Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**Change request for Preamble of OFDM mode**	
Date Submitted	**2003-09-05**	
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Re:	Contribution for clarification on comments for letter ballot #11b	
Abstract	This document includes text referenced in comment given for ballot 11b	
Purpose	To be integrated into P802.16d/D3 2003 draft document	
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Change request for Preamble in OFDM

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1. Replace the clause 8.4.3.6 with the following text

All the preambles are structured as either one of two OFDM symbols. The OFDM symbols are defined by the values of the composing subcarriers. Each of those OFDM symbols contains cyclic prefix, whose length is the same as the cyclic prefix for data OFDM symbols.

The first preamble in the DL PHY PDU, as well as the initial ranging preamble, consists of two consecutive OFDM symbols. The first OFDM symbol uses only subcarriers the indices of which are a multiple of 4. As a result, the time domain waveform of the first symbol consists of 4 repetitions of 64-sample fragment, preceded by a CP. The second OFDM symbol utilizes only even subcarriers, resulting in time domain structure composed of 2 repetitions of a 128-sample fragment, preceded by a CP. The time domain structure is exemplified in Figure 128al. This combination of the two OFDM symbols is referred to as the long preamble.

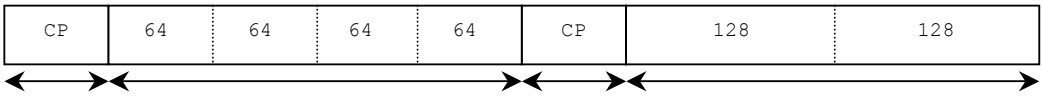


Figure 193: DL and network entry preamble structure

The frequency domain sequence for the 4 times 64 sequence P_{4x64} is defined by:

P_{4x64}=[+1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1-j, 0, 0, 0, +1-j, 0, 0, 0, +1-j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, 0, 0, 0, 0,-1-j,0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, -1+j, 0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j,0, 0, 0, +1-j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, +1-j,0, 0, 0, -1-j, 0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, -1-j,0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j]*2;

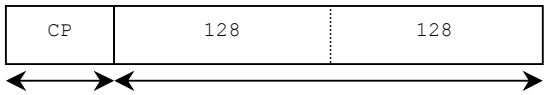
The frequency domain sequences for all full-bandwidth preambles are derived from the sequence:

P_{ALL}=[1 , 1 ,-1 ,-1 ,-1 ,-1 , 1 ,-1 , 1 , 1 ,-1 ,-1 , 1 , 1 ,-1 ,-1 ,-1 ,-1 ,-1 , 1 ,-1 , 1 , 1 ,-1 , 1 ,-1 , 1 ,-1 ,-1 ,-1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 , 1 , 1 , 1 , 1 , 1 , 1 ,-1 ,-1 , 1 , 1 ,-1 , 1 , 1 , 1 , 1 ,-1 , 1 , 1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 , 1 , 1 ,-1 ,-1 ,-1 , 1 , 1 ,-1 ,-1 ,-1 ,-1 , 1 , 1 , 1 , 1 ,-1 ,-1 , 1 , 1 ,-1 ,-1 , 1 , 1 , 1 , 1 , 1 , 1 , 1 , 1 , 1 ,-1 , 1 ,-1 ,-1 , 1 ,-1 , 1 , 1 , 0 , 1 , 1 ,-1 ,-1 ,-1 ,-1 ,-1 , 1 , 1 , 1 ,-1 ,-1 , 1 , 1 ,-1 ,-1 ,-1 ,-1 ,
-1 ,-1 ,-1 , 1 , 1 , 1 , 1 , 1 , 1 , 1 ,-1 , 1 ,-1 , 1 ,-1 ,-1 ,-1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 , 1 ,-1 , 1 , 1 , 1 ,-1 ,
-1 , 1 ,-1 , 1 , 1 ,-1 ,-1 ,-1 ,-1 , 1 , 1 , 1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 , 1 ,-1 , 1 , 1 ,-1 , 1 , 1 ,
1 , 1 ,-1 ,-1 , 1 ,-1 ,-1 ,-1 ,-1 ,-1 ,-1 ,-1 ,-1 , 1 , 1 , 1 , 1 ,-1 ,-1 ,-1]

The frequency domain sequence for the 2 times 128 sequence P_{EVEN} is defined by:
$P_{\_EVEN}(k) = 2*(P_{\_ALL}(k))$ if k=0 mod 2, otherwise $P_{\_EVEN}(k)=0$.

In the UL, when the entire 16 subchannels are used, the data preamble, as shown in Figure 128ak consists of one OFDM symbol utilizing only even subcarriers. The time domain waveform consists of 2 times 128 samples preceded by a CP. The subcarrier values shall be set according to the sequence P_{EVEN}. This preamble is referred to as the short preamble. This preamble shall also precede all allocations during the AAS portion of a frame and shall be used as burst preamble on the DL bursts when indicated in the DL-MAP_IE.

Figure 194: UL data and DL AAS preamble structure



In the DL bursts which start with a preamble and which fall within the STC-encoded region, the preamble shall be transmitted from both transmit antennas simultaneously and shall consist of a single OFDM symbol.The preamble transmitted from the first antenna shall use only even subcarriers, the values of which are set according to the sequence P_{EVEN}. The preamble transmitted from the second antenna shall use only odd subcarriers, the values of which shall be set according to the sequence P_{ODD}.

$P_{\_ODD}(k) = 2*P_{\_ALL}(k)$ if k=1 mod 2, otherwise $P_{\_ODD}(k)=0$.

The AAS network entry preamble shall use odd subcarriers only, using the sequence of values P_{AAS}. The time domain waveform consists of two groups of 128 samples preceded by a CP, the sign of the samples in the second group being reversed from those in the first group, as shown in Figure 194. The sequence P_{AAS} is defined by:

P_{AAS}=[0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0, -1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1, 0 , -1 , 0 , -1 ,0 , -1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , -1 , 0 , -1 , 0 , -1 , 0, -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1, 0 , -1 , 0 , -1 ,0 , -1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1, 0 , -1 , 0 , -1 , 0 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1, 0 , -1 , 0 , -1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1, 0 , -1 , 0 , -1 , 0 , -1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , -1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , -1, 0 , 1 , 0 , 1 , 0 , 1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , 1 , 0 , -1 , 0 , -1, 0 , 1 , 0 , 1 , 0]*2;

In the UL, when subchannelization transmissions are employed, the data preamble consists of a 256-sample sequence preceded by a CP whose length is the same as the cyclic prefix for data OFDM symbols. This preamble is referred to as the subchannelization preamble. The frequency domain sequence for the 256 samples is defined by P_{SUB}. Preamble carriers that do not fall within the allocated subchannels shall be set to zero.

P_{Sub}=[-1+i , 1+i , -1+i , 1-i , -1-i , 1-i , -1+i , 1+i , -1+i , -1+i, 1+i , -1+i , -1-i , -1-i , -1+i , -1-i , 1+i , 1-i , 1+i , -1-i, -1+i , -1-i , -1-i , -1+i , -1-i , 1+i , 1+i , -1-i , 1+i , -1+i, 1+i , 1+i , 1+i , -1-i , -1-i , 1-i , -1-i , -1-i , 1+i , 1-i, 1+i , 1+i , -1-i , -1-i , 1+i , 1-i , 1+i , -1-i , 1+i , 1+i, -1-i , -1-i , 1+i , 1+i , 1+i , -1-i , -1-i , -1-i , 1+i , -1-i, . -1-i , 1+i , -1+i , -1+i , -1+i , 1-i , 1-i , 1-i , -1+i , -1+i, -1+i , 1-i , -1+i , -1+i , 1-i ,

1+i , 1+i , -1-i , 1+i , -1+i, 1+i , 1+i , 1+i , -1-i , -1-i , 1-i , -1-i , 1-i , -1-i , -1+i, -1-i ,-1-i , 1+i , 1+i , -1-i , -1+i , -1-i , 1+i , -1-i , -1-i, 0 , 1-i , -1+i , -1+i , 1-i , -1+i , -1+i ,1-i , -1+i , -1+i, -1+i , 1-i , 1-i , 1-i , 1+i , -1-i , -1-i , 1+i , -1-i , -1-i, 1+i , -1-i , -1-i , -1-i , 1+i , 1+i , -1-i , -1-i , 1+i , -1-i, 1-i , -1-i , -1-i , -1-i , 1+i , 1+i , -1+i , 1+i , 1-i , -1-i, -1+i , -1-i , -1-i , 1+i , 1+i , -1-i , -1+i , -1-i , 1+i , -1-i, -1-i , 1+i , -1+i , 1+i , 1+i , -1+i ,1+i , 1+i , -1+i , 1+i, -1-i , 1-i , -1-i , 1+i , 1-i , 1+i , 1-i , 1-i , 1+i , 1-i, 1-i , 1+i , 1-i ,-1+i , -1-i , -1+i , 1+i , 1+i , -1-i , 1+i, -1+i , 1+i , 1+i , 1+i , -1-i , -1-i , 1-i , -1-i , -1-i , -1-i, -1+i , -1-i , -1-i , 1+i , 1+i , -1-i , -1+i , -1-i , 1+i , -1-i,-1-i];

In the case that the UL allocation contains midambles, the midambles will consist of one OFDM symbol and shall be identical to the preamble used with the allocation.

2: Causes of the change

The preamble sequences herein were proposed based on the following considerations.

1. **the sequence should use BPSK as possible**, which will make less computing complexity for the related parameter estimation.

2. In totally, the sequences have better PAPR.

3. what's more, the total proposed sequence **do not occupy any extra memory**, comparing with the current sequences

A) PAPR Result for full bandwidth:

	Current	Proposed	Gain
P_{4x64}	3.0103 (QPSK)	3.0103 (QPSK)	0
P_{ODD}	3.0040 (QPSK)	2.9259(BPSK)	+0.0781
P_{AAS}	3.0040 (QPSK)	2.9259(BPSK)	+0.0781
P_{EVEN}	3.0065 (QPSK)	3.0695(BPSK)	-0.0630

B) PAPR Result for subchannlization:

For two subchannels		
Current	Proposed	Gain
4.2200	4.0181	0.2018

4.0471	4.0471	0

For four subchannels		
Current	Proposed	Gain:
4.1864	4.0387	0.1477
4.1794	4.1322	0.0472
4.1814	4.1814	0
4.2009	4.2009	0

For 8 subchannels		
Current	Proposed	Gain
3.9887	3.8904	0.0983
3.9699	3.8862	0.0837
3.9675	3.8699	0.0976
3.9769	3.9079	0.0690
3.9866	3.9866	0
3.9887	3.9887	0
3.9002	3.9002	0
3.8722	3.8722	0

For 16 subchannels		
Current	Proposed	Gain
3.0097	3.0011	0.0086
3.0052	3.0014	0.0038
3.0097	3.0011	0.0086
3.0052	3.0014	0.0038
3.0071	3.0049	0.0023
3.0097	3.0052	0.0045
3.0071	3.0049	0.0023
3.0097	3.0052	0.0045
3.0052	3.0052	0
3.0097	3.0097	0
3.0052	3.0052	0
3.0097	3.0097	0
3.0097	3.0097	0
3.0071	3.0071	0
3.0097	3.0097	0
3.0071	3.0071	0