IEEE P802.15
Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)
Title	**TG3 D10 running comment resolutions**
Date Submitted	[21 August, 2002]
Source	[James P. K. Gilb] Voice: [858-538-3903] [Appairent Technologies] Fax: [858-538-3903] [9921 Carmel Mountain Rd. #247, San E-mail: [gilb@ieee.org] Diego, CA 92129]
Re:	[]
Abstract	[This document is a record of comment resolutions for LB17.]
Purpose	[To provide a record of the comment resolution for LB17.]
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.
Release	The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15.

1. PICS review call

Attendees: John Barr, Jay Bain, Knut Odman, Bob Huang, James Gilb, James Allen

Meeting called to order at 12:08 pm PDT.

Table F.1 - No problems.

Table F.2 - No problems.

Table F.3 -

Jump to table F.5

S1 is OK

Delete S2, mode 1 support and renumber.

S2 (new is old S3)

S2.1 - ECMQV is S2: O.2

S2.2 - Ntru is S2: O.2

S2.3 - RSA is S2: O.2

S3 - OK, but renumber

S3.1 - ECMQV X509 certs, S3: O.3

S3.2 - ECMQV Implicit certs, S3: O.3

S3.3 - RSA X509 certs, S3: O.3

S4 - Supports acting as security managers, {xref 9.7.1}, FD2 & S2: M, S2: O

Back to table F.3 (note, need to renumber security modes in this table).

MF2.4 - is just Imm-ACK

Delete second MF2.4.

Rest of MF2.x is OK

MF3 now,

MF3.3 is gone, now is part of the beacon.

MF3.6 should be M, O with xtra xref 8.13.2

MF3.7 deleted, now part of the beacon.

MF3.9 should be M and FD2: M

MF3.10 has been deleted.

MF3.11 may be moved and renamed but it is still optional.

MF3.12 now parent PNC BSID, should be FD2: O/M depending child neighbor O for receiver.

MF3.15 will be deleted.

MF3.19, MF3.20 and MF3.21 will deleted.

MF3.22 will be changed to M and FD2: M

That finishes MF3

MF4 now

MF4.1 and MF4.2, change FD1: M to just be M.

MF4.13 is gone

MF4.14 is OK

New MF4.xx PNC handover response command, FD2: M and FD2:M

MF4.19 - deleted.

MF4.20 and MF4.21, change FD1: M to just M.

MF4.22 is O and M

MF4.23 is M and O.

MF4.26 is O and M.

MF4.24 and MF4.25, change FD1: M to just M.

MF4.27 and MF 4.28 are deleted.

MF4.29 is renamed and is OK as written.

MF4.34 new that is Vendor specific commands, O and O.

Back to

MF4.4 S2: M and S4: M

MF4.5 S4: M and S2: M

MF4.6 S4: M and S2: M

MF4.7 S2: M and S4: M

MF4.8 S2: M and S4: M

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

MF4.9 S4: M and S2: M

MF4.10 S4: M and S2: M

MF4.11 S2: M and S4: M

MF4.12 S2: M and S2: M

Now table F.4

MLF4.1 Parent PNC supports request mechanism for creating a child piconet. M

MLF4.2 PNC capable DEV support of becoming a child PNC. O

MLF5.1 Parent PNC supports request mechanism for creating a neighbor piconet. O

MLF5.2 PNC capable DEV support of becoming a neighbor PNC. O

MF3.12 is O and O due to the above decision.

(note: The above 5 really should be FD2: as a modifier for all since these describe PNC capable functions only. The only exception is MF3.12 receiver where DEVs receive this element and optionally pay attention to it.)

MLF13 is deleted, was for old process.

MLF17 change to FD2: M

MLF18.2 Extended beacon support, FD2: O.

MLF20 BF'ed and no M.

MLF20.4 will be deleted.

MLF20.5 Optional (rename 21)

Rename MLF20.6 - rename.

MLF21 - re-do formatting.

Below MLF21.4

22.1 Moving beacon - FD1: M, FD2: O, MLF4.2: M MLF5.2 M

22.2 Changing superframe duration - FD1: M, FD2: O, MLF4.2: M MLF5.2 M

22.3 Setting the BSID and PNID (this is moved from above) - M

22.4 Maintaing sycnrhonization in child and neighbor piconets. - MLF4.2: M MLF5.2 M

MLF23 - change to O

MLF24 remove O and make a heading.

MLF24.1 - becomes PSPS, O

MLF24.2 and MLF24.3, xref should be to 8.12.2.

MLF25 remove M and make a heading.

MLF25.1 - FD1: M, FD2: O

MLF25.2 Request transmitter power adjustment: O

MLF25.3 Adjust transmitter power as requested: M

Finished review.

Meeting adjourned at 2:13 pm PDT.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

2. Comment resolution in Schaumburg

2.1 Thursday, 8 August, 2002

Attendees: John Barr, James Gilb, Jim Allen, Mark Schader, Dan Bailey, Gregg Rasor, Rene Struik, Knut Odman, Allen Heberling, Bill Shvodian, Robert Huang, Jeyhan Karaoguz, Jay Bain, Mike Harvey.

Meeting called to order 8:35 am, CDT, Thursday 8 August, 2002.

2.1.1 Other issues

450 (Gilb, TR) - The beacon can be quite long, allow it to be split in two. Either add a last field (0 for more fragments, 1 for final fragment) or allow the beacon to be fragmented with the fragmentation process, possibly with an upper limit of 2 or 3 fragments. Allow DEVs to act on any fragment they hear. Put the piconet syncrhonization IE in each fragment so DEVs know the timing for any fragment they hear. **Suggest accept in principle**, "Allow the beacon to be fragmented into two sections, each one of which has the piconet sychronization elements. Use the fragmentation field to indicate which is which. Add text that says "A DEV that correctly receives the header of the first beacon fragment may use channel time allocations in the frame body of a beacon fragment which has also been correctly received."

Accept in principle, "Add to 8.6.2. Allow the PNC to send IEs in probe frame (DestID = BcstID) in either a broadcast MTS following the beacon or in a probe frame (DestID = BcstID) in the CAP one SIFS after the beacon (i.e. it cheats on the back off rules). If the beacon is too large, then the PNC may put the other IEs in the following probe frame(s). Make sure SPS DEVs have some way to know that more important information is to follow. How about using the more data bit to indicate this? Or use MSTF IE. Also, make sure that if the beacon is protected with security then the probe command that follows should also be protected with security. JPKG will have new text for tomorrow in 02/273r13."

'If the PNC determines that the beacon is too large or if it wishes to split the information in the beacon, it may send one or more probe command with the SrcID set to the PNCID and the DestID set to the BcstId following the beacon. If the PNC has allocated time for the CAP, then the first probe command shall be sent one SIFS following the beacon with any additional probe commands following one SIFS after the the prior probe command. If the PNC is using MTSs instead of the CAP, then the probe command shall be sent in the first MTS assigned in the superframe. This MTS shall have the SrcID set to the PNCID and the DestID set to the BcstID. If the PNC sends some of the beacon information in the broadcast probe frames, it shall set the more data bit to indicate 'more data' in the frame control field of the beacon frame and in all but the last probe command frame used to communicate the information elements. The PNC shall send CTA IEs, Piconet BSID, SECID IE or the Parent BSID IE only in the beacon frame and not in any of the broadcast probe frames. Since the probe frames are sent to the BcstID, the ACK policy shall be set to no-ACK in the frames.'

Accept suggested resolution.

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it. ADH to provide suggested text tomorrow, 7 August, 2002.

Accept in principle, "Modify Clause 6 as indicated in 02/273r15." 1

2

180 (Heberling, TR) KO> Informing the receiver when a pseudostatic CTA is moved will be so much over- 3
head that it's unmanagable. Besides, the constructions in there to avoid transmitter contention. Receiver con- 4
tention is ok! Let whoever missed the CTA in the beacon listen to the whole superframe. Besides, if the 5
intended receiver misses the CTA in the beacon, how is it going to find out when the PNC wants to inform it 6
about the change? 2nd problem: A PNC must have the authority to arrange CTA as it pleases. It cannot be 7
stopped by a DEV not responding. Especially if it needs to rearrange CTA to fit in a request from a new DEV 8
in a timely fashion. The PNC shall make an effort to inform the transmitter but it shall always proceed with 9
the change. A third problem is that once the PNC has decided to change something, it must proceed. PNC 10
may have a stronger signal than the DEV, hence the PNC doesn't hear the acknowledgements but the DEVs 11
have heard the order to change. Consequently the PNC must finish what it has started. Therefore, see Reso- 12
lution [08] in 02276r3P802-15_TG3-commentsD10_KO.doc, page 15. **Suggest accept** 13

14

Table until Wednesday, 31 July, 2002, the solution seems OK, WMS will check for consistency. 15
Table until Schaumburg, Tuesday morning. 16

17

Bill to propose just moving the CTAs in the beacon and let the DEVs handle it. The receiever may 18
miss a few. Other alternative is to notify in the beacon the old CTAs so that the receiver may listen to 19
those as well. 20

21

Accept in principle, "Have the PNC put the new CTAs in the beacon and ensure that the old time is 22
not allocated until aMaxLostBeacons have passed. The receiver should listen to both the old and 23
new. Also add that pseudo-static GTSs shall not have sub-rate allocations. The PNC tells the destina- 24
tion via a directed frame when a stream with pseudo-static GTSs is allocated to them." 25

26

94 (Heberling, TR) - Delete lines 1-5 regarding the definitions of the PNC response field subfields. Delete 27
lines 11-12 regarding the piconet services IE which has been negativly commented on numerous times. 28
Please make the requested changes. **Suggest accept in principle**, "The resolution of the PNC response issue 29
is documented in other CIDs, see 808, 191, 92, 12, 86 and 357. The resolution of the PN services IE is docu- 30
mented in CIDs 170." 31

32

Accept suggested resolution. 33

34

17 (Heberling, TR) - PNCResponse is an unnecessary parameter. Consequently delete it. ACDEVAddress is 35
no longer needed per comments regarding clause 8.2.3. Consequently, delete it from the table. Also Delete 36
NewPNCTimeout since it is no longer needed per comments in clause 8.2.3. Suggest accept in principle, 37
"The PNC response will be kept, see CIDs 808, 191, 188, 10, 92, 12, 86 and 357. Delete ACDEVAddress 38
and NewPNCTimeout." 39

40

Accept original comment. 41

42

135 (Heberling, TR) Requests for asynchronous and isochronous channel time have two completely differ- 43
ent sequences. Therefore the two can never be combined in the same request. Consequently, <add two sen- 44
tences> The same channel time request frame cannot contain CTRB for both asynchronus and isochronous 45
channel time. Incorrectly formatted requests shall be rejected by the PNC with the result code set to 46
ILLEGAL_REQUEST. **Suggest Accept** 47

48

"Change on page 181, line 53 and 54, 'A new asynchronous CTR to a target DEV or group of target 49
DEVs replaces the previous one and unallocated TUs from a previous request shall be replaced by 50
the current request.' to be 'A new asynchronous CTR to a target DEV replaces the previous request 51
for that target DEV and unallocated TUs from the previous request shall be replaced by the current 52
request. A new asynchronous CTR to a group of target DEVs replaces the previous request and unal- 53
located TUs from a previous request shall be replaced by the current request.'" 54

Agree to allow create, modify and terminate for isochronous and asynchronous into a single request frame. Allow multiple responses to a request, this requires changing the channel time response command. The new text will be.

(begin new text)

octets: 5	...	5	5	2	2
Response-n	...	Response-2	Response-1	Length (=variable)	Command type

Figure 1—Channel time response command format

The response field shall be formatted as illustrated in Figure 2.

octets: 1	2	1	1
Reason code	Available number of TUs	Stream index	Stream request ID

Figure 2—Response field format.

(end new text)"

485 (Gilb, T) - The use, in this standard of the DME/MLME boundary can be confused with architectural decsions rather than simply a split that was created to facilitate describing the standard. Add a paragraph that describes that the DME contains the functionality that is outside of the scope of the standard and other management functions while the MLME and MAC contain the functionality specified in the standard. Also add that the split is arbitrary and is not intended to be an architectural split for an implementation. **Suggest accept.**

Accept "Add text 'The split in functionality between the MLME and DME in this standard is intended to facilitate the formal verification of the protocol. It is not intended to be an architectural description of a particular implementation. Implementers are free to split the functionality between the DME and MLME as required in thier implementation."

2.1.2 Continue PS resolution

CIDs 361, 365, 822, 1158, 823, 1159

361 (Heberling, TR) - The current wakeup mechanisms are not sufficient to wake up a DEV when a major system change occurs. Examples are channel change, PNC handover, beacon duration or location change and PNID change. A method is needed to allow all APS and SPS devices to easily check if a system change is in progress. The intervals for such checks must be decided by PNC. See resolution [13] in 02276r0P802-15_TG3-commentsD10_KO.doc A system change bit is added to the mode field of the PNC synchronization IE. All DEVs are required to check this bit at minimum intervals. The bit is unrelated to any APS and SPS wakeup method.

Accept in principle, "Add to 8.x Changing piconet 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.'" Also add this to 8.2.3 and possibly 8.11 Channel change."

365 (Heberling, TR) - The powersave modes are a disaster. They don't conform to the other frame formats, neither to the terminology of the rest of the standard. The beacon shares no info about when a certain SPS is awake. There is no handover procedure. A DEV can join several SPS but how does it know when to be awake? How do you send to broadcast of DEVs are in different SPS? What are you supposed to do with "suspended CTA?"? How does transmitters know when an intended receiver is awake? How does it fit wit with ATP? With pseudostat? with subrate? The APS doesn't work either, since there is no commonly agreed upon wake beacons to put the PCTM in. How is PNC supposed to calculate available CTA when DEvs of different SPS may end up with all their CTA needs in the same superframe at some intervals? The idea with PCTM is wrong since PNC should accept or reject CTR instantly. SPS interval is mentioned in clause 8 but never defined A much simpler power save solution is needed.   See resolution [14] in 02276r0P802-15_TG3-commentsD10_KO.doc

822 (Shvodian, TR) - APS needs to be modified. See XSI powersave submission.

823 (Shvodian, TR) - SPS mode should be merged with a modified APS. See XSI powersave submission.

1158 (Schrader, TR) - There is a possibility of eliminating APS and providing similar functionality. This would simplify the standard. Consider the following mode: An SPS CTR Type with CTR Interval defining its awake beacon interval. When the source DEV switches to SPS mode, it has no channel time allocated to it, but shall listen to its awake beacons CTAs and its PCTM. If an ACTIVE DEV can set the PCTM bit, this mode is similar to APS mode, except that the SPS DEV listens to beacons at fixed intervals and can stay in SPS mode indefinitely (assuming no PCTM event).

> Suggest accept in principle, "APS will be replaced by the proposal in 02/273r15"

1159 (Schrader, TR) - No good method exists for the creator of an SPS set to move with other DEVs to a new SPS Set for the battery powered unit. The best way for multiple DEVs to transition to new SPS timing is to leave one set and join the replacement set. Since multiple devices may be in the first set, this will only work if there are at least 2 SPS sets in existence at the same time during the transition. Change the minimum number of SPS Sets from 1 to 2 (or more) for a battery powered unit.

1155 (Schrader, TR) - Uniform use of CTR interval and SPS Sets for both ACTIVE and SPS CTR Types is not documented. It is better to make the selection of the time base source explicit rather than implicit. It is easier to understand and easier to implement. Document 02/231r0 adds the text, a figure, and the "Time Base" CTR control field.

> Accept in principle, "Make the changes as indicated 02/231r3."

2.1.3 PN Services

202, 204, 63, 306, 65, 170, 308, 395, 90, 88, 397, 396, 309, 189, 802, 107

202 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE.

> Accept in principle, "Replace the current PN services IE with the text in 02/273r15. This will replace the DEVPiconetServicesIE with another element that request the broadcast of the piconet services."

204 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove table entries DEVPiconetServicesIE and PNCPIconetServicesIE.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15. This will replace the DEVPiconetServicesIE with another element that request the broadcast of the piconet services. The PNCPiconetServicesIE will be deleted."

306 (Shvodian, TR) This IE does not belong in the standard. This function belongs above the MAC. Besides, this is never sent in the beacon. It is a field in the association request and response and should not be an IE. Remove 7.4.23 **Suggest accept in principle**.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

63 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete table 30. **Suggest reject** as the solution for CID 306 addresses the issue.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

170 (Heberling, TR) The piconet services information element is a potentially powerful information element. Unfortunately, because its definition does not specify in any detail the contents of either the Piconet services field or the type field, this info element represents an interoperability liability. Consequently, this information element should be deleted from the specification until such time a complete definition is provided. Delete the piconet services information element or provide a detailed definition. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

65 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. delete the clause 7.4.23 about piconet services. **Suggest reject** as the solution for CID 306 addresses the issue.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

308 (Shvodian, TR) Piconet services IE should not be in the standard if the contents are not specified. Remove piconet services IE. **Suggest reject** as the solution for CID 306 addresses the issue.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

90 (Heberling, TR) The piconet services IE is incompletely defined. Either add more detail as requested in Clause 7.4.23, P127, L28 or delete this IE from the command. Please perform either of the requested changes. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

395 (Heberling, TR) Since the Piconet Services element is incompletely defined, please remove this IE from figure 48. **Suggest reject** as the solution for CID 306 addresses the issue.

Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

397 (Heberling, TR) Remove the Piconet services IE from the Association response command since the comment in C7.4.23 P127, L27 recommends deleting this IE. **Suggest reject** as the solution for CID 306 addresses the issue.

Accept in principle, "The piconet services IE will be removed from the command. The current PN services IE will be replaced with the text in 02/273r15."

88 (Heberling, TR) The piconet services IE is another one of those weasel information elements that attempts to add functionality to the 15.3 MAC without specifying the details of the functionality it attempts to add. Consequently, the piconet services IE needs to be either described in more detail so that the potential for interoperability issues is eliminated or it should be deleted. Please either provide more detail or delete this information element from the 15.3 MAC specification. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

396 (Heberling, TR) Delete the sentences between lines 6 and 7 regarding the piconet services IE. The lack of specific details makes this IE a potential interoperability problem. **Suggest reject** as the solution for CID 306 addresses the issue.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

309 (Shvodian, TR) Piconet services does not belong in the standard if its use is not standardized. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

802 (Shvodian, TR) The piconet services IE does not belong in a standard since it is completely unspecified. **Suggest reject** as the solution for CID 306 addresses the issue.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

107 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete clause 8.3.2. **Suggest reject** as the solution for CID 306 addresses the issue.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

189 (Heberling, TR) this clause describes a potentially worthwhile information exchange within the piconet. Unfortunately, the lack of detail regarding the services that a piconet or DEVs in the piconet provide opens the door for serious interoperabilty issues. Consequently, it is recommended that until the details of which services are provided and encoded, this clause should be deleted from the specification. **Suggest reject** as the solution for CID 306 addresses the issue.

    Accept in principle, "Replace the current PN services IE with the text in 02/273r15."

2.1.4 Bit order

150 - Current BRC vote tied, 2/2/4, waiting for JK.

Meeting adjourned at 3:00 pm CDT.

2.1.5 Text for channel scan, remote scan, start and sync resolutions

6.3.2 Scan

Table 1—MLME-SCAN primitive parameters

Name	Type	Valid Range	Description
Open Scan	Boolean	TRUE, FALSE	Indicates whether scan is an open scan or not. Open scan is defined in 8.2.1.
PNID	Integer	0-65535	The ID of a specific piconet for which to scan.
BSID	OctetString	As defined in 7.4.2	The text string of a specific piconet for which to scan.
Channel List	Ordered set of integers	0 to the maximum number of PHY channel as defined in {xref 11.2.3.}	Specifies a list of channels to be examined when scanning for either a specific PNID/BSID or any PNID/BSID.
ChannelScanDuration	Duration	0-65535	The length of time in milliseconds that the DEV is to spend scanning a channel to find either a specific PNID/BSID, or any PNID/BSID.
NumberOfPiconets	Integer	0-255	As defined in {xref 7.5.6.4}
PiconetDescriptionSet	Set of piconet descriptions	As defined in {xref Table 2	The PiconetDescriptionSet is returned to indicate the results of the scan request. It is a set containing zero or more instances of a PiconetDescription.
NumberOfChannels	Integer	0-n PHY dependent channels defined in {xref 11.2.3}	Indicates the number of channels scanned
ChannelRatingList	Ordered set of integers.	0- the maximum number of PHY dependent channels defined in {xref 11.2.3}	As defined in {xref 7.5.6.4}
ResultCode	Enumeration	SUCCESS, INVALID_PARAMETERS	Indicates the result of the MLME request.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

Table 2—Elements of PiconetDescription

Name	Type	Valid Range	Description
BSID	As defined in Table 1	As defined in 7.4.2	The text string of a discovered piconet.
PNID	As defined in Table 1	As defined in Table 1	The PNID of a discovered piconet
PiconetType	Enumeration	PNC, DEPENDENT	The Piconet type of a discovered piconet.
ScannedFrameType	Integer	0-2	0->NoFramesfound 1-> Beacon 2->NonBeaconFrame
ChannelIndex	Integer	0-255	A PHY dependent channel as defined in {xref 11.2.3}
SuperframeDuration	Duration	0-65535	The superframe duration in microseconds of the discovered piconet.
CAPEndTime	Integer	0-65535	As defined in {xref 7.4.3}.
SECID	Integer	0-65535	As defined in {xref 7.x.x}
CAPDataAllowed	Boolean	TRUE, FALSE	As defined in {xref 7.4.3}
CAPCmdsAllowed	Boolean	TRUE, FALSE	As defined in {xref 7.4.3}
CAPAssocAllowed	Boolean	TRUE, FALSE	As defined in {xref 7.4.3}
SECmode	Enumeration	MODE_0, MODE_1, MODE_2	As defined in {xref7.4.3.}

6.3.2.1 MLME-SCAN.request

..."The semantics of this primitive are:

```
MLME-SCAN.request                    (
                                     OpenScan,
                                     BSID,
                                     PNID,
                                     ChannelList,
                                     ChannelScanDuration
                                     )
```

6.3.2.1.1 When generated

..." initiate a passive scan for either a specific BSID, PNID, or for any BSID and/or PNID.

6.3.2.2 MLME-SCAN.confirm

...”The semantics of this primitive are:

MLME-SCAN.confirm   (
                                     NumberOfPiconets,
                                     PiconetDescriptionSet
                                     NumberOfChannels,
                                     ChannelRatingList,
                                     ResultCode
)

6.3.3 Start

6.3.3.1 MLME-START.request

Table 3—MLME-START primitive parameters

Name	Type	Valid range	Description
PNID	As defined in {xref Table 1}	As defined in {xref Table 1}	The PNID of the new pico-net
BSID	As defined in {xref Table 1}	As defined in {xref 7.4.2}	The BSID of the new pico-net.l
Channel Index	As defined in {xref Table 2}	as defined in {xref Table 2}	Indicates the PHY depen-dent channel {xref 11.2.3} in which to start a piconet.
SuperframeDuration	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
CAPEndTime	As defined in {xref Table 2}	As defined in {xref Table 2}	As defined in {xref Table 2}
SECID	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
CAPDataAllowed	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
CAPCmdsAllowed	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
CAPAssocAllowed	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
SECMode	As defined in {xref Table 2}	As defined in {xref Table 2}	as defined in {xref 7.4.3}
ResultCode	Enumeration	SUCCESS, INVALID_PARAMETERS, PICONET_DETECTED.	Indicates the result of the requested action.

..."The semantics of this primitive are:

```
MLME-START.request                    (
                                      PNID,
                                      BSID,
                                      ChannelIndex,
                                      SuperframeDuration,
                                      CAPEndTime,
                                      SECID,
                                      CAPDataAllowed,
                                      CAPCmdsAllowed,
                                      CAPAssocAllowed,
                                      SECMode
                                      )
```

6.3.3.2 MLME-START.confirm

6.3.3.2.2 Effect of receipt

..."the ResultCode shall be set to PICONET_DETECTED." Delete remaining sentences following this frag-ment. Then add this text: The PNC DME then has the option of either sending another MLME-START.request to its MLME with a different ChannelIndex to start a piconet in a different channel or to send an MLME-ASSOCIATE.request to its MLME to initiate an association as either a regular DEV, child or

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

neighbor piconet of the PNC. If any of the parameters are in error the ResultCode shall be
INVALID_PARAMETERS.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

6.3.4 Synchronization

Table 4—MLME-SYNCH primitive parameters

Name	Type	Valid range	Description
PNID	As defined in {xref Table 1}	As defined in {xref Table 1}	The piconet identifier of the pico-net with which to synchronize.
BSID	As defined in {xref Table 1}	As defined in {xref 7.4.2}	The beacon source identifier of the piconet with which to synchronize.
ChannelIndex	As defined in {xref Table 2}	As defined in {xref Table 2}	The PHY channel to be used to find the piconet.
ChannelScanDuration	As defined in {xref Table 1}	As defined in {xref Table 1}	The time duration to be spent searching for the piconet.
ResultCode	Enumeration	SUCCESS, TIMEOUT, INVALID_PARAMETERS	Indicates the result of the MLME-SYNCH.request.

6.3.4.1 MLME-SYNCH.request

...”The semantics of this primitive are:

```
MLME-SYNCH.request          (
                            PNID,
                            BSID,
                            ChannelIndex,
                            ChannelScanDuration,
                            ResultCode
                            )
```

6.3.16 Remote Scan

Table 5—MLME-REMOTE-SCAN primitive parameters

Name	Type	Valid range	Description
TrgtID	Integer	Any valid DEVID as defined in {xref7.2.3}	Specifies the DEVID of the target DEV
ChannelList	As defined in {xref Table 1}	As defined in {xref Table 1}	Specifies a list of channels to be examined when scanning for piconets or interference.
ChannelScanDuration	As defined in {xref Table 1}	As defined in {xref Table 1}	As defined in {xref Table 1}.
RemoteScanTimeOut	Duration	0-65535	The time in milliseconds during which the PNC expects to receive a response to its request.
NumberOfPiconets	As defined in {xref Table 1}	As defined in {xref Table 1}	As defined in {xref 7.5.6.4}
PiconetDescriptionSet	As defined in {xref Table 1}	As defined in {xref Table 2}	As defined in {xref Table 1}
NumberOfChannels	As defined in {xref Table 1}	As defined in {xref Table 1}	As defined in {xref Table 1}
ChannelRatingList	As defined in {xref Table 1}	As defined in {xref Table 1}	As defined in {xref 7.5.6.4.}
ReasonCode	Integer	As defined in 7.5.6.4	Indicates the scan was denied or was successful, as defined in {xref 7.5.6.4}
ResultCode	Enumeration	SUCCESS, TIME-OUT	Indicates the result of the request.

6.3.16.3 MLME-REMOTE-SCAN.response

...”The semantics of the primitive are:

    MLME-REMOTE-SCAN.response   (
                                        NumberOfPiconets,
                                        PiconetDescriptionSet,
                                        NumberOfChannels,
                                        ChannelRatingList,
                                        ReasonCode
)

6.3.16.4 MLME-REMOTE-SCAN.confirm

...”The semantics of this primitive are:

    MLME-REMOTE-SCAN.confirm   (
                                        TrgtID,
                                        NumberOfPiconets,
                                        PiconetDescriptionSet,
                                        NumberOfChannels,
                                        ChannelRatingList,
                                        ReasonCode,
                                        ResultCode
)

2.1.6 PNServices element

7.4.23 Piconet services

The piconet services information element is used to provide information about the application layer capabilities of ~~either all of the DEVs in a piconet or~~ a_n individual DEV. The piconet services information element shall be formatted as illustrated in Figure 3.

octets: 0-n	2	1	1	1
Piconet Services field	Vendor ID	DEVID	Length (= n+3)	Element ID

Figure 3—Piconet services information element format

The piconet services field is used to indicate the application layer capabilities of the DEV that sends this IE. In the case of the PNC sending the IE, it is the aggregate application layer capabilities of the DEVs in the piconet. The value of this field is set with the MLME association commands. ~~The content of the field is application dependent and so is outside of the scope of this standard.~~

The DEVID identifies the DEV associated with the Piconet services field.

The vendor ID is defined in {xref}.

7.5.x Piconet services command

The piconet services command is used to provide information about the application layer capabilities of all of the DEVs in a piconet. When sent to the PNC the piconet services command allows DEVs to inform the PNC of their application capabilities. When sent by the PNC, the piconet services command informs DEVs

of the capabilities of all DEVs in the piconet. The piconet services command shall be formatted as illustrated in Figure 3.

octets: l_n	....	l_2	l_1	1	2	2
Piconet services IE n	...	Piconet services IE 2	Piconet services IE 1	Command status	Length (= 1 or sum l_1-l_n)	Element ID

Figure 4—Piconet services command format

The piconet services IE is defined in {xref 7.4.23}

The length field shall be 0 for a DEV requesting the PNC to provide its stored piconet services IEs. Other wise, the length field is the total length of all of the piconet services IEs in the command.

If a DEV or PNC does not support the piconet services IE it shall not send the PNServices IE.

The command status is used by the PNC on returning information to the DEV sending its piconet services IE for storage. If the PNC has capacity to save the information it will respond with 1 in this field. If the PNC does not have capacity to store additional piconet services IEs, it shall respond with 2. If the PNC does not support the feature, it shall respond with 3.

If the capability is supported but its policy is not to broadcast one or more piconet services block elements, a DEV or PNC shall send the PNServicecs IE but only with piconet services IEs that are allowed. not send the PNServices IE in the association request for cases where the policy says not to .

The policy for sending the piconet services IE as set for a DEV in the MACPIB_DEVServicesBroadcast while for the PNC it is set in the MACPIB_PNCServicesBroadcast, 6.5.4.

For the building the association response piconet command, the PNC concatenates the piconet service blocks from associated {should this be member} DEVs. The considerations for this are found in {xref 8.3.2}.

8.3.2 Piconet services operation

Piconet services information is provided by the PNC, if supported, to an associating DEV upon request. The association command, 7.5.1.1, piconet services inquiry bit in the association request command format shall be set to one if the associating DEV is requesting the PNC to deliver the Piconet services via the piconet services command. The bit shall be set to zero if the feature is not supported in the associating DEV or the DEV does not desire piconet services information. (this is actually clause 7 text). If the DEV sets the piconet services inquiry bit in the association request command, then the PNC shall send the piconet services command with DestID set to AssocID. The association process does wait for the piconet services command to complete.

~~The piconet services command is constructed as one or more piconet services IE, 7.4.23.~~ An associating DEV may inspect the piconet services IEs returned by the PNC to determine information about other DEVs in the piconet prior to completion of the association and, if requried, authentication process.

Associated DEVs may place their own piconet services IE in the PNC's record of piconet services sending the piconet services IE to the PNC using the probe command. When the PNC receives this IE from a DEV, it adds it to its internal record of piconet services. The PNC then sends a probe command with DestID set to BcstID with the IE that it has added to its internal record of piconet services.If the PNC supports this capability, it retains the DEV piconet services IEs of DEVs that have sent their piconet services IE via the piconet services command. Not all DEVs in the piconet may be provided with space in the PNC for this information

if the PNC is not able to save the DEVs piconet field of this element. The field is filled on a first come basis by DEVs in the piconet with content sent to the PNC by DEVs in the probe commands.

If a DEV sends a probe command to the PNC requesting the piconet services IE, the PNC responds with probe commands that contain all of the IEs that it has in its internal record. If a DEV has not provided an IE to the PNC, the PNC sends the IE in the probe command with the DEVID, a zero vendor ID and zero length piconet services field. If the PNC did not have enough space to save the IE that a DEV provided, it shall send in the probe command a piconet services IE with length 1, i.e. it only contains the DEVID.

If a DEV has a need for privacy, it may not want to provide information that would be available outside of the security operations of the piconet. The MAC PIB element MACPIB_DEVServicesBroadcast, 6.5.4, indicates if the DEV will send the piconet services field. Likewise the PNC is not required to furnish this information if it violates the security policy as set in the MAC PIB element MACPIB_PNCServicesBroadcast, 6.5.4.

It is outside of the scope of this standard to define the content or use of the piconet services field.

8.3.1 Association request command (change)

Delete the piconet services IE from the association request command. Add an octet to the request command with a bit in it called 'Services request bit' for the request identified in 8.3.2. Note this deletes the services field from the assocation response command.

2.1.7 PSAVE proposal

5.3.10 Power management

Page 19, line 34-36, rename APS to PSAVE temporarily (until we get a better name)

page 19, line 38-44

"The DEV sends a request to the PNC when it wants to enter the PSAVE mode. The PNC informs the piconet by setting the DEV's bit in its PS bitmap IE in the beacon. PNC will at intervals send system wake beacons. All DEVs in PSAVE mode are required to listen to the wake beacons. All asynchronous traffic to DEVs in PSAVE mode will be allocated in the wake beacon.

6.3.19 Power save operation

Update PS_MODE_CHANGE subclause.

Update Table 23 to look like the following (plus any additional SPS changes):

(note: We need to change the text in clause 8 to ensure that a modify may change the CTR Interval Type.)

**Table 6—MLME-SPS-SET-INQUIRY, MLME-SPS-SET-CONFIGURE,
MLME-PS-MODE-CHANGE, and MLME-PS-MODE-ACTIVE primitive parameters**

Name	Type	Valid Range	Description
PSMode	Enumeration	ACTIVE, PSAVE, APS	The PS mode requested by the DEV DME.
PSRequestTimeout	Duration	0-65535	The time in milliseconds in which the operation initiated by the MLME request needs to be completed before responding with a ResultCode of TIMEOUT.
ReqSysWakeBeaconInt	Integer	0-255	As defined in {xref new PS mode change command}
SPSSetOperation	Enumeration	NEW, JOIN, LEAVE	The SPS set operation requested, 7.5.7.2.
SPSSetIndex	Integer	0-255	As defined in 7.5.7.2.
SPSInterval	Integer	As defined 7.5.7.2.	As defined in 7.5.7.2.
NextAwakeBeacon	Integer	$0-(2^{32}-1)$	The superframe number that the DEV next plans to be awake.
SPSSupported	Integer	1-255	The number of SPS sets currently supported by the PNC of this piconet.
SPSStructureSet	Set of SPSStructure	As defined in Table 24.	The SPSStructureSet returns the information about the SPS sets currently supported by the PNC. It is a set containing SPSSupported instances of a SPSStructure.
PSActiveEvent	Enumeration	DATA_PENDING, MAX_SLEEP	An event that causes the MLME to change the PS mode of operation to ACTIVE.
SPSReasonCode	Integer	As defined in 7.5.7.3.	As defined in 7.5.7.3.
ResultCode	Enumeration	SUCCESS, TIMEOUT, INVALID_CHANGE.	Indicates the result of the MLME request.

2.1.7.1 MLME_ PS_MODE_CHANGE.request

```
MLME_ PS_MODE_CHANGE.request(
                            PSMode,
                            ReqSysWakeBeaconInt,
                            ModeChangeTimeout
                            )
```

2.1.7.1.1 When generated

This primitive is generated by the DME to change the PS mode.

2.1.7.1.2 Effect of receipt

Upon receipt of this primitive, the MLME will send the PS mode change command to PNC indicating the new PS mode. If the MAC is already in the ACTIVE state when the primitive is passed with the PSMode ACTIVE, the MLME shall take no action before responding with the MLME_PS_MODE_CHANGE.confirm.

2.1.7.2 MLME_ PS_MODE_CHANGE.confirm

MLME_ PS_MODE_CHANGE.confirm(

                                ResultCode

)

2.1.7.2.1 When generated

This primitive is sent by the MLME with the ResultCode set to SUCCESS if it received an acknowledgement from the PNC on the PS mode change command, otherwise it is set to TIMEOUT.

2.1.7.2.2 Effect of receipt

The DME is informed about the result of the MLME_PS_MODE_CHANGE.request.

7.4.3 Piconet synchronization parameters (note, this is in the beacon frame format subclause now.)

Add 1 octet to the synchronization parameters called 'system wake countdown' and the following:

The system wake countdown field shall be formatted as illustrated in Table 23

Bits: b7	b6-b0
system wake beacon	system wake beacon countdown

Figure 5—System wake countdown field format

The system wake beacon bit is set to 1 if the current beacon is a wake beacon, otherwise it's set to 0.

The system wake beacon countdown indicates how many beacons there will be before the next system wake beacon. At the beacon where the countdown would have reached 0, the countdown value is set to the the value of the next count down. If PNC wishes to chain multiple system wake beacons, it shall set the system wake beacon bit to 1 and the countdown field to 0 in all except the last system wake beacon which shall have the countdown field set to new countdown.

7.4.15 Pending channel time map (PCTM)

(Table? Does SPS still need it. If so, probably needs new name. Could still be used for wake up indications.)

New IE (unless replaced by directed frame)

7.4.xx CTR Interval announcement

(note: Make sure that it is noted in clause 8 that this is sent for subrate slots to sleeping DEVs. If a DEV thinks it missed this, it may use the probe command to request this information from PNC.)

Octets: 1	1	1	4	4
Element ID	Length (=6)	Stream index	CTR interval	Start beacon number

Figure 6—CTR interval announcement information element format

(Should this be directed or not? BRC has not yet decided, this could be sent in a directed frame to the sleeping DEV to signal a wakeup.)

(move this sentence to 8 'This IE is put into the first wake beacon after a creation or modification of a stream.')

The stream index field indicates the stream that has had its CTR interval modified.

The CTR interval shall be set to the number of beacons between every GTS that was requested by the originating DEV. If one or multiple GTS per superframe is allocated, this value shall be set to 0.

The start beacon number is set to the beacon number, {xref beacon number} of the first beacon where the first GTS of the new or modified stream will be allocated.

7.4.xx PSAVE Status

The PSAVE status information element shall be formatted as illustrated in Figure 7.

Octets: 1	1	1	1-32
Element ID	Length (=2-33)	Start DEVID	PSAVE bitmap

Figure 7—PS status information element format

The PSAVE bitmap field is a bit map of 1 to 32 octets in length. Each bit of the PSAVE bitmap when set to 1 indicates that the DEV is in PSAVE mode. The bits are set to 0 otherwise. The bit position 0, i.e. the first bit or lsb of the bitmap corresponds to the start DEVID. The bits corresponding to the AssocID, BcstID, McstID and PNCID are reserved. All of the reserved bit positions shall be set to zero upon transmission by PNC and may be ignored upon reception.

(new format, this is an old IE)

7.4.16 SPS Status

The SPS status information element shall be formatted as illustrated in Figure 7.

Octets: 1	1	1	1-32
Element ID	Length (=2-33)	Start DEVID	SPS bitmap

Figure 8—PS status information element format

The SPS bitmap field is a bit map of 1 to 32 octets in length. Each bit of the SPS bitmap when set to 1 indicates that the DEV is in SPS mode. The bits are set to 0 otherwise. The bit position 0, i.e. the first bit or lsb of the bitmap corresponds to the start DEVID. The bits corresponding to the AssocID, BcstID, McstID and PNCID are reserved. All of the reserved bit positions shall be set to zero upon transmission by PNC and may be ignored upon reception.

7.5.5.2 Channel time status response command

Page 142, line 48, delete '6 => DEV in APS mode'

The following command replaces 7.5.7.1, 7.5.7.2 and 7.5.7.3

7.5.7.1 PS mode change command

The PS mode change command shall be formatted as illustrated in Figure 9.

Octets: 2	2	1	1
Command type	Length (=2)	PS mode	Requested system wake beacon interval

Figure 9—PS mode change command format

The PS mode field indicates the new powersave mode for the DEV:

— 0 -> ACTIVE
— 1 -> PSAVE
— 2 -> SPS
— 3 -> SPS and PSAVE
— 4-255 Reserved

The requested system wake beacon interval field indicates the DEV's preferred interval between wake beacons.

8.2.7 Setting the BSID and PNID

(new text for handling power save DEVs, this uses the old SPS text and is generic to both modes. The following replaces page 159, line 53 through page 160, line 3.)

The PNC shall not be required to wait until all of the DEVs in power save modes are in ACTIVE mode before changing either the PNID or the BSID. A power save DEV is not required to switch to ACTIVE mode when there is a PNID or BSID change in progress. However the power save DEV shall update its internal values for the PNID and the BSID at the time indicated in the piconet parameter change element.

8.5.1.1 Isochronous stream creation

(insert page 175, line 52. However, the CTR interval announcement IE may be replaced with a directed frame since this allows the PNC to communicate a wakeup request to the sleeping DEV and to be able to verify its receipt).

Creation of an isochronous stream with either a power save DEV or the BcstID as the DestID shall be announced in the wake beacon using the CTR interval announcement IE, 7.4.16. The PNC is not required to send the CTR interval announcement IE unless there is at least one DEV in power save mode. The PNC shall issue the first GTS for the stream in the superframe indicated by the announcement. For a stream directed to a specific power save DEV as the destination, this notification shall be sent in next wake beacon of the power save DEV. If the destination is the BcstID, the notification shall be inserted in the next system wake beacon. The PNC shall include in the beacon a CTR interval announcement IE for at least aMinBeaconInfoRepeat beacons.

8.5.1.2 Isochronous stream modification

(Similar text to add to this subclause, comments regarding the directed frame apply here as well.)

The modification of the CTR interval of an isochronous stream with either a power save DEV or the BcstID as the DestID shall be announced in the wake beacon using the CTR interval announcement IE, 7.4.16. The PNC is not required to send the CTR interval announcement IE unless there is at least one DEV in power save mode. The PNC shall issue the first GTS for the stream in the superframe indicated by the announcement. For a stream directed to a specific power save DEV as the destination, this notification shall be sent in next wake beacon of the power save DEV. If the destination is the BcstID, the notification shall be inserted in

the next system wake beacon. The PNC shall include in the beacon a CTR interval announcement IE for at least aMinBeaconInfoRepeat beacons.

8.5.2.1 Asynchronous channel time reservation and modification

<insert page 181, line 39, TR>

If any of the DestIDs is currently in a power save mode, PNC shall allocate the CTA with the power save DEV or DEVs in the next wake beacon, either system or SPS. It is the responsibility of the source DEV to be able to handle different CTAs for DEVs in power save mode as opposed DEVs in ACTIVE mode.

If the asynchronous allocation uses the destintion list and some of the DEVs are in a power save mode, then the PNC shall allocate as much as possible of the requested channel time in its wake beacons. The rest of the channel time may be allocated in non wake beacons.

8.6.2 Beacon generation

<add page 183, line 34, TR>

At intervals to be chosen by the PNC, the PNC shall send a system wake beacon. The system wake beacon is a normal beacon with the difference that all PSAVE DEVs are required to listen to it. The PNC shall set and decrement the system wake beacon countdown information field, 7.4.3, to enable DEVs to synchronize their sleep period with the next system wake beacon.

8.11 Dynamic channel selection

(The new text is now generic to both power save modes) Page 194, lines 1-5, change to

"The PNC shall not be required to wait until all of the DEVs in power save modes are in ACTIVE mode before changing channels. A power save DEV is not required to switch to ACTIVE mode when there is a channel change in progress. However the power save DEV should change channels at the time indicated in the channel change element.

8.12 Power management

There are two states defined for this standard, the AWAKE state and the SLEEP state. There are three modes of powersave defined for this standard, ACTIVE, PSAVE and SPS modes. A DEV that is in either PSAVE, SPS or both SPS and PSAVE modes is defined to be a power save mode DEV. Being in the AWAKE state is defined as listening for traffic. Being in the SLEEP state is defined as having the receiver function disabled. In the ACTIVE mode, a DEV listens to all beacons and will listen in all CTAs where {xref where listen is defined} its DEVID, BcstId or McstID is indicated as the destination. In the PSAVE mode, the DEV is only required to listen to system wake beacons and its allocated GTSs where its DEVID is indicated as destination. In the SPS mode, a DEV is required to listen to periodic wake beacons and to GTSs allocated in its wake beacons. Regardless of power save mode, a DEV is allowed to go to the SLEEP state during a GTS where it is not a destination. A DEV is also allowed to switch to the AWAKE state during any time when it is in a power save mode.

A DEV shall always associate and authenticate with the piconet starting in the ACTIVE mode.

8.12.1 PSAVE mode

System wake beacons are identified with a down counter. It is the responsibility of the DEV using PSAVE mode to synchronize with the beacon's system wake beacon countdown field before entering the sleep state.

A DEV shall send a PS mode command to the PNC with the PSMode field set to PSAVE and receive the
ACK before entering the PSAVE mode. When the PNC receives this command, it sets the PS status bitmap
appropriately, {xref 7.4.x}.

The PS status bitmap in the beacon shall serve as indication to a DEV that its peer has gone into PSAVE
mode.

(Note, shouldn't the PNC terminate all streams with the CTR interval type set to 1?)

(What about switching a DEV to ACTIVE mode? Are there any restrictions on the stream allocations?
Need to mention here that the PNC will not necessarily align subrate allocations to the system wake beacon.)

A DEV in PSAVE mode shall listen to all wake beacons, as announced by PNC.

The DEV may leave the PSAVE mode by sending a PS mode command to the PNC with the PSMode field
set to ACTIVE. Once this command is sent the DEV shall regard itself as in the ACTIVE mode regardless if
the command was acknowledged by the PNC or not. If the PNC does not set the PS status bitmap appropri-
ately and the DEV did not receive an ACK to the PS mode command, the DEV should resend the PS mode
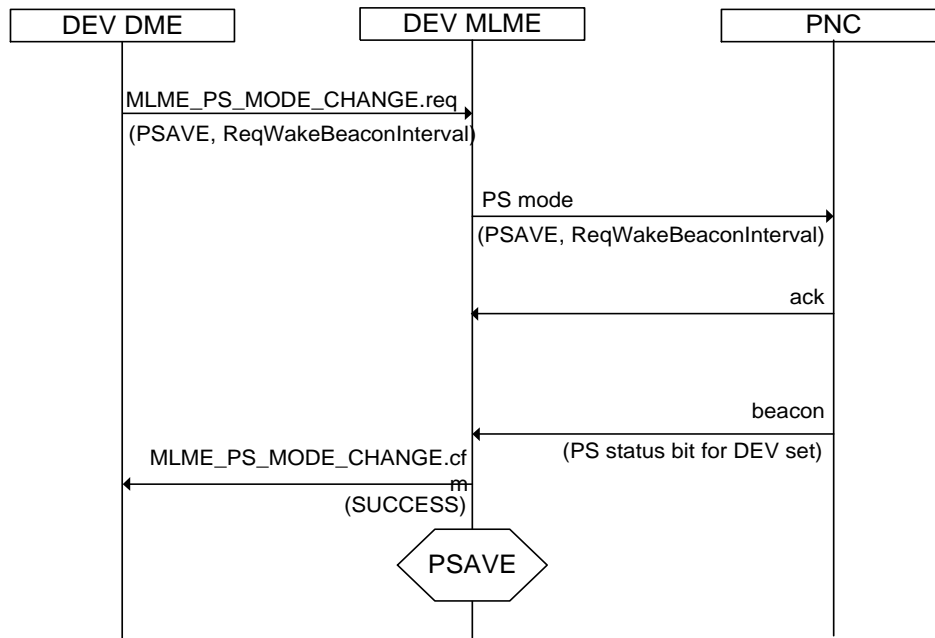command to the PNC with the PSMode field set to ACTIVE.

MSCs:

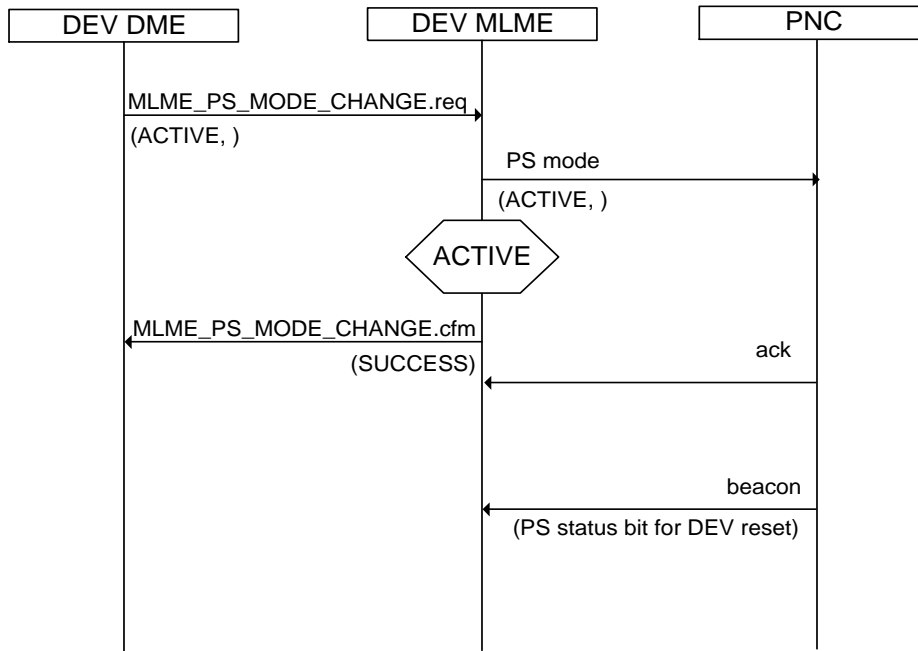**Figure 10—DEV changing to PSAVE mode**

Figure 11—DEV changing from PSAVE to ACTIVE mode

8.12.2 (SPS stuff goes here)

Table F.4—MAC sublayer functions

<page 346, line 24-31, TR>

Change MLF24.1 – PSAVE mode.

2.2 Wednesday, 7 August, 2002

Attendees: John Barr, James Gilb, Jim Allen, Mark Schader, Dan Bailey, Gregg Rasor, Rene Struik, Knut Odman, Allen Heberling, Bill Shvodian, Robert Huang, Jeyhan Karaoguz, Jay Bain, Mike Harvey.

Meeting called to order 8:33 am, CDT, Wednesday 7 August, 2002.

Security subcommittee consisting of John Barr, Rene Struik, Mike Harvey, Gregg Rasor, Dan Bailey, Bill Shvodian convened in separate conference room.

2.2.1 Tabled items for Wednesday

196 (Heberling, TR) - A method of moving the beacon is needed for several reasons. During hand-over, the private CTA of child and neighbor PNC might have been moved. Simarly, a method of changing the super-frame duration is needed. All this must be synchronized throughout the piconet and possible child and neighbor piconets. See resolution [11] in 02276r0P802-15_TG3-commentsD10_KO.doc, page 23   This res-olution contains changes from both Resolution [10] and [11]. It also solves handover, beacon move, super-frame duration change, channel change and PNID change with client and neighbor piconets. **Suggest accept in principle**, "Change the title of 6.3.17 from 'Changing channels' to be 'Changing piconet parame-ters'. Change '.. to change certain characteristics of the piconet, i.e. the PNID, BSID or PHY channel.' to be

'... to change the PNID, BSID superframe duration, beacon position or PHY channel.' Modify Table 21 to match the table in 02/273r14 (shown below).

Table 7— MLME-PICONET-PARM-CHANGE primitive parameters

Name	Type	Valid range	Description
NewChannelIndex	Integer	PHY dependent.	Index of the new PHY channel.
NbrOfChangeBeacons	Integer	As defined in {xref 7.4.5}	The number of beacons that will be sent with the Piconet Parameter Change IE before the change takes effect.
BeaconDuration	Duration	0-65535	The change of superframe duration or beacon position in milliseconds
Change type	Enumeration	CHANNEL, MOVE, SIZE, PNID, BSID	Indicating if the position of the beacon is moved, the size of the superframe is changed or the PNID is changed.
PNID	Integer	0-65535	The ID of the piconet.
BSID	String	As defined in {xref 7.4.2}	A text string that identifies the piconet
ResultCode	Enumeration	SUCCESS, TIMEOUT, INVALID_PARMETERS	Indicates the result of the MLME request.

In 6.3.17, change '... to change certain characteristics of the piconet, i.e. the PNID, BSID or PHY channel.' to be 'to change the PNID, BSID, superframe duration, beacon position or PHY channel.' Change the rest of 6.3.17.1 to be:

(begin new 6.3.17.1)

2.2.1.1 MLME_PICONET_PARM_CHANGE.request

This primitive initiates changing either the piconet PHY channel, the superframe duration, the beacon position, the PNID or BSID. The semantics of the primitive are as follows:

```
MLME_PICONET_PARM_CHANGE.request(
                        NewChannelIndex,
                        PNID,
                        BSID,
                        ChannelChangeTimeout,
                        BeaconDuration,
                        ChangeType,
                        NbrOfChangeBeacons
                        )
```

The primitive parameters are defined in {xref Table 21}.

2.2.1.1.1 When generated

The PNC DME sends this primitive to its MLME after the PNC DME determines that it wishes to change one of the piconet parameters.

2.2.1.1.2 Effect of receipt

The PNC MLME upon receiving this primitive initializes the piconet parameter change information element, {xref 7.4.5}, with the parameters passed in the primitive. The PNC MLME then takes the appropriate action as defined by the ChangeType parameter, {xref 8.x new Changing piconet parameters}.

(end new 6.3.17.1)

Change the paragraph is subclause 6.3.17.2.1 to read 'The PNC MLME sends this primitive to its DME when the PNC has broadcasted the first beacon with the change in effect.'

In 7.4.5, add three fields to the IE, 'Change type', 'Change countdown' to the front of the IE and 'Beacon duration' after the 'New channel index'. Add the following definitions:

'The change type field indicates the type of change and shall be encoded as follows:

— 0 -> PNID
— 1 -> BSID
— 2 -> MOVE
— 3 -> SIZE
— 4 -> CHANNEL
— 5-255 Reserved

The change countdown field contains the current value of the countdown until the change takes effect as defined in {xref 8.x Changing piconet parameters}.

If change type is set to CHANNEL, then the new channel index field is set to the channel where the PNC will send its first beacon when the change process is complete. Otherwise, this field shall be ignored on reception.

If change type is set to PNID, then the PNID field is the new PNID that will take effect when the change process is complete. If the PNID is not changing, this field shall be set to the current PNID. Otherwise, this field shall be ignored on reception.

If the change type is set to MOVE, then the superframe timing is the offset in milliseconds between the new beacon position and position where beacon would have been, {xref 8.x.1} if the change had not occured, {xref 8.x.y}. Otherwise, this field shall be ignored on reception.

If the change type is set to SIZE, then the superframe timing field contains the new superframe duration that will take effect when the change process is complete.

If the change type is not set to either MOVE or SIZE, then the superframe timing field shall be ignored on reception.

If the change type is set to PNID, then the PNID field is the new PNID that will take effect when the change process has completed, {xref 8.2.7}.

If change type is set to BSID, then the BSID field is the new BSID that will take effect when the change process has completed, {xref 8.2.7}.

(end new text).

In subclause 8.2.3, add the following text to page 155 following line 30 (new paragraph).

'A dependent PNC receiving a parent beacon with a PNC handover IE may immediately insert the piconet parameter change element into its beacons with the change type set to MOVE, 7.4.5 and the the superframe timing field set to zero.

A member of a child or neighbor piconet that receives this IE shall not transmit after the beacon where the countdown is set to 0 until it has correctly received a beacon from its PNC without the piconet parameter change IE present.'

In subclause 8.2.7, page 159, line 47 add the following paragraph 'Before changing its PNID, a parent PNC shall scan for the PNIDs of other piconets, including of all of its child and neighbor piconets. The PNC shall not change its PNID to the same value as that of any other piconet it can detect.'

Add a new subclause, 8.x with title 'Changing piconet parameters.'

(begin text for Changing piconet parameters)

This subclause describes the methods used to change certain key characteristics of the piconet.

A PNC shall not change pseudo-static CTAs during a piconet parameter change. If the parent needs to move a pseudo-static CTA because the superframe duration is being reduced, it shall do so prior to using the superframe duration change process, {xref 8.x.2}. If a child or 802.15.3 neighbor piconet has the same superframe duration as the parent, then it shall use the change countdown value in the piconet parameter change IE from the parent's beacon in the piconet parameter change IE in its own beacon. The exceptions to this are when the parent is changing its PNID or BSID and that a child or neighbor PNC may decide not to change channels, {xref 8.x.3 dynamic frequency selection}, with the parent PNC. In all cases, the child or neighbor PNC shall ensure that it does not schedule channel time for its piconet outside of the time allocated by the parent PNC.

8.x.1 Moving Beacon

The PNC may move the relative position of its beacon. Moving a beacon means that the superframe duration is unchanged while the position of the beacon is moved.

If the PNC wishes to move its beacon position, it shall insert the piconet parameter change IE, 7.4.5, into NbrOfChangeBeacons beacons with the change type set to MOVE and the superframe timing, set to the delay of the first beacon after this sequence compared to previous beacon transmission time.

(add figure with beacon duration replaced with superframe timing, change moved beacon to beacon)

8.x.2 Changing superframe duration

The PNC may change the duration of its superframe. If the PNC wishes to change its superframe duration, it shall insert the piconet parameter change IE, 7.4.5, into NbrOfChangeBeacons beacons with the Change type set to SIZE and the superframe timing set to the size of the superframe following the first beacon after this sequence.

(add figure with beacon duration replaced with superframe timing, change regular beacon to beacon)

(Ed. note: put changing PNID and BSID subclause here)

8.x.7 Maintaining synchronization in child and neighbor piconets.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

A child or neighbor PNC receiving a parent beacon with a piconet parameter change information element, where the change type is set to MOVE or SIZE, shall immediately insert the appropriate piconet parameter change element into its beacons.

(end new text for Changing piconet parameters)

In subclause 8.11, replace 'In that beacon the PNC may send the piconet parameter change element indicating the new channel and the time-out for changing the channel' with 'If a better channel is available and the PNC decides to switch channels, the PNC shall send the piconet parameter change element in its beacon for NbrOfChangeBeacons beacons, {xref 7.4.5}. The channel change shall take effect starting with the first beacon after the last of the beacons with the piconet parameter change IE has been sent.' Delete 'Whenever another channel is not available, the PNC may decide to stay in the same channel and hence may not send piconet parameter change element in its beacon.' (note to self, figure out how this merges with the fix for 8.11).

Add the following as either a subclause or a paragraph to 8.11

(begin new text)

8.11.1 Maintaining child and neighbor piconets during a channel change.

When a parent PNC changes channels, the dependent PNC may decide to change channels as well. If the dependent PNC wishes to change channels with the parent PNC, then it puts the appropriate piconet parameter change element into its beacons when it receives a beacon from the parent indicating an pending channel change. The dependent PNC shall then switch channels to the channel indicated in the IE at the appropriate time.

A dependent PNC may change to a different channel even if the parent PNC does not change channels. In this case, the child or 802.15.3 PNC shall remove the parent BSID IE from its beacon after the channel change since it is no longer a child or neighbor of that piconet.

(end new text).

(Ed. note: add definitions for dependent PNC, 802.15.3 dependent PNC and 802.15.3 neighbor PNC.)"

2.2.2 PM/SPS

1154 (Schrader, TR) - ACTIVE Source to SPS Destination: should the SPS Destination become ACTIVE? Currently undefined how to control this. Solution Submitted in document 02/231r0. **Suggest accept**, this uses the PCTM IE to signal a DEV to go ACTIVE, it is requested with the CTRB. See also CID 915.

> Accept in principle, "Add to 7.5.5.1 a PCTM bit to the CTR control field (expand to 2 octets if necessary. Add the following description for the bit 'The Set PCTM field enables an ACTIVE mode source DEV to tell an SPS mode destination DEV to start listening to every beacon and issue an SPS change command to change to ACTIVE mode. The conditions required for the setting of the destination DEV's bit in the PCTM {XREF 7.4.15} are shown in Table ??2. The CTR type field, the time base field, and the set PCTM field are used together to select whether or not the PNC sets a bit in the PCTM information element. If the set PCTM field is "1", the PNC shall set the PCTM bit only if CTR type field is "ACTIVE" and the time base field is set to "CTR Interval". Otherwise the PCTM bit is not set by the PNC.' Add to 8.12.2.1 'When a DEV in SPS mode recieves a beacon with its PCTM bit set, it shall begin listening to all beacon and shall inform the PNC that it is switching to ACTIVE mode, {xref switch to active}, as soon as possible.'"

915 (Bain, TR) - Text and a method is required so that a DEV that is the target of Channel time may deter- 1
mine of possible multiple CTAs, which are for SPS mode (a field in the CTR) and which for ACTIVE mode. 2
This information would be used to understand when a stream change has been made by a source DEV and 3
indicate to an SPS DEV if it should return to ACTIVE. Document 02/231 contains a suggested solution. Of 4
course, we could return to tri-partite negotiations! **Suggest accept**, this uses the PCTM IE to signal a DEV to 5
go ACTIVE, it is requested with the CTRB. See also CID 1154. 6
                                                                                                            7
      Accept in principle, "Add to 7.5.5.1 a PCTM bit to the CTR control field (expand to 2 octets if nec- 8
      essary. Add the following description for the bit 'The Set PCTM field enables an ACTIVE mode 9
      source DEV to tell an SPS mode destination DEV to start listening to every beacon and issue an SPS 10
      change command to change to ACTIVE mode. The conditions required for the setting of the desti- 11
      nation DEV's bit in the PCTM {XREF 7.4.15} are shown in Table ??2. The CTR type field, the time 12
      base field, and the set PCTM field are used together to select whether or not the PNC sets a bit in the 13
      PCTM information element. If the set PCTM field is "1", the PNC shall set the PCTM bit only if 14
      CTR type field is "ACTIVE" and the time base field is set to "CTR Interval". Otherwise the PCTM 15
      bit is not set by the PNC.' Add to 8.12.2.1 'When a DEV in SPS mode recieves a beacon with its 16
      PCTM bit set, it shall begin listening to all beacon and shall inform the PNC that it is switching to 17
      ACTIVE mode, {xref switch to active}, as soon as possible.'" 18
                                                                                                           19

2.2.3 Handover
20
                                                                                                           21
206 (Heberling, TR) - The method of selecting the preferred AC is wrong. A child PNC should be first 22
choice, a 802.15.3 capable neighbor second (how do we know?), AC des, AC capable, thereafter. It is essen- 23
tial that the AC can handle all associations and streams of the current PNC. SEC and PSAVE if used, Rate, 24
comes last. Table 51 is based on some legacy, AC announcement doesn't exist and Transmit power is not 25
known. See resolution [12] in 02276r0P802-15_TG3-commentsD10_KO.doc. **Suggest accept in principle**, 26
'The task group decided that the PNC will not be allowed to hand over to child or neighbor PNCs. However, 27
in the change from D09, information that was passed in the announcement comamnd was deleted. Delete the 28
'PSAVE' row from Table 51 and change the title of the table to read 'Comparison order of fields for PNC 29
handover'. Change the capabilites field information element in 7.4.4 to be 6 octets total by adding octets for 30
'Max number of GTS' and 'TX power level' with the following descriptions: 31
                                                                                                           32
      'The max number of GTS indicates how many GTSs the DEV is capable of allocating as a PNC. 33
      This shall be set to 0 in a non-PNC capable DEV. 34
                                                                                                           35
      The TX power level indicates the maximum transmit power that is possible for the DEV. The power 36
      level is in dBm, encoded in 2s complement notation. For example, if a DEV was capable of 14 dBm 37
      TX power, the field would take on the value 0x0E while if the DEV was capable of -4 dBm TX 38
      power, the field would take on the value 0xFC.' 39
                                                                                                           40
      Add text to 8.2.3, 'The handover procedure will transfer all information necessary for the new PNC 41
      to take over except: 42
—   Asynchronous CTRBs will not be transferred. All DEVs with asynchronous data to send needs to 43
      reissue a new CTR to the new PNC once it has sent its first beacon 44
—   CTA location are not transferred, except in the preceding beacons.'" 45
                                                                                                           46
      Accept suggested resolution. 47
                                                                                                           48
422 (Heberling, TR) - When handing over to a child or neighbor, it is possible that the total number of DEVs 49
is greater than what the new PNC can handle. It is also possible that we get a conflict in DEVIDs between 50
old and new piconet. See resolution [15] in 02276r0P802-15_TG3-commentsD10_KO.doc   Solution: let 51
parent PNC assign a group of DEVID to the child or neighbor based on request. **Suggest accept in princi-** 52
ple, "The parent PNC will not be allowed to handover to a child or neighbor PNC and never was allowed to 53
merge piconets. Thus the potential conflict has been removed." 54

Accept in principle, "The parent PNC will not be allowed to handover to a child or neighbor PNC and never was allowed to merge piconets. Thus the potential conflict has been removed. Change the PSAVE entry in Table 51 to be 'Max associated DEVs' with 'higher value is preferred.' in second column. Add one octet to the capabilities information field that is 'Max associated DEVs' with definition 'The max associated DEVs field is the maximum number of DEVs that the DEV is capable of associating as a PNC. It shall be set to 0 in an non-PNC capable DEV."

415 (Heberling, TR) - During PNC Handover, Child and Neighbor piconets will encounter problems that the current PNC Handover text does not address. Doc: 02/276r0 page 26 Clause 8.2.3 provides text to be added to D10 Clause 8.2.3. Make the requested change. **Suggest accept in principle**, "The parent PNC will not be allowed to handover to a child or neighbor PNC and never was allowed to merge piconets. This prevents the problems with the current PNC handover text."

Accept suggested resolution.

112 (Heberling, TR) - Figure 94 has several problems in its Handover MSC. -Prob. 1 PNC handover info command should be renamed PNC Handover CTRB command. This will make it less confusing with the PNC info command. Prob. 2 The last PNC handover CTRB command should generate an MLME-PNC-HANDOVER-CTRB.indication primitive similar in functionality to the MLME-PNC-INFO.indication primitive. Prob. 3 The MLME-PNC-HANDOVER.response primitive and the PNC handover response command are missing from the MSC. Please add them to the MSC. Prob. 4 Delete the new PNC announcement command there is no need for this command. **Suggest accept in principle**, "Keep the command name as PNC handover information since it will need to carry more information than just the CTRBs. The MLME-PNC-HANDOVER-INFO.indication is not issued because the information, e.g. CTRBs and ATPs are not information that is managed by the DME. Furthermore, the operation of the MAC in this case is fully specified and so it does not require calls to the DME. Add the MLME-PNC-HANDOVER.response primitive indicated below:

(new MLME)

2.2.3.1 MLME_PNC_HANDOVER.response

This primitive is sent by the DME of the new PNC when the DME is ready to assume PNC responsibility.

```
MLME_PNC_HANDOVER.response  (
                            )
```

This primitive has no parameters.

2.2.3.1.1 When generated

This primitive ise sent by the DME of the new PNC when the DME is ready to assume PNC responsibility.

2.2.3.1.2 Effect of reciept

The MLME is informed that the DME is ready to continue with the PNC handover process, {xref 8.2.3}.

(end new MLME)

Delete the new PNC announcement command, its functionality is going to be replaced with the new handover process. Add that the curent PNC sends the SPS information response command to the new PNC to pass the SPS information. Add this to the MSC. Change the PNC handover information command to be formatted as follows:

(begin new text)

The PNC handover information command shall be formatted as illustrated in Figure 12.

Octets: $1+3*L_m$	$2+12*L_n$	2	2
APS list	CTRB list	Length (= $3+12*L_n+3*L_m$)	CommandType

Figure 12—PNC handover information command format

The piconet CTRB field shall be formatted as illustrated in Figure 13.

octets: 11	1	...	11	1	2
CTRB n	DEVID	...	CTRB 1	DEVID	Num CTRBs

Figure 13—CTRB field format

The num CTRBs field indicates the number of CTRB entries that are present inthe command.

The DEVID is the identifier of the source of the CTRB that follows in the command.

The CTRB is defined in {xref 7.5.5.1}.

The APS list shall be formatted as illustrated in Figure 14.

Octets: 1	1	1	...	1	1	1	1
APS max sleep duration n	APS sleep cycle duration n	DEVID	...	APS max sleep duration 1	APS sleep cycle duration 1	DEVID	Num APS DEVs

Figure 14—APS field format

The Num APS DEVs indicates the number of DEVs in APS mode

The APS sleep cycle duration is defined in {xref 7.5.7.2}.

The APS max sleep duration is defined in {xref 7.5.7.2}.

(end new text)"

Accept suggested resolution.

111 (Heberling, TR) - The current PNC handover information command (renamed to PNC handover CTRB) and the PNC information command does not contain any APS or SPS information. The SPS Set doesn't contain any information about the SPS set. The new PNC wouldn't know about it unless it's a member of the same SPS set. Neither is the current APS state passed. SPS/APS promotors group needs to clarify. Appropriate information elements need to be added to PNC information, 7.5.4.2, or a new SPS/APS handover command frame needs to be specified. The latter may be preferred since the PNC information can be a response to an inquiry from a DEV. **Suggest accept in principle**, "For SPS DEVs have the PNC send the existing SPS information response command to the new PNC as described in the resolution of CID 112. For APS DEVs the extra information will be passed in the PNC handover information command as indicated in CID 112."

Accept suggested resolution.

77 (Heberling, TR) - After a handover, the new PNC needs to know the association timeout for each device to be able to do piconet live check. Add a 2 octet field, ATP, to the format of a record in PNC information command. **Suggest accept in principle**, "The ATP will be passed as as described in the resolution of CID 112."

> Accept original resolution, update CID 112 to reflect this.

2.2.4 PNCInfo

377 (Heberling, TR) - The "Last" field is no longer needed given the requested changes in the PNC Handover Procedure in clause 8.2.3. Consequently, replace the "Last" field in figure 66 with a NmbrDEVs field. Please make the requested technical change. **Suggest accept in principle**, "The last field will be deleted as indicated in the resolution of CID 112."

> Accept in principle, "Remove the 'Last' field since its functionality is replaced by allowing this command to be fragmented."

140 (Heberling, TR) - After handover was fixed there is a problem with this clause. The sequence relies on a last information element that no longer exists. This needs to be fixed by replacing the "Last" field with a Number of DEVs field. Dependencies: comment 26 and 82 In addition, this solves the problem with information commands being received in the wrong order due to repetitions. Number of DEVs is set to 0 if no authenticated or associated DEV exists with the requested DEVID. Otherwise the Number of DEVs field is set to the total number of information records to be transferred. Delete line 12-14 " The last field...". Suggest accept in principle "The last field will be deleted as indicated in CID 112. The command is now allowed to be fragmented using the regular fragmentation procedure, see comments 448, 449 and 490, so the number of DEVs is not required."

> Accept in principle, "Remove the 'Last' field since its functionality is replaced by allowing this command to be fragmented."

2.2.5 IEs

307 (Shvodian, TR) - The frame fields do not belong with the information elements. Information elements have type/length/value format. Frame fields only have a value. 802.11 has a subclause for (mangement) frame fields that separate from the information element sub-clause. Create a new sub-clause containing frame fields. This clause should include the contents of 7.4.4, 7.4.6, 7.4.9, 7.4.12, 7.4.13, 7.4.14, 7.4.17, 7.4.18, 7.4.19, 7.4.20, 7.4.21, 7.4.22, 7.4.23. **Suggest reject**, "The only information elements that are currently defined are required to have TLV so that they can be used in either the probe command or the beacon. There are a few IEs that need to be deleted, as indicated in other comments."

> Resolution is to reject as indicated above.

391 (Heberling, TR) - Delete these Info Elements from the table: DEV GTS status; as commented earlier adds way to much overhead to the beacon. Application Specific IE; is an undefined IE. consequently should not be in this standard. Time token IE; This IE is no longer needed since it is broadcast in every secure beacon as the beacon count subfield of the piconetsynchparm entity. Piconet Services IE; is an undefined IE. consequently should not be in this standard. Replace the PNC Shutdown IE with PNCHandOver IE. The PNC Shutdown IE has been subsumed into the piconetSynchParm IE. The PNCHandOver IE is a new IE to be used in the beacon during the beacon transition phase from the Old PNC to the first New PNC beacon. Add the StreamAnnouncement IE to this table. This new IE is needed in the beacon as part of the CTR protocol. Without this element the delay between making a CT request and receiving a confirmation could be to long an interval for subrate CT requests. The consequences of which would be a failure to confirm. Please make the requested change. **Suggest accept in principle**, "This table is a reflection of the IEs defined in the

subclause that follows and is always updated to be a current reflection of the contents of the subclause. If IEs are deleted or added, they will be reflected in the table as appropriate."

Accept suggested resolution.

299 (Shvodian, TR) - Max CTAs should not be an IE. It should be a command field. Change this from an information element into a frame field and put it into a frame field sub-clause. It should also be added to the association command. **Suggest accept in principle**, "Delete the Max CTAs as an IE. Add the fields and their definition to the association request command and add a new 'Max CTAs field' to the PNC handover command that passes this information to the new PNC. Possibly merge this information with the ATP information field in the modified command. See also CID 112."

Accept in principle, "Delete the Max CTAs as an IE. Add the fields and their definition to the association request command and add a new 'Max CTAs field' to the capabilities field that passes this information to the new PNC. See also CID 112."

298 (Shvodian, TR) - Delete the maximum transmit power IE. It only needs to be sent to the DEV in the association response command. It does not need to be in every beacon. Remove the Piconet Maximum Transmit Power IE. If this needs to be changed, create a new command to change it. **Suggest accept in principle**, "Resolve as indicated in CIDs 778. See also CIDs 292 and 824".

Accept suggested resolution.

2.2.6 MACPIB

428 (Gilb, TR) - There seems to be no policy about what is in or out of the PIB. Only allow items in the PIB if they are not passed to the DME or they are clearly items that need to be managed by a higher layer. This requires changes to many items in the MAC and PHY PIB.

Withdrawn

429 (Gilb, TR) - The security group 6.5.5 has way too many things in it that don't belong there because they change too rapidly or are not really management items. Delete the following items from the security group: MACPIB_PNCSECID MACPIB_SMSeqNum MACPIB_DEVSeqNum MACPIB_CurrentTimeToken MACPIB_ValidBeacon MACPIB_NewPNC Rename as follows: MACPIB_SecuritySuite - MACPIB_PiconetSecuritySuite. **Suggest accept in principle**, "Delete the following items from the security group: MACPIB_PNCSECID MACPIB_NewPNC Rename as follows: MACPIB_SecuritySuite as MACPIB_PiconetSecuritySuite.

Pass this comment to security.

2.2.7 ASIE

76, 73 (Heberling, TR) - The sentence in line 50 opens the door for interoperability problems. Consequently, if the sentence: ..."Its use by the application capable DEV is outside of the scope of this standard." is not deleted and replaced with a specification for how this information element is to be used, I strongly recommend that this information element be removed from the specification. **Suggest accept in principle** but using an approach different than 02/176r1 resolution [16] text. It seems reasonable that piconets may have the possibility of multiple 'vendors' within a single piconet considering both ASIE and PNServices. If so, then the vendor ID as a single IE is not sufficient.

Accept in principle, "Use the text for the ASIE in 02/273r14 for new ASIE text. Also add reserved IE numbers from 0x80 to 0xFF, add reserved command numbers from 0x0100 to 0xFFFF, and put in a vendor specific command format consisting of command ID, length, vendor ID and a variable

length payload. See 02/276r3, resolution [16], for examples of how to put in reserved command numbers."

300 (Shvodian, TR) - The ASIE presents interoperability problem. What if two manufacturers choose the same IE value to convey different information. Anything application specific should be negotiated at the application layer, not in the MAC. Besides, that, the text in 7.4.11 says that the use of ASIEs are negotiated with command frames. What command frames? Proprietary ones? There are no command frames that negotiate the ASIE. **Suggest accept in principle** but using an approach different than 02/176r1 resolution [16] text.

Accept in principle, "Use the text for the ASIE in 02/273r14 for new ASIE text. Also add reserved IE numbers from 0x80 to 0xFF, add reserved command numbers from 0x0100 to 0xFFFF, and put in a vendor specific command format consisting of command ID, length, vendor ID and a variable length payload. See 02/276r3, resolution [16], for examples of how to put in reserved command numbers."

(Begin new text for ASIE)

The following replaces sub-clause 7.4.11

7.4.11 Application specific

{note: underline text is add, strikethrough is delete}

The application specific information element (ASIE) shall be formatted as illustrated in Figure 20. The purpose of this IE is to allow custom information for enhanced operation that is outside of the scope of this standard.

octets: L_n	1	1	2	1	1
Application specific data	DEVID	Application data identifier	Vendor ID	Length (=4+L_n)	Element ID

Figure 15—Application specific information element format

The vendor ID is a registered value. RAC {note, what is the propoer name here} is the registration authority. {xref to means to contact in the reference section of the standard} A value of Vendor ID not understood by a receiving DEV causes the remainder of this information element to be ignored

The application data identifier is developed by the PNC and provides information for a receiving DEV to identify new vs. repeating appliction specific data.

The DEVID indentifies the DEV that will make use of this IE. The DEVID may also be the BcstID.

The application specific data is provided by the PNC. Its use by the application specific capable DEV, understanding the vendor ID, is outside of the scope of this standard.

More than one ASIE may be placed in any beacon.

The ASIE shall only be used by the PNC after negotiating the application specific capability with a DEV using data and command frames. The negotiation of the application specific capability between the DEV and the PNC is outside of the scope of this standard.

The following is suggested text for a new sub-clause 8.x.y   1

2

8.x.y ASIE Operation   3

4

The ASIE is used to implement beyond-the-scope features that require additional functionality by both the   5
PNC and one or more of its piconet member DEVs. The "additional functionality" is defined as an enhance-   6
ment that does not violate the standard and allows DEVs that do not have the functionality to operate nor-   7
mally. The IE data provides the messages that are only interpreted by the targeted DEV.   8

9

The ASIE communicates to potential DEVs that the PNC can provide its part of the additional functionality,   10
and it is also used to control that functionality. Multiple ASIEs may be added by the PNC unless limited by   11
standard services that are required by the PNC or by the size of the beacon. The designer should minimize   12
the size of each ASIE used to support the custom application.   13

14

{note: some of the following text should be more properly as part of the MLME for ASIE}   15

16

The PNC DME uses MLME-PNC-CREATE-ASIE.request to tell the PNC MLME to place the specified   17
ASIE in one or more beacons. If the DME uses a "0" application data identifier field, the PNC shall create a   18
new ASIE. A value other than zero shall cause the PNC MLME to modify the specified existing ASIE.   19

20

The MLME-PNC-CREATE-ASIE.confirm is used by the PNC MLME to tell the PNC DME whether or not   21
ASIE requested will be generated. If the application data identifier field was set to "0" in the request, the   22
MAC shall assign a new application data identifier that is different from that assigned to other current   23
ASIEs. The "0" value application data identifier shall not be assigned to any ASIE.   24

25

If the requested application data identifier belongs to an existing ASIE, the MAC shall modify the persis-   26
tence of that ASIE, and reply with the same application data identifier in the indicate. If the repeat field an   27
existing ASIE is set to "0", the PNC shall terminate the existing ASIE.   28

29

The application specific data of an existing ASIE shall not be modified.   30

31

The MLME-RECEIVE-ASIE.indicate is used by the MLME of the DEV addressed in the ASIE, to pass the   32
ASIE data up to the DME. The MLME shall pass the data to the DME only once for each unique application   33
specific identifier, ASIE. Since each ASIE may persist in multiple beacons, this persistence shown shall be   34
detected in the DEV MLME.   35

36

(begin clause 6 text)   37

38

6.x.x MLME-PNC-ASIE.request   39

40

This primitive is used to request the initialization and broadcast of an ASIE in one or more beacons. The   41
semantics of this primitive are: 42

43

MLME-PNC-ASIE.request	(	44
	Cmd,	45
	NumBeacons,	46
	VendorID,	47
	ElementID,	48
	TrgtID,	49
	MessageLength,	50
	ASIEMessage	51
	)	52

53

The primitive parameters are defined in {xref Table xx.}   54

(begin new table for ASIE MLMEs)   1

                                                                                             2

Name = Cmd, Type = Enumerated, Valid Range = NEW, TERMINATE, Description: NEW requests that a   3
new ASIE be placed in the beacon., TERMINATE causes a currently scheduled ASIE to no longer be placed   4
in the beacon.   5

                                                                                             6

Name = NumBeacons, Type = Octet, Valid Range = 1 - 255, Description: Specifies the number of beacons in   7
which the ASIE will appear.   8

                                                                                             9

Name: VendorID, Type: Integer; Valid range: 0-65535; Description: xref 7.x.y ASIE   10

                                                                                            11

Name: ElementID,   Type: Integer; Valid range: 128-255; Description: The element ID for the ASIE.   12

                                                                                            13

Name: TrgtID;   Type: Integer; Valid range: 0-255; Description: xref 7.x.y DEVID   14

                                                                                            15

Name: MessageLength; Type: integer; Valid range: As defined in xref 7.x.y; Description: The length of the   16
ASIE message.   17

                                                                                            18

Name: App. Data; Type: String; Valid range: Any valid string of length up to MessageLength; Description: 19
xref 7.x.y ASIE.   20

                                                                                            21

Name: ResultCode; Type: Enumeration; Valid range: SUCCESS, FAILURE; Description: The result of the   22
MLME request.   23

                                                                                            24

(end new table for ASIE MLMEs)   25

                                                                                            26

6.x.x.1 When generated   27

                                                                                            28

This primitive is sent by the PNC DME to its MLME when it wants to create or terminate ASIE IE.   29

                                                                                            30

6.x.x.2 Effect of receipt   31

                                                                                            32

If the Cmd is "NEW", then the PNC MLME when it receives this primitive initializes the fields of the ASIE,   33
prepares a new beacon containing this IE, and responds to the PNC DME with an MLME-PNC-CREATE-   34
ASIE.confirm primitive. If the Cmd is "TERMINATE", then the PNC MLME no longer sends the ASIE in   35
the beacon and responds to the PNC DME with an MLME-PNC-CREATE-ASIE.confirm primitive.   36

                                                                                            37

6.x.y MLME-PNC-ASIE.confirm   38

                                                                                            39

This primitive is used to inform the PNC DME that its request to initiate or terminate an ASIE broadcast has   40
been completed. The semantics of this primitive are: 41

                                                                                            42

   MLME-PNC-ASIE.confirm   (43
                VendorID,   44
                ElementID,   45
                ResultCode   46
)   47

                                                                                            48

6.x.y.1 When generated   49

                                                                                            50

This primitive is sent by the PNC MLME to its DME upon completion of the requested action.   51

                                                                                            52

6.x.y.2 Effect of reciept   53

                                                                                            54

The PNC DME upon receiving this primitive from its MLME is informed of the result of its request to initiate an ASIE broadcast is either successful, ResultCode = SUCCESS, or that the PNC MLME was unable to fit the ASIE into the beacon, ResultCode = FAILURE. If the request fails, the PNC DME may decide to send the ASIE with the probe command. It also may try to send the ASIE in another beacon.

6.x.z MLME-ASIE.indicate

This primitive is used to indicate reception of an ASIE. The semantics of this primitive are:

```
MLME-ASIE.indicate                    (
                                      Vendor ID,
                                      ElementID,
                                      MessageLength,
                                      ASIEMessage
                                      )
```

6.x.z.1 When generated

This primitive is sent by the DEV MLME to its DME upon reception of a beacon containing an ASIE containing its DEVID.

6.x.z.2 Effect of receipt

The DEV DME is informed of the new data in the beacon.

(end ASIE new text.)

Recessed at 12:12 pm CDT.

Reconvened at 1:13 pm CDT.

300 (Shvodian, TR) - The ASIE presents interoperability problem. What if two manufacturers choose the same IE value to convey different information. Anything application specific should be negotiated at the application layer, not in the MAC. This is a standard, after all. I will quote Bob O'Hara from 802.11:   "I am also conflicted about whether we should define a standard way to make the standard proprietary. 802.11 is not in the business of promoting proprietary anything. 802.11 is in the business of creating a (preferably single) interoperable standard." Besides, that, the test in 7.4.11 says that the use of ASIEs are negotiated with command frames. What command frames? Proprietary ones? There are no command frames that negotiate the ASIE. Suggest accept in principle, "Resolve as indicated in CIDs 76 and 73."

> Accept in principle, "Use the text for the ASIE in 02/273r14 for new ASIE text. Also add reserved IE numbers from 0x80 to 0xFF, add reserved command numbers from 0x0100 to 0xFFFF, and put in a vendor specific command format consisting of command ID, length, vendor ID and a variable length payload. See 02/276r3, resolution [16], for examples of how to put in reserved command numbers."

2.2.8 MTS

910 (Bain, TR) - There are few comments on MTS use and what if anything comes via the DME. There is no wording related to the CAP parameters and that if they are all off (including min time dedicated to the CAP period) then MTS should be expected. Recommend that in clause 7.4.3, that text such as "If the CAP period indicates no available time and no message types are permitted during the CAP, then MTS is implied." **Suggest accept**.

Accept, "Add to page 118, the paragraph on lines 14-16, probably in the last paragraph."										1

2

924 (Bain, TR) - Based on reading the mechanism of 8.4.4.5, it would seem that aMTSAssocPeriod at 0.6											3
seconds could yield a less than reasonable time to connect. Change the aMTSAssocPeriod to be 0.075 sec-											4
ond in table 54. **Suggest accept**. "Change aMTSAssocPeriod to 75 ms."										5

6

Accept in principle, "Change aMTSAssocPeriod to 150 ms."										7

8

925 (Bain, TR) - There is no requirement at all made on the PNC related to open MTSs. The impact is a very											9
non-deterministic situation for DEVs using the services of the PNC. Suggested text will be in document 02/											10
289. Suggest?										11

12

Reject, "The method that the PNC uses to determine the number of open MTSs and their frequency											13
is outside of the scope of the standard. The committee was unable to come up with any good method											14
that enabled the PNC to determine if more were available without imposing significant complexity											15
in the standard. The commenter was also unable to provide a suggestion for a method to enable the											16
PNC to determine if it needed to increase or decrease the number of open MTSs."										17

18

## 2.2.9 Multicast										19

20

939 (Shvodian, TR) - Need an MLME primitive to enable multicast reception and to allow filtering for a par-											21
ticular multicast stream. Add an MLME primitive to enable multicast reception and to allow filtering for a											22
particular multicast stream.										23

24

(added text begins)										25

26

### 6.x.x MLME-MULTICAST-RX-SETUP.request										27

28

MLME-MULTICAST-RX-SETUP.request(										29
                                    MulticastStatus,										30
                                    SrcID,										31
                                    StreamIndex										32
)										33

34

The primitive parameters are contained in table xx.										35

36

(begin new table, Create table xx:)										37

38

Name: MulticastStatus, type: boolean, valid range: TRUE, FALSE, ALL, NONE, definition: Indicates											39
whether the MAC should receive multicast traffic defined by the stream index.										40

41

Name: SrcID; type: octet; valid range; Any valid DEVID, {xref 7.2.3}; definition; The ID of the source of											42
the multicast stream.										43

44

Name: StreamIndex, type: octet, valid range; stream index identifier, definition: Used by the DEV to filter on											45
the multicast ID for that stream index.										46

47

(end new table)										48

49

### 6.x.x.1 When Generated										50

51

This primitive is sent by the DME to the MLME to control the multicast receive parameters.										52

53

### 6.x.x.2 Effect of receipt										54

If MulticastStatus is TRUE, the DEV should receive multicast frames with the SrcID and StreamIndex specified in the primitive parameters. If MulticastStatus is FALSE, the DEV should disable reception of multicast frames with the SrcID and StreamIndex specified in the primitive parameters. If the status is ALL then the DEV shall pass all multicast frames regardless of StreamIndex to the upper layers. If MulticastStatus is NONE all multicast reception is disabled.

(end new text)

Suggest accept

> Accept in principle, "Add the text in 02/273r14."

2.2.10 Others

1155 (Schrader, TR) - Uniform use of CTR interval and SPS Sets for both ACTIVE and SPS CTR Types is not documented. It is better to make the selection of the time base source explicit rather than implicit. It is easier to understand and easier to implement. Document 02/231r0 adds the text, a figure, and the "Time Base" CTR control field. **Suggest accept**. (text needs a little work though.)

> Table, until later, Mark Schader to have new text, 2/231r2 ready for Wednesday morning. Delete the SPS set with CTRI time base, for potential merge, re-use SPS set configure with SPS set index of 0xFF (reserved set index).

315 (Heberling, TR) - Figures 67 and 38 are inconsistent with each other. The comment I submitted for figure 38 proposes a change to its IE format. Similarly, I propose Figure 67 be changed to make it more consistent with the proposed change in Figure 38. Please change figure 67 to this format: |SPSInfo|ATP(2)|AssociationStatus|Capability|DevAddress|DEVID| **Suggest accept in principle**, "The SPS info element isn't needed and it is the wrong size. Delete the SPS info field from this frame. The ATP could be added (although only the PNC really needs this). However, in 67, the association status is always "associated" by definition since only associated DEVs are included in this frame and so the association status field is not necessary."

> Accept "Change the format of the field to |new fields|Capability|DevAddress|DEVID|' Note that other comments have added some new fields, these need to go onto the end of this field."

2.2.11 PNC responsiveness

Comment 808, 94, 191, 188, 17, 10, 92, 12, 86, 357 - SUGGEST ACCEPT IN PRINCIPLE - The PNCResponse parameter is useless if the scheduler in the PNC for determining to which command frames the PNC must respond first is not specified. Comment 12 is a good observation in lack of specification. My d09 comment was addressing a broad issue of response but of most interest was the CTR and response to SPS info command. Perhaps the more general case of all commands is appropriate since they will include the CTR and SPS info commands. The text below remains limited to enhancing the current text. If so, then the text should indicate that all commands will be processed in order of receipt.

"Add text after the last paragraph of 8.4.4.3 - 'The intent of the PNC responsiveness is for the PNC to indicate a characteristic of responsiveness based on the implementation of the PNC. From this, the associating DEV may derive sufficient information to adjust how it relates to the PNC and what the DEV expectations may be. It is up to the PNC to report this and it should be a useful parameter for the DEV to use, including finding a piconet with a PNC more suited to the DEV needs. PNC implementations may be responsive to within a single superframe of a successful command in the CAP or open MTS. Further, within the limitation of the CAP or open MTS capability, PNCs may be of such a design as to accommodate several command operations within a single superframe. Other PNCs may be of the other extreme and be implementations that

presume a somewhat static application set. Again, the idea is for DEVs to be able to better understand the nature of the PNC of the network they are joining.

The distribution of association and open MTSs within superframes has a significant impact on PNC responsiveness {xref MTS in clause 8}.'

Add a field to the beacon, CTRRespTime, that is 4 bits with 4 reserved bits (i.e. one more octet to the sychronization parameters. It is is defined as follows:

'The CTRRespTime field is an estimate by the PNC of the number of superframes it will currently take to respond to a channel time request by a DEV, 8.4.4.3. A value of 0 means that the PNC estimates that it will take longer than 15 superframes to respond to a channel time requests.'"

> Accept this as the resolution for the comments 808, 191, 188, 92, 12, 86, 357.
> For 10, "Correct the spelling. PNC responsiveness will be kept as indicated in CIDs 808 and 191."
> For 92, 12, 86, 357 "PNC responsiveness will be kept as indicated in CIDs 808 and 191."
> 94 and 17 have multiple issues.

2.2.12 PNC Shutdown

375 (Heberling, TR) - Change figure 24 Piconet mode field by adding a Piconet shutdown bit to bit 7. Consequently, shortening the reserve field to just bits 5&6 inclusive. By making this change the Piconet Shutdown IE can be removed from the specification, thereby removing a 3 octet wasting IE from the beacon. **Suggest accept**.

> Withdrawn per acceptance of CID 356.

376 (Heberling, TR) If an earlier requested change to the piconet mode field is accepted(7.4.3,P118,L7), then the PNC shutdown IE is no longer necessary. Consequently, replace the PNC shutdown IE with the PNC HandoverCount IE. The PNCHandoverCount info element shall be formatted as illustrated in Figure 36. This IE is used during the beacon transition phase of the PNC Handover procedure. |ElementID|Length=1|PNCHanoverBeaconCount(1 octet)| The PNCHandoverBeaconCount is decremented after each beacon the "old" PNC broadcasts during the Beacon transition period of the PNC Handover Procedure. **Suggest accept**.

> Accept in principle, "The handover process will be modified as indicated in the resolution of CID 785 and 779."

642 (Gilb, TR) - There are many possible technical issues here if more than one child or neighbor piconet exists when the parent piconet ends operation. It might be safer for the parent to terminate all child or neighbor piconets before ending the piconet. **Suggest accept in principle**, "Use the text in document 02/289r1 to describe how to handle the parent stopping with child or neighbors present."

> Accept suggest resolution.

2.2.13 IE/PNServices - 63, 65, 88, 90, 107, 170, 189, 306, 308, 309, 395, 396, 397, 802

306 (Shvodian, TR) This IE does not belong in the standard. This function belongs above the MAC. Besides, this is never sent in the beacon. It is a field in the association request and response and should not be an IE. Remove 7.4.23 **Suggest accept in principle**.

Add a section to clause 8 (below). It will address the two IEs (ASIE and PNServices) in a single location regarding vendor ID. The PNServices text (and clause 6 and 7) will address the vendor ID information that prevents an interoperability problem. For PNServices, The first two octets of the string (in each direction)

would hold the vendor ID. It should be clear that this IE is not in the beacon but has the IE structure to allow graceful use in the association request/response. The naming of the MACPIB_DEVPiconetServicesIE and MACPIB_PNCPiconetServicesIE may imply a broadcast operation but it is within the confines of the association request/response. A change to include the 16 bit (registered) vendor ID as the first two octets in the PNServices strings will be made.

8.x.x Vendor identification

One or more registered vendor identifications shall be part of all exchanges of Application Specific IE, {xref to 7 and the subclause in 8 (new)} and the Piconet Services IE {xref to 7.4.23 and 8.3.2}, within this standard. Those IEs provide applications above the DEV level with over-the-air messages in support of those applications but without interpretation by DEVs as defined in this standard.

Correct interpretation of application information is assured with the Vendor ID that is part of each use of either ASIE or Piconet Services IE. The registration authority assuring uniqueness for the vendor ID is RAR {xref to references clause}

{Note: prior to the ratification of this standard, the paperwork for registration must be set up}

> Need to have more information on the format of the element. Current thinking is, ID, length, and then TLV, vendor id, length, value possibly repeated up to 128 octets total length.
> Table until Schaumburg all of the ones below.

63 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete table 30. **Suggest reject** as the solution for CID 306 addresses the issue.

170 (Heberling, TR) The piconet services information element is a potentially powerful information element. Unfortunately, because its definition does not specify in any detail the contents of either the Piconet services field or the type field, this info element represents an interoperability liability. Consequently, this information element should be deleted from the specification until such time a complete definition is provided. Delete the piconet services information element or provide a detailed definition. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

65 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. delete the clause 7.4.23 about piconet services. **Suggest reject** as the solution for CID 306 addresses the issue.

308 (Shvodian, TR) Piconet services IE should not be in the standard if the contents are not specified. Remove piconet services IE. **Suggest reject** as the solution for CID 306 addresses the issue.

90 (Heberling, TR) The piconet services IE is incompletely defined. Either add more detail as requested in Clause 7.4.23, P127, L28 or delete this IE from the command. Please perform either of the requested changes. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

395 (Heberling, TR) Since the Piconet Services element is incompletely defined, please remove this IE from figure 48. **Suggest reject** as the solution for CID 306 addresses the issue.

397 (Heberling, TR) Remove the Piconet services IE from the Association response command since the comment in C7.4.23 P127, L27 recommends deleting this IE. **Suggest reject** as the solution for CID 306 addresses the issue.

88 (Heberling, TR) The piconet services IE is another one of those weasel information elements that attempts to add functionality to the 15.3 MAC without specifying the details of the functionality it attempts to add. Consequently, the piconet services IE needs to be either described in more detail so that the potential

for interoperability issues is eliminated or it should be deleted. Please either provide more detail or delete this information element from the 15.3 MAC specification. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

396 (Heberling, TR) Delete the sentences between lines 6 and 7 regarding the piconet services IE. The lack of specific details makes this IE a potential interoperability problem. **Suggest reject** as the solution for CID 306 addresses the issue.

309 (Shvodian, TR) Piconet services does not belong in the standard if its use is not standardized. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

802 (Shvodian, TR) The piconet services IE does not belong in a standard since it is completely unspecified. **Suggest reject** as the solution for CID 306 addresses the issue.

107 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete clause 8.3.2. **Suggest reject** as the solution for CID 306 addresses the issue.

189 (Heberling, TR) this clause describes a potentially worthwhile information exchange within the piconet. Unfortunately, the lack of detail regarding the services that a piconet or DEVs in the piconet provide opens the door for serious interoperabilty issues. Consequently, it is recommended that until the details of which services are provided and encoded, this clause should be deleted from the specification. **Suggest reject** as the solution for CID 306 addresses the issue.

2.2.14 Reset

957 (Bain, T) - The description of SetDefaultPIB in Table 3 on page 28 calls out the PIB reset behaviour with the MLME-RESET.request primitive. The text on lines 38 and 39 do not seem to take this into account. "In all cases ... default values but still consistent with the SetDefaultPIB parameter of Table 3". **Suggest accept**.

    Accept

4 (Heberling, TR) - The sentence frag.: ..."and leaves the operation unfinished." is confusing. Which operation is being referenced here? The reset operation, the handover operation, or the shutdown operation. If the handover, or shutdown operations are being referenced does this mean after the reset operation that there is the possibility of continuing these operations? Replace the indicated sentence frag. with this fragment: ..."and cancels the interupted operation." **Suggest accept**.

    Accept.

2.2.15 Scan

599 (Gilb, TR) - "if the piconet that is found is a child piconet," "if the piconet that is found is a child or neighbor piconet," **Suggest accept in principle**, "Change 'if the piconet that is found is a child piconet,' to be 'if the piconet that is found is a child or neighbor piconet,'

    Accept in principle, "Change 'if the piconet that is found is a child piconet,' to be 'if the piconet that
    is found is a dependent piconet,' Change 'child or neighbor' to 'dependent' throughout clause 6
    where appropriate."

967 (Bain, T) - Should there be a timeout as part of the MLME-SCAN.request? If so, add timeout parameter for Result code rename Table 6 Result code to be reason code add Table 6 result code as with other time-outs. add 6.3.2.2 MLME-SCAN.confirm parameter of ReasonCode. **Suggest accept in principle**, "The scan command will finish after the channels have been scanned, there is no need for a timeout."

Withdrawn   1

6 (Heberling, TR) - The parameter "ChannelRatingList" implies an operation in the scan process that is not
described in clause 8.2.1. Please add text to clause 8.2.1 to make it congruent with the implied operation in
clause 6.3.2.2. Something along the lines of: ..."In addition, the searching DEV shall collect statistics on
each channel scanned and save them in the ChannelRatingList as described in 7.5.6.4. **Suggest accept**.

Accept.

964 (Bain, T) - It would seem that some mention of the multiple occupancy of a single channel would be
appropriate with a pointer to the child and neighbor sub-clauses. Add text in 8.2.1 after the last paragraph.
"The scanning process returns the information on child piconets, xref, and neighbor piconets, xref. This pro-
vides a complete inventory of each channel." **Suggest accept**.

Withdrawn.

976 (Bain, T) - No mention is made of the inventory of channels including child or 15.3 neighbors on the
same channel. "The result of a scan shall include information on parent, child, and 15.3 neighbor piconets
operating on the same channel." see 02/289. **Suggest accept in principle**. "Add the sentence 'The result of
a scan shall include information on any parent, child or 802.15.3 neighbor piconets that were detected.'"

Accept.

796 (Shvodian, TR) - Scan should be done before start, not as a part of the start. DME chooses channel, not
the MLME. Change to: A DEV that is instructed to start a piconet through MLME-START.request, 6.3.3.1,
shall try only to start its own piconet and shall not attempt to associate with an existing piconet. The DME
will have requested a scan through the channels and will have chosen the channel in which to start the pico-
net. When a DEV is looking to start a new piconet, it should also look for potential interference in the chan-
nels that it scans and rate the channels, from best (lowest interference) to worst (highest interference) and
return this information in the MLME-SCAN.confirm command via the ChannelRatingList. The DME
should choose the channel with the least amount of interference to start the piconet. Once the DME has
chosen a channel, it shall send the MLME-START.request primitive with the chosen channel. The DEV shall
listen to the channel for aMinChannelScan duration to determine if the channel is still clear. If, at the end of
this listening period, the DEV determines that the channel is clear, the DEV, now the PNC, shall commence
broadcasting its beacon once every superframe duration. If, however, the DEV determines that the channel
is no longer clear, it shall issue an MLME-START.confirm with a ReasonCode indicating a failure to start
the piconet. **Suggest accept in principle**, "Change lines 30-32 on page 153 to read "A DEV that is
instructed to start a piconet through the MLME-START.request, 6.3.3.1, shall try only to start its own pico-
net and shall not attempt to associate with an existing piconet. The DME shall have recently completed a
scan procedure and will have chosen the channel in which to start the piconet.

The DME should choose the channel with the least amount of interference to start the piconet based on the
ChannelRatingList returned in the MLME-SCAN.confirm primitive, {xref 6.3.2.2}.

Once the DME has chosen a channel, it shall send the MLME-START.request primitive with the chosen
channel. The DEV shall listen to the channel for aMinChannelScan duration to determine if the channel is
still clear. If, at the end of this listening period, the DEV determines that the channel is clear, the DEV, now
the PNC, shall commence broadcasting its beacon once every superframe duration. If, however, the DEV
determines that the channel is no longer clear, it shall issue an MLME-START.confirm with a ResultCode
indicating a failure to start the piconet."

Accept suggested resolution.

2.2.16 PM (SPS/APS merge)

361 (Heberling, TR) - The current wakeup mechanisms are not sufficient to wake up a DEV when a major system change occurs. Examples are channel change, PNC handover, beacon duration or location change and PNID change. A method is needed to allow all APS and SPS devices to easily check if a system change is in progress. The intervals for such checks must be decided by PNC. See resolution [13] in 02276r0P802-15_TG3-commentsD10_KO.doc A system change bit is added to the mode field of the PNC synchronization IE. All DEVs are required to check this bit at minimum intervals. The bit is unrelated to any APS and SPS wakeup method.

> Attempting to provide PS coexistence mode.

365 (Heberling, TR) - The powersave modes are a disaster. They don't conform to the other frame formats, neither to the terminology of the rest of the standard. The beacon shares no info about when a certain SPS is awake. There is no handover procedure. A DEV can join several SPS but how does it know when to be awake? How do you send to broadcast of DEVs are in different SPS? What are you supposed to do with "suspended CTA"? How does transmitters know when an intended receiver is awake? How does it fit wit with ATP? With pseudostat? with subrate? The APS doesn't work either, since there is no commonly agreed upon wake beacons to put the PCTM in. How is PNC supposed to calculate available CTA when DEvs of different SPS may end up with all their CTA needs in the same superframe at some intervals? The idea with PCTM is wrong since PNC should accept or reject CTR instantly. SPS interval is mentioned in clause 8 but never defined A much simpler power save solution is needed.   See resolution [14] in 02276r0P802-15_TG3-commentsD10_KO.doc

822 (Shvodian, TR) - APS needs to be modified. See XSI powersave submission.

823 (Shvodian, TR) - SPS mode should be merged with a modified APS. See XSI powersave submission.

1158 (Schrader, TR) - There is a possibility of eliminating APS and providing similar functionality. This would simplify the standard. Consider the following mode: An SPS CTR Type with CTR Interval defining its awake beacon interval. When the source DEV switches to SPS mode, it has no channel time allocated to it, but shall listen to its awake beacons CTAs and its PCTM. If an ACTIVE DEV can set the PCTM bit, this mode is similar to APS mode, except that the SPS DEV listens to beacons at fixed intervals and can stay in SPS mode indefinitely (assuming no PCTM event).

1159 (Schrader, TR) - No good method exists for the creator of an SPS set to move with other DEVs to a new SPS Set for the battery powered unit. The best way for multiple DEVs to transition to new SPS timing is to leave one set and join the replacement set. Since multiple devices may be in the first set, this will only work if there are at least 2 SPS sets in existence at the same time during the transition. Change the minimum number of SPS Sets from 1 to 2 (or more) for a battery powered unit.

2.2.17 MTS

113 (Heberling, TR) - MTS shall not be identified by dest or source, since that would make them indistinguishable from an ATS to/from the PNC. It would also complicate the queue implementation for the source. Change first sentence: <from> Management Time Slots (MTSs) are identical to GTSs except that the PNC address is either the SrcID or the DestID in the CTA   <to> Management Time Slots (MTSs) are identical to GTSs except that the stream index is set to the management stream index, 7.2.5.

> Accept in principle, "Change the first sentence from 'Management Time Slots (MTSs) are identical to GTSs except that the PNC address is either the SrcID or the DestID in the CTA' to 'Management Time Slots (MTSs) are identical to GTSs except that the PNC address is either the SrcID or the DestID in the CTA and the stream index is set to the management stream index, 7.2.5'"

115 (Heberling, TR) - MTS shall not be identified by dest or source, since that would make them indistinguishable from an asynchronous GTS to/from the PNC. It would also complicate the queue implementation for the source. Add: 0xFD shall be reserved for MTS traffic, 8.4.4.4.

Accept in principle, "Add 'Add: 0xFD shall be reserved for MTS traffic.'"

Meetin adjourned at 6:25 pm CDT.

2.2.18 Others

150 (Heberling, TR) - Why are we still doing the painful 802.11 version with LSb to the left? If you have LSb to the right and all fields in falling octet order, and of course send MSb first over the air, you will: - Have all fields and frame formats in the same orientation. - Have FCS in the same order as the rest of the frame - Have your buffers in transmitter and receiver built as the frame is specified. - Don't have to shift the orientation of data - send the bits over the air in the same order they are specified. Doing it this way, building buffers and reading them is trivial. Example: headerbuf[2] = PNID/256; headerbuf[3] = PNID%256; int PNID = headerbuf[2] * 256 + headerbuf[3]; HW: transmit(&headerbuf); // in the bit order it's built!!! Change the entire chapter 7 to: Send MSb first. Specify frames in the intuitive order, for instance: 7.2 General frame format |-- | octets: 2 | 2 | 1 | |---------------|------|-------------------| ... | Frame Control | PNID | Destination DEVID | |-- Figure 6 - MAC geader and frame format 7.2.1 Frame control field |-------------------------------------- | bits: b15-b14 | b13-b11 | b10 | |-------------------|------------|-----| ... | Protocol Version | Frame type | SEC | |------------------------------------- Figure 7 - Frame control field format 7.2.1.2 Frame type field |-- | Type value | Frame type | see | | | b13 b12 b11 | description | clause | |-------------|---------------|---------| | 000 | Beacon frame | 7.3.1 | |-------------|---------------|---------| | 001 | Imm-ACK frame | 7.3.2 | ... |-------------------------------------- Table 36 - Valid frame type values -----------------------> Transmission order.

2.3 Tuesday, 6 August, 2002

Attendees: John Barr, James Gilb, Jim Allen, Mark Schader, Dan Bailey, Gregg Rasor, Rene Struik, Knut Odman, Allen Heberling, Bill Shvodian, Robert Huang, Jeyhan Karaoguz, Jay Bain.

Meeting called to order 8:28 am, CDT, Tuesday 6 August, 2002.

Reviewed agenda.

2.3.1 IM (Interference mitigation)

148 (Heberling, TR) - The PNC cannot stop sending beacons. The consequence will be that a DEV starting up will not hear any beacons during scan and then start its own piconet. Neither can a PNC switch to other channels, while still maintaining the services of the piconet. The only possibility for PNC to do its own scanning would be to silence the piconet by allocating only a private CTA to itself and then listen while deviating its own beacon position during the listening period. A much better solution is to use remote scan. The remote scan response already contains a channel rating list. The PNC must trust the judgement of the reporting DEV. To account for deviations throughout the piconet area the PNC can ask two (or more) different DEVs to a do remote scan Delete paragraph page 193, line 40-44 "If the decision is made ... shall assume they are disconnected." Change next paragraph: <from> When the PNC returns to the current channel it shall send a beacon at the appropriate time. In that beacon the PNC may send the piconet parameter change element indicating the new channel and the time-out for changing the channel. <to> If the decision is made by the PNC to change the channel, the PNC shall send the piconet parameter change element indicating the new channel and the time-out for changing the channel. **Suggest reject**, "The requirement for the PNC to stop sending beacons and listen to the channel has been present in the channel change procedure since before

D09. The WG discussed this requirment in the resolution of the previous letter ballot and decided to keep the requirement. One reason for this is that the PNC need to passively scan the new channel to determine that, from it's point of view, that the channel is empty. Another reason is that a DEV that is near the PNC and is transmitting while the PNC is scanning will negatively affect the PNCs ability to determine if the new channel is clear. Furthermore, since the PNC is the 'center' of the piconet since all DEVs are required to be in its range, it is the entity best able to determine if a new channel is better than the current channel."

> Suggest accept in principle, "Add to page 193 at the end of the second paragraph on line 44 a sentence that says 'The PNC shall not suspend beacon transmission for more than 2*{xref aMinChannelScan}.'"

292 (Shvodian, TR) - Remove the piconet maximum transmit power IE. This should be transmittted in an association response frame as a frame field. Remove the piconet maximum transmit power IE. **Suggest accept in principle**, "Delete the maximum transmit power IE, take the Max TX power level field and put it with the new piconet synchronization field in the beacon. Add text that says that if the PNC does not want to limit the TX power it shall set the field to 0x7F. See also the resolution of CID 778."

> Accept in principle, "Delete the maximum transmit power IE, take the Max TX power level field and put it with the new piconet synchronization field in the beacon. Add text in clause 7 where the Max TX power level field is defined that says that if the PNC does not want to limit the TX power it shall set the field to 0x7F. Following '... transmit power IE in the beacon.' add 'DEVs shall comply with the maximum transmit power within 10*aMaxLostBeacons superframes following the beacon in which the DEV detects the change.' See also the resolution of CID 778."

824 (Shvodian, TR) - Change maximum power level change to being set in the association response and changed with a command frame. Max tranmit power should be sent in the association response and changed if needed with a command frame. There is no reason to put an IE into the beacon. **Suggest accept in principle**, "Delete the maximum transmit power IE, take the Max TX power level field and put it with the new piconet sycnrhonization field in the beacon. Add text that says that if the PNC does not want to limit the TX power it shall set the field to 0x7F. See also the resolution of CID 778."

> Accept in principle, "Delete the maximum transmit power IE, take the Max TX power level field and put it with the new piconet synchronization field in the beacon. Add text in clause 7 where the Max TX power level field is defined that says that if the PNC does not want to limit the TX power it shall set the field to 0x7F. Following '... transmit power IE in the beacon.' add 'DEVs shall comply with the maximum transmit power within 10*aMaxLostBeacons superframes following the beacon in which the DEV detects the change.' See also the resolution of CID 778."

2.3.2 PM/SPS

1154 (Schrader, TR) - ACTIVE Source to SPS Destination: should the SPS Destination become ACTIVE? Currently undefined how to control this. Solution Submitted in document 02/231r0. **Suggest accept**, this uses the PCTM IE to signal a DEV to go ACTIVE, it is requested with the CTRB. See also CID 915.

> Table until tomorrow morning. Add also that this can be used to request wakeup for asynchronous traffic.

915 (Bain, TR) - Text and a method is required so that a DEV that is the target of Channel time may determine of possible multiple CTAs, which are for SPS mode (a field in the CTR) and which for ACTIVE mode. This information would be used to understand when a stream change has been made by a source DEV and indicate to an SPS DEV if it should return to ACTIVE. Document 02/231 contains a suggested solution. Of course, we could return to tri-partite negotiations! **Suggest accept**, this uses the PCTM IE to signal a DEV to go ACTIVE, it is requested with the CTRB. See also CID 1154.

Table until tomorrow morning. Add also that this can be used to request wakeup for asynchronous traffic.

446 (Gilb, TR) - Let the PNC choose the next awake beacon, that way it can balance the traffic better. Delete the next awake beacon from the SPS configuration request command and put it in the SPS configuration response command. Change the wording to indicate that the PNC sets this number, not the DEV. Change clause 8, where appropriate, to reflect this change. Make sure the MSCs reflect it as well. **Suggest accept.** "Also put in text that says that the PNC is able to send a directed SPS configuration response command with a new beacon number at any time to change the phase of the awake beacons for a give SPS set."

Accept suggested resolution. "Put the additional text in clause 8.12.2.1 describing when the PNC is able to send the directed configuration response command. Also make sure the text and MSCs in 8.12.2.1 matches the change in the request process."

1156 (Schrader, TR) - The relationship between AWAKE beacons and GTS slots is not clear. Coloring the AWAKE beacons black and the GTS slots in Figure 137 will help, but it is not enough. Change the Text and the two figures shown in 02/321r0 in the 8.12.2.1 section. **Suggest accept**.

Accept in principle, "Change the text and the two figures shown in 02/231r0 in the 8.12.2.1 section."

1157 (Schrader, TR) - There is concern that SPS opens up the possibility of overloading superframes for large numbers of DEVs using the same SPS Set. This probably tranlates into denial of a CTR. The mechanism is in place for a DEV to trade off the amount of power saved with the loading of an individual superframe. This is shown in document 02/231r0. The use of this mechanism is up to the application, not the PNC. **Suggest accept in principle**, "Use a new IE formatted like the PCTM where if the SPS DEV's bit is set, then the SPS DEV knows that its slots will appear in the next superframe. This allows the PNC to delay the slot multiple times."

Accept in principle, "Use a new IE called the 'remain awake IE' formatted like the PCTM where if the SPS DEV's bit is set, then the SPS DEV knows that its slots will appear in the next superframe. This allows the PNC to delay the slot multiple times. Also add text to clause 8.12.2.2 to describe the use of this IE and text that says 'The PNC should avoid using this mechanism repeatedly for a DEV since it has a negative impact on the sleeping DEVs power usage."

1161 (Schrader, TR) - The management of SPS IE is not well defined. See document 02/321r0 for deleted and inserted text. **Suggest accept**.

Accept in principle, "See document 03/231r0 subclause 8.12.2.2 for deleted and inserted text."

1162 (Schrader, TR) - The suspend and resume overrides are inadequate for correct operation of PS transiitons, but useful in overriding what should be default behavior. See table ??3 and associatted text in 02/231r0. The default changes list the desired default behaviors for proper stream management. As an example: an active device using an SPS set to talk to a an SPS mode device should continue using that stream when it switches to SPS mode unless it manually suspends that stream. **Suggest accept**.

Accept in principle, "Use table ??3 and text in subclause 8.12.2.2 in 02/231r0. The default changes list the desired default behaviors for proper stream management."

1159 (Schrader, TR) - No good method exists for the creator of an SPS set to move with other DEVs to a new SPS Set for the battery powered unit. The best way for multiple DEVs to transition to new SPS timing is to leave one set and join the replacement set. Since multiple devices may be in the first set, this will only work if there are at least 2 SPS sets in existence at the same time during the transition. Change the minimum number of SPS Sets from 1 to 2 (or more) for a battery powered unit. **Suggest accept**.

Table until Thursday, 8 August, 2002, move to hard issues. Suggested new text "Add text to 8.12.2.1 that says 'If a group of DEVs want to change the SPS set characteristics, then one of the DEVs needs to request a new SPS set and then the other DEVs can change over to it. If there are no more SPS sets available, then all of the DEVs need to leave the current SPS set so that PNC is able to deallocate the SPS set index. However, if not all of the DEVs leave the set, then the PNC will not be able to deallocate the SPS set index."

351 (Heberling, TR) - So the PNC is going to update the SPS IEs and then broadcast them in the beacon along with the CTAs? My concern is how long is the beacon going to become to convey this change in SPS status? Please clarify, and provide text providing limits to just how long the SPS status IE becomes. Please provide the requested clarification and supporting text. **Suggest accept**, "Add text to the SPS section that indicates that the PNC needs to limit the number of SPS sets and members based on the potential problems with the beacon length. Note that the new PCTM format limits the size of a single SPS status IE to be no more than 35 octets."

Accept suggested resolution.

1155 (Schrader, TR) - Uniform use of CTR interval and SPS Sets for both ACTIVE and SPS CTR Types is not documented. It is better to make the selection of the time base source explicit rather than implicit. It is easier to understand and easier to implement. Document 02/231r0 adds the text, a figure, and the "Time Base" CTR control field. **Suggest accept**. (text needs a little work though.)

Table, until Wednesday afternoon, Mark Schader to have new text, 2/231r2 ready for Wednesday morning. Delete the SPS set with CTRI time base, for potential merge, re-use SPS set configure with SPS set index of 0xFF (reserved set index).

178 (Heberling, TR) - There is no power to be saved by allocating powersave first in the beacons. On the contrary, since SPS CTA are likely to be subrates, it will severely complicate the allocation procedure to mix them with normal GTS. Instead they are better handled like ATS with higher priority and allocated in a section after the GTS for various allocations that don't occur in every beacon. MTS shall still be first, as specified. Delete sentence on line 24-46 "The PNC should attempt to allocate GTSs of all APS and SPS ..." **Suggest reject**, "The PNC is only required to try to put them first. If it loads the other GTSs at the front of the superframe, then it would not be able to fulfill this request. On the other hand, if it loads the other GTSs from the back, then adding the SPS GTSs (or subrate GTSs) is not a problem. The SPS GTS is allocated in an infrequent manner, in the same manner as the MTSs. If allocating the SPS GTSs first is a problem, then allocating the MTSs first would likewise be a problem."

Withdrawn

2.3.3 CTM/SPS

Recessed at 10:13 am CDT until 10:30 am CDT.

Meeting called to order at 10:30 am CDT.

486 (Gilb, TR) - The first paragraph in 8.12.3 is confusing. Change the first paragraph in 8.12.3 to read "The number of superframes between time slots is specified the CTR interval field of the channel time request command, {xref channel time request command}. An additional condition placed on the timing is that the value of the CTR interval shall not be less than the number of superframes between awake beacons, i.e. the SPS interval. Since the CTR interval, like the SPS interval, must be a power of 2, the frequency of SPS slots must be a power of 2 that is a subrate of the awake beacon rate, as illustrated in Figure 140. {Add an example here of what this means} An SPS DEV shall listen to every awake beacon regardless of the frequency with which awake slots are allocated. If the SPS DEV is the DestID of any CTA in the awake beacon, then the SPS DEV shall listen during the associated GTS slot in that awake superframe." An example needs to be

generated and inserted as indicated above. Perhaps it would use the timing shown in figure 140. **Suggest accept in principle**, "Change the first paragraph in 8.12.3 to read

> 'The number of superframes between time slots is specified the CTR interval field of the channel time request command, {xref channel time request command}. An additional condition placed on the timing is that the value of the CTR interval shall not be less than the number of superframes between awake beacons, i.e. the SPS interval. Since the CTR interval, like the SPS interval, must be a power of 2, the rate of SPS slots must be a power of 2 subrate of the awake beacon rate, as illustrated in {xref Figure 137}. For example, in case 3 of {xref Figure 137} the SPS interval is $2=2^1$ while the channel time request intervale is $8=2^3$. Thus, the slots occur every fourth, $4 = 8/2$, awake beacon. An example of values that are not allowed would be an SPS interval of 4 and a channel time request interval of 2. The reason that this is not allowed is that the slots would occur more often than the DEV was waking to listen to the beacon. An SPS DEV shall listen to every awake beacon regardless of the frequency with which awake slots are allocated. If the SPS DEV is the DestID of any CTA in the awake beacon, then the SPS DEV shall listen during the associated GTS slot in that awake superframe.'

> Accept suggested resolution.

Next item is Mode 1 security, does it exist, if so how. Suggestion is to completely remove mode 1, "Add informative text to 8.3.1, e.g. 'The PNC may refuse association based on the DEV address of the associating DEV. In this case, the PNC sends the association response command with a reason code of 'Association denied'. Add a reason code to 7.5.1.2 that is '8 - Association denied'."

Security sub-committee will convene after lunch, 1:00 pm CDT.

2.3.4 PM/APS

487 (Gilb, TR) - How do you wake up a DEV that is in APS mode (Asynchronous Power Save mode) when you want to allocate a GTS to it? Two options: 1) fix it or 2) delete APS mode. To fix it, I offer 3 options: 1. Make SPS set 0 the set of all DEVs using APS mode. The SPS set interval and next awake beacon will be set to 0 for this set. Thus, when an originating DEV sends the CTR command to talk to the sleeping target DEV, it knows the target DEV is sleeping in APS mode and will wait, possibly for a long time, for the target DEV to wake up. This means that a battery powered PNC shall support at least 2 SPS sets and an AC powered PNC shall support 5 SPS sets. 2. The PNC responds to the CTR from the originating DEV with a channel time status command with reason code "Target DEV in APS mode". If the target DEV wakes up from APS mode, then the PNC send the channel time status command with reason code "Success" and allocates the CTA. 3. The orignating DEV watches the beacons after its request and reads the TIM element (should be CTIM - channel time indication map?) to see if the target DEV is being told by the PNC to wake up. If so, then the originating DEV knows the target DEV is sleeping in APS mode and will wait, possibly for a long time, for the target DEV to wake up. **Suggest accept**, "Assuming APS is not deleted or merged with SPS, use option 2. The PNC responds to the CTR from the originating DEV with a channel time status command with reason code 'Destination DEV in APS mode'. If the target DEV wakes up from APS mode, then the PNC send the channel time status command with reason code 'Success' and allocates the CTA. See also CID 913."

> Accept in principle, "Assuming APS is not deleted or merged with SPS, use option 2. The PNC responds to the CTR from the originating DEV with a channel time status command with reason code 'Destination DEV in APS mode' and the assigned stream index. This allows the requesting DEV to terminate the stream if it does not get a response in time. If the target DEV wakes up from APS mode, then the PNC sends the channel time status command with reason code 'Success' and allocates the CTA. Also add the reason code to 7.5. 5.2, 'Destination DEV in APS mode'. See also CID 913.

913 (Bain, TR) - A CTR directed to an APS DEV will cause the PCTM information element action. However, there is no indication on the correct manner to inform the requesting DEV that the PNC is not able to comply with the CTR immediately. Suggested that the sending DEV receive a reject of the CTR with a result code of pending. Text should indicate that the requesting DEV try again but that the PCTM bit will remain set. This will result in a DEV coming out of APS after the its next wake period. The PNC will not allow the DEV that was in APS mode to reenter APS mode until aAPSHoldOff expires. This allows for the CTR requester to requeue its CTR. **Suggest accept in principle**, "Assuming APS is not deleted or merged with SPS, use option 2. The PNC responds to the CTR from the originating DEV with a channel time status command with reason code 'Destination DEV in APS mode'. If the target DEV wakes up from APS mode, then the PNC send the channel time status command with reason code 'Success' and allocates the CTA. See also CID 487"

> Accept in principle, "Assuming APS is not deleted or merged with SPS, use option 2. The PNC responds to the CTR from the originating DEV with a channel time status command with reason code 'Destination DEV in APS mode' and the assigned stream index. This allows the requesting DEV to terminate the stream if it does not get a response in time. If the target DEV wakes up from APS mode, then the PNC sends the channel time status command with reason code 'Success' and allocates the CTA. Also add the reason code to 7.5. 5.2, 'Destination DEV in APS mode'. See also CID 913.

488 (Gilb, TR) - What does the PNC do if the target DEV in APS mode does not respond to the PCTM before its scheduled wakeup? Two options: 1) fix it or 2) delete APS mode. In any case, add text that says "The PNC waits until the target DEV indicates that it is awake up by sending a directed frame to the PNC before it allocates the requested CTA." To fix it, I offer 2 options: 1) The PNC should (or shall) reject the CTR with new message code "DEV failed to respond to wakeup" or 2) The PNC waits until ATP for the DEV expires and then rejects the CTR with message code "DEV not associated" and peforms the disassociation procedure (i.e. puts the association info into the beacon). **Suggest accept** "Assuming APS is not deleted or merged with SPS, add text that says 'The PNC waits until the target DEV indicates that it is ACTIVE, as defined in {xref 8.12.1?}, before it allocates the requested CTA." The PNC shall reject the CTR with new message code 'DEV failed to respond to wakeup'.

> Accept in principle, "Use option 2, the PNC waits until the ATP expires and then disassociates the DEV. The requesting DEV is notified that the stream is gone with the normal disassociation process. Add text to 8.12.1 that explains this and uses xref's to disassociaton to describe what happens. This is similar to the resolution of stream termination when a DEV disassociates."

489 (Gilb, TR) - What does the PNC do if a DEV has GTSs assigned to it as the destination and it requests to go to APS mode? Two options: 1) fix it or 2) delete APS mode. To fix it, I offer 4 options: 1. The PNC refuses the request because of current streams/slots 2. The PNC accepts request and continues to allocate GTSs for the streams 3. The PNC accepts request and terminates the GTSs assigned to the DEV as destination. 4. The PNC accepts the request and doesn't allocate the CTAs until the DEV wakes up again. The PNC somehow communicates this to the other DEVs. Need to add how this is communicated to the other DEVs Also need to specify if this applies if the DEV is the source of a GTS and if this applies to asynchronous data traffic as well. **Suggest accept in principle**, "Assuming APS is not deleted or merged with SPS, The PNC accepts request and terminates all GTSs assigned to the DEV as either destination or source using the stream termination procedure with reason code 'Destination DEV in APS mode' or 'Source DEV in APS mode' with the exception of GTSs where the DEV is the source and requested the channel time with the power save field set. This is similar to the proposal from WMS in 02/163r0."

> Accept in principle, "Change 'DEV shall not request to enter APS mode if it is the source or destination of any current GTSs.' to be 'DEV shall not request to enter APS mode if it is the source or destination of any current isochronous GTSs.'

2.3.5 CTM/IsochTerm

8.5.1.3 Isochronous stream termination (CIDs: 364(withdraw Per this resolution), 907(accept in principle), 120(reject), 366(accept), 917(accept in principle, since the PNC DME does not need to know))

907 (Bain,TR) Grammatical errors and reference to figure 118 is incorrect and does not pertain to text in this section. Consequently, change the paragraph to the following: "In the case where the PNC wishes to terminate the stream, it shall notify the originating DEV and the target DEV via the next periodic beacon that the CTAs assigned to the indicated stream index are set to a null CTA value for aMinBeaconInfoRepeat duration." **Suggest reject** pending acceptance of CID 364

> Resolution is to reject, "Figure 118 has been removed, a new termination procedure in 02/273r13 describes with correct MSCs the procedure."

120 (Heberling, TR) Change this sentence from "In the case where the originating DEV that wishes to terminate is the stream is the PNC,..." to "In the case where the originator of the stream termination request is the PNC, the PNC shall simply remove the CTAs associated with the terminated stream index from the next beacon." **Suggest accept** pending acceptance of CID 364

> Accept in principle, "The termination procedure is now defined in 02/273r13."

366 (Heberling, TR) The sentences between lines 44 and 46 are redundant. Therefore delete them. **Suggest accept** pending acceptance of CID 364.

> Suggest accept in principle, "The text in lines 44-46 will be replaced by the new termination procedure in 02/273r13."

(Beginning of suggested resolution text)

> Start replacing on line 40, continue up until the end of the subclause including figures 117 and 118. Both the text below and the 3 figures are to be inserted.

P 179, L40,

The PNC, upon receiving a channel time request command from a DEV requesting stream termination, shall respond with an ACK. In the case where the stream originating DEV is requesting a stream termination, the PNC shall than notify the target DEV of the termination via a null CTA in the beacon for {xref aMinBeaconInfoRepeat} duration. For CTAs that were not allocated every beacon, e.g. subrate slots, the null CTAs shall be placed starting in the beacon where the next CTA would have occured and in the following {xref aMinBeaconInfoRepeat}-1 beacons. A null CTA has the stream index, SrcID and DestID with zero values for the slot location and slot duration, {xref 7.4.8}. {xref Figure 16} illustrates the MSC for termination of a stream by a source DEV. In the case where the target DEV is requesting a stream termination, the PNC shall than notify the stream originating DEV of the termination via a channel time response command. {xref Figure 17} illustrates the MSC for termination of a stream by a target DEV.

In the case where the PNC decides to terminate a stream originating DEV's stream, the PNC shall notify the source DEV via a channel time response command and the target DEV via a null CTA in the beacon for aMinBeaconInfoRepeat duration. For CTAs that were not allocated every beacon, e.g. subrate slots, the null CTAs shall be placed starting in the beacon where the next CTA would have occured and in the following {xref aMinBeaconInfoRepeat}-1 beacons. {xref Figure 18} illustrates the termination of a source DEV's stream by the PNC.
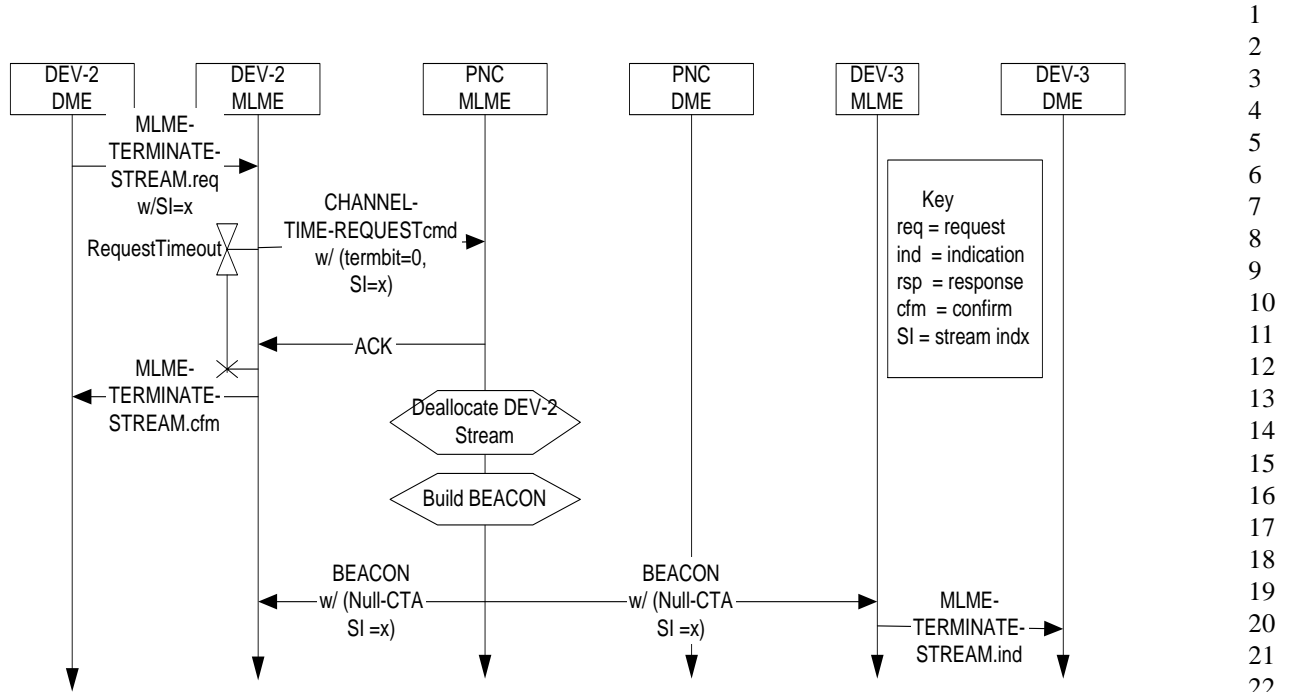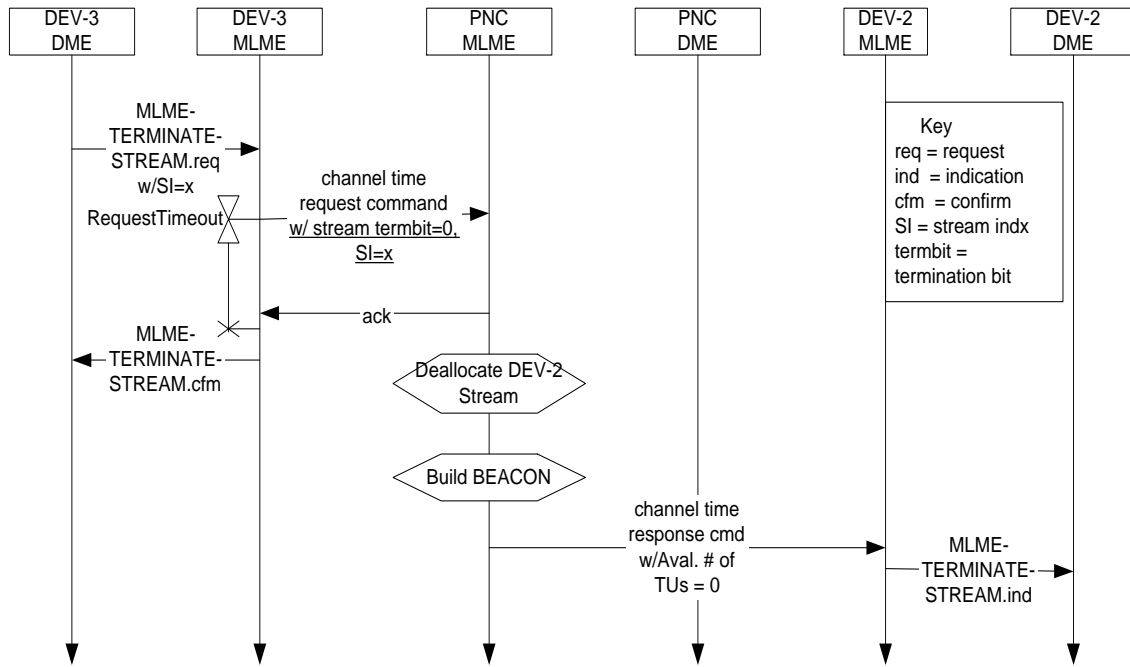
Figure 16—Source DEV-2 Terminating its stream

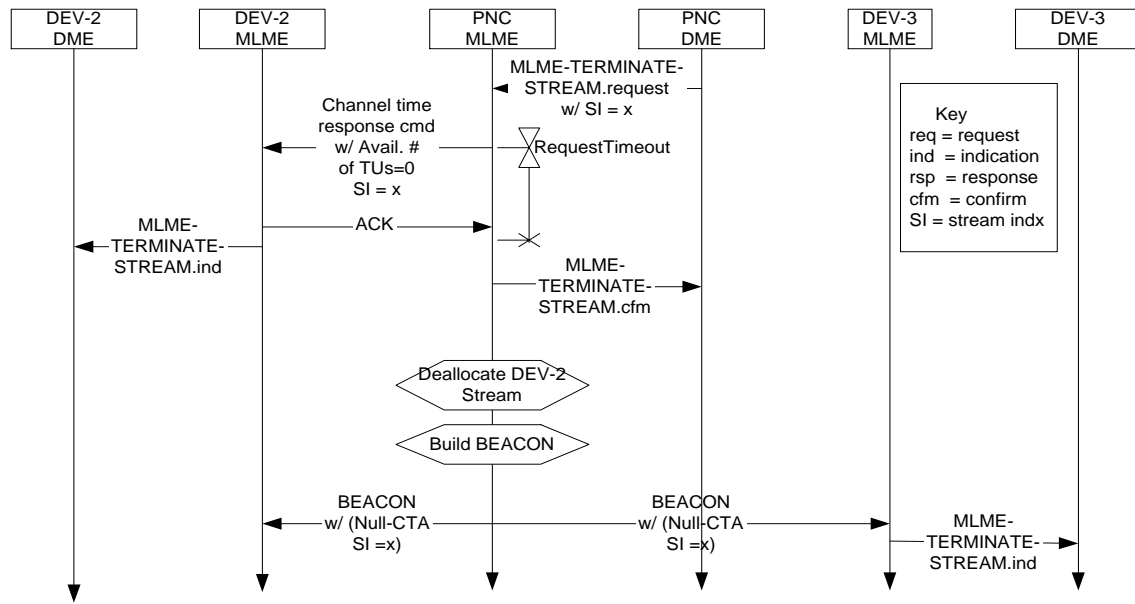**Figure 17—Target DEV-3 terminating Source DEV-2's stream MSC**

Figure 18—PNC Terminating Source DEV-2's stream MSC

155 (Heberling, TR) KO> MLME-TERMINATE-STREAM.indication not used for target, only source. Consequently, for clause 6.3.14.10 MLME_TERMINATION_CTA.indication <change from> This primitive is used to inform the target DEV that channel time that was previously allocated is no longer present in the most recently received beacon. <to> 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. **Suggest accept in principle**, "Change 6.3.14.10 as indicated in 02/273r12"

Accept in principle, "Change 6.3.14.10 as indicated in 02/273r13."

364 (Heberling, TR) Please change this sentence frag. from "...followed by a beacon in which the CTAs assigned to the indicated stream index are set to a null CTA..." to " followed by a beacon in which the CTAs assigned to the indicated stream index are removed." In the case where the SrcDEV is requesting the termination of the stream, the ACK to its request is sufficient. The receiving DEV will know that the stream has been deallocated by the absence of the CTAs assoicated with the stream index. This is a more concise means of terminating the stream CTA.   In the case where the DestDEV is doing the termination the same rules apply. The SrcDEV will be notified via the absence of the CTA in the beacon. **Suggest accept**

Withdrawn

(begin text for resolution of CIDs 155, 410 and 364)

This text replaces the 6.3.14.10 but move this after the MLME-TERMINATE-STREAM.confirm

6.3.14.10 MLME-TERMINATE-STREAM.indication (CIDs: 410(withdraw), 155(Accept in Principle), 364(withdraw))

This primitive is used to inform the source or target DEV that channel time previously allocated is no longer available. The semantics of this primitive are:

MLME-TERMINATE-STREAM.indication(

StreamIndex

)

6.3.14.10.1 When generated

This primitive is sent from the DEV's MLME to its DME upon receiving either a beacon containing a null CTA with the indicated StreamIndex, or a channel time response command with the indicated StreamIndex, available number of TUs = 0 and reason code = "Stream terminated" .

6.3.14.10.1 Effect of Receipt

The DME upon receiving this primitive is informed that the CTAs associated with the indicated stream index have been terminated.

(end resolution of CIDs 155, 410 and 364).

2.3.6 FrmFrmt

450 (Gilb, TR) - The beacon can be quite long, allow it to be split in two. Either add a last field (0 for more fragments, 1 for final fragment) or allow the beacon to be fragmented with the fragmentation process, possibly with an upper limit of 2 or 3 fragments. Allow DEVs to act on any fragment they hear. Put the piconet syncrhonization IE in each fragment so DEVs know the timing for any fragment they hear. **Suggest accept in principle**, "Allow the beacon to be fragmented into two sections, each one of which has the piconet sychronization elements. Use the fragmentation field to indicate which is which. Add text that says "A DEV that correctly receives the header of the first beacon fragment may use channel time allocations in the frame body of a beacon fragment which has also been correctly received."

> Accept in principle, "Add to 8.6.2. Allow the PNC to send IEs in probe frame (DestID = BcstID) in either a broadcast MTS following the beacon or in a probe frame (DestID = BcstID) in the CAP one SIFS after the beacon (i.e. it cheats on the back off rules). If the beacon is too large, then the PNC may put the other IEs in the following probe frame(s). Make sure SPS DEVs have some way to know that more important information is to follow. How about using the more data bit to indicate this? Or use MSTF IE. Also, make sure that if the beacon is protected with security then the probe command that follows should also be protected with security. JPKG will have new text for tomorrow in 02/273r13."

Recessed for lunch, 12:06 am CDT.

Meeting called to order, 1:07 CDT.

Security subcommittee consisting of Dan Bailey, John Barr, Rene Struik, Gregg Rasor, Bill Shvodian moved to conference room C.

762 (Shvodian, TR) - Does the MAC pass the HCS to the PHY or not? 12 octets in TXMACHead would include the HCS, but these are at best dummy octets, and more accurately they are dumb octets. Clasue 11, Figure 181 does not show HCS being passed from the MAC to the PHY. Change the header size to 10 octets and make clear that HCS is not sent in the Tx Vector. **Suggest accept**.

Accept in principle, "Change the header size to 10 octets and add the following sentence to both the TXMACHead and RXMACHead definition, 'Note that the MAC header does not include the HCS, as indicated in {xref 7.2}.'"

764 (Shvodian, TR) - HCS does not belong in the MAC frame format. HCS is inserted and removed by the PHY. Remove HCS from the figure. Leave a space between the header and the frame body. HCS must be removed from all header figures. Leave a space between the payload and the header. **Suggest accept**. Note: the validation of the MAC header is done by the PHY, where is it best to state that?

Accept in principle. "See example in 02/273r13. Add text to 7.3, (the rest is going to be deleted with the pad bit), 'The figures in this subclause are a representation of the MAC frame and MAC header. The HCS is not shown since this is calculated and verified by the PHY.' Change all MAC header lengths from 12 to 10."
Example of a frame format is shown below.

octets: 0 or 4	L_n		10
FCS	Data		MAC header
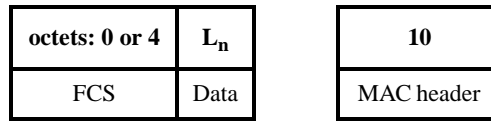
Figure 19—Non-secure data frame format

765 (Shvodian, TR) - Clarify that the MAC does not create or receive the HCS. Add the following sentence: The HCS is created by and removed by the PHY and is not passed from the MAC to the PHY. **Suggest accept**.

Accept in principle, "On page 102, Delete item b and delete the HCS field in figure 6, leaving a gap, as shown in 02/273r13 CID 764."

773 (Shvodian, TR) - Why is the HCS in the MAC frame format? It is created in the PHY and checked in the PHY. It has no use in the MAC. If an implementation wishes to pass down dummy octets, fine. The standard doesn't need to show this. Remove HCS from the frame format and delete this sub-clause. **Suggest accept in principle**, "Replace this clause with one entitled: 'MAC header validation' and text 'The MAC header is validated by the PHY before it is passed to the MAC when a frame is received. The protection provided as well as the method for valdiating the data in the MAC header is PHY dependent. In addition, the bit order for the protection mechansim is also PHY dependent. The length of the HCS is a PHY dependent parameter, {xref pLengthHCS}. For the 2.4 GHz PHY, the MAC header protection and validation is defined in {xref HCS}.' Add a parameter to table 54, '{marker pLengthHCS}' with value 'PHY dependent, defined in 11.2.9 for the 2.4 GHz PHY' Add to 11.2.9 on page 272, line 4, 'The MAC parameter, {xref pLengthHCS} shall be 2 for this PHY."

Accept suggested resolution.

60 (Heberling, TR) - Which bit and byte order does the HCS get sent in? Does it get sent in the same order as the FCS? Please clarify. **Suggest accept**. "See the resolution of CID 773, 762, 764 and 765."

Accept suggested resolution.

393 (Heberling, TR) - Remove the Pad subfield from the frame control field. Padding command and/or data frames creates unnecessary complications. Particularly, when fragmenting MSDUs and reassembling fragments into MSDUs. Please perform the requested change. **Suggest accept**.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

Accept

394 (Heberling, TR) - Remove the Pad field clause. Padding data frames creates unnecessary complications when fragmenting MSDUs and reassembing fragments into MSDUs. Please make the requested change. **Suggest accept**.

Accept

499 (Gilb, TR) - The pad field is uneccessary and downright silly when you think about it. Remove the pad field and the pad octet requirements for frames. The pad field becomes a reserved bit in the frame control field. The pad octet is described in the first paragraph of 7.3, line 39 page 106. Delete the entire paragraph. **Suggest accept**.

Accept

1194 (Heberling, TR) - The pad octet is a specific solution for some 16 bit implementation that has no bearing on interoperability. Get rid of pad bit in header and pad octet in all frames. Get rid of all pad octets inside command frames. Affected parts: Figure 7, page 102, line 48 7.2.1.8, page 104, line 26-30 7.2.8, page 106, line 9 "including stuffed octet" 7.3, page 106, line 42, "If the pad octet..." 7.3, page 106, line 45, "Note that the FCS ... the stuffed octet" **Suggest accept**.

Accept

2.3.7 PNServices

202, 204, 402 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE. **Suggest accept in principle**, "Adding the vendor IE to the associate request and response commands as outlined in 02/276r0 will take care of problems with standardization. Since this information is needed to provide a fast response time, the DEVPiconetServicesIE will remain in the associate request command."

Possible proposal,vendor string + vendor specific IE but not DEVPiconetServicesIE.
Table until Schaumburg.
Resolutions: The current process does not allow multiple vendor IDs in the down stream case, this is a problem. JPKG will suggest a solution tomorrow, 7 August, 2002. Question: Is there a way to provide services information quickly by simply not locking out a potential solution that will be defined at a later date.

2.3.8 CAP

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it. ADH to provide suggested text tomorrow, 7 August, 2002

2.3.9 CTM/Isoch

404 (Heberling, TR) Insert the parm (ACK Policy) between stream Index and CTR-Control. Please make the requested change. **Suggest accept.** (page 59, line 41, 6.3.14.1)

Accept. (also rename Policy in MAC-ASYNC-DATA.request to be ACKPolicy). 1

2

405 (Heberling, TR) Insert the parm ACK Policy into the parm table between parms StreamIndex and CTR- 3
Control. Type: Enumeration; Range: no-ACK, Imm-ACK, Dly-ACK; Defn: Default ACK request type for 4
stream. Please make the requested change. **Suggest accept**. (page 60, line 11, Table 18). 5

6

Accept. 7

8

406 (Heberling, TR) Add this enumerated result code to the ResultCode range: ILLEGAL_ACK_POLICY. 9
Please make the requested change. **Suggest accept**. (page 60, line 11, Table 18). 10

11

Accept. 12

13

2.3.10 CTM/CTRinterval 14

15

378 (Heberling, TR) The CTR interval type field was found to cause inconsistent interpetations of the CTR 16
Interval and the CTR TU. Consequently, delete the CTR interval type field from figure 74. **and** 788 (Shvo- 17
dian, TR) Remove CTR interval type. **and** 379 (Heberling, TR) Due to a previous comment regarding Figure 18
74, the defintion of CTR Interval type is no longer needed. Consequently, delete the sentence from between 19
lines 37 & 38 inclusive. Also remove the sentence between lines 44 & 45 for the same reason. **and** 39 20
(Heberling, TR) KO> There is no application for having several CTAs of the same stream in the same super- 21
frame. Besides there is no definition how the PNC should handle a request where enough avail-TU exists but 22
not enough CTR-interval. In addition, it would be practically impossible to use with pseudo static streams. 23
Only the CTR-interval-type 1 (subrate) has a useful implementation and hence the frame format of CTR- 24
Control can be simplified. The interval 0 has no use after asynchronous GTS is incorporated **Suggest accept** 25
for the reasons given. 26

27

Suggestion of limiting CTR interval to be no more than 8 when the type indicates slots per super- 28
frame. Suggest of also limiting to only pseudo static? 29

30

Table until July 29, 2002 conference call, carry discussion to email. We are looking for suggestions, 31
includes 176, 378, 788, 379, 39. 32

33

Accept in principle, "On page 141 line 42, following 'If the CTR interval type is set to 1, the value 34
contained in the CTR interval field shall be a power of 2.' Add text 'If the CTR interval type is set to 35
0, the value contained in the CTR interval field shall be less than or equal to 8.' On page 141, line 36
44-45, change 'Regardless of the CTR interval type field, if the CTR interval field is zero, the DEV 37
is requesting its fair share of as much channel time as is available.' to be 'Regardless of the CTR 38
interval type field, if the CTR interval field shall not be set to zero.' Subclause 7.5.5.2, page 142, line 39
49, add a reason code 'Requested super-rate unsupported.'" 40

41

176 (Heberling, TR) - There is no application for having several CTAs of the same stream in the same super- 42
frame. Besides there is no definition how the PNC should handle a request where enough avail-TU exists but 43
not enough CTR-interval. As an addition, it would be practically impossible to use with pseudo static 44
streams. Only the CTR-interval-type 1 (subrate) has a useful implementation and hence the frame format of 45
CTR-Control can be simplified. The interval 0 has no use after ATS is incorporated. Delete sentence on line 46
21-22 "If multiple slots per superframe are requested,..." **Suggest reject:** "As in all cases, if the PNC is 47
unable to satisfy the request for the CTR interval, it simply rejects the channel time request. However, if the 48
PNC is able to satisfy it, it may allocate it. Similarly, the PNC is able to move pseudo-static slots, if neces- 49
sary, to satisfy requests for multiple slots per superframe. Since the PNC controls the superframe duration, 50
DEVs with specific latency requirements need to be able to control this by asking for more than one slot per 51
superframe. This is the application for having several CTAs of the same stream in a superframe. If the PNC 52
is unable to do this, it simply rejects the request." 53

54

Resolution is to reject as indicated.

789 (Shvodian, TR) Since there is no guarantee how much the PNC will spread out multiple GTS slots in a superframe, DEVs must be prepared to accept the worst case assignment. Consequently, Delete reference to CTR interval type, Remove line 36 to 45 and replace with: The CTR interval field indicates the number of superframes from one slot to the next. The value contained in the CTR interval field shall be a power of two

Reject, "The number of super-rate slots is now fixed to less than or equal to 8 as indicated in CID 378. If the DEV is unhappy about how the PNC is spreading out the slots, it can terminate the stream and request a new one with a lower super-rate."

368 (Heberling, TR) Please change this sentence frag. from " ... GTS Type and CTR interval type shall be set to 0..." to " and GTS Type shall be set to 0..."

Reject "The CTR interval type has been modified so that it is better defined, so the setting of it needs to remain."

483 (Gilb, TR) - We refer to superframes per slot in many locations (as opposed to slots per superframe). However, this is not accurate and is confusing.Change the terminology "superframes per slot" to be "1 slot per N superframes" Where this is defined, add text that says that "This means that the rate is a subrate of the superframe rate. For example, a value of 4 means one slot every fourth superframe." If it refers to awake beacons, then "it is one awake beacon after three sleep beacons, " This requires changes globally in clause 6, 7 and 8. **Suggest accept**.

Accept in principle, "Change 'superframes per slot' to be 'sub-rate' and change 'slots per super-frame to be 'super-rate' at all locations in the draft. Add definitions to clause 3, 'sub-rate slots: A channel time allocation where the time slots occur every n superframes.' 'super-rate slots: A channel time allocation where there is more than one time slot in a given superframe. Add examples to clause 8.4.1 that say 'A sub-rate slot is one that is not allocated every superframe. For example, a sub-rate value of 4 means one slot is allocated every fourth superframe. On the other hand, a super-rate slot is one where the more than one GTS is allocated for the stream index in a superframe. In this case, a super-rate value of 3 means that 3 time slots are allocated in the superframe."

2.3.11 CTM/CTA/Child

969 (Bain, T) - Paragraph mentions private GTS and where used. 1 Child is not mentioned as use. 2 It also mentions that private GTS will usually be pseudo-static GTSs. Shouldn't it be always? 3 Other text indicates that the child and neighbor will be "static". Static has been removed and pseudo-static is used instead else-where. Add child networks as examples of private. Change that privates are always pseudo-static. **Suggest accept in principle**, "Change 'Private GTSs will usually be pseudo-static GTSs, ...' to be 'Private GTSs shall be pseudo-static GTSs, ...' Following 'Instead, it is used to reserve channel time for some other use.' add 'For example, a private GTS would be used for a child or neighbor piconet, {xref 8.2.4 and 8.2.5}'

Accept

2.3.12 CTM/IsochModify

362 (Heberling, T) Change this sentence from "build a new beacon with the requested channel time" to "build a new beacon with a stream announcement information element and the requested channel time if immediately available." Please make the indicated technical change. **Suggest reject**, "The concept of a stream announcement IE was rejected in favor of using the channel time response command to close the loop. See also CIDs 205 and 74."

Resolution is to reject as indicated.

2.3.13 CTM/IsochMSC

135 (Heberling, TR) Requests for asynchronous and isochronous channel time have two completely different sequences. Therefore the two can never be combined in the same request. Consequently, <add two sentences> The same channel time request frame cannot contain CTRB for both asynchronus and isochronous channel time. Incorrectly formatted requests shall be rejected by the PNC with the result code set to ILLEGAL_REQUEST. **Suggest Accept**

> Table until Wednesday, 31 July 2002. Homework to everyone to review 02/109r0 to see why it might be a problem to combine requests.

> Everyone agrees isochronous modifies and terminates can be combined in a single command frame.

> "Change on page 181, line 53 and 54, 'A new asynchronous CTR to a target DEV or group of target DEVs replaces the previous one and unallocated TUs from a previous request shall be replaced by the current request.' to be 'A new asynchronous CTR to a target DEV replaces the previous request for that target DEV and unallocated TUs from the previous request shall be replaced by the current request. A new asynchronous CTR to a group of target DEVs replaces the previous request and unallocated TUs from a previous request shall be replaced by the current request.'"

> Agree to allow create, modify and terminate for isochronous into a single request frame. Possibly allow multiple responses to a modify request, this requires changing the channel time response command. Also allow the PNC to concatenate channel time response command. The new text will be:

> Straw poll on asynchronous and isochronous in the same frame: Allow them to be combined.

> Last item is to generate new channel time response command, JPKG to complete by 7 August, 2002.

2.3.14 CTM/PseudoStatic

180 (Heberling, TR) KO> Informing the receiver when a pseudostatic CTA is moved will be so much overhead that it's unmanagable. Besides, the constructions in there to avoid transmitter contention. Receiver contention is ok! Let whoever missed the CTA in the beacon listen to the whole superframe. Besides, if the intended receiver misses the CTA in the beacon, how is it going to find out when the PNC wants to inform it about the change? 2nd problem: A PNC must have the authority to arrange CTA as it pleases. It cannot be stopped by a DEV not responding. Especially if it needs to rearrange CTA to fit in a request from a new DEV in a timely fashion. The PNC shall make an effort to inform the transmitter but it shall always proceed with the change.   A third problem is that once the PNC has decided to change something, it must proceed. PNC may have a stronger signal than the DEV, hence the PNC doesn't hear the acknowledgements but the DEVs have heard the order to change. Consequently the PNC must finish what it has started. Therefore, see Resolution [08] in 02276r3P802-15_TG3-commentsD10_KO.doc, page 15. **Suggest accept**

> Table until Wednesday, 31 July, 2002, the solution seems OK, WMS will check for consistency.
> Table until Schaumburg, Tuesday morning.

> Bill to propose just moving the CTAs in the beacon and let the DEVs handle it. The receiever may miss a few. Other alternative is to notify in the beacon the old CTAs so that the receiver may listen to those as well.

Recess at 3:55 pm, CDT reconvene at 4:15 pm CDT.

Meeting called to order 4:23 pm CDT.

807 (Shvodian, TR) DEVs that don't hear the Beacon cannot transmit in the CAP or MTS either. Modified text: If a DEV did not receive the beacon, it shall not transmit during the CAP or any MTS or dynamic GTSs during the CFP. **Suggest accept in principle**, "Change 'If a DEV did not receive the beacon, it shall not transmit during any dynamic GTSs during the CFP.' to be 'If a DEV did not receive the beacon, it shall not transmit during the CAP or during any MTS or dynamic GTS.'"

Accept suggested resolution.

2.3.15 Handover

383 (Heberling, TR) - Change this whole clause to this new text: The PNC DME, upon receiving this primitive, is informed that it (PNC) has broadcast its last beacon. Note: There is no need for the concept of success or failure to report since if the PNC receives the beacon from the new PNC that's great. However, if it doesn't receive the beacon from the new PNC, there is nothing the PNC can do about it, since if it tries to send a beacon at the next beacon interval it could end up interfering with the new PNC beacon. And if it tries to initiate another handover procedure with a different AC it could end up causing interference with the current new PNC. So all the old PNC can do is notify its DME that "hey the AC was in synch until this point" Please make the indicated change. **Suggest accept in principle**, "The handover process may fail before the PNC begins its count down, hence it can return the status of TIMEOUT. Change the text of 6.3.11.3.1 to read 'The PNC MLME sends this primitive to its DME with ResultCode set to SUCCESS after it has sent its last beacon frame in the handover procedure, {xref 8.2.3}. If the PNC is not able to successfully transfer the piconet data to the chosen PNC capable DEV, it sends this primitive to the DME with ResultCode set to TIMEOUT.' Change the text of 6.3.11.3.2 to read 'The PNC DME, upon receiving this primitive, is informed whether its MLME-PNC-HANDOVER request was successful or unsuccessful. If unsuccessful, the PNC is able to resend the MLME-PNC-HANDOVER.request to the same PNC capable DEV or to another PNC capable DEV. If successful, the PNC has relinquished its PNC role.' Globally change 'AC' to be 'PNC capable' in the standard to avoid confusion with alternating current."

Accept suggested resolution.

384 (Heberling, TR) - Please change the text in this clause to: "The PNC DME, upon receiving this primitive, is informed that its PNC handover procedure is complete." All the original text may be deleted. If the handover is successful, the PNC DME will be delighted. However, if the handover is unsuccessful (assume the old PNC did not hear the new PNC beacon) there really is nothing the old PNC can do about it. Since, if it tries to initiate a new Handover procedure with a new AC it could end up interfering with the new PNC. If it (old PNC) tries to issue its own beacon during what would be the next beacon transmission time of the new PNC it could cause interference with the new PNC beacon. Consequently, all the PNC DME can do is accept the fact that it did its best up to this point. **Suggest accept in principle**, "This is a repeat of CID 383, resolve as indicated in CID 383."

Accept suggested resolution.

784 (Shvodian, TR) - Handover timeout is broken. If the PNC cannot succesfully transfer all required frames to the new PNCD in time for the handout the handover will happen anyway. Remove the handover timeout. **Suggest accept**, "The handover procedure has been changed and the handover timout has been removed. Remove it from this figure. See also CID 172."

Accept suggested resolution.

338 (Heberling, TR) - BSID must be persistent throughout the piconet lifetime. If the PNID changes the BSID is the only way to find the right PNC. After a handover the MACaddr of the PNC will have changed as well. BSID should be fixed and user defined. This part is solved in Resolution [04] in 02276r0P802-15_TG3-commentsD10_KO.doc. One problem remains. What if the new PNC taking over initially has a different BSID? TBD in Vancouver. We have already proven that a PNC cannot change BSID. The conse-

quence must be that a handover can only be done to a DEV with the same BSID as the current PNC. This needs to be specified in 8.2.3. Add line 23: "If during the lifetime of a piconet the PNC decides to either leave the piconet or to transfer its PNC responsibilities to another DEV, the PNC shall attempt to choose a DEV that is capable of being a PNC. PNC can only hand over to an AC with the same BSID as the current PNC's BSID" **Suggest reject**, "The BSID is not constant over the life of a piconet, see CIDs 398 and 418. In addition, a PNC capable DEV allways uses the existing BSID of the piconet when it receives the handover. This requirement is clearly stated on page159, lines 28-29 'The BSID is preserved in the PNC handover process.'"

Withdrawn

196 (Heberling, TR) - A method of moving the beacon is needed for several reasons. During hand-over, the private CTA of child and neighbor PNC might have been moved. Simarly, a method of changing the super-frame duration is needed. All this must be synchronized throughout the piconet and possible child and neighbor piconets. See resolution [11] in 02276r0P802-15_TG3-commentsD10_KO.doc, page 23   This resolution contains changes from both Resolution [10] and [11]. It also solves handover, beacon move, super-frame duration change, channel change and PNID change with client and neighbor piconets. **Suggest accept in principle**, "Use the modified text in 02/276r3 as the basis for the changes."

6.3.17 Changing channels
<change headline to Changing Piconet Parameters, Editorial>

Change to 'This set of primitives allows the PNC to change the PNID, BSID superframe duration, beacon position or PHY channel. The parameters used for these primitives are defined in Table 21.'

for table, use the suggestion except delete the PARENT_* and add BSID to the change type.

6.3.17.1.2 - delete reference to MAC functional stuff, just point to the correct location in 8.

7.4.5 delete 5 and 6 in change type.

<change page 119, line 49-51, TR> (add BSID to first paragraph of added text.)

If Change type is set to CHANNEL, the new channel index field is set to the channel where the PNC will send its first beacon after NbrOfChangeBeacons beacons have been sent on the old channel. Otherwise, this field shall be ignored on reception. (add these to all of the parameters as necessary).

(following move and size paragraphs)
If the change type is not set to either MOVE or SIZE, then the beacon duration field shall be ignored on reception.

If Change type is set to BSID, the BSID field is the new BSID that will take effect when the change process has completed, 8.2.7 (use appropriate locations for the other ones, make them all like this).

8.2.3 skip this one.

8.2.7 'Before changing its PNID, a parent PNC shall scan for the PNIDs of other piconets, including of all of its child and neighbor piconets. The PNC shall not change its PNID to the same value as that of any other piconet it can detect.'

8.6.5 Moving Beacon
The PNC may need to move its beacon. Moving a beacon means that the superframe duration is unchanged while the position of the beacon is moved.

If the PNC wishes to move its beacon position, it shall insert the piconet parameter change IE, 7.4.5, into NbrOfChangeBeacons beacons with the change type set to MOVE and the superframe timing, set to the delay of the first beacon after this sequence compared to previous beacon transmission time.
(add figure with beacon duration replaced with superframe timing, change moved beacon to beacon)

8.6.6 Changing superframe duration

The PNC may need to change the duration of its superframe.

If the PNC wishes to change its superframe duration, it shall insert the piconet parameter change IE, 7.4.5, into NbrOfChangeBeacons beacons with the Change type set to SIZE and the superframe timing set to the size of the superframe following the first beacon after this sequence.
(add figure with beacon duration replaced with superframe timing, change regular beacon to beacon)

8.6.7 (Bob to check if move and size are Okey-dokey with child/neighbor). Change text so that if a child or 802.15.3 neighbor has the same superframe duration as the parent, it may simply place the piconet parameter change element into its beacon. In all cases, the child and neighbor PNCs shall ensure that the members of their piconet comply with the timing requirement of the parent PNC's superframe. (text still needs a little work).

8.11 Replace 'In that beacon the PNC may send the piconet parameter change element indicating the new channel and the time-out for changing the channel' with 'If a better channel is available and the PNC decides to switch channels, the PNC shall send the piconet parameter change element in its beacon for NbrOfChangeBeacons beacons, {xref 7.4.5}. The channel change shall take effect starting with the first beacon after the last of the beacons with the piconet parameter change IE has been sent.' Delete 'Whenever another channel is not available, the PNC may decide to stay in the same channel and hence may not send piconet parameter change element in its beacon.' (note to self, figure out how this merges with the fix for 8.11).

Add a sentence that says 'A child or neighbor PNC may change to a different channel even if the parent PNC does not change channels.' For the first two paragraphs in 8.11.1, they need some work, see how it ends up as compared with the move and size modifications.'

Recessed at 6:38 pm CDT.

2.4 Pending resolution (aka hard ones)

2.4.1 DME

485 (Gilb, T) - The use, in this standard of the DME/MLME boundary can be confused with architectural decsions rather than simply a split that was created to facilitate describing the standard. Add a paragraph that describes that the DME contains the functionality that is outside of the scope of the standard and other management functions while the MLME and MAC contain the functionality specified in the standard. Also add that the split is arbitrary and is not intended to be an architectural split for an implementation. **Suggest accept.**

2.4.2 PM (SPS/APS merge)

361 (Heberling, TR) - The current wakeup mechanisms are not sufficient to wake up a DEV when a major system change occurs. Examples are channel change, PNC handover, beacon duration or location change and PNID change. A method is needed to allow all APS and SPS devices to easily check if a system change is in progress. The intervals for such checks must be decided by PNC. See resolution [13] in 02276r0P802-

15_TG3-commentsD10_KO.doc A system change bit is added to the mode field of the PNC synchroniza-
tion IE. All DEVs are required to check this bit at minimum intervals. The bit is unrelated to any APS and
SPS wakeup method.

      Pending resolution of power save modes.

365 (Heberling, TR) - The powersave modes are a disaster. They don't conform to the other frame formats,
neither to the terminology of the rest of the standard. The beacon shares no info about when a certain SPS is
awake. There is no handover procedure. A DEV can join several SPS but how does it know when to be
awake? How do you send to broadcast of DEVs are in different SPS? What are you supposed to do with
"suspended CTA?"? How does transmitters know when an intended receiver is awake? How does it fit wit
with ATP? With pseudostat? with subrate? The APS doesn't work either, since there is no commonly agreed
upon wake beacons to put the PCTM in. How is PNC supposed to calculate available CTA when DEvs of
different SPS may end up with all their CTA needs in the same superframe at some intervals? The idea with
PCTM is wrong since PNC should accept or reject CTR instantly. SPS interval is mentioned in clause 8 but
never defined A much simpler power save solution is needed.   See resolution [14] in 02276r0P802-15_TG3-
commentsD10_KO.doc

822 (Shvodian, TR) - APS needs to be modified. See XSI powersave submission.

823 (Shvodian, TR) - SPS mode should be merged with a modified APS. See XSI powersave submission.

1158 (Schrader, TR) - There is a possibility of eliminating APS and providing similar functionality. This
would simplify the standard. Consider the following mode: An SPS CTR Type with CTR Interval defining
its awake beacon interval. When the source DEV switches to SPS mode, it has no channel time allocated to
it, but shall listen to its awake beacons CTAs and its PCTM. If an ACTIVE DEV can set the PCTM bit, this
mode is similar to APS mode, except that the SPS DEV listens to beacons at fixed intervals and can stay in
SPS mode indefinitely (assuming no PCTM event).

1159 (Schrader, TR) - No good method exists for the creator of an SPS set to move with other DEVs to a
new SPS Set for the battery powered unit. The best way for multiple DEVs to transition to new SPS timing is
to leave one set and join the replacement set. Since multiple devices may be in the first set, this will only
work if there are at least 2 SPS sets in existence at the same time during the transition. Change the minimum
number of SPS Sets from 1 to 2 (or more) for a battery powered unit.

2.4.3 MTS

113 (Heberling, TR) - MTS shall not be identified by dest or source, since that would make them indistin-
guishable from an ATS to/from the PNC. It would also complicate the queue implementation for the source.
Change first sentence: <from> Management Time Slots (MTSs) are identical to GTSs except that the PNC
address is either the SrcID or the DestID in the CTA   <to> Management Time Slots (MTSs) are identical to
GTSs except that the stream index is set to the management stream index, 7.2.5.

115 (Heberling, TR) - MTS shall not be identified by dest or source, since that would make them indistin-
guishable from an asynchronous GTS to/from the PNC. It would also complicate the queue implementation
for the source. Add: 0xFD shall be reserved for MTS traffic, 8.4.4.4.

2.4.4 Others

150 (Heberling, TR) - Why are we still doing the painful 802.11 version with LSb to the left? If you have
LSb to the right and all fields in falling octet order, and of course send MSb first over the air, you will: -
Have all fields and frame formats in the same orientation. - Have FCS in the same order as the rest of the
frame - Have your buffers in transmitter and receiver built as the frame is specified. - Don't have to shift the
orientation of data - send the bits over the air in the same order they are specified. Doing it this way, build-

ing buffers and reading them is trivial. Example: headerbuf[2] = PNID/256; headerbuf[3] = PNID%256; int PNID = headerbuf[2] * 256 + headerbuf[3]; HW: transmit(&headerbuf); // in the bit order it's built!!! Change the entire chapter 7 to: Send MSb first. Specify frames in the intuitive order, for instance: 7.2 General frame format |-- | octets: 2 | 2 | 1 | |--------------|------|------------------| ... | Frame Control | PNID | Destination DEVID | |-- Figure 6 - MAC geader and frame format 7.2.1 Frame control field |------------------------------------- | bits: b15-b14 | b13-b11 | b10 | |-----------------|-----------|-----| ... | Protocol Version | Frame type | SEC | |----------------------------------- Figure 7 - Frame control field format 7.2.1.2 Frame type field |-- | Type value | Frame type | see | | b13 b12 b11 | description | clause | |-------------|--------------|---------| | 000 | Beacon frame | 7.3.1 | |-------------|--------------|---------| | 001 | Imm-ACK frame | 7.3.2 | ... |------------------------------------- Table 36 - Valid frame type values -----------------------> Transmission order.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

3. Comment resolution, Vancouver to Schaumburg

3.1 Friday, 2 August, 2002

Attendees: Jay Bain, Allen Heberling, Bill Shvodian, James Gilb, Knut Odman, Mark Schader

Meeting called to order at 9:11 am PDT.

3.1.1 Tabled issues

45 (Heberling, TR) KO> Text makes no sense. The PNC allocates what it's asked for. The PNC will not go back and reallocate more time if its available later. The client is always responsible for requesting changes. Consequently, delete line 26-28. **Suggest accept in principle.** "Change the text from 'If the PNC allocates less time than requested but more than minimum, it shall allocate more time if the PNC determines that the time is available in the CFP.' to be 'If the PNC allocates less time than requested but more than minimum, it shall allocate more time if it becomes available by sending the channel time response command, {xref}, to the DEV and changing the allocations in the beacon. In addition, in any individual superframe, the PNC may allocate more than the amount of time indicated in the channel time response command.'

> Suggest accept in principle, "Change the text from 'If the PNC allocates less time than requested but more than minimum, it shall allocate more time if the PNC determines that the time is available in the CFP.' to be
>
> > 'If the PNC has indicated via the channel time response command that it will update channel time request, then it shall allocate more time up to the maximum requested by sending the channel time response command, {xref}, to the DEV and changing the allocations in the beacon. If the PNC has indicated in the channel time response command that it will not update the channel time request, then the DEV will need to use the stream modification procedure, xref, if it wants additional channel time. The PNC may also reduce the channel time allocation for a stream by sending the channel time response command to the DEV and changing the allocations in the beacon. However, the PNC shall not reduce the channel time allocation of a private GTS allocated for a child or neighbor network.
> >
> > In addition, in any individual superframe, the PNC may allocate more than the amount of time indicated in the channel time response command.'
>
> Add a new octet to the channel time response command called the 'update CTR' with definition 'The update CTR field shall be set to 1 if the PNC will update the channel time allocations as the traffic conditions change, {xref 8.xx} and shall be set to 0 if the PNC will not be updating the channel time allocation indicated in this response command. All other values are reserved.'"

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

> Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it.
> ADH will provide suggested text by COB 2 August 2002.
> Table until Schaumburg: Still waiting for text.

356 (Heberling, TR) - We lack methods for parent PNC to gracefully shut down a neighbor piconet. The parent PNC cannot just remove the CTA since it would leave the neighbor piconet hanging. Change text <from> If the parent PNC wants to end either a child the parent PNC shall use either the stream termination process, 8.5.1.3, to remove the GTS from the beacon. If the parent PNC wants to end a neighbor piconet, it shall use the disassociation process, 8.3.4, to remove the neighbor PNC from the network. <to> If the parent PNC wants to stop a child piconet, the parent PNC shall use the Parent PNC termination of child piconet procedure, 8.2.4.1. If the parent PNC wants to stop a neighbor piconet, the parent PNC shall use the Parent PNC termination of neigbor piconet procedure, 8.2.5.1. **Suggest accept in principle** - use the techniques of contribution 02/316.

> Suggest accept in principle, "The new procedures for stopping child and neighbor piconets will be put in 8.2.6 so the cross reference text isn't needed."

352 (Heberling, TR) - We lack methods for parent PNC to gracefully shut down the child piconet. The parent PNC cannot just remove the CTA since it would leave the child piconet hanging. 8.2.4.1 Parent PNC termination of child piconet. If the parent PNC wishes to stop the child piconet, it shall send a disassociate request to the child PNC. The child PNC shall then immediately initiate its shutdown procedure, 8.2.6. The parent PNC shall listen for the child PNC shutdown beacon sequence to determine when the child piconet CTA can be removed. The parent PNC may set a maximum time for the completion of the child shutdown sequence, after which the CTA will be removed regardless of the completion of the child shutdown procedure. If the child PNC receives a shutdown beacon from its parent, it shall immediately initiate its shutdown sequence, 8.2.6. **Suggest accept in principle** The text of 02/316r0 should be used for child and neighbor being made aware of shutdown.

> Accept in principle, "Add the following text to 8.2.6
> '8.2.6.x Parent PNC termination of child piconet
>
> If the parent PNC wishes to stop the child piconet, it shall terminate the stream allocated to the child piconet using the isochronous stream termination procedure, {xref 8.5.1.3}. The child PNC shall then immediately initiate its shutdown procedure, {xref 8.2.6}. The parent PNC shall listen for the child PNC shutdown beacon sequence to determine when the child piconet CTA should be removed. The DME of the parent PNC may set a maximum time, via the MLME-STREAM-TERMINATE.request, for the completion of the child shutdown sequence, after which the CTA will be removed regardless of the completion of the child shutdown procedure. If the child PNC receives a shutdown beacon from its parent, it shall immediately initiate its shutdown sequence, {xref 8.2.6}.'"

354 (Heberling, TR) We lack methods for parent PNC to gracefully shut down a neighbor piconet. The parent PNC cannot just remove the CTA since it would leave the neighbor piconet hanging. 8.2.5.1 Parent PNC termination of neighnor piconet If the parent PNC wishes to stop the neighbor piconet, it shall send a disassociate request to the neighbor PNC. The neighbor PNC shall then immediately initiate its shutdown procedure, 8.2.6. The parent PNC shall listen for the neighbor PNC shutdown beacon sequence to determine when the neighbor piconet CTA can be removed. The parent PNC may set a maximum time for the completion of the neighbor shutdown sequence, after which the CTA will be removed regardless of the completion of the neighbor shutdown procedure. If the neighbor PNC is not 802.15.3 compliant, the parent PNC shall provide the same time as it allows for its own shutdown sequence, for the neighbor PNC to stop its piconet before removing its private CTA. If the neighbor PNC receives a shutdown beacon from its parent, it shall immediately initiate its shutdown sequence, 8.2.6. - **Suggest accept in principle** The text of 02/316r0 should be used for child and neighbor being made aware of shutdown.

> Accept in principle, "Add the following text to 8.2.6
> '8.2.6.x+1 Parent PNC termination of neighbor piconet

If the parent PNC wishes to stop the neighbor piconet, it shall send a disassociate request, {xref 8.3.4}, to the neighbor PNC. The neighbor PNC shall then immediately initiate its shutdown procedure, {xref 8.2.6}. The parent PNC shall listen for the neighbor PNC shutdown beacon sequence to determine when the neighbor piconet CTA should be removed. The DME of the parent PNC may set a maximum time, via the MLME-DISASSOCIATE.request primitive, xref {6.x.x.x}, for the completion of the neighbor shutdown sequence, after which the CTA will be removed regardless of the completion of the neighbor shutdown procedure. If the neighbor PNC is not 802.15.3 compliant, the parent PNC shall provide the same time as it allows for its own shutdown sequence, for the neighbor PNC to stop its piconet before removing its private CTA. If the neighbor PNC receives a shutdown beacon from its parent, it shall immediately initiate its shutdown sequence, {xref 8.2.6}.'"

A.I. Jay Bain to merge this with 02/289r1 making it r2 for review by everyone.

410 (Heberling, TR) Delete the MLME-TERMINATE-STREAM.indication primitive since the PNC DME does not care about this piece of information only its MLME does. Consequently, the MLME can handle deallocating the ct allocated to the stream index specified when terminating this stream. Also, only isochronous data associated with a stream index requires a specific termination request. Asynchronous data follows a different set of rules. In the case where a target DEV is disassociating, the disassociation process spelled out in clause 6.3.6, clause 7.5.1.3, clause 8.3.4 and illustrated in Figure 102 will take care of notifying the PNC and the source DEV that the target DEV is no longer available to receive any data(asynch or isoch) **Suggest reject** deletion of MLME-TERMINATE-STREAM.indication primitive per CID 155. .AND. **Suggest accept** process describing disassociation and MSC as preferred method of terminating a stream when a DEV disassociates.

Withdrawn

155 (Heberling, TR) KO> MLME-TERMINATE-STREAM.indication not used for target, only source. Consequently, for clause 6.3.14.10 MLME_TERMINATION_CTA.indication <change from> This primitive is used to inform the target DEV that channel time that was previously allocated is no longer present in the most recently received beacon. <to> 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. **Suggest accept**

Table again until Schaumburg.

364 (Heberling, TR) Please change this sentence frag. from "...followed by a beacon in which the CTAs assigned to the indicated stream index are set to a null CTA..." to " followed by a beacon in which the CTAs assigned to the indicated stream index are removed." In the case where the SrcDEV is requesting the termination of the stream, the ACK to its request is sufficient. The receiving DEV will know that the stream has been deallocated by the absence of the CTAs assoicated with the stream index. This is a more concise means of terminating the stream CTA. In the case where the DestDEV is doing the termination the same rules apply. The SrcDEV will be notified via the absence of the CTA in the beacon. **Suggest accept**

Table again until Schaumburg.

907 (Bain,TR) Grammatical errors and reference to figure 118 is incorrect and does not pertain to text in this section. Consequently, change the paragraph to the following: "In the case where the PNC wishes to terminate the stream, it shall notify the originating DEV and the target DEV via the next periodic beacon that the CTAs assigned to the indicated stream index are set to a null CTA value for aMinBeaconInfoRepeat duration." **Suggest reject** pending acceptance of CID 364

Table again until Schaumburg.

120 (Heberling, TR) Change this sentence from "In the case where the originating DEV that wishes to termi-nate is the stream is the PNC,..." to "In the case where the originator of the stream termination request is the PNC, the PNC shall simply remove the CTAs associated with the terminated stream index from the next bea-con." **Suggest accept** pending acceptance of CID 364

     Withdrawn

366 (Heberling, TR) The sentences between lines 44 and 46 are redundant. Therefore delete them. **Suggest accept** pending acceptance of CID 364.

     Table again until Schaumburg.

917 (Bain, TR) - The figures 117 and 118 should change to add the indication to PNC DME and to add the block noting the operation taking place in the PNC DME that allows the MAC and DME to be synched on resources. Other change needs to be in 6.3.14.10 and is a different comment. **Suggest reject** for these rea-sons: Fig. 118 is better represented by Fig. 102 which descibes more precisely what happens when a DEV disassociates from the piconet and what the effect upon a stream would be. Fig. 117 do not require the requiredf primitive since CIDs 155 and 364 describe a more efficient means of terminating a stream.

     Suggest accept in principle, "The changes to the MLMEs for stream creation and modification no longer involve the PNC's DME, thus the PNC's DME does not now require an indication."

3.1.2 IM issues

658 (Gilb, TR) - Clause 8.9.3 says: "The channel status request command may be used by any DEV in the piconet to get information from a target DEV about the link quality between the two DEVs." Clause 8.11 says: "To do this,the PNC sends the channel status request command, defined in 7.5.6.1, to request that the DEVs provide their channel status via the channel status response command, 7.5.6.2."   Is the PNC allowed to send a channel status request command to a DEV if the PNC is currently not transferring data to the DEV? Add text that indicates that the channel status request command shall only be sent to DEVs with which the originating DEV is currently transferring data. **Suggest accept in principle**, "Allow the PNC to request the channel status from DEVs in the piconet. Specify that the DEVs report the aggregate statistics for all of their connections. Add to 7.5.6.2, line 24 after '... channel condition at the target DEV.' this sentence 'When the DestID of this command is the PNCID, i.e. the originator is the PNC, then the DEV shall report the values below as the total values for all DEVs with which the target DEV is communicating.'"

     Accept suggested resolution.

147 (Heberling, TR) - Use this rewritten text based on the current text in 8.11: If the PNC decides, based upon the results of either a remote scan or its own scans of other channels, to initiate a channel change, the PNC shall broadcast the piconet parameter change information element,7.4.5, in its current channel via its beacon for up to a NmbrOfChangeBeacons. The piconet parameter change information element shall con-tain the channel index of the new channel to which the PNC will be moving the piconet, and the change count after which the piconet DEVs should switch to the new channel. The DEVs, receiving the beacon con-taining the piconet parameter change information element, shall change from their current channel to the new channel immediately after the beacon with the ChangeCount field of the PiconetParmChange IE becomes zero. The DEVs that changed channels shall wait for the PNC to broadcast its first new beacon in the new channel before commencing their previous transmissions. If there are DEVs in APS mode, the PNC shall...(include text as is from Page 194, lines 1-5) Also include line 25 and Figure 130 of Page 194 in this subclause. For another perspective and suggested text see doc: 02/276r0 page 22. In addition to the above text, please add the text regarding "Maintaining child and neighbor piconets" from doc: 02/276r0 page 28 clause 8.11.1. **Suggest accept in principle**, "Change the text in 8.11 from:

'In that beacon the PNC may send the piconet parameter change element indicating the new channel and the time-out for changing the channel. The DEVs that received the beacon with piconet parameter change element shall change the channel to the new channel within the time-out duration and wait for beacons in the new channel. Whenever another channel is not available, the PNC may decide to stay in the same channel and hence may not send piconet parameter change element in its beacon.'

to read:

'The PNC shall broadcast the piconet parameter change information element, {xref 7.4.5}, in its current channel via its beacon for up to the value of NmbrOfChangeBeacons indicated in the information element. The piconet parameter change information element shall contain the channel index of the new channel to which the PNC will be moving the piconet, and the change count after which the piconet DEVs shall switch to the new channel. The DEVs, receiving the beacon containing the piconet parameter change information element, shall change from their current channel to the new channel immediately after the beacon with the ChangeCount field of the piconet parmeter change IE becomes zero. The DEVs that have changed channels shall wait for the PNC to broadcast its first new beacon in the new channel before commencing their previous transmissions. The behavior of DEVs in a power save mode is defined in {xref 8.12}.

Child and 802.15.3 neighbor piconets shall either change to the new channel with the parent PNC or shall cease operations. If a child or neighbor PNC ceases operation due to a channel change, it may attempt to restart its piconet in the original channel using the start procedure defined in {xref 8.2.2}.'

Accept suggested change.

470 (Gilb, TR) - Allow the PNC to send the channel status request command as a broadcast command. In this case, the ACK policy would be set to no-ACK in the case where the DID=BcstID. Add a sentence to the first paragraph that says "The ACK policy shall be set to no-ACK if the DID is set to the BcstID, i.e. when the PNC is requesting channel status information from all of the DEVs in the piconet." **Suggest accept in principle**, "Add a sentence to the first paragraph that says 'The ACK policy shall be set to no-ACK if the DestID is set to the BcstID and the SrcID is the PNCID, i.e. when the PNC is requesting channel status information from all of the DEVs in the piconet.'"

Accept in principle, "Add a sentence to the first paragraph that says 'This command may be sent by the PNC as a broadcast frame, i.e. the DestID set to the BcstID.'"

151 (Heberling, T) - Use this text for this clause "If the PNC determines based upon its own scans or remote scans of other channels that the other channels are worse than its current channel which it has discovered is occupied by an incumbent PNC, the PNC may decide to negotiate with the incumbent PNC either the establishment of a neighbor piconet as described in 8.2.5, or a child piconet as described in 8.2.4. Please make the requested change. **Suggest accept in principle**, "Add text to this clause 'If the PNC determines based upon its own scans or remote scans of other channels that the other channels are worse than its current channel which it has discovered is occupied by an incumbent PNC, the PNC may join the incumbent piconet to form either a neighbor piconet as described in 8.2.5, or a child piconet as described in 8.2.4.'"

Accept suggested resolution.

294 (Shvodian, TR) - Where is the overlapping piconets IE used? This needs a command and should be a command field, not an IE. **Suggest reject**, "The use of the overlapping piconets IE is defined in 8.2.7, page 159, lines 43-46, 'If a DEV detects a piconet within its range on any channel with the same PNID, it shall send a probe command to the PNC with the overlapping piconets information element, 7.4.22, that contains the current PNID and channel index. Once this command has been sent successfully, the DEV shall not send this information again until after the current PNID has been changed by the PNC.'"

Resolution is to use the suggested reject.   1

2

75 (Heberling, TR) - The Overlapping PNID IE never used in standard. Should be deleted. Delete clause   3
7.4.22. **Suggest reject**, "The use of the overlapping piconets IE is defined in 8.2.7, page 159, lines 43-46, 'If   4
a DEV detects a piconet within its range on any channel with the same PNID, it shall send a probe command   5
to the PNC with the overlapping piconets information element, 7.4.22, that contains the current PNID and   6
channel index. Once this command has been sent successfully, the DEV shall not send this information again   7
until after the current PNID has been changed by the PNC.'"   8

9

Resolution is to use the suggested reject.   10

11

801 (Shvodian, TR) - How is the PNC informed by a DEV of overlapping piconets with the overlapping   12
piconets information element? What is the format of the command? Need a new command to send the over-   13
lapping piconets information in. **Suggest reject**, "The use of the overlapping piconets IE is defined in 8.2.7,   14
page 159, lines 43-46, 'If a DEV detects a piconet within its range on any channel with the same PNID, it   15
shall send a probe command to the PNC with the overlapping piconets information element, 7.4.22, that con-   16
tains the current PNID and channel index. Once this command has been sent successfully, the DEV shall not   17
send this information again until after the current PNID has been changed by the PNC.'"   18

19

Resolution is to use the suggested reject.   20

21

25 (Heberling, TR) - A mechanism for reporting an overlapping PNC from a DEV was attempted but not   22
fully specified. The easiest solution is to allow DEVs to report overlaps by sending, unsolicited, a remote   23
scan response frame to PNC <insert text> A DEV that is receiving beacons from more than one PNC may   24
send, unsolicited, a remote scan response frame to its PNC with a piconet description set representing the   25
interfering PNCs. **Suggest accept in principle**, "Add the following sentences to 8.9.4, 'A DEV that is   26
receiving beacons from more than one PNC may send, unsolicited, a remote scan response frame to its PNC   27
with a piconet description set representing the interfering PNCs. A DEV should not report overlapping pico-   28
nets based on beacons received from a child or 802.15.3 neighbor piconet that is associated with the DEVs   29
current piconet.'"   30

31

Accept suggest resolution.   32

33

897 (Bain, TR) - The MLME-REMOTESCAN.request calls for the PNC as origination of the command yet,   34
the rest of the subclause is vague on who is the originator, e.g. OrigID. Make the initial description PNC spe-   35
cific and also remove the OrigID from table 20. **Suggest accept in principle** "Make the initial description   36
PNC specific and also remove the OrigID from table 20. This implies that remote scan requests from other   37
than the PNC shall be ignored by a DEV. That text should be added as well to clause 8.9.4."   38

39

Accept suggest resolution.   40

41

895 (Bain, T) - Remote channel scan seems to need the content similar to the text of 8.2.1 that the PNC   42
should allocate CFP such that there is quiet time for it to scan the channel for other piconets. Add the text in   43
remote channel scan and change the MSC for remote channel scan to allow for an optional preceeding action   44
of the PNC reserving channel time for the DEV being asked to perform the remote channel scan. The com-   45
mand (and primitive) should add a field to designate that there is a reserved slot for this operation. **Suggest**   46
accept.   47

48

Accept suggest resolution.   49

50

144 (Heberling, TR) A PNC should always be able to order its DEVs to perform certain actions. The DEVs   51
should not be able to refuse this, since it would create un resolvable chaos in the piconet. In the example of   52
remote scan, one has to assume that the PNC has made an educated decision to select its scanner DEV. There   53
is a danger if one allows DEVs to refuse that implementors always sets their DEVs to refuse all PNC   54

requests. Change/ paragraphs 3 and 4 as follows: <from> The PNC initiates a remote scan by sending the remote scan request with a list of channels to a DEV in the piconet. The target DEV has the option of not accepting the request to perform a channel scan on behalf of the PNC. If the DEV does not accept the request, it shall respond to the PNC by sending a remote scan response command with a ReasonCode set to 'request denied'. The PNC upon receiving this response, may send another remote scan request to another piconet DEV, initiate its own channel scan or take other action.   In the case where the target DEV does accept the request, the target DEV shall initiate a series of OpenScan channel scans, ... <to> The PNC initiates a remote scan by sending the remote scan request with a list of channels to a DEV in the piconet.   The target DEV shall initiate a series of OpenScan channel scans, ... **Suggest reject**, "The DEVs in the piconet may have reasons why they do not wish to perform the remote scan requested by the PNC. The PNC is always able to ask another DEV to perform the scan, it may scan the channels itself, it may request channel status information or use other methods to determine the channel quality."

> Accept in principle "Change the text from "The target DEV has the option of not accepting the request to perform a channel scan on behalf of the PNC. If the DEV does not accept the request, ...' to 'The target DEV should accept the request to perform a channel scan on behalf of the PNC. If the DEV does not accept the request, ...'"

Meeting adjourned at 9:35 am, PDT.

3.2 Thursday, 1 August, 2002

Attendees: Allen Heberling, Bill Shvodian, Jay Bain, James Gilb, Mark Schrader.

Meeting called to order at 8:07 am, PDT.

3.2.1 Tabled issues

783 (Shvodian, TR) - The disassociation command requires authentication if authentication is required. Put and X in the Authenticated column of the Disassociation request command. Suggest accept.

> Re-categorize this one as security. Find the other security comment that discusses what to do when you receive insecure frames in a secure piconet. To be resolved on security calls.

45 (Heberling, TR) KO> Text makes no sense. The PNC allocates what it's asked for. The PNC will not go back and reallocate more time if its available later. The client is always responsible for requesting changes. Consequently, delete line 26-28. **Suggest accept in principle.** "Change the text from 'If the PNC allocates less time than requested but more than minimum, it shall allocate more time if the PNC determines that the time is available in the CFP.' to be 'If the PNC allocates less time than requested but more than minimum, it shall allocate more time if it becomes available by sending the channel time response command, {xref}, to the DEV and changing the allocations in the beacon. In addition, in any individual superframe, the PNC may allocate more than the amount of time indicated in the channel time response command.'

> Table until Friday. What about the PNC racheting down the time allocation using the channel time response command.

3.2.2 IE/ASIE

76, 73 (Heberling, TR) - The sentence in line 50 opens the door for interoperability problems. Consequently, if the sentence: ..."Its use by the application capable DEV is outside of the scope of this standard." is not deleted and replaced with a specification for how this information element is to be used, I strongly recommend that this information element be removed from the specification. **Suggest accept in principle** but using an approach different than 02/176r1 resolution [16] text. It seems reasonable that piconets may have

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

the possibility of multiple 'vendors' within a single piconet considering both ASIE and PNServices. If so, then the vendor ID as a single IE is not sufficient.

> Suggest accept in principle, "Use the text for the ASIE in 02/273r10, also add reserved IE numbers from 0x80 to 0xFF, add reserved command numbers from 0x0100 to 0xFFFF, and put in a vendor specific command format consisting of command ID, length, vendor ID and a variable length pay-load. See 02/276r3, resolution [16], for examples of how to put in reserved command numbers."
> Table until Schaumburg

300 (Shvodian, TR) - The ASIE presents interoperability problem. What if two manufacturers choose the same IE value to convey different information. Anything application specific should be negotiated at the application layer, not in the MAC. Besides, that, the text in 7.4.11 says that the use of ASIEs are negotiated with command frames. What command frames? Proprietary ones? There are no command frames that negotiate the ASIE. **Suggest accept in principle** but using an approach different than 02/176r1 resolution [16] text.

> Table until Schaumburg

The folliong is suggested to replace sub-clause 7.4.11

7.4.11 Application specific

{note: underline text is add, ~~strikethrough is delete~~}

The application specific information element (ASIE) shall be formatted as illustrated in Figure 20. The purpose of this IE is to allow custom information for enhanced operation that is outside of the scope of this standard.

octets: L_n	1	1	2	1	1
Application specific data	DEVID	Application data identifier	Vendor ID	Length (=4+L_n)	Element ID

Figure 20—Application specific information element format

The vendor ID is a registered value. RAC {note, what is the propoer name here} is the registration authority. {xref to means to contact in the reference section of the standard} A value of Vendor ID not understood by a receiving DEV causes the remainder of this information element to be ignored

The application data identifier is developed by the PNC and provides information for a receiving DEV to identify new vs. repeating appliction specific data.

The DEVID indentifies the DEV that will make use of this IE. The DEVID may also be the BcstID.

The application specific data is provided by the PNC. Its use by the application specific capable DEV, understanding the vendor ID, is outside of the scope of this standard.

More than one ASIE may be placed in any beacon.

~~The ASIE shall only be used by the PNC after negotiating the application specific capability with a DEV using data and command frames.~~ The negotiation of the application specific capability between the DEV and the PNC is outside of the scope of this standard.

The following is suggested text for a new sub-clause 8.x.y   1
                                                                                                  2
8.x.y ASIE Operation   3
                                                                                                  4
The ASIE is used to implement beyond-the-scope features that require additional functionality by both the   5
PNC and one or more of its piconet member DEVs. The "additional functionality" is defined as an enhance-   6
ment that does not violate the standard and allows DEVs that do not have the functionality to operate nor-   7
mally. The IE data provides the messages that are only interpreted by the targeted DEV.   8
                                                                                                  9
The ASIE communicates to potential DEVs that the PNC can provide its part of the additional functionality,   10
and it is also used to control that functionality. Multiple ASIEs may be added by the PNC unless limited by   11
standard services that are required by the PNC or by the size of the beacon. The designer should minimize   12
the size of each ASIE used to support the custom application.   13
                                                                                                  14
{note: some of the following text should be more properly as part of the MLME for ASIE}   15
                                                                                                  16
The PNC DME uses MLME-PNC-CREATE-ASIE.request to tell the PNC MLME to place the specified   17
ASIE in one or more beacons. If the DME uses a "0" application data identifier field, the PNC shall create a   18
new ASIE. A value other than zero shall cause the PNC MLME to modify the specified existing ASIE.   19
                                                                                                  20
The MLME-PNC-CREATE-ASIE.confirm is used by the PNC MLME to tell the PNC DME whether or not   21
ASIE requested will be generated. If the application data identifier field was set to "0" in the request, the   22
MAC shall assign a new application data identifier that is different from that assigned to other current   23
ASIEs. The "0" value application data identifier shall not be assigned to any ASIE.   24
                                                                                                  25
If the requested application data identifier belongs to an existing ASIE, the MAC shall modify the persis-   26
tence of that ASIE, and reply with the same application data identifier in the indicate. If the repeat field an   27
existing ASIE is set to "0", the PNC shall terminate the existing ASIE.   28
                                                                                                  29
The application specific data of an existing ASIE shall not be modified.   30
                                                                                                  31
The MLME-RECEIVE-ASIE.indicate is used by the MLME of the DEV addressed in the ASIE, to pass the   32
ASIE data up to the DME. The MLME shall pass the data to the DME only once for each unique application   33
specific identifier, ASIE. Since each ASIE may persist in multiple beacons, this persistence shown shall be   34
detected in the DEV MLME.   35
                                                                                                  36
(need to add Clause 6 text here, Jay Bain will have new text by Tuesday morning, 6 August, 2002. Need to   37
answer how you create/terminate, use a flag.)   38
                                                                                                  39
3.2.3 IE/PNServices - 63, 65, 395, 309, 308, 306, 88, 90, 107, 397, 170, 396, 802, 189   40
                                                                                                  41
306 (Shvodian, TR) This IE does not belong in the standard. This function belongs above the MAC.   42
Besides, this is never sent in the beacon. It is a field in the association request and response and should not   43
be an IE. Remove 7.4.23 **Suggest accept in principle**.   44
                                                                                                  45
Add a section to clause 8 (below). It will address the two IEs (ASIE and PNServices) in a single location   46
regarding vendor ID. The PNServices text (and clause 6 and 7) will address the vendor ID information that   47
prevents an interoperability problem. For PNServices, The first two octets of the string (in each direction)   48
would hold the vendor ID. It should be clear that this IE is not in the beacon but has the IE structure to allow   49
graceful use in the association request/response. The naming of the MACPIB_DEVPiconetServicesIE and   50
MACPIB_PNCPiconetServicesIE may imply a broadcast operation but it is within the confines of the asso-   51
ciation request/response. A change to include the 16 bit (registered) vendor ID as the first two octets in the   52
PNServices strings will be made.   53
                                                                                                  54

8.x.x Vendor identification

One or more registered vendor identifications shall be part of all exchanges of Application Specific IE, {xref to 7 and the subclause in 8 (new)} and the Piconet Services IE {xref to 7.4.23 and 8.3.2}, within this standard. Those IEs provide applications above the DEV level with over-the-air messages in support of those applications but without interpretation by DEVs as defined in this standard.

Correct interpretation of application information is assured with the Vendor ID that is part of each use of either ASIE or Piconet Services IE. The registration authority assuring uniqueness for the vendor ID is RAR {xref to references clause}

{Note: prior to the ratification of this standard, the paperwork for registration must be set up}

> Need to have more information on the format of the element. Current thinking is, ID, length, and then TLV, vendor id, length, value possibly repeated up to 128 octets total length.
> Table until Schaumburg all of the ones below.

63 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete table 30. **Suggest reject** as the solution for CID 306 addresses the issue.

170 (Heberling, TR) The piconet services information element is a potentially powerful information element. Unfortunately, because its definition does not specify in any detail the contents of either the Piconet services field or the type field, this info element represents an interoperability liability. Consequently, this information element should be deleted from the specification until such time a complete definition is provided. Delete the piconet services information element or provide a detailed definition. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

65 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. delete the clause 7.4.23 about piconet services. **Suggest reject** as the solution for CID 306 addresses the issue.

308 (Shvodian, TR) Piconet services IE should not be in the standard if the contents are not specified. Remove piconet services IE. **Suggest reject** as the solution for CID 306 addresses the issue.

90 (Heberling, TR) The piconet services IE is incompletely defined. Either add more detail as requested in Clause 7.4.23, P127, L28 or delete this IE from the command. Please perform either of the requested changes. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

395 (Heberling, TR) Since the Piconet Services element is incompletely defined, please remove this IE from figure 48. **Suggest reject** as the solution for CID 306 addresses the issue.

397 (Heberling, TR) Remove the Piconet services IE from the Association response command since the comment in C7.4.23 P127, L27 recommends deleting this IE. **Suggest reject** as the solution for CID 306 addresses the issue.

88 (Heberling, TR) The piconet services IE is another one of those weasel information elements that attempts to add functionality to the 15.3 MAC without specifying the details of the functionality it attempts to add. Consequently, the piconet services IE needs to be either described in more detail so that the potential for interoperability issues is eliminated or it should be deleted. Please either provide more detail or delete this information element from the 15.3 MAC specification. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

396 (Heberling, TR) Delete the sentences between lines 6 and 7 regarding the piconet services IE. The lack of specific details makes this IE a potential interoperability problem. **Suggest reject** as the solution for CID 306 addresses the issue.

309 (Shvodian, TR) Piconet services does not belong in the standard if its use is not standardized. **Suggest accept in principle**. The text to be supplied for CID 306 addresses the issues.

802 (Shvodian, TR) The piconet services IE does not belong in a standard since it is completely unspecified. **Suggest reject** as the solution for CID 306 addresses the issue.

107 (Heberling, TR) KO Services broadcast not standardized, thus not interoperable and must be removed from standard. Delete clause 8.3.2. **Suggest reject** as the solution for CID 306 addresses the issue.

189 (Heberling, TR) this clause describes a potentially worthwhile information exchange within the piconet. Unfortunately, the lack of detail regarding the services that a piconet or DEVs in the piconet provide opens the door for serious interoperabilty issues. Consequently, it is recommended that until the details of which services are provided and encoded, this clause should be deleted from the specification. **Suggest reject** as the solution for CID 306 addresses the issue.

3.2.4 PNCResponse

17, 94 - Two dependent comments that can't be retired totally as a result of this series of resolution.

188 -Timeouts only works in the client in the vertical direction. A client cannot set a timeout for its server, less the entire distributed state machine in the scheduler is completely specified (RTOS theory). Delete the whole subclause 8.4.4.3. **Suggest accept in principle** - Comment 188 suggests that the text in clause 8.4.4.3 is not clear enough since the DEV (client) in fact only receives the information from the PNC. Thus, other than assuring that the text is clear on this, the comment should be satisfied. Suggested text is added in 8.4.4.3. In a new sentence that follows each of the 1st and 2nd paragraphs, add the following:

"This parameter is provided by the PNC as a read only indication of its ability to respond. The DEV may use the information to adjust its operating parameters."

> Accept in princple "Comment 188 suggests that the text in clause 8.4.4.3 is not clear enough since the DEV (client) in fact only receives the information from the PNC. Thus, other than assuring that the text is clear on this, the comment should be satisfied. Suggested text is added in 8.4.4.3. In a new sentence that follows each of the 1st and 2nd paragraphs, add the following: 'This parameter is provided by the PNC as an indication of its ability to respond and is only set by the PNC. The DEV may use the information to adjust its operating parameters.'"

Meeting adjourned, 9:41 am PDT.

Comment 808, 94, 191,188, 17, 10, 92, 12, 86, 357 - SUGGEST ACCEPT IN PRINCIPLE - The PNCResponse parameter is useless if the scheduler in the PNC for determining to which command frames the PNC must respond first is not specified. Comment 12 is a good observation in lack of specification. My d09 comment was addressing a broad issue of response but of most interest was the CTR and response to SPS info command. Perhaps the more general case of all commands is appropriate since they will include the CTR and SPS info commands. The text below remains limited to enhancing the current text. If so, then the text should indicate that all commands will be processed in order of receipt.

Add text after the last paragraph of 8.4.4.3 - "The intent of the PNC responsiveness is for the PNC to indicate a characteristic of responsiveness based on the implementation of the PNC. From this, the associating DEV may derive sufficient information to adjust how it relates to the PNC and what the DEV expectations may be. It is up to the PNC to report this and it should be a useful parameter for the DEV to use, including

finding a piconet with a PNC more suited to the DEV needs. PNC implementations may be responsive to within a single superframe of a successful command in the CAP or open MTS. Further, within the limitation of the CAP or open MTS capability, PNCs may be of such a design as to accommodate several command operations within a single superframe. Other PNCs may be of the other extreme and be implementations that presume a somewhat static application set. Again, the idea is for DEVs to be able to better understand the nature of the PNC of the network they are joining.

The distribution of association and open MTSs within superframes has a significant impact on PNC respon-siveness {xref MTS in clause 8}."

Add a field to the beacon, CTRRespTime, that is 4 bits with 4 reserved bits (i.e. one more octet to the sychronization parameters. It is is defined as follows:

The CTRRespTime field is an estimate by the PNC of the number of superframes it will currently take to respond to a channel time request by a DEV, 8.4.4.3. A value of 0 means that the PNC estimates that it will tak longer than 15 superframes to respond to a channel time requests.'

Meeting adjourned at 9:38 am, PDT.

3.3 Wednesday, 31 July, 2002

Attendees: Bill Shvodian, Allen Heberling, James Gilb, Knut Odman, Jay Bain, Mark Schraeder

Meeting called to order at 9:37 am, PDT.

3.3.1 Tabled issues

135 (Heberling, TR) KO> Requests for asynchronous and isochronous channel time have two completely different sequences. Therefore the two can never be combined in the same request. Consequently, <add two sentences> The same channel time request frame cannot contain CTRB for both asynchronus and isochro-nous channel time. Incorrectly formatted requests shall be rejected by the PNC with the result code set to ILLEGAL_REQUEST. **Suggest Accept**

> Table until Wednesday, 31 July 2002. Homework to everyone to review 02/109r0 to see why it might be a problem to combine requests.

> Everyone agrees isochronous modifies and terminates can be combined in a single command frame. Table until Schaumburg.

182 (Heberling, TR) KO> MaxCTA of any kind is a PNC decision which may change due to PNC capabili-ties and amount of associated DEVs. Since we're not specifying the algorithm we should leave this up to the PNC implementer. Consequently, delete the 2nd paragraph which starts: "The PNC shall not assign more than aMaxAssignedCTAs... **Suggest accept** pending acceptance of CID 71.

> Accept in principle, "Add the MaxCTA IE to the association request frame."

71 (Heberling, TR) - The MaxCTA is a PNC implementation specific number, and depends on network size and PNC capabilities. It should not be a part of the standard. Delete 7.4.9. also affects 8.4.4.2, 2nd para-graph.

> Accept in principle, "Add the MaxCTA IE to the association request frame."

180 (Heberling, TR) KO> Informing the receiver when a pseudostatic CTA is moved will be so much over-head that it's unmanagable. Besides, the constructions in there to avoid transmitter contention. Receiver contention is ok! Let whoever missed the CTA in the beacon listen to the whole superframe. Besides, if the intended receiver misses the CTA in the beacon, how is it going to find out when the PNC wants to inform it about the change? 2nd problem: A PNC must have the authority to arrange CTA as it pleases. It cannot be stopped by a DEV not responding. Especially if it needs to rearrange CTA to fit in a request from a new DEV in a timely fashion. The PNC shall make an effort to inform the transmitter but it shall always proceed with the change.   A third problem is that once the PNC has decided to change something, it must proceed. PNC may have a stronger signal than the DEV, hence the PNC doesn't hear the acknowledgements but the DEVs have heard the order to change. Consequently the PNC must finish what it has started. Therefore, see Resolution [08] in 02276r3P802-15_TG3-commentsD10_KO.doc, page 15. **Suggest accept**

> Table until Wednesday, 31 July, 2002, the solution seems OK, WMS will check for consistency.
> Table until Schaumburg, Tuesday morning.

992 (Bain, T) - The description field for the PiconetDescriptionSet carries the incorrect direction of flow. For start operation, the direction is towards the MAC and not a return as defined in MLME-START.request. Also, for starting, it is but a single set and not multiples. New text for PiconetDescriptionSet in table 6 is recommended as "Characteristics of the superframe." **Suggest accept in principle**, 'Change the text in Table 6: Change "PiconetDescriptionSet" label to "PiconetDescription", and replace the text in the column Description of that same row with, 'The characteristics of the new piconet to be started, except PiconetStatus, which is ignored.'"

> Table until Wednesday, 31 July, 2002, MKS will provide new text for a table that has the relevant elements to start a piconet. The PNID will not be passed in the .request but rather will be returned in the .confirm.
> Accept in principle, "Change the text in Table 6: Change "PiconetDescriptionSet" label to "PiconetDescription", and replace the text in the column Description of that same row with, 'The characteristics of the new piconet to be started, except PiconetStatus, which is ignored.' Add the parameters to the 'PiconetDescription' and 'ChannelRatingList' to MLME-START.confirm. On page 152, line 30, subclause 8.2.2, replace the text 'When a DEV is looking to start a new piconet ... an MLME-START.confirm with a ReasonCode indicating a failure to start the piconet' with the following text:

'The MLME-START.request shall cause the DEV to take the following actions:

a)   Look for potential interference in the channels that it scans and rate the channels, from best (lowest interference) to worst (highest interference) and return this information in the MLME-START.confirm command via the ChannelRatingList.

b)   Choose the channel with the least amount of interference to start the piconet.

c)   Once the DEV has chosen a channel, it shall listen to the channel for aMinChannelScan duration to determine if the channel is still clear.

d)   If, at the end of this listening period, the DEV determines that the channel is clear, then the DEV shall become the PNC, issue an MLME -START.confirm with a ReasonCode indicating success and PiconetDescription with parameters of the newly created piconet. In addition, the DEVshall commence broadcasting its beacon once every superframe duration. If, however, the DEV determines that the channel is no longer clear, it shall issue an MLME -START.confirm with a ReasonCode indicating a failure to start the piconet.'"

202, 204, 402 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE. **Suggest accept in principle**, "Adding the vendor IE to the associate request and response commands as outlined in 02/276r0 will take care of problems with standardization. Since this information is needed to provide a fast response time, the DEVPiconetServicesIE will remain in the associate request command."

        Possible proposal,vendor string + vendor specific IE but not DEVPiconetServicesIE.

        Jay Bain will provide suggested text by COB 29 July 2002.

        Table until Schaumburg.

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

        Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it.

        ADH will provide suggested text by COB 2 August 2002.

3.3.2 DEP/PN issues

356 (Heberling, TR) - We lack methods for parent PNC to gracefully shut down a neighbor piconet. The parent PNC cannot just remove the CTA since it would leave the neighbor piconet hanging. Change text <from> If the parent PNC wants to end either a child the parent PNC shall use either the stream termination process, 8.5.1.3, to remove the GTS from the beacon. If the parent PNC wants to end a neighbor piconet, it shall use the disassociation process, 8.3.4, to remove the neighbor PNC from the network. <to> If the parent PNC wants to stop a child piconet, the parent PNC shall use the Parent PNC termination of child piconet procedure, 8.2.4.1. If the parent PNC wants to stop a neighbor piconet, the parent PNC shall use the Parent PNC termination of neigbor piconet procedure, 8.2.5.1. **Suggest accept in principle** - use the techniques of contribution 02/316.

        Table until Friday, 2 August 2002, Jay Bain will provide modified text for 352, 354, and 356.

        Accept 7.4.13 in document 02/316r0, causes withdraw of 358, 101, 67, 69.

989 (Bain, TR) - To support the MLME-InitDependentPNC.request/confirm, text in this sub-clause should support the action of starting a dependent PNC. see the 6.3.x comment see 02/289. **Suggest accept** - Use the text of 02/289r0. This is the same resolution as for child piconets of comments 986, 988.

        Accept.

962 (Bain, T) - The text is written in a way that implies that only a single neighbor piconet can exist within a parent piconet. adjust the sub-clause to reflect multiple neighbors. Then specify a process for the remaining neighbors and how they select one of their number to take over the role of parent. Interesting if they are all non-15.3 piconets. 8.2.5 should lead the change and this sub-clause follow obviously. **Suggest accept** - this makes clause 5 text match that there may be up to 6 neighbors for a single parent PNC.

        Accept.

588 (Gilb, TR) - If a parent piconet ends operation and a neighbor piconet continues to operate without disruption, does the neighbor piconet use all the airtime previously used by the parent piconet or does the neighbor piconet continue to operate in the space previously alloted by the parent? Is this specified anywhere? What if multiple neighbor piconets exist, or a child and a neighbor piconet both exist, when a parent piconet ends? Add text to clause 8 that describes what to do in this case. I suggest letting the neighbor piconet reclaim all of the unused time after the ATP expires if there are no other child or neighbor piconets in the parent piconet. If there is more than one child piconet in the parent piconet, the first one whose ATP expires becomes the first PNC. Others can join the new parent piconet and request time. Once that is done, add an informative summary of this to clause 5 once the decision has been made.Once that is done, add an informative summary of this to clause 5 once the decision has been made. **Suggest accept in principle** - see 02/316

Accept in principle, "Accept 02/136r0 except that the PNC chooses the child or neighbor DEV with the lowest DEVID not PNID. See also comment 358." (resolve 358 same way).

179 (Heberling, TR) - Figure 98 should be replaced with a proper MSC of the required protocol needed to establish a neighbor piconet. Replace figure 98 with a proper MSC. **Suggest accept** - An MSC for neighbor piconet initialization is included below. It needs twiddling to get the vertical lines to not show in the hex process blocks. Also, although consistent with other similar diagrams, this MSC seems to need the first beacon of the neighbor PNC shown.

The MSC for the initiation of the neighbor piconet is illustrated in Figure 21.
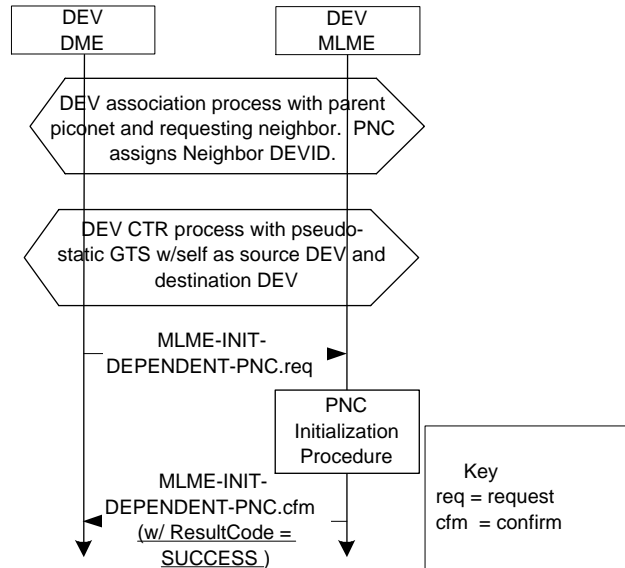
Figure 21—MSC for the initiating of a neighbor piconet.

Accept in principle, "Accept suggested resolution but add a line at the bottom that shows the first beacon being sent. Also add after the sentence that says 'The MSC for the initiation a neighbor piconet is illustrated in Figure 21.' the following sentence, 'The association and channel time request processes are defined in xref and xref, respectively.'"

352 (Heberling, TR) - We lack methods for parent PNC to gracefully shut down the child piconet. The parent PNC cannot just remove the CTA since it would leave the child piconet hanging. 8.2.4.1 Parent PNC termination of child piconet. If the parent PNC wishes to stop the child piconet, it shall send a disassociate request to the child PNC. The child PNC shall then immediately initiate its shutdown procedure, 8.2.6. The parent PNC shall listen for the child PNC shutdown beacon sequence to determine when the child piconet CTA can be removed. The parent PNC may set a maximum time for the completion of the child shutdown sequence, after which the CTA will be removed regardless of the completion of the child shutdown procedure. If the child PNC receives a shutdown beacon from its parent, it shall immediately initiate its shutdown sequence, 8.2.6. **Suggest accept in principle** The text of 02/316r0 should be used for child and neighbor being made aware of shutdown.

Table until Friday, 2 August 2002, Jay Bain will provide modified text for 352, 354, and 356.

354 (Heberling, TR) We lack methods for parent PNC to gracefully shut down a neighbor piconet. The parent PNC cannot just remove the CTA since it would leave the neighbor piconet hanging. 8.2.5.1 Parent PNC termination of neighnor piconet If the parent PNC wishes to stop the neighbor piconet, it shall send a disas-

sociate request to the neighbor PNC. The neighbor PNC shall then immediately initiate its shutdown proce-
dure, 8.2.6. The parent PNC shall listen for the neighbor PNC shutdown beacon sequence to determine when
the neighbor piconet CTA can be removed. The parent PNC may set a maximum time for the completion of
the neighbor shutdown sequence, after which the CTA will be removed regardless of the completion of the
neighbor shutdown procedure. If the neighbor PNC is not 802.15.3 compliant, the parent PNC shall provide
the same time as it allows for its own shutdown sequence, for the neighbor PNC to stop its piconet before
removing its private CTA.   If the neighbor PNC receives a shutdown beacon from its parent, it shall imme-
diately initiate its shutdown sequence, 8.2.6. - **Suggest accept in principle** The text of 02/316r0 should be
used for child and neighbor being made aware of shutdown.

Table until Friday, 2 August 2002, Jay Bain will provide modified text for 352, 354, and 356.

181 (Heberling, TR) - The second paragraph of clause 8.2.6 is incomprehensible. Clean it up.(and an edito-
rial) Rewrite the second paragraph of clause 8.2.6 so that it is clear, concise and comprehensible. **Suggest
accept** - "Remove 'either' in two places, the new sentence reads 'If the parent PNC wants to end a child
piconet, the parent PNC shall use the stream termination process, 8.5.1.3.'"

Accept suggested resolution, "Note, however, that the resolution of CIDs 352, 354 and 356 may
change the shutdown procedure slightly."

358 (Heberling, TR) - If the parent PNC shuts down, a child or neighbor PNC cannot just take over on its
own initiative. If there are more than one child and/or neighbor, the new PNC candidates would all start
sending beacons, which would lead to collisions. The procedure must be that the parent PNC selects a child
or neighbor to hand over to. If that fails, the parent shutdown must lead to the shutdown of all client and
neighbor piconets. <change text> <from> If the parent piconet ends operation, the child or neighbor pico-
net may continue operation. The child PNC shall remove the parent PNC DEV address element from its bea-
con frame, signifying that it is a free-standing piconet. If the neighbor piconet is an 802.15.3 piconet, then
the neighbor PNC removes the parent PNC DEV address element from its beacon frame, signifying that it is
a freestanding piconet. <to> If a child or neighbor piconet is present, the parent PNC shall first attempt to
hand over to one of the child or neighbor PNC using the procedures defined in 8.2.3. If a handover for any
reason is impossible, the shutdown of the parent PNC shall start the shutdown procedure for the child PNC
as defined in 8.2.4.1, and the neighbor PNC as defined in 8.2.5.1.   If a child or neighbor PNC wishes to ter-
minate its piconet, it shall first initiate the shutdown procedure for its piconet. After the child or neighbor
piconet shutdown is completed, a child PNC may remain in the parent piconet as a DEV by initiating a
stream termination procedure for its private CTA, 8.5.1.3, or it may initiate the disassociation procedure to
leave the parent piconet, 8.3.4. A neighbor PNC shall only use the disassociation procedure. **Suggest accept
in principle** - use the text in 02/316r0.

Accept in principle, "Accept 02/136r0 except that the PNC chooses the child or neighbor DEV with
the lowest DEVID not PNID. See also comment 588."

985 (Bain, TR) - Multiple children (no limit stated in draft?) and neighbors can be in a single parent. On
stopping the parent, there is no definition of how the neighbors and children remain operational when there
are multiples. Text is provided in the remedy but it is not a very nice approach. It would be far better to allow
one of the dependent piconets to pick up parent responsibility. Change existing text to indicate single neigh-
bor. Then add a new paragraph after line 22. "Parent piconets containing combinations of neighbor and child
piconets (dependent piconets) are permitted in this standard. When multiple dependent piconets are present,
the parent should end all child and neighbor piconets before removing itself from the piconet." **Suggest
reject** - The solution of 02/316r0 should be used as it is a better solution than killing off everyone.

Resolution is the reject stated above.

961 (Bain, T) - The text is not clear that the child uses the allocation approach and the neighbor uses the dis-
association approach. "... end the subsidiary piconet via the dissassocation command (for neighbor piconets)

or by removing the allocated GTS from the beacon (for child piconets). **Suggest accept** - this brings clause 5 into alignment with suggested resolutions of clause 8.

> Accept.

3.3.3 IE/ASIE

273 (Gilb, T) - withdrawn

> Withdrawn

Meeting adjourned at 11:02 am PDT.

3.4 Tuesday, 30 July, 2002

Roll call: John Barr, Allen Heberling, Bill Shvodian, Jay Bain, Mark Schrader, Jeyhan Karaoguz, James Gilb, Bob Huang.

Meeting called to order at 9:13 am PDT.

3.4.1 Tabled issues

135 (Heberling, TR) KO> Requests for asynchronous and isochronous channel time have two completely different sequences. Therefore the two can never be combined in the same request. Consequently, <add two sentences> The same channel time request frame cannot contain CTRB for both asynchronus and isochronous channel time. Incorrectly formatted requests shall be rejected by the PNC with the result code set to ILLEGAL_REQUEST. **Suggest Accept**

> Table until Tuesday, 30 July 2002. Homework to everyone to review 02/109r0 to see why it might be a problem to combine requests.

> Table until Wednesday.

91 (Heberling, TR) - It should be possible for a PNC to deny creation of a child piconet. On line 41 add text: If the PNC rejects the creation of a child piconet, it shall set the ReasonCode of the channel time response command to CHILD_UNSUPPORTED. **Suggest accept in principle** Since support of child piconets is an option, the comment is correct that a reasoncode of child_unsupported is added. HOWEVER, it is dangerous precedent to allow PNCs that support pseudo-static GTS to not support child or neighbor piconets. Also, although for neighbors, this is a coexistence mechanism. We need a better answer.

> Table until Tuesday, 30 July, 2002.

> Reject, 'The PNC is able to determine if the request for a child based on the source and destination IDs. It may reject it with a channel time unavailable code, even if time is available but it simply does not want to allow the creation of the child piconet."

3.4.2 CTM/Isoch

203 (Heberling, TR) The only parameters that are negotiable are the DesiredNUmberOfTUs and the stream index. Consequently, please delete the sentences between lines 19 and 21 and replace with this sentence: " Only the DesiredNumberOfTUs in the CTRB of Figure 73 and the stream index shall be negotiable." **Suggest accept**

Accept in principle, "Delete the sentences between lines 19 and 21, 'The values for GTS Type, and CTR Interval Type Figure 74 shall be non-negotiable and are decided by the DEV that is sending the channel time request. These values shall not be changed anytime after the first transmission of the command frame containing the request for that stream.'"

205 (Heberling, TR) After the last sentence in the list on line 48 (The reason code field is set to "SUC-CESS"), please add this next item to the list: Send a beacon with a stream announcement IE and the requested channel time if immediately available. This addition to the beacon is necessary to provide the requesting DEV with a more immediate response from the PNC particularly in the case where the DEV requested a sub rate CTA that could potentially result in the PNC not scheduling a beacon with the requested CTA IE until some considerable time in the future. This would cause the DEV to wait a long time to confirm the success of its request. **Withdraw** per CID 74.

Withdrawn

995 (Bain, TR) Figure 119 MSC for reserving asynchronous data channel time provides MAC-SAP primitives. The MSC figures for isochronous do not show this information. The MSCs of figure 113 through 118 should have this information added where appropriate. Consequently, add the MAC-ISOCH-DATA primitives as noted above **Suggest reject**

Accept in principle, "Add an additional MSC that shows what happens when a MAC-ISOCH-DATA comes in and no stream has been allocated. It shows that the creation process occurs and then the data is transferred after the CTAs appear in the beacon. ADH will add to 01/469ryy where yy is large."

3.4.3 CTM/MaxCTA

182 (Heberling, TR) KO> MaxCTA of any kind is a PNC decision which may change due to PNC capabilities and amount of associated DEVs. Since we're not specifying the algorithm we should leave this up to the PNC implementer. Consequently, delete the 2nd paragraph which starts: "The PNC shall not assign more than aMaxAssignedCTAs... **Suggest accept** pending acceptance of CID 71

Table until Wednesday, 31 July, 2002.

71 (Heberling, TR) - The MaxCTA is a PNC implementation specific number, and depends on network size and PNC capabilities. It should not be a part of the standard. Delete 7.4.9. also affects 8.4.4.2, 2nd paragraph

Table until Wednesday, 31 July, 2002.

3.4.4 CTM/Psuedostatic

451 (Gilb, TR) The probe command is now used to communicate the new CTAs to the DEVs using a pseudo-static GTS. However, that doesn't seem to be the best way to do it. Consequently, consider these options: - Keep probe - Add CTA to channel time status command - Bring back channel time grant command, possibly with a different name **Suggest accept** option 1: Keep the probe command pending acceptance of CID 180. **Accept in principle** option 2: It may be advisable to reuse the channel time status command name(given that the current channel time status command is being renamed to channel time response command) to convey CTAs, given the changes discussed while trying to come to consensus regarding CIDs 410, 155, 364, 907, 120, 366.

Accept in principle, "Keep the probe command for moving pseudostatic GTSs."

180 (Heberling, TR) KO> Informing the receiver when a pseudostatic CTA is moved will be so much over-head that it's unmanagable. Besides, the constructions in there to avoid transmitter contention. Receiver con-

tention is ok! Let whoever missed the CTA in the beacon listen to the whole superframe. Besides, if the intended receiver misses the CTA in the beacon, how is it going to find out when the PNC wants to inform it about the change? 2nd problem: A PNC must have the authority to arrange CTA as it pleases. It cannot be stopped by a DEV not responding. Especially if it needs to rearrange CTA to fit in a request from a new DEV in a timely fashion. The PNC shall make an effort to inform the transmitter but it shall always proceed with the change. A third problem is that once the PNC has decided to change something, it must proceed. PNC may have a stronger signal than the DEV, hence the PNC doesn't hear the acknowledgements but the DEVs have heard the order to change. Consequently the PNC must finish what it has started. Therefore, see Resolution [08] in 02276r3P802-15_TG3-commentsD10_KO.doc, page 15. **Suggest accept**

Table until Wednesday, the solution seems OK, WMS will check for consistency.

186 (Heberling, TR) KO> The receiver cannot be involved during pseudostat move negotiation. Instead, the rules must be that a DEV that cannot interpret the CTA must stay awake for the whole superframe. That solves receiver problems with the move. The transmitter will still get the move probe handshake. Consequently, insert this text on line 17: "A DEV that did not correctly receive the CTAs of a beacon shall listen for the following superframes until the CTAs of a beacon are correctly received." **Suggest accept**.

> Accept in principle, "Insert text after line 17, 'If a DEV that is the destination of a pseudo-static GTS misses a beacon, it should listen for the entire duration of the superframe in case the pseudo-static GTS is in the process of being moved. Any DEV that misses a beacon may also wish to listen for the entire duration of the superframe for frames for which it is the destination.'"

3.4.5 Start issues

963 (Bain, TR) - MLME-START.request suggests the means to starts parents, children, and neighbors using the current PiconetType parameter. The MLME-START.request is not used for starting either child or neighbors. Both a neighbor and child would associate first (neighbor in associate) and then obtain channel time. Recommend that PiconetType parameter be removed from Table 6 (page 31, line 12). **Suggest accept in principle:** "1) Remove PiconetType parameter from Table 6 (page 31, line 12 and the MLME-START.request. 2) Also, since the MAC knows that the DME needs neighbor (not child) piconet established as part of the MLME-ASSOCIATE.request command (since the PNC must know in order to assign a reserved DEVID). Therefore: Add a new PiconetType parameter to MLME-ASSOCIATE.yyy commands, and add a row for PiconetType in Table 9 with the enumeration: 'Neighbor' and 'Member'. The 'Child' and 'PNC' enumerations are not needed. 3) In order to clear up when a member becomes a child to the parent PNC, add the following text to section 8.5.1 after line 25: 'A piconet member DEV or a member neighbor DEV shall allocate a private psuedo-static GTS for use with for its private piconet. When a member DEV that is not a neighbor is granted a private psuedo-static GTS, it shall be distinguished as a 'child PNC' by the parent PNC. The 802.15.3 child or neighbor network shall use the channel time allocated to the private GTS for its beacon, its CAP, and its CFP. The parent PNC shall manage the GTS that is allocated to the child or neighbor member, in the same manner as any other psuedostatic GTS.'

> Accept resolution, except for the 3), "Add this sentence to 8.2.4, line 45 and to 8.2.5 line 25 'The 802.15.3 child or neighbor network shall use the channel time allocated to the private GTS for its beacon, CAP and CFP. The parent PNC shall manage the GTS that is allocated to the child or neighbor PNC in the same manner as any other psuedostatic GTS.'"

992 (Bain, T) - The description field for the PiconetDescriptionSet carries the incorrect direction of flow. For start operation, the direction is towards the MAC and not a return as defined in MLME-START.request. Also, for starting, it is but a single set and not multiples. New text for PiconetDescriptionSet in table 6 is recommended as "Characteristics of the superframe." **Suggest accept in principle**, 'Change the text in Table 6: Change "PiconetDescriptionSet" label to "PiconetDescription", and replace the text in the column Description of that same row with, 'The characteristics of the new piconet to be started, except PiconetStatus, which is ignored.'"

Table until Wednesday, 31 July, 2002, MKS will provide new text for a table that has the relevant elements to start a piconet. The PNID will not be passed in the .request but rather will be returned in the .confirm.

3.4.6 IE issues

177 (Heberling, TR) - Figure 96 should be replaced with a proper MSC of the required protocol needed to establish a child piconet. Replace figure 96 with a proper MSC. **Suggest accept** 'An MSC for child piconet initialization is included below. It needs twiddling to get the vertical lines to not show in the hex process blocks. Also, although consistent with other similar diagrams, this MSC seems to need the first beacon of the child PNC shown.

The MSC for creating a child piconet is illustrated in Figure 22.
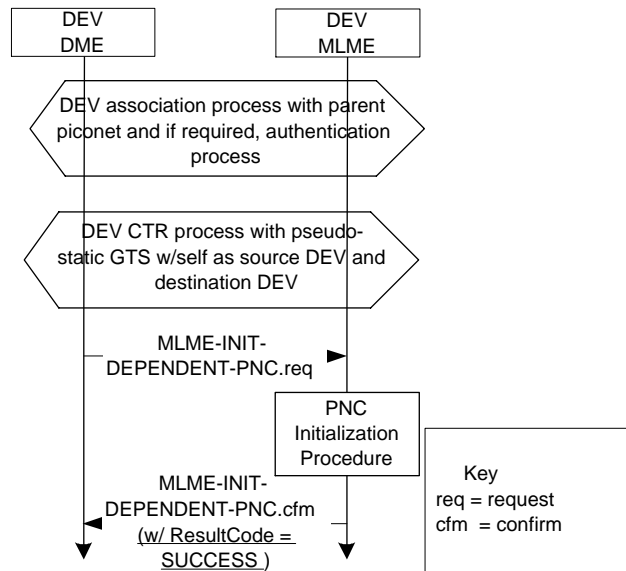
Figure 22—MSC for the creating a child piconet.

Accept suggested resolution but add a line at the bottom that shows the first beacon being sent. Also add after the sentence that says 'The MSC for creating a child piconet is illustrated in Figure 22.' the following sentence, 'The association and channel time request processes are defined in xref and xref, respectively.'

987 (Bain, T) - It is suggested that the neighbor sub-clause be split. The breakout would be for neighbors intending to be for 15.3 piconets or for neighbors intending to be for non-15.3 piconets. Suggested text will be in document 02/289. **Suggest accept in principle**, should be editorial and be tech editor choice if non-15.3 and 15.3 type neighbors are split in 8.2.5.

Accept in principle, "Add additional text about neighbor piconets that says that a non-802.15.3 compliant neighbor shall ensure that its network does not have transmission outside of its allocated GTS."

200 (Heberling, TR) - If one allowed hierarchical piconets ad absurdum the integrity of the TDMA protocol could not be maintained. <add sentence> A neighbor PNC shall decline the start of a subordinate client or neighbor piconet within its private CTA. **Suggest accepting partial** - A neighbor (of the 15.3 type) should not be allowed to start a dependent neighbor piconet. However, suggest that a 15.3 neighbor (the only type we can control in the standard) be allowed to start a single child piconet.

　　　Withdrawn

Meeting adjourned at 10:37 am PDT.

3.5 Monday, 29 July, 2002

Attendees: Jay Bain, John Barr, Bill Shvodian, Allen Heberling, Knut Odman, Rene Struik, Jeyhan Karaoguz, James Gilb

Meeting called to order, 9:06 am PDT.

3.5.1 Email resolutions due 23 July 2002 and 29 July 2002

July 23, 2002, from Ari Singer

783 - I agree in principle that an X should be included in the table for disassociate. However, if we accept the comment that devices may accept protected or unprotected frames in a secure piconet, we may want to change the text to say that the commands "should" be sent with the SEC bit turned on instead of "shall". We also need to make exceptions for commands that may be sent before the DEV is authenticated. For example, the probe command may be sent and received before authentication, but it is marked with an X in this table. The same applies to disassociate.

311 - I agree in principle. As mentioned above, if the DEV is not yet authenticated, it doesn't share a key with the PNC so the disassociate command must be sent unprotected. Perhaps it should say something like "The disassociation request command shall use the secure command format if the DEV is authenticated in the piconet."

From Allen Heberling

I accept these comments as written: (959, 312, 783, 311, 803, 804, 726, 814, 53, 958, 46, 609)

However I suggest these editorial changes to 129 (<Change> "...is one less than the total amount of fragments..." <to> "...is one less than the total number of framgents..."

Cannot accept the indicated CIDs until clarification of these comments is received: (Bain (977, 979, 949), Roberts: 1126)

Further discussion is required on this comment: (485)

From John Barr

1126 - How does a non-802.15.3 network which has just enough intelligence to associate as an 802.15.3 neighbor network synchronize with the PNC's clock? Also, on page 174, line 37 there is the following sentence: "All DEVs will resynchronize their clock based on the beacon arrival." The child PNC and the neighbor device controlling the allocation of the time slot for the neighbor network (we don't require that it be a piconet, just conform to the time allocation) are DEVs hearing the beacon. Also, a DEV in a child piconet will be required to synchronize with the beacon it hears from the child PNC. How can it also synchronize with he parent PNC? The child PNC uses the piconet timing of it's parent to determine when to send out its beacon and shall not allocate any more time than allocated by the parent PNC.

I think the resolution of this is more than just inserting the suggested sentence. Either change sentence to make it clear that the clock of the child and neighbor PNC are the only ones involved instead of all the DEVs

in each subnetwork, or clean up the text in both sections to make sure that only one 'shall' statement is present

1126 (Roberts, T) - Suggest accept in principle, "Add a sentence after 'All DEVs within a single piconet shall be synchronized to the PNC 's clock.' that says 'In addtion, child or neighbor PNCs shall syncrhonize their networks time usage to the parent PNC's beacon and their allocated GTS time.'"

> Accept suggested resolution.

783 (Shvodian, TR) - The disassociation command requires authentication if authentication is required. Put and X in the Authenticated column of the Disassociation request command. Suggest accept.

> Table until Thursday, 1 Aug, 2002. Re-categorize this one as security. Find the other security comment that discusses what to do when you receive insecure frames in a secure piconet.

311 (Shvodian, TR) - The disassociation request command should be integrity protected in a secure piconet. Add the following text: The disassociation request command shall use the secure command format in piconets using security mode 2 or 3. **Suggest accept.**

> Accept in principle, "Add the sentence 'The disassociation request command shall use the secure command format if the DEV is authenticated in the piconet.'"

977 (Bain, T) - There is the omission of mention that a PNC that is either a child or neighbor may be found. They are valid as opposed to a PNC that is not of the child or neighbor type. (8.2.1, p 152, line 21) "same channel, that is not a valid child or neighbor PNC, it may ...." **Suggest accept**.

> Accept in principle, "On 8.2.1, p 152, line 21, change 'same channel it may' to be 'same channel, that is not one of its own child or neighbor piconets, it may ...'

979 (Bain, T) - It is not stated how the beacon number field is handled when the PNC is attempting a dynamic channel change. Does it continue to increment as if it was still sending beacons? This would be best for SPS DEVs. At end of 1st sentence, add a sentence as follows "The PNC shall continue to increment beacon count during the period when it is searching other channels." **Suggest accept.**

> Accept in principle, "At end of 1st sentence, add a sentence as follows, 'The PNC shall increment the beacon number field by the number of beacons not sent while seaching the other channels when it resumes sending beacons.'"

949 (Bain, TR) - It would seem that all MTS should follow the same rule in using the maximum transmit power IE. The text calls for directed in both directions but not open or association. The text also does not note that the PNC shall use that setting for CAP and MTSs. See also comment in clause 5.3.11 page 20. "CAP, beacon and MTSs." on line 3. "in the CAP or MTSs to be ..." on line 7. " for the beacon, CAP, and MTSs to be ..." on line 8. **Suggest accept.**

> Accept in principle, "The association MTS is exempt from the piconet maximum transmit power. Change 'for the CAP, beacon and directed MTSs.' to be 'for the CAP, beacon, and MTSs, excluding association MTSs.' on line 3, page 205. On line 7, page 205, from 'the CAP or directed MTSs' to be 'for the CAP or MTSs, excluding association MTSs.'"

485 (Gilb, T)

> Tabled until text is available.

3.5.2 Tabled issues

202, 204, 402 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE. **Suggest accept in principle**, "Adding the vendor IE to the associate request and response commands as outlined in 02/276r0 will take care of problems with standardization. Since this information is needed to provide a fast response time, the DEVPiconetServicesIE will remain in the associate request command."

> Possible proposal,vendor string + vendor specific IE but not DEVPiconetServicesIE.
> Table until Monday, 29 July 2002, Jay Bain will provide suggested text.
>
> Table again until Wednesday, 31 July 2002, Jay Bain will provide suggested text by COB 29 July 2002.

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

> Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it.
> Table until Monday, 29 July 2002.
>
> Table again until Wednesday, 31 July 2002, ADH will provide suggested text by COB 29 July 2002.

CTM/Isoch/Term*

919 (Bain, T)) This relates to another comment directed to 8.5.1 on MSCs. The indication does not free the resources in PNC-DME that were allocated in other primitives for CTA. We have a MLME-TERMINATE-CTA.ind but it is not for the PNC DME. We need to define an additional primitive for this. **Suggest reject** since CID 155 redefines the MLME-TERMINATION-CTA.indication primitive.

> Source terminating is informed by the ACK from the PNC.
> The target is informed of termination with the null-CTAs.
>
> Target terminating is informed by the ACK from the PNC.
> Source is informed of termination with the channel time response command.
>
> PNC terminating informs the target with the null-CTAs.
> PNC terminating informs source with channel time response command.
>
> Table until Monday, 29 July, 2002
>
> Accept in principle, "The procdure for termination has been modified so that the PNC DME is no longer informed of the stream termination as indicated in the resolution of comment 155. Thus the MLME primitive is no longer needed.
>
> ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

410 (Heberling, TR) Delete the MLME-TERMINATE-STREAM.indication primitive since the PNC DME does not care about this piece of information only its MLME does. Consequently, the MLME can handle deallocating the ct allocated to the stream index specified when terminating this stream. Also, only isochronous data associated with a stream index requires a specific termination request. Asynchronous data follows

a different set of rules.   In the case where a target DEV is disassociating, the disassociation process spelled out in clause 6.3.6, clause 7.5.1.3, clause 8.3.4 and illustrated in Figure 102 will take care of notifying the PNC and the source DEV that the target DEV is no longer available to receive any data(asynch or isoch) **Suggest reject** deletion of MLME-TERMINATE-STREAM.indication primitive per CID 155. .AND. **Suggest accept** process describing disassociation and MSC as preferred method of terminating a stream when a DEV disassociates.

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

155 (Heberling, TR) KO> MLME-TERMINATE-STREAM.indication not used for target, only source. Consequently, for clause 6.3.14.10 MLME_TERMINATION_CTA.indication <change from> This primitive is used to inform the target DEV that channel time that was previously allocated is no longer present in the most recently received beacon. <to> 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. **Suggest accept**

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

364 (Heberling, TR) Please change this sentence frag. from "...followed by a beacon in which the CTAs assigned to the indicated stream index are set to a null CTA..." to " followed by a beacon in which the CTAs assigned to the indicated stream index are removed." In the case where the SrcDEV is requesting the termination of the stream, the ACK to its request is sufficient. The receiving DEV will know that the stream has been deallocated by the absence of the CTAs assoicated with the stream index. This is a more concise means of terminating the stream CTA.   In the case where the DestDEV is doing the termination the same rules apply. The SrcDEV will be notified via the absence of the CTA in the beacon. **Suggest accept**

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

907 (Bain,TR) Grammatical errors and reference to figure 118 is incorrect and does not pertain to text in this section. Consequently, change the paragraph to the following: "In the case where the PNC wishes to terminate the stream, it shall notify the originating DEV and the target DEV via the next periodic beacon that the CTAs assigned to the indicated stream index are set to a null CTA value for aMinBeaconInfoRepeat duration." **Suggest reject** pending acceptance of CID 364

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

120 (Heberling, TR) Change this sentence from "In the case where the originating DEV that wishes to terminate is the stream is the PNC,..." to " In the case where the originator of the stream termination request is the PNC, the PNC shall simply remove the CTAs associated with the terminated stream index from the next beacon." **Suggest accept** pending acceptance of CID 364

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

366 (Heberling, TR) The sentences between lines 44 and 46 are redundant. Therefore delete them. **Suggest accept** pending acceptance of CID 364.

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

917 (Bain, TR) - The figures 117 and 118 should change to add the indication to PNC DME and to add the block noting the operation taking place in the PNC DME that allows the MAC and DME to be synched on resources. Other change needs to be in 6.3.14.10 and is a different comment. **Suggest reject** for these reasons: Fig. 118 is better represented by Fig. 102 which descibes more precisely what happens when a DEV disassociates from the piconet and what the effect upon a stream would be. Fig. 117 do not require the requiredf primitive since CIDs 155 and 364 describe a more efficient means of terminating a stream.

Table until Monday, 29 July, 2002

Table again until Friday, 2 August, 2002. ADH will work on unified text for CTA termination, due by Friday 2 August, 2002.

3.5.3 CTM/CTR

45 (Heberling, TR) KO> Text makes no sense. The PNC allocates what it's asked for. The PNC will not go back and reallocate more time if its available later. The client is always responsible for requesting changes. Consequently, delete line 26-28. **Suggest accept**.

Table until Wedneday 31 July, 2002. Gilb will suggest new text, due by COB 30 July, 2002.

3.5.4 CTM/CTRType

161 (Heberling, TR) KO> Always use MACRO names for enumerated values so the reader can easily search the standard for occurances and easily verify the implementation against the text. In this case it's worse because one type suggests that the DEV can change the MTS allocation. It can not! Consequently, reduce CTR type field to 1 bit. 0 -> ACTIVE_GTS 1 -> SPS_GTS. **Suggest accept.**

Withdrawn

Meeting adjourned 10:40 PDT, 29 July 2002.

3.6 Friday, 19 July, 2002

Attendees: Allen Heberling, Jay Bain, Jeyhan Karaoguz, Ari Singer, James Gilb, Bill Shvodian, Knut Odman, Mark Schrader.

Meeting called to order at 8:08 am PDT.

3.6.1 Tabled issues

3 (Heberling, TR) - A stream with del-ACK policy cannot be used with any other ACK-Request. Neither can the policy be changed, because enqueued frames with different ACK-Policy (del-ACK and other) will create

unresolvable protocol conflicts. Consequently if del-ACK is declined by the destination, the stream must be terminated. 8.8.3, Insert line 9: Delayed Acknowledgement can only be used with isochronous data. Insert line 23, before "The destination DEV may change the max burst..." Upon reception of an imm-ACK frame after sending a data frame with the ACK request field set to del-ACK, the source DEV MAC shall: -issue a MLME_TERMINATE_STREAM.indication to DME - send a Channel Time Request frame to PNC with the terminate bit set to 1 and the desired CT to 0." **Suggest accept in principle**, "Change 'shall be used only for directed stream data frames where' to be 'shall be used only for directed stream data frames, i.e. isochronous connections, where' Add text to the section that says 'The source DEV may change the ACK policy in a stream from Dly-ACK to Imm-ACK or no ACK by sending a frame with the ACK policy set to one of those values. This has the effect of canceling the Dly-ACK policy and the souce shall use the Dly-ACK negotiaion procedure before restarting the Dly-ACK mechanism. The receiver shall no longer maintain the ACK status of any previous frames sent with the Dly-ACK policy set.'"

> Accept proposed resolution with addition of a reason code for MLME-ISOCH-DATA.confirm that indicates when a delayed-ACK negotiation failed. See 02/276r3 for information on this addition.

202, 204, 402 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE. **Suggest accept in principle**, "Adding the vendor IE to the associate request and response commands as outlined in 02/276r0 will take care of problems with standardization. Since this information is needed to provide a fast response time, the DEVPiconetServicesIE will remain in the associate request command."

> Possible proposal,vendor string + vendor specific IE but not DEVPiconetServicesIE.
> Table until Monday, 29 July 2002, Jay Bain will provide suggested text.

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. **Suggest accept**.

> Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/child MLME set. ADH to work on it.
> Table until Monday, 29 July 2002.

Email comments due 19 July, 2002. No opposition, so resolutions will be applied as per 02/273r4.

3.6.2 CTM/Isoch/Mod

19 (Heberling, TR) KO> MLME_MODIFY_CTA.request can only modify the channel time and requested layout of the CTA, not destination and other parameters. Consequently, delete the following parameters from MLME_MODIFY_CTA.request and MLME_MODIFY_CTA.indication: NumTrgts, TrgtIdList, OrigID, SPSSetIndex, MinNumTUs (= what you already have!) NumAsyncTUs (see comment about asynch data) Replace CTR-Control with individual parameters CTR-Interval, GTS-Type and CTR-Interval-Type **Suggest Accept** the indicated parameters from the MLME_MODIFY_CTA.request. However, MLME-MODIFY-CTA.indication is a moot point due to acceptance of CID 33.

> Pending confirmation that this matches changes already adopted for clause 8.
> Accept in principle, "Delete the following parameters from MLME_MODIFY_CTA.request and MLME_MODIFY_CTA.indication: NumTrgts, TrgtIdList, OrigID, SPSSetIndex, NumAsyncTUs. Replace CTR-Control with individual parameters CTR-Interval, GTS-Type and CTR-Interval-Type."

360 (Heberling, TR) Please delete this sentence: "Minimum number of TUs field is set to either the original value requested or anew value ..." The minimum value should be a fixed quantity. It is the DesiredNumber-OfTUs which is negotiable. **Suggest accept**.

　　　Withdrawn

918 (Bain, TR) In the figure 115, it would seem the two .reqs on the right side should be .ind and .rsp. **Suggest reject** per acceptance of CID 33.

　　　Accept in principle, "The .ind and .rsp MLMEs will be deleted per acceptance of CID 33."

3.6.3 CTM/Isoch/Term*

919 (Bain, T)) This relates to another comment directed to 8.5.1 on MSCs. The indication does not free the resources in PNC-DME that were allocated in other primitives for CTA. We have a MLME-TERMINATE-CTA.ind but it is not for the PNC DME. We need to define an additional primitive for this. **Suggest reject** since CID 155 redefines the MLME-TERMINATION-CTA.indication primitive.

　　　Source terminating is informed by the ACK from the PNC.
　　　The target is informed of termination with the null-CTAs.

　　　Target terminating is informed by the ACK from the PNC.
　　　Source is informed of termination with the channel time response command.

　　　PNC terminating informs the target with the null-CTAs.
　　　PNC terminating informs source with channel time response command.

　　　Table until Monday, 29 July, 2002

410 (Heberling, TR) Delete the MLME-TERMINATE-STREAM.indication primitive since the PNC DME does not care about this piece of information only its MLME does. Consequently, the MLME can handle deallocating the ct allocated to the stream index specified when terminating this stream. Also, only isochronous data associated with a stream index requires a specific termination request. Asynchronous data follows a different set of rules. In the case where a target DEV is disassociating, the disassociation process spelled out in clause 6.3.6, clause 7.5.1.3, clause 8.3.4 and illustrated in Figure 102 will take care of notifying the PNC and the source DEV that the target DEV is no longer available to receive any data(asynch or isoch) **Suggest reject** deletion of MLME-TERMINATE-STREAM.indication primitive per CID 155. .AND. **Suggest accept** process describing disassociation and MSC as preferred method of terminating a stream when a DEV disassociates.

　　　Table until Monday, 29 July, 2002

155 (Heberling, TR) KO> MLME-TERMINATE-STREAM.indication not used for target, only source. Consequently, for clause 6.3.14.10 MLME_TERMINATION_CTA.indication <change from> This primitive is used to inform the target DEV that channel time that was previously allocated is no longer present in the most recently received beacon. <to> 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. **Suggest accept**

　　　Table until Monday, 29 July, 2002

364 (Heberling, TR) Please change this sentence frag. from "...followed by a beacon in which the CTAs assigned to the indicated stream index are set to a null CTA..." to " followed by a beacon in which the CTAs assigned to the indicated stream index are removed." In the case where the SrcDEV is requesting the termination of the stream, the ACK to its request is sufficient. The receiving DEV will know that the stream has

been deallocated by the absence of the CTAs assoicated with the stream index. This is a more concise means
of terminating the stream CTA.   In the case where the DestDEV is doing the termination the same rules
apply. The SrcDEV will be notified via the absence of the CTA in the beacon. **Suggest accept**

       Table until Monday, 29 July, 2002

907 (Bain,TR) Grammatical errors and reference to figure 118 is incorrect and does not pertain to text in this
section. Consequently, change the paragraph to the following: "In the case where the PNC wishes to termi-
nate the stream, it shall notify the originating DEV and the target DEV via the next periodic beacon that the
CTAs assigned to the indicated stream index are set to a null CTA value for aMinBeaconInfoRepeat dura-
tion." **Suggest reject** pending acceptance of CID 364

       Table until Monday, 29 July, 2002

120 (Heberling, TR) Change this sentence from "In the case where the originating DEV that wishes to termi-
nate is the stream is the PNC,..." to " In the case where the originator of the stream termination request is the
PNC, the PNC shall simply remove the CTAs associated with the terminated stream index from the next bea-
con." **Suggest accept** pending acceptance of CID 364

       Table until Monday, 29 July, 2002

366 (Heberling, TR) The sentences between lines 44 and 46 are redundant. Therefore delete them. **Suggest
accept** pending acceptance of CID 364.

       Table until Monday, 29 July, 2002

917 (Bain, TR) - The figures 117 and 118 should change to add the indication to PNC DME and to add the
block noting the operation taking place in the PNC DME that allows the MAC and DME to be synched on
resources. Other change needs to be in 6.3.14.10 and is a different comment. **Suggest reject** for these rea-
sons: Fig. 118 is better represented by Fig. 102 which descibes more precisely what happens when a DEV
disassociates from the piconet and what the effect upon a stream would be. Fig. 117 do not require the
requiredf primitive since CIDs 155 and 364 describe a more efficient means of terminating a stream.

       Table until Monday, 29 July, 2002

3.6.4 Others

445 (Gilb, TR) - Not all IEs should be able to be retrieved from all DEVs as a result of a probe command.
Add a table of all of the IEs (possibly adding another 2 columns to table 46) that indicate if the element may
be returned by the PNC or a DEV. For example, the piconet synchronization IE or piconet BSID would be
returned by the PNC but not a DEV. Both the PNC and DEV would return the capabilities field. The CTA
IEs or PCTM IE, on the other hand, would never be returned in response to a probe request since they only
really belong in the beacon. **Suggest accept in principle:** Add the tables of valid IEs that may be sent or
requested based on the tables in document 02/271r0.

       Accept suggested resolution.

455 (Gilb, TR) - The probe MSC needs some work. The timeout closes when the .cfm is received. Also, we
need to add and indication that the exchange of probe commands goes on until someone runs out of things to
say. **Suggest accept**.

       Accept.

655 (Gilb, TR) - If a MLME-PROBE.response can contain a request for IEs from the target dev for the response, then the dev generating the MLME-PROBE.response should set a "ProbeTimeout" timer before sending the probe command. This means that the MLME-PROBE.response primitive should contain a parameter named ProbeTimeout. Figure 127 should be modified to show this timer as well. The timer should be set each time a response includes an embedded request. This is the price to pay for overloading the primitives. Change as indiated. **Suggest accept.**

> Accept

142 (Heberling, TR) - Timeouts only works in the client in the vertical direction. A client cannot set a timeout for its server, less the entire distributed state machine in the scheduler is completely specified (RTOS theory). Delete paragraph on line 9-16: "To accomodate peer discovery and peer-to-peer communication ... the required channel backoff time will be in addition to the delay described above". **Suggest accept in principle**, "The timeout applies only to a single DEV, i.e. a compliant DEV is required to create a response within a specified period of time after it receives the request. To clarify this, change 'A DEV that receives a probe command with any information request bit set shall respond with a probe command, 7.5.4.3, with its response within aProbeResponseDelay.' to 'A DEV that receives a probe command with any information request bit set shall respond with a probe command, 7.5.4.3, with its response within {xref aProbeResponseDelay} time of when it received the probe command.'"

> Accept proposed resolution.

3.6.5 CTM/IsochMSC

135 (Heberling, TR) KO> Requests for asynchronous and isochronous channel time have two completely different sequences. Therefore the two can never be combined in the same request. Consequently, <add two sentences> The same channel time request frame cannot contain CTRB for both asynchronus and isochronous channel time.   Incorrectly formatted requests shall be rejected by the PNC with the result code set to ILLEGAL_REQUEST. **Suggest Accept**

> Table until Tuesday, 30 July 2002. Homework to everyone to review 02/109r0 to see why it might be a problem to combine requests.

122 (Heberling, TR) 1) The channel time request command in the MSC has the wrong parameter indicated. Replace the "DCTR-TUs=0" with "Stream Termination bit=1" This change will make the MSC consistent with the text description in clause 8.5.1.3. 2) Move the MLME-TERMINATE-CTA(STREAM).confirm from its current position in the MSC to just below the ACK . This is a more appropriate location for the confirm, since the requesting DEV will have received confirmation via the ACK that the PNC received its request to terminate the CTAs associated with a specific stream index. Also remove the phrase w/(Null CTA, SI=x) from the beacon. There is no need for a null CTA. Finally, remove the MLME-TERMINATE-STREAM.indication from the MSC since the receiving DEV-3 DME doesn't need to know anything about the terminated stream. **Suggest Accept**

> Accept in principle, "Replace the "DCTR-TUs=0" with "Stream Termination bit=1". 2) Move the MLME-TERMINATE-CTA(STREAM).confirm from its current position in the MSC to just below the ACK."

812 (Shvodian, TR) Termination Bit should be used to terminate the stream, not Des-TU set to 0 **Suggest Accept** or **withdraw** pending acceptance of CID 122.

> Accept.

3.6.6 More comments

988 (Bain, TR) - To support the MLME-InitDependentPNC.request/confirm, text in this sub-clause should support the action of starting a dependent PNC. See previous 6.3.x comment. see 02/289. **Suggest accept** "Add the text in 02/289r0 for subclause 8.2.4, including the MSCs that describes the use of the MLME-INIT-DEPENDENTPNC.xxx primitives to start dependent piconets."

> Table until Monday, 29 July, 2002. Do we need to send the PNID of the child up to the parent. JB, KO, ADH, JPKG, MS to review documents on email.

452 (Gilb, TR) - Shouldn't neighbor and child piconets request pseudo-static GTSs? In the case of a child piconet, if it doesn't, the beacon timing may move around, confusing members of the child piconet and making power saving difficult. Change "request a private GTS." to be "request a pseudo-static private GTS." here and change line 15, page 157 from "to obtain a private GTS for the neighbor piconet." to be "to obtain a pseudo-static private GTS for the neighbor piconet." **Suggest accept in principle** Delete the concept of a "private" GTS and use pseudo-static GTS wherever private is found. (check whole document).

> Accept in prinicple, "Change 'request a private GTS.' to be 'request a pseudo-static private GTS.' here and change line 15, page 157 from 'to obtain a private GTS for the neighbor piconet.' to be 'to obtain a pseudo-static private GTS for the neighbor piconet.'"

198 (Heberling, TR) - If one allowed hierarchical piconets ad absurdum the integrity of the TDMA protocol could not be maintained. <add sentence> A child PNC shall decline the start of a subordinate client or neighbor piconet within its private CTA. **Suggest accept in principle** - The standard does not provide for child of child since the Parent Address (ethernet address) is included in the Child or Neighbor beacon. The text in 8.2.4 and 8.2.5 should indicate this to clarify. However, the start of a child in a neighbor piconet should not be precluded. This may be only if the neighbor is non-15.3 but should be for both neighbor cases if possible.

> Withdrawn

960 (Bain, T) - It is not clear that only a single child piconet may exist in a single parent piconet. Clarify! It would seem that more than a single child could exist. If so, then the text in the draft should reflect that and also correct words for which child takes over the piconet and using what process. **Suggest accept in principle** "Add text in 5.3.2.1 and 8.2.4 to mention that more than a single child piconet is possible from a common parent piconet."

> Accept in principle, "Add text in 5.3.2.1 and 8.2.4 to mention that more than a single child piconet is possible from a common parent piconet. Also add text that mentions that a child of a child or child of a neighbor is possible."

91 (Heberling, TR) - It should be possible for a PNC to deny creation of a child piconet. On line 41 add text: If the PNC rejects the creation of a child piconet, it shall set the ReasonCode of the channel time response command to CHILD_UNSUPPORTED. **Suggest accept in principle** Since support of child piconets is an option, the comment is correct that a reasoncode of child_unsupported is added. HOWEVER, it is dangerous precedent to allow PNCs that support pseudo-static GTS to not support child or neighbor piconets. Also, although for neighbors, this is a coexistence mechanism. We need a better answer.

> Table until Tuesday, 30 July, 2002.

Meeting ended 10:01 PDT.

3.7 Email comments due Monday, 29 July, 2002

116 (Heberling, TR) Replace the channel time status command in the MSC with channel time response command. This requested change is consistent with the requested command name change in clause 7 (CID 104: "Change the clause title <u>from</u> " Channel time status command" <u>to</u> Channel time response command". This name change is more concise and less likely to be confused with the channel status commands.).   Move the Chk-Resources and Allocate Resources processes from the PNC DME to the PNC MLME in the MSC. Doc. 01/469r5 figure 3, page 13 had it right the first time. IN addition, the primitives currently passing from the PNC MLME to the PNC DME are incorrectly labeled. Finally, even though they are incorrectly labeled they are unneeded. So delete the primitives from figure 115. Also make sure to get rid of MLME-Modify-Stream.indication and .response from clause 6.3.14.6 and 6.3.14.7 since they are not needed. **Suggest Accept** these items: 1) changing channel time status command to channel time response; 2) the others per acceptance of CIDs(413, 414, 33, 409)

118 (Heberling, TR) Replace the channel time status command in the MSC with channel time response command. This requested change is consistent with the requested command name change in clause 7. Move the Chk-Resources process from the PNC DME to the PNC MLME. And delete the MLME-Modify-Stream.ind/ rsp from the MSC. Again doc: 01/469r5 had it right the first time. **Suggest Accept** per acceptance of CID 116 and per previous acceptance of CIDs (413, 414, 33, 409)

371 (Heberling, TR) - Figure 118 is an incorrect MSC of what happens when a Target DEV disassociates from a piconet. Figure 102 is the correct MSC. Consequently, either remove figure 118 or replace it with figure 102. **Suggest Accept** "Remove figure 118."

968 (Bain, T) - The ParentDEVAddress parameter description lacks text regarding a valid 15.3 neighbor found. "... is a child piconet or 15.3 neighbor piconet,..."**Suggest accept.**

986 (Bain, TR) - For a normal piconet start, the MLME-START.request contains MACParameterSet, PiconetMaxTXPower in addition to several other parameters. In that child and 15.3 neighbors "start" in different ways than MLME-START.request, a different mechanism should be defined. The MLME-START could be used (since the parameters of interest are present) but that is a very wierd overloading. MLME-Init-DependentPNC.request   This primitive is used to begin the operation of the child or neighbor PNC. The semantices of the primitive need definition. MLME-InitDependentPNC.confirm   This primitive is used to inform the DME that the dependent PNC was able to initiate operation with the parameters sent with the request primitive.   In clause 8, in the appropriate child or neighbor sub-clause. An MLME-InitDependent-PNC.request shall be sent to the DEV after association and channel time allocation for a neighbor, or after channel time allocation for the child. The DEV would then apply the parameters of the MLME- before sending the first beacon it sends as a PNC. Note: The new MLME should come after the channel time is granted by the PNC. Because at least one PNC parameter is based on the resulting granted time, the DME should first inspect the granted time and then initiate piconet operation for the child or neighbor.   The graphics need to be changed as well in 8.2.4 and 8.2.5 to include the step in the correct location. see 02/289. **Suggest accept** "Add the text in 02/289r0 for the MLME-INIT-DEPENDENTPNC.xxx with the correction that the parameter list of 6.3.x change to match planned reorganization of the piconet description set and MAC parameter set. Include text to be added to 8.2.4

587 (Gilb, TR) - If a parent piconet ends operation and a child piconet continues to operate without disruption, does the child piconet use all the airtime previously used by the parent piconet or does the child piconet continue to operate in the space previously alloted by the parent? Is this specified anywhere? What if multiple child piconets exist, or a child and a neighbor piconet both exist, when a parent piconet ends? **Suggest accept in principle** "The new handover procedures will let one of the child piconets take over the full channel if there are no other child or neighbor PNCs. see comment xx on what happens if multiples.

681 (Gilb, T) and several editorials - I don't understand this figure. Neither "unassigned GTS time" field fits exactly into the parent's CFP. Perhaps you meant the second one shown on the righthand side of the dia-

gram. In that case the first one shown at the left should not be marked with an asterisk. **Suggest accept in principle** - There are several suggestions. Update the figure to use the form similar to that of figure 97. Suggest Mark S. does the update.

350 (Heberling, TR) <add text> Only the child PNC, which is a direct member of the parent PNC, can be allowed to exchange data with other members of the parant PNC. The reason is that the child piconet DEVs and the parant piconet DEVs may have the same DEVID but different PNID. Receivers must filter frames on both PNID and DestID to make sure they get only the frames addressed to them. Consequently two DEVs with the same DEVID in different piconets cannot exchange data. If this functionality is desired one would need a child PNC data forwarding capability which is currently not defined in the standard. The non-PNC members of the child piconet may not exchange data with any DEV in the parent piconet. **Suggest accept in principle** - The text of 8.2.4 should have clarification that the standard does not provide for the direct transfer between a member of a child piconet and a member of a parent piconet. Furthermore, this includes any other child piconets that are dependents of the parent. The text of 02/316r0 plus a bit.

956 (Bain, T) - In this draft is a statement that a child piconet could form to enhance the range of a piconet. If the DEVs already part of the parent move to the child, what happens? Do they stay associated but release their channel time with the parent and reestablish channel time within the child piconet private GTS? Do child PNCs use the same address space as the parent? If so how does the child PNC obtain DEVID numbers from the parent when previously unassociated DEVs decide to join the child piconet (by whatever means they can distinguish the parent from the child)? If new address space for child piconet, it is assumed that all previously established DEVs with the parent will have to disassociate themselves from the parent and reassociate with the child. Add at end of paragraph "For child piconets established to extend the range of the parent piconet (xref) all DEVs moving from the parent would disassociate from the parent and resassociate with the child piconet." **Suggest accept in principle** "Add text to 8.2.4 that indicates that DEVs of a parent do not move to the child without going through disassociate/reassociate process."

582 (Gilb, TR) Need to specify what a parent or neighbor does if it misses 4 consecutive beacons. Should it be required to stop its beacon as well? Need to address the issue of what happens it lots of beacons are lost for child and neighbor piconets. Add text that describes the requirements to 8.2.4 and 8.2.5. **Suggest accept** There doesn't seem to be an alternative to not stopping operations of child or neighbor piconets after 4 consecutive parent PNC beacons are missed.

417 (Heberling, TR) - PiconetBSID as a parameter to establish the id of the piconet is not specified in the MLME-START.request parm list. Please add the PiconetBSID parm to the parm list before the PNID parm. Please make the requested change. **Suggest accept**.

894 (Bain, TR) MLME-START.confirm seems to be lacking parameters based on the text of sub-clause 8.2.1 (pg 151, ln 48) and 8.2.2 (pg 152, ln 35). The text indicates that the ChannelRatingList is in the MLME-START.confirm primitive and it is not present. recommended text will be in 02/289. **Suggest accept in principle**, "Add the ChannelRatingList and PiconetDescriptionSet to the parameters of MLME-START.confirm. See also CID 8."

8 (Heberling, TR) - MLME-START.confirm parameter list is not in agreement with the parameter list specified in clause 8.2.2. Please add the PiconetDescriptionSet, and ChannelRatingList parms to the MLME-START.confirm primitive. Please add the ChannelRatingList parameter to the MLME-START.confirm primitive and to Table 6. **Suggest accept in prinpciple**, "Add the ChannelRatingList and PiconetDescriptionSet to the parameters of MLME-START.confirm. See also CID 894."

893 (Bain, T) - The MLME-START.confirm primitive and the text of this paragraph do not match. Also, it is a primitive and not a command. The text in this clause other than the editorial of command vs primitive, seems to match the intent so the change should be in clause 6 MLME-START.request/confirm more in 02/ 289. **Suggest accept in principle** 'The text in 8 is correct, so the parameters of the primitive in clause 6 will

be changed as indicated in CIDs 894 and 8. In 8.2.2, change 'MLME-START.confirm command' to be 'MLME-START.confirm primitive'."

908 (Bain, T) - CFPDuration parameter in the Elements of MACParameterSet table has a description that says "The duration in microseconds allocate to the CAP within the superframe" It would seem that some adjustment is necessary! Information in this table ties to Piconet synchronization parameters, 7.4.3. But, it is not clear what is intended in this case since the CAP value must be dynamic as the beacon duration changes. Is this a nominal split between CAP and CFP? **Suggest accept in principle**, "This parameter indicates the initial setting of the CAP duration. Therefore, change "CFPDuration" to be "CAPDuration" in table 7 and change the description to read 'The duration in microseconds initially allocated to the CAP within the super-frame.'

110 (Heberling, T) - Move the paragraphs between lines 19 and 27 from their current location to line 44 in clause 8.2.2. The new location for this paragraph makes more sense given the content described in the moved paragraph. In addition to moving the indicated paragraph, modify the paragraph to this text: " Once a PNC has established a piconet, the PNC should periodically allocate channel time in the CFP such that there is quiet time for it to scan the channel for other piconets. If the PNC detects another piconet in the same channel it may take action to improve coexistence with the other piconet. Some of the actions the PNC may take include: - Changing to a different channel, 8.11 - Becoming a child or neighbor piconet of the other piconet, 8.2.4 and 8.2.5 - Reducing the piconet's transmit power, 8.x.1. **Suggest accept**.

912 (Bain, T) - The length field shows one less than the number of octets shown in the fields of this figure. Change length to be 3 in value instead of 2. **Suggest accept**.

951 (Bain, T) - Suggest adding clarification on interference to mean to others. Also, the extending battery life by reducing transmit power is not a characteristic of all possible alt-PHYs. "interference to other networks" on line 18 "in some PHY types to extend battery life" also line 10 should have the same change as above related to extending battery life. **Suggest accept**.

950 (Bain, T) - IF the comment on 8.13.1 is accepted, then the text in 5.3.11 should change to match. Remove "directed" from "directed MTSs" change "PNC reduce ..." to PNC and DEVs during these piconet control fields to reduce ...". **Suggest accept in principle** "Change the text in 5.3.11 to match the change adopted for the resolution of CID 949"

3.8 Thursday, 18 July, 2002

Attendees: James Gilb, Mark Schraeder, Jay Bain, Bill Shvodian, Ari Singer, Allen Heberling, Jeyhan Karaoguz, James Allen.

Called to order at 8:10 am, PDT, 18 July, 2002.

398 (Heberling, TR) - Delete the BSID field from the piconet parm change info element. Replace the change time out field with a NmbrOfChangeBeacons field. Also delete the text definition of the BSID field located at P120, L4-5. Since based on the analysis of C8.2.1 and C8.2.7 it makes no sense to change the BSID on the fly. The new format of the Piconet parm change IE shall be as illustrated here: |ElementID|Length= 4|ChangeBcnCntDown(1)|NewChannelIndex(1)|PNID(2)| See doc: 02/276r0 Page 22 for new text descriptions and recommended text changes. **Suggest accept in principle**, "The change time out field will be changed to NmbrofChangeBeacons (or similar name). However, the setting of the BSID is under user control and provides a human friendly manner to identify the piconet (i.e. a text string instead of list of hex numbers). Because of this, the user will want to be able to set this value from time to time without re-starting the entire piconet and re-program every DEV in thier net. However, since it is intended for use control, it is unlikely that it will change very often."

Accept suggested resolution.

194 (Heberling, TR) - When PNC switches channels, the DEVS cannot be free to change at any time within a timeout. If they switch early (or late) they will not hear a beacon and eventually issue a MLME_SYNCH_LOST.indication to their DME. The switch must be synchronized. A similar manner as the new handover proposal is used with a count down to switch. All DEVs must stay awake to receive the beacons and they must switch at the same time. No DEV shall be allowed to transmit until they have correctly received a CTA from their PNC on the new channel. See doc: 02276r0, page 21, resolution [10] Changing Channels. **Suggest accept in principle** "DEVs will be allowed to stay in PS mode during a channel change. However, the channel change will become a countdown of beacons as indicated in the resolution of other comments. Additional text will be added to the channel change sub-clause that indicates that a DEV that is the source of a pseudo-static slot shall not be allowed to transmit until it has heard the first beacon after the channel was scheduled to change."

Accept suggested resolution.

501 (Gilb, TR) - We have not described what action to take when a command frame is received by a DEV. Add a table that lists the commands and the actions to take (accept, may accept or shall ignore) that lists if the frame is received from a DEV or PNC and if it is received secure or insecure. **Suggest accept.**

Accept suggested resolution.

437 (Gilb, TR) - We are using different methods to communicate lists of DEVIDs, we really should use only one. Change all lists of DEVIDs (except in the CTR) to match the format used for the PCTM IE, 7.4.15, e.g. the SPS status IE. **Suggest accept.**

Accept suggested resolution.

old comment, 495 in 02/055r15 (Gubbi, TR) - Reserve 0xF0 to 0xF9 for future use: We never know what else we'll need special addresses for. Reserve 0xF0 to 0xF9 for future use. **Suggest accept in principle** (previously accepted), "Reserve 0xF0 to 0xF6 for future use, 0xF7 through 0xF9 were reserved for additional neighbor piconets."

Accept suggested resolution.

708 (Gilb, TR) - I think this subclause needs some work. For example, what happens when retransmitting a fragment? Presumably the fragment number is not increased in that case and the standard should say so. If the first fragment of an MSDU cannot be transmitted, shouldn't the remaining fragments be discarded? How many MSDUs must potentially reassembled at one time? Since the standards says that "multiple" SDUs may be retransmitted in a fragment burst, it should provide a value for this maximum number. On line 20, this subclause talks about delivery to the FCSL. On line 38, it talks about delivery to the SSCS. One term should be used consistently, in addition to the provision of answers for the issues I raised in the comment section. **Suggest accept in principle:** "Change all references to SSCS to be FCSL, as well as the spelled out versions. In subclause 8.7 change 'Each subsequent fragment is sent with the fragment number incremented by one.' to say 'Each subsequent fragment shall be sent with the fragment number incremented by one. However, the fragment number shall not be increased when a fragment is retransmitted.' However, the maximum number of MSDUs that may potentially be reassembled at any give time depends on the specific implementation as well as the number of other connections that the DEV is currently supporting. If a DEV runs out of room to store the fragments, it drops the MSDU, as indicated in the draft."

Accept suggested resolution.

448 (Gilb, TR) - The SPS information response command could be quite long. There needs to add a way to fragment the command. Either change the command to allow fragmentation as in the PNC handover infor-

mation command or allow this command to be fragmented. **Suggest accept** "Change the text in clause 7 and 8 to reflect the fact that certain commands may be fragmented. Add the SPS information response command to this list. Add a table or list in 7.5 with the commands that may be fragmented and a cross-reference in sub-clause 8.7 that says "The commands that are allowed be fragmented are listed in {xref 7.5}. Also, delete the fragmentation field entry from Tables 44 and 45 and add text to the 7.3.3 'Only certain commands are allowed to be fragmented as indicated in {xref 7.5}. For commands that are not allowed to be fragmented, the fragment number and the max fragment number field shall be set to 0'"

> Accept suggested resolution.

449 (Gilb, TR) - There are now three commands that may need fragmentation and we have adopted a command level fragmentation rather than using the existing process. Change the rules to allow fragmentation for only the following commands: PNC handover information command (remove last fields and text) PNC information command (remove last fields and text) SPS inquiry response command. The first two changes require updating the text and MSCs in clause 8 as well. **Suggest accept in principle**, "Add the PNC handover information command and PNC information command to the list of commands in 7.5 that may be fragmented (see resolution of 448). Delete the last fields from these commands and the associated text. Update the MSCs in clause 8 to reflect the deletion of the last field and add text to the sentence that references the figure that states that while the command may be fragmented, only one command is shown in the MSC. In 8.2.3 change "The PNC shall first send the PNC information commands ... with the last field set appropriately, 7.5.3.3." to read "The PNC shall first send the PNC information command, {xref 7.5.4.2}, to the chosen AC. Note that the PNC may fragment the PNC information and PNC handover information commands using the process described in {xref 8.7}. When the PNC has received an ACK for the last fragment of the PNC information command it shall then begin sending all of the current channel time requests to the chosen AC using the PNC handover information command, {xref 7.5.3.3}.""

> Accept suggested resolution.

490 (Gilb, TR) - PNC information command has been modified to include a "last" field similar to what was done in the PNC handover information command. However, the text in 8.9.1 has not been updated. Use sub-clause 8.2.3, page 153, lines 32-39, as a template for inserting appropriate text into sub-clause 8.9.1. Check the MSC to reflect the new behaviour of the signal exchange between the two entities.   However, if we adopt standard fragmentation for this command, then the update is somewhat different, we just need to note that the command may be fragmented. **Suggest accept in principle**, "The PNC information command is now allowed to be fragemented using the normal fragmentation process, see the resolution of comments 448 and 449. Therefore, the text in 8.9.1 is now correct."

> Accept suggested resolution.

176 (Heberling, TR) - There is no application for having several CTAs of the same stream in the same superframe. Besides there is no definition how the PNC should handle a request where enough avail-TU exists but not enough CTR-interval. As an addition, it would be practically impossible to use with pseudo static streams. Only the CTR-interval-type 1 (subrate) has a useful implementation and hence the frame format of CTR-Control can be simplified. The interval 0 has no use after ATS is incorporated. Delete sentence on line 21-22 "If multiple slots per superframe are requested,..." **Suggest reject:** "As in all cases, if the PNC is unable to satisfy the request for the CTR interval, it simply rejects the channel time request. However, if the PNC is able to satisfy it, it may allocate it. Similarly, the PNC is able to move pseudo-static slots, if necessary, to satisfy requests for multiple slots per superframe. Since the PNC controls the superframe duration, DEVs with specific latency requirements need to be able to control this by asking for more than one slot per superframe. This is the application for having several CTAs of the same stream in a superframe. If the PNC is unable to do this, it simply rejects the request."

> This resolves with CIDs 378, 788, 379, 39, discussed later.

658 (Gilb, TR) - Clause 8.9.3 says: "The channel status request command may be used by any DEV in the piconet to get information from a target DEV about the link quality between the two DEVs." Clause 8.11 says: "To do this,the PNC sends the channel status request command, defined in 7.5.6.1, to request that the DEVs provide their channel status via the channel status response command, 7.5.6.2."   Is the PNC allowed to send a channel status request command to a DEV if the PNC is currently not transferring data to the DEV? Add text that indicates that the channel status request command shall only be sent to DEVs with which the originating DEV is currently transferring data. **Suggest accept in principle**, "Allow the PNC to request the channel status from DEVs in the piconet. They report the aggregate statistics for all of their connections."

Table until July 29.

3.8.1 CTM/Asynch*

15 (Heberling, TR) KO> The CTA request for asynchronous data can only be initialized by the MAC after having reviewed the current needs of its asynchronous data queue. It can be issued at certain time intervals, as new MAC_ASYNCH_DATA primitives are entered or as transmissions fails and needs to be repeated. It can not be initialized by the DME since the DME has no knowledge of the current queue status or how much of the requested time has already been allocated in CTAs. This is a MAC internal functionality and it just so happens that it reuses the same CTR command as is used by the isochronous stream reuqest. It is also wrong to use destination lists with isochronous MLME_STREAM_CREATE requests. Consequently, in the MLME_CREATE_CTA.request primitive and in table 18 - Delete the parameters NumTrgts and NumAsyn-chTUs, and replace the parameter TrgtId list with TrgtID. **Suggest accept**

Accept suggested resolution.

34 (Heberling, TR) NumAsyncTUs is an unnecessary parameter for the primitives MLME-CREATE-STREAM, MODIFY-STREAM, TERMINATE-STREAM. Consequently, Delete NumAsysncTUs from Table 18. **Suggest accept**

Accept suggested resolution.

16 Heberling, TR) KO> Same comment as 15 above However, consequence is to <Change text in 6.3.14.1.1> <from> This primitive is generated by an originating DME to initiate a bi-partite channel time negotiation between a DEV and its PNC. The purpose is to establish a channel time for the originating DEV to communicate with one or more DEVs in the piconet.   <to> This primitive is generated by an originating DME to initiate a bi-partite channel time negotiation between a DEV and its PNC. The purpose is to establish an isochronous data stream for the originating DEV to communicate with one DEV, a multicast group or all DEVs (broadcast) in the piconet. **Suggest accept**

Accept suggested resolution.

906 (Bain, T) The text seems to be incorrect. Consequently, change the phrase to the following: "Each CTA shall have the same asynchronous stream index, source, start time and duration"; **or** per 197 (Heberling, E) Please change this sentence frag.: from "...and the same destination, start time and duration." to "... , different destination DEVID, and the same start time and duration." **Suggest accept** Bain's proposed change.

Accept in principle "Change 'Each CTA shall have the asynchronous stream index and the same destination, start time and duration.' to read 'Each CTA shall have the asynchronous stream index and the same SrcID, start time and duration but different DestIDs.'"

614, 652 (Gilb, T) The MLME-CREATE-CTA.req should be shown coming from the DEV-2 DME. What is "MAC-Q"? Also, the CL is no longer the packet CL but the FCSL (i.e. frame convergence sublayer). Consequently, change MAC-Q to be simply MAC. Change Packet CL to be FCSL in figure 4. **Accept in Principle**

1) replace MAC-Q and MLME with simply DEV-2 MAC. 2) Rename Packet CL to FCSL 3) Delete Figure 4 since it is duplicated in Figure 119. 4) Incorporate suggested changes identified in CID 327

Accept suggested resolution.

914 (Bain, T) In figure 119, The PNC DME has the task of building the beacon. However, in the isochronous operation figures, the PNC MLME is shown to be building the beacon. Consequently, change the location of the build beacon element to the PNC MLME. **Suggest accept in principle** per CID 327

Accept suggested resolution.

327 (Heberling, TR) Figure 119 is a flawed MSC of the Asynchronous channel time reservation process and data frame exchange. Consequently, delete the current MSC from this section of clause 8.5.2.1 and replace it with 02r0P802-15_TG3-Asynch-channel-time-allocation.eps. **Suggest accept**.

Accept in principle, "Update the MSC to be similar to the ones in section 2.2 of document 02/ 273r3."

195 (Heberling, T) KO> Asynchronous channel time is not modifiable or terminated due to the fact that asynchronous data is non deterministic in when it will arrive and when it will expire. Consequently, please change this sentence frag. from "The creation, modification, and termination of asynchronous channel..." to "The reservation of asynchronous channel..." **Suggest accept** for the reason given.

Accept in principle, "The sentence will be changed to say "reservation and termination" Add text to the asynchronous creation (now reservation section) that says that the source may request zero desired number of TUs and zero minimum number of TUs, which has the effect of terminating the request. For PNC termination of an ansynchronous request, adopt the same process as isochronous termination.

813 (Shvodian, TR) There is no reason in the world to terminate an asynchronous GTS. The slots are allocated then they go away. Consequently, delete this sub clause since it is unnecessary. **and** 370 (Heberling, TR) Please delete the Asynchronous GTS termination clause. Asynchronous data does not play by the same rules as isochronous data. Consequently, it is incorrect to assume that the isochronous stream termination rules apply to an asynchronous channel time allocation. **Suggest accept**.

Accept in principle, as in the resolution of 195. The termination subclause will be heavily modified, no more destination termination, source termination use reservation procedure and PNC uses isochronous termination procedure.

3.8.2 CTM/CTRinterval

378,788,379,39

378 (Heberling, TR) The CTR interval type field was found to cause inconsistent interpetations of the CTR Interval and the CTR TU. Consequently, delete the CTR interval type field from figure 74. **and** 788 (Shvodian, TR) Remove CTR interval type.**and** 379 (Heberling, TR) Due to a previous comment regarding Figure 74, the defintion of CTR Interval type is no longer needed. Consequently, delete the sentence from between lines 37 & 38 inclusive. Also remove the sentence between lines 44 & 45 for the same reason. **and** 39 (Heberling, TR) KO> There is no application for having several CTAs of the same stream in the same superframe. Besides there is no definition how the PNC should handle a request where enough avail-TU exists but not enough CTR-interval. In addition, it would be practically impossible to use with pseudo static streams. Only the CTR-interval-type 1 (subrate) has a useful implementation and hence the frame format of CTR-Control can be simplified. The interval 0 has no use after asynchronous GTS is incorporated **Suggest accept** for the reasons given.

Suggestion of limiting CTR interval to be no more than 8 when the type indicates slots per super-
frame. Suggest of also limiting to only pseudo static?

Table until July 29, 2002 conference call, carry discussion to email. We are looking for suggestions,
includes 176, 378, 788, 379, 39.

789 (Shvodian, TR) Since there is no guarantee how much the PNC will spread out multiple GTS slots in a
superframe, DEVs must be prepared to accept the worst case assignment. Consequently, Delete reference to
CTR interval type, Remove line 36 to 45 and replace with: The CTR interval field indicates the number of
superframes from one slot to the next. The value contained in the CTR interval field shall be a power of two

Tabled, as above

368 (Heberling, TR) Please change this sentence frag. from " ... GTS Type and CTR interval type shall be set
to 0..." to " and GTS Type shall be set to 0..."

Tabled, as above

3.8.3 CTM/Isoch

401 (Heberling, TR) MLME-CREATE-CTA, MLME-MODIFY-CTA, AND MLME-TERMINATE-CTA are
incorrectly named. The correct primitive names for these entries are: MLME-CREATE-STREAM, MLME-
MODIFY-STREAM, AND MLME-TERMINATE-STREAM. Comments in clauses 6.3.14.1-11 give the
technical reasons for why the original names are correct and need to be reinstated. **Suggest Accept**

Accept.

404 (Heberling, TR) Insert the parm (ACK Policy) between stream Index and CTR-Control.

Table

405 (Heberling, TR) Insert the parm ACK Policy into the parm table between parms StreamIndex and CTR-
Control.   Type: Enumeration; Range: no-ACK, imm-ACK, dly-ACK; Defn:Default ACK request type for
stream

Table

406 (Heberling, TR) Add this enumerated result code to the ResultCode range: ILLEGAL_ACK_POLICY

Table

80 (Heberling, TR) An isochronous data stream is negotiated before hand and afterwards has a stream index
assigned to it as a result of the negotiation. Consequently, there is no need for the parameters TrgtID,
OrigID, or Priority to be part of the MAC-ISOCH-DATA.request parameter list. However, there is a need for
an ACK policy parameter field to be part of the parm list. Consequently, remove the parameters(TrgtID,
OrigID, and Priority) from the MLME-ISOCH-DATA.request parm list, and add the ACKpolicy parm.
Withdrawn per acceptance of CID 23

Withdrawn.

78 (Heberling,TR) The data frame format and MAC header do not support the passage of the priority field
from one MAC to the other. Consequently, the primitive MAC-ISOCH-DATA.indication should not contain
the priority field. Therefore please remove the priority parameter from the MAC-ISOCH-DATA.indication
parameter list. **Suggest Accept** per acceptance of CID 23

Accept suggested resolution.

Call ended, 9:40 am, PDT, 18 July, 2002.

3.9 Email resolutions due Tuesday, 23 July, 2002

977 (Bain, T) - There is the omission of mention that a PNC that is either a child or neighbor may be found. They are valid as opposed to a PNC that is not of the child or neighbor type. (8.2.1, p 152, line 21) "same channel, that is not a valid child or neighbor PNC, it may ...." **Suggest accept**.

959 (Bain, T) - The ReasonCode valid range points to the wrong section of clause 7. Change "As defined in 7.5.1.2" to "As defined in 7.5.1.3". **Suggest accept**.

312 (Shvodian, T) - What reason code does a DEV use when disassociating from the PNC? Add reason code: 4 -> DEV leaving the piconet. **Suggest accept** (Note: this was in D09, but was taken out. However, a DEV disassociating has no valid code it can send now. The other 4 codes only apply to the PNC sending the disassociate command.)

783 (Shvodian, TR) - The disassociation command requires authentication if authentication is required. Put and X in the Authenticated column of the Disassociation request command. **Suggest accept**.

311 (Shvodian, TR) - The disassociation request command should be integrity protected in a secure piconet. Add the following text: The disassociation request command shall use the secure command format in piconets using security mode 2 or 3. **Suggest accept.**

485 (Gilb, T) - The use, in this standard of the DME/MLME boundary can be confused with architectural decsions rather than simply a split that was created to facilitate describing the standard. Add a paragraph that describes that the DME contains the functionality that is outside of the scope of the standard and other management functions while the MLME and MAC contain the functionality specified in the standard. Also add that the split is arbitrary and is not intended to be an architectural split for an implementation. **Suggest accept.**

129 (Heberling, TR) - Max fragment number field used wrong. Change 'Each fragment shall be sent with the max fragment number field set to the total amount of fragments of the current MSDU.' to 'Each fragment shall be sent with the max fragment number field set to the highest fragment number of the current MSDU, which is the same as the total amount of fragments of the MSDU - 1.' **Suggest accept in principle**, "Change the sentence to read 'Each fragment shall be sent with the max fragment number field set to the highest fragment number of the current MSDU, which is one less than the total amount of fragments of the MSDU.'"

803 (Shvodian, TR) - RIFS needs to allow time for an ACK transmission, not just CCA or aBackoffSlot. 802.11 allows for the full thransmission of an ACK. Otherwise, if the ACK is not heard, the retransmssion may well collide with the ACK and that frame will nto get through either. Change the equation for RIFS to: RIFS=2*SIFS+ACKTime. **Suggest accept** (implied by resolution of 819).

804 (Shvodian, TR): - The following is misleading: The beacon frame, which is neither in the CAP nor the CFP, does not use inter-frame spacing. Interframe spacings still apply to the beacon, but they are ensured by the location of the GTS slots. Delete the sentence. **Suggest accept in principle**, "Replace the sentence with 'The interframe spacing requirement for the beacon is ensured by the location of the GTS slots which is determined by the PNC, {xref 8.4.4.7}.'"

726 (Gilb, TR) - Withdrawn

1126 (Roberts, T) - Insert a sentence in line 3. Between the first and second sentence insert the following: In addition, child and neighbor PNC DEVs shall be synchronized to the parent PNCs clock. **Suggest accept in principle**, "Change 'All DEVs within a single piconet shall be synchronized to the PNC 's clock.' to be 'All DEVs within a single piconet shall be synchronized to the PNC 's clock, including and child or neighbor piconets.'

814 (Shvodian, TR) - It should be clarified that it is the superframe clock that is being reset. change "clock" to "superframe clock" in lines 7 and 9. **Suggest accept.**

53 (Heberling, TR) - Must scan for both BSID and PNID. Change text to read: "..., the MLME scans the specified channel unter either a beacon with the specified PNID and BSID is detected or..." **Suggest accept.**

958 (Bain, T) - Use of "initiate" instead of "indicate" "This primitive is used to indicate that the ...." **Suggest accept.**

979 (Bain, T) - It is not stated how the beacon number field is handled when the PNC is attempting a dynamic channel change. Does it continue to increment as if it was still sending beacons? This would be best for SPS DEVs. At end of 1st sentence, add a sentence as follows "The PNC shall continue to increment beacon count during the period when it is searching other channels." **Suggest accept.**

46 (Heberling, TR) - The parameters "NmbrChannels" and NmbrPiconets" described in clause 7.5.6.4 are missing from MLME-REMOTE-SCAN.confirm primitive's parameter list. Please add the missing parameters to MLME-REMOTE-SCAN.confirm's primitive list. **Suggest accept in principle.** "Add the missing parameters 'NmbrChannels' and 'NmbrPiconets' to the primitive list and Table 20."

609 (Gilb, TR) - The parameters "ReasonCode" and "ResultCode" have been confused in this section. The MLME-REMOTE-SCAN.response should contain a "ReasonCode" instead of a "ResultCode". Page 69 Line 39: Add "REQUEST_DENIED" to valid range for "ResultCode".   Page 70 Line 30-32: Change to "The DME upon receiving this primitive may send either an MLME-SCAN.request to its MLME to initiate the requested channel scan or an MLME-REMOTE-SCAN.response with the ReasonCode indicating that the request for a remote scan was denied, 7.5.6.4"   Page 70 Line 42: Replace "ResultCode" with "ReasonCode". **Suggest accept.**

949 (Bain, TR) - It would seem that all MTS should follow the same rule in using the maximum transmit power IE. The text calls for directed in both directions but not open or association. The text also does not note that the PNC shall use that setting for CAP and MTSs. See also comment in clause 5.3.11 page 20. "CAP, beacon and MTSs." on line 3. "in the CAP or MTSs to be ..." on line 7. " for the beacon, CAP, and MTSs to be ..." on line 8. **Suggest accept.**

3.10 Tuesday, 16 July, 2002

Attendees: Dan Bailey, Ari Singer, Jay Bain, Rene Struik, Bill Shvodian, Allen Heberling, Knut Odman, James Gilb, Jim Allen, Mark Schraeder, Bob Huang.

Meeting called to order at 11:08 am, PDT.

909 (Bain, T) - Piconet Maximum transmit power is a beacon parameter that as suggested in the text (as a means of working with interference), may change during the duration of a piconet. It is not clear, how this parameter is adjusted after the initial configuration with MLME-START.request. Many of the operations regarding channels involve the DME so there should be a means to reflect a DME choice into the IE of 7.4.7. I recommend that we overload the existing MLME-PICONET-PARM-CHANGE.request and create a duplicate of the parameter PiconetMaxTxPower. Suggest accept in principle, "Add a new MAC PIB element to 6.5.1 as follows:"

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

Managed Object	Octets	Definition	Type
MACPIB_MaxTXPower	1	The maximum TX power allowed in certain times of the superframe as defined in 8.11.2.1.	Dynamic

Accept original, add to MLME-PARM-CHANGE.request and create a duplicate of the parameter PiconetMaxTxPower. Note, we will be changing the MaxTXPower to be a field in the synchronization fields. Related to comments 292 and 824.

926 (Bain, TR) - The text of 8.5.2.1 pg 181 line 40-43 on no guarantee of what delay will be between the time of request and a beacon indicating the time should also be placed in 8.5.1. Place the text mentioned above into 8.5.1 with a change that noting the change from async to isosync. Suggest accept.

Accept.

3 (Heberling, TR) - A stream with del-ACK policy cannot be used with any other ACK-Request. Neither can the policy be changed, because enqueued frames with different ACK-Policy (del-ACK and other) will create unresolvable protocol conflicts. Consequently if del-ACK is declined by the destination, the stream must be terminated. 8.8.3, Insert line 9: Delayed Acknowledgement can only be used with isochronous data. Insert line 23, before "The destination DEV may change the max burst..." Upon reception of an imm-ACK frame after sending a data frame with the ACK request field set to del-ACK, the source DEV MAC shall: -issue a MLME_TERMINATE_STREAM.indication to DME - send a Channel Time Request frame to PNC with the terminate bit set to 1 and the desired CT to 0." Suggest accept in principle, "Change 'shall be used only for directed stream data frames where' to be 'shall be used only for directed stream data frames, i.e. isochronous connections, where' Add text to the section that says 'The source DEV may change the ACK policy in a stream from Dly-ACK to Imm-ACK or no ACK by sending a frame with the ACK policy set to one of those values. This has the effect of canceling the Dly-ACK policy and the souce shall use the Dly-ACK negotiaion procedure before restarting the Dly-ACK mechanism. The receiver shall no longer maintain the ACK status of any previous frames sent with the Dly-ACK policy set.'"

Table until Thursday.

819 (Shvodian, TR) - CCA should not be used for retransmission. In a poor channel the sending DEV may not hear the other DEV. It needs to wait for an ACK time. 802.11 does not use CCA. It uses an ACK time-out. (p84 of 802.11 1999). Replace CCA with ACK time. Suggest accept, "Fix the text to indicate that the DEV waits for the length of time required for the appropriate ACK, either Dly-ACK or Imm-ACK."

Accept, WMS to provide text.

340 (Heberling, TR) - The rules for association and authentication with PNC are inconsistent. < add text> In a piconet operating in security mode 0 or 1, an association shall also imply authentication. No authentication frame exchange shall be done with PNC in these modes. Suggest accept in principle, "A DEV will become a 'member of the piconet' or have 'membership in the piconet' when it is associated for mode 0 or completes authentication for mode 1, 2 or 3. Text will be added to specify this and the draft modified to use 'membership' instead of 'associated, and if required authenticated'. Note that the authentication process for mode 1 will be resolved as a part of another comment. If a null security suite is used, then the authentication process will be required. Otherwise, it will have the status of mode 0, i.e. that association is equivalent to authentication."

Accept above resolution.

342, 348 (Heberling, TR) -

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

Withdrawn 1

2

202, 204, 402 (Heberling, TR) - Services broadcast not standardized, thus not interoperable and must be 3
removed from standard. Remove MLME_ASSOCIATE.request parameter DEVPiconetServicesIE. Suggest 4
accept in principle, "Adding the vendor IE to the associate request and response commands as outlined in 02/ 5
276r0 will take care of problems with standardization. Since this information is needed to provide a fast 6
response time, the DEVPiconetServicesIE will remain in the associate request command." 7

8

Table until Thursday, text due from Allen. 9

10

109 (Heberling, TR) - No need to broadcast piconet information after association. Instead the newly associ- 11
ated DEV should ask for the information it desires. The PNC may still broadcast information at intervals of 12
its own choice. If nothing has changed in the piconet, no broadcast is necessary. Delete first sentence "The 13
PNC shall broadcast ... after a DEV associates" Delete "In addition" <Change from> The PNC shall send 14
the piconet information for each of the associated DEVs at least once every aBroadcastDEVInfoDuration via 15
a PNC information command. <to> The PNC may broadcast the piconet information for each of the associ- 16
ated DEVs when any change of association status has occured or at intervals of the PNCs own choice via a 17
PNC information command. Suggest reject "A new DEV joining the piconet is unable to do anything until it 18
finds out information about the other DEVs in the piconet. The information about the DEVs in the piconet is 19
the first thing that the new DEV will likely require. It also allows other DEVs to update their own informa- 20
tion in case they have missed the indication of a previous DEV joining or leaving the piconet. The broadcast 21
of the DEV information table after association is unchanged since D09." 22

23

Accept in principle, "Change the text in the broadcasting the piconet information subclause to say 24
that it is done after the DEV becomes a member of the piconet, not after association only." 25

26

372 (Heberling, TR) - This whole clause raises the question of why does the PNC info command get broad- 27
cast unsolicited? When a DEV associates, its Association IE info is broadcast via the beacon. If the Associ- 28
ating DEV needs the DEV association list from the PNC it can request directed frames from the PNC. There 29
is no need to clog the medium with an unsolicited broadcast. Consequently, remove this clause. Please make 30
the requested deletion. Suggest reject "A new DEV joining the piconet is unable to do anything until it finds 31
out information about the other DEVs in the piconet. The information about the DEVs in the piconet is the 32
first thing that the new DEV will likely require. It also allows other DEVs to update their own information in 33
case they have missed the indication of a previous DEV joining or leaving the piconet. The broadcast of the 34
DEV information table after association is unchanged since D09." 35

36

Accept in principle, "Change the text in the broadcasting the DEV info table to say that it is done 37
after the DEV becomes a member of the piconet, not after association only." 38

39

105 (Heberling, TR) - Timeouts only works in the client in the vertical direction. A client cannot set a time- 40
out for its server, less the entire distributed state machine in the scheduler is completely specified (RTOS 41
theory). Delete the sentence: "The time difference between sending an ACK..." Suggest accept in principle, 42
"The timeout is a requirement only for the PNC to enable fast join times for the network. However, the cur- 43
rent sentence does not state that clearly. Change 'The time difference between sending an ACK to an associ- 44
ation request and sending an association response command meant for the same DEV shall not exceed 45
aAssocRespConfirmTime.' to be 'The time difference between when the PNC sends an ACK to the associa- 46
tion request command from a DEV and when it sends an association response command meant for the same 47
DEV shall not exceed aAssocRespConfirmTime.'" 48

49

Accept suggested resolution. 50

51

625 (Gilb, TR) - It is not likely but it is possible that this information element could be longer that 256 bytes 52
long if enough devices associate/disassociate at the same time. Indicate that the PNC may use multiple DEV 53
association IEs in the beacon too many DEVs are associating than will fit in the beacon. Suggest accept. 54

Accept.

777 (Shvodian, TR) - DEV association IE does not belong in the beacon. There is no guarantee that the associating DEV will get the beacon anyway. The beacon is big enough as is. Other DEVs cannot talk to that DEV until it authenticates if it is a secure piconet anyway. The PNC info table is broadcast when the DEV associates (or authenticates in a secure piconet). If the DEV does not receive the PNC info table and has not MTS assigned to it, it will shall to associate again. Suggest accept.

Withdrawn.

920 (Bain, T) - It seems that information on what type of CAP/MTS used by piconet is not returned as part of a scan. Since MTS is optional in PICS a DEV may not support this and thus consider joining a different piconet. Add the CAP information from the channel timing IE to the MLME-SCAN.indicate primitive. Place as additional field in piconetdescriptionset in table 5. Suggest accept.

Table until Thursday. Need to add MAC parameter set to piconet description set and change the name of piconet description set for remote scan and add a new table. Also shows up in neighbor/ child MLME set. ADH to work on it.

361 (Heberling, TR) - The current wakeup mechanisms are not sufficient to wake up a DEV when a major system change occurs. Examples are channel change, PNC handover, beacon duration or location change and PNID change. A method is needed to allow all APS and SPS devices to easily check if a system change is in progress. The intervals for such checks must be decided by PNC. See resolution [13] in 02276r0P802-15_TG3-commentsD10_KO.doc A system change bit is added to the mode field of the PNC synchroniza-tion IE. All DEVs are required to check this bit at minimum intervals. The bit is unrelated to any APS and SPS wakeup method. Suggest reject "There is no way to both guarantee that sleeping DEVs will see system change and make changes quickly. In fact it is not possible to to guarantee that DEVs that are ACTIVE will see the system change. The only way to guarantee that DEVs are aware of the change before it happens is to send directed frames to each DEV with Imm-ACK policy. When a system change happens and a DEV, for whatever reason, misses it, the DEV will begin to scan for its piconet. If it finds it before the ATP expires, it will re-join the piconet. If not, it will re-associate with the piconet when it finds it."

Table until PM resolved.

418 (Heberling, TR) - Doc: 02/276r0 provides an argument for the persistence of the PiconetBSID. Conse-quently, change this sentence frag. from: "...PNID, BSID, and ChannelChangeTimeOut parameters." to "...PNID, and NmbrOfChangeBeacons parameters." Please make the indicated change. Suggest reject "The setting of the BSID is under user control and provides a human friendly manner to identify the piconet (i.e. a text string instead of list of hex numbers). Because of this, the user will want to be able to set this value from time to time without re-starting the entire piconet and re-program every DEV in thier net. However, since it is intended for use control, it is unlikely that it will change very often."

Comment is rejected as noted above.

210 (Gilb, TR) - The LQI gives better information if it is for the entire frame rather than for just the last CAZAC. In fact, the results for the CAZAC are not that good relative to checking the results of the TCM demodulator. Change "The LQI SNR shall be measured in the last CAZAC sequence of the PHY preamble, 11.4.2." to be "The LQI SNR shall be reported as the value for the received frame after the FCS for frames that have a frame length longer than 100 octets." Suggest accept in principle, "Change the the last two sen-tences in 11.6.7 from 'The LQI SNR shall be measured ... via the PHY-RX-START.indication, 6.7.4.3.' to read 'The LQI SNR shall be measured during the TCM frame body and shall be reported after the last FCS symbol. This number shall be reported via the PHY-RX-END.indication, {xref 6.7.4.6.}.' Change subclause 6.7.4.3 to remove LQI from the parameter list. Change subclause 6.7.4.6 to add LQI before the RXERROR

parameter. Modify subclause 6.7.4.6.1 to include LQI in the list of parameters that are described, with the   1
description 'LQI is a 5 bit field that represents an SNR estimate from the receiver, {xref 11.6.7}.'"   2
                                                                                                                             3
    Accept.   4
                                                                                                                             5
508 (Gilb, TR) - The CCA only detects the CAZAC, but doesn't tell you to keep signalling busy until the end   6
of the frame, up to the max frame length. Add text that says the CCA shall be maintained as busy until the   7
end of the frame for which the inverted CAZAC was detected. Suggest accept.   8
                                                                                                                             9
    Accept   10
                                                                                                                             11
512 (Gilb, T) - Incorrect sentence: "At the end of SLEEP state in APS mode, the DEV shall wakeup suffi-   12
cient time before the expiration of the maximum sleep time in order to inform the PNC that it is in the   13
ACTIVE mode."Change to "When transitioning from APS mode to ACTIVE mode, the DEV shall enter the   14
AWAKE state sufficient time before the expiration of the maximum APS time in order to inform the PNC   15
that it is in the ACTIVE mode." Suggest accept.   16
                                                                                                                             17
    Accept   18
                                                                                                                             19
510 (Gilb, T) - When a dev is in APS mode, it can be in either the AWAKE or SLEEP state. Therefore, the   20
following sentence is not correct: "The DEV shall be allowed to enter SLEEP state for a maximum sleep   21
time duration indicated by the PNC in the APS sleep response command,..." Change to Replace with: "The   22
DEV shall be allowed to enter APS mode for a maximum APS time duration indicated by the PNC in the   23
APS response command,..." Suggest accept.   24
                                                                                                                             25
    Accept.   26
                                                                                                                             27
729 (Gilb, T) - Related to switching to ACTIVE mode, can't the DEV send ANY PDU to the PNC that   28
requires an Imm-ACK, not just a command? Change to ..."the DEV shall send any directed frame, which   29
may be an MSDU or MPDU with no payload, that requires"...   Also change "wakeup" to "wake up" in this   30
paragraph. Suggest accept.   31
                                                                                                                             32
    Suggest accept in principle, "Only the probe command will be used to register that the DEV is enter-   33
    ing ACTIVE mode. See also comment 363."   34
                                                                                                                             35
313 (Heberling, T), 353 (Heberling, TR) - SPS set is not defined. Please define. Also, the structure of the   36
DEVID list is not defined either. Please define. Please provide the requested definitions. Suggest accept   37
"Add text that says 'The SPS set field is defined in {xref 7.5.7.4}.' Also, change the DEVID list to be for-   38
matted in the same way as the PCTM field, i.e. a starting DEVID and a bitmap that is as long as is required.   39
Copy over the text, figure and description. This gives us a uniform method of listing DEVIDs in the stan-   40
dard."   41
                                                                                                                             42
    Accept suggested resoluion.   43
                                                                                                                             44
347 (Heberling, TR) - What is the difference between ACTIVE PS mode and the Awake state? Please clar-   45
ify. Please provide the requested clarification. Suggest accept, "Resolve as in comment 456, Add text that   46
says something similar to 'There are three modes and 2 states in each mode. The modes are ACTIVE, APS   47
and SPS. Within each mode, a DEV is either awake or sleeping.' Gather up all of the modes and state refer-   48
ences and put them in the beginning of 8.12 rather than spread out throughout the sublcause."   49
                                                                                                                             50
    Accept suggested resolution.   51
                                                                                                                             52
335 (Heberling, TR) - The first sentence of this paragraph is and incomplete sentence. Please rewrite the   53
sentence so that it expresses a complete thought. Please provide the requested rewrite of the indicated sen-   54

tence. Suggest accept, "Change the first sentence to read 'SPS mode allows a DEV that is sensitive to power utilization to reduce its power usage while remaining synchronized with the SLEEP states of other selected DEVs.'"

  Accept.

Meeting adjourned at 12:35 pm PDT.

3.11 Email, due Friday, 19 July, 2002

464 (Gilb, T) - We should have an informative annex with sample calculations and examples of frame headers, commands, IEs, beacons, etc. Assign each person one item to create and assign 2 people to review their work. Suggest accept in principle "If there is time left when all other tasks are completed, we will try to put together some examples."

632 (Gilb, T) - Delete the word "can". Suggest accept in principle, "Change 'The CCM ideas can easily be extended to other block sizes, but this will require further definitions.' to 'The CCM ideas are easily extended to other block sizes, but this would require further definitions.'"

502 (Gilb, TR) - Cross reference to parameter missing. Add: "The parameter used in this primitive is defined in {xref Table 35}."(in 6.7.3.5) Suggest accept.

5, 131 (Heberling, TR), 786, 818 (Shvodian, TR) - Implied ACK policy is no longer needed since we have support for asynchronous time slots. Remove this sub clause and andy reference to implied ACK. Suggest accept. For 5 and 131, suggest accept in principle. "Implied ACK and all references to it will be removed from the draft."

424 (Heberling, TR) - A 20 day Letter Ballot is much to short an interval to adequately review the volume of new text that was incorporated into D10. Particularly, all the material associated with security. There are major integration issues that need to be addressed that I did not have time to consider. Also given the PICs is now included in this document, there was no time to properly review the decisions made by the various editors to determine if they were in agreement as to what should be mandatory or optional. Recommend that the next LB for 802.15.3 be extended to 30 days minimum. Suggest reject "While we all appreciate the hard work that goes into reviewing a document for letter ballot, neither the ballot resolution committee nor the task group has the power to set the length of the letter ballot. The working group voted to set that duration."

688 (Gilb, TR) - Withdraw

279 (Gilb, TR) - Meaning? I think you want to set the SrcID to the PNCID. Change to "The SrcID shall be set to the PNCID." Suggest accept.

48 (Heberling, TR) - The clause title: "Changing channels" is too restrictive given the change in primitive name. Rename clause 6.3.17 Changing Channels to "Changing Piconet parameters. Suggest accept.

209 (Gilb, TR) - PHYPIB_CCAThreshold is an 802.11 holdover and is not used in this standard. Delete this PIB entry. If it stays, however, it should be -55 dBm, but better still, just xref where it is defined. Suggest accept in principle, "Change the value of the PIB entry to indicate that it is implementation dependent but no more than the value listed in {xref 11.6.5}. Also remove 'For the 2.4 GHz PHY' text where found in the PIB tables in this subclause."

1169 (Shellhammer, T) It is quite common for an 802.11b network to utilize all three channels. In addition to the adjacent and alternate channels plot the co-channel FER in figure D.2. Also, add a figure on 802.11b co-channel operation (like figures D.3 and D.4). Accept in principle, "While 802.11b networks will use all three

channels in an infrastructure environment, it is not likely in the home environment targeted by 802.15.3. In addition, the APs for these channels will be widely spread (> 50 m distance) so that they do not interfere with each other. However, we will add additional results for co-channel interference with the note that this case is unlikely due to the ability of the 802.15.3 network to find the 'quietest' channel."

1168 (Shellhammer, T) - The theoretical BER curves from 802.15.2 need some work. Modify to new formula once new 802.15.2 draft becomes available. Also, replot figure D.1 so that it is possible to determine which curve is for which system. Accept in principle "If the new formulas are available in time, the coexistence curves will be re-calculated. If not, it will be considered for revision at a future time."

1170 (Shellhammer, T) - In clause D.3.3 it is not clear the separation between the two nodes in the system under evaluation. For example, the separation between the two 802.15.3 nodes is not specified in clause D.3.3.1 as far as I could tell. Please add text to state the separation between node of the system under evaluation. Do similar for the other systems under evaluation (i.e. 802.11b and 802.15.1). Suggest accept in principle, "Add text to D.3 that states that the separation of the members of the desired system is implied by the receive signal power, which is 10 dB above sensitivity. Add to the assumptions section that the received power is 10 dB above sensitivity since at sensitivity the channel fading cause >> 10% FER."

1167 (Shellhammer, T) Receiver sensitivity does not effect coexistence performance. What does effect it is the signal-to-interference ratio (SIR) of the various standards. Remove clause D.3.2. section "a" and replace it with a section on SIR. Suggest accept in principle "None of the standards discussed have a SIR performance specified for other systems. SIR performance depends on the modem design and so would vary among implementations. However, the SNR performance is a reasonable approximation of the SIR peformance of the system since the SIR is not known. Add text to D.3.2 that discusses why SNR was used instead of SIR for the analysis."

1164 (Shellhammer, T) - Since CSMA/CA is often based on frame detection it is not clear why this is the "best method" of coexistence. State that a method of detecting frames from the other standard would be required to use this method for coexistence. Suggest accept in principle "Some CCA detection is done purely on an energy detection basis (this optional for 802.11 and required for 802.15.3). In addition, the timing parameters used in the CSMA/CA affects the peformance of the systems. Add text that better describes the situations under which CSMA/CA would be an appropriate coexistence method, mentioning timing and the requirement for either energy detection or frame detection."

1165 (Shellhammer, T) - It is not clear what happens if one Piconet chooses the four-channel plan and another Piconet selects the three-channel plan, since the first Piconet was already established. It looks like you could never effectively use the four-channel plan. Explain. Suggest accept in principle "Add text to clause D that explains what happens in this situation."

1166 (Shellhammer, T) - References to collaborative coexistence mechanism states that "no on-air signaling is required." This is true of PTA, however, AWMA uses signaling over 802.11 to manage the coexistence mechanism. Please remove the phase "no on-air signaling is required." Suggest accept.

1163 (Shellhammer, T) - IEEE 802.11 not only uses CDMA/CA but is also uses a poling mechanism in Point Coordination Function. Mention PCF to prevent comments in sponsor ballot. Suggest accept.

1139 (Roberts, TR) - I missed this on the first letter ballot but specification of the EVM test seems to be incomplete. Below is suggested text to complete the specification. 11.5.2 EVM Calculated Values A compliant transmitter shall have EVM values of less than those given in Table 104 for all of the modulation levels supported by the PHY when measured for 1000 symbols. The error vector measurement shall be made on baseband I and Q data after recovery through an ideal reference receiver system.The ideal reference receiver shall perform carrier lock, symbol timing recovery and amplitude adjustment while making the measurements. The ideal reference receiver shall have a data filter impulse response whose cross-correlation is within 0.5 dB referenced to the impulse response of an ideal root raised cosine, 35% excess band-

width, Fc=5.5 MHz (3 dB point) filter. Suggest accept in principle, "Add text to the end of 11.5.2 that says 'The ideal reference receiver shall have a data filter impulse response that approximates that of an ideal root raised cosine filter with 30% excess bandwidth.'"

507 (Gilb, TR) - Need to add HCS to list of things in the frame. Change "... PHY preamble, PHY header, MAC header and the FCS." to be "... PHY preamble, PHY header, MAC header, HCS and FCS." Suggest accept.

506 (Gilb, TR) - HCS needs to be scrambled as well. Change "... MAC header and frame body." to be "... MAC header, HCS and frame body." Suggest accept.

504 (Gilb, TR) - CCIT CRC-16 implementation, the description doesn't say that it needs to be set to all 1s when initialized and the figure doesn't really show how to get the data out. Add text that says that the register shall be set to all 1s before beginning the process and show how the data is xor'ed and shifted out of the registers when it is done. Suggest accept.

580 (Gilb, TR) Errors in 802.11's description of the CRC calculation. 1. The text states "consider the following 48-bit length sequence" but in fact the sequence is only 32-bits.   2. The text identifies bits as follows "b0......................b48", but it seems that "b0.........................b31" would be correct. Again, it is only a 32-bit stream.   3. The text identifies the HCS output sequence as follows "b0.......... ....b16" but in fact, since it is only 16-bits, it should be "b0.......... ....b15". Suggest accept.

943 (Bain, TR) - The text solution does not match the comment on LB12. The first value is to be the means to return the PHY to a operational state (not in a power save state). "Vector number 0 is the entry used by the MAC to instruct the PHY to return from a reduced power state, or off state, to a state where it is ready to receive command. Other values are implementation dependent." Suggest accept in principle, "The table is only times, not the instruction. PSLevel in 6.7 and 6.7.5 controls the PHY's on/off state. Add text to the description of PSLevel in Table 35 that says 'PSLevel value 0 is used by the MAC to instruct the PHY to return from a reduced power state, or off state, to a state where it is ready to receive command. Other values are implementation dependent.'"

505 (Gilb, TR) - The status of the scrambler with respect to the second PHY header is ambiguous. In order to ensure that the FER of the 11 Mb/s mode remains low, the scrambler will need to be reset so that losing one of the first two bits does not cause an FER failure. Add text that states that the PHY header of the second repetition of the PHY + MAC header + HCS is unscrambled and that the scambler is re-initialized with the same seed used for the first header when it begins scrambling the second header. The scrambler continues for the frame body following the second header structure as normal. Suggest accept.

456 (Gilb, TR) - Need to add a better explanation of the power save modes here. Add text that says something similar to "There are three modes and 2 states in each mode. The modes are ACTIVE, APS and SPS. Within each mode, a DEV is either awake or sleeping." Gather up all of the modes and state references and put them in the beginning of 8.12 rather than spread out throughout the sublcause. Suggest accept.

947 (Bain, T) - "enable DEVS to completely ...." may be how many implementations will operate but this is implementation specific as to how deep the DEV will "turn off". Change to 'to turn off completely or reduce power...'. Suggest accept.

4. Comment resolution in Vancouver

4.1 MLME policy

— Change MLME-CREATE-CTA parameters to pass only those things needed to verify the functioning of the standard. Since the channel time parts are not going to be verified, only that a CTA.

4.2 Channel time management (CTM/Async*, CTM/Isoch*)

IDs: 15, 16, 34, 368, 813, 370, 614, 195, 906, 652, 914, 907, 917, 155, 411, 364, 366, 120, 410.

For asynchronous data, initial command comes from FCSL via MAC SAP with the MAC-ASYNC-DATA.request. Then the DEV MLME decides if it needs more time (hexagon decision). If so, it sends the frame over the air. The PNC MLME decides what to do and in the case of rejection responds with channel time status command, otherwise it is a beacon. Neither the PNC DME nor the DEV-2 DME are involved.

Asyncrhonous termination: Do we allow the destination to terminate. PNC is allowed to terminate and the source is allowed to terminate (this simply means that it sets the request to zero).

Now we don't need MLME-CREATE-CTA.indication or MLME-CREATE-CTA.response, just let the PNC MLME do the response over the air. Also we don't need MLME-MODIFY-CTA.indication or MLME-MODIFY-CTA.response

Note: Perhaps we want to rename MLME-xxx-CTA to be MLME-xxx-STREAM?

20, 21 , 411 (Heberling, TR) Terminations can never be unsuccessful. The command can only originate from the client and the PNC cannot refuse termination. If the PNC wishes to initialize a termination it will just remove the CTA.

For the ResultCodes on negative actions, allow timeout but do not refer to it as unsuccessful, instead refer to it in the text as indicating that the ACK was not received.

20 - Reject: The ResultCode indicates if the ACK was received for the command. The DEV may consider this to be success or it may take other action depending on the implementation. However the text associated with this is incorrect since it refers to the lost ACK as "unsuccessful" rather than that the ACK was not received.

21 - Accept in principle. Change "The originating DME, when it receives this primitive, is notified whether its CTA termination request was successful or unsuccessful." to be "The originating DME, when it receives this primitive, is notified of the result of its CTA termination request."

411 - Accept in principle. The ResultCode indicates if the ACK was received for the command. The DEV may consider this to be success or it may take other action depending on the implementation. Retain the result code, change the text in clause 6.3.14.11.1 to say: "The originating DEV MLME sends this primitive to its DME after the DEV MLME either has received an ACK to its CTA request command or the RequestTimeout has expired." and change the text in clause 6.3.14.11.2 as indicated in the resolution of comment number 21.

Ed note: This probably applies to other comments, particularly disassociation and deauthentication.

123 (Heberling, TR) - Many issues

Beacon confirmation of synchronous request. Suggest stream creation information element. IDs 123, which really is a reference to [06] in 02/276r0. Asked for straw poll, do we require ACK before building the beacon, result was 4/1/5 (y/n/a). So action is for WMS to create new text in 8.5.1.1, page 175, line 50 that indicates this and send it to the reflector by COB 10 July 2002.

Resolution for 123: Accept in principle: Detailed resolution is in document 02/273r2.

(Beginning of resolution for comment #123)

"8.5 Channel Time management
<Page 175, line 3, TR> Page 175, line 3, TR> Change 'The creation, modification and termination of asynchronous channel time' to be 'The reservation and termination of asynchronous channel time.'

8.5.1 Isochronous Stream management
<Page 175, line 13-15> Change '... an isochronous stream may be sent peer to peer, modified or terminated.' to be '... an isochronous stream may be modified or terminated.'
'
<Page 175, line 19-20> Delete the sentences between lines 19 and 21, 'The values for GTS Type, and CTR Interval Type Figure 74 shall be non-negotiable and are decided by the DEV that is sending the channel time request. These values shall not be changed anytime after the first transmission of the command frame containing the request for that stream.' See also CID 203.

<Page 175, line 24> Change 'channel time status commands.' to be 'channel time response commands.' Note: this is a result of a global name change, see also CIDs 104, 116 an 118.

8.5.1.2 Isochronous stream modification,
<Page 177, lines 34-37, last two bullets>
Change last two items in the list from 'Minimum number of TUs field is set ... or equal to the minimum number of TUs.' to be

— 'The CTR type field shall be set to the same value as in the original request for that stream index.
— All the other channel time request command parameters are set to appropriate values as defined in {xref 7.5.5.1}.'

<page 177, line 46, TR> Delete 'or PRIORITY_UNSUPPORTED'.

<Page 178, Figure 115> – Revert to older MSC, the PNC DME is no longer involved in the negotiation.

8.5.1.3 Isochronous stream termination
<Page 179, line 30> Add text 'In the case of multicast or broadcast streams, only the source DEV or the PNC may terminate the stream.'

<Page 180, Figure 118> Delete Figure 118, also delete lines 23-24 on page 180. Add text that says 'When either the source or destination of a stream is disassociated from the network the streams are terminated as indicated in {xref disassociation}.' See also CID 371.

8.5.2.1 Asynchronous channel time creation and modification

<Page 181, line 1> Change 'creation and modification' to be 'reservation' in subclause title.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

<Page 181, line 26> Delete "CTR Interval type"

<Page 181, line 37, TR> Change "and the same destination" to be "and the same source"

<Page 181, line 40, E> Change 'However, there is no guarantee of what the delay will be between the time of the request and the reception of …' to be 'However, there is no guarantee of the length of the delay between the time of the request and the reception of…'

<Page 181, line 49, E> Change 'send a channel time response command…' to be 'send a channel time response command…'.

<Page 182, Figure 119> – MSC for reserving asynchronous data channel time. Discussed earlier, new MSC is below (needs work to match the other MSCs in the clause.):
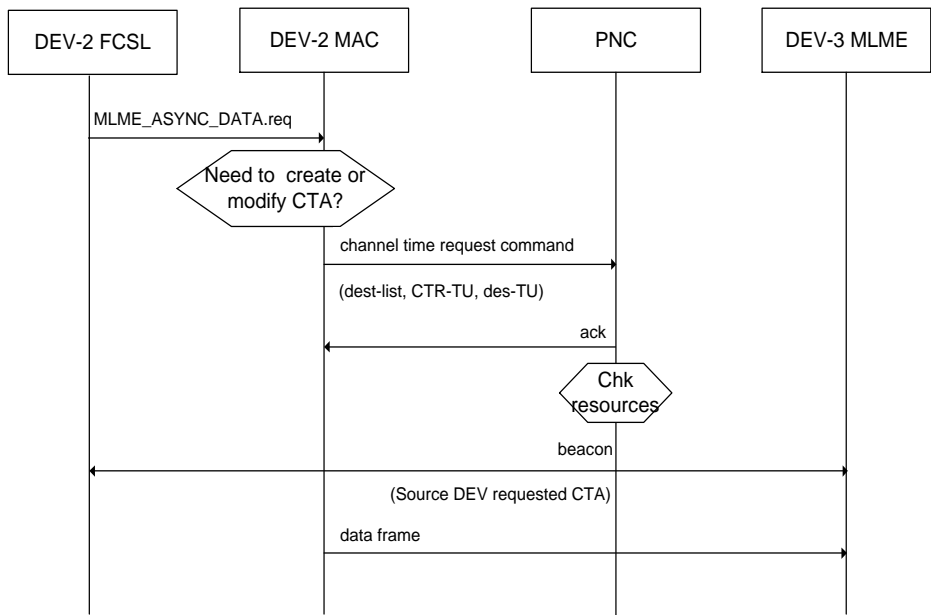
Figure 23—MSC for a approved asynchronous channel time request
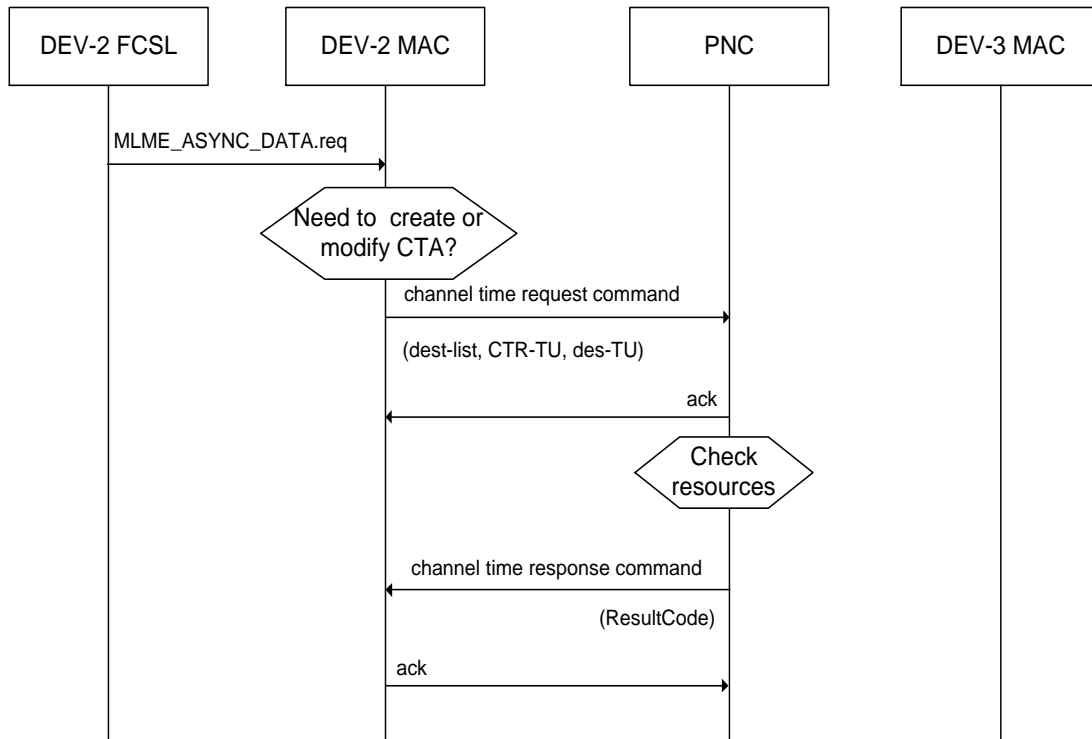
Figure 24—MSC for a denied asynchronous channel time request

8.5.2.1 Asynchronous GTS termination:
<Page 182, line 39> Change 'Only the PNC, the originating DEV, or the target DEV shall be able to'
to be 'Only the PNC or the originating DEV shall be able to'
(end of resolution of comment #123)

4.3 Child/neighbor handover ()

4.4 Handover

779, 785 (Shvodian, TR) - Add a new handover handover IE to be used to announce the beacon number where handover will take place.

785 ACCEPT IN PRINCIPLE. The new IE will be added as indicated in the resolution of comment #779.

779 ACCEPT IN PRINCIPLE. Add an PNC Handover information element. It only needs to be 4 octets total (IE number, Length=2, handover countdown, PNC response) . The last beacon sent by that PNC shall have counter number 0.

Note: the PNC response field depends on the resolution of the comments relative to this field.

24 (Heberling, TR) - Withdrawn

154 - Withdrawn

797 - ACCEPT IN PRINCIPLE. Add a beacon countdown in the new PNC handover IE.

22 - ACCEPT IN PRINCIPLE. Add new subclause as follows:

6.3.11.5 MLME-PNC-HANDOVER-INFO.indication This primitive indicates the reception by the DEV of an unsolicited DEVInfo list sent by the PNC as part of the PNC handover procedure, 8.2.3. The semantics of this primitive are: MLME-PNC-HANDOVER-INFO.indication(DEVInfoSet)   6.3.11.5.1 When generated The MLME sends this primitive to its DME upon receiving a complete DEVInfo list via the PNC info command.   6.3.11.5.2 Effect of receipt The new PNC's DME is provided with a copy of the complete DEVInfoSet.

160 ACCEPT IN PRINCIPLE. Change the indication to be initiated by the PNC handover information element in the beacon as opposed to the broadcast PNC handover command. This now passes one element, the PNC response value.

98 - ACCEPT. Delete all other references to it in the draft, replacing it, where appropriate with the PNC handover IE.

154 - Withdrawn

14 (Heberling, TR) - Add these parameters to the MLME-PNC-HANDOVER.request parameter list: NmbrHndOvrBcns, DEVInfolist. Delete NmbrOfDEVs from the parm list since it can be determined from the DEVInfoList. Also add these new parameters to Table 15 with these type/range and defs. NmberHndOvrBcns: Type:Integer; Range: 4-255; Def: The number of beacons, containing the PNC handover IE, the old PNC will transmit before control of the piconet by the old PNC is turned over to the new PNC.

606 - ACCEPT IN PRINCIPLE. The new PNC timeout has been replaced by the number of beacons.

162 - ACCEPT IN PRINCIPLE. Add new clause 6.3.11.3 which describes the MLME-PNC-HANDOVER.response primitive.   The text of which is included here.   6.3.11.3 MLME-PNC-HANDOVER.response This primitive is used to initiate a response to an MLME-PNC-HANDOVER.indication. The semantics of this primitive are: MLME-PNC-HANDOVER.response()

6.3.11.3.1 When generated This primitive is sent by the new PNC's DME to its MLME after receiving these two primitives in succession, MLME-PNC-HANDOVER.indication, MLME-PNC-INFO.indication and the DME is ready to take over as the new PNC of the piconet.

6.3.11.3.2 Effect of receipt When the new PNC's MLME receives this primitive from its DME it is informed that its DME is ready to become the new PNC of the piconet.

399 - Withdrawn.

381 - ACCEPT IN PRINCIPLE. Delete the HandoverTimeout from the MLME-PNC-HANDOVER.indication parameter list

100 - ACCEPT IN PRINCIPLE. Change the PNC handover information command to PNC handover CTRB command. Also change the title of figure 64 as well. Delete the "Last" field from the command body and its descriptive text.

43 - ACCEPT IN PRINCIPLE. The new handover will use the number of beacons to avoid this problem.

323 - Accept.

319 - ACCEPT IN PRINCIPLE. Change this sentence fragment from "... and obtain the DEV information from the current PNC within ..." to "... and be prepared to receive the list of DEV information list, {xref 7.5.4.2}, and CTRB records from the current PNC."

317 - ACCEPT. Change this sentence fragment from "...with an indication of the hand-over time out." to "... with the parameters specified in the PNC handover request command, 7.5.3.2."

325 - Please delete the sentence starting with these words: " The PNC shall indicate that the transfer is complete..." Also delete the first two sentences of the last paragraph and insert these sentences: " The chosen AC after receiving the PNC handover request command, the list of DEV information, and the CTRB records shall respond to the PNC with a PNC handover response command. This will signal to the PNC that the chosen AC is ready to commence the handover beacon sequence. The PNC upon receiving the PNC handover response shall ACK the received command and then put the PNC handover IE, {xref 7.4.x}, in the beacon. (additional text is provided in 02/276r0 Page8, Clause 8.2.3 paragraph 3 and page 9 paragraph 1.) Meanwhile the chosen AC after receiving an ACK to its PNC handover response command will prepare to broadcast its first beacon as the new PNC after the last beacon received from the current PNC.   The current PNC shall decrement the beacon countdown field in the PNC handover IE with each beacon broadcast until the field is zero. After sending the last handover beacon, the old PNC relinquishes control of the piconet, generates an MLME-PNC-HANDOVER.confirm to its DME, and stops generating beacons. The new PNC shall broadcast its first beacon as close to the start time of what would have been the old PNC's next beacon."

382 - The PNC MLME sends this primitive to its DME   The PNC MLME sends this primitive to its DME after it has sent its last beacon as PNC or if it fails to receive the PNC handover response command within the HandoverTimeout interval.

For effect of recipt, The ResultCode is set to SUCCESS when the PNC sends its last beacon as PNC before the HandoverTimeout interval expires. The ResultCode is set to HANDOVER_FAILED if the PNC fails to receive the PNC handover response command before the HandoverTimeout interval expires, then the ResultCode is set to TIMEOUT.

677 - ACCEPT IN PRINCIPLE. The old sentence was deleted.

172 - ACCEPT IN PRINCIPLE. The proposed text for these changes are below: 7.5.3.1 PNC handover request command   keep the first two sentences intact.   Make these changes   to figure 63: |CmdType|Length=2|NmbrDevs(1)|NmbrCTRBs(1)|.   NmbrDevs is the same defintion as is currently defined in this clause.   NmbrCTRBs is the number of CTRBs, excluding requests for asynchronous channel time, currently being served by the PNC that will be transferred from the current PNC to the new PNC using the PNC handover CTRB command.   7.5.3.2 PNC handover response command This command is used to inform the current PNC that the DEV selected to become the new PNC is ready to assume PNC responsibilities. The structure of this command shall be as ilustrated in figure xxx |Command type|Length=0|(PNC response, if it survives, xref to where it is defined).|

400 - Accept.

192 - Withdrawn

4.5 ACK (ACK*)

1024 (Rasor, TR) - Figure 11: the non-secure Immediate ACK Frame Format does not contain a FCS, which is incompatible with practice with all other frame formats.

> Reject, There is no need for an FCS if there is no payload. The Imm-ACK has an HCS on the header, so all of the information in the packet is protected by a CRC. Depending on the what is done

with an FEC in a future PHY, there may be a minimum packet size for interleaving and additional latency. Furthermore, this is an item that has been unchanged since before D09. (accepted by Rasor).

421 (Heberling, TR) - <change from> If an Imm-ACK is expected for that frame, the remaining time in the time slot needs to be large enough to accomodate the current frame, 2 SIFS periods and the Imm-ACK frame at the same PHY rate as the transmitted frame. <to> If an Imm-ACK or del-ACK is expected for that frame, the remaining time in the time slot needs to be large enough to accomodate the current frame, 2 SIFS periods and the Imm-ACK or del-ACK frame at the same PHY rate as the transmitted frame.

      Accept

3 (Heberling, TR) - Del-ACK policy: 1) Once you request Dly-ACK policy on a stream, can you change it? If so, is it required to do a Dly-ACK request? If Dly-ACK is declined, you should be able to keep sending Dly-ACK policy, change to Imm-ACK policy or No-ACK, but you cannot mix them up. Can we pass up the decline to the higher layers? If so, it can re-negotiate the time.

13 (Heberling, TR) - Dly-ACK negotiation, do we need to add more values? ACCEPT IN PRINCIPLE. The name of the field may need to change. Also need to delete aMaxDlyACKBurstSize from the end of clause 8 and change the reference to it to indicate that it is a value passed in the Dly-ACK frame.

768, 816, 817 (Shvodian, TR) - Dly-ACK policy/No-ACK explained: ACCEPT IN PRINCIPLE. The ACK stream policy is set with the stream, individual data packets set an ACK policy, the two bits in the frame field are back to ACK-policy and the one bit Dly-ACK is Dly-ACK request. (Note: we still need someone to write precise text).

819 - (Shvodian, TR) - Accept if Implied ACK goes away, probably accept anyway. The text needs some work and we need to say that you have to leave time for a Dly-ACK request as well. WMS to provide some text.

1 (Heberling, TR) - Does MAC or CL decide ACK policy for each packet? This depends in part on the resolution of 3. WITHDRAWN by Heberling.

806 (Shvodian, TR), 184 (Heberling, TR) - The recipient of Delayed ACK traffic is no longer responsible for obtaining channel time for sending the Dly-ACK frames

      Accept 184, Accept 806 in principle, "Resolve as indicated in 184."

820 (Shvodian, TR) - The retry bit is also used to detect duplicate frames.

      ACCEPT IN PRINCIPLE.   Change to "The source ID, stream index, fragmentation field and retry bit are used to detect multiple receptions of the same frame."

4.6 IEs (IE*)

73, 76 (Heberling, TR), 300 (Shvodian, TR) - Does this create interoperability problems?

      Suggest accept in principle, use the suggestion in 02/276r1 (resolution [16] in the document), but we need to find a way to get unique manufacturer identifiers. Suggestions are:

— Use MAC address first 2 (or is it 3) octets
— String that is the trademarked manufacturer name.
— Have the RAC assign number

— Have 802.15 assign OIDs
— Have 802.15 assign number.

74 (Heberling, TR) - Remove DEV GTS status information element. The supposed benefits provided by this information element do not warrant chewing up 34 octets of beacon time.   In its place introduce this new information element: StreamAnnouncement IE   7.4.10 Stream announcement The stream announcement information element shall only be sent by the PNC in the beacon. The stream announcement IE shall be formatted as illustrated in Figure 33. This IE is used to indicate in the beacon to a DEV that its requested CTA |Element ID|Length|= 2|SrcDEVID|StreamIndex| SrcDEVID is defined in 7.x.x Stream Index is defined in 7.x.x.

> Accept in principle: Delete the DEV GTS Status IE. However, the stream announcement information element is not needed.

4.7 Implied ACK (ACK/Implied)

WMS will post to the list to see if someone still needs it. Comments 786, 131, 5 (withdraw if implied ACK is deleted), 818.

4.8 Starting child or neighbor piconets (DepPN)

968 -

4.9 Frame issues

255 (Heberling, TR)

> Withdrawn

770 - accept.

444 - Rejected.

778 - ACCEPT IN PRINCIPLE. Delete the maximum transmit power IE, take the Max TX power level field and put it with the new piconet sycnrhonization field in the beacon. Add text that says that if the PNC does not want to limit the TX power it shall set the field to 0x7F.

432 - ACCEPT IN PRINCIPLE. The beacon ordering was resolved with comment #937 and 386.

937 - ACCEPT. Change the piconet synchronization IE into a field.

436 - Accept.

500 - Withdrawn

70 - Accept: The pad bit has been removed, make the indicated change.

166 - Accept: The pad bit has been removed, make the indicated change.

1018 - ACCEPT IN PRINCIPLE. Change the text to "At the receiver, the initial remainder shall be preset to all ones. The serial incoming bits of the calculation fields and FCS, when divided by G(x), in the absence of

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

transmission errors, results in a unique non-zero remainder value. The unique remainder value is the polynomial:"

64 - ACCEPT IN PRINCIPLE. The FCS field shall be transmitted in the order specified in {xref 7.1}. Change the text on page 101, line 47, from "Any field containing a CRC is an exception to this convention and is transmitted with the coefficient of the highest-order term first." to read "Any field containing a CRC is an exception to this convention and is transmitted msb first."

774 - ACCEPT IN PRINCIPLE. Modified as follows: "The frame body is a variable length field and contains information specific to individual frame types. The minimum frame body is zero octets. The maximum length frame body is aMaxFrameSize-4 octets. This maximum length includes the security fields, if present."

1020 - REJECT. The non-secure frames do not need a sequence counter. The secure frames probably don't need a sequence counter either, that will be resolved by another comment.

4.10 Security/authentication (SEC/Auth)

57 (Heberling, TR) The MAC address isn't needed as parameter in the Authentication exchange. The header carries the DevID of source and destination, and if either side is unknown to the other, they are not likely to accept authentication anyway.

    Withdrawn

941 (Shvodian, T)

    Dan is to figure this one out.

769, 890 (Shvodian, TR) Do we need a SEC pad - Yes, add an octet to secure frame formats. It is set to the number of octets that the encryption algorithm added. If the frame is unecrypted, the is field shall be set to 0. (unless the encryption already deals with this.)

48 (Gilb, TR) Withdrawn

834 (Shvodian, T) - Do we need to protect ACKs

    Accept (deletes protected ACKs)

835 (Shvodian, T)

    Accept in principle. PNC handover does not require ACL handover. (See clause 9.3.2).

831 (Shvodian, T)

    Accept.

832 (Shvodian, T)

    Accept in principle. PNC handover does not require ACL handover. (See clause 9.3.2).

836 (Shvodian, T)

    Accept in principle. ACLs are needed, text needs to be added to mode 3 to clarify this requirement.

837 (Shvodian, T)

    Accept.

836 (Shvodian, T)

    Accept in principle. ACLs are needed, text needs to be added to mode 3 to clarify this requirement.

836 (Shvodian, T)

    Accept in principle. ACLs are needed, text needs to be added to mode 3 to clarify this requirement.

    872 (Shvodian, T)Withdrawn
    875 (Shvodian, T)Reject
    854 (Shvodian, T)ACCEPT IN PRINCIPLE. The security manager maintains a separate association/authentication state for each of the DEVs with which it is willing to authenticate.
    863 (Shvodian, T)ACCEPT IN PRINCIPLE. Text will be added (based on another comment) that describes what happens in this case.
    853 (Shvodian, T)Accept.
    866ACCEPT IN PRINCIPLE. None of the commands use the secure command format. Clause 7.5.2.x specifies that these commands are always sent in the non-secure format.

4.11 PNC Responsiveness

10, 12, 17, 86, 92, 94, 188, 191, 357 (Heberling, TR), 808 (Shvodian, TR)

    17 and 94 have more than just PNC Responsiveness.

    808 - Suggested remedy is to have JB add text that clarifies the usage of the PNC responsiveness, text is due by the morning of 11 July, 2002.

    For the rest, ADH will review a prior document to see if there is a compromise available. 02/109, review will be later today.

4.12 Transmission sequence resync

41 (Heberling, TR), 478 (Gilb, TR), 787 (Shvodian, T) - Transmission sequence resync command is not needed.

    Accept: The transmission sequence resync command and all references to it will be removed from the draft.

4.13 Misc

56 (Heberling, TR) Inconsistent DEVID naming conventions between clause 6 and clause 7. Which is it going to be: SrcID instead of OrigID, DestID instead of TrgtID? Lets be consistent.

    Accept in principle. The BRC will closely review the use of OrigID, TargetID, SrcID and DestID to reduce the number of uses of OrigID and TargetID to the absolute minimum necessary.

423 (Heberling, TR) - Missing an MSC illustrating the primitives and signals needed during a de-authentication initiated by a DEV to the PNC.

Withdrawn

96 (Heberling, T) Missing a reason code for when the DEV disassociates from the piconet. Add this reason code 4-> DEV_LEAVING_PICONET.

Accept.

55 (Heberling, T) Disassociation cannot "fail". Both PNC and client shall regard a disassociate request as being completed when requested and proceed with the disassociation procedure. The PNC needs to get back the DevID from the confirm in case it has disassociated several DEVs. The reasonCode is not needed since the request cannot fail, and even if it did there is no recovery.

ACCEPT IN PRINCIPLE. The command is issued when it gets an ACK or the time out has occurred. The ResultCode is used to inform the DME of the result of the process. Change text in 6.3.6.3.1 to "This primitive is sent by the originating MLME to its DME after sending a disassocia-tion request command, {xref 7.5.1.3}, and receiving either an ACK or an ACK_TIMEOUT." Change the text in 6.3.6.3.2 to "The originating DME, when it receives the MLME-DISASSOCI-ATE.confirm primitive, is notified of the result of the disassociation procedure."

158 (Heberling, TR) The MLME-DISASSOCIATION.confirm primitive has value only to the PNC. A DEV that requests to be disassociated from the piconet doesn't really care if it receives an ACK, since by the time it does receive an ACK it would most likely be shutdown. Consequently, the only entity that is interested in receiving a confirmation is the PNC, since it will still be in operation and therefore interested in knowing which DEV, it(PNC) had previously requested disassociate, responded with an ACK. Given this perspective please make these changes: Change this sentence from: "This primitive reports the results of a disassocia-tion request." to "This primitive reports to the PNC the results of a PNC initiated disassociation request directed to a DEV. The semantics of the primitive are: MLME-DISASSOCIATE.confirm(DEVID) 6.3.6.1 When generated This primitive is sent by the PNC MLME to its DME after receiving an ACK from the DEV to which the PNC had sent a disassociation request command 7.5.1.3. (Delete lines 35-37)   6.3.6.2 Effect of receipt The PNC DME, when it receives the MLME-DISASSOCIATE.confirm primitive, is noti-fied as to which DEV has been disassociated.

Accept in principle, Add to then end of 6.3.6.2 "The PNC DME, when it receives the MLME-DIS-ASSOCIATE.confirm primitive, is notified as to which DEV has been disassociated.

1) IEs PNServices CID-63: This one will be handled with the vendor identification that will be used for the ASIE.

2) MTS CIDs 58 Trying to compromise, up to 'Change this sentence fragment from"... 0x00 reserved for asynchronous data and 0xFE reserved for unassigned streams." to "...0x00 for asynchronous GTSs and asynchronous data, 0xFD reserved for MTSs, and 0xFE reserved for unassigned streams."'

119, ACCEPT IN PRINCIPLE. Change the sentence to read "If commands are not allowed in the CAP, the PNC should assign an MTS with the new DEVs DEVID as the SrcID as soon as possible after a successful association, {xref 8.3.1}, preferably in the next superframe, in order to support fast connections."

190 Withdrawn.

3)PICs CID 1171 Although I did not have a personal comment regarding the PIC, I feel very strongly that this is an area of the Specification that I will definitely clobber during the next recirc. if we do not discuss in detail what functionality shall be mandatory and what should be optional.

1171 (Cypher, TR)

ACCEPT. The BRC will closely review the PICS to ensure that it is correct before the next letter ballot.

4)PNCInfo CIDs 377 & 140

377 - This will be true when we fix the fragmentation of the commands for handover.

140 - This will be true when we fix the fragementation of the commands for handover.

5) Scan(BSID) CIDs 83, 795, 416; BSID CIDs420,51,419,50,52

83 - Withdrawn, except that need to make sure another comment addresses adding the BSID to the scan procedure.

795 - ACCEPT IN PRINCIPLE. Need to specify that we scan for both or one, the other or any. (need better text).

416 - Accept

420 - Withdrawn

51 - Withdrawn

419 - Withdrawn

50 - ACCEPT IN PRINCIPLE. Delete the ChannelChangeTimeout parameter. Replace the deleted parm with NmbrOfChangeBeacons. see doc: 02/276r0 Page 21 for further description.

52 - ACCEPT IN PRINCIPLE. Replace ChannelChangeTimeOut parameter with the NmbrOfChangeBeacons parm. Also make sure the definition of this parameter goes in the appropriate table, as indicated in 02/276r0, p21.

6) CTM CIDs 32,30,23,28,80,33,408,407,409,413,414,401

32 - Accept.

30 - Accept

23 - Accept

28 - ACCEPT IN PRINCIPLE. Remove NumTrgts and NumAsyncTUs from the all instances of MLME-CREATE-CTA, MLME-MODIFY-CTA, and MLME-TERMINATE-CTA. Rename the TrgtIDlist to Trgt-DEVID in all the indicated primitives.

80 - Withdrawn

33 - ACCEPT IN PRINCIPLE. MLME-yyy-CTA.indicate and MLME-yyy-CTA.response do not go up or come down from to the PNC DME. Delete these MLMEs and fix the MSCs to reflect this change.

408 - Withdrawn, Resolution of 33 makes this unnecessary.

407 - Withdrawn, Resolution of 33 makes this unnecessary.

409 - Withdrawn, Resolution of 33 makes this unnecessary.

413 - ACCEPT IN PRINCIPLE. Move the Chk Resources and Evaluate request to the PNC MLME. Delete the MLME-CREATE-CTA.{ind,rsp} from the MSC. Delete the PNC DME from the MSC. Delete the Allocate Resource hexagon.

414 - ACCEPT IN PRINCIPLE. Move the Chk-Resources processes from the DME to the MLME. Delete the and Allocate Resources hexagon.

401 - Withdrawn

7) DEVID CID 56 - Resolution in process, agreement in principle.

8) DisAssoc/DeAuth CIDs

344 (Heberling, TR) - Withdrawn

348 (Heberling, TR) - Withdrawn

346 (Heberling, TR) - ACCEPT IN PRINCIPLE. Add text "The PNC does not use the de-authenticate command to remove a DEV from the piconet."

9) bit/byte ordering CID 150

150 (Heberling, TR) - Ask the reflector, BRC will vote, outcome either way is OK.

10) FrmFrmt/... CIDs 386, 385,66,68

386 (Heberling, TR) - Accept

385 (Heberling, TR) - ACCEPT IN PRINCIPLE. Move the table to 7.3.1 so that it is clear that it applies to both secure and non-secure beacon formats. Delete the SECID, integrity code and time token IEs since they are already in the frame format for the secure beacon.

425 (Gilb, TR) - Accept.

66 (Heberling, TR) - ACCEPT IN PRINCIPLE. Change the text to "At the receiver, the initial remainder shall be preset to all ones. The serial incoming bits of the calculation fields and FCS, when divided by G(x), in the absence of transmission errors, results in a unique non-zero remainder value. The unique remainder value is the polynomial:"

68 (Heberling, TR) - ACCEPT IN PRINCIPLE. "The FCS is the one's complement of the sum of the remainders in "a" and "b" below: a) The remainder resulting from $((x^k*(x^{31}+x^{30}+...))$ divided(modulo 2) by G(x)). The value k is the number of bits in the calculation field. b) The remainder resulting from the calculation field contents, treated as a polynomial, multiplied by X^{32} and then divided by G(x))." Note: add reference to ANSI X3.66 CRC-32 when we get a copy to review to get the correct reference.

11) ChnlTime change CID 194

194 - Accept in principle, DEVs may sleep and BSID stays.

12) System Change Bit CID 361 Possible withdrawn.