**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 meeting during May 2014 in Waikoloa, HI, USA. |
| Date Submitted | May 19th , 2014 |
| Source | Marco Hernandez (NICT) |
| Response |  |
| Abstract |  |
| Purpose | For reference in TG8 |
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1. Minutes

**Chair:** Prof. Myung Lee, CUNY, USA

**Secretary:** −Marco Hernandez, NICT, Japan

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>Monday May 12th, AM2 session

−Chair calls the meeting to order.

−Chair proposes this week's agenda: presentations and future planning.

−Agenda is approved unanimously.

−Minutes document DCN 14-212r0 of the previous meeting is approved unanimously.

−Chair goes through all presentations and specification documents submitted with a total of 17 contributions.

−All members acknowledge if their contribution is PHY, MAC or both: 6-PHY, 9-MAC and 2 informative contributions.

−Presentations are organized as MAC & PHY. Which one goes first is defined by a straw poll:

MAC: 2 votes.

PHY: 5 votes.

Result: PHY contributions are presented first follow by MAC contributions.

**Chair:** The order of presentations is first contribution submitted (considering revision) is presented first within 45 minutes each presentation.

−1st presenter is Marco (NICT) in behalf of David Smith from NICTA, Australia.

DCN 14-245r1 "Proposal Outline of Completely Distributed Power Control Mechanism for Peer-Aware-

Communications"

**Comments:**

**Qing:** Are the priorities based on what?

**Response:** packet delivery ratio (PDR).

**BJ:** What is the impact on performance?

**Response:** PDR is connected with PER and the presented curves show such impact.

−2nd presenter is Igor (NICT) DCN 14-274r0 "NICT Final Impulse Radio Ultra-Wideband PHY Proposal in response to CFC"

**Comments:**

**Chang:** What is the maximum distance?

**Response:** 250 m.

**Prof. Lee:** Why random packet sizes?

**Response:** Packet size is unknown.

−3rd presenter is B. Verso (Decawave) DCN 14-243 "Decawave UWB PHY for TG8"

**Comments:**

**Chang**: Why results do not consider fading channels?

**Response**: The TGD does not consider fading channels.

**Li:** How to deal with new regulations?

**Response:** Depending on the data traffic and application switching to another channel.

**Li:** Low duty cycle?

**Response:** not necessarily.

**BJ:** What is the carrier sensitivity?

**Response:** not sure.

**BJ:** How is the detection performed?

**Response:** Averaging over 30 symbols.

**Prof. Lee:** Do simulation results consider mobile scenarios?

**Response:** We have some results, but are not presented here.

−4th presenter is Marco (NICT) DCN 14-247r1 "NICT PHY proposal"

**Comments:**

**Chang:** We have a concerned of power consumption with spatial multiplexing.

**Response:** True, the higher throughput of spatial multiplexing comes at the expense of increased complexity and power consumption. However, we envision this technique in fixed PDs, where there is not an issue in power consumption as compared with hand-held devices.

**Chang:** How is the complexity of QC-LDPC codes compared to convolutional codes?

**Response:** We present implementations of LDPC codes in popular wire and wireless standards, where it is shown that the complexity of QC-LDPC codes is in the range of Wi-Fi implementations.

**BJ:** What about energy consumption?

**Response:** The next graph presents the energy per bit invested against throughput.

**Chang:** The complexity with a sequence length 1024 for random access may be too high.

**Response:** The design of such sequence is for the worst case scenario, like devices moving to 100 Km/h, devices at 500 m apart, etc. However, the design is flexible.

**Chair:** Recess until PM1 session.

>Monday May 12th, PM1 session

−Comments for Marco, DCN 14-247r1, continue:

**Qing:** Why the performance curves of iterative MIMO receiver are different?

**Response:** That is due to using a different channel model.

−5th presenter is BJ (ETRI) DCN 14-249r2 "Performance Evaluation of Fully Distributed Synchronization

Mechanism for PAC"

−This is a merged proposal within ETRI proposers and Samsung.

**Comments:**

**Qing:** The synchronization slot for each PD overlaps.

**Response:** The timing reference signal contains a back off. It is for synchronization maintenance. The reference signal is transmitted by random access.

**Qing:** The synchronization interval seems to depend on use case and performance as well.

**Response:** That is a compromise for a fully distributed MAC.

**Qing:** That is ok if there is not cooperation among PDs.

**Qing:** When PDs are in 2 different groups how do they synchronize?

**Response:** Such PDs switch timing reference to one group until all PDs involved have the same timing reference.

**Qing:** With that process, there are problems like dissociation due to different signal strengths plus if one PD switches but other PDs are still in group 2.

**Response:** The network behind moves forward based on the synchronization interval rather using the signal strength.

**Paul:** There are issues of disruption during the switching of timing reference if PDs move around.

**Response:** Multiple carrier sensitivity levels may solve that issue.

**Paul:** I do not agree. If I transmit I do not sense at the same time.

**Response:** The transmission is shared in the wireless medium; the reference signal uses a random access scheme.

**Paul:** Frames overlap during timing reference interval. When PDs are mobile there is performance degradation.

**Response:** The 2 networks coexist shortly.

**Paul:** Still there is work to do when PDs are mobile; the proposal is not a full solution.

**Response:** If you have a better solution we can discuss.

**Qing:** In scenarios like stadiums, arenas, etc., with high density of PDs, the proposal does not seem to work.

**Response:** Power control may solve the interference problem.

**Qing:** The issue is in the synchronization overhead in those scenarios.

**Response:** The proposal covers those scenarios such that PAC networks maintain synchronization.

**Qing:** The MAC synchronization is meant for estimating frame boundaries only.

**Paul:** The issue is that some scenarios seem broken and that is fine, this needs further discussion.

−6th presenter is BJ (ETRI) DCN 14-254r0 "Samsung-ETRI Merged MAC Proposal to TG8 CFC"

**Comments:**

**Marco:** What is the merged frame structure?

**Response:** It covers synchronization, peering, discovery and data communication.

**Qing:** Devices need to listen or wake up during discovery slot all the time.

**Response:** The proposal uses energy detection instead preamble detection during discovery. However, if there is no discovery information PDs go to sleep.

**Qing:** Who assigns scheduling during CFP?

**Response:** From the associated peer.

**Chair:** Recess until PM2 session.

>Monday May 12th, PM2 session

−7th presenter is Chang (ETRI) DCN 14-250 "ETRI PHY Proposal for PAC"

**Comments:**

**Marco:** what is MCS?

**Response:** Modulation and coding.

**Marco:** Do you use ZC sequences for preambles?

**Response:** Yes.

**Li:** Why BER in synchronization results?

**Response:** It is detection error rate rather than BER.

**Qing:** What are the uses of STF?

**Response:** Carrier detection, AGC, etc.

**Qing:** The system is very sensitive for AGC when using OFDM and even more with 64QAM. What about I&Q balance results?

**Response:** Introducing a phase shift in the modulation to make a complex signal for AGC.

−8th presenter is BJ (ETRI) DCN 14-251 "Clustered Random Drop of PDs for Performance Evaluation of

PAC"

−This is not a proposal, only for the use of a reference model for system level simulations in the TGD.

**Comments:**

**Paul:** Do you propose different model parameters per use case?

**Response:** Yes, maybe. It needs further clarification.

**Prof. Lee:** We may indicate 3 typical use cases for simulations in the TGD.

**Li:** Is the parameter alpha for changing the clusters?

**Response:** No, it is sigma.

**Li:** What about location of the cluster?

**Response:** That is random.

**Qing:** The clustering model seems very good for realistic scenarios.

**Response:** Yes.

−9th presenter: BJ (ETRI) DCN 14-252 "Physical Layer Security as a Key Technology for D2D"

−This is not a proposal only informative.

**No comments.**

**Chair:** recess until AM2 session tomorrow

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>Tuesday May 13th, AM2 session

−Chair calls the meeting to order.

−10th presenter is Qing (Inter-digital) DCN 14-257 "Frame Structure Supporting Multi-hop

Communications for PAC - Final Contribution"

**Comments:**

**Li:** Considering the mobility in the network, the routing table must be updated continuously and it is a burden for PDs.

**Response:** Yes, there is overhead to deal with. We require further discussion how to reduce such overhead.

**Li:** In general a configuration, a PD selects another relay-PD. How is the selection?

**Response:** It is based on the shortest distance hopper. It is not hierarchical.

**BJ:** In the case of multi-hop, when 2 faraway PDs communicate, is one of them the initiator?

**Response:** If that is the case, the network is reorganized.

**BJ:** What is the difference between logical and physical hop?

**Response:** It depends on the physical distance, shortest distance selection. We do not use logical hop.

**BJ:** If PDs are around, but move away later, will they require multi-hop?

**Response:** The initiator is the one defining the boundary for the multi-hop configuration.

**BJ:** How other PDs know the change of configuration.

**Response:** Cooperation among PDs and this is announced in a common channel.

**BJ:** But all PDs need to know that super-frame structure before transmission.

**Response:** The reconfiguration of the super-frame is broadcast.

**BJ:** Do you have an initiator only for multi-hop?

**Response:** No for multi-hop. The initiator is elected only at the beginning of the network creation; you need someone to establish the beginning of a network topology.

**BJ:** Can a PD faraway change the super-frame structure for multi-hop?

**Response:** In the dynamic change of the super-frame, you send a request for a hop candidate. If there is a positive response, the configuration of super-frame can change. Otherwise, it goes to the initiator.

**BJ:** In summary, the proposal is self-organized but still centralized and with a lot of overhead.

**Response:** The initiator maintains the hopping table in one scheme. In our 2nd scheme proposal, PDs maintain the hopping table.

**BJ:** Even if the efficiency of this centralized approach is better, TG8 considers a fully distributed MAC.

**Response:** Do not take distributed too literally. We introduced flexibility in this hybrid approach. Real systems so far are not fully distributed.

**BJ:** The PAR requires proposals to be fully distributed, not in the middle.

**Response:** The proposal is distributed.

**Chair:** This discussion is taking too long. The PAR requires fully distributed proposals. If that is not the case, we have a problem. But let's move on to another question.

**Response:** The initiator and other PDs can change the structure of the super-frame and we believe the proposal is distributed.

**BJ:** If the group agrees the proposal is in fact distributed.

**Response:** What is better for PAC applications fully distributed or a hybrid proposal?

**BJ:** In the presented sectorization, how the PDs know their location in the network?

**Response:** Routing is not provided. We present the frame structure only. However, it is based on location information, like GPS, in a distributed manner and the location is broadcast.

**BJ:** Have you consider the huge overhead?

**Paul:** Once the network is formed, the overhead is small even if the network grows.

**BJ:** The sectorization is controlled by the initiator and that is a centralized approach.

**Chair:** This discussion is taking too long. Let’s move on to the last question?

**Chang:** Your proposal does not seem a fully distributed system. If the initiator is gone, the network is gone.

**Response:** No, if the initiator is gone, there is a reformation that elects a new initiator while maintaining the network.

−11th presenter is Qing (Inter-Digital) DCN 14-261 "Reliable Multicast for PAC - Final Contribution"

**Comments:**

**BJ:** In page 23, keeping the same BER does not seem realistic.

**Response:** I need to check it.

**BJ:** The partial ACK follows one curve and then another curve, why?

**Response:** This is due to variations in the simulation method.

**BJ:** How do you measure the mobility?

**Response:** Based on context aware to know the location and we assume very slow mobility.

**Chang:** In location based ACK, how to do it? PDs do not have GPS.

**Response:** Location based ACK is an option. We are presenting only possibilities how to handle ACK.

Chair: recess until PM1 session

>Tuesday May 13th, PM1 session

**Chair:** I would like to thank Marco for taking over as secretary of TG8.

−12th presenter is Qing (Inter-digital) DCN 14-259 "Multi-hop Peering for PAC - Final Contribution"

**Comments:**

**BJ:** In page 5, what is device level peering?

**Response:** PDs are aware of each other, but do not share same applications.

**BJ:** Do we need application peering?

**Response:** Yes, it is a bit confusing.

**BJ:** In page 7, PDs A and B want to communicate with a relay in between them, for what applications?

**Response:** Interception communications.

**BJ:** In page 11, PDs A, B, C communicate to PD Z with a relay among them, how it works?

**Response:** It is a possible scenario of multi-hop many-to-one peering.

**BJ:** What about details of random access and CFP? Are those in the specification proposal?

**Response:** I need to double check.

**BJ:** When there is a relay, what about security?

**Response:** It is not considered at the moment.

**BJ:** In page 26, simulations of RD do not reach 1. Is this due to the time out?

**Response:** Yes.

**Paul:** I would like to add that device level peering could provide benefits, like peering support for relay.

**BJ:** It seems an upper layer interaction is required for routing.

**Response:** Yes.

**BJ:** Device level peering is not considered in our proposal, hope you drop that idea.

**Response:** This is only a proposal; we can discuss further to find a solution.

**Li:** Peering and association are used loosely in the presentation. Are they the same?

**Response:** It is the same meaning.

−13th presenter is Qing (Inter-digital) DCN 14-263 "Cross-layer Context Management for PAC – Final

Contribution"

**Comments:**

**BJ:** Do primitives depend on the context?

**Response:** Yes.

**BJ:** Specification of a logical interface is ok, but is a physical interface necessary?

**Response:** Yes, we want to include it but we are flexible.

**Li:** Compare to other standards what is different in this proposal?

**Response:** The only difference is context aware information, which is not covered in other standards.

−14th presenter is Qing (Inter-digital) DCN 14-265 "Power Control for PAC - Final Contribution"

**Comments:**

**Marco:** Our proposal for distributed power control fits into context aware power control without the overhead of power control information exchange of your proposal.

**Response:** We throw general ideas. Part of such overhead information can be simplified.

**Marco:** Simulation results are not for system performance, only instantaneous power across time.

**Response:** We will include throughput.

**Chang:** In page 6, are different QoS for different applications?

**Response:** Yes, it depends on the application.

**Chang:** Does close-loop power control information need to be feedback over a control channel?

**Response:** How the feedback is done is not defined at the moment.

**Chair:** recess until PM2

>Tuesday May 13th, PM2 session

−15th presenter is J. Yu (Chung-Ang Univ.) DCN 14-253 "Performance evaluation of CAU proposal"

**Comments:**

**Marco:** What is the reliability metric about?

**Response:** Number of successful transmissions over total number of transmitted packets.

**Li:** In scenario 1, are there PDs that do not belong to the group?

**Response:** All PDs belong to the same group.

**Chang:** In slide 21, the reliability does not change between the proposal and with no ACK, why?

**Response:** This happens only in scenario 1. In scenarios 2 and 3, reliability is almost 1.

**Chang:** There is not evaluation of the security proposal.

**Response:** We provide only the analysis under known attacks.

−16th presenter is HB Li (NICT) DCN 14-272 "NICT MAC Proposal In Response to Call For Contribution

With Simulation Results"

**Comments:**

**Chang:** In slide 9, one common mode per frequency band?

**Response:** Yes.

**Chang:** If there is a problem with the channel for common mode, the proposal does not work.

**Response:** This scenario was agreed by the group in the TGD.

**Chang:** What if a PD wants to join 2 groups?

**Response:** PDs must synchronize to both groups.

**Chang:** In slide 12, what is the blue color for?

**Response:** CCA (clear channel assessment) period.

**Chang:** Why is there a back off interval?

**Response:** To handle the join request of PDs.

**BJ:** In slide 15, are the results for a 500m x 500m area?

**Response:** The area is 50m x 50m.

**BJ:** In slide 17, the assumed 1000 PDs are transmitters or receivers?

**Response:** It is selected at random.

**BJ:** In slide 24, some parameters are confusing.

**Response:** Let me check it.

**BJ:** The latency results are confusing.

**Response:** Let me check it.

**BJ:** In slides 29, with 32 I-PDs per area, it does not seem a dense scenario.

**BJ:** Does the operation mode use the common mode channel?

**Response:** No.

**Qing:** In slide 12, the frame structure operation mode is for what?

**Response:** Only for data communications.

**BJ:** In slide 11, how is the discovery procedure to start a group?

**Response:** An initiator sends the appropriate signaling for timing reference, group IDs, etc.

**Chair:** Session in recess until Thursday AM1 session

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>Thursday May 15th, AM1 session

−17th presenter is Joo (ETRI) DCN 14-260r1, "Peer Aware Communication MAC Final-proposal to Call for Contributions"

**Comments**

**Prof. Lee:** Were the associated frame structure algorithms presented already?

**Response:** Yes.

**Li:** In slide 4, how a group is started?

**Response:** Higher layers create primitives to trigger the searching a peer group or it will start a new group.

**Li:** Is starting a group indicated in the chart?

**Response:** Yes.

**Chair:** All contributions have been presented. Let's start how to move forward.

−Chair goes through the PAC framework document (PFD) and technical guidance document (TGD) with the idea of identifying the proposals that cover the different clauses of the TGD and PFD.

−There is confusion on the TGD latest version. In Mentor, the TGD latest version is DCN 12-568r8 (r8).

However, the Chair has r9 in his PC and the Call for Contributions mentions r9 as well.

−It seems Shannon (Samsung) was editing r9 in the Chair's PC during the January 2014 meeting in LA.

However, such r9 was never uploaded to Mentor afterwards.

−Chair and BJ try to compare r8 and r9 to see what was revised. It seems the blue text was the addition done to r8.

**Paul:** I suggest a procedure, first to approve agreed changes in the text, so that new changes can be tracked in the TGD over a clean version every time.

−BJ is not sure if all the changes (blue text) in r9 were approved. Chair checks the minutes of the January 2014 meeting DCN 14-101r0 to find it out. Unfortunately, according to the minutes, it is not clear if r9 was approved.

−BJ says we need r9 as it is addressed in the Call for Contributions.

−Chair suggests approving r9.

−BJ moves a motion to approve r8, as it is, as r9.

−Official voting:

In favor 8 votes, oppose 0 votes, abstain 1. Motion passes.

−BJ uploads r8, as it is, as r9.

−Chair suggests to go through the PFD DCN 14-568r1 to identify proposals covering different clauses.

−Members acknowledge which contribution (specification text submission) covers a specific clause.

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*List of technical proposals specification documents covering the different clauses of the Technical Guidance Document (TGD) DCN 12-568r9, and PAC Framework Document (PFD) DCN 14-085r1.*

**PFD,**

**4.2 Topology:**

1) Joo (ETRI) DCN 14-270r0.

**4.3 Reference model**

1) Joo (ETRI) DCN 14-270r0

**5 MAC layer,**

**5.2 Frame structure:**

1) Joo (ETRI) DCN 14-270r0,

2) Qing (Inter-digital) DCN 14-328r0,

3) BJ (ETRI) DCN 14-271r2,

4) Li (NICT) DCN 14-126r1.

**5.3 Synchronization**

1) BJ (ETRI) DCN 14-271r2,

2) Li (NICT) DCN 14-126r1,

3) Qing (Inter-digital) DCN 14-328r0.

**5.4 Discovery**

1) Li (NICT) DCN 14-126r1,

2) Joo (ETRI) DCN 14-270r0,

3) BJ (ETRI) DCN 14-271r2,

4) Qing (Inter-digital) DCN 14-328r0,

5) Marco (NICT) 14-248r1.

**5.5 Peering**

1) Li (NICT) DCN 14-126r1,

2) Joo (ETRI) DCN 14-270r0,

3) BJ (ETRI) DCN 14-271r2,

4) Qing (Inter-digital) DCN 14-328r0,

5) Marco (NICT) 14-248r1,

6) J. Yu (Chung-Ang Univ.) DCN 14-129r0.

**5.6 Communication**

1) Joo (ETRI) DCN 14-270r0,

2) BJ (ETRI) DCN 14-271r2,

3) Qing (Inter-digital) DCN 14-328r0,

4) J. Yu (Chung-Ang Univ.) DCN 14-129r0 (unicast, multicast, broadcast),

5) Marco (NICT) 14-248r1 (unicast).

**5.7 MPDU structure**

1) Joo (ETRI) DCN 14-270r0,

2) Qing (Inter-digital) DCN 14-328r0,

3) J. Yu (Chung-Ang Univ.) DCN 14-129r0.

**5.8 Multiple access**

1) Joo (ETRI) DCN 14-270r0,

2) BJ (ETRI) DCN 14-271r2,

3) Qing (Inter-digital) DCN 14-328r0.

**5.9 Synchronization procedure**

1) BJ (ETRI) DCN 14-271r2,

2) Li (NICT) DCN 14-126r1,

3) Qing (Inter-digital) DCN 14-328r0.

**5.10 Discovery procedure**

1) Li (NICT) DCN 14-126r1,

2) Joo (ETRI) DCN 14-270r0,

3) BJ (ETRI) DCN 14-271r2,

4) Qing (Inter-digital) DCN 14-328r0,

5) Marco (NICT) 14-248r1.

**5.11 QoS**

1) Joo (ETRI) DCN 14-270r0.

**5.12 Interference management**

1) Marco (NICT & NICTA) DCN 14-246r0,

2) Qing (Inter-digital) DCN 14-328r0,

3) Joo (ETRI) DCN 14-270r0.

**5.13 Power control**

1) Marco (NICT & NICTA) DCN 14-246r0,

2) Qing (Inter-digital) DCN 14-328r0.

**5.14 Multi-hop**

1) Joo (ETRI) DCN 14-270r0,

2) Qing (Inter-digital) DCN 14-328r0,

3) J. Yu (Chung-Ang Univ.) DCN 14-129r0.

**5.15 Relative positioning**

1) Joo (ETRI) DCN 14-270r0,

2) Igor (NICT) DCN 14-273r0.

**5.16 Power management**

1) Qing (Inter-digital) DCN 14-328r0,

2) BJ (ETRI) DCN 14-271r2.

**5.17 Security**

1) J. Yu (Chung-Ang Univ.) DCN 14-129r0.

**5.18 Coexistence**

1) Joo (ETRI) DCN 14-270r0,

2) BJ (ETRI) DCN 14-271r2.

**5.19 Upper layer interaction**

1) Joo (ETRI) DCN 14-270r0,

2) BJ (ETRI) DCN 14-271r2,

3) Qing (Inter-digital) DCN 14-328r0.

**6 Physical layer,**

**6.1 Channelization**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.2 Duplex schemes**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.3 Multiplexing schemes**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.4 PPDU structure**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.5 Modulation and coding schemes**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.6 Multiple antennas**

1) Marco (NICT) DCN 14-248r1 (2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands).

**6.7 Bit interleaver**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.8 Scrambling**

1) Marco (NICT) DCN 14-248r1 (sub-GHz, 2.4 GHz, 5 GHz bands),

2) BJ (ETRI) DCN 14-271r2 (2.4 GHz, 5 GHz bands),

3) Igor (NICT) DCN 14-273r0 (UWB band),

4) Billy (Decawave) DCN 14-333r0 (UWB band).

**6.9 UWB physical layer**

1) Igor (NICT) DCN 14-273r0 (UWB band),

2) Billy (Decawave) DCN 14-333r0 (UWB band).

**TGD,**

**5.2 Common mode**

1) Marco (NICT) DCN 14-248r1,

2) Igor (NICT) DCN 14-273r0 (UWB band),

3) Billy (Decawave) DCN 14-333r0 (UWB band),

4) Li (NICT) DCN 14-126r1.

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**Yu:** We have primitives for PD management entity (PDME) mentioned in clause 4.3, but it is not described in clause 5.19.

**Paul:** PDME should describe MAC and PHY SAP, the rest is out of scope.

**Chair:** Clause 4.3 describes only user plane. Primitives for PDME are not included. Yu DCN 129r0 contribution includes those. That is the issue.

−After a discussion the result is that primitives for PDME are not necessary at the moment.

−Chair mentions the 802.15 Chief Editor commented him that TG8 only needs one editor, or at least he wants to deal with only one editor.

−BJ is elected to be the representative editor of TG8.

**Li:** TGD clause 5.2 Common mode is not included in the PFD.

−Chair includes TGD clause 5.2 Common mode to the list as

Marco DCN 14-248r1 (sub-GHz 2.4 GHz, 5 GHz), Igor DCN 14-273r0 (UWB band), Li DCN 14-126r1.

(Later Billy (Decawave) DCN 14-333r0 (UWB band) was added as it is shown in the list above).

**Chair:** If harmonization is not reached by the July 2014 meeting, I may move motions to vote for the selection of a proposal as the one to appear in the final specification.

**Chair:** let's schedule teleconferences before the July meeting.

**Paul:** I suggest teleconferences to discuss exclusively MAC and another one for PHY.

**BJ:** I suggest only one teleconference and submit a document/presentation to follow.

**Marco:** Teleconferences are aimed to inform about the harmonization progress. The harmonization in itself is done separate by the parties involved by email, etc.

−Chair suggests having leaders of the harmonization process, aka champions, to help/push the effort of harmonization.

−After a discussion, Qing and Marco are leaders of the harmonization process for the MAC and PHY, respectively, while BJ will provide the template for harmonized text and coordinate the draft specification.

−One teleconference is scheduled on Thursday June 26th at 7:00 AM ET (8:00 PM Japan and Korea, 12:00 PM Ireland, on the same day). Inter-digital will provide the bridge and webex, which will be announced later.

−The teleconference's agenda includes harmonization leaders’ report of the harmonization process status (which proposals are harmonized and which ones are not harmonized yet according to the list provided above).

**Chang:** Interoperability definition in TGD must not include common mode as a mandatory channel.

**Marco:** Common mode means the mandatory features of a proposal, not a specific channel necessarily.

**Chair:** As there are not remaining issues for the meeting's agenda, the meeting is adjourned until the July 2014 meeting in San Diego, CA, USA.