**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | Minutes of IEEE 802.15.8 TG Plenary Meeting on November 2014 in San Antonio, Texas |
| Date Submitted | November 12th , 2014 |
| Source | Marco Hernandez (NICT) |
| Response |  |
| Abstract |  |
| Purpose | For reference in TG8  |
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1. TG8 sessions

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| AM1 | **Ad-hoc** | **TG8** |  | **TG8** | **TG8** |
| AM2 | **Ad-hoc** |  | **TG8** |  | **TG8** |
| PM1 | **Ad-hoc** | **TG8** | **~~TG8~~**† |  | **TG8** |
| PM2 | **~~Ad-hoc~~**† |  |  | **TG8** | **~~TG8~~**† |

 †Canceled.

1. Minutes

Chair: Prof. Myung Lee (CUNY) USA.

Secretary: Marco Hernandez (NICT) Japan.

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Monday November 3rd, AM1 session

−Chair calls the meeting to order.

−Chair proposes the week's agenda DCN 14-0610r0:

1) Harmonization of proposals

2) Toward Draft Spec. V1.0

3) Discussion on the Project Plan.

−The agenda is approved unanimously.

1st presenter is BJ (ETRI), "PAC\_Teleconference\_20141022\_bj" (Power Point file submitted to the email reflector)

**Comments:**

**Marco:** Regarding the comment to the minutes about power control during CAP, BJ was busy preparing the draft specification and at the end of the presentation he said -I will check it later.

**Response:** That comment is not important to me.

**Marco:** Regarding the comments on the confusion on document DCN 14-542, Qing prepared the text for discovery and peering and TG8 voted to approve DCN 14-542r1. Later Qing posted r2 and r3, but she did not say anything to the TG. That is why there is no record of DCN 14-542r3 been approved. That was clarified during the teleconference.

**Response:** Ok, so I want a motion to approve such r3 and then approve the Draft Specification v0.3.

**Chair:** Ok, let's do that.

−Minutes of the previous meeting, DCN 14-596r1, is approved unanimously.

**Chair:** Report of teleconference by Marco.

−Marco reads the minutes of the teleconference on October 23rd DCN 14-618r0.

**Chair:** Report of the ad hoc meeting on Sunday by BJ.

−BJ reports the progress of the ad hoc meeting about the wideband PHY harmonization between ETRI and NICT.

**Chair:** Rick Alvin has created a private area for posting the draft specification. Also, I contacted the chair of TG9. He agrees to meet us about security.

**Chair:** Ok, let's have a look to DCN 14-542r3.

**Li:** In clause 5.2.1, there was a changed.

**BJ:** In clause 5.2.1 communication link parameters, Qing mentioned examples. I replaced # by number of antennas.

−BJ explains how he embedded the text from the different approved contributions into the Draft Specification v0.3.

**Chair:** I want to approve v0.3 to become v0.4 (agreed version) and during the meeting more motions to incorporate text into Draft Specification will be in v0.5.

**Chair:** Motion to accept the harmonized text in DCN 14-542r4 into the Draft Specification v0.3.

Move: Marco. Second: BJ

Discussion: none.

Official vote on the mentioned motion:

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

−BJ goes through Draft Specification v0.3 one more time.

**Chair:** Any discussion?

−None.

Marco moves a motion to update the Draft Specification from v0.3 (working version) to v0.4 (agreed version).

Second: Chang.

Discussion: none.

Official vote on the mentioned motion:

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

**Chair:** Next item is about harmonization. Last time, we assigned items to champions:

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.

**Chair:** Shannon and Qing are not here. About 3) power management, BJ?

**BJ:** I do not have a contribution for this, but rather synchronization, peering.

**Chair:** About 4) channel selection, HB Li?

**Li:** I have a presentation.

**Chair:** About 8) discovery signal, Marco?

**Marco:** It is included in the harmonized text with ETRI.

**BJ:** We have harmonized text for narrow band PHY between ETRI and NICT

**Marco:** We have harmonized text for power control during CFP.

**Chair:** Let's hear Igor first.

2nd presenter is Igor (NICT) DCN 14-636r2 "Motion to Include UWB PHY text in the Standard Draft"

**Comments:** none.

Igor moves a motion to approve the harmonized text in DCN 14-548r0 into the Draft Specification v0.5.

Second: Billy.

Official vote on the mentioned motion

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

3rd presenter is Marco (NICT) DCN 14-619r0 "Harmonized text for distributed power control during CFP"

**Comments:**

**BJ:** Did you make sure this contribution is compatible with Shannon's proposal?

**Response:** Yes, it is compatible.

**BJ:** Did Shannon approve it?

**Response:** I discussed with Shannon in the last meeting during the presentation, we did not have any conflict. However, I cannot say it was approved in his behalf. Anyway, if there is a conflict, we can address it in the next meeting.

Marco moves a motion to approve the harmonized text in DCN 14-619r0 into the Draft Specification v0.5.

Second: HB Li.

Official vote on the mentioned motion

In favor: 5. Oppose: 0. Abstain: 2. Motion carries.

4th presenters are BJ (ETRI) and Marco (NICT) DCN 14-635r1 "Harmonized text for narrow band PHY between ETRI and NICT"

**Comments:**

**Li:** You should find some commonalities and change the text and afterwards we can move a motion.

**BJ:** I prefer to approve the text as it is now. We have already agreed on finding some commonalities, but I need some time.

**Marco:** The technical content will be the same; we will change only the presentation of the proposals.

**Chair:** If that is you preference I think is fine, because the Draft Specification will be updated continuously. So, BJ and Marco can refine the text.

Chang moves a motion to approve the harmonized text in DCN 14-635r1 into the Draft Specification v0.5.

Second: Marco.

Official vote on the mentioned motion

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

Chair: The meeting is in recess until PM1.

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Monday November 3rd, PM1 session.

−Chair calls the meeting to order.

**Chair:** We need to move a motion to affirm the decisions made by the TG during the AM1 session.

It is procedural.

Marco moves a motion to confirm the TG decisions made during the AM1 session.

Second: BJ.

Discussion: none.

Motion is approved unanimously.

5th presenter is Li (NICT), DCN 14-634r0 "Frequency channel selection"

**Comments:**

**BJ:** My preference is that channel selection is done by upper layers. The MAC only provides the interface.

**BJ:** About communication avoiding using the starting channel, I am not sure about it.

**Response:** to avoid as much as possible.

**BJ:** I prefer not to forbid any channel.

**Response:** The presentation is for discussion only.

**Chair:** This can be developed further targeting the specification.

**BJ:** In slide 7, I agree with that frequency channel selection is performed by higher layers.

**Billy:** The acronym FCS is used for frame check sequence, avoid it.

**BJ:** I know of a paper that describes channel selection. We need some time to address this.

**BJ:** Why does it take so long for 11 to scan the channels?

**Response:** I do not know details of 11. Maybe they scan all 3 channels.

**Chair:** In 15.4 the discovery is fast.

**BJ:** Do you want to accomplish something during this meeting?

**Response:** Yes, I will send an email to Qing and Shannon for discussion and coming back later in the week for approval.

**Chair:** The next step is what to do with the rest of sessions, but before, BJ will present motions on behalf of Shannon.

6th presenter is BJ (ETRI) on behalf of Shannon (Samsung) DCN 14-640r0 "Proposed motions for assigned tasks"

After discussion:

**Chair:** It seems motion X0 is premature. It requires agreement by MAC proposers.

**BJ:** I do not move a motion, anybody else? Hearing none, let's continue.

**BJ:** About MAC layer filtering, I agree that is not a good idea to store many number of discovery information.

**Li:** This is not a motion for text specification.

**Chair:** I think so.

**BJ:** Discovery resource selection:

−After discussion, discovery resource selection motion looks promising, but it requires more details.

**BJ:** Communication period:

−After discussion, BJ will present the original figure of communication period of Shannon for approval later.

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

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Tuesday November 4th, AM2 session

−Chair calls the meeting to order.

**Chair:** Let's go through the draft v0.5 to identify key items still open. Also, who will be assigned to resolve such remaining items? We need to figure out how to accomplish milestones. But before, let's hear BJ pending motion presentation.

7th presenter is BJ (ETRI) DCN 14-646r0 "Proposed frame structure for PAC"

−After discussion: the TG agrees to move a motion to approve the frame structure.

BJ moves a motion to approve the frame structure in DCN 14-646r1 into the Draft Specification v0.5.

Second: Marco.

Official vote on the mentioned motion:

In favor: 4. Oppose: 0. Abstention: 1. Motion carries.

**Chair:** BJ will present the Draft Specification v0.4 in order to identify key remaining items still open.

8th presenter is BJ (ETRI) "Draft Specification v0.4"

**Comments:**

**BJ:** I have some problems with the UWB text. It does not follow the same structure of the Draft and there are placeholders. I want them remove.

**Billy:** Please just take the PHY text.

**BJ:** Billy, please delete those placeholders and use Draft v0.4 to place the text of the UWB PHY.

−Mayor issues identified:

1) Frame structure and super-frame renaming.

2) Synchronization addressed by ETRI and Samsung

3) Discovery and peering: still details are missing. Qing is champion for peering.

4) Communication period: text is missing. BJ will provide text for CAP.

5) Multi-hop operation: MAC will provide only an interface to higher layers for multi-hop.

6) Relative positioning: Igor will provide text for the UWB PHY.

7) Power management:

**Chair:** It can be combined with power control.

**BJ:** Power control is about reducing interference, while power management is about power saving.

−TG decides the champion is Qing as she has a contribution about it.

8) Security:

−BJ will provide some text for PHY layer security.

Chair: Ok, I summarized the open items as:

1) Network synchronization: championed by BJ and Shannon

Expected milestone: by January 2015 meeting.

2) Discovery: championed by Shannon and TBD.

Expected presentation and discussion: by January 2015 meeting.

PHY interface with MAC championed by Marco and BJ.

3) Peering:

MAC championed by Qing and BJ.

PHY interface with MAC championed by Marco and BJ.

Expected milestone: by March 2015 meeting.

BJ will present a contribution during this meeting.

4) Communication period:

CAP championed by BJ. CFP championed by Shannon

Expected milestone: by January 2015 meeting.

5) Transmit power control:

CAP championed by Qing.

Expected presentation and discussion: by January 2015 meeting.

6) Power management: championed by BJ and Qing.

Expected presentation and discussion: by January 2015 meeting.

7) Relative positioning:

UWB PHY championed by Igor.

Expected presentation and discussion: by the January 2015 meeting.

8) Security:

Interface to KMP championed by TBD.

PHY layer security: championed by BJ.

Expected presentation and discussion: by March 2015 meeting.

9) Channel selection: championed by HB Li.

HB Li will present a contribution and discussion during this meeting.

**Chair:** I will upload those items as DCN 14-657r0.

**Chair:** Next item, we need to redefine the TG timeline.

−After discussion:

Marco moves a motion to approve DCN 14-610r1 "PAC Agenda" to revise the TG timeline.

Second: HB Li.

Official vote on the mentioned motion

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

**Chair:** Presenters are not ready yet, there is not further discussion right now and BJ needs time to finish the Draft specification v0.5, let's skip PM1 session.

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

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Wednesday November 5th, AM1 session

−Chair calls the meeting to order.

**Chair:** This morning we will hear Robert Moskowitz, the chair of TG9.

**Chair:** Marco requested a modification to the discovery item: PHY interface with MAC championed by Marco and BJ. This will be uploaded as DCN 14-657r1.

**Igor:** I have a motion for the UWB PHY.

9th presenter is Igor (NICT) DCN 14-663r0 "Motion to Include UWB PHY text in the Standard Draft"

**Comments:** none.

Igor moves a motion to approved the text in DCN 14-654r0 into the Draft specification v0.5.

Second: Billy.

Official vote on the mentioned motion:

In favor: 6. Oppose: 0. Abstention: 0. Motioncarries.

**Chair:** We are in recess until 9:00 AM.

−Chair calls the meeting to order.

**Chair:** Robert Moskowitz is here.

**Robert:** I have not prepared any slides. I will give just an overview. Please ask questions.

**Robert:** Your network architecture without central control is very challenging. There is not 3rd party as reference to authenticate. For authentication one possibility is using side channel approach, e.g., every PD has a QR code as key. My phone takes a picture of the QR code to authenticate. The same for other PDs, then we build a secure PAC network. Now, a problem is how to evict a PD who is not playing nice.

**Robert:** Are you going to have assigned MAC addresses or secret MAC addresses?

**Robert:** Another possibility is the identity of a PD is a public key. Higher layers decide if it is trusted.

**Robert:** When share identity is done, you need a secure protocol to handle cryptography. That is what we do in TG9. A key dispatch selector is used 15.4, but this is star network. The idea is to accept traffic until cryptography is done.

**Robert:** Think about it, you can use as identity a QR code or say trust me (public key as ID), then authentication. Then you need a secure protocol in which you differentiate security traffic from communication traffic. The keys exchange is done in the clear, so it must be asymmetric. However, some protocols can take a while, up to 10 seconds.

**BJ:** How often do we need to apply security?

**Robert:** Every time devices start a communication session. We can have a group key for all devices to listen. The distribution is cheap, but the problem is when one device is evicted. You need to re-key everybody else. We have 2 options: group key or one key per link. There are advantages and disadvantages and there is not a clear winner. You should think about it.

**Billy:** Group key is expensive in some scenarios.

**Robert:** In 11p (inter-vehicle communications) they broadcast signed objects. Every vehicle then validates such objects. Having mobility, people joining and leaving a group: please look at 11p. Mobile devices like cell phones can handle the burden of computation.

**Robert:** MAC security is like; to whom am I allowed to communicate with? In TG8 is about how to handle the keys in trusted devices.

**Billy:** What about multi-hop?

**Robert:** In multi-hop is difficult to extend one hop security. One possibility is to employ trusted MACs. Then, MAC to MAC can do forwarding without the need of encrypted traffic.

**Robert:** By the way, I can recommend you to use large MPDU, the larger the MPDU, the better. For instance, with 90 bytes there is not any key to handle that. Another possibility is to use sub-MAC fragmentation like 15.4k, but it is not applicable to multi-hop. MPDU with 250 bytes is the bare minimum.

**Robert:** Another recommendation is that MAC security must be done by the MAC alone. Please do not leave it to higher layers.

**BJ:** Can you recommend how to start?

**Robert:** MPDU size, traffic selector, multi-hop forwarding with 2, 3, 4 addresses?

**BJ:** We do not have an expert on security. We would like to reuse something already done from other groups.

**Robert:** Look at 15.4k MAC fragmentation, or 11 3-address format, or 15.10 2-address formats. How they do group key and key management.

**Chair:** Thank you very much. This is very helpful information. We will contact you later.

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

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Wednesday November 5th, PM2 session

−Chair calls the meeting to order.

**Chair:** Robert sent me a summary of his talk. I will post it to Mentor later.

10th presenter is HB Li (NICT) DCN 14-662r0 "Proposed text for frequency channel selection"

**Comments:**

−It was clarified that frequency channel selection is for the procedure to select a channel from a channelization band plan.

 **−**After discussion, text was modified to move a motion later.

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

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Thursday November 6th, AM1 session

−Chair calls the meeting to order.

−Chair goes through the list of remaining items.

−Chair goes through the security considerations in DCN 14-677r0.

11th presenter is BJ (ETRI) DCN 14-678r0 "Proposed Text for Fully Distributed Initial Synchronization"

**Comments:**

**Li:** Why multiple synch signals? We have only one.

**Response:** To make it clearer, I delete the reference to single and multiple signals.

**Li:** The initial synch is divided into 3 cases; just make a carry return in the 1st paragraph to make it clearer.

**Response:** Ok.

**Billy:** Is the synchronization in the same frequency channel?

**Response:** The synch happens in the same frequency channel. If you switch to another channel, the timing synchronization is maintained.

**BJ:** I will upload r1 with the suggested changes by the TG to vote later.

**Chair:** Let's hear to HB Li.

12th presenter is HB Li (NICT) DCN 14-662r1 "Proposed text for frequency channel selection"

−After discussion, some changes in the text were done and will be uploaded as a separate document to vote later.

−Chair: The meeting is in recess until AM2

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Thursday November 6th, AM2 session

−Chair calls the meeting to order.

HB Li moves a motion to approve the text in DCN 14-679r1 into the Draft specification v0.5.

Second: Marco.

Official vote on the mentioned motion:

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

13th presenter is BJ (ETRI) DCN 14-678r1 "Proposed Text for Fully Distributed Initial Synchronization"

−After discussion, text was changed again and the TG will resume the discussion during PM1.

**Chair:** I suggest continuing the capture of all approved motions into a single document. Marco, can you help?

**Marco:** Yes.

−Chair: The meeting is in recess until PM1.

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Thursday November 6th, PM1 session

−Chair calls the meeting to order.

The TG continues the discussion of BJ DCN 14-678r2 "Proposed Text for Fully Distributed Initial Synchronization".

BJ moves a motion to approve the text in DCN 14-678r2 into the Draft Specification v0.5.

Second: Li.

Official vote on the mentioned motion:

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

13th presenter is BJ (ETRI) DCN 14-687r0 "Adaptive Random Access Scheme for PAC"

**Comments:**

**Li:** As this is the first time we see this, we need some time to check it.

**Response:** Yes, I think it is a good idea to give some time to people to check it.

**Chair:** BJ, please finish Draft Specification v0.5 in order to approve it.

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

Wednesday December 17th at 7:00 A.M. ET; 9:00 PM in Japan and Korea, 12:00 PM in Ireland.

**BJ:** I am ready.

Marco moves a motion to approve the text in the Draft Specification v0.5 to become v0.6.

Second: BJ.

Discussion: none.

Official vote on the mentioned motion:

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

**Chair:** Any other business or comment?

**Chair:** The meeting is adjourned until the January 2015 meeting in Atlanta.