**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title |  | |
| Date Submitted | [24 September 2011] | |
| Source | [Betty Zhao] [Huawei Technologies Co., Ltd.] [address] | Voice: [ ] Fax: [ ] E-mail: [ ] |
| Re: | [Task Group 802.15.4k Interim Meeting in Okinawa] | |
| Abstract | [Task Group 802.15.4k Minutes] | |
| Purpose | [Official Minutes of the Task Group Session] | |
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# AM2, Monday, September 19, 2011

10:33am Chair called meeting to order

Chair introduced opening report doc. 616-00.

* Chair displayed slide 6 to 10 about IEEE patent policy.
* Chair asked if anyone in the meeting was personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance? There were no responses.

Confirm this week’s presentation schedule doc. 563-01.

Motion: Allow all the presenters in doc. 563-01 to do the presentations at the session.

Moved by Shu Kato, seconded by Seong-Soon Joo.

Motion carries.

Motion: Approve San Francisco session minutes doc. 557-01.

Moved by Ben Rolfe, seconded by David Howard.

Motion carries.

Motion: Approve the amended agenda doc. 563-02.

Moved by Clint, Seconded by Seong-Soon Joo.

Motion carries.

Channel mode presentation doc. 571-00 is presented Lawrence Materum.

Doc. 464-02 is presented by Sourav Dey.

Discussion on whether there’s difference between short-range and long-range channel model.

11:42am Recessed

# AM1, Tuesday, September 20, 2011

8:00am Chair called meeting to order

Doc. 619-01 by Pingping Xu

* Is the point of the proposal to resolve capacity issue or access issue? In slide 11, 8 nodes is much less than 4k capacity.
* A node may not detect other node’s transmission by CCA when all the nodes are sending to one collector, how to resolve the interference?
* In slide 5 who is the receiver here? End-point or coordinator? If coordinator, it’s mains power, so it doesn’t need to sample.
* What is the wake-up sequence and how is it working?
* Which 4k application is batch transmission for?
* It’s better to clarify the above questions in conference calls.
* Pingping Xu will ask proposer Dr. Yao to answer these questions.

Betty presents 0631r1 “Acknowledgement schemes for fragmentation”.

* Questions:
* Sourav (ORW) asks if the enhanced acknowledgement can be large enough that it would need fragmenting? Answer is that we haven’t gotten to that level of detail, but it is possible.
* Shu Kato points out that the “block ACK” from 802.15.3 is similar to the group acknowledge and may have useful parts to adopt also.
* Seong points out that there are other features of 4e enhanced acknowledgment which can be used. Betty suggests this will be investigated.
* A question is asked if the channel change part is applicable to 4k. Betty points out that there may be multiple channels with some PHY proposals, so it is still useful. Pat points out that even in the wide-band proposal, the changing channel conditions may effectively provide multiple logical channels via PHY parameters that may be adjusted.
* A question is asked if the channel is going bad, is it likely the channel change message is lost. [I missed the answer ask Betty to fill in]. It is also pointed out that with a central concentrator, the channel assignment may be asymmetric, i.e. controlled by the concentrator and not dynamic.
* Some discussion on what “channel means” and it is pointed out it can be a collection of parameters not just center frequency.

9:30am Recessed

# AM2, Tuesday, September 20, 2011

10:30am Chair called meeting to order

Doc. 607-01 by M. Al Ameen

* Q: Slide 18’s figure shows that beacon needs to be acknowledged. So is beacon sent directly to each end-point or broadcast? A: Acknowledge the payload in beacon frame and multiple ACKs are returned in different slots.
* C: Store so many beacons by coordinator may cause beacon explosion.
* Slide 39, explanation on why more slots leading to less energy consumption and less collision.
* Q: Slide 38, 10000 endpoints use 128 slots, if two end-points choose one slot, they may collide. A: Subsequent collisions are not guaranteed.
* Q: What about claim for EAP at the same time. A: No such many collisions occur by simulation, emergency is a special case.
* How to transfer application-specific parameters to MAC and keep MAC simple at the same time?
* The proposer is not in favor of CCA, because its failure rate is high.

Doc. 589-00 by Ben Rolfe

* Q: In theory 2047 bytes, but in actual LECIM cases small packet size to 1 byte, what about fragment efficiency? A: Fragmentation usage depends on application.
* Q: Collector receives PPDU, how does it know it’s fragment or a frame, which can’t be figured out by 2011 device. A: A couple of ways can achieve it by MAC in next step. Proposer will look to it.
* Q: Immediate ACK may cause a lot of transmission from collector to end-points?
* C: Slide 27, 16-bit FCS is good.
* Slide 35, fragment validation means FCS, MIC, etc.
* How CID is assigned? CID is assigned during association procedure, and end device will keep it all the time.

12:30pm Recessed

# PM1, Tuesday, September 20, 2011

1:40pm Chair called meeting to order

Doc. 627-00 by Sourav Dey

* Question: on spreading factors (slide 18) consider that sampling must be 2X data rate. Why chose BPSK? Why differential? For simple receivers. Slide 18 chipping rate is consistent. Q: Benefit of BPSK? A: For simple receiver implementation
* Question: interleaver, what is the separation? Depends on packet size.
* Question: modulation, constant envelope wasn’t chosen why? Could be investigated
* Question: slide 11, coding gain, ADC bits? Floating point, e.g. infinite
* Q: What about OQPSK, GFSK, etc.? A: They are potential candidates.
* Comments on slide 11 and 13
* Q: In the proposal the bandwidth is 2MHz, so what about 1KHz~1MHz, compliant with FCC rules? A: The proposer has less than 1MHz experiment and lower chip rate.
* Q: How to deal with near far effect? A: LQI based on that, end-point and collector can share it.
* Q: TDD or FDD between collector and end-point? A: Symmetrical PHY, TDD. End-point synchronizes with collector.
* Proposer is open to other options.

Doc. 623-01 by Shu Kato

* Clarification of ‘way side’ (with power) and slide 18’s path loss, Rx power and Tx power.
* Slide 16: there’re not many way- side stations under a base station. So the number of slots is enough.
* Q: Channel model is different from other applications in 4k and very US focus. A: There’re other countries have the same problem and requirement.
* Discussion on the possibility of an interest group formed for this, or is 4k an appropriate TG for this application.

Straw poll: Is PTC requirements in doc. 623-01 on the current path of TG4k?

Yes 0 No 11

3:00pm Recessed

# PM2, Tuesday, September 20, 2011

4:00pm Chair called meeting to order

Doc. 611-01 by Kyung Sup Kwak

* Comments on the simulation of slide 10 & 17
* Q: Why the band is narrow band per slide 22 bullet 1, but not narrow per slide 9 and FCC?
* Q: Why choose 1.28Mcps?
* Q: How to set up spreading factor? Is it fixed? A: Depending on application, there’s … scheduled spreading factor.
* Q: Which modulation is pursued (slide 8)? A: BPSK.

Doc. 606-01 by Yong Li

* Q: For emergency transmission, is MAC based on CSMA or TDMA? A: Combination
* Q: Slide 10, how does one device know whether a slot has been allocated by another device? A: By beacon
* Q: One slot is allocated to more than one device? A: Yes.
* Q: So what about more than one device wakes up at the same slot to transmit? A: Coordinator has the management function.

5:00pm Recessed

# AM1, Wednesday, September 21, 2011

8:07am Chair called meeting to order

Doc. 609-01 by Mi-Kyung Oh

* Q: Slide 18 what’s the justification of the spreading scheme? How about comparison between this and rate 1/4 coding?
* Q: Slide 14, inter-symbol interference? A: Will give simulation results next meeting.
* Q: Packet by packet beam forming?
* C: Slide 19, some of the spreading factors and date rates violate FCC rules. A: will check them.
* Simple spreading scheme is selected because of its energy efficiency.
* Q: Could security encryption be re-used to perform the function of the data whitening? A: Yes.

Doc. 629-02 by Shusaku Shimada

* C: Slide 45 Tx antenna gain seems higher than most countries’ regulation.
* Q: Is the high antenna gain from beam forming? A: No
* Q: Slide 2 part 1 is out of 4g baseline now, so how to extend it? A: 4g draft text can be referred by copy-paste manner.
* C: Should consider the power consumption/battery life of OFDM
* C: BPSK and OQPSK are same only on certain channel, not other channels.

10:00am Recessed

# PM1, Wednesday, September 21, 2011

13:31 chair open

Shu Kato presents 15-0641-02

Question:

* Why CSMA for low power MAC? Presenter showed a graph showing the energy ratio vs. number of non PNC devices.
* 400 – 420 band - proposing DSSS at low data rate? Not 8.5 kb/s
* maximum hops is one (i.e. one hop beyond)
* as to the declaration that star network nodes can be cheaper, why?
  + Mesh requires a device to send/receiver packets for other devices, hence extra energy requirements
* Spreading factor of 1 – 10,000? Yes
* Dynamically assigned? Yes
* Lower end of bit rate…100 b/s, how did you reason it to be the appropriate low data rate? Applications don’t require high capacity.
* New MAC or 4e MAC?
  + If different MAC than 4e MAC is necessary then new MAC
* Duty cycle limit? Determined by application Latency limit? Determined by application
* Double layer network—how can switch between layers? Beacon will help to synchronize
* Look at overhead, could be an issue for double layer

Matt Johnson presented 15-11-0602-00

Question:

* Slide 16: CRC is not affected by # of endpoints. R- higher # of endpoints realizes more messages thus increasing # of falses
* Slide 34: how was data taken? measurements over 3 days using average of maximum RSSI, antenna heath of 7.5 – 8 m above ground
* Number of hops for one channel, how much gain? frequency diversity gain of 3- 4 dB, avoiding nulls and gaining capacity
* Slide 11: every 5 minute transmission
* Slide 15: network ID 8 or 16 bits
* Smaller addresses? 32-bit would work but 64-bit is mandatory
* Optional data rate – one network may choose different up vs. downlink
* Operating at higher data rates would be chosen if possible
* No FEC? No, FEC really didn’t significantly help the nodes with very small SNRs
* No ack? For meter device w/o power, the device’s energy would be better spent in sending multiple times rather than receiving
* Coherent or differential? Access point could be coherent
* Transmission range? 3 km as per slide 33
* Asymmetric links are typically more Uplink limited

# AM1, Thursday, September 22, 2011

8:07am Chair called meeting to order

Doc. 597-01 by Seong Soon Joo

* Q: Any specific PHY for the proposed MAC? A: Not at this moment.
* C: Slide 15, the calculation related to beacon interval seems to be inaccurate.
* Q: Slide 16, how is the multiple beacon mode to be scheduled for multi-thousand end-points?
* Q: How to handle event signal in the proposed scheme? A: Without synchronous with coordinator, transmit the event data using CCA.
* Q: What’s the accuracy of time stamp? A: Depends on applications.

Doc. 630-02 by David Howard and Sourav Dey

* Q: Will it increase complexity? A: Maybe more complexity for coordinator, but easy for the air link.
* Clarify the scheme of when to wait for ACK: For the first 4 fragments, end-point doesn’t wait for ACK. Since the fifth fragment, end-point waits for ACK after sending each fragment until ACK is received.
* Q: Channel coding on top of this RS scheme? A: For special PHY it is.
* Clarification of ‘multicast’: one block multiple uplinks
* In hybrid mode, ACK may fail. If ACK fails, sender keeps transmitting.

10:01am Recessed

# AM2, Thursday, September 22, 2011

10:30am Chair called meeting to order

Doc. 605-01 by Jean Schwoerer

* Q: Any particular reason to choose TSCH rather than channel hopping scheme in DSME? A: Open to all the choices, here is for illustrating compatible with 4e MAC.
* Q: How to control transmission power? A: No particular means.
* Q: Symmetrical between uplink and downlink?
* Slide 13, gateway is a coherent receiver, end-point is not.
* Clarification and comments on channel hopping modes used here

Doc. 596-00 is presented by Betty Zhao instead of the proposer Wilson Wang.

Doc. 591-01 is presented by David Howard instead of the proposer Wilson Wang.

12:11pm Recessed

# PM1, Thursday, September 22, 2011

1:31pm Chair called meeting to order

1:31pm ~ 2:30pm PHY panel discussion

2:30pm ~ 3:30pm MAC panel discussion

3:30pm Recessed

# PM2, Thursday, September 22, 2011

4:07pm Chair called meeting to order

Discussion about the next step of merging proposals and TG schedule

5:00pm Recessed