Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**IEEE 802.16.1 PHY Minutes, Session #10, Tampa Florida, November 6-9, 2000**
Date Submitted	**2000-11-09**
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Abstract	This document provides the minutes of Session #10 of the IEEE 802.16.1 TG PHY meeting. *This document is a best-effort representation of the actual discussion. The text provided represents the author's interpretation, and does not provide verbatim statements. The author concedes the possibility that the intentions of the speakers were misunderstood and/or inaccurately represented.*
Purpose	Administrative & Informative
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802.16 TG1 PHY Draft Editing Session Minutes

TG Session called to order:
16:30, November 6, 2000

J.Klein: Motion to accept minutes of Session #9. Second by Lars Lindh. Motion carried by voice vote.

J.Klein: Identified procedure to address editorial comments first, followed by technical comments, followed by TBDs.

Comment log:

Comment number	Notes/Comments	Disposition
502		accepted
515		accepted
472		accepted
525		accepted
542	Technical	Deferred
491		accepted
516		accepted
548		accepted
547	Typo	accepted
511	Technical	Deferred
569	Reworded for clarity	accepted
512	Reworded for clarity and correctness	accepted
470	Technical	Deferred
538		accepted
580	Technical	Deferred
456		accepted
494		accepted
506		accepted
492		accepted
460		accepted
462		accepted
477		accepted
489		accepted
523		accepted
464		accepted
Comment number	Notes/Comments	Disposition

566		accepted
508		accepted
563		accepted
466		accepted
485		accepted
483		accepted
495		accepted
522		accepted
520		accepted
517		accepted
557		accepted
484		accepted
486		accepted
487		accepted
537		accepted
531		accepted
493		accepted
565		accepted
467		accepted
493		accepted
455		accepted
458		accepted
507		accepted
469		accepted
463		accepted
546		accepted

J.Foerster: This concludes the work on editorial comments.

General Comments

Comment number	Notes/comments	Disposition
526	Modified	accepted
530		accepted
524	**D. Williams** to propose appropriate text.	deferred

J.Klein: We'll continue tomorrow at 08:00.

TG Session adjourned:
6:00 p.m. November 6, 2000

November 7, 2000
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TG Session called to order:
08:15, November 7, 2000

J.Klein indicated that the TG will continue in comment resolution.

Comment number	Notes/comments	Disposition
505	Page 282; discussion on coding options. The inner code rate is 2/3. Change wording for technical accuracy.	accepted
459	**J.Klein**: Page 269; add text to define restricted capability of half-duplex terminal.	accepted
550,544, 543,541, 540,539, 527,514, 545,510, 501, 503 509	**B.Aboukarr**: Change definition of inner convolutional code to harmonize with ETSI BRAN-HA. **J.Klein** spoke against this change, noting that it does not contribute any benefit.	In favor: **2** Opposed: **7** (rejected)
461	Add detail to define basestation	accepted
504	**Y.Leiba**: Revise lower limit on RS parity to T=0.	accepted
457	Change text to use term FSDD (comment by **P.Guillemette**) . **J.Klein**: this statement is unnecessary. **J.Foerster:** add comment defining support for half-duplex in FDD after line 38. **J.Klein**: the comment is resolved by comment 459.	rejected
490	**J.Klein**: Swap labels on subscriber terminal and basestation, add equalizer.	accepted
481-482	**K.Stambaugh**: substitute the constellation map. **J.Foerster:** these should be direct copies from DVB. Mode A and Mode B have different constellations. **J.Foerster** will add a table to clarify symbol mapping.	referred to editor

Comment number	Notes/comments	Disposition
475	**J.Foerster**: Editor to add table, ensuring consistency with constellation diagram	referred to editor
479	**J.Klein**: the drawing is incorrect. When q = 0, there is no meaning for q-1 path.	referred to editor
476	**J.Foerster**: editor added correct reference.	accepted
474	**K.Stambaugh**: clarification of interleaver cell depth	accepted
468	Pointer byte ambiguity. Function is currently defined to point to MAC message start and to stuff byte start. **Editorial team**: Add sentence to note purpose of pointer is to trigger search for first byte in new MAC frame.	referred to editorial team, accepted as modified.
488	**K.Stambaugh**: Change wording to clarify addition of single pointer byte.	accepted
496	**K.Stanwood**: Convey modem information to basestation prior to registration. Allows terminal operation in most-efficient PHY mode at earliest time. Unresolved pending MAC discussions on same topic.	unresolved
480	**W.Hunter**: Different constellation maps for Mode A and Mode B. **J.Klein:** recommend leave as is. We covered this topic in Denver.	rejected
471	**K.Stambaugh**: Eliminate section 3.1.2.1	accepted
470	**S.Marin**: Alert reader to compatibility with EN 300 421. **J.Klein:** This could cause confusion. **K.Stambaugh:** Modify to include text limiting the statement to components for Mode A downstream transmission compliant with EN 300 421.	accepted as modified
497	Insert randomizer polynomial for Mode B, same as for Mode A. **J.Klein:** Copy the polynomial from page 273 line 28.	accepted

Comment number	Notes/comments	Disposition
498	Clarify that the preambles are not randomized	accepted
499	**K.Stambaugh:** the randomizer should pause during creation of parity bytes. **J.Liebetreu:** The diagram implies that randomization is only applied to information bits. **J.Klein:** I am reluctant to add text that could confuse the reader. **J.Liebetreu:** State that the randomizer sequence only advances with new information bits.	accepted as modified
473	Is the interleaver depth adequate for the maximum symbol rate?	rejected
556	Revise rolloff factor to single value of 0.3	rejected
558	**J.Klein:** This text is proposed to clearly address the interactions of baud rate, rolloff factor, channel BW, and Physical Slots per frame.	accepted
559	**J.Klein:** Modify this comment to remove the sentence from line 36 to eliminate reference to implementation technique.	accepted as modified
518	**J.Klein:** This text clarifies the tail-biting technique, for accuracy. **G.Resheff:** Limit comment to encoder only.	accepted as modified
579	**J.Klein:** Revise text to refer to channel model type in Falconer submission (pc00/21); do not import reference to Falconer Type 3 channel, an unusual case. **C.Belfiore:** The standard should specify the minium number of equalizer taps.	accepted
536	TC sublayer pointer byte (upstream)	accepted (see 468)
513	**J.Klein:** Change is editorial, change should be reflected in section 3.3.3.2.1	accepted

Comment number	Notes/comments	Disposition
519	**J.Klein:** Designate parity as LSB. **D.Williams:** Is it specified anywhere that the parity is even or odd? **J.Klein:** Yes. It's even, since it says that the parity bit is an exclusive-or of all 8 bits.	accepted as modified
521	**D.Williams:** The graphics help to improve the level of familiarity and correctness of implementation for these codes.	rejected
511	Editorial comment, improves clarity. Applicable to section 3.3.3.2.1.	accepted as modified
528	**J.Klein:** Change to include the statement designating this as TDM burst type 1 (DIUC=0), without removing the definition of modulation and code type.	referred to the combined MAC and PHY editorial team

L.Lindh: How does the TC sublayer behave in this case?

J.Klein: We will need to have clarification of TC sublayer operation from the MAC and PHY team.

529	**J.Klein:** Add text paragraph indicating that stuff bytes shall be appended to the end of control messages.	accepted as modified
532	Editorial comment, but it refers inaccurately to Mode A	rejected
533	**K.Stambaugh:** Add text paragraph to show how to force an integer number of symbols per PS. **J.Klein:** Fill the end with zero-bits to ensure an integer number of symbols per PS.	accepted as modified
553	TC sublayer should not be turned off; defer to resolution by MAC group.	deferred
535	TC sublayer should not be turned off; defer to resolution by MAC group.	deferred
542	Change so T=0 is the lower limit, for consistency.	accepted
534	Move randomization row to 2nd row, to reflect correspondence with signal flow.	accepted as modified

J.Klein: Let's make another pass through the comments. **W.Hunter:** I'll sort again to group unresolved comments.

Comment number	Notes/comments	Disposition
549	**D.Williams:** Typo, the code should be (30,24).	accepted
524	**D.Williams** to generate a contribution containing the proposed editorial changes.	deferred

J.Klein: We'll adjourn. We have a joint MAC/PHY session at 3:00 today.

TG Session adjourned:
6:00 p.m. November 6, 2000

November 8, 2000
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TG Session called to order:
08:10, November 8, 2000

J.Klein: We'll review the comments from TG2; **Andy McGregor** is here. Discussion ensued on spectral mask requirements for unwanted emissions. **G.Robinson:** We should include multi-carrier in the specification, since they both exist in this frequency band. **P.Thompson:** Was there an interest in TG1 to address spectral mask requirements, or is this something new. **J.Klein:** If you look at p314, you'll see a section on spectral mask and regulatory requirements. The document is not coherent in its last section; the tables need to be completed. Do we want to leave the table open, or fill it in with information from TG2? We may apply the TG2 requirements in some cases, but local authorities will want their requirements to apply. **P.Thompson:** Can you say to use the TG2 requirement, except where local regulations are more stringent, in which case they should be followed? **J.Klein:** Modify the table on p314, lines 30-34. Follow section 6.1.4.1 Unwanted Emission Limit. **A.McGregor:** Use the document number 802.16RP. **J.Klein:** Follow section 6.1.4.1 Unwanted Emission Limit of 802.16RP or relevant local regulatory requirements if more stringent.

Comment number	Notes/comments	Disposition
583	See discussion above, use TG2 Unwanted Emission Limit	accepted as modified
582	(Adds EIRP Limits-suggest adding limits for repeater) **A.McGregor:** Our numbers are EIRP, while yours are transmitted power, which is before the antenna. **P.Thompson:** Was it the intent of TG1 to specify anything about the EIRP or power transmitted? So you would be augmenting our words with minimum specs. **J.Klein:** We need to use the EIRP limits given in IEEE802.16-2-00/01r9 for both basestation and subscriber station.	accepted as modified

Comment number	Notes/comments	Disposition
584	**J.Klein:** Antenna requirements, why should we care? **A.McGregor:** It's completely your call. **J.Klein:** My recommendation is to leave it to the	rejected

	service provider, or integrator. **P.Thompson:** It's a mainbeam coexistence issue.	
560	(Power control, p314, line1). **P.Thompson:** You've put in 40dB, and we've only asked for 15dB. **J.Klein:** It was agreed that 40 is easily achievable. **B.Foster:** are you talking about static or dynamic control. **P.Thompson:** It's all dynamic; we're talking about how much you need for coexistence. Document currently covers required amount.	rejected

J.Klein: At 1:00 we'll meet with the MAC to conclude what we started yesterday, and to go over the TFM comments and resolve them. I've discussed it with Roger; for clarification, since it's a technical issue, what is the requirement on a vote for it to pass. Roger guided me that it is 75%, and not just an ordinary comment to resolve. With that said, I want to dedicate this day to resolve the comments associated with the last section of our document. My feeling is that section 3.6, and the sections following, are missing the point. These sections are important for interoperability. I believe some items are missing, and some are included which should not be, since they are outside the guidelines. We need to decide how to make this performance section relevant to interoperability.

G.Robinson: I think it's premature to specify the phase noise or Tx symbol jitter. **J.Klein**: Interoperability is not achieved unless all the CPEs can operate regardless of the basestation. **J.Klein** introduced ETSI document 301-213-1 on interoperability. **J.Klein:** Let's list the issues that are important for interoperability. We can look at p314. From a basestation perspective:

Basestation Tx
- frequency accuracy
- modulation types (Tx, Rx)
- BER of BS transmitter (by an "ideal" SS)
    - for specific modulation, expected RSL for specific BER (or expected degradation from theory)
    - raw BER?? or EVM?? to measure transmission quality

Subscriber station Rx
- BER performance
    - per channel type
    - per modulation and FEC choice
    - classes of SS
- Dynamic range
- Adjacent channel performance

Subscriber station Tx
- minimum output power (at max level)
- frequency accuracy

- modulation types (Tx, Rx)
- BER of BS transmitter (by an "ideal" SS)
    - for specific modulation, expected RSL for specific BER (or expected degradation from theory)
    - raw BER?? or EVM?? to measure transmission quality

A consensus emerged that the TG will not address basestation receiver performance parameters.

J.Klein: Now we're in a position to address the comments.

Comment number	Notes/comments	Disposition
584	**J.Klein:** p318, line4. This is to clarify that the time-average of power is used.	Accepted
580	Refer power to the antenna input port.	Accepted
578	Co-Channel interference	Approved 5-1
574	Phase noise is not included as a parameter in minimum performance	Rejected
577	Adjacent channel interference; comment suggests using ETSI 301-213-1 values. **L.Lindh** noted that adaptive modulation is not addressed (adjacent channels may have differing modulations).	Accepted

Comment number	Notes/comments	Disposition
575, 571	(Insert BER threshold values.) **J.Liebetreu:** Where are the values measured? Use values suggested, but add TBR notation, to reflect that the values are not approved, but are inserted to stimulate further discussion / analysis. **J.Klein**: Here is the relevant section of the ETSI document that contains the proposed values. We also need a reference diagram to show where the measurement is taken.	Accepted as modified

J.Klein: We must review the **Dave Williams** document, and I will provide a reference diagram as well. We should use the TBR notation for adjacent and co-channel interference as well.

Comment number	Notes/comments	Disposition
573		Rejected

J.Klein: We should break for lunch, because we meet at 1:00 with the MAC group to discuss TFM.

TG Session reconvened:
1:35 p.m., November 8, 2000 (After MAC/PHY TFM discussion and vote)

Comment number	Notes/comments	Disposition
564	Partition specification on frequency accuracy into separate specifications for each band. Discussion of merits. Type of source: fee-running, or based on phase-locked synthesis.	Rejected 6-4
570	Basestation receiver dynamic range: either remove the item or relax the requirement. Consensus to remove the dynamic range item (modification)	Accepted as modified 7-1

G.Robinson expressed concern that the specification would not support equipment deployment due to absence of important parameters.

Comment number	Notes/comments	Disposition
551	Original text correctly identifies uplink modulation requirement (QPSK)	Rejected
567	This section will be removed.	Deferred
562	This section was addressed by the decision not to address phase noise.	Rejected
561		Deferred
568		Deferred
428	Clarification regarding TC sublayer operation received from MAC group; revised comment accepted as modified.	Accepted as modified

D.Williams presented a contribution containing details of a proposed editorial change to clarify the process for generating shortened codewords for the turbo product codes.
K.Stambaugh discussed whether the need exists for a technique to generate codeword sizes different than the fundamental codeword size, since the MAC burst profile contains the code row and column parameters. **D.Williams** also observed that the larger

codeword size is too large, so the 392-byte code needs to be revised. Also, **K.Stambaugh** noted that a technique to generate a shortened last codeword must also be defined. **J.Klein** noted that the fallback is to have no shortened last codeword capability. **D.Williams** and **K.Stambaugh** to define a new code (smaller than the 392-byte code), and to define the algorithm for shortened last codeword.

K.Stambaugh presented a contribution containing details of a proposed method to define the fixed codeword size, but did not address a method for generating the shortened last codeword. Discussion ensued, but time expired.

TG Session adjourned:
4:25 p.m. November 8, 2000

November 9, 2000
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TG Session called to order:
08:20, November 9, 2000

K.Stambaugh presented a further contribution containing details of a proposed method to define the fixed codeword size. This discussion was a continuation of the discussion from the previous afternoon. **K.Stambaugh** raised the question of how to handle the situation where a short MAC message appears in a codeword after a MAC message tail that crossed the codeword boundary at the beginning of the codeword, or the case of multiple MAC messages in a codeword. **J.Liebetreu** noted that the TCS is not explicitly identified to possess the function of inserting the stuff bytes. **K.Stambaugh** also discussed a method for last codeword shortening. Stuff bytes are defined as 0xFF.

Motion by **K.Stambaugh**, second by **L.Lindh,** to accept the text proposed by **K.Stambaugh**. Motion passed unanimously.

D.Williams presented a revised contribution containing details clarifying the Block Turbo Codes. **G.Resheff** determined that a longer code can be generated from the same extended Hamming code. The revised long code is a 253-byte code (46x44 information bits), based on (64,57) extended Hamming code. **K.Stambaugh** noted that the code should be an integer number of bytes. **D.Williams** added a clarifying statement to the text. **D.Williams** presented text identifying the method for last codeword shortening. Stuff bits are defined to have the value '1'.

TG approved the text by **D.Williams** submitted in response to TG request for clarification to resolve comment 524.

Comment number	Notes/comments	Disposition
524	**D.Williams** BTC clarification accepted	Accepted as modified

J.Klein presented material proposing modifications to the table on pp314-315. The purpose of the proposed modifications was stated as advancing the development of the table; another review of the contents and structure is anticipated. **J.Klein** reviewed plans for an editing session in San Diego.

J.Klein: We have concluded our business; our next meeting is at the closing plenary session at 3:00.

TG Session adjourned:
11:35 a.m. November 9, 2000