APPROVED

Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**IEEE 802.16.1 PHY Meeting Minutes, IEEE 802.16 Session #9**
Date Submitted	**2000-09-14**
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Re:	IEEE 802.16 Session #9, 802.16.1 PHY Team
Abstract	This document provides the minutes of Session #9 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.*
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802.16 TG1 PHY Session Minutes, Meeting #9

TG Session called to order:
08:00, September 12, 2000

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

Comment log:

Comment number	Notes/Comments	Disposition
257	Reference configuration material is contained in MAC; remove from PHY	referred to editor
258	Editor recommends section be deleted	referred to editor
259	Editor recommends deletion of figure	referred to editor
260	Remove editorial remark	accepted
261		referred to editor
262	Typo	accepted
263	**J.Foerster** noted overlap with MAC sections on framing. **G.Robinson** spoke against removing all framing references, noting that PHY should address it for sake of completeness.	unresolved
264	Editor recommends removal	referred to editor
265	Extraneous figure heading (typo)	accepted
EC1	Editor added segue prior to mode A description.	accepted

K.Stambaugh noted that editorial comment did not address requirement on BS.
G.Robinson noted that heading numbers were different in this version from rev2.
J.Foerster clarified that the working document is that which had been published for comment. **G.Robinson** and **J.Foerster** concluded that the difference between the documents is in the section numbers.

268	Extraneous figure heading (typo)	referred to editor
EC2	Remove subjective comment	accepted
EC3	add randomizer logic diagram to correspond to original document	accepted
EC4	**J.Foerster**: this adds Boolean expressions defining differential encoding	accepted
Comment number	**Notes/comments**	**Disposition**
EC5	**J.Foerster**: this adds equations defining	accepted

	SRN pulse shape	
269	**J.Foerster**: agreement on unification; location of scrambler judged to be a technical question	postponed for later review under technical

M.Ran advocated scrambling after FEC, rather than prior to FEC encoding. **J.Klein**, **Liebetreu**, **L.Lindh** noted benefits of scrambling prior to FEC encoding.

270	**J.Foerster**: notation change to retain consistency with commonly used notation	must resolve comment 269 first
273	**Foerster**: refer to MAC/PHY discussions	editorial
274	**J.Foerster/J.Klein**: insert clarification; **K.Stambaugh**: leave unresolved, since it will be deleted. **J.Klein**: we agree to have it in the table, if the table exists.	editorial
276	**J.Foerster**: refer this to MAC/PHY discussion.	editorial
277	**J.Foerster**: this is a formatting error	accepted
279	**J.Foerster**: this is for notational consistency. **L.Lindh**: what is the notation for constraint length?	accepted
EC6	**J.Foerster**: delete use of k for constraint length, remove k from the Table 64, correct polynomial in Table 64 from 131 (oct) to 133 (oct).	accepted
282	**J.Foerster**: remove extraneous table heading.	accepted
285	**J.Foerster**: this corrects the values.	accepted
EC7	**J.Foerster**: Correcting figure numbers.	accepted
287	**J.Foerster**: Add missing text to refer to tables.	accepted
288	**J.Foerster**: changes table heading to figure heading.	accepted
291	**J.Foerster**: changes table heading to figure heading.	accepted
Comment number	**Notes/comments**	**Disposition**
292	**J.Foerster**: this inserts the correct equation for SRN pulse shape.	accepted
293	**J.Foerster**: adds 3 table headings	accepted
294	**J.Foerster**: defer this to MAC/PHY	unresolved

	discussions.	
295	**J.Foerster**: Recommend deleting this table, but this should be checked against the corresponding MAC table; should resolve comment 294 first	unresolved
296	**J.Foerster**: This also refers to framing; should resolve comment 294 first	unresolved
297	**J.Foerster**: This is a minor editorial change; if the figure is moved into the MAC, it should be corrected.	refer to editor
298	**J.Foerster**: "Figure" should be "Table".	accepted
299	**J.Foerster**: refer to PHY/MAC	unresolved
EC8	**J.Foerster**: change BTC to outer code for consistency. **M.Ran**: BTC should be specified as both outer and inner code. **D.Williams**: There is a higher probability of confusion if it is specified as both.	accepted as outer code
EC9	**J.Foerster**: Add this clarification so that it is clear that the preamble length is not a time-varying parameter.	accepted
EC10	**J.Foerster**: Add this clarification so that it is clear that the modulation is not a time-varying parameter.	accepted
EC11	**J.Foerster**: Add constellation MAP as specified in the original PHY documents (missed during FrameMaker conversion).	accepted
EC12	**J.Foerster**: Add note to clarify meaning of BTC as an outer code. **Liebetreu**: note should clarify that no inner code is selected in this case.	accepted

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

Technical Comments

Comment number	Notes/comments	Disposition
266	**J.Foerster**: refer this to PHY/MAC discussion. **J.Klein**: This should be resolved in the MAC.	refer to editor
TC1	**J.Foerster**: This change modifies the	

	diagrams to place randomization outside of the FEC encoder/decoder.	

Liebetreu: If the randomization is outside the FEC, it makes synchronization of the randomizer more reliable. **Y.Leiba**: The purpose of randomization is to whiten data, which implies appropriate positioning for randomization is outside the FEC. **J.Foerster**: The randomization should be prior to the FEC encoder. **D.Williams**: the randomizer belongs outside the FEC. M.Ran: If scrambler is prior to FEC, working point for synchronization is 1e-3 or 1e-4, then it won't be effective for burst mode transmissions. **J.Klein**: The argument is not valid for burst, since there are other synchronization methods applied in burst mode. **J.Foerster**: It seems like you'll be better able to obtain sync after the FEC. **J.Foerster**: Note that the randomization technique is not specified yet for the upstream link. **J.Klein**: This discussion is different from the one under consideration. I want to finalize the current discussion. **K.Stambaugh**: The preamble is not randomized. Y.Leiba: The randomization has nothing to do with burst synchronization. **G.Resheff**: The codes in mode B are systematic, so no colorization is introduced. **D.Williams**: RS cross-over point is 1e-2. There are 3 orders of magnitude improvement in BER, so the sync byte protecting the with FEC.

J.Klein: Motion to move the FEC decoding block before the de-randomizer on the SS block diagram and accordingly to swap the FEC encoder and randomization on the BS block diagram. Second by **K.Stambaugh**.
Vote tally: 8 in favor, 0 opposed, motion passes.

269	**J.Foerster**: Recommend acceptance of this technical change.	accepted
272	**J.Foerster**: This removes ambiguity in the packet definition for stuffing. **K.Stambaugh**: Clarify that the first byte is the pointer byte.	accepted

Comment number	Notes/comments	Disposition
275	See discussion below.	

J.Foerster: Adds a field for interleaving options in BTC. **M.Ran**: Optimal interleaving in BTC can improve performance. **D.Williams**: The motivation is not clear. **Liebetreu**: There are many ways to write the data block to the interleaver. **J.Klein**: The standard accommodates future revisions to the coding specification; to define the future migration is a waste of time of this meeting. **M.Ran**: We must define all the details. **J.Klein**: If a new code emerges, we can address it at that time. **Liebetreu**: The details of the encoder must be accurately defined, or the encoders and encoders will not be interoperable. **J.Klein**: we do not want to delay the standard, so we should put in the basic encoder description. **K.Stambaugh**: Moshe and Dave should resolve this and report back to the TG. **G.Robinson**: If we don't remove the ambiguity, we should remove this section. **J.Foerster**: It is clear how the array is written, but not how it is read. Also, the alternative method of shortening is not defined. These must be resolved. **Disposition**: **M.Ran** and **D.Williams** designated to report a resolution by Thursday.

278	**J.Klein**: This should be deferred until after two papers on this subject are presented.	deferred
280	**M.Ran**: Parity check is typically most significant part. The data should be first, instead of the parity, to reduce delay on data as much as possible. The LSB should enter the channel first. No objections.	accepted
281	**A.Gupta**: It is important to have an even number of information bytes. **L.Lindh**: To release the document, it is important to know how to shorten it. **J.Klein**: Alok should propose an approach by Thursday.	deferred
283	**M.Ran**: It would be nice to have common notation defining output significance. **J.Klein**: This must also be resolved by the beginning of Thursday's session.	deferred

Comment number	Notes/comments	Disposition
283	**D.Williams**: What is the value of defining symmetric codes to be preferred? **J.Klein**: Some codes in the document are symmetric, some are not. **Liebetreu**: The statement does not add anything. **J.Klein**: Then we	accepted modification to define g1 and g2, but to reject paragraph defining

	should remove it. The sentence is more destructive than constructive. **M.Ran**: I don't think it's destructive. **J.Foerster**: There is a section in the MAC identifying the constituent Hamming codes	symmetry as a preferred characteristic
286	**J.Foerster**: use QPSK as only mandatory DS modulation in mode B	rejected 8-0
304	**J.Foerster**: This change makes QPSK the only mandatory US modulation. **W.Hunter**: There isn't any difference in radio fidelity required. **K.Stambaugh**: The PAR is higher for 16QAM. **W.Hunter**: The link will have a reduced range for 16QAM.	revision accepted in favor 5 opposed 2
289, 290	**M.Ran**: The modulation map makes QPSK, 16QAM, and 64QAM consistent. **Y.Leiba**: Some modulations are described as I and Q bits interleaved, where some use 2b of I then 2b of Q, etc. **J.Klein**: Do we want the same rule for all modulation orders? Is there a strong preference for one over another? **K.Stambaugh**: Do we agree that the result should maintain gray-coding? (general agreement voiced).	289: Ran's suggested gray code mapping received 1 votes. 290: Y.Leiba's suggested gray code mapping received 3 votes.
TC2	**L.Lindh**: There is no need for differential encoding in the uplink. **L.Lindh**: *Motion* to remove differential encoding from the uplink specification. Second by **Y.Leiba**.	Motion approved 8-0
TC3	**J.Klein**: *Motion* to make QPSK modulation map for the upstream link the same as that specified for the downstream link Second by **K.Stambaugh**.	Motion approved 8-0
Comment number	**Notes/comments**	**Disposition**
306-307	**J.Foerster**: this change is to make the upstream link consistent with the downstream link (16QAM and 64QAM modulation mappings)	accepted
310	Current baud rate ranges 10-40 DS and 5-30 US; proposal to change to 5-40 for both DS and US.	accepted in favor 4 opposed 3

311-312	Delete section and table on baud rate recommendations. **K.Stambaugh**: Reject both comments, but acknowledge that this topic should be addressed. **J.Klein**: This comment should be rejected, but band plans should be reviewed.	rejected in favor: 0 reject: 3
314	**J.Klein**: References should be removed. **G.Robinson**: Rain and multipath are mixed in this comment. **J.Klein**: Multipath is the PHY issue. **G.Robinson**: Typically the multipath is 15dB below the signal. **J.Klein**: The question is whether we insert this statement as an introduction. Recommend that the first paragraph is accepted and the remainder is rejected.	accepted as modified; in favor: 2 reject: 1

J.Foerster: This concludes the technical comments.

Liebetreu: Is the plan to now address the unresolved comments that are not referred to the joint MAC/PHY meeting?

J.Foerster: Yes.

J.Klein: We'll approach the unresolved comments by considering the contributions that have been submitted.

J.Klein presented document 802.16.1c-00/06 **FEC Parameterization for Control Channel Information** and document 802.16.1c-00/07 **FEC Parameterization for Data Transport**.

J.Foerster: Now we can continue with comment resolution.

Comment number	Notes/comments	Disposition
278	**Y.Leiba**: Make code types 2 and 3 optional for burst DS Mode B; simplifies requirement for compliance. **J.Klein**: Coding presentations (see note above) indicate that all three code types are necessary. **A.Gupta**: Having additional inner code capability provides more flexibility. **K.Stambaugh**: If you need the flexibility, you can put it in, so make it	accepted as modified in favor: 6 opposed: 0

	optional. **J.Klein**: Yes, that's a valid point. **Y.Leiba/K.Stambaugh**: Make codes 1 and 3 mandatory, but code 2 optional.	

J.Klein: On Thursday from 08:00-09:30 we will have a joint session with TG2.

293	Add heading to Table 77.	accepted
300	Accept first byte as byte 1	accepted
271	Formatting problem	refer to editor
313	Comment on TBDs	rejected

J.Foerster: Should we start filling in TBDs?

J.Klein: Sure. Let's have Jeff present his submission on open issues in the PHY; it should help to identify what we should do about the TBDs.

J.Foerster presented document 802.16.1-00/01, **Summary of Open PHY Issues in IEEE 802.16.1**.

J.Foerster: We need to address coding for the PHY/MAC control message portion of the frame.

A.Gupta: For the PHY/MAC control portion, the outer code could be RS(30,20) if the inner code is (32,16) convolutional instead of the inner code specified, the (24,16) convolutional code.

J.Klein: But the code specified is RS(40,20) and inner code (24,16) convolutional.

J.Foerster: We need an allocation map once per frame.

J.Foerster: Can we have a motion to insert this text?

> The PHY/MAC control portion of the downstream frame shall be encoded with a fixed set of parameters in order to ensure that all subscriber stations can read the information. The modulation shall be QPSK, and the PHY/MAC control portion of the frame shall be encoded with an outer (40,20) Reed-Solomon code with a (24,16) inner convolutional code. There must be a minimum of 2 codewords per control portion of the frame when a downstream allocation map is present.

Motion by **W.Hunter**, second by **J.Klein**. In favor: 7; opposed: 0.

J.Foerster: Next is the randomizer logic diagram for Mode B downstream. Added descriptive text paragraph.

J.Foerster: A longer polynomial should be used for longer transmissions.

J.Foerster: We need a motion to insert this language.

> Randomization shall be employed to minimize the possibility of transmission of an unmodulated carrier and to ensure adequate numbers of bit transitions to support clock recovery. The stream

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of downstream packets shall be randomized by modulo-2 addition of
the data with the output of the pseudo random binary stream (PRBS)
generator, as illustrated in the following diagram.  (insert
Figure 138)

At the beginning of each burst, the PRBS register is cleared and
the seed value of 100101010000000 is loaded.  Note that a burst
corresponds either to a TDM burst starting with a frame start
preamble (Preamble 1 in the next section) or a TDMA burst starting
with a shortened preamble (Preamble 2 in the next section).  The
seed value must be used to calculate the randomization bit, which
is combined in an XOR with the first bit of data of each burst
(which is the MSB of the first symbol following the last symbol of
the preamble).
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Motion by **J.Foerster**, second by **J.Klein**. In favor: 6; opposed 0.

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

TG Session adjourned:
6:00 p.m. September 12, 2000

September 13, 2000
802.16 TG1 PHY Draft Editing Session Minutes

TG Session called to order:
08:15, September 13, 2000

J.Klein briefly discussed preamble sequence generation technique advocated by Siemens, highlighting that a presentation on this topic will be forthcoming.

J.Klein noted that the TG is not in a position to leave the topic of additional modulations open, due to the timeline considerations. However, he noted that if a member desires to propose an additional modulation technique, it may be done through the letter ballot procedure. **J.Foerster** asked whether there was any objection to removing reference to additional modulations. No objections were voiced.

J.Foerster asked whether it is appropriate to provide additional options for allowable **frame times**. **K.Stambaugh** noted the presence of another table referring to physical slots per frame. **J.Foerster** suggested revisiting the question when the topic of baud rates is addressed.

J.Foerster noted that baud rates in the draft were selected based on a 0.25 rolloff factor. **Liebetreu** suggested that the baud rates be defined in a set of ranges, to address cost factors associated with high baud rates, for example 5-20, 10-30, and 10-40 Mbd. **K.Stambaugh** advocated the use of a table that defines minimum ranges. Other rates outside the minimum range may be defined as optional. **L.Lindh** suggested that 20 Mbd is a good center of range value. **D.Williams** expressed concern that the standard would be less competitive if the maximum baud rate is lower than 40 Mbd. **C.Belfiore** commented that the motivation should not be tied to ODU or RF, since the frequency translation problem is not heavily dependent on baud rate. He also noted that and that low values are of little importance in this application. Further, he noted that many countries have space above 50 MHz. **K.Stambaugh** noted that the 12.5 and 14 MHz channels had a high level of importance. **J.Klein** identified ETSI 56, 28, and 14 MHz band as important, as well as 36 MHz. **J.Foerster** added 21 MHz to the list. **J.Foerster** constructed a table of baud rates based on channel bandwidths and rolloff factors, constrained by physical slot and frame time constraints. **J.Klein** commented that the resolution in baud rates is an important factor in defining baud rate tables. **K.Stambaugh** suggested that 200kHz resolution is appropriate, since it is divisible by 4kHz (for symbol/PS and frame size constraints). **J.Klein** proposed 500kHz step size; **K.Stambaugh** consented. **K.Stambaugh** commented that the standard should address discrete baud rates, and

allow manufacturers to provide additional capability at their option. **J.Klein** agreed, and recommended that the standard should contain a table to address this requirement. **J.Foerster** will add the appropriate language and table to the draft, for review on Thursday.

J.Klein directed the attention of the TG membership to the subject of preamble generation, and introduced **Claudio Santacesaria** (Siemens ICN), who presented his ETSI BRAN contribution on **CAZAC Preamble Sequences**, BRAN19.5d044. **J.Klein** invited additional contributions from interested parties by Thursday morning.

J.Klein directed the attention of the TG to the topic of power control. **J.Klein** noted that the System Requirements document may contain the appropriate values for power fade rate and depth. **C.Belfiore** noted that fade rates of 100dB/s will not be seen in bands above 15GHz. **J.Klein** indicated that the correct range is 10-30dB/s maximum. The TG resolved by consensus to set the power control rate at 10dB/s, subject to confirmation that this value does not contradict the System Requirements Document.

Motion by **J.Klein**: Include the wording

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The power control algorithm should be designed to support power attenuation due
to distance loss or power fluctuation at rates of at most 10dB/s with depths of
at least 40dB.
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Second by **G.Robinson**. (**K.Stambaugh** checked for contradiction of System Requirements Document, and found none.)

Motion carried by voice vote.

G.Robinson: Power control update must prevent carrier dropout. **G.Resheff**: The MAC update sets the frequency of power control adjustment (update). **J.Klein**: The rate is only 0.01dB/msec; this provides great flexibility to the MAC for update rate. **W.Hunter**: The real metric is that it must be done without loss of data. **J.Klein**: We have consensus to add the phrase "without data loss" to the power control paragraph (no objections).

L.Lindh: Add to Table 3-1 the entries of 20-30dBm with accuracy +/-5dB, 10-20dBm (+/-5dB), 0-10dBm (+/-5dB), -10-0dBm(TBD), -15 to –10dBm (+/-7dB), and –25 to –15dBm (+/-10dB). **W.Hunter**: If you're walking it up or down in 0.5dB steps, you should be able to maintain accuracy of 0.5dB. You don't want the power control circuit to be more expensive than the PA. **J.Klein**: Accuracy of 0.5 dB on higher level signals is fine, and lower accuracy on lower level signals. **K.Stambaugh**: If the step size is greater than 5db, accuracy is 1dB, if less…**G.Robinson**: Step size finer than 0.5 dB doesn't really do any good. **J.Klein**: We need more than that, since it translates to a MAC message. **G.Robinson**: Accuracy isn't as important as step size because you'll walk the level in; the power is relative. **J.Klein**: Let's try to simplify, defining step size and number of steps. **K.Stambaugh**: But we need to define the accuracy of the step. **J.Klein**: It cannot be maintained throughout the full range. **G.Resheff**: Maybe use a step size that varies across the range within some limits. **L.Lindh** : 0.5dB is quite small. **C.Belfiore**: The step should be independent of the absolute power; it should all be under the control of the basestation. On a relative basis, you can do much better than 0.5dB, and the cost is almost nothing. The values in the table are very achievable on an absolute basis. You also need a gross number, because you'll run it up due to interference. To avoid this, you need intelligence at the network level, and then something large in size is sufficient. For 64QAM, on a clear day, you'll cream the whole area, so you'll need to run at a lower level; you'll always be telling all the CPEs to lower their power. Getting back to the question, I think these numbers are very achievable.

Resolved to set step size to 0.5dB, with step accuracy +/-0.2dB.

L.Lindh: Do we have a need for absolute power level control? **C.Belfiore**: You don't need it; when a new station comes on, you step it up from minimum level. **G.Robinson**: We don't say that new terminals should enter [the network] at lowest power, maybe we should.

(SS) Minimum Tx level at maximum power level setting **J.Klein**: If we define minus 23dBW per Mbd, we're ok. For example, -10dBW is 20dBm for 20Mbd. **C.Belfiore**: Why force everyone to transmit at such a high level? **J.Klein**: Typical installations will have several km distances. **C.Belfiore**: If you put it too low, you'll prevent certain services from being supported. **J.Klein**: Let's relax it by 3dB, to minus 26dBW/Mbd. Then –13dBw is 17dBm for 20Mbd.

(SS) Tx power level and range **J.Klein**: The range should be set at >40dB, but Tx power is a coexistence question. **J.Foerster** modified the draft to address Tx dynamic range, but not power level.

Codeword length constraints **J.Foerster**: Minimum RS codeword length is 6 bytes. If a large codeword is followed by a short codeword, there's a question of whether the decoder will have time to decode the large codeword.

Basestation maximum Tx phase noise **J.Klein**: My recommendation is to use integrated phase noise, rather than specifying the mask. What is the rule of thumb? Is it the minimum constellation phase separation, divided by 10. **W.Hunter:** A good PL-DRO will run about 1.9deg, which will put you a few tenths of a dB from theory for 16QAM. **C.Belfiore**: The integrated phase noise should be about 1.6deg rms, for both sides for16QAM. **J.Klein**: This corresponds to 1.3deg on each side. **K.Stambaugh**: We should note that this assumes a receiver tracking loop bandwidth, say 1%.

W.Hunter: The spectral mask specification should be per the relevant local regulatory requirements. **J.Klein**: That's the right approach, I agree.

A consensus emerged (**J.Klein. J.Foerster, W.Hunter, J.Liebetreu, C.Belfiore**) that 1.0dB pk-pk ripple over the signal baud rate bandwidth for composite amplitude ripple is appropriate, while 10% of symbol period (64QAM) and 20% of symbol period (16QAM) for group delay is appropriate.

Further, the TG agreed to defer ACI and CCI specifications to completion of the relevant coexistence document (TG2). Since the document does not exist, these specifications are temporarily removed from the specification. Spurious emissions were moved to be situated close to spectral mask (out-of-band) and specified to be "per relevant local regulatory requirements" (**W.Hunter**).

J.Foerster then constructed the corresponding table for basestation receiver performance specifications (dynamic range, receiver equivalent noise floor, maximum input 1dB compression point, adjacent channel interference), based on contributions from **J.Klein**, **W.Hunter**, **K.Stambaugh**, **G.Robinson**, **C.Belfiore**, **G.Resheff**.

Dynamic Range 70dB above receiver noise floor.

Receiver equivalent noise floor -105dBm (includes noise floor for a 1MHz noise bandwidth, noise figure, and other implementation losses).

Maximum input 1dB compression point -25dBm (**G.Robinson**).

J.Klein: We have a joint meeting with the MAC group tonight from 6:00 to 7:30.

TG Session adjourned:
5:00 p.m. September 13, 2000

September 14, 2000
802.16 TG1 PHY Draft Editing Session Minutes

TG Session called to order:
09:15, September 14, 2000

J.Liebetreu presented the report of the ad hoc reporting group charged with resolving the BTC encoder definition (**Liebetreu, Williams, Ran**)

J.Foerster noted that it is a complication to have two shortening approaches in the standard.

K. Stambaugh asked whether all bytes of the encoded array must be transmitted in the case where the payload is shorter than the payload size for optimal encoding.

Consensus emerged to eliminate the codeword sizes that require bit-level shortening. (**K.Stambaugh, J.Klein, D.Williams, J.Foerster**). This eliminates the need for additional shortening bits.

K.Stambaugh noted the need for unambiguous definition of the procedure for applying BTC to payloads of any size.

J.Klein reported on the encoding procedure for Mode B concatenated codes with shortening.

J.Klein reported on CAZAC preamble sequences. He proposed using 3 best CAZAC16 sequences, denoted X, Y, Z. For the downlink frame his recommendation is to repeat X twice, for downlink TDMA use Y, for uplink use Z repeated N times.

Y.Leiba reported on the 802.11 preamble generation method, adapted for 802.16. The proposed preamble has two distinct segments, one for sync, one for frame delimiting. The SYNC segment will be 3-microseconds in duration.

J.Klein asked what method should be inserted into the draft. **L.Lindh** indicated his support for the CAZAC preamble generation method.

J.Foerster noted that the uplink preamble is programmable and therefore does not need to be further specified, but that the CAZAC sequences seemed appropriate for the downlink (Mode B)

J.Klein asked if there were any objections to including the CAZAC sequences in the specification for the downklink Mode B preamble.

Motion by **J.Klein.** Include the wording:

> `The downlink preambles will be based on a CAZAC16 sequence. To delineate the downlink frame start use 2 repetitions of a 16-symbol sequence and to delineate a TDMA burst use a 16-symbol sequence.`

Second by **J. Foerster**. Friendly amendment offered by Y.Leiba rejected by J.Klein. In favor: 4; opposed 2. **Motion passes.**

The TG discussed using a Nx16 symbol preamble, for N = 0,1,2,3, or 4, using the 16 symbol CAZAC sequence. Consensus emerged and this was adopted without objection. **J.Klein** noted that a specific sequence must be defined.

TG Session adjourned:
12:15 p.m. September 14, 2000

September 15, 2000
802.16 TG1 Session Minutes

TG1 Session called to order by J.Klein:
08:20, September 14, 2000

J.Klein led TG1 in constructing a motion for submission to the Working Group in the Closing Plenary:

> Initiate a Working Group review of the IEEE 802.16.1 working document number 802.16.1-00/01r4 (to be constructed by incorporating the resolved comments listed in 802.16.1-00/04 into document 802.16.1-00/01r3). The review will run from September 29 through October 30. See Call for Comments 802.16.1-00/05.

Accompanying discussion: **J.Mollenauer**: I have most of the resolved comments folded into the document now, but I need to be sure that I have the correct disposition. **C.Eklund**: Phil is the official holder of what we have done. **J.Klein**: Do we want the motion to indicate who is to be involved in this comment resolution process? **R.Marks**: Put it in the Call for Comments, but this motion could refer to the Call for Comments.

The TG then proceeded to compose the Working Group Review Call for Comments. **R.Marks**: When this is issued, the working document is available. **J.Mollenauer**: I'll have it as soon as possible (in time for the WG Plenary).

G.Sater led TG in composing the Call for Contributions for the 802.16.1 Convergence Sub-layer Annexes (MAC Annex Call for Contributions).

The TG then composed informative material addressing 802.16.1 PHY Minimum Performance Requirements for the Call for Contributions.

TG Session adjourned:
10:00 a.m. September 15, 2000.