Constellation Bit Encodings for IEEE 802.11 OFDM System

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Introduction

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

Descriptions

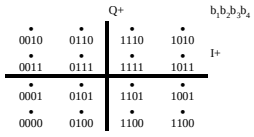
- I and Q mappings to bits
  - same as existing Tables 81, 82, 83,84
  - @ integer locations without power normalizations
- Gray Code Mappings
  - no change made
- Bit transmission
  - bit b_1 transmitted earlier in stream
- Power Normalization
  - Preserve same normalizations for unity average power
    - BPSK,QPSK and Pilot Encoding $\times 1/\sqrt{2}$
    - 16 QAM $\times 1/\sqrt{10}$
    - 64 QAM $\times 1/\sqrt{42}$

BPSK,QPSK and 16 QAM Constellation Encoding

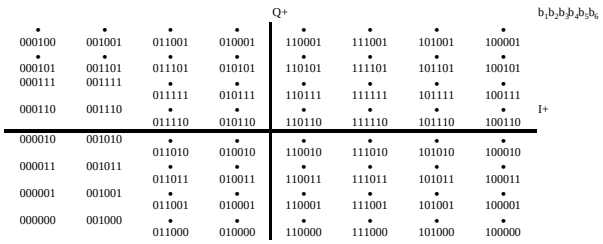
- BPSK and Pilots

- QPSK

- 16 QAM



64 QAM Constellation Encoding



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

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) and (-1,-1)
    - QPSK, $\{I_i,Q_i\}$ = $\{\pm1, \pm1\}$
    - 16 QAM, $\{I_i,Q_i\}$ = $\{\pm1, \pm3\}$
    - 64 QAM, $\{I_i,Q_i\}$ = $\{\pm1, \pm3, \pm5, \pm7\}$
- Transmitted I and Q values are normalized by power scaling to achieve unity average power
  - reference the clause on normalization