

March 1999

doc.: IEEE 802.11-99/074

Constellation Bit Encodings for IEEE 802.11 OFDM System

- Bob Ward in Cooperation with Symbol Technologies, Inc.

Submission

Slide 1

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

Introduction

- This contribution provides the OFDM Constellations as per IEEE Standards conventional format.
- No technical content change is made

Submission

Slide 2

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

Descriptions

- I and Q mappings to bits
 - same as existing Tables 81, 82, 83,84
 - @ integer locations without power normalizations
- Gray Code Mappings
 - no change made
- Bit transmission
 - bit b_1 transmitted earlier in stream
- Power Normalization
 - Preserve same normalizations for unity average power
 - BPSK, QPSK and Pilot Encoding
 - 16 QAM $\sqrt{1/42}$
 - 64 QAM

Submission

Slide 3

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

BPSK, QPSK and 16 QAM Constellation Encoding

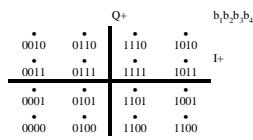
- BPSK and Pilots



- QPSK



- 16 QAM



Submission

Slide 4

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

64 QAM Constellation Encoding

								b ₁ b ₂ b ₃ b ₄ b ₅ b ₆
000100	001001	011001	010001	110001	111001	101001	100001	
000101	001101	011101	010101	110101	111101	101101	100101	
000111	001111	011111	010111	110111	111111	101111	100111	
000110	001110	011110	010110	110110	111110	101110	100110	I+
000010	001010	011010	010010	110010	111010	101010	100010	
000011	001011	011011	010011	110011	111011	101011	100011	
000001	001001	011001	010001	110001	111001	101001	100001	
000000	001000	011000	010000	110000	111000	101000	100000	

Submission

Slide 5

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

Recommendation

- Move to:
 - Clarify Bit Encoding with constellation encoding diagrams provided in this recommendation
 - Include in 17.3.5.7, the reference to the necessary power normalization factors (as was in earlier drafts) included in a separate paragraph
- Benefits
 - Follows IEEE Standard conventions for bit encoding descriptions
 - Clarity
 - Easy storage of bit encoding tables (since @ integer locations)
 - Separates bit encoding and power normalization requirements

Submission

Slide 6

Bob Ward - SciCom, Inc.

March 1999

doc.: IEEE 802.11-99/074

Proposed text clauses

- For constellation description
 - In each constellation, symbols are located at integer points, within the following sets
 - BPSK, $\{I_i, Q_i\} = \{(1,1) \text{ and } (-1,-1)\}$
 - QPSK, $\{I_i, Q_i\} = \{\pm 1, \pm 1\}$
 - 16 QAM, $\{I_i, Q_i\} = \{\pm 1, \pm 3\}$
 - 64 QAM, $\{I_i, Q_i\} = \{\pm 1, \pm 3, \pm 5, \pm 7\}$
- Transmitted I and Q values are normalized by power scaling to achieve unity average power
 - reference the clause on normalization

Submission

Slide 7

Bob Ward - SciCom, Inc.