**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 Sep, 2022] | |
| Source | [David Xun Yang] [] [Bantian, Shenzhen, China] | Voice: [+86.159.1411.7462] Fax: [--] E-mail: [david.yangxun@huawei.com] |
|  | [Ben Rolfe] [] [--] | Voice: [+1.408.395.7207] Fax: [--] E-mail: [ben.rolfe@ieee.org] |
| Re: | [Sep 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, 12 Sep, 2022 – PM1

**Opening**

**1:41 PM HST** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0482-00-04ab*)

* >80 attendees joined the meeting

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

Chair reminded people to join without audio or disable their device audio completely if they join the Webex in the meeting room.

## 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. # for the week. After reviewing the agenda, no one objected to approve the modified agenda. it was approved by unanimous consent.  
*(doc. # 15-22-0440-03-04ab)*

Chair raised the motion of minutes for Jul plenary *(doc. # 15-22-0433-00-04ab)* and telecons between Jul and Sep *(doc. # 15-22-0480-00-04ab)*. No one objected to approve the motion. The motion was approved by unanimous consent.

Chair announced the rules for the mix mode meetings in this week.

Chair asked every attendee to come to mic and announce his name and affiliation before he speaks.

**TG Meeting Activity**

Using the agenda *(doc. # 15-22-0440-03-04ab)* Chair proceeding with running the meeting.

Lochan (Apple) presented “UWB Channel Usage Coordination for better UWB Coexistence”

(*doc. # 15-22-0456-00-04ab*)

This presentation is a joint contribution on UWB channel usage coordination for better UWB coexistence.

Questions/comments raised include operations for mandatory and optional, limited channels in UWB, detailed information to carry, intervals of APs and overhead vs. benefits, etc.

Huan-Bang Li (NICT) presented “NB CCA follow-up”

(*doc. # 15-22-0473-01-04ab*)

This presentation summarizes NB-assisted UWB channel access.

Questions/comments raised include Operation procedure and CCA modes.

Chair recessed the mtg. @ 3:30pm HST, until Mon. PM2.

# Monday, 12 Sep, 2022 – PM2

**4:00 PM HST** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0482-00-04ab*)

* >80 attendees joined the meeting

## Legal

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**TG Meeting Activity**

Using the agenda *(doc. # 15-22-0440-03-04ab)* Chair proceeding with running the meeting.

Kuan Wu (Huawei) presented “More on updating the number of fragments for NBA-MMS UWB ranging”

(*doc. # 15-22-0466-00-04ab*)

This presentation discusses approach for managing the number of fragments selection in NBA-MMS-UWB ranging.

Xiaohui Peng (Huawei) presented “More consideration on sensing pulse shape in 802.15.4ab”

(*doc. # 15-22-0479-00-04ab*)

This presentation further discusses the sensing pulse shape.

Carlos Aldana (Meta) presented “PHR Content and Rate”

(*doc. # 15-22-0475-01-04ab*)

This presentation in a joint contribution on the wideband packet PHR content for 4ab.

Questions/comments raised include the reasons of fields in the proposed PHR, configuration of new PHR rate, and repetition of PHR, etc.

Ben Rolfe (BCA) presented “SSBD Channel Access”

(*doc. # 15-22-0485-01-04ab*)

This presentation proposes a variation on channel access that includes spectrum sensing and potentially deferring transmission in a time-bounded way to improve performance, reliability and bound latency.

Questions/comments raised include the performance of the proposed scheme, benefits over exponential backoff, fairness issue,

Chair recessed the mtg. @ 5:45pm HST, until Tue. AM1.

# Tuesday, 13 Sep, 2022 – AM1

Called to order by chair at 08:01am local time.

Reminders given; call for essential patents made, no response heard.

Agenda document *15-22-0440-05*.

Technical contribution: Cross correlation of preamble codes, document *15-22-0481-01*. Presented by Michael McLaughlin (Qorvo).

Presents further analysis of proposed preamble codes. Discussion followed.

Technical contribution: BPSK modulation for high-speed data-rates in impulse ultra-wideband radio, document *15-22-0468-02*. Presented by Jarek Niewczas (Qorvo).

Presents analysis of an alternate modulation to achieve higher data rates. Discussion followed.

Technical contribution: A PHY Header Proposal, document *15-22-0467-01*. Presented by Billy Verso (Qorvo).

Short presentation on PHY header format. Discussion followed.

Technical contribution: Sensing Sequence selection, document *15-22-0489-00.* Presented by Frank Leong (NXP).

Presents merge of multiple proposals. Discussion followed.

Technical contribution: Usecase for the Multiple Transmissions in A Ranging Slot, document *15-22-0465-01*. Presented by Taeyoung Ha (Samsung).

Presents further information on the proposed modification to scheduled ranging. Discussion followed.

Recess at 09:59am local time.

# Tuesday, 13 Sep, 2022 – PM1

**1:31 PM HST** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0482-00-04ab*)

* >80 attendees joined the meeting

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

## Legal

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**TG Meeting Activity**

Using the modified agenda *(doc. # 15-22-0440-06-04ab)* Chair proceeding with running the meeting.

Pooria Pakrooh (Qualcomm) presented “Further Evaluation of Preamble Sequence Options for 15.4ab”

(*doc. # 15-22-0494-02-04ab*)

This presentation continues evaluation of preamble proposals for detection and channel estimation.

Bin Qian (Huawei) presented “More on NB considerations for NBA-MMS UWB”

(*doc. # 15-22-0476-01-04ab*)

This presentation further discusses the symbol-to-chip mapping and performance gain.

Questions/comments raised include the necessity of optimizing NB.

Li Sun (Huawei) presented “MMS-UWB ranging integrity protection via time hopping”

(*doc. # 15-22-0474-01-04ab*)

This presentation proposes an integrity protection for MMS-UWB ranging, thus improving ranging performance.

Questions/comments raised include the hopping sequence and the peaks from the third-party.

Alexander Krebs (Apple) presented “Updates on Narrowband Channel Allocation and Access”

(*doc. # 15-22-0493-02-04ab*)

This presentation summarizes the discussions and additional simulation results on previously proposed methods for NBA-MMS-UWB channel allocation and access methods.

Questions/comments raised include extra memory of AES, hopping sequences, …

Chair recessed the mtg. @ 3:30pm HST, until Wed. AM1.

# Wednesday, 14 Sep, 2022 – AM1

Called to order by chair at 08:30am. Following slight delay getting WebEx working.

Reminders given; call for essential patents made, no response heard.

Agenda document *15-22-0440-07*.

Technical contribution: Merging scheduled RTLS, document *15-22-0508-00*. Presented by Zhenzhen Ye (Redpoint).

Update on the merge of RTLS scheduling, incorporating scheduled ranging enhancements. Zhenzhen notes that work continues, with ad hoc discussion including the concepts from *15-22-0465*. Discussion follows.

Technical contribution: Requirements for location tracking in dense environments, document *15-22-0471-00*. Presented by Jean-Marie Andre (ST).

More information on prior proposal. Jean-Marie notes that he is working with Zhenzhen also to merge. Discussion followed.

Technical contribution: UWB sensing discussion, document *15-22-0504-01*. Presented by Pooria Pakrooh (Qualcomm).

Further discussion on sensing. Discussion followed.

Recess at 10:00am local time.

# Wednesday, 14 Sep, 2022 – PM1

**1:30 PM HST** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0482-00-04ab*)

* >70 attendees joined the meeting

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:

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**TG Meeting Activity**

Using the modified agenda *(doc. # 15-22-0440-08-04ab)* Chair proceeding with running the meeting.

Chenchen Liu (Huawei) presented “Simulation evaluation of preamble sequences for 4ab”

(*doc. # 15-22-0507-00-04ab*)

This presentation analyzes the metrics for the preamble sequence and proposes to reach consensus on the preamble sequence evaluation method.

Wei Lin (Huawei) presented “New Results on Possible LDPC Codes for 15.4ab”

(*doc. # 15-22-0506-01-04ab*)

This presentation further compares the performance of Raptor-like LPDC and 11n-based LDPC.

Kangjin Yoon (Meta) presented “New Scheduling IE for 4ab applications”

(*doc. # 15-22-0501-00-04ab*)

This presentation proposed new scheduling IE for 4ab applications.

Kangjin Yoon (Meta) presented “New Control IE for 4ab applications”

(*doc. # 15-22-0500-00-04ab*)

This presentation proposed new control IE for 4ab applications.

Chair recessed the mtg. @ 2:43pm HST, until Thu. AM2.

# Thursday, 15 Sep, 2022 – AM2

**10:02 AM HST** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0482-00-04ab*)

* >70 attendees joined the meeting

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:

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**TG Meeting Activity**

Using the modified agenda *(doc. # 15-22-0440-10-04ab)* Chair proceeding with running the meeting.

Dries Neirynck (Ultra-radio) presented “Non-coherent PHY Layer Proposal for 4ab TFD”

(*doc. # 15-22-0514-00-04ab*)

This presentation introduces further details in TFD text format for support of non-coherent reception.

Xiliang Luo (Apple) presented “RMARKERs in Mixed MMS for Ranging Integrity”

(*doc. # 15-22-0499-00-04ab*)

This presentation defines RMARKERs to ensure ranging integrity with mixed MMS format.

Discussion follows. Several items identified in discussion for follow-up discussion (chair recommends using the email reflector).

Claudio da Silva (Meta) and Ben Rolfe (BCA) presented “Merged HRP channel plans”

(*doc. # 15-22-520-00-04ab*)

This presentation combines the ideas from multiple contributors to expand the HRP channel plan to include overlapping channel definitions and extension above 10.6 GHz.

Questions/comments raised include rules of overlapping channels, the effects to the technical design such as preambles, etc.

Vinod Kristem (Apple) presented “More on 4ab preambles: apEval results and recommendations”

(*doc. # 15-22-470-01-04ab*)

This document provides recommendations on the preamble selection and performance comparison of different preamble sequences.

Further discussions on overlapping channels for sensing.

Chair recessed the mtg. @ 12:16pm HST, until Thu. PM1.

# Thursday, 14 Jul, 2022 – PM1

**8:02 AM ET** Chair, Ben Rolfe (Blind Creek Associates), called the meeting to order and opened the TG Agenda.  
(*15-22-0359-01-04ab*)

* >80 attendees joined the meeting

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:

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**TG Meeting Activity**

Using the modified agenda *(doc. # 15-22-0328-09-04ab)* Chair proceeding with running the meeting.

Carlos Aldana (Meta) presented “New Data rates and coding”.

(*doc. # 15-22-520-00-04ab*)

This document is a joint proposal from many people on the new data rates, coding scheme and related parameters.

Chair reviewed the project schedule. Chair further introduced his plan for the next step. No question/comment heard.

Billy Verso (Qorvo) introduced his thought on Draft text.

Chair introduced the session targets, and further encouraged people to reach consensus, especially through reflectors.

Chair introduced the teleconference schedule for next two months. The time slots were changed to alternate between 6am and 10pm PT. No objection heard.

Chair reminded people to take attendance.

Chair asked if there is any other business. No response heard.

Chair adjourned the mtg. @ 2:07pm ET.