Low PAPR Sequences for the 802.16a Preamble

IEEE 802.16 Presentation Submission Template (Rev. 8.21)

Document Number: C802.16a-02/17r1

Date Submitted:

Rev 0 - 2002-17-01, Rev 1- 2002-18-02

Source:

Apurva N. Mody	Voice:	404-894-9370
Georgia Institute of Technology	Fax:	404-894-7883
250, 14th Street NW, #549	E-mail:	apurva@ece.gatech.edu
Atlanta, GA 30318.		

Venue:

IEEE 802.16, Meeting 17, Levi, Finland/ Meeting 18, St. Louis, USA

Base Document:

Purpose:

For posting on the 802.16 website, presentation to ad-hoc and comment resolution.

Low PAPR Sequences for the 802.16a Preamble

Apurva N. Mody

Georgia Institute of Technology
Atlanta, Georgia, U. S. A.
apurva @ece.gatech.edu

Ns=256

For Ns=256,

S_1=[{28 0's} 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 -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 -1
1   1   1   {27 0's}] – PAPR of 3.06 or 4.85 dB.

Ns=128

For Ns=128,

S$_1$=[{14 0's} 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 {13 0's}] – PAPR of 2.63 or 4.19 dB.

Ns=64

For Ns=64,

S_1=[{7 0's} -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 {6 0's}] – PAPR of 2.113 or 3.24 dB

Ns=32

For Ns=32,

S_1=[{4 0's} 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 {3 0's}] – PAPR of
   1.72 or 2.35 dB.

Ns=16

For Ns=16,

S_1=[0 0 1   1   1 -1 -1 -1 0   1 -1 -1   1 -1 -1 0] – PAPR of 1.5957 or 2.02 dB.

N=256, Sequence that results in 4X64 after a 256-point IFFT

For Ns=256,

S_1=sqrt(2)*[{28 0's} -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   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 {27 0's}] – PAPR of 2.451 or 3.89 dB

Sequence formation
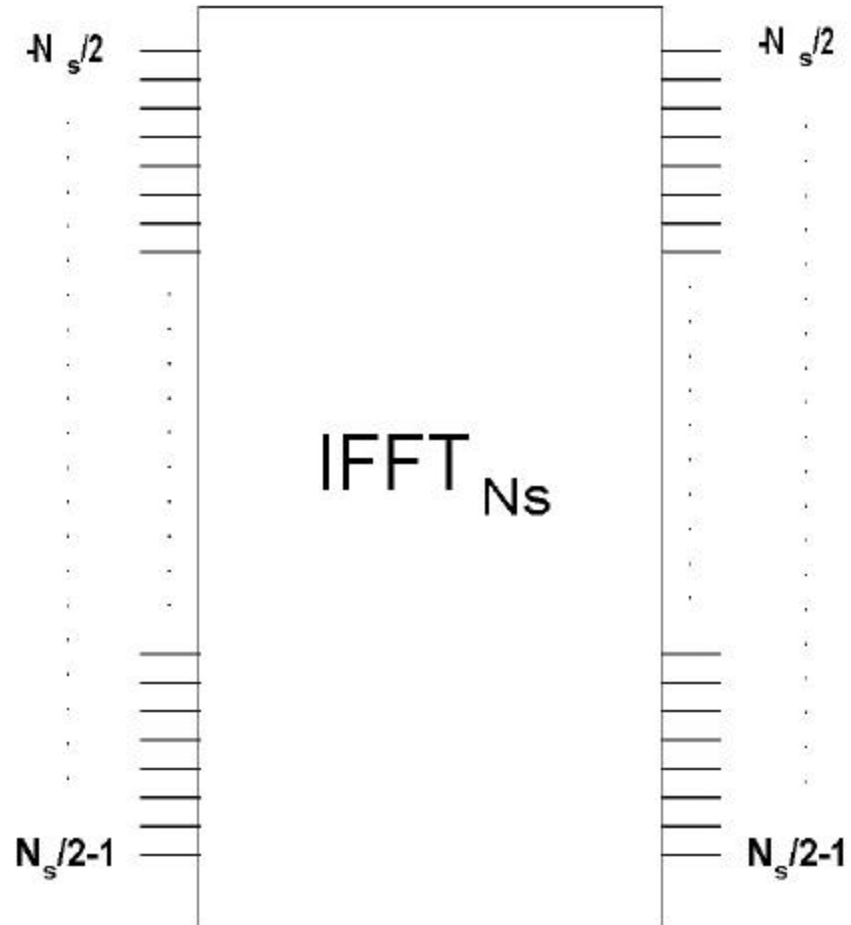
<u>References</u>

[1] A. N. Mody and G. L.Stüber, "Parameter Estimation for OFDM with Transmit Receive Diversity," *VTC2001*, Rhodes, Greece.

[2] A. N. Mody and G. L.Stüber, "Synchronization for MIMO OFDM Systems," to appear *GLOBECOM 2001*, San Antonio,Texas, November 2001.

[3] A. N. Mody and G. L. Stüber, "Efficient Training and Synchronization Sequence Structures for MIMO OFDM," 6th International OFDM-Workshop, Hamburg, Germany, September 2001.

[4] C. Tellambura, M. G. Parker, Y. Jay Guo, S. Shepherd and S. Barton, "Optimal Sequences for Channel Estimation Using Discrete Fourier Transform Techniques," IEEE Tran. on Comm., Vol. 47, No. 2, Feb. 1999.

[5] J. H. Manton, "Optimal Training Sequences and Pilot Tones for OFDM Systems," IEEE Comm. Letters, Vol. 5, No. 4, April 2001.