

IEEE 802.16m Codebook Design Guidelines for SU-MIMO

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Venue:

TGm – Call for comments on 16m DL-MIMO rapporteur group draft : C80216m-08_657r2.pdf

Base Contribution:

IEEE C802.16m-08/836

Abstract:

Proposal for 16m codebook design methodology

Purpose:

Adoption of proposed text/content as requirements for 802.16m SU-MIMO codebook design for System Description Document

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<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <http://standards.ieee.org/guides/opman/sect6.html#6.3>>.

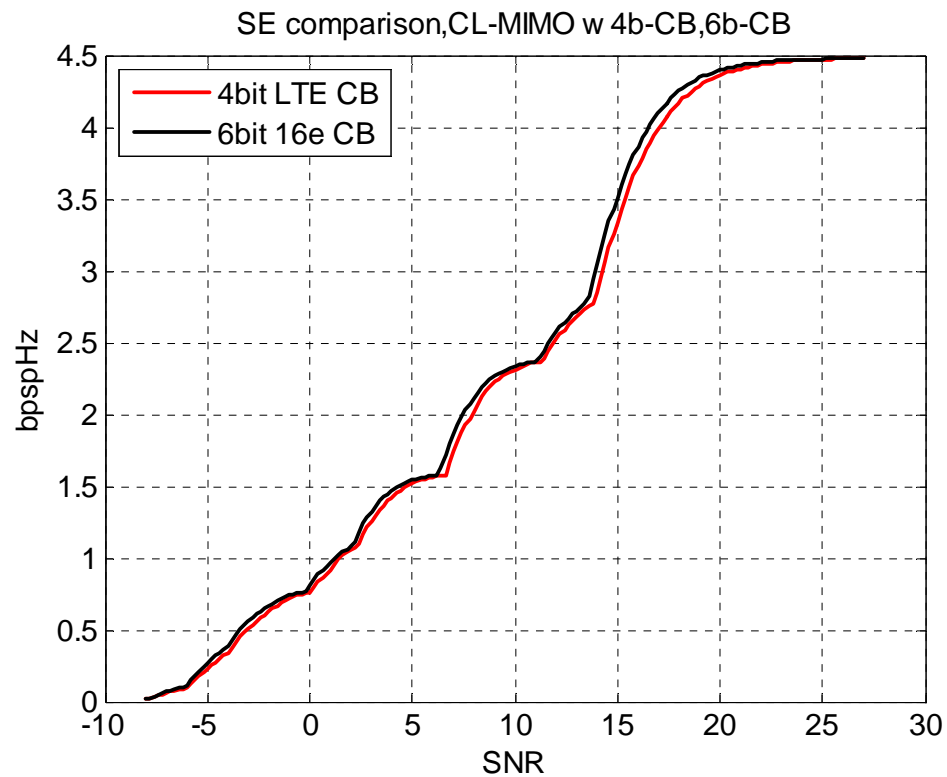
Further information is located at <http://standards.ieee.org/board/pat/pat-material.html>> and <http://standards.ieee.org/board/pat>>.

Codebook Design Guidelines

- ❑ 2Tx antenna SU codebook
 - Rank-1,2 support
 - 3bits
- ❑ 4Tx antenna SU codebook
 - Rank1-4 support
 - 4bits
 - 6 bits show little additional gain (results shown later)
 - 6 bits require ~4 times more computations
 - 8PSK or 4PSK alphabet
 - Simplify codebook search computations
 - Guarantee equal gain for all antennas
 - Rank nesting property
 - Reuse computations across ranks
- ❑ 8Tx antenna SU codebook
 - 6bits (other properties same as 4Tx)

4Tx Codebook Comparison

□ 4b, 6b CB comparison



Simulation Parameters 1

Parameter	Value
NFFT	1024
Carrier frequency	2.6 GHz
# Tx antennas, # Rx antennas	4 Tx, 2 Rx
Antenna spacing	4 λ for Tx, 0.5 λ for Rx
MCS	1/2 QPSK, 3/4 QPSK, 1/2 16QAM, 1/2 64QAM
Channel model	SCM Urban Macro 15 ⁰
Mobile speed	3kmph
UL delay	5ms delay codebook feedback
Pilots	Dedicated, 2.5dB boost
Codebook parameters	4-bit LTE codebook or 6-bit 16e codebook for 4Tx, 1 codebook index feedback per band (18 subcarriers), error-free feedback of codebook index
Receiver	MRC for Rank-1, LMMSE for Rank-2
DL channel estimator	2D-MMSE based on 18x6 tile
Packet size	288/432/480 bits
DL- Allocation	Localized allocation, 18x6 tile randomly distributed in frequency
Midamble	Ideal Channel estimation for midamble

Simulation Parameters 2

- ❑ Pilot - 5.56% -1 stream
- ❑ Pilot - 11.11% - 2 streams

