IEEE P802.15
Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)	
Title	**TG3 LB22 comment resolution**	
Date Submitted	[11 November, 2002]	
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Re:	[]	
Abstract	[This document is a record of comment resolutions for LB22.]	
Purpose	[To provide a record of the comment resolution for LB22.]	
Notice	This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
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1. Comment resolution in Kauai

1.1 Tuesday, 12 November, 2002

Meeting called to order at 8:05 am HAST.

CID 8 (Bain, T) - The wake beacon interval and next wake beacon should be set to zero for set 0 by the PNC and ignored on reception. Separate the text of PSPS and HIBERNATE with regard to unused fields for HIBERNATE.

> Accept in principle, “Add to then end of the paragraph on page 158, lines 17 and 18 ‘Note that the wake beacon interval has no interpretation for PS set 0, {xref 8.13.3}.’ Add to then end of the paragraph on page 158, lines 20 and 21‘Note that the next wake beacon has no interpretation for PS set 0, {xref 8.13.3}.’”

CID 92 (Heberling, TR) - Editorial, move text around, add clarification in shutdown and handover that the beacon announcements are done as indicated in 8.6.4.

> Accept in principle, “Editorial mistakes here, One page 165, line 20, change ‘shutdown announcement’ to be ‘handover announcement’, (Ed. note, ‘enought’ is misspelled). The text on page 171, lines 37 and 38, is redundant now with the change for beacon announcements, so change the sentence to be a cross-reference, i.e. change ‘The PNC shall ... down the piconet.’ to be ‘The PNC shall ensure that the shutdown announcement complies with the rules for beacon announcements in 8.6.4. The only exception to this requirement is if the PNC will be shutting down and does not have enough time to to wait for the next system wake beacon to complete the handover process.’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 180 (Heberling, TR) - [PNC_HndOvr] aMaxLostBeacons used for minimum repetition of IE, but in 8.6.4 we has specified it to be aMinBeaconInfoRepeat. Change here accordingly/KO replace aMaxLostBeacons with aMinBeaconInfoRepeat and change "following that system wake beacon" to "including that system wake beacon"

> Accept in principle, “The sentence is redundant since the beacon announcement requirements are given line 20 of the same page. Delete the sentence ‘The PNC shall ensure that the beacon countdown includes at least one system wake beacon and at least aMaxLostBeacons beacons following that system wake beacon.’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 93 (Heberling, TR) - Editorial changes:

> Accept in principle, “Change the shape of the optional ACL handover MSC reference to be a rounded edge box and extend it to cover both the PNC and DEV-1. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 21 (Gifford, T) - As I stated in LB19 802.15.3/D11 CommentID: #10, the title is incorrect. Specifically, "Part 15" should be "Part 15.3". I suggest: Draft Standard for Information technology- Telecommunications and information exchange between systems- Local and metropolitan area networks Specific requirements-

Part 15.3: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for High Rate Wireless Personal Area Networks (WPANs)

Please make the change globally.

Additionally, and in terms of the LB19 CommentID: #10 rejection, I understand the PAR issue but I think this is a clear editorial issue and we have WG precedents to apply the editorial suggestion. Here are some issues to consider in this rebuttal

1. The 802.15.3 PAR is incorrect and is in conflict with itself and should state the previously mentioned item in the title section i.e., "2. Assigned Project Number [P802.15.3]" or section 4 should state "...Part 15.3...". http://grouper.ieee.org/board/nescom/802-15-3.pdf

2. An example is the 802.15.1 PAR which TG3 copied and is why you have the error in the first place :). When 802.15.1 got to Sponsor Ballot the PE said 15.1 was ok cuz (a) we had a corrigendum: http://ieee802.org/secmail/msg00600.html and (b) implicitly it was necessary to add the dot level based on the 15.2, 15.3, 15.4, etc. approvals. http://ieee802.org/15/par.html

3. Specifically, having the 802.15.1(TM)-2002 published sets a precedent as our PAR says "Part 15..." but we are published with "Part 15.1..." http://grouper.ieee.org/board/nescom/802-15.pdf

Note: 802.15.4/D17 is in Sponsor Ballot with "Part 15.4..."

4. If you release the 15.3 Draft to Sponsor Ballot there might be an issue and someone might object BUT I think going forward w/ the title as-is is a bad idea. For example the 3rd of the 802 five criteria "Distinct Identity" will be problematic if the IEEE titles are NOT distinct and/or inconsistent in the WPAN Standards Family: http://ieee802.org/3/rules/rules.html#P72

Note: I applied (Session #20) the latest edit to the 802.15.3a DRAFT PAR because of this very issue and after careful review of other approved Alt PHY Layer Standards and their titles: http://ieee802.org/secmail/msg02824.html

In terms of the next step I suggest you ask Jennifer Longman what her opinion is i.e., leave as-is, apply edit, submit a corrigendum to the 802.15.3 PAR, etc.

Finally, I think just from a publishing and distribution point of view it will become confusing - make the edit. If the Editor or Chairs need to change the PAR then please do so, however, the approved IEEE Std 802.15.1-2002 states "Part 15.1" and the PAR does not. It was not an issue for RevCom and the StdBD so it should be an easy edit to apply to keep our family of standards consistent.

> Accept in principle, “The TG will start the process to create either a corrigendum or modification of the PAR. When the title is changed in the PAR, we will change the title in the draft to match it.”

CID 26 (Gifford, T) - Again, the text "...20 Mb/s is proposed to be the lowest rate..." and the text on the next page, pg 2, ln 14 "...20 Mb/s or more..." are from the PAR but Clause 11, Table 118, pg 313, ln 14 states "...11 Mb/s...". It is very likely that this inconsistancy (PAR vs. Draft) issue will come up in Sponsor Ballot. A parallel PAR change now will add mimimal to no delay to the project BUT RevCom can add 3-6 months! I suggest that the 802.15.3 Ballot Review Committee (BRC) submit a draft corrigendum 802.15.3 PAR to the TG3/WG for submission to the SEC/NesCom the goal is to update the PAR to change the minimum data rate to "11 Mb/s". Note: The current 15.4 PAR corrigendum is addressing the same issue "The draft says 20 so the PAR should say 20." said Bob H but TG4 decided to act:, http://ieee802.org/secmail/msg02790.html. Here is follow up on the thread: http://ieee802.org/secmail/msg02794.html http://ieee802.org/secmail/msg02796.html.

> Accept in principle, “The current PAR only states that DEVs will support greater than 20 Mb/s, i.e. that the rate will be high enough, 20 Mb/s or more. All DEVs are required to support the 22 Mb/s mode so that this fulfills the requirment. Note that the quoted text says that 20 Mb/s is proposed to be the lowest rate, but it is not a requirement from the PAR. However, as a part of the corrigendum or PAR modification process, the TG will look at the text to see if it can be clarified.”

CID 192 (Heberling, TR) - [Assoc] This should be obvious, but the fact is that a dumb PNC implementation can create problems for other DEVs! Examples are PS status and PCTM. Let's plug this one/KO Add text: "When a DEV is disassociated, the PNC shall reset its bit from all relevant bitmaps in all IEs in the beacon ."

> Accept in principle, "Add to page 176, line 18, a new paragraph 'Note that when a DEV is disassociated, it loses its DEVID and so the PNC will reset the bits that refer to this DEVID in all of the relevant bitmaps, e.g. PS status IE, PCTM IE, CWB IE. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 98 (Heberling, TR) - [CTA] The last sentence "Channel time requests that are ACKed are valid until the next channel time request is made" is only true for asynchronous data, and only if the TrgtIdList bit is set. In all other cases it's false./KOEditorial, delete redundant text. Remove this sentence.

> Accept in principle, "The sentence is redundant since the text in 8.5.1 and 8.5.2 more completely describes the behavior of the channel time requests. Delete the sentence 'Channel time requests that are ACKed are valid until the next channel time request is made.' from page 180, line 38. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 100 (Heberling, TR) - [CTA/Isoch] The last sentence is what happens with asynchronous data if no CTA arrives before the SDU timeout. In the case of ISOCH-DATA, you do MLME-CREATE-STREAM first./KO Delete the last sentence of the paragraph on page 187 line 38-40

> Accept in principle, "The sentence is redundant since the timeout is already described for MAC-ISOCH-DATA in 6.6.5.1. Delete the last sentence of the paragraph on page 187 line 38-40. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 236 (Shvodian, TR) - Why does the MLME timeout for the DME? Why doesn't the DME do it's own timeout. What if the MLME gets a response just after it sends the time out? Does it send the response up the confirm to the DME or abandon it. DME shoudl do it's own timeout. MLME should't be tracking state for the DME request. Elimiate the last sentence in thsis paragraph.

> Accept in principle, "Resolve as indicated in CID 100. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 106 (Heberling, TR) - [Frag] Unclear what "A DEV shall support concurrent reception of fragments of at least three MSDU/MCDUs" means. Is it per stream or totally? Where did this sentence come from?/KO Delete or clarify.

> Accept in principle, "The sentence is unclear, change the sentence from A DEV shall support concurrent reception of fragments of at least three MSDU/MCDUs' to be 'A DEV shall support concurrent reception of fragments of at least three MSDU/MCDUs for all streams, including asynchronous data and commands.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 181 - [ChngParms] aMaxLostBeacons used for minimum repetition of IE, but in 8.6.4 we has specified it to be aMinBeaconInfoRepeat. Change here accordingly/KO replace aMaxLostBeacons with aMinBeaconInfoRepeat and change "following that system wake beacon" to "including that system wake beacon"

> Accept "The sentence is redundant since the exact same requirement is listed in 8.6.4. On page 208, lines 30-31, change 'parameters, the PNC shall ensure that the beacon countdown includes at least one system wake beacon and at least aMaxLostBeacons beacons following that system wake beacon.' to be 'parameters, the PNC shall ensure that the piconet parameter change announcement complies with the rules for beacon announcements in {xref 8.6.4}.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 182 (Heberling, TR) - [ChnlChng] aMaxLostBeacons used for minimum repetition of IE, but in 8.6.4 we has specified it to be aMinBeaconInfoRepeat. Change here accordingly/KO. replace aMaxLostBeacons with aMinBeaconInfoRepeat and change "following that system wake beacon" to "including that system wake beacon"

> Accept “The sentence is redundant since the exact same requirement is listed in 8.6.4. On page 212, line 6, change ‘The PNC shall ensure that the beacon countdown includes at least one system wake beacon and at least aMaxLostBeacons beacons following that system wake beacon.’ to be ‘The PNC shall ensure that the piconet parameter change announcement complies with the rules for beacon announcements in {xref 8.6.4}.’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 162 (Heberling, TR) - [ChnlChng] Change this sentence frag. <from> "...after it has performed a PNC channel scan,8.9.5, and ..." <to> "...after it has performed either a PNC channel scan,8.9.5, or a remote channel scan, 8.9.4, and..." The original sentence is too restrictive in its scope and implies that an implementor can only execute a channel change after performing only a PNC channel scan. Make the indicated change.

> Accept in principle, “Add to page 211, line 38, “Note that in addition to the PNC channel scan, the PNC is able to use other methods, describe above, to determine which channel to use as the new channel.’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 110 (Heberling, TR) - [ChnlChng] Missing text from CID 317/KO Insert text: PNC shall broadcast the piconet parameter change information element, 7.4.6, with the change type set to CHANNEL...

> Accept in principle, “The text in clause 7 indicates that the change type shall be set to CHANNEL when there is a channel change in progress. However, it is good to mention it here as well for completeness. One page 211, line 39, change ‘piconet parameter change information element, 7.4.6, in its current channel’ to be ‘piconet parameter change information element, 7.4.6, with the change type set to CHANNEL in its current channel’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 112 (Heberling, TR) - [PM] The DEV is not forced to be in the AWAKE state during the entire wake superframe, only as described in 8.13. Use the correct text from 02/276r13./KO Change first sentence to: "In the PSPS mode the DEV is only required to listen to system wake beacons and CTAs where its DEVID is indicated as the destination."

> Withdrawn, 12 November 2002.

CID 111 (Heberling, TR) - [PM] range for system wake beacon interval has no lower limit/KO Change to: "The system wake beacon interval shall not be less than 4 and not greater than 255".

> Accept in principle, “The range for the wake beacons is defined in clause 7, but there is no reference Change sentence to “The valid range for requested system wake beacons is defined in {xref 7.5.7.2}.” Also add an xref to the appropriate place for SPS, this is on page 216, line 52, change the explicit definition to an xref since it is redundant and therefore is evil. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 170 (Heberling, TR) - [PM] Please clarify the intent of this sentence which starts with these words: "In the SPS DEV DEV's next wake superframe, ..." <and ends with these words:> "...that is long enough to handle a PS change command and a channel time request command with 4 isochronous CTRBs." Why 4 isoch CTRBs? Please clarify and if need me rewrite to make the intent clearer.

> Accept in principle, “Add a sentence to page 218, line 10 following the paragraph ‘This allows the SPS DEV to request a change to one of the current channel time allocations, to request new channel

time or to request that a channel time allocation be terminated.' After discussion, the commenter agreed that this comment is editorial and not technical."

1.1.1 Security comments

CID 230 (Shvodian, TR) - The channel tiem request command normally requires authentication, but what is the authentication process for neighbor piconets. The piconet group key clearly cannot be exchanged. Clarify how security works with neighbor piconets.

Accept in principle. "Section 8.2, page 161 line 49 defines a neighbor piconet as 'A dependent piconet where the PNC is not a regular DEV in the parent piconet.' Table 53 applies only to regular DEVs in the piconet. Add sentences to 7.5, line 8: 'Since a neighbor PNC is not a regular DEV in the piconet, it sends commands without authentication.'"

CID 245 (Shvodian, TR) - It looks like certificate use has been added for Ntru and RSA. WHy are these not listed as sub-suites in Table 95 as they are for ECMQV. Be consistent. Either add sub-suites for Ntru and RSA or delete them for ECMQV.

Reject. "The specification and content of the ACL is left up to the implementer and as such can contain hashes, keys, certificates, or anything else. The ACL may be consulted as part of an authentication protocol. Subsuites exist for those suites that explicitly use certificates as part of the authentication procedure, rather than as part of the ACL."

CID 9 (Barr, T) - TrgtDEVAddress description is "The DEV Address of the security manager." However, this is only used in the Challenge.request command and the frame format for the Challenge.request command does not include this field. Remove from table and Challenge.request command.

Accept in principle, "A mistake in changing the notiation, in Figure 154, change 'ID_SM' to be 'AD_SM', 'ID_D' to be 'AD_D', AD_SM is required to generate the IC that appears in the challenge request frame.'Also change name of 'TrgtDEVAddress' in table 11 to be 'SMDEVAddress' and in the challenge request command since this name is confusing. Also change 'DEV address' on page 139 in the figure and following text to be 'SM DEV address' to be clear. After discussion, the commenter agreed that this comment is editorial and not technical."

1.1.2 More comments

CID 126 (Heberling, T) - [CTA/Isoch] Rename the SPSSetIndex parm to PSSetIndex since that is how the various PS sets are referenced now. Please make the requested change.

Accept, "The name in this location could be better, so change as indicated. Also add the clarification that HIBERNATE and PSPS are not allowed values for this set index. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 129 (Heberling, T) - [CTA/Isoch] Rename the SPSSetIndex parm to PSSetIndex since that is how the various PS sets are referenced now. Please make the requested change.

Accept, "The name in this location could be better, so change as indicated. Also add the clarification that HIBERNATE and PSPS are not allowed values for this set index. Change the appropriate location in clause 6 as well (6.3.18). After discussion, the commenter agreed that this comment is editorial and not technical."

CID 7 (Bain, T) - In figure 92, each structure is noted as 37 octets in length. In figure 93, the DEVID bitmap is 1 to 32 octets in length so the each structure may take on values of from 8 to 37 octets. The Length calcu-

lation requires change. Change the headers in figure 92 to be "8 to 37" in two places.Change the Length formula to (1 + sum of PS set structure 1 through PS set structure n)).

> Accept in principle, “An editorial change since the following figure indicates the correct range. Change ‘37’ to be ‘8-39’ in the figure. Also change the total length to be ‘ (1 + sum of PS set structure 1 through PS set structure n)’. After discussion, the commenter agreed that this comment is editorial and not technical.”

Recessed at 10:11 am HAST

Status at 10:30 am HAST, T & TR 64, TR 44, T 20, E 121

Called to order at 10:43 am HAST.

CID 117 (Heberling, TR) - [CTA/isoch] support of pseudostatic streams are not mandatory, while support for an isochronous stream (would imply dynamic) is./KO Add two subrequirements to MLF13. 13.1 dynamic isochronous stream, 8.4.4.1, M 13.2 pseudo-static isochronous steam, 8.4.4.1, O.

> Accept in principle, “The description in the table is not clear while the text in clause 8 does describe this correctly. Change ‘Isochronous stream - at least one’ to be ‘Isochronous stream in a dynamic CTA- at least one’ After discussion, the commenter agreed that this comment is editorial and not technical.”

1.1.3 Fragmentation

CID 202 (Roberts, TR) - Delete the "preferred fragment size" sub-field from the DEV capabilities field of the capability information IE. There were no CIDs from LB-19 that requested this addition. If the TE felt this was a necessary item to address why wasn't it raised as a comment during LB-19? No CID, no discussion, no to its inclusion. Make the deletion.

> Accept in principle, “On page 129, line 6, change ‘that indicates the MAC frame size preferred’ to be ‘that indicates the maximum MAC frame size preferred’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 137 (Heberling, TR) - [Frag] Delete the "preferred fragment size" sub-field from the DEV capabilities field of the capability information IE. There were no CIDs from LB-19 that requested this addition. Arbitrary additions by the TE are abominable. If the TE felt this was a necessary item to address why wasn't it raised as a comment during LB-19? No CID, no discussion, no to its inclusion. Make the deletion.

> Accept in principle, “Resolve as indicated in CID 202. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 203 (Roberts, TR) - Delete this sentence: "A dEV indicates its preferred fragment size for reception in the preferred frament size field in the capabilities IE,..." There were no CIDs from LB-19 that requested this addition. If the TE felt this was a necessary item to address why wasn't it raised as a comment during LB-19? No CID, no discussion, no to its inclusion. Make the requested deletion.

> Accept in principle, “Resolve as indicated in CID 202. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 154 (Heberling, TR) - [Frag] Delete this sentence: "A dEV indicates its preferred fragment size for reception in the preferred frament size field in the capabilities IE,..." There were no CIDs from LB-19 that requested this addition. Arbitrary additions by the TE are abominable. If the TE felt this was a necessary

item to address why wasn't it raised as a comment during LB-19? No CID, no discussion, no to its inclusion. Make the requested deletion.

> Accept in principle, "Resolve as indicated in CID 202. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 73 (Heberling, T) - [Assoc] Capability Field is not part of the DEV association IE. Consequently, delete this parm from the MLME-DEV-ASSOCIATION-INFO.indication primitive's parm list. After making the deletion, add DEVDataRates parm to the the list.

> Accept in principle "The name of this field was changed from 'capability field' to 'supported data rates' so change 'CapabilityField' to 'SupportedDataRates'. Add 'SupportedDataRates' to the table, xref 7.4.12 for valid range and type and the definition 'The data rates supported by the associating DEV.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 76 (Heberling, T) - [ASIE] OUI may be same for several calls to MLME-CREATE-ASIE.request Even if not, it's easier to all with an index when you want to remove the IE. /KO Add parameter to MLME-CREATE-ASIE.request: "ASIE-index", integer type, range is application specific.

> Withdrawn, 12 November, 2002.

CID 77 (Heberling, T) - [ASIE] OUI may be same for several calls to MLME-CREATE-ASIE.request Even if not, it's easier to call with an index when you want to remove the IE. /KO Add parameter to MLME-CREATE-ASIE.confirm: "ASIE-index", integer type, range is application specific.

> Withdrawn, 12 November, 2002.

CID 131 (Heberling, T) [PM] Please clarify the PSActiveEvent parm. There does not seem to be any correlation betwen the enumerations and the parm passed in the ps-mode-change command, 7.5.7.1. Please make the requested deletion.

> Accept in principle, "The use of this MLME is described in clause 6, but it is not clear when you read clause 8 why it is used. Therefore, add a sentence to the end of 8.13 to point to the usage of this MLME that is defined in clause 6, 'If the DEV MLME changes its PS mode to ACTIVE without the prompting of the DME, it notifies the DME with the MLME-PS-MODE-ACTIVE.ind primitive as described in {xref 6.3.24.7}.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 1 (Bain, T) - The MLME-PS-SET-INFORMATION.confirm lacks a parameter for the number of PSStructureSet found in the confirm. Add a parameter as defined above.

> Accept in principle, "Depending on the implementation, the number of sets in the PSStructureSet can be determined directly from the set itself. The MLMEs are a logical description not a precise description of an implementation. However, the technical editor will review the MLMEs and suggest a uniform method for specifying variable length fields."

CID 133 (Heberling, T) - [PM] Delete the PSSetOperation parm from the MLME-PS-SET-CONFIGURE.confirm parm list since it is not returned in the PS configuration response command's parm list. Please make the requested deletion.

> Reject "The PSSetOperation is used to identify a configuration request where the .request uses the unassigned set index and the response comes back with a new set index. The PSSetOperation is passed to the DME to tell it that this is in response to a prior configuration request."

CID 3 (Bain, T) - The confirm has the PSSet operation included. The actual command lacks this. Remove the PSSetOperation from the primitive.

> Reject “The PSSetOperation is used to identify a configuration request where the .request uses the unassigned set index and the response comes back with a new set index. The PSSetOperation is passed to the DME to tell it that this is in response to a prior configuration request.”

CID 135 (Heberling, T) -

> Withdrawn, 12 November, 2002.

CID 231 (Shvodian, T) - Why aren't the Max CTRBs and Max associated DEVs part ot the PNC capabvilities? MMake ax CTRBs and Max associated DEVs part ot the PNC capabvilities

> Withdrawn, 12 November, 2002.

Recessed at 12:03 HAST.

Meeting called to order at 1:10 pm HAST

CID 127 (Heberling, T) - [ASIE] OUI may be same for several calls to MLME-CREATE-ASIE.request. Consequently, it may be necessary to add an ASIE index to both the ASIE and to the MLME-CREATE-ASIE.request/confirm primitives. Please make the requested change.

> Withdrawn, 12 November, 2002.

CID 233 (Heberling, T) - Why are bcast and multicast excluded from the Rx frame count. A DEV gets a feel for channel status by whether or not it is getting ACKs. However, mcast and bcast cannot have ACKs, so channel status could be more important. include mcast and bcast frames into channel status response command.

> Reject, “The text for the RX frames is unchanged (other than editorial) from the last draft. The commenter is invited to resubmit this comment in Sponsor ballot.”

CID 5 (Bain, T) - The low end of the PS wake beacon interval should be 2 and not 4. Please make requested change.

> Reject, “An interval of 2 would be too small for useful power savings.”

CID 6 (Bain, T) The use of shall may not be correct for this. Perhaps "If the PS set index field has been set to zero ..." make suggested change.

> Accept “This is a grammatical mistake. Change to ‘If the PS set index field has been set to zero ...’ as this does not affect operation for the DEV. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 145 (Heberling, T) - [ASIE] OUI may be same for several calls to MLME-CREATE-ASIE.request. Consequently, it may be necessary to add an ASIE index to the Vendor specific command just after the Vendor OUI field.

> Withdrawn, 12 November, 2002.

CID 148 (Heberling, T) - [PM] Remove from the table all the entries for "SPS supported in capability", "PSPS supported in capability", and "Hibernation supported in capability". These modes are no longer indicated in the capability fields. Please make the requested change.

> Accept in principle, “As defined in the standard, these fields would always be set to one for a PNC capable DEV. Therefore there is no reason to include these in the table. Deleting these items does not change the operation or compliance of a DEV. Another editorial change, change ‘capability field’ to be ‘PNC capabilities field’ in the remaining entries where it occurs. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 149 (Heberling, T) - [Assoc] Please change this sentence frag. <from> "...,accept the DEVID as its address for all future communications." <to> "...accept the DEVID for all future communications." This change will make the sentence less confusing. Address implies a 48bit MAC address and not the 8 bit assignment. Please make the requested change.

> Accept “Make the editorial change. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 153 (Heberling, T) [CTA/Term] Delete this sentence "The stream termination field in the CTR control field shall be set to one." It is my recollection that one of the resolutions to a LB-19 comment required the elimination of the termination bit. If that is a valid recollection than make the requested change. Also modify the MSCs in Figure 119 and 120 so that there is no reference to the "termination bit" Please make the requested deletion.

> Accept in principle, “There was not a CID in LB19 that requested the deletion of this bit.”

CID 157 (Heberling, T) - [ChnlStatus] This sentence is too exclusive: "Thus, the command should only be used for DEVs that are actively participating in a data transfer as the information would not have much meaning otherwise." The reason for this comment is that the PNC can request that all DEVs in the piconet send it(PNC) channel status responses as described in 8.11.1, item 3. Either delete the qouted sentence above or add an additional qualifying sentence regarding the PNC.

> Accept in principle, “Add a sentence following the paragraph on page 205, line 43, ‘The PNC also uses this command to get the channel status information from the DEVs in the piconet, as described in {xref 8.11.1}, {xref 7.5.6.1} and {xref 7.5.6.2}. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 15 (Barr, T) - Since the new PNC must authenticate with all of the DEVs in the piconet. It must allocate time for this to happen. If the PNC does not allow commands in the CAP, then the PNC SHALL set up CTAs for authentication. Change 'should' to 'shall' and note that this is only necessary when commands are not allowed in the CAP.

> Reject, “This text is the same technically as in D11 with the exception of an editorial change. The commenter is invited to resubmit the comment in sponsor ballot.”

CID 16 (Barr, T) - A DEV must associate in order to be assigned DEVID and CTAs. Change 'should' to 'shall'.

> Reject, “This text is the same technically as in D11 with the exception of an editorial change. The commenter is invited to resubmit the comment in sponsor ballot.”

CID 84 (Heberling, TR) - [PM] There's not much use setting an element in the beacon for a DEV that doesn't listen to beacons!/KO Remove "HIBERNATE" from the first sentence.

Withdrawn, 12 November, 2002.

1.1.4 CWB IE

CID 204 (Roberts, TR) - Delete the Continued wake beacon IE. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule for item 3 in clause 8.13.2.3, P219, L3: "If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon." Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 205 (Roberts, TR) - Delete the continued wake beacon clause. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule for item 3 in clause 8.13.2.3, P219, L3: "If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon." Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 206 (Roberts, TR) - Suggest reject or withdraw - Delete item 3 from this clause. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule: "If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon." Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 136 (Heberling, TR) - [PM/CWB] Delete the Continued wake beacon IE. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule for item 3 in clause 8.13.2.3, P219, L3, and for a combined item 2 & 3 in clause 8.6.4, P198, L41: - If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon.(solution by KO) Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 139 (Heberling, TR) - [PM/CWB] Delete the continued wake beacon clause. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule for item 3 in clause 8.13.2.3, P219, L3, and for a combined item 2 & 3 in clause 8.6.4, P198, L41: - If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon.(solution by KO) Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 172 (Heberling, TR) - [PM/CWB] Delete item 3 from this clause. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE

because it didn't hear it. The simpler solution is to implement the following rule: - If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon.(solution by KO) Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 175 (Heberling, TR) - [PM/CWB] Delete the CWB entry from the table. It is not needed. The use of the CWB IE in the wake beacon only works if the sleeping SPS DEV hears the wake beacon and in that case the SPS DEV doesn't need the CWB IE. And in the other case it doesn't matter, because it can't use the info in the CWB IE because it didn't hear it. The simpler solution is to implement the following rule for item 3 in clause 8.13.2.3, P219, L3, and for a combined item 2 & 3 in clause 8.6.4, P198, L41: - If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon.(solution by KO) Make the requested deletion.

Withdrawn, 12 November, 2002.

CID 193 (Heberling, TR) - [PM/CWB] PCTM and CWB don't work if the DEV missed its wake beacon. The rule in SPS that beacon announcements shall be done in N subsequent wake beacons, in stead of just N subsequent beacons starting with the wake beacon, makes PNC implementation utterly complicated. All this calls for a unified rule for PSPS and SPS: If you miss your wake beacon, listen to the next beacon/KO

Reject "The only IE affected by this is the CTA status IE which is sent in SPS wake beacons for the minimum repeat sequence. The implication is that the DEVs in SPS mode have decreased battery life in exchange for a slightly simpler implementation for the PNC."

CID 119 (Heberling, TR) - [PM/CWB] PCTM and CWB don't work if the DEV missed its wake beacon. The rule in SPS that beacon announcements shall be done in N subsequent wake beacons, in stead of just N subsequent beacons starting with the wake beacon, makes PNC implementation unnecessarily complicated. All this calls for a unified rule for PSPS and SPS: If you miss your wake beacon, listen to the next beacon/ KO In rules for individual DEV, combine second and third rule to: - If the DEV is in PSPS or SPS mode, the announcement shall be made in aMinBeaconInfoRepeat subsequent beacons starting with the system or SPS wake beacon.

Reject "The only IE affected by this is the CTA status IE which is sent in SPS wake beacons for the minimum repeat sequence. The implication is that the DEVs in SPS mode have decreased battery life in exchange for a slightly simpler implementation for the PNC."

CID 116 (Heberling, TR) - [CTA/PM] CTR may be refused because destination is in hibernation. Therefore change the error code to reflect both the case were a stream is established but the destination enters hibernation or SPS, and the case where a CTR is made for a DEV in hibernation/KO Rename error code 7 to 'destination in power save mode'

Accept in principle, "The reason code 'Destination DEV in power save mode' is technically equivalent to 'Stream terminated, DEV entered power save mode.' The stream index combined with the PS status IE tells the source DEV that the stream was terminated due to a DEV entering power save mode. Likewise, if it is a request, the source DEV knows because the unassigned stream index is used in the response. Thus changing the text here clarifies the meaning of the error code. Rename error code as 'Destination DEV in power save mode'. After discussion, the commenter agreed that this comment is editorial and not technical."

CID 89 (Heberling, TR) - [RemoteScan] You can't tell from a beacon if the PNC _is_ a parent, only that it _has_ a parent./KO Change piconet type codes to: 0 -> Independent or parent piconet 1 -> Dependent piconet 2-255 -> Reserved.

Reject “There are many ways that the DEV can determine that a piconet is the parent of another piconet, e.g. private CTAs, a Neighbor ID assigned, finding both the parent and dependnet beacons, etc. It is up to the DEV’s judgement to determine if it thinks the piconet it found was either a parent or independent piconet.”

Recess at 2:45 pm HAST.

Summary at 3:10 pm HAST: T & TR - 27, TR - 27, T - 0, E - 121

Meeting called to order at 3:30 pm HAST.

CID 228 (Shvodian, TR) - What is the "preferred fragment size?" Is it the biggest, smalest or nominal? What if it is ignored? Is it the preferred fragment size as transmitter or receiver? This field has no place and should be deleted. The fragment size is solely up to the transmitter based on the channel conditions. Drop this from tex, too.

Accept in principle, “Resolve as indicated in CID 202. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 99 (Heberling, TR) - [CTA] MaxProcessedCTA and MaxAssignedCTA are deleted from standard and thus the paragraph on lines 40-43 is obsolete./KO Delete line 40-43 on page 180.

Accept “The MaxProcessedCTA and MaxAssignedCTAs are no longer passed to the PNC, thus the PNC is not required to make any consideration for this in the current draft. This text is redundant and will be deleted. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 101 (Heberling, TR) - [CTA/Isoch] The original purpose of this IE got lost! All subrates shall also be announced, regardless if the DEV is in PS mode. The DestDEV cannot find the CTR-interval in any other way and it needs it if it wants to go into a PS mode./KO Add "and of all subrate streams" to the sentence on line 14.

Reject “Although announcing the subrate allocation is very helpful, it is not required. An ACTIVE mode DEV will eventually find out about the subrate allocation and can even request this information from the PNC.”

CID 103 (Heberling, TR) - [CTA/Isoch] All changed subrates shall also be announced, regardless if the DEV is in PS mode. The DestDEV cannot find the CTR-interval in any other way and it needs it if it wants to go into a PS mode./KO Always announce CTR-Interval changes. Remove the words "if any DEV is in power save mode"

Reject “Although announcing the subrate allocation is very helpful, it is not required. An ACTIVE mode DEV will eventually find out about the subrate allocation and can even request this information from the PNC.”

CID 87 (Heberling, TR) - [CTA/Term] Terminate bit is terminated/KO Remove 'stream termination', pack all fields to the right and let b7 be reserved.

Reject “The terminate bit is still used in clause 8.5.1.3 to indicate that the DEV wants the stream terminated. While the bit is probably redudant, at this point the text requires its presence.”

CID 88 (Heberling, TR) - [CTA/Term] The terminate bit no longer exists./KO Delete the sentence "The stream termination field...".

Reject “The terminate bit is still used in clause 8.5.1.3 to indicate that the DEV wants the stream terminated. While the bit is probably redudant, at this point the text requires its presence.”

CID 140 (Heberling, TR) - [PNC Service] Seems there is a need for an MLME-PICONET-SERVICES.indication/response set of primitives. During association a DEV can set its PiconetServiceInquiry bit to request a list of piconet services from the PNC. The response to the services request bit is independent of the association response. Also I'm assuming that since the Services database is not managed by the MAC or MLME, that the PNC DME or some other protocol layer needs to receive some sort of notification that a request for services information has been received. Consequently, the current resolution to CID xxx is incomplete and not acceptable.

Withdrawn, 12 November 2002.

CID 97 (Heberling, TR) - [PiconetService] The probe isn't used for service response due to its potential length. The fragmentable piconet services command shall be used. /KO In the first sentence on line 21-22, replace "probe command" with "piconet services command".

Withdrawn, 12 November 2002.

1.1.5 PM/Wakeup

CID 183 (Heberling, TR) - [PM] Some attempts have been made to create a wakeup signal from a DEV to a sleeping peer DEV. A simple addition to the PS mode change command can cause the PNC to set the PCTM bit for a sleeping DEV./KO Add one octet to PS Mode change command: TrgtID TrgtID is set to the SrcId if the DEV wants to inform the PNC that it's switching to the ACTIVE MODE. If the TrgtID is set to the DEVID of another member DEV, the PNC will set the bit for this DEV in the PCTM IE. If the PS Mode field is set to Hibernate or PS, this field shall be ignored upon reception.

Reject “The current method of using the channel time request command does allow other DEVs to request that a DEV in PS mode change to ACTIVE mode. During the time that a DEV is awake, i.e. its awake beacon, it possible to send it an application specific command that would cause the DEV to switch to ACTIVE mode.”

CID 184 (Heberling, TR) - The PNC may request that a DEV in power save mode switches to ACTIVE mode after its next wake beacon. In this case, the PNC shall set the bit for the DEV it wants to wake up in the PCTM IE. The bit shall be set to 1 until the power save DEV informs the PNC that it's switching to ACTIVE mode by sending the PS Mode change command with the PS Mode field set to ACTIVE and the TrgtID field set to it's own DEVID. A power save DEV that wakes up and finds its bit set in the PCTM shall switch to ACTIVE mode and remain ACTIVE for at least the CTRResponseTime indicated in the beacon. A DEV may request that the PNC sets the PCTM bit for another DEV by sending the PS Mode change command with the PS Mode field set to ACTIVE and the TrgtID field set to the DEVID of the peer DEV it wishes to wake up.

Reject “The current method of using the channel time request command does allow other DEVs to request that a DEV in PS mode change to ACTIVE mode. During the time that a DEV is awake, i.e. its awake beacon, it possible to send it an application specific command that would cause the DEV to switch to ACTIVE mode.”

CID 185 (Heberling, TR) - [PM] Small changes to support new TrgtID field in the PS Mode change command. Editorial: Switching to ACTIVE is the same procedure regardless of PS mode. Maybe lift out to the general clause?/KO 8.13.1 page 216 line 22. (for PSPS) 8.13.2.2 page 217 line 39. (for SPS) 8.13.3 page 221 line 2. (for HIBERNATION) Add "with the PS Mode field set to ACTIVE and the TrgtID set to its own DEVID" Change Figure 146, page 224. Add param TrgtID=SrcID to MLME-PS-MODE-CHANGE.req and to PS mode change command.

> Reject “The current method of using the channel time request command does allow other DEVs to request that a DEV in PS mode change to ACTIVE mode. During the time that a DEV is awake, i.e. its awake beacon, it possible to send it an application specific command that would cause the DEV to switch to ACTIVE mode.”

CID 186 (Heberling, TR) - [PM] Small changes to support new TrgtID field in the PS Mode change command./KO Add parameter TrgtId to MLME-PS-MODE-CHANGE.request. Add TrgtId to table 29, page 83: TrgtId, Integer, as defined in 7.5.7.1...

> Reject “The current method of using the channel time request command does allow other DEVs to request that a DEV in PS mode change to ACTIVE mode. During the time that a DEV is awake, i.e. its awake beacon, it possible to send it an application specific command that would cause the DEV to switch to ACTIVE mode.”

CID 115 (Heberling, TR) - [PM] The requestor cannot hang and wait an indefinite time for a decision from the PNC. Either you get your channel time or you don't. If the destination is in hibernation, any CTR shall be denied. If a DEV wants to know about traffic it can select PSPS or SPS. In Hibernation it just wants to sleep. I would kindly urge all editors to please try to refrain from putting undiscussed ad-hoc inventions into the draft. If you really want to wake up a sleeping DEV at some unknown time in the future, we could consider having a new command to set the PCTM bit. One way would be to add a DEVID to PS mode change. If (operation == ACTIVE && dev != UNASSOC) set PCTM(dev)./KO Delete page 145 line 9-14. Replace with: "The PNC shall deny a channel time request if the destination is in HIBERNATE mode. The PNC shall return a channel time response command with the error code set to 'destination in power save mode' (rename error code 7 in 7.5.5.2).

> Reject “The current method of using the channel time request command does allow other DEVs to request that a DEV in PS mode change to ACTIVE mode. During the time that a DEV is awake, i.e. its awake beacon, it possible to send it an application specific command that would cause the DEV to switch to ACTIVE mode.”

1.1.6 PNC/Scan

CID 118 (Heberling, TR) - [PNC Scan] Implementation wise it is preferrable to just stop beacon transmission and then start at a later time continuing from where it stopped. The reason we force the PNC to upgrade the timetoken for silent beacons is that a consistent increment is needed for SEC DEVs. On the other hand, if the PNC wants to scan it would be better to have the whole piconet silent. Unfortunately the PNC cannot just remove the CTA since that would cause dependent networks to cease operations on the current channel. A better solution would be to announce when scan starts and how long it will last./KO 1) Create a new PNC Scan IE. Parameters: Suspend beacon number[16b], Quiet superframes [8b]. Add to clause 7.4. (see other comment). 2) Change text in 8.9.5, line 48-51: If the PNC initiates a scan of one or more alternate channels, the PNC shall insert the PNC scan IE with the Suspend beacon number field set to the last beacon number before the scan and the Quiet superframes set to the number of superframe durations where no beacon will be sent. The PNC scan IE shall be sent in at least one system wake beacon and at least aMinBeaconInfoRepeat beacons including that system wake beacon. After the beacon that was indicated as suspend beacon number has been sent, the PNC shall suspend beacon transmissions. The PNC shall not suspend beacon transmissions for more than twice aMinChannelScan. The PNC shall resume beacon transmission after the indicated amount of superframes. The PNC, upon returning to its current channel and resuming the transmission of its beacons, shall increment the time token field from the last beacon before the scan by one. A DEV that receives the PNC scan IE shall suspend transmission of the indicated amount of superframes, regardless of the CTA. A Dependent PNC that receives the PNC scan IE shall immediately insert its own PNC scan IE in its beacon.

> Reject “For sleeping DEVs, it is very advantageous to keep the beacon numbers incrementing at a regular rate, especially for DEVs that sleep for long periods of time. Likewise, the PNC really can’t

wait for all of them to reach their wake beacon before it goes off to look at its own or other channels."

CID 179 (Heberling, TR) - [PNC scan] Add the new PNC scan IE to table/KO PNC scan IE, 7.4.x, aMinBeaconInfoRepeat, 8.9.5

Reject "For sleeping DEVs, it is very advantageous to keep the beacon numbers incrementing at a regular rate, especially for DEVs that sleep for long periods of time. Likewise, the PNC really can't wait for all of them to reach their wake beacon before it goes off to look at its own or other channels."

CID 178 (Heberling, TR) - [PNC/Scan] A new IE is needed to support comment about PNC channel scan in 8.9.5. This IE informs the piconet that the beacon will be suspended for a certain time./KO Add new IE: PNC Scan IE. The PNC scan IE is used to inform all DEVs in the piconet that the PNC beacon transmission will be suspended for a specified time, and to order all DEVs in the piconet to suspend all transmission for the same time. [octets:1 | 2 | 1 | 1] [Quiet |Suspend beacon | Length=3 | Element ID] [superframes | number | |]

Reject "For sleeping DEVs, it is very advantageous to keep the beacon numbers incrementing at a regular rate, especially for DEVs that sleep for long periods of time. Likewise, the PNC really can't wait for all of them to reach their wake beacon before it goes off to look at its own or other channels."

1.1.7 MCTA

CID 189 (Heberling, TR) - [PM/MCTA] Just like with SPS, HIBERNATE DEVs needs enough MCTA to change modes when they wake up/KO Add sentence: "The PNC shall provide enough assigned MCTA or open MCTA for the DEV in HIBERNATE mode that it is able to send a PS Mode change, probe or other command to the PNC before its ATP expires."

Accept in principle, "It would be useful to add some editorial guidance to the implementers regarding the allocation of MCTAs for power save mode DEVs. Add to page 220, line 45 'Because the HIBERNATE DEV will need to send a frame to the PNC at least once during its ATP, the PNC needs to take this into consideration when allocating MCTAs if the CAP is not available for commands.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 190 (Heberling, TR) - [PM/MCTA] Just like with SPS, PSPS DEVs needs an MCTA to change modes when they wake up. I chose the wording "should" because there may be overload in the system wake superframe so there is no space for all MCTA, or the PNC may use another predictable cyclic allocation scheme in which case the PSPS DEVs will know when the next MCTA occurs/KO Add sentence: "The PNC should allocate assigned MCTA for PSPS DEVs or open MCTA in the system wake beacon"

Accept in principle, "It would be useful to add some editorial guidance to the implementers regarding the allocation of MCTAs for power save mode DEVs. Add to page 215, line 52 'Because the PSPS DEV at some point will need to send commands to the PNC, e.g. the PS mode change command, the PNC needs to take this into consideration when allocating MCTAs if the CAP is not available for commands.' After discussion, the commenter agreed that this comment is editorial and not technical."

CID 191 (Heberling, TR) - [MCTA] We need a little better specification on how often MCTA are allocated to assure that the PNCRespTime can be met. /KO New text, continuing on "When MCTA are used...": "The PNC shall allocate MCTA assigned to a DEV, open MCTA or both. The frequency of assigned MCTA shall be at least CTRRespTime, as defined in the beacon. If only open MCTA are used, the PNC shall allocate at least one open MCTA per DEV and CTRRestTime. The PNC may reduce the MCTA allocation frequency

for power save DEVs, and for DEVs requesting a longer interval between assigned MCTA using the CTR command, 7.5.5.1. Special rules power save DEVs is listed in 8.13.1, 8.13.2.2 and 8.13.3"

> Suggest ?“Note that the frequency of MCTA allocations by the PNC will have an effect on the total time required to complete a channel time request. Any delay in allocating MCTAs is in addition to the delay indicated by the CTRRespTime value broadcast in the beacon.”

Recessed at 5:08 pm HAST.

Meeting called order at 7:14 pm HAST

CID 191 (Heberling, TR) - [MCTA] We need a little better specification on how often MCTA are allocated to assure that the PNCRespTime can be met. /KO New text, continuing on "When MCTA are used...": "The PNC shall allocate MCTA assigned to a DEV, open MCTA or both. The frequency of assigned MCTA shall be at least CTRRespTime, as defined in the beacon. If only open MCTA are used, the PNC shall allocate at least one open MCTA per DEV and CTRRestTime. The PNC may reduce the MCTA allocation frequency for power save DEVs, and for DEVs requesting a longer interval between assigned MCTA using the CTR command, 7.5.5.1. Special rules power save DEVs is listed in 8.13.1, 8.13.2.2 and 8.13.3"

> Reject “The current usage of CTRRespTime does not include the time required for getting the command to the PNC.”

1.1.8 Number of SPS sets.

CID 165 (Heberling, TR) - [PM/SPS-4] Delete this sentence frag. "... when the PNC is battery powered and support at least four SPS sets when the PNC is powered by the alternating current mains, Table 60." As I stated in my BRC PM e-mail ballot of 10/29/02 regarding my opposition to making 4 SPS sets mandatory: "...Mr. M. Schrader, on the other hand is advocating 4 SPS sets for an AC powered device. This approach constrains the customer/implementor to having to support a powermanagement scheme that forces the PNC to manage DEV defined wake beacon intervals for each SPS set instantiation(this has complex implications for the MAC CTA scheduler and Beacon generation algorithms). In addition, it also forces the customer/implementor to implement a MAC that has to support a minimum of 4 SPS sets regardless of whether it is battery powered or AC powered. It is highly unlikely that implementors are going to develop/support two different MAC HW/SW instantiations based on whether one instantiation is going to be in a battery powered environment and one is going to be in an AC powered environment." Make the requested change.

> Reject “There are applications that would require more than a single SPS set supported by the PNC. Based on this view of the market requirements, having 4 SPS sets as mandatory for AC powered PNCs is reasonable for these applications.”

CID 177 (Heberling, TR) - [PM/SPS-4] Delete MLF23.3 I don't have a problem with making Hibernate, PSPS and 1 SPS set mandatory. However, I do get heartburn when 4 SPS sets are mandated. A 15.3 DEV can support up to 252 streams yet we only mandate that a DEV support at least 1 isochronous stream. We leave it optional as to how many more streams a DEV or a PNC capable DEV may handle. Make the requested change.

> Reject “There are applications that would require more than a single SPS set supported by the PNC. Based on this view of the market requirements, having 4 SPS sets as mandatory for AC powered PNCs is reasonable for these applications.”

CID 207 (Roberts, TR) - Delete this sentence frag. "... when the PNC is battery powered and support at least four SPS sets when the PNC is powered by the alternating current mains, Table 60." As Allen Heberling stated in his BRC PM e-mail ballot of 10/29/02 regarding his opposition to making 4 SPS sets mandatory:"...Mr. M. Schrader, on the other hand is advocating 4 SPS sets for an AC powered device. This

approach constrains the customer/implementor to having to support a powermanagement scheme that forces the PNC to manage DEV defined wake beacon intervals for each SPS set instantiation (this has complex implications for the MAC CTA scheduler and Beacon generation algorithms). In addition, it also forces the customer/implementor to implement a MAC that has to support a minimum of 4 SPS sets regardless of whether it is battery powered or AC powered. It is highly unlikely that implementors are going to develop/ support two different MAC HW/SW instantiations based on whether one instantiation is going to be in a battery powered environment and one is going to be in an AC powered environment." Make the requested deletion.

> Reject “There are applications that would require more than a single SPS set supported by the PNC. Based on this view of the market requirements, having 4 SPS sets as mandatory for AC powered PNCs is reasonable for these applications.”

CID 208 (Roberts, TR) - Delete MLF23.3 I don't have a problem with making Hibernate, PSPS and 1 SPS set mandatory. However, I do get heartburn when 4 SPS sets are mandated. A 15.3 DEV can support up to 252 streams yet we only mandate that a DEV support at least 1 isochronous stream. We leave it optional as to how many more streams a DEV or a PNC capable DEV may handle. Make the requested deletion.

> Reject “There are applications that would require more than a single SPS set supported by the PNC. Based on this view of the market requirements, having 4 SPS sets as mandatory for AC powered PNCs is reasonable for these applications.”

1.1.9 Miscellaneous

CID 200 (Rasor, TR) - The previous draft was changed to specify a "new" encryption scheme for NTRUEncrypt, referencing EESS #1, ees251ep3. The current draft specification is supposed to represent a guide to implementers that will stand the test of time as a standard if approved. It is a fact that the evolving NTRUEncrypt scheme has been proven vulnerable to attacks that completely render the encryption useless. Additionally, the immature, relatively untested and unreviewed nature of this cryptographic scheme exposes the proposed standard to early obsolescence in this unproven element. Completely remove the NTRUEncrypt security suite from the draft specification until such time that the evolving NTRUEncrypt scheme is stable enough for relaible commercial delopyment.

> Reject, “The NTRUEncrypt suite has been included as an optional security suite since D10. The TG will ask the IEEE if this specification or other references should be archived so that it will be available in the future for an implmenter. Inclusion of any security suite in this standard is not an evaluation that any one of the suites are suitable for security purposes.”

CID 160 (Heberling, TR) - [TxPwr] This whole concept of reducing the maximum transmit power in the piconet seems wrong. I could see it if we had a mechanism for overlapping piconets to negotiate a more appropriate power level but we don't. So if I(the PNC) get an indication that one of my piconet DEVs is having trouble hearing my beacon because of its proximity to an overlapping piconet, I(the PNC) am going to reduce my power? I don't think so, I'm going to crank it up, baby! Consequently, I think we need to either rethink the whole concept reducing Tx power as an inteference mitigation mechanism or just delete any occurence of the concept in this document. Please make one of the requested changes.

> Withdrawn, 12 November, 2002.

CID 238 (Shvodian, TR) - How does a PNC meet aAssocRespConfirmTime of 5 ms? The assoc may be at the end of the CAP or in an association MTS and the PNC may not have any channel time available in 5 ms. or DEV. Change to 2* max SF duration.

> Reject “The parameter has been unchanged since D11. The commenter is invited to resubmit the comment in sponsor ballot.”

CID 239 (Shvodian, TR) - How does a PNC or DEV meet aProbeResponseDelay of 8 ms? The probe may be at the end of the CAP or in a CTA and the responder may have no available channel time. Dlelete this parameter altogether.

> Reject “The parameter has been unchanged since D11. The commenter is invited to resubmit the comment in sponsor ballot.”

CID 196 (Rasor, TR) - Revisited

> The text is a little confusing, so put in precise names for the particpants in this exchange, Change the paragraph to read 'The PNC or another DEV may request that each DEV with which it has authenticated periodically transmit a secure frame using the management key to be certain that the DEV is still in the piconet. If no secure frames are being transmitted by the previously authenticated DEV, the PNC or requesting DEV may send a secure probe command requesting an information element (such as the DEV address) from the previously authenticated DEV. If the previously authenticated DEV does not respond with a secure frame within a period of time, the PNC or requesting DEV may assume that the previously authenticated DEV is no longer present and disassociate or deauthenticate the previously authenticated DEV.'

Meeting recessed at 8:15 pm HAST.

1.2 Monday, 11 November, 2002

1.2.1 Security comments

Meeting called to order at 7:00 pm HAST.

CID 194 (Rasor, TR) - At the Vancouver plenary, in the agreeded upon security resolution regarding security models, the GROUP was told that the architecture presented by NTRU and adopted in St. Louis as the baseline would support both piconet wide data protection and smaller groups beginning at the peer to peer level. The current text does not support that model. The suggested text supports the current model as well as a sub-group starting at 2 DEVs and going up to the nmaximum allowable number of DEVs in the piconet - 1. Delete section 9.1.6 and insert the following text: Data encryption uses a symmetric cipher to protect data from being read by parties without the cryptographic key. Data may be encrypted either by using a key shared by all piconet DEVs or by using a key shared between two or more DEVs. **Suggest reject:** Do not have a remedy. For starters, the nonce and logic to determine which key to use must change. Appears to be a major technical change.

> Reject, “Group authentication mechanisms (other than the piconet group) is outside of the scope of the standard. In addition, the changes required for the current draft to implement this have not been presented to the task group. A mechanism does exist in the standard to accomplish sub-group security. The method that is available to do this is to start a dependent piconet with the members of that piconet as members of the dependent piconet.”

CID 195 (Rasor, TR) - At the Vancouver plenary, in the agreeded upon security resolution regarding security models, the GROUP was told that the architecture presented by NTRU and adopted in St. Louis as the baseline would support both piconet wide data protection and smaller groups beginning at the peer to peer level. The current text does not support that model. The suggested text supports the current model as well as a sub-group starting at 2 DEVs and going up to the nmaximum allowable number of DEVs in the piconet - 1. Data integrity uses an integrity code, often referred to as a message authentication code, to protect data from being modified by parties without the cryptographic key. It further provides assurance that data came from a party with the cryptographic key. Integrity may be provided using a key shared by all piconet DEVs or using a key shared between two or more DEVs. All secure data frames that fail integrity checks are dis-

carded. **Suggest reject:** Do not have a remedy. For starters, the nonce and logic to determine which key to use must change. Appears to be a major technical change.

> Reject, “Group authentication mechanisms (other than the piconet group) is outside of the scope of the standard. In addition, the changes required for the current draft to implement this have not been presented to the task group. A mechanism does exist in the standard to accomplish sub-group security. The method that is available to do this is to start a dependent piconet with the members of that piconet as members of the dependent piconet.”

CID 196 (Rasor, TR) - The current text in 9.2.2 attempts to implement a very loose heartbeat function that closes teh set of authenticated DEVs in an established piconet. The problem is that security, in the sense of a wireless network, cannot be "mushy." In more definite terms, the text of 9.2.2 is indefinite and cannot be used to implement a method that securely, reliably closes teh network set. Replace the exsiting text with the following text: Current rememdy lacks notion of frequency. Even with "shall," DEV can simply choose to never do this. The PNC or another DEV shall request that each DEV with which it has authenticated (previously authenticated DEV) periodically transmit a secure frame using the management key to be certain that that DEV is still in the piconet. If no secure frames are being transmitted by the previously authenticated DEV, the PNC or requesting DEV shall send a secure probe command requesting an information element (such as the DEV adress) from the previously authenticated DEV. If the previously authenticated DEV does not respond with a secure frame within a predetermined period of time, the previously authenticated DEV's authentication is revoked and the PNC or requesting DEV shall disassociate or deauthenticate the previously authenticated DEV. By definition, dissassociation of an authenticated DEV results in deauthentication. **Suggest accept in principle:** Rene and Gregg to clarify use of "periodically." Also Gregg to massage text slightly to clarify.

> Reject, “The current text allows DEVs to keep track of when other DEVs are still within the piconet. If the security manager wants to ensure that the DEVs are still available it can send frames to those DEVs. The security manager could also change the key periodically to ensure that DEVs that are part of the relationship are still current.”

CID 242 (Shvodian, TR) - It needs to be made clear if authentication is required for a neighbor piconet. If so, a separate table is needed for neighbor authentication where the sym_keys_D are not passed. Create a table for neighbor authentication. **Suggest accept in principle:** Update 8.2.5, last paragraph. Change "The neighbor PNC is not a member of the parent piconet and shall only send the association request com-mand, the dissassociation command, the CTR command, authentication commands or any required Imm-ACK frames to the parent PNC. The parent PNC is not a member of the neighbor piconet." to "The neighbor PNC is not a member of the parent piconet and shall only send the association request command, the dissassociation command, the CTR command, or any required Imm-ACK frames to the parent PNC. The parent PNC is not a member of the neighbor piconet. In particular, the neighbor PNC shall not send authentication commands to the parent PNC."

> Accept in principle, “While the Neighbor PNC is allowed to request authentication from the parent PNC, it is unlikely that this would be successful based on the security policy of the parent PNC. However, it is not prohibited in the draft, so the text in 8.2.5 is correct.”

CID 241 (Shvodian, TR) - The fact that a public key is in the ACL is not what provides theat the public key belongs to the intended DEV. The trust is established by the fact that the DEV can respond to the challenge and prove that it has the private key that accompanies the public key in the ACL. The fact that the public key and dev address are in the ACL provides the authorization that the DEV should be allowed into the piconet, provided it can authenticate by proving that it has the private key. Change to: In order to use a public key to achieve mutual authentication, it is necessary to trust that the received public key belongs to the intended DEV. This trust shall be indicated by a certificate or by a DEV rsponding sucessfully to a challeng, proving that it has the private key that corresponds to the public key in the ACL. the key’s representation in an ACL or by the DEV verifying a digital certificate at the time of authentication. **Suggest reject:** Section 9.1.3 is

addressing accepting trust in a public key. For this operation, verification of a certificate or the key's representation in the ACL is adequate.

Accept in principle, "Change 'that the received public key belongs to the intended DEV.' to be 'that the received public key belongs to the intended DEV associated with the DEV address.'"

CID 199 (Rasor, TR) - The reference "While the security suites are interoperable," is inaccurate and misleading. Interoperation implies exactness in purpose, operation and results. In our case, the purpose of all security suites is the same, but the operation and results are different. For example, the ECMQV suite establishes a 128 bit key, while the NTRU and RSA suites establish only 80 bit keys. Repair the text to accurately reflect the defined operation of any current or future security suite. **Suggest accept in principle:** "Change 9.4, line 49 from 'While the security suites are interoperable, it is possible that there are differences in the levels of security provided as described in C.3' to 'While the security suites all establish symmetric keys, it is possible that there are differences in the levels of security provided as described in C.3.'"

Accept suggested resolution.

CID 198 (Rasor, TR) - In reading this clause, an implementer will certainly be confused. The Access Control List is said to contain information "about which devices are authorized to authenticate with the DEV using their corresponding public key." The implemener then see the "manner in which the ACL is used depend[ing] on the application and the security suite in use." This is very confusing for the following reason. In the 802.15.3 ad-hoc network, DEVs are openly admitted (associated), and admitted DEVs then request authentication, and if successful, the PNC will add the authenticated DEV to the ACL. Does the current text preclude this operation? The text must be modified to address the correct issue. That issue is the binding of a DEV's identity to its public key, then the subsequent addition of the DEV's public key, or other representation into the ACL to control future group membership in the piconet. **Suggest accept in principle:** "Change 9.3.2, 2nd paragraph to move the last sentence 'See C.4 for further details on authorization of public keys.' to be the second sentence in the paragraph."

Accept suggested resolution.

CID 201 (Rasor, TR) - The SRF - Security requirements field, defined as being included in the authentication response command used to indicate the authentication policies of the security manager. This should be more fully discussed with respect to the operation and establishment of data keys. It needs to be able to establish a required bit level of security in a system. Reference to current sections:

7.5.2.2 Authentication response command

If the certificates required bit is set to 1, the security manager shall only authenticate DEVs with a security suite that uses certificates, 1.2.1 and Table 96, while it operates as the security manager. If the 128-bit security required bit is set to 1, the security manager shall only authenticate DEVs with a security suite that is stated to provide 128-bit security in Table 96 while it operates as the security manager. The auth response field is the integrity code generated by the security manager and associated with the authentication protocol, 10.2. 10.3.1.3 ECMQV key agreement protocol The optional parameter Text2 as specified in sections 6.11.1 and 6.11.2 of ANSI X9.63-2001 shall be the one-byte value of the security requirements field included in the authentication response command,7.5.2.2.

Suggest reject: The Security Requirements Field allows a PNC to require 128-bit security suite and/or certificate usage. It currently suffices.

Reject "The security requirements field allows the PNC to require an 128-bit security suite and/or certificate usage. It does not adversely affect the security of the piconet to allow higher levels of security."

CID 18 (Barr, TR) - When mode 2 was removed, implementation of any of the defined security suites for the remaining security mode is required. This sentence limits the suites to the non-certificate security suites which was not the intention of the BRC when this was accepted. Change "ECMQV manual, NTRUEncrypt raw 1, or RSA-OAEP raw 1" with "ECMQV manual, ECMQV implicit, ECMQV X.509, NTRYEncrypt raw 1, RSA-OAEP Raw 1, or RSA-OAEP X.509 1" **Suggest accept in principle:** Change "ECMQV manual, NTRUEncrypt raw 1, or RSA-OAEP raw 1" to "ECMQV manual, ECMQV implicit, ECMQV X.509, NTRYEncrypt raw 1, RSA-OAEP Raw 1, or RSA-OAEP X.509 1"

> Accept in principle “The text has an incorrect set of cross references and a sentence that is not clear. Change ‘one of the following sub-suites: ECMQV manual, NTRUEncrypt raw 1, or RSA-OAEP raw 1. All other defined security subsuites may be implemented by a compliant DEV.’ to be ‘one of the sub-suites listed in {xref Table 95}. A DEV may implement more than one of the defined security subsuites.’ This matches the requirements in the PICS clause.”

CID 120, 121 (Heberling, T) - [SEC/Auth] Not clear whether PublicKeyObjectLength parm is required in the MLME-AUTHENTICATE.request/indication primitive's parm list since this parameter does not get used in the Authentication request command,7.5.2.1. Either add the parameter to the Authentication request command or delete the parm from the MLME-AUTHENTICATE.request primitive's parm list. Please make the indicated change. **Suggest accept in principle:** Remove PublicKeyObjectLength parameter from MLME-AUTHENTICATE.request, 6.3.7.1 and MLME-AUTHENTICATE.indication, 6.3.7.2.

> Reject “While the PublicKeyObjectLength is not sent explicitly over the air, it is used to calculate the length of the command frame by the MLME.”

CID 122, 123 (Heberling, T) - [SEC/Auth] It is not clear whether the "Key" parm in the MLME-REQUEST-KEY.response/confirm primitive's parm list needs to be listed as "EncryptedKey" since that is how it is named in the request key response command, 7.5.2.6. Please clarify which name is correct and make the appropriate change in either clause 6 or clause 7. Please make the requested clarification and change. **Suggest accept in principle:** “Change 6.3.8.3.2 from ‘The MLME generates a request key response command, 7.5.2.6, and sends it to the specified DEV.’ to ‘The MLME generates a request key response command, 7.5.2.6 ,and sends it to the specified DEV. The MLME encrypts the key before transmission.’ Change the last sentence of 6.3.8.4.1 from: ‘Otherwise, the ResultCode is SUCCESS.’ to ‘Otherwise,the ResultCode is SUCCESS and the MLME decrypts the key.’”

> Accept suggested resolution.

CID 124, 125 (Heberling, T) - [SEC/Auth] It is not clear whether the "Key" parm in the MLME-DISTRIBUTE-KEY.request/indication primitive's parm list needs to be listed as "EncryptedKey" since that is how it is named in the distribute key request command, 7.5.2.7. Please clarify which name is correct and make the appropriate change in either clause 6 or clause 7. Please make the requested clarification and change. **Suggest accept in principle:** “Change 6.3.9.3.2 from ‘The MLME generates a distribute key response command, 7.5.2.8, and sends it to the specified DEV.’ to ‘The MLME generates a distribute key response command, 7.5.2.8, and sends it to the specified DEV. The MLME encrypts the key before transmission.’ Change the last sentence of 6.3.9.4.1 from: ‘Otherwise, the ResultCode is SUCCESS.’ to ‘Otherwise, the ResultCode is SUCCESS and the MLME decrypts the key.’”

> Accept suggested resolution.

CIDs with no resolution:

Table until 1:00 pm Tuesday, November 12, 2002.

CID 16 (Barr, T) - A DEV must associate in order to be assigned DEVID and CTAs. Change 'should' to 'shall' Suggest accept?

CID 15 (Barr, T) - Since the new PNC must authenticate with all of the DEVs in the piconet. It must allocate time for this to happen. If the PNC does not allow commands in the CAP, then the PNC SHALL set up CTAs for authentication. Change 'should' to 'shall' and note that this is only necessary when commands are not allowed in the CAP. Suggest accept in principle: Change 9.2.4, line 20 from "When the PNC role has been handed over,the new PNC should set up CTAs for each of the authenticated DEVs to perform the authentication protocol with the new PNC." to "When the PNC role has been handed over, the new PNC shall set up CTAs for each of the authenticated DEVs to perform the authentication protocol with the new PNC if commands are allowed in the CAP. Otherwise it should set up CTAs for each of the authenticated DEVs to perform the authentication protocol with the new PNC."

CID 200 - No agreement among security participants.

CID 9 - Tabled for clarification by commenter.

CID 245 (Shvodian, T) - It looks like certificate use has been added for Ntru and RSA. WHy are these not listed as sub-suites in Table 95 as they are for ECMQV. Be consistent. Either add sub-suites for Ntru and RSA or delete them for ECMQV. Table to discuss with commenter.

CID 243 - Tabled for discussion with Rene.

CID 244 - Tabled for discussion with Rene.

CID 19 - Tabled for discussion with Rene.

CID 229 - Tabled for discussion with Rene.

1.2.2 Miscellaneous

CID 56 (Gubbi, TR) - Same as comment #537 in LB12 and Comment 387 in LB19 ORIGINAL COMMENT (LB12): What is the point in having slotted aloha access in addition to the backoff in CAP, TDMA in CFP? Why is this complexity being thrusted on the implementors of this "low cost", "low complexity" and "low power" standard?I don;t see any justification in having yet another access scheme with WPAN. ORIGINAL SUGGESTED REMEDY Remove slotted aloha scheme in 8.4.3.4 and all references to it from the draft. RESPONSE: REJECT. Slotted Aloha was added to make the MAC more versatile so that more PHYs that could use the 802.15.3 MAC. While it could be added at a later date, that would make the MACs incompatible.REBUTTAL: SAME AS THAT FOR COMMENT 536 in LB12 Commenter's response (LB22) If slotted aloha is added so that the MAC is used in other PHYs, since DEVs using different PHYs can not directly communicate with each other why should it cause incompatibility? The new mechanisms in MAC must be added only when a defined PHY needs it, all of which we may not know today. At the time of addition of new mechanism, it has to be overlaid on the existing mechanism. and there is definitely a way to do the same with slotted aloha as and when it is needed. For example, a set of stream indices can be left reserved and used at that time for the purpose desired. Regarding MCTA, specifically, what is not objected to is the open and association MCTAs. What prevents these things to be done in CAP insteadof devicing a new mechanism altogether for such a relatively low probability events? -- Remove open/association MTS/MCTA mechanism and slotted aloha mechanism and all references to them from the draft (Applicable to 8.4.4.4 and 8.4.4.5 in LB22/D14) Reserve a group of stream indices in 7.2.5 for future enhancements like the slotted aloha so that it can be added if and when it is really needed. **Suggest reject:** "The open and association MCTAs were added to handle two concerns, the first was that new PHYs may not support efficient CCA detection. In this case, slotted aloha provides a contention access method that provides for the needs of the piconet. Another reason to used slotted aloha is that under certain conditions, it can be more efficient than using the CAP. Adding a new contention method to the MAC when a PHY group has been formed is probably not the best venue. At this time, the TG has many members who have expertise in the MAC available to review draft. In the future, when a new PHY is down-selected, there may not be as many people available who have the experience and knowledge of the TG3 MAC to be able to add a new contention method. Add-

ing slotted aloha does not add much, if any complexity, the DEV needs the random number generatora and exponential increasing backoff for any contention based method. The DEV is already required to be able to send frames and look to see if it gets an ACK. Depending on the parameters used for either the CAP or the open and association MCTAs, the power usage may actually be lower using MCTAs for the DEVs in the piconet than using the CAP. MCTAs have an advantage over the CAP in that they can be put into multiple locations in the superframe allowing the PNC to potentially use the time more efficiently."

Reject as indicated above.

CID 63 (Gubbi, TR) Same as comment 513 in LB19 Comment: same as comment #536 in LB12 ORIGINAL COMMENT (LB12)If SA is broadcast and anybody could start tx, how's collision handled? What is the point in getting devices to collide here instead of making this MTS part of CAP and letting devices freely use CAP as alreadydefined. This is useless and adds unnecessary complexity ORIGINAL SUGGESTED REMEDY (LB12): Remove lines 8:22 on page 151 and all references to "MTS/GTS with BC/MC-SA"from the draft Response: REJECT. The slotted aloha access method is used to provide access to theseslots just as CSMA/CA is used in the CAP. The TG has decided to allow bothaccess methods, CSMA/CA in the CAP and slotted aloha in the MTSs so thatthe 802.15.3 MAC is capable of supporting different types of PHYs. REBUTTAL (LB19): The response does not resolve the issue of having COLLISION based transmissions under COLLISION FREE PERIOD, instead of making this part of CAP. I do not see 802.15.3 PHY or applications listed in PAR requiring it. I do not see how CSMA/CA mechanism used in CAP and TDM mechanism used in CFP fail in achieving whatever the slotted-aloha cheme is achieving. I do not see any reason or justification to add extra complexity resulting from having one another channel access mechanism. Suggested Remedy: Remove MTS mechanism and slotted aloha mechanism and all references to them from the draft. (This is applicable to section 8.4.4.4 and 8.4.4.5 in the current draft) Response: ACCEPT IN PRINCIPLE. Add new subclause 11.2.10, 'Channel access methods' with text 'A PNC-capable DEV compliant to this standard shall allow the use of the CAP for contention based access for association, data and commands, {xref 7.3.1} when using the 2.4 GHz PHY. A DEV compliant to this standard shall support the use of the CAP when using the 2.4 GHz PHY.'Use 1 bit from the reserved bits to the 'Piconet mode field', 'MCTAs used' with definitions 'The MCTAs used bit shall be set to 1 if the PNC will be using open or association MCTAs.' Delete the sentence on page 111, lines 1-2, 'If the CAP end time indicates no available time and no message types are permitted during the CAP, then MTSs are implied.' (note this deletion is in response to CID 407). Expand MLF13 in the PICs (note this will become MLF13.1 and MLF13.2 due to another comment.)MLF13.1; Open and association MCTA operations; 8.4.4.4, 8.4.4.5; O.1MLF13.2; Regular MCTA operations; 8.4.4.4; M{ed. note: the CAP stuff is like MLF13.3 now}Commentor's response: Response to this comment do not address the core issue of an additional access mechanism (MTS and slotted aloha) in the standard. The proposal does not justify why they are needed in802.15.3. Hence the resolution is unacceptable. -- Remove MTS mechanism and slotted aloha mechanism and all references to them from the draft. (This is applicable to section 8.4.4.4 and 8.4.4.5 in the current draft) **Suggest reject:** "The open and association MCTAs were added to handle two concerns, the first was that new PHYs may not support efficient CCA detection. In this case, slotted aloha provides a contention access method that provides for the needs of the piconet. Another reason to used slotted aloha is that under certain conditions, it can be more efficient than using the CAP. Adding a new contention method to the MAC when a PHY group has been formed is probably not the best venue. At this time, the TG has many members who have expertise in the MAC available to review draft. In the future, when a new PHY is down-selected, there may not be as many people available who have the experience and knowledge of the TG3 MAC to be able to add a new contention method. Adding slotted aloha does not add much, if any complexity, the DEV needs the random number generatora and exponential increasing backoff for any contention based method. The DEV is already required to be able to send frames and look to see if it gets an ACK. Depending on the parameters used for either the CAP or the open and association MCTAs, the power usage may actually be lower using MCTAs for the DEVs in the piconet than using the CAP. MCTAs have an advantage over the CAP in that they can be put into multiple locations in the superframe allowing the PNC to potentially use the time more efficiently."

Reject as indicated above.

CID 58 (Gubbi, TR) Same as CID 410 in LB22 Original comment: The new field "Num max frame size" is mostly useless. What if all the frames are (aMaxFrameSize-1) octets long? Instead of that, it is useful to includethe total number of octets as sum of number of octets in the payload of all frames sent in the dly-ack-window. this total number of octets is helpfulin buffer management at the receiver which is supposed to hold all theframes (in some corner cases) until a delayed-ack-frame is sent.Suggested Remedy:1. Remove "Num max frame size" from Figure-15 and all its references from the fraft2. Include total number of octets as sum of number of octets in the payload of all frames sent in the delayed-ack-windowResponse: REJECT. Two variables are needed, the total amount that can be sent as well as the number of frames that the destination DEV is able to handle. The number of frames is important because there are physical limitations in the Dly-ACK generation. The other reason is that there are physical limitations in the buffer implemention, e.g. addressing. Commentor's response: The commenter agrees that there are two variables needed and it is evident by the suggestion. But what is not clear is the intention in providing number of frames of size aMaxFrameSize, instead of providing a direct bound of max on total number of octets that is entertained in the burst. The implementations can make use of this information in a useful way while the current info does not given any cluse on the size of the (MAxNumFrames - NumMAxFrameSize) of the frames. How do you expect the implementations to guess those sizes? If all of them are (aMaxFrameSize-1), they are not indicated to the rx-DEV in this frame and the rx-DEVis supposed to handle them properly. In the worst case if all of the NumMaxFrames areof the size (aMaxFrameSize-1), then NumMAxFrameSize will be indicated as zero although the rx-DEV has the pain of dealing with these mega-burst!! -- Remove "max frames" from Figure-17 and instead include a two-octet wide "total number of octets" as sum of number of octets in the payload of all frames sent in the burst. **Suggest reject:** "The TG has considered the new suggestion, but feels that ther are two different numbers that are required, one that gives the total amount of space available for frames and another that indicates the number of frames of any size that the DEV is able to receive. Both of these values have direct implications in terms of the capabilities of the implementation. An implementation will likely need to keep track of each of the frames received individually, e.g. assign them some space and a 'pointer' that indicates the start point and either a length or another 'pointer' to the end of the buffer. This places a specific requirement on an implementation that is not communicated with a single number of the total buffer space. In addition, using aMaxFrameSize is an abstraction that allows this to be used for future PHYs that may use much larger frame sizes as opposed to using only the number of bytes."

Resolution is to reject.

CID 59 (Gubbi, TR) Same as Comment 412 in LB19 Original comment:In D10 the start of Information element was adjusted to be from even pos(2 octets) to help implementations having to deal with octet levelsearching for the start of required IE. Complexity involved in octetlevel searching is too much for low-cost implementations. This will also halve the computations needed in implementations that use higher size ords (like 4-octet).Suggested Remedy:Put back the paragraph that mandated the start of an IE at evenposition of octets and hence the padding of a zero if an IE whenever thetotal size of that IE is odd number.Response: REJECT. The frame formats specified only shows the bits sent over the air. Implementations of the receiver functions of a DEV are free to pad and rearrange to any word length, endian or bit order they may choose to optimize the interface to their host. This issue was discussed multiple times before the TG agreed to make the change. Commentor's response: The comment itself is about the bits sent over the air, not some constructionwithin rx-DEV. The goal is to simplify, as much as possible, the processing of IEs. As noted in the comment, the even octet aligning of IEs does simplify the processing both in hardware and software implementations. By the time the frame arrives at therx-DEV, the damage is already done in the sense that the rx-DEV has to go through octet level processing of the frame. Hence the resolution is NOT acceptable. -- Put back the paragraph that mandated the start of an IE at even position of octets and hence the padding of a zero at the tx-DEV at the end of an IE whenever the total size of that IE is odd number of octets. **Suggest reject:** "The BRC has addressed this issues and believes that while it may help some implementations to use 16 bit alignment for IEs, other impementations may not be assisted with this. For example, a 32 or 64 bit implementation would not necessarily benefit from the 16 bit alignment."

Resolution is to reject.

CID 60 (Gubbi, TR) same as CID 414 in LB19 Original comment: In this sentence what does "multiple beacons" actually mean? Multiple beacons in the same superframe, similar to fragementing beacon, OR IEbeing present in beacons sent at different TBTT but each time with differentcontents of association info. I think what is intended is to say thatif there are too many assoc/disassoc, the beacon at current TBTT may notbe big enough to carry them all, so the remaining Dev-assoc-IEs will befilled into the next beacon sent at next TBTTSuggested Remedy:If intended, do NOT allow fragementation of beacon. Alter the sentence inln42:43 to mean that the PNC may send IE corresponding to a recent assoc/deassoc in the beacon at next TBTT if the current beacon does nothave space for it.Response:ACCEPT IN PRINCIPLE. Delete the sentence "The PNC may use multiple beacons to broadcast successive DEV association IEs if too many DEVs are associating than will fit in a single beacon.." as it is confusing and does not add any new information. The PNC is able to choose when it sends any IE.Commentor's response (LB22)The response addresses the issue only partially. For interpretations towardsconformance, "The PNC is able to choose when it sends any IE" is not correct The interpretation by vendors can go either way. that is, a group of implementors might expect the Dev-Assoc-IE contianing the recently associated DEVs to appear immediately after assoc while the rest might tolerate it appearing anytime. Hence the inclusion of the suggested remedy is required. I have rephrased the same in thefollowing text for editor's peruse (Applicable after the removal of sentence asin the response)."The the DEV association IE corresponding to an association shall be included in thebeacon sent at the start of immediate next superframe, excepting the case where thatbeacon is already at its maximum allowed size where the inclusion of IE is delayeduntil the space in the beacon permits the same." -- I have rephrased my earlier suggested remedy in the following text for editor's peruse (Applicable after the removal of sentence asin the response)."The the DEV association IE corresponding to an association shall be included in thebeacon sent at the start of immediate next superframe, excepting the case where thatbeacon is already at its maximum allowed size where the inclusion of IE is delayeduntil the space in the beacon permits the same." Suggest accept in principle – TBD need to review to determine if draft text is not clear on use IEs and Association IE in beacons.

> Accept in principle "The sentence was deleted for draft D14 as indicated in the resolution of CID 414 for LB19. The words "multiple beacons" occurs only once in D14 in the section describing ASIE and not for association/disassociation. The repetition of beacon announcements is now described in 8.6.4 for all of the announcements, including this one. Functional descriptions, such as when announcements belong in clause 8. The location of text is editorial and the repetition of these elements is already described in clause 8."

CID 61 (Gubbi, TR) Definition of wake beacon is vague and hence can cause confusion to theimplementors who are not part of TG3 -- A wake beacon is a beacon sent by PNC at a previously declared periodic interval at which time all the sleeping DEVs, except those in HIBERNATE mode, are expected to be awake and be able to receive. Wake beacons contains <TBD???> in addition to other fields/elements that can be present in beacons transmitted at other times. The BC/MC traffic in a piconet shall always be in the superframe in which a wake beacon was transmitted by the PNC.[NOTE: If beacon transmission time is defined (BTT), this can be defined as WBTT which makes the text flow naturally since wake beacon referred here is mostly to do with the time of its transmission than its contents] – Recommend accept in principle – the suggested resolution does not match the intent of the draft. Provide clarification in a single location in 8.13 to note the idea of wake beacons relationship to PS set.

> Reject, "The wake beacons are defined in 8.6.2 (for system wake beacons) and in 8.13 (for all of the wake beacons and in 8.13.2.1 (for SPS wake beacons). A wake beacon is when a DEV wakes up and otherwise is a normal beacon. It does not contain any special fields that are not present in any other beacon. The concept of the wake beacon is well defined for all power save modes and is used consistently in the draft."

CID 62 (Gubbi, TR) Same as comment 509 in LB19 (Applicable for 8.13.2 also)PS status bit map has an issue and that is, let's say DEV-A and DEV-B aremembers of the same piconet managed by a PNC. If DEV-A sees the PS-status-bit corresponding to DEV-B as set in the beacon from PNC (meaning DEV-Bis in power save mode), but in the same superframe receives a frame (directed or not) from DEV-B, can DEV-A

assume that the DEV-B is in AWAKEstate for that superframe? I think that should be allowed. it helps certainBC/MC traffic transactionsSuggested Remedy:1.If a DEV in in PSPS (SPS) mode in a superframe, but transmits a frame theDEV shall consider itself in AWAKE state and hence may enter SLEEPstate only after another succesful transaction of power-save-commands(s)with PNC.AND2. The DEV shall enter SLEEP state only at the start of superframefollowing the succesful transaction of power-save-commands(s) with PNC.Response:ACCEPT IN PRINCIPLE. 1. A DEV in PSPS keeps it's GTS and may transmit in them. This does not imply that the DEV wishes to change power save mode. 2. It is specified in 13.1 that a DEV may enter the SLEEP state only after having received an ACK from PNC on a PS mode change command with the PS Mode set to PSPS.Commentor's response (LB22) The comment exposes an ambiguity in the interpretation of PS-status bits and frame transmissions by a PSPS DEV as read in the draft (D11). But the resolution is just an explantory to the commentor with no clarification in the draft. Hence the ambiguity in the draft is still left remaining. -- 1.If a DEV in in PSPS (SPS) mode in a superframe, but transmits a frame the DEV shall consider itself in AWAKE state and hence may enter SLEEP state only after another succesful transaction of power-save-commands(s)with PNC. AND 2. The DEV shall enter SLEEP state only at the start of superframefollowing the succesful transaction of power-save-commands(s) with PNC. – Suggest reject The text seems to request the operation similar to APS where the DEV is required to request PS repeatedly. Is it a misunderstanding or a preference of operation?

> Reject: "It is clear in the text that AWAKE and SLEEP states are not the same as a power save mode. A DEV will be in AWAKE and SLEEP states when it is in a power save mode or even when it it ACTIVE. The draft clearly states this on page 214, line 54 'Regardless of the power save mode, a DEV is allowed to go to the SLEEP state during a CTA where it is neither the source or the destination. A DEV is also allowed to switch to the AWAKE state during any time when it is in a power save mode.' Thus, the second sentence clearly states that a DEV may be AWAKE for some period of time without changing its power save mode. Since AWAKE means either transmitting or receiving, a DEV is allowed to send frames without changing its power save mode. This is an intended feature of 802.15.3's power save modes that is an different from the 802.11 power save modes."

CID 64 (Gubbi, TR) Change of GTS into CTA from D11 to D14 in clauses 5, 7 & 8:AT many places in clause-8, this has caused lot of confusion.For example pp-188, ln-17:18 where the first reader can easily confuse this with PNC listing the CTA information in the beacon as opposed to the GTS allocation in that superframe. To a vetern 802.15.3-WPANer this may seem same, but they are not. CTA is only a way of providing a GTS, there may be other ways in the future. change back all the GTS as they were in D11 in Clause 7 and 8. -- Revert back to the use of GTS when referring to time slot in super frame and CTA being limited to the component present in the beacon that is used to allocate a GTS to a DEV. Suggest accept in principle – Review draft and edit cases of CTA that are used without clarification of CTA IE vs CTA in CFP.

> Reject, "The name of an element in the standard is editorial decision, not technical one. A CTA is time allocated during the superframe. A CTA block is an element in an IE that tells a DEV when the CTA is allocated, the stream index, source DEVID and destination DEVID. A collection of CTA blocks is called a CTA IE that is put into the beacon. Thus the component in the beacon is either the CTA IE or the CTA block, but never the CTA. The technical editor is considering if a change to the name for the time allocation is appropriate, but any such change is editorial and not technical."

CID 67 (Gubbi, TR) Lines 53-54 on pp-178 with lines 1-3 on pp-179 create an unnecessary special case for starting backoff algorithm at the start of CAP. The save is not worth the special case at the lowest level of MAC where Backoff algo is run. Added to that, applicability of this special case gets narrowed by another level by the probability of not-correctly-receiving the beacon and/or the last extended beacon by a DEV. Although this specail case has a "may" in it and hence does not enforce its applicability, it is worth the space in the standard given the above reasoning. -- Change "SIFS" to "BIFS" in Lines 53-54 on pp-178 and lines 1-3 on pp-179 Suggest table for group.

> Reject "If the DEV does not correctly receive the beacon, it cannot use the CAP anyway. If it correctly receives the beacon, it knows if there are extended beacons and it knows when the beacon

eneded. If it is too complex for the DEV to implement this special case, it doesn't have to do it. However, if the DEV can use this, it should be allowed to."

CID 68 (Gubbi, TR) Table-120:Definition of MIFS and BIFS: Since MIFS is less than SIFS, make them same as SIFS. The channel time saving by the use of MIFS is very little given the probability of its use, but this is another unnecessary IFS that the MAC has to deal with and it is not optional. Making MIFS same as SIFS adds to uniformity at the lowest level of MAC. If the committee is so bent on saving channel time, please explore putting back the chaining of commands and similar options where the saving is huge and not just a few (at most 10+) microseconds. -- Change MIFS to SIFS in the draft Suggest reject – The Intent of MIFS is reduce overhead with a single CTA with multiple frames that to not entail a transmit/receive switch. The benefit with the 2.4GHz PHY of the draft is nominal but with increased data rates of alt-PHYs the overhead becomes pronounced.

Reject "While the benefit with the 2.4GHz PHY of the draft is nominal, it is still about 5% at the highest data rate. With increased data rates of alt-PHYs the overhead becomes pronounced and is necessary to realize the promise of higher throughput. While chaining commands could save some overhead, commands are sent very infrequently while the vast majority of the traffic in the piconet is data. Thus, reducing the overhead for data is much more important than reducing the overhead for commands. Currently, the draft defines four IFS, all of which are based on the characteristics of a PHY. The MIFS relates directly to a PHY's ability to send or receive multiple frame when it does not have to switch between sending or receiving. Thus it makes sense to keep this as a separate parameter."

CID 69 (Gubbi, TR) Table-120: PLEASE summarise all PHY parameters (aCCADetectTime, aPHYSIFSTime etc.) in a table at one place instead of spreading them all around the PHY clause (something on the lines of Table-64, for MAC, is very desirable from implementors' view). Although Table-65 provides a list of PHY parameters in a table, the values have to be searched through in those referred clauses, which can easily be avoided. -- Create a summary table of PHY parameters instead of spreading them all over the PHY clause(s). Suggest accept in principle – There is already a single table in d14 for interframe spacings. Text to provide a single location for all parameters should be provided by clause 11 editor.

Accept in principle "The location of the parameters in the draft is an editorial decision, not a technical decision (and this location did not change from draft D11 to D14). However, the technical editor will consider putting all of the parameters into a single table at the end of the PHY clause."

CID 70 (Gubbi, TR) 8.13 - Table-66. The cell corresponding to "Hibernate in wake superframe" column and "Beacon" row contradicts the text on pp-220, lines36-41 where the hibernating DEVs are allowed the liberty of sleeping through "any" beacon until they themselves change over to ACTIVE state (and it should be within ATP to retain the membership of Piconet) -- Change the referred entry from "AWAKE" to "May sleep" Recommend accept in principle – a note should be added for the table 63 cell regarding HIBERNATE wake superframe. Although the text is correct, distinguish the HIBERNATE from other PS wake superframes.

Accept in principle "The text above the table indicates that the HIBERNATE DEV only wakes up when it wants to listen to the beacon and that is called its wake beacon. Therefore, the table is correct since a HIBERNATE DEV's wake superframe is defined as any superframe where it listens to the beacon. The relevant text fro 8.13 is 'The wake beacon for a DEV in HIBERNATE mode occurs at times determined by the DEV and is unknown to the PNC and other DEVs in the piconet. Unlike the SPS and PSPS wake beacons, the wake beacon of the DEV in HIBERNATE mode is not periodic and is only guaranteed to happen once per ATP period for that DEV.'"

CID 71 (Gubbi, TR) 8.14 - See CID-446, 477, 478 and 479 in LB19 Use of Vendor specific command is the answer to the issue that is intended to be solved through this app-specific IE. -- Remove this subclause and references to ASIE from the draft. Recommend reject – This may not be resolvable.

Reject, “The ASIE is intended to be included in the beacon as an announcement. A command cannot be sent in the beacon so the vendor specific command would not be applicable to solve this need. The ASIE was put in to enable new functionality for some DEVs without breaking compatibility for all DEVs. Since the TG cannot possibly forsee all uses that might be required, this is left to be defined by the vendors.”

CID 216 (Shvodian, TR) There should not be an MLME that is sent every beacon. Get rid of this MLME.

Accept in principle, “Change ‘upon reception of a beacon containing an ASIE containing its DEVID.’ to be ‘upon reception of a beacon containing an ASIE containing its DEVID, as described in {xref 8.14}.’”

CID 78 (Heberling, TR) - [CTA] Range of AvailableNumTUs is wrong. CTR response carries only one octet for this parameter, see 7.5.5.2/KO. Valid range for AvailableNumTUs is 0-255.

Accept, “The requirements for this field are set out in clause 7.5.5.2, so the range in clause 6 should match. Change as indicated. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 79 (Heberling, TR) - [CTA/Asynch] AvailableNumTUs never returned for asynchronous requests (neither is the primitive!)/KO. Change description to: "The number of TUs available to the requesting DEV for allocation"

Accept, “The description does not match the usage that is clearly defined in clause 8. Change as indicated in the comment. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 80 (Heberling, TR) - [CTA/Term] The source is not informed about termination via the NULL CTA, it's informed via the CTR response from the PNC. Ref Fig 120, page 193 and 8.3.4 page 176 line 16-17./KO Change sentence to: This primitive is used to inform the SrcDEV DME that the MLME has received a channel time response command indicating that the channel time that was previously allocated has been terminated by the PNC or the TrgtDEV. It may also be used to indicate to the TrgtDEV DME that the MLME has seen a null-CTA in the beacon with its DEVID, BcstId or McstID as the destination.

Accept in principle, “Change ‘This primitive is used to inform the source DEV that channel time that was previously allocated is no longer present in the most recently received beacon.’ to be ‘This primitive is used to inform the DEV DME that a stream has been terminated.’ After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 218 (Shvodian, TR) - If conformant DEVs are not allowed to send reserved values in fields, how does a DEV receive a reserved value? Unsupported version? Clarify by changing the sentence to: "Reserved values in non-reserved fields shall not be transmitted by conformant DEVs. However, a DEV may receive frames of a different protocol version with values that it considers to be reserved values in non-reserved fields.

Withdrawn, 11 November, 2002.

CID 225 (Shvodian, TR) - What does "may be decoded" mean? Change to "may be ignored"

Accept in principle, “Change ‘may be decoded’ to be ‘may be ignored’ in two tables, 47 and 48 since the terms are technically equivalent. However, this needs to be changed for consistency in the draft. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 240 (Shvodian, TR) - WHy is there a MaxRetransmissionLimit? Does that mean that a DEV that tries to associate and gets no response must self destruct? Get rid of maximum retransmission limit. That should be left to the implementer.

> Accept in principle, “The retry limit is defined in 8.8.4. The only location this parameter is referenced is in 8.4.3, page 179, line 22 which has to do with the backoff procedure and not the retry limit. Consequently, to clean up the organization, delete the sentence ‘The DEV ... is reported through the MAC-SAP interface.’ and delete the parameter in table 64 since the parameter is not used in the draft. After discussion, the commenter agreed that this comment is editorial and not technical.”

CID 232 (Shvodian, TR) - What about unsupported sub-rate? Add "or unsupported sub rated"

> Reject. “This error code was not changed from D11 to D14. The commenter is encouraged to resubmit this comment in sponsor ballot.”

Recessed at 10:06 pm HAST.

Summary as of recess on 11 November, 2002: T & TR - 88, TR - 60, T - 28, E - 121.

1.2.3 Working list of comments

216 - Suggest reject or withdraw.

186 - Suggest reject or withdraw.

140 - Suggest reject or withdraw.

86 - Suggest reject or withdraw

87 - Suggest reject or withdraw

238 - Fix if possible? Old comment?

97 - Suggest reject or withdraw, probably fragment probe command?

191 - Suggest reject or withdraw.

101 - Suggest reject or withdraw

103 - Suggest reject or withdraw

207 - Suggest reject or withdraw

165 - Suggest reject or withdraw

239 - Suggest reject or withdraw

MCTA

190 - Suggest reject or withdraw

189 - Suggest reject or withdraw

CWB

84 - Suggest reject or withdraw, possibly withdraw?

204 - Suggest reject or withdraw

205 - Suggest reject or withdraw

206 - Suggest reject or withdraw

136 - Suggest reject or withdraw

139 - Suggest reject or withdraw

116 - Suggest reject or withdraw

172 - Suggest reject or withdraw.

175 - Suggest reject or withdraw.

119 - Suggest reject or withdraw

193 - Suggest reject or withdraw

89 - Suggest reject or withdraw? Or can we add a clarification as to how to set this.

177 - Suggest reject or withdraw.

208 - Suggest reject or withdraw.

PM/Wakeup

183 - Suggest reject or withdraw

184 - Suggest reject or withdraw

185 - Suggest reject or withdraw

115 - Suggest reject or withdraw

PNC/Scan

118 - Suggest reject or withdraw

179 - Suggest reject or withdraw.

178 - Suggest reject or withdraw.

2. Editorial CIDs

CID 75, 86 (Heberling, E) - Parameter "ACLInfoSet" is called "ACL Record" in 7.5.4.4/KO. pick one “Replace ‘ACL record’ in 7.5.4.4 with ‘ACLInfoSet’”

CID 222 (Shvodian, E) - Change payload to Secure Payload Change payload to Secure Payload. Also show that everything in the figure but the FCS is part of the MAC payload. Accept.

CID 12 (Barr, E) - Verification info length(=L2) does not seem to be required since the length of the ACL record field will determine length of the Verification info. Remove Verification info length if not really required. Suggest reject.

CID 197 (Rasor, E) - The current text reads: "The authentication and challenge commands are designed to be used with security turned off." Is this an accurate statement? Withdrawn? Otherwise, Accept in principle: “The statement is accurate, the security for the authentication procedure comes from the protocol that is used not via an integrity code on any of the individual frames. The protocol calculates an integrity code for the entire authentication process which verifies the identity of the participants in the exchange.”

CID 20 (Barr, E) - Market suitability criteria seems to be incomplete. Change "The protocols have been reviewed by" to "The protocols have been reviewed by (whomever reviewed these protocols)" Accept in principle. “Delete the dashed item. ‘Market suitability: The protocols have been reviewed by to ensure that they satisfy the requirements of 802.15.3 applications.’”

3. Status summary

3.1 Status at opening of Kauai meeting

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Table 1—Ballot resolution at opening of Kauai meeting

Type	LB22
T (technical)	34
TR (Technical required)	90
T and TR	124
E (editorial)	121
Total	245

3.2 Status at closing in Kauai

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Table 2—Ballot resolution as of close of Kauai meeting

Type	LB22	Unresolved as of 15 November, 2002
T (technical)	34	
TR (Technical required)	90	
T and TR	124	
E (editorial)	121	
Total	245	