# IEEE P802.15
# Wireless Personal Area Networks

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **TG3 LB12 St. Louis comment resolution** | |
| Date Submitted | [11 March, 2002] | |
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| Re: | [] | |
| Abstract | [This document is an additional record of comment resolution of LB12 completed in St. Louis.] | |
| Purpose | [To provide a record of comment resolution, particularly for comments that are resolved based on the resolution of prior comments.] | |
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# 1. Comment resolution order

## 1.1 Results of email comment resolution

Forgot suggested resolution of 1294:

1294 (Roberts, TR): Mention is made of a trusted relationship. The standard must explain how that trusted relationship is established. Suggest accept in principle, “The 802.15.3 committee is going to issue a CFP, evaluate and choose a mandatory cipher suite for DEVs that implement security.”

Comment numbers 35, 34, 400, 401, 403, 404, 405, 406, 407, 409, 410, 411, 412, 415, 416, 438, 440, 441, 760, 1184, 1187, 1189, 1194, 1201, 1207, 1208, 1211, 1215, 1217, 1218, 1219, 1279, 1280, 1281, 1283, 1285, 1286, 1287, 1288, 1289, 1294, 1594, 1592, 1595, 1598, 1599, 1625, 1626, 1627, 1630, 1654, 1726, 1727. See 02/075r15 for resolutions.

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## 1.2 March 11, 2002

301 (Gilb, T): Need a figure to show how the bit ordering is used in the figures that follow. Add the figure once it has been generated and reviewed. Figure should have multiple fields with LSb and MSb indicated for each of the fields, an indication of the order in which they are sent over the air and an example of a simple command or information element with specific values. Suggest accept in principle, “A figure will be created that indicates the bit ordering in the fields and in the overall frame. Also include some sample frames with the associated bits to the informative annex B with a cross reference to them in clause 7.

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1628 (Shvodian, T): Need to add a text on how asynchronus data will be efficiently handled. Need to specify how asynchronous data will be handled in a scheme that is both power and bandwidth efficient.

Table, WMS to supply text by 10 March, 2002.

56 (Bain, T): Is there a case where an open MTS is less than one per superframe? If so, is there appropriate wording to change the responsivness of the PNC to requests for change. I believe that up to 4 superframes may pass from CTR till CTA reflecting the change. The 4 superframe lag is long already. It should not go beyond that. put the appropriate SHALL to keep the lag from CTR (or Stream) till CTA from getting higher than 4 superframes when MTS is used. Suggest that Jay make a better suggestion.

> Text from Jay Bain, “pg 151 line 6, ‘For PNCs allocating open MTSs at less than the superframe rate, the PNC shall remain obligated to respond to a channel time request within four superframes from when the requesting DEV would have made the request had the open MTS been present.’

### 1.2.1 Gap with no CAP

1346 (Schrader, T): The text should elaborate on the Non-CAP case, especially with regards to processing time for the beacon. If the CAP is not present there must be a gap or unallocated time slot allocated to allow all deviecs to process the information in the beacon. If the amout time is not specified, a PNC may assign slots before a device can interpret its CTA. Indicate in the text that a minimum size CAP will be assigned even for the MTS only case, where the CAP will serve only as a gap between the Beacon and the GTS slots. Suggest accept in principle, “Indicate in the text that the PNC shall not allocate any time slots within aNew-Parameter time of the end of the beacon.”

Table

57 (Bain, T): In the absence of CAP, the first GTS is bumped against the end of the beacon. The development of real implementations of this standard may be hindered if the parsing of the beacon body must occur in the very few microseconds available. Provide guidance to implementers but also place a minimum time till the beginning of the first GTS in the absense of CAP. If a PNC to DEVs MTS is always present, then this would not be a problem. Suggest accept in principle, “Resolve as indicated in 1346.”

Table, proposals due by March 6.

### 1.2.2 Del-ACK and fragmentation

1564 (Shvodian, TR): Fragmentation and defragmentation should not be in the MAC. It will overly complicate the designs and require large per-stream buffers. Fragmentation should be done at the convergence layer. Move Fragmenation to the convergence layer. Suggest reject, “Fragmentation is required for commands as well as data. The standard specifies the logical requirements of the protocol, not the archictecture. Regardless of where the functionality is described in the draft, the implementer is free to put that functionality anywhere in the final architecture. For example, if fragmentation/defragmentation is the first/last things done to data in the MAC (which is up to the implementer to design), then it could easily reside with either the MAC or the convergence layer in the implementation. However, while it could be put into either, there are three reasons why fragmentation belongs in the MAC: 1) fragmentation is required for commands, which generally do not travel to the convergence layer. 2) Fragmentation can be used to overcome difficulties in the channel, e.g. interferers. The channel information is monitored by the DME, not the convergence layer. 3) The fragmentation specification needs to be the same for all of the potential convergence layers or else it would not be possible to send from one DEV that is using one CL while the receiver is using another CL. Placing identical definitions for the same functionality in more than one location in the draft will lead to incompatibilities, make it difficult to maintain the standard and make it harder to implement more CL’s.”

Table until Monday afternoon.

1464 (Shvodian, T): Get rid of Delayed ACK. This will unnecessarily complicate the MAC to implement. We should keep a WPAN as simple as possible. Eliminate Delayed ACK. Suggest reject “The use of delayed ACK greatly increase the throughput, particularly at higher data rates. Because of this, the task group feels that the added complexity is justified by the increased throughput.”

Table, waiting on the 1564.

1151 (Roberts, T): In general, this paragraph deals with sending the delayed ack. The sentence at line 18 that beguns "However the recipient ..." since it implies a DEV should send a delayed ACK at the expiration of the retransmission window. My question is this ... do you sent this at the expiration only if not previously send or do you send it again regardless. MAC committee to comment and clarify text if necessary.

Table, waiting on the 1564.

1570 (Shvodian, TR): DEVS cannot reject a delayed ACK. This must be from when we were calling them "retransmission requests" Change the paragraph as follows: "When Del-ACK is used for a stream, the DEV transmitting the data frame may abort retransmssion attempts once the negotiated retransmission window for the stream has been reached. When retransmissions are aborted, the DEV transmitting the stream shall send transmission sequence sync command, as defined in 7.5.9.2, to the recipient of the stream in order to synchronize the delayed-ACKs."

Table, waiting on the 1564.

### 1.2.3 Tripartite negotiation

1434 (Shvodian, TR): Eliminate tripartate negotiation. bipartate negotiaon between the PNC and DEV is all that is needed.

Table

1120 (Schrader, T): This comment supplements as suggestion for adding stream management command in section 7.5.10.3, page 133 for final confirmation or acceptance of stream connection. One of the primary purposes of the stream connection process is to determine if the originator and the target agree on a single set of QoS parameters. As currently proposed the communication flow is: Originator->PNC->Target->PNC->Originator. The originator will then reply to only to the PNC only if it rejects the Targets modified QoS values. The trigger that starts PNC generation of time slots should be a response from the Originator to the PNC conThe stream connection process involves the PNC to determine if it can provide the GTS slot allocation requested, and the two peers must agree on a set of QoS parameters. As currently proposed the communication flow is Originator->PNC->Target->PNC->Originator. The originator will then reply to only to the PNC if it rejects the Targets modified QoS values. The trigger for PNC generation of time slots should be a response from the Target to the PNC confirming acceptance of the final QoS parameters relayed from the Target, not the absence of any negative response. The following is a rewrite of lines 12-27 on page 153. Either the sending DEV or the intended recipient DEV for the new stream may send a stream management command with the request for stream connection. The process of stream connection is illustrated in Figure 88. In this figure, DEV A is the originator of stream connection request and DEV B is the target, consistent with the stream management command section 7.5.10.3. In all stream management communications from the PNC to the other involved DEV, the PNC appropriately changes the value of the direction field to imply the same direction of the stream as originally requested. The values for direction, security, stream type and priority shall be non negotiable and are decided by the DEV A that is sending the stream connection request. These values shall not be changed anytime after the first transmission of the command frame containing the request for that stream. The target DEV B responding to the forwarded stream connection request may modify the remaining QoS parameters including bandwidth and latency requirements. All the bandwidth and latency related requirements of the stream shall be confirmed or rejected by the originator of the stream connection request in response to the final PNC acceptance message. The PNC decision on the values of the stream QoS parameters that are supported in the piconet shall be final. If the originating DEV A does not accept the PNCs final stream parameters, then DEV A shall send a stream management command to the PNC with action type set to disconnection/rejection as specified in 7.5.10.3. Then the PNC shall then send a stream management command to the target DEV B with action type set to disconnection/rejection. Otherwise, DEV A shall send a stream management command with a final confirm/accept action type, and the PNC shall then begin generating ACTIVE type CTA elements and GTS timeslots as specified upon receipt of this command. Suggest that this comment wins the prize for longest comment.

Suggest accept in principle, “Change the paragraphs ‘Either the sending ... set to disconnection/rejection’ in lines 12-27 on page 153 to read

> ‘The source DEV for the new stream may send a stream management command with the request for stream connection. The process of stream connection is illustrated in Figure 88. In this figure, DEV A is the originator of stream connection request and DEV B is the target of the stream management command. In addtion, the originator the command is also the souce of the stream while the target of the command is the destination of the stream.
>
> The values for direction, security, stream type and priority shall be non negotiable and are decided by the originating DEV. These values shall not be changed anytime after the first transmission of the command frame containing the request for that stream.
>
> The target DEV responding to the forwarded stream connection request may modify only the receive window size. Any change the receive window size of the stream shall be confirmed or rejected by

the originator of the stream connection request in response to the final PNC acceptance message. The PNC's decision on the values of the stream parameters that are supported in the piconet shall be final.

If the originating DEV does not accept the PNC's final stream parameters, then the originating DEV shall send a stream management command to the PNC with action type set to disconnection/rejection as specified in xref 7.5.10.3. Then the PNC shall then send a stream management command to the target DEV with action type set to disconnection/rejection. Otherwise, the originating DEV shall send a stream management command with a final confirm/accept action type. The PNC shall then allocate the GTSs via CTAs in the beacon.'"

Table.

378 (Gilb, T): Since the direction field is constant during the negotiation (since the target and originator addresses are now included), this sentence is incorrect. Delete the sentence "In all stream management ... as originally requested." Suggest accept in principle, "Resolve as indicated in the resolution of comment 1120."

Table.

### 1.2.4 Stream managment cleanup

1563 (Shvodian, TR): "All the bandwidth and latency related requirements of the stream shall be negotiated between the sender of the stream and the PNC. The PNC decision on the values of the stream QoS parameters that are supported in the piconet shall be final." The PNC knows nothing about bandwidth. It only knows about channel time. I don't think these QoS parameters should be negotiated at the MAC, but if they are the other DEV should have the oportunity to negotiate the values down.

Table.

602 (Heberling, TR): The MLME-CHANNEL-TIME.request, indication,response and confirm are missing. Please insert clauses 6.xxxx from 01/410r1 into the space just before clause 6.3.13 Stream creation.

725 (Heberling, TR): The Channel Time request command is inadequately defined for the functions required of it in this protocol. The Channel Time request command clause in doc 02/037r0 provides detailed resolution to this issue. Suggest accept when 02/037r0 is ready for review.

Table pending 01/469r3, discuss 8 am 11 March 2002.

726 (Heberling, TR): The Stream managment command is an inordinately complicated frame command for the functions it is needed in this draft. Replace the Stream managment command with the upgraded Channel Time request command described in doc 02/037r0. Suggest accept when 02/037r0 is ready for review.

Table pending 01/469r3, discuss 8 am 11 March 2002.

1716 (Song-Lin, TR): It is confusing that this command seems suggesting a DEV seeking to communicate with target DEV needs to use this command, even if after a stream connection has been established. While CTA for one stream is assigned at the end of stream conection (Fig.3). Clarify if this command is used in conjunction with stream management command for establishment of communication and required for allocating time slots for the stream. Suggest accept when 02/037r0 is ready for review, "Documents 02/100r3, 02/115r1 and 02/037r0 will be used to modify the stream management and channel time request commands. The commands will be merged into one set of commands to allocate time and to manage streams."

Table pending 01/469r3, discuss 8 am 11 March 2002.

### 1.2.5 PNC selection process.

670, 704, 723, 724 (Heberling, TR): PNC selection, request to change the previously accepted process, see document 02/037. (tagged PNC selection).

174 (DuVal, T): Diagram hard to read. How does this diagram relate to the previous paragraph? Where are the terms aCSFrameRepeat and aCSFrameBroadcast in this diagram? I would like to see their timing relationships.

1526 (Shvodian, T): Why bother with PNC selection at all? Now that we can do handover if a better PNC shows up, Just wait a random time and start sending out beacons. This would be a much simpler process. Also, the odds of turning on a bunch of machines all at the exact time is small. Eliminate PNC selection and simplify by just waiting a random amount of time then start sending out beacons. Then, handover if more qualified PNC.

Table, text due on 11 March, 2002

### 1.2.6 Piconet shutdown

1529 (Shvodian, TR), 597 (Heberling, T): Piconet shutdown element. (tagged PiconetShutdown)

Table, text due on 11 March, 2002

### 1.2.7 Power management

1185 (Roberts, T): We talk about EPS sets ... but this is still vague. Perhaps a figure should be added to illustrate the concept. This figure should go into clause 8.13.3.1. The figure can be generated with help from the Power Management subcommittee. “A figure that illustrates the relationship between the WAKE beacon and WAKE superframe will be added based on document 02/115r1”

41 (Bain, T): Should provide clarification on recovery from incorrect beacon. Add: This may as simple as dealing with a PNC that is checking another channel for better rf conditions. It may also be that the PNC has changed the superframe duration while a DEV was not awake. Procedures outside of EPS power management process are used to recover. Suggest accept.

1210 (Roberts, TR): Line 10 indicates that the EPS DEVs recognize an error condition. How is this done? Via Table 2 ReasonCode? The ReasonCodes in Table 2 are not defined. Refer to Power Management folks.

1213 (Roberts, T): Line 12 refers to a "recovery operation" Where is this recovery operation described. Supply reference clause. Suggest accept in principle, “Resolve as indicated in the resolution of commnet 41.”

1633 (Shvodian, TR): The beacon count of the next awake beacon for every member of the EPS set will not be synchronized. By the time the requestor gets the information, the Beacon pointed to may already have passed. The requesting DEV will think that it has to wait for 2^16 cycles of the beacon counter. Find a way to eliminate the need to use a frame request that ties to real time data like a beacon number.

#### 1.2.7.1 Broadcast traffic in SPS and APS modes.

1584 (Shvodian, TR): How is broadcast traffic handled when a device is in EPS mode? Is the PNC forced to perform repeater service to every DEV that is in EPS. Need to decide how to handle broadcast traffic when devices are in EPS mode since TCP/IP uses broadcast.

1209 (Roberts, T): In line 170, reference is made that the "PNC shall save these for the next superframe". Does this mean these have to be buffered by the PNC? Refer to the power management folks. How is the size limit of this buffer specified?

#### 1.2.7.2 General comments on PM

1724 (Rofheart, TR): The power management method is overly complex and vague. Refer to the remedy indicated by Bill Shvodian.

1629 (Shvodian, TR): A complex power management solution has been specified, but we need a very simple approach that will be useful for very low power devices that are not. If the current apprach stays it sould be optional, and we should add a low-complexity solution as an alternative. I will be proposing a low complexity power management solution. Suggest accept in principle, “The power management section is going to be rewritten based on proposals 01/384r2, 02/067r1 and the minutes.”

Table, waiting for text.

### 1.2.8 SIFS, range or value?

1567 (Shvodian, TR): "The start of transmission of the response data frame shall start at the end of a SIFS, like an Imm-ACK frame transmission." This is inconsistent with the previous section which says that Immediate ACK is sent within a SIFS. Need to clarify the use of SIFS. Suggest accept in principle, “The previous section that said that the Imm-ACK ‘shall start within a SIFS duration’ has been changed to be ‘shall start a SIFS duration’ as part of the resolution of comment 1543, which is now consistent with the current section.”

Table

### 1.2.9 Modified association protocol

1601 (Shvodian, TR): A AssocRespConfirmTime of 5 ms is too short. There may not be any CAP or GTS slot time to respond and the PNC may be busy. Change AssocRespConfirmTime to 2 superframe durations. Suggest accept, “Change the value of aAssocRespConfirmTime to be 2*aMaxSuperframeDuration.”

Table, include in modified association process proposal, 02/109r0 outlined proposals, text in 02/037r0 which will be due Sunday night.

576, 662, 717, 718 (Heberling, TR), 661 (Heberling, T)

719 (Heberling, TR): Suggest change to current association process. (tagged AssociationInfo)

721 (Heberling, TR): Change broadcasting DEV (now CTR) information description. (tagged AssociationInfo)

Skipped

### 1.2.10 PNID related issues

(tagged PNID)

1524 (Shvodian, T): Piconet randomization does not address if the PNID is the same each time the piconet starts, or if it chooses a different random PNID each time. Clarify if each PNC calculates the same random number each time they generate a PNID, or if it is different each time. Resolve with 1467.

1467 (Shvodian, TR): "The PNID remains constant during the current instantiation of the piconet and may be persistent for multiple sequential instantiations of the piconet by the same PNC." "May be persistent"? How is it determined if it is persistent? Up to the implenter? Do PNCs always use the same PNID? Need to describe the details of persistence of the PNID. Suggest ?

800 (Kinney, T): There is a possibility of duplicate network id's. A device will check to see if there are any similar ids but this search cannot be 100% sure, additionally, a PAN may walk into another's coverage area. I did not see any detection nor resolution of this event. Describe the techniques to detect network id duplication and the procedures to resolve it. Suggest accept in principle, “The beacons in any piconet are unique since they contain the PNCs address. However it is possible for a DEV to hear packets from adjacent piconets that are using the same PNID. Add to the end of the paragraph in subclause 8.2.2 the following sentence, ‘However, when a DEV starts a piconet, it shall not use a PNID that was found in the scan that was used to start the piconet.’”

Table, looking for additional suggestions from the committee.