**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
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1. TG8 sessions

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1. Minutes

Chair: Prof. Myung Lee (CUNY) USA.

Secretary: Marco Hernandez (NICT) Japan.

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Monday September 15th, PM2 session

−Chair calls the meeting to order.

−Chair proposes the week's agenda DCN 14-0509r0:

Objectives:

1. Harmonization or down selection.
2. Draft specification.
3. Discussion of the project's plan.

−The agenda is approved unanimously.

−Minutes of the previous meeting DCN 14-0485r1 is approved unanimously as well.

−Marco reports the teleconference by reading the minutes in DCN 14-504r0.

Comments: none.

**Chair:** The major components for the draft specification v 0.1 assigned to champions are:

Frame structure: BJ

Synchronization: BJ

Discovery: Qing

Peering: Qing

Data transmission: Shannon

UWB PHY: Igor, Billy

Wideband PHY: Marco, BJ

Channel access and allocation: TBD

**Chair:** Channel access and allocation must be prioritized, but first let's hear an update by the champions.

**BJ:** Frame structured has been parked at the moment until synchronization is finished, due to potential changes in the frame structure.

**Shannon:** I agreed with BJ. We need to solve and harmonize the different items and later the specification text can be provided.

**BJ:** The text for frame structure is relatively easy. The major issue is a solution for synchronization first.

**Shannon:** We should present our progress to the group.

**BJ:** Sorry I have not provided specification text for my items.

**Chair:** We need to move on: We need some specification text, a simple one for the moment.

**BJ:** Ok, I can prepare some text for frame structure and synchronization after my presentation.

**Chair:** For peering and discovery, Qing just uploaded some text.

**BJ:** I hope Qing will discuss with Shannon. The text that Qing provided is high level without text really.

**Chair:** As BJ, Qing and Shannon are here, we can draft something.

**BJ:** I will move my presentation by tomorrow AM2.

**Shannon:** I will try to distribute something tomorrow. Although, I think there is some ambiguity on my task. Based on the motion, my task is for the communication period including CFP and CAP.

**Chair:** After synchronization, discovery and peering, describing the communication period is the same as data transmission.

**Shannon:** I am concerned with channel access and allocation for discovery and peering.

**Chair:** Let's see what we have in discovery and peering with Qing tomorrow and if we have an open issue with channel access for discovery and peering. For channel access and allocation we mean channel selection, time slot allocation, etc.

**Chair:** Let's try the champions distribute and present some specification text by tomorrow night.

**BJ:** I can do it for frame structure.

**Shannon:** Yes.

**Chair:** Ok, we have discovery and peering text with Qing and synchronization text with BJ by Wednesday.

**Chair:** BJ will collect all text contributions for the Draft Specification v0.3, and if the group agrees, it will be updated to v0.4 (agreed version). That is the goal of this meeting.

**BJ:** I am concerned about that. If we are in a hurry for an agreed Draft Specification, we cannot provide a good solution that addresses all parties. We need more offline discussions.

**Chair:** The harmonized text will be done in a separate document for discussion.

**Shannon:** We made motions during the last meeting. We need to do the same for the remaining issues.

**Chair:** The remaining issues will be identified as soon as the already mentioned 6 topics are done.

**Shannon:** For discovery we have high level definitions without details in the Draft Specification.

**Chair:** For that, we will follow the same procedure. We listen what the champions have produced or collected. Those are discussed during an open session and eventually pass as motions.

**Chair:** The meeting is in recess until tomorrow AM2 session.

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Tuesday September 16th, AM2 session

−Chair calls the meeting to order.

**1st presenter** is BJ (ETRI) DCN 14-554r0 "Updates on Fully Distributed Synchronization Scheme for PAC"

Comments:

**Shannon:** In slide 6, the references are academic. Those are not realistic. There are more references with realistic scenarios and parameters.

**Shannon:** You should compare your results with mine results.

**Shannon:** In slide 22, there are not converging cases. Those can be addressed by a refractory period.

**Response:** The refractory period is included. Moreover, random access is used to avoid collisions.

**Shannon:** Algorithmically, the firefly algorithm and your proposal should be the same.

**Response:** Yes, although the most conflictive scenario we found is when 2 different groups meet.

**Shannon:** The simulation time takes too long. In my proposal, convergence is achieved in 10 slots. I think my proposal is better.

**Response:** Under ideal conditions.

**Shannon:** That is not true. It is been adapted to a wireless scenario.

**Shannon:** I am fine with the backup period, but I do not agree with your modification of the firefly algorithm.

**Response:** The transmission of the synchronization signal is random due to the random access backup.

Moreover, the initialization of PDs at the same time is not realistic. Your proposal cannot work in the case of many PDs transmitting.

**Shannon:** I can accommodate many PDs in my proposal.

**Response:** Your proposal ignores collisions.

**Shannon:** Regardless, my proposal works.

**Paul:** In slide 22, multiple PDs initializing at the same time, I think it is double. Think of many people entering an arena or stadium.

**Response:** Yes, but it is not instantaneous.

**Paul:** Of course, but anyhow, I can detect many PDs at the same time in those scenarios.

**Billy:** Another use case is a plane arriving with many people on board.

**Paul:** Multiple PDs initializing at the same time is feasible, but not the instantaneous case.

**Response:** That situation never happens.

**Chair:** For the case of multi-hop, we should consider multiple channels.

**Response:** I have not considered multiple channels in my simulations.

**Paul:** What is the distribution of PDs?

**Response:** Cluster and uniform random drop.

**Shannon:** Simulations do not consider a real scenario.

**Response:** It is what I am talking about.

**Qing:** Listen before transmission is ok, but if I do not hear anything, I will start transmitting, the same for other users and multiple synchronization signals may be detected.

**Response:** In case of multiple timing signals, randomly I choose only one timing signal.

**Qing:** For the selection of the contention window (CW), you have inter-arrival time criterion, and adjusting based on the CW of others PDs criterion. Does that scenario generate competition?

**Response:** If the CW size is large you need to decrease it and the other way around. Based on simulations, these rules were the best choice. We have 2 parameters inter-arrival time and fairness. These rules try to make a balance between such parameters.

**Marco:** The 1800 rule is a large piecewise jump as compare with the concave rule of the firefly algorithm.

**Response:** Yes, our proposal is different.

**Qing:** In your simulation results, are you trying to avoid collisions?

**Response:** Collisions are included in the simulations.

**Qing:** What about the effect of fading channels?

**Response:** At the moment, only path-loss is considered.

**2nd presenter** is Marco (NICT) DCN 14-553r1 "Power Control Harmonization"

Comments:

**Shannon:** Is the power control for CFP dynamic?

**Response:** Yes, and distributed.

**Shannon:** We need to address power control with scheduling for interference management.

**Response:** Yes, that is the next step.

Chair: The meeting is in recess until PM1 session.

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Tuesday September 16th, PM1 session

−Chair calls the meeting to order.

**3rd presenters** are Igor (NICT) and Billy (Decawave) DCN 14-553r1 "Draft text of UWB PHY for TG8"

Comments:

**Marco:** For 2 modulation modes, you need something that says under this circumstance use this mode.

Otherwise use the other mode.

**Response:** That is not part of the standard. We only specify modes of operation.

**Marco:** For interoperability having 2 modes of operation is not good.

**Chair:** One mode can be mandatory and the other optional.

**Billy:** We prefer the 2 modes are optional.

**Chair:** For interoperability you need to find something that distinguishes both modes.

**Chair:** By Thursday, TG8 will choose and vote which parts of the harmonized text will be incorporated in the Draft Specification v0.3.

**Qing:** We need to discuss next level of depth for discovery and peering that will include channel access and allocation.

**Chair:** Shall we continue the discussion in an official session or shall we recess for ad hoc meetings?

**Shannon:** In the motion for frame structure, there are some pending conditions.

**BJ:** The frame structure is fixed. Qing what about super-frame conditions? Like discovery should be done regardless of the super-frame structure.

**Qing:** We do not have further simulation results.

**Chair:** Ok, BJ will provide text for frame structure, no super-frame. Shannon uploaded data transmission text. Let's hear it for discussion.

**4th presenter** is Shannon (Samsung) DCN 14-557r0 "802.15.8\_d0.2\_Communication\_Period.doc"

Comments:

**Qing:** Slot allocation is part of channel management, no data communication.

**Response:** Data communication is assumed after peering.

**Chair:** Also, he assumes scheduling was done.

**BJ:** You talk of random access and there are some issues. I prefer details of random access are TBD.

**BJ:** In CW for next multicast does not include initial CW. There are other issues. In fact, I do not like this text.

**Chair:** Shannon, please highlight the conflicting text. We will come back to this later.

**Qing:** The scheduling text should be moved out. In the motion for data transmission, there is not mention of assignment of resources.

**Chair:** Shannon does not describe a scheduling algorithm.

**Qing:** I prefer it highlighted, though.

**Chair:** Shannon, please highlight the refereed scheduling sentences.

**BJ:** This text is based on link ID. We have not discussed that yet. In fact the whole text is problematic.

**Paul:** There are definitions that are not in the motions for data communication.

**Chair:** Please highlight link ID as well. Let's discuss the highlighted text during PM2.

**5th presenter** is Qing (Inter-Digital) DCN 14-542r2 “DiscoveryPeering.doc"

Comments:

**BJ:** In figure 1, what are the discovery responses from PD2 and PDn?

**Response:** I merged publish/subscribe and query discovery types. I will separate them.

**Shannon:** Who decides to trigger the response, high layers?

**Response:** Details are TBD.

**Shannon:** Peering ID terminology should be described.

**Response:** Details will be included later.

**BJ:** Figure 4 should be described as logical.

**Response:** Yes, and I will pass this figure to discovery procedure.

**Chair:** The highlighted text for data communication will be discussed after 1 hour of ad hoc meeting. The meeting is in recess until 5 PM.

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Tuesday September 16th, 5:00 PM of PM2 session

−Chair calls the meeting to order.

**Chair:** Are you ready guys?

**BJ:** We have some progress.

**Qing:** I am ready for making questions and comments.

**Qing:** The communication section must contain unicast, multicast, broadcasting etc., separately.

**Qing:** The text in the PFD can be re-used. Reliable transmission text in the PFD can be included as well.

**Qing:** In the scheduling text portion of CFP, are control and emergency messages a priority over data transmission?

**Chair:** That is addressed in peering and scheduling.

**Qing:** The 1st sentence in clause 5.1 is defined in frame structure already.

**Qing:** The 2nd sentence about all communication types are supported for CAP and CFP in clause 5.1 should be removed.

**Chair:** Shannon, please modify the text.

**Qing:** The sentence from line 19 describes CAP, but also it is mentioned in other parts as well. It should be organized.

**Qing:** Make a sub-clause for data communication in CAP.

**Paul:** It is better to have a sub-clause for data communication in CAP and other one for CFP and describing unicast, multicast, broadcast, etc.

**BJ:** Shannon's intention is from the MAC perspective. It does not know about single hop or multi-hop.

**Chair:** Shannon has enough feedback so far. So, he can start building up specification text for data transmission.

**Qing:** I would like to ask for an ad hoc meeting during the PM1 session to address discovery and peering procedures.

**Chair:** Let's start the discussion in AM1. If we do not have enough time, we may have an ad hoc meeting in PM1 tomorrow.

**Chair:** The meeting is in recess until AM1 tomorrow.

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Wednesday September 17th, AM1 session

−Chair calls the meeting to order.

**6th presenter** is H.B. Li (NICT) DCN 14-562r0 "Discovery procedure"

Comments:

**BJ:** In page 6, J-PD and I-PD terminology may not be used.

**Response:** Yes, we can change the labels.

−After discussion, a motion was decided:

Motion 22: Discovery Request Message in DCN 14-464r3

Move: HB Li. 2nd: Marco.

Discussion:

**Shannon:** Is this motion for advertisement type?

**BJ:** It is a good idea to clarify which discovery types are supported by the motion.

**Official vote** on motion 22 in DCN 14-464r3:

In favor: 6. Oppose: 0. Abstain: 0. Motion 22 carries.

−Further discussion on a new motion for discovery procedure takes place.

−In extra time:

**Chair:** The meeting is in recess until PM2. Recall, there is an ad hoc session during PM1 in Thalia 2.

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Wednesday September 17th, PM2 session

−Chairs call the meeting to order.

**Chair:** Let's continue with H.B. Li (NICT) DCN 14-562r0 "Discovery procedure" presentation.

−After discussion on "Discovery procedure", TG8 decided and redacted bullets in DCN 14-571r0 for Qing to create text for the Draft Specification to be approved tomorrow officially.

**Chair:** The meeting is in recess until AM1 tomorrow.

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Thursday September 18th, AM1 session

−Chair calls the meeting to order.

**7th presenter** is Shannon (Samsung) DCN 14-557r1 "02.15.8\_d0.2\_Communication\_Period.doc"

Comments:

**BJ:** There is new text that was not discussed before.

**BJ:** In the figure of clause 5.1, the scheduling request and response blocks belong to CFP, no CAP.

−After discussion, TG8 decided the compromise solution is to create a CAP, scheduling period and CFP blocks, where the location of the scheduling period is TBD.

Marco moves and Billy seconds a motion to accept the harmonized text in DCN 14-557r2 into the Draft Specification v0.3.

Discussion: none.

**Official vote** on the mentioned motion:

In favor: 6. Oppose: 0. Abstain: 1. Motion carries.

**Chair:** The meeting is in recess until AM2.

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Thursday September 18th, AM2 session

−Chair calls the meeting to order.

**8th presenter** is BJ (ETRI) DCN 14-569r0 "D0.2+frame structure"

Comments:

**Chair:** Please include the notes of DCN 557r2 clause 5.1 into DCN 14-569r1.

BJ moves and Marco seconds a motion to accept the harmonized text in DCN 14-569r1 into the Draft Specification v0.3.

Discussion: none.

**Official vote** on the mentioned motion:

In favor: 7. Oppose: 0. Abstain: 0. Motion carries.

**9th presenter** is Qing (Inter-digital) DCN 14-542r1 "PAC Spec for Discovery and Peering"

Comments:

−After discussion, the harmonized text was modified and uploaded as r2.

Marco moves and BJ seconds a motion to accept the harmonized text in DCN 14-542r2 into the Draft Specification v0.3.

Discussion: none.

**Official vote** on the mentioned motion:

In favor: 5. Oppose: 0. Abstain: 0. Motion carries.

**Chair:** We need to address "peering", "the TBDs of communication period" and "synchronization".

**BJ:** I am working on the Draft Specification v0.3. I do not think I have time to finish synchronization.

**Chair:** Let's discuss about peering with Qing.

**10th presenter** is Qing (Inter-digital) DCN 14-580r0 "PAC Peering Procedure Discussion"

Comments:

−This presentation capture the discussion about "peering" sent to the email reflector, in order to start harmonization.

**Chair:** The discussion about peering procedure at the MAC level can be used to produce harmonized text.

**Chair:** The meeting is in recess until PM1.

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Thursday September 18th, PM1 session

−Chair calls the meeting to order.

Continuation of 10th presenter Qing (Inter-digital) DCN 14-580r0 "PAC Peering Procedure Discussion"

Comments:

−After discussion, Qing will create harmonized text for "peering procedure" based on DCN 14-580r1 to be incorporated in the Draft Specification v0.3 for approval by TG8 later.

**11th presenter** is Shannon (Samsung) DCN 14-579r0 "Proposed Motions for Remaining Issues"

Comments:

−After discussion, the "remaining issues" were discussed, but no official motions were created.

**Chair:** The meeting is in recess until PM2.

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Thursday, September 18th, PM2 session

−Chair calls the meeting to order.

**Chair:** Let's ask for champions for the remaining issues to be resolved. The idea is to see their progress by the teleconference.

Champions for the remaining issues from DCN 14-579r1 are:

1) Discovery source ID: Shannon

2) Discovery resource selection: Shannon

3) Power management: BJ

4) Channel selection: H.B. Li

5) MAC layer filtering for discovery message: Qing

6) Champion for TBDs resolution in Draft Specification v0.3 for "communication period": Shannon

7) Champion for TBDs resolution in Draft Specification v0.3 for "Discovery and peering": Qing.

8) Discovery signal at PHY level: Marco.

9) Security: champion to be contacted by Prof. Lee. Otherwise, TG8 will ask about adapting security from other IEEE802.15 Standards.

**12th presenter** is Shannon (Samsung) DCN 14-589r0 "PAC Draft Spec for Synchronization"

Comments:

−After discussion, some text was modified and updated as r1.

Marco moves and BJ seconds a motion to accept the harmonized text in DCN 14-589r1 into the Draft Specification v0.3.

Discussion: none.

**Official vote** on the mentioned motion:

In favor: 7. Oppose: 0. Abstain: 0. Motion carries.

**13th presenter** is BJ (ETRI) "Draft Specification v0.3 (working version)"

Comments:

**Paul:** we should be more serious and follow procedure. Speeding up the process only generates inaccuracies.

−After discussion, still there are remaining editorial issues. Hence, the Draft Specification remains as v0.3 (working version).

**14th presenter** is Shannon (Samsung) DCN 14-464r3 "Motions for MAC Harmonization"

Comments:

−After discussion, TG8 decided the mentioned motions are included already in the topics assigned to champions for further discussion. No official motions were created.

**Shannon:** I want to discuss about multi-hop.

**BJ:** I do not want to deal with routing at layer 2.

**Response:** agree.

**Chair:** We need to define if multi-hop is going to be addressed or not.

**BJ:** The TGD and PFD mention multi-hop support.

**Response:** Support, no that multi-hop is a feature of PAC.

Motion 23: "Multi-hop support" in DCN 14-464r4

Move: Marco. 2nd: BJ.

Discussion: none.

**Official vote** on the mentioned motion:

In favor: 5. Oppose: 0. Abstain: 1. Motion carries.

**Chair:** We have one teleconference scheduled as:

Wednesday October 22nd at 7:00 AM EDT, 8:00 PM in Japan and Korea, 12:00 PM in Ireland.

Moreover, an ad hoc face-to-face meeting is scheduled one day before the official meeting in November,

Sunday November 2nd 2014 from 8:00 AM to 5:00 PM in San Antonio.

**Chair:** The meeting is adjourned until the November 2014 meeting in San Antonio, Texas, USA.