, 879, 894 and 901)” (*doc. # 15-24-0221-01-04ab*).

Zhongxing Yu (Calterah) continued to present “Time Efficient MMS for one-to-many DS-TWR Ranging”

(*doc. # 15-24-220-00-04ab*)

The presenter is suggested to submit comments in the following letter ballots.

Chair recessed the mtg. @ 12:31pm CET, until Thu. PM1.

# Thursday, 16 May, 2024 – PM1

**1:32 PM CET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-24-0263-00-04ab*)

* ~60 attendees joined the meeting

## Legal

Chair reminded the group of the following from the 802.15 opening meeting:

* IEEE-SA patent policy
* Submission of Letter(s) of Assurance (LoA) or to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) that the participant believes may be essential for any of the ongoing activities within the 802.15 WG.
  + No essential patent claims were brought forth
* IEEE Anti-Trust statement
* IEEE Copyright Policy, including Code of Ethics

**TG Meeting Activity**

Using the updated agenda *(doc. # 15-24-0201-14-04ab)* Chair proceed with running the meeting.

Vice chair Clint Chaplin (Samsung) introduced the current progress.

**Presentation #27:**

Carlos Aldana (Meta) presented “CID 152 Proposed Resolution”

(*doc. # 15-24-0302-00-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0302-00-04ab*.

Carlos Aldana (Meta) presented “NB Coex Next Steps”

(*doc. # 15-24-0295-02-04ab*)

Brief discussion. Carlos agreed to the withdraw comments and continue work on improved coexistence mechanisms outside the scope of this comment collection.

**Presentation #28:**

Li-Hsiang Sun (MTK) presented the updates to “proposed resolution for CID 21”

(*doc. # 15-24-0270-00-04ab*)

There were a few discussions.

There was no objection to the resolutions as in *doc. # 15-24-070-00-04ab*.

Billy Verso (Qorvo) continued his presentation “Acknowledgements”

(*doc. # 15-24-0312-00-04ab*)

There were a few discussions. Conclusion is it needs more time.

Alexander Krebs (Apple) presented the updates in “Comment Resolution for CID 20”

(*doc. # 15-24-0261-03-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0261-03-04ab*.

Alexander Krebs (Apple) presented the updates in “DraftC comment resolution proposals for LBT related comments (CIDs 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 289, 290, and 291)”

(*doc. # 15-24-0207-06-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0207-06-04ab*.

Alexander Krebs (Apple) presented the updates in “DraftC comment resolution - NB channel access - CIDs 149, 161”

(*doc. # 15-24-0226-03-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0226-03-04ab*.

Alexander Krebs (Apple) briefly introduced the resolutions in *doc. # 15-24-0222-01-04ab*.

There was no objection to the resolutions as in *doc. # 15-24-0222-01-04ab*.

Youngwan So (Samsung) briefly introduced the resolutions excluding CID 28 in *doc. # 15-24-0249-01-04ab*.

There was no objection to the resolutions as in *doc. # 15-24-0249-01-04ab*.

Aniruddh Rao (Samsung) presented the updates in “Resolutions for DraftC CID 102,110,111,673-676”

(*doc. # 15-24-0296-03-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0296-03-04ab*.

**Presentation #29:**

Aniruddh Rao (Samsung) presented “Draft C comment resolution for CID 673, 674, 675, 676”

(*doc. # 15-24-0311-00-04ab*)

There was no objection to the resolutions as in *doc. # 15-24-0311-00-04ab*.

Carl Murray (Qorvo) continued to present “Toward consensus before resolving MMS ranging CIDs” (*doc. # 15-24-0156-03-04ab*) and “Draft C comment resolution for MMS (CIDs 7, 29, 52, 80, 81, 90, 91, 212, 269, 318, 683, 729, 859-862, 879, 894 and 901)” (*doc. # 15-24-0221-01-04ab*).

There were lots of discussions.

Youngwan So (Samsung) briefly recapped the resolutions in *doc. # 15-24-0271-01-04ab*.

There was no objection to the resolutions as in *doc. # 15-24-0271-01-04ab*.

Chair reviewed his plan on the telecons between May and July. There were two telecons for people to resolve the remaining comments so as to launch the first letter ballot. (*doc. #* *15-24-0317-00-04ab*)

Vice chair Clint Chaplin (Samsung) introduced that there were 49 comments left: 43 with proposed resolutions, 6 assigned but no contributions yet.

Chair adjourned the mtg. @ 3:34pm CET.