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| Re: | Rev 1. | |
| Abstract | This document contains a record of the TG4 working group of IEEE 802 meeting for session 13 in Orlando, FL. | |
| Purpose | This document forms a record of events for session #13. | |
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# Minutes of TG4 Session 13

Monday May 13th, 2001

Meeting opened by Durga at 11:30 AM, shortly following the opening of the TG3 meeting by Brian Keirnan.

Durga noted that TG4 MAC agenda is same as TG3 as both groups have joint meetings all week.

Sanjay Moghe provided a detailed TG4 PHY agenda.

Durga asked for a motion for acceptance of the agenda.

Ken so motioned.

Sanjay seconded the motion.

Durga asked for any objections, none were raised. The TG voting members approved the agenda unanimously.

Ken Peirce motioned to approve the session 12 TG4 minutes.
Sanjay Moghe seconded the motion.

Durga asked for any objections to the approval of the minutes. No objections were raised so the voting members present unanimously approved the minutes.

The meeting was adjourned until 1:00.

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## Joint TG3 and TG4 MAC Minutes

Subir announced that the TG3 MAC group would like to resume the joint MAC meeting on Tuesday morning. Ken agreed and announced the joint MAC meeting.

At the joint TG3 and TG4 PHY meeting, it was decided that several OFDM/OFDMA contributions from Runcom would be presented. As the MAC group attendees were at this meeting, it was felt that this would allow the MAC groups to skip repeat presentations on Tuesday.

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Tuesday 5/16/2001

Ken brought the meeting to order at 8:45AM

First presentation is Brian Gieschen on MPDU formats

Discussion ensued.

Vladimir brought up that new superframe header would be hard to pass. Brian agreed that adding a new subheader would be easier. A clarification was made that this is packing of MPDUs not packing within a MPDU.

Brian and Subir had a discussion concerning the value of providing an explicit length versus map-derived length.

Brian was asked by Subir to provide more proof of the need for this functionality.
It's a tradeoff of overhead of superframe header versus processing power on MAP to derive length information.

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Lei presented #63 ranging modification that changes timing synchronization. She felt that there is no need for a timer to handle synchronization. This results in a lower cost implementation.

Vladimir questioned the value of this contribution, as it is simply a different way to solve a solved problem.

Brian Gieschen explained that SS doesn't need to use absolute time, so the SS doesn't need a timer.

Discussion was stopped because of time.

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Huanchan Ye presented #64 antenna technology

Space Division Multiple Access was highlighted in this presentation. Broadcast is not possible as SDMA gives you multiple PtP links. You need a broadcast control mechanism.

With SDMA UCD and downlink channel descriptors (DCD) are not required because adaptive modulation is implicitly supported.

It was agreed that this could be an optional mode of operation.
Discussion had to be stopped to permit the next presentation.

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Huanchan Ye gave a presentation on contribution #65 (ARQ). The presentation suggests using 802.2 for ARQ.

Discussion was held.

Vladimir Changes presented contribution #66 (fragmentation and packing).

His proposed system does not allow for the combination of packing sub\headers (multiple MPDUs w/CIDs) and fragment subheaders. This is a limitation but the original goal was to support VoIP.

Lei Wang presented contribution #29. She explained that TG3/4 needs more burst types than TG1. She proposed stealing a bit from a length field?????(see contribution)

15 bits in Dl-MAP
11 bits in UL-LAP

She believes that this is a more straightforward method than using an expansion element in TG1 draft.

Vladimir stated that the current method of using an expansion element had been negotiated with the TG1 MAC team.

The meeting was adjourned for lunch at 11:30.
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The meeting resumed at 1PM.

John Sydor presented his RFMM document.

Vladimir raised the point that its unlikely that BSes will be able to hear one another. John answered that the uplink messages from a SS will aid in the new BS finding the other BS

Brian G. asked John for a sequence of messages sent at startup.

He also asked for suggestions for a mechanism to prevent UNII camping.

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Subir announced that the rest of the day would be a review and rework session for the TG3/TG4 common sections in the TG3 working document.

The group worked on the following:

Clause #4 MAC-PHY Interference

Lei asked why some contributions were being accepted into the strawman and others weren't.

Ken explained that some contributions were initial text used to fill out the empty sections of the document while others were new ideas. The former were invited and the latter were not.

Clause #5 MAC-PHY OFDM

Itzik Kitroser went through this section of the document.

Clause #8 Adaptive antenna
Einan Regev proposed

At 3:15 a break was given

At 3:30 Vladimir presented a joint ARQ proposal.

Ken mentioned the need to coordinate FEC and ARQ.
As FEC gets stronger, size of MSDU can be increased.

At 4:45 Subir announced that TG3 should adopt the working document formally as a working document.

Subir asked for someone to motion to adopt contribution #61 as a working document for TG3.

Discussion followed.

Vladimir motioned (#1) to make 802.16.3c-01/61 the official working document of TG3 MAC group.

Roger seconded the motion (#1).

A poll of voting members was taken:

Motion #1: 4 yeas, 2 nays

The motion passed and TG3 adopted contribution #61 as its working document.

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Wednesday 5/15/01

The TG3 and TG4 MAC meeting was started at 8:10.

Subir announced a procedure for motions:

1. 10 minute recap and presentation of motion
2. 15 minutes for discussion
3. 5 minutes for voting

Subir asked for voting members to raise their hands. The count was 7.

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Contribution #62 MPDU Formats

Motion #1: Walt Roehr made a motion to "include a 3rd MPDU format in the working group as described in #62 document in the working document". Rich Baugh seconded the motion. After some discussion, Brian Gieschen recapped his proposal.

Vladimir Yanover offered a friendly amendment that instead of the defined superframe header, the generic type header field would be used.

Walt rejected the friendly amendment.

Discussion of the original motion ensued.

Vladimir motioned (#2) to table the original motion (#1)

Walt seconded the motion (#2)

David Trinkwon motioned (#3) to call the question.
Rick Baugh seconded the motion (#3)

Vote on motion #3: 9 yea. 1 nea

Motion (#3) to call the question passed.

Vote on motion #2: 9 yea 2 nea
The motion (#2) passed so motion (#1) was tabled.✍----track for session 14

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Lei Wang made a motion (#4) to have the contribution #63 (Timing Control for Ranging) included in the working document.

Lei provided a recap of contribution #63.

Discussion ensued.

Itzak Kitroser motioned (#5) to call the question.

Walt seconded motion#5.

Vote: 10 yea 0 nea

Walt seconded the motion(#4)
Vote on motion (#4): 1 yea, 8 nea

Motion #4 fails

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Huanchun Ye made a motion (#6) to draft a text based on these contributions (#13, #45 and #64) for inclusion in the working document as a MAC option to support appropriate PHYs

Rick Baugh seconded motion #6.

Walt offered a friendly amendment that both Einan Regev and Haunchan Ye create joint text and return at the next session.

Huanchan accepted the friendly amendment.

David Trinkwon made a friendly amendment to Walt's amendment to accept #64 and for the editorial group to incorporate the text into the working document.

Huanchun Ye accepted the friendly amendment.

Motion(#6) Accept contribution of #64 and for the editorial group to incorporate the text into the working document.

Discussion of the modified motion(#6) followed.

Walt made motion(#7) to call question.
Huanchan seconded motion.

Vote for motion #7: 8 yea 0 nea
Motion(#7) to call question passed.

Vote on motion #6: 5 yea, 8 nea
Motion #6 failed.

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Vladimir recapped contribution #66(Packing and Fragmentation)

Vladimir made a motion (#8) to adopt the fragmentation subheader in the working document.

Walt seconded the motion (#8).

Discussion followed.

Subir proposed a friendly amendment. The amendment is to allow an option for a 14 bit FSN as well.

Vladimir rejected the friendly amendment because of the uncertainty of the available payload types.

Lei offers a friendly amendment that Vladimir work with authors of MPDU format (contribution #61) and come back later with other format.

Vladimir rejected the friendly amendment.

Concern was raised that fragmentation as presented would create a second way to handle fragmentation when combined with the fragmentation mechanism in ARQ.

Jacob Jorgensen made a motion (#9) to table motion (#8) until ARQ discussion .
Motion (#9) was seconded by Subir Varma.

Additional discussion was held.

Vote on motion #9: 6 yea, 4 nea
Motion #9 to table motion #8 passed.

Motion #8 is tabled. ✍ record tabled motion

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Huanchun Ye made a motion (#10) to "draft a complete text for the ARQ section (including the ARQ state machines) before releasing working document for comments".

Huanchun provided a brief recap of contribution #65 (802.2 ARQ).

Discussion followed.

David Trinkwon seconded motion #10.

Vladimir Yanover asked that motion (#10) be ruled out of order because TG3 MAC Chair Subir Varma had announced a Thursday ARQ session.

Subir (TG3) and Ken Peirce (TG4) MAC chairs ruled that because the ARQ announcement was not made before the motion, that motion (#10) could not be ruled out of order.

Itzik made a motion (#11) to table motion #10 until ARQ discussion is complete.
Walt seconded motion #11.

Vote on motion #11: 10 yeas, 2 nays.
Motion (#11) to table motion #10 passes. ✍--record tabled motion

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Subbu Ponnuswamy presented TG4 ARQ contribution #32

Discussion followed.

Joint TG3/TG4 MAC Meeting Adjourned at 11:50AM

TG4 PHY and MAC meeting called to order by Durga at 1:30PM

Ken Peirce presented a list of PHY dependent MAC issues that the MAC team wanted the PHY team to investigate.

1. Coexistence
2. DFS
3. Power Control
4. Ranging

Ken also presented some preliminary text that had been created for these areas.

Discussion ensued and John Sydor and Radu Salea answered questions on the preliminary solutions text.

Durga adjourned the meeting at 2:20.

Brian Keirnan called a new meeting to order at 2:30

The TG3 and TG4 PHY and MAC groups held a joint meeting to publicly review PHY dependent MAC issues.

The TG3 PHY team had prepared a list of issues that they believe must be addressed. Ken Peirce added a single issue that was TG4 specific to the list: coexistence.

The topics were discussed with the goal of insuring that no critical topics were left off the list.

The TG1 MAC team joined the meeting at 5:00 and provided and update on the status of the current TG1 draft and urged the TG3 and TG4 MAC teams to work with them to avoid creating problems with the overall MAC design.

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Thursday 5/16/2001

Joint TG3 and TG4 MAC meeting

Ken Peirce brought the meeting to order at 8:15.

Phil Whitehead (TG2 Chair) and David Chauncey presented the work being done in the TG2 for coexistence. TG2 is developing a new PAR to bring 11 – 66MHz coexistence work (TG1 and similar systems – i.e. by other standards committees) to the sub-11 GHz bands.

Three coexistence groups are currently working for 802:

1. 802.16.2 TG1 coexistence
2. 802 Coexistence .11, .15 and .16
3. Regulatory liaison group

At 9:00 the ARQ discussion was started.

Subir announced that the three original ARQ parties had reached an agreement on ARQ.

Vladimir presented the ARQ agreement.

David Trinkwon asked if the 802.2 ARQ proposal was included in the agreement.

Vladimir explained that the ARQ proposal was primarily concerned with data structures. He explained that the algorithm and state machines were not detailed in the agreement and that these would likely be taken from 802.2 as a starting point.

Discussion followed.

Vladimir explained that this document is a data structures descriptions only.

Vladimir asked that the group adopt a modified version of contribution #60 in the TG3 working document.

Vladimir made a motion(#1) to have the group adopt the modified contribution #60 text and that Huanchan Ye should develop the ARQ algorithm using 802.2 as a starting point.

Itzik seconded the motion(#1).

Discussion on the motion followed.

Vote on motion #1: 10 yeas, 2 nays

Motion #1 passed and the editor for TG3 will include the modified contribution #60 text into the TG3 working document.

Vladimir stated that that the new draft of the working document would be available within the next 2 weeks.

Subir adjourned the joint MAC meeting at 10:20.

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# Session 13
# Meeting May 14-18, 2001
# TG4 PHY minutes

**Monday:**

Plenary meeting.

Motion made by Ken, seconded by Sanjay: **Accept the minutes from the last meeting.** Motion passed unanimously.

Joint TG3/TG4 meeting started at 1 pm. Anader presented the single carrier proposal for TG4

Motion made by Minfei Leng, seconded by Baruch Buskilair: **We appreciate the spirit of the proposal in contribution IEEE 802.16.4c-01/31 to integrate 802.16a and 802.16b, but will consider it after we complete our OFDM-based standards work.** Motion tabled at Durga's suggestion. Later on, Tuesday, motion passed with 8 votes for and 0 votes against.

The group approved Larry Watkins replaces Demos Kostas as editor of section 7. To try to involve also John Sydor from the MAC group.

The group reviewed section 2. No changes were made.

**Tuesday:**
The group reviewed the development in section 3 and approved several changes based on the comments. Two major changes have been approved:

- ?? **The 802.16b will use 8 pilots instead of 12 pilots for the 256-FFT mode.**
- ?? **The optional 1024-FFT mode with OFDMA was changed to optional 2048-FFT mode with OFDMA.**

The group took a straw-poll on the randomizer:

- ?? The 802.16b will use a 7 bit randomizer – 8 votes
- ?? The 802.16b will use a 15 bit randomizer – 2 votes

A motion was made by McCallister and seconded by Rhodes: **The 802.16b will use a 7-bit randomizer for OFDM modes and a 15-bit randomizer for the optional OFDMA mode**. Motion passed with 7 votes for and 2 against.

The group decided to postpone the discussion on the modification of the tail-biting into head-biting as proposed in a comment by Octavian.

The group took a straw-poll on interleaving method:

?? PRBS based interleaving – 2 votes
?? extended version of the 802.11a interleaver – 8

A motion was made by Rhodes, seconded by McCallister: **The 802.16b will use an extended version of the 802.11a interleaver**. Motion passed with 5 votes for and 0 against.

Turbo codes were presented by Brian (TCC) and Sean (TPC).

The group took a straw-poll on coding methods:
?? Convolutional only – 4 votes
?? Concatenated RS and convolutional – 26 votes
?? Concatenated RS and convolutional with option to bypass the RS – 20 votes
?? Turbo Product Codes – 20 votes
?? Convolutional Turbo Codes – 6 votes

Differentiated straw-poll on mandatory coding vs. FFT-modes

| | 64-FFT OFDM mode | 256-FFT OFDM mode | 1024-FFT OFDMA (optional) |
|---|---|---|---|
| Convolutional | 10 votes | 7 votes | 0 votes |
| RS+CC | 25 votes | 27 votes | 27 votes |
| TPC | 9 votes | 10 votes | 13 votes |
| TCC | 2 votes | 2 votes | 7 votes |

Motion made by Jori, seconded by Nico: The 802.16b will use as mandatory coding modes the concatenated RS and convolutional.

Hostile amendment made by Yossi, seconded by Zion: To use tail-biting convolutional. Motion rejected: 7 votes for and 9 against.

Hostile amendment made by Zion, seconded by Yossi: To use tail-biting convolutional for OFDMA. Friendly amendment made by Mariana to Zion's amendment: To use zero tailing for OFDM. Amendment passed with 13 votes for, 7 votes against.

Amended motion made by Jori, seconded by Nico: **The 802.16b will use as mandatory coding modes the concatenated RS and convolutional with zero tailing for OFDM and tail-biting for the optional OFDMA mode.** Motion passed with 20 votes for and 0 against.

Motion made by Anader, seconded by Sean: **Turbo Product Code shall be an optional coding scheme for all FFT modes.** Hostile amendment made by Jori, seconded by Nico: Turbo Codes shall be optional coding for all FFT modes. Amendment rejected with 8 votes for and 9 votes against. Initial motion by Anader passed with 13 votes for and 9 votes against.

**Wednesday:**
Motion made by John, seconded by Bob: **TCC shall be an optional coding sheme for all FFT modes.** Motion passed with 6 votes for and 3 votes against.

Motion made by Minfei, seconded by Jori: **Request comparative information between TPC and TCC under the same test parameters based on channel and interference model developed in TG4 (parameters to be specified by Tal) as well as implementation considerations for session 14 and TG4 will vote for possible elimination of one as optional coding scheme.** Motion passed with 9 votes for and 0 against.

The group agreed that: **The comparison between TPC and TCC will use as a baseline the mandatory coding mode: concatenated RS and convolutional.**

The group took a straw-poll on adding the option to bypass the RS encoder for the 64-FFT mode: 9 votes for and 0 votes against.

Motion made by Baruch, seconded by Sanjay: **The convolutional encoding shall be an optional coding scheme for the 64-FFT mode.** Motion passed with 5 votes for and 2 votes against.

The group took a straw-poll on adding the option to allow tail biting for 64 and 256-FFT OFDM modes: 10 votes for and 0 votes against.

Motion by Zion, seconded by Nico: **Add option to allow tail biting for 64 and 256-FFT OFDM modes.** Motion passed with 9 votes for and 0 votes against.

Motion by Nico, seconded by Jori: **The 802.16b shall use constellations as in 802.11a and the current working document of TG3 -OFDM.** Motion passed with 10 votes for and 0 votes against.

Motion by Zion, seconded by Yossi: **The interleaver for the OFDMA mode shall use the PRBS method.** Motion passed with 7 votes for, 0 votes against.

The group reviewed section 6 with Drayt. The group agreed to discuss in detail the spectral mask at the later time. There were objections concerning section 6.3.4. so that section can be modified next meeting with simple majority. All the other changes were captured in the strawman document.

**Thursday:**
The finished reviewing section 6. Test modes section was changed to diagnostic tests and we are looking for inputs in that area.

The group decided to postpone discussions on section 7 for the next meeting.

The group reviewed the channel and interference model in section 11 with Tal. The group also discussed major parameters to be used for simulations. Major decisions are presented below.

The group agreed that the RMS delay spread shall be 25% of the peak delay spread.
The group took a staw-poll on the values of peak delay-spread to be used in the simulations:

- ?? 1us and 5us: 9 votes
- ?? 0.5us and 2.5us: 5 votes
- ?? 25% above the GI: 15 votes

Motion made by Bob, seconded by Jori: **Simulations shall use peak delay spread values of 1us, 5us and 25% above the GI.** Motion passed with 9 votes for, 0 votes against.

The group took a straw-poll on interference parameters:

- ?? Model 1:36us(50%), 100us(30%), 180us(20%) – 1 vote
- ?? Model 2: Uniform distribution between 36us and 180us – 12 votes
- ?? Model 3: Exponential distribution with average of 36us – 3 votes

The group agreed to use Method 2: **Uniform distribution between 36us and 180us.**
The group agreed to use: **Relative power of the interfering signal in the range 0dB -30dB.**

Burach proposed putting or between 64 and 256 mandatory systems to get products out quickly based on 802.11a PHY chips. Discussion resumed to table the issue until a number of options were mentioned including :

The group decided to postpone discussion of sections 8 and 9 for the next meeting.

The group discussed the integration of the TG3 and TG4 working documents. Several amendments have been made on the TG3 proposed document structure. Motion made by Nico, seconded by Durga: **Accept the amended TG3/4 document structure.** Motion passed unanimously.

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Durga called the joint TG4 MAN and PHY meeting at 3:15.

Durga presented the TG2 presentation seen earlier in the day by the TG4 MAC group for the benefit of the PHY group.

Durga presented a document called the Orlando Agreement that governs the merging of TG4 PHY document material with that of TG3 PHY. The text of this agreement can be seen in the presentation.

Discussion followed concerning the Orlando Agreement text.

Durga explained that both TG3 and TG4 are independent bodies. He also explained that if disagreements emerged between TG3 and TG4 on common issues, that the disputed issue would be removed from the common issues set and handled by the individual working group.

Durga announced that there would be an interim TG4 PHY meeting.

Discussion was held as to whether TG4 needs an exit strategy from a joint document because the TG3 PHY effort is so much more complicated. There was no dissent expressed by members present on this issue.

Durga made a motion (#1) to have the working group adopt the Orlando Agreement as a guiding document in the joint TG3 and TG4 PHY development effort.

Vote on motion #1: 8 yeas, 0 nays

The motion passed unanimously.

Nico van Waes led a discussion

Durga made a motion (#2) to recommend to the working group to adopt the jointly (TG3 and TG4 PHY) derived table of contents for "AIR Interface for Fixed Broadband Wireless Access Systems, Part A: Systems between 2 and 11 GHz."

Nico seconded the motion.

No discussion was required.

Vote: 7 yeas, 0 nays.

The motion (#2) passed unanimously.

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Ken presented comments on the TG4 MAC document from Vladimir Yanover, Subbu Ponnuswamy and Jori Arrakoski. Ken expressed his thanks to Jori for his extensive review of the document. The total number of comments to date is 8.

Ken motioned (#3) to have the approved comments applied to the TG4 strawman document.

Durga seconded motion #3.

Vote: 5 yeas, 0 nays

Motion #3 approved unanimously.

Ken announced that he would place these in a comment database and publish them within a week.

Durga presented a new version of the Orlando Agreement that reflected the group's concern for an exit strategy.

Durga made a motion (#4) to approve the text of the new version of the Orlando Agreement.

Ken seconded motion #4.

Vote: 5 yeas, 0 nays

Motion #4 approved unanimously.

Durga announced that tg4 WOULD MEET ON Friday from 8:00 to 9:30 AM.

Durga adjourned the meeting at 5:15.

Friday 5/17 2001

Durga brought the TG4 PHY and MAC meeting to order at 8:25

Durga reviewed the proposed closing plenary presentation.

Motion (#1) by Durga to update the table of contents.

Ken seconded motion #1.

Vote: 5 yeas, 0 nays

Motion #1 passed unanimously, so updated table of contents are approved and will be placed on the working group server.

A joint TG3 and TG4 PHY interim editorial meeting has been scheduled for June 7 and 8, 2001. The location has not yet been determined.

Motion (#2) by Durga to accept current TG4 PHY draft as current PHY working document.

Jori Arrakoski seconded motion #2.

Vote: 5 yeas, 0 nays

Motion #2 passed unanimously so the working group adopts the new draft of the TG4 PHY working group.
Durga adjourned the meeting at 9:25.