

IEEE 802.16m Sounding Channel Design Proposal

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*<http://standards.ieee.org/faqs/affiliationFAQ.html>

Venue:

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

Abstract:

Proposal for 16m sounding channel

Purpose:

Adoption of proposed text/content for 802.16m 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>.

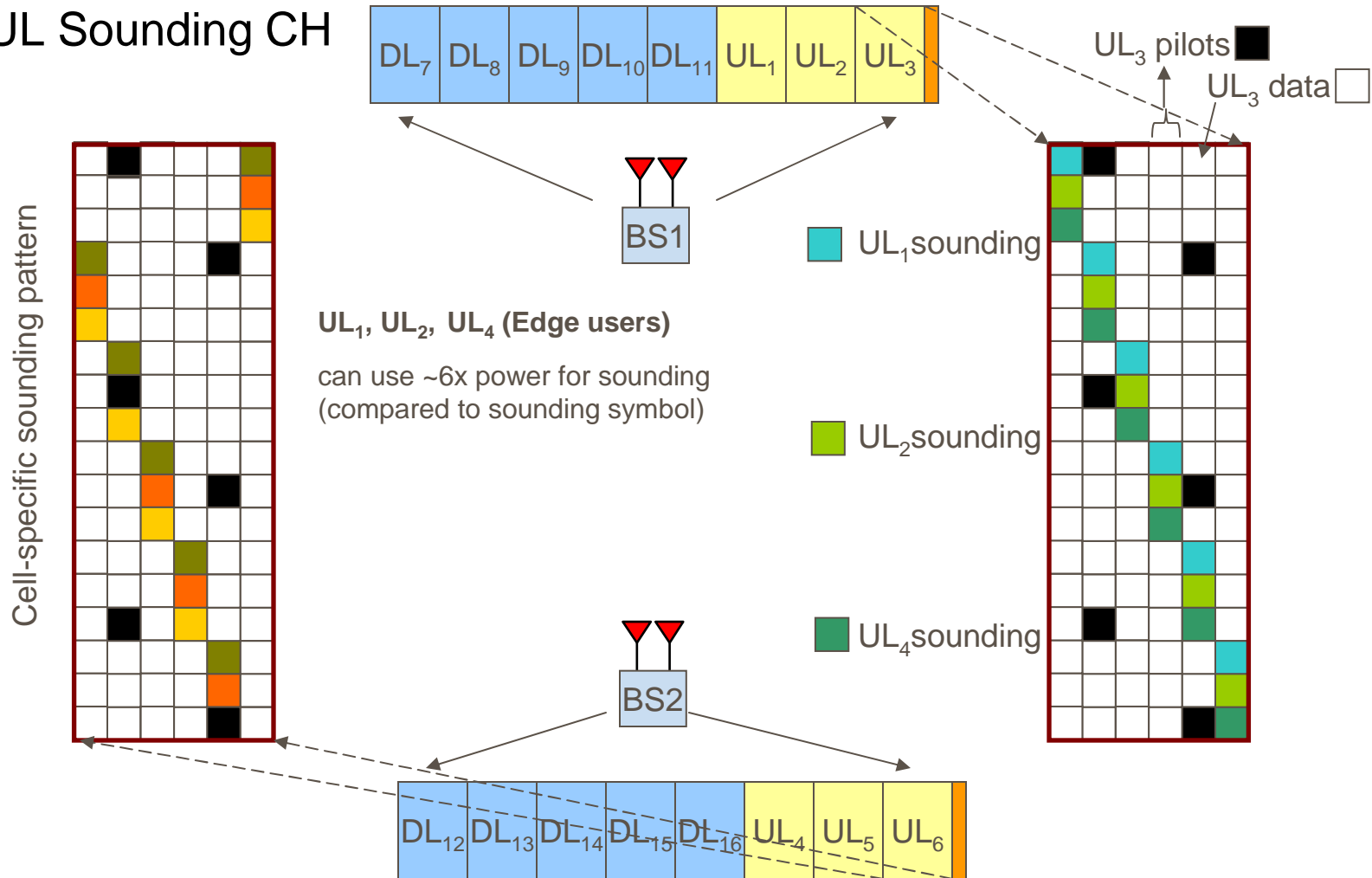
Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and <http://standards.ieee.org/board/pat>.

Sounding Channel Design

- ❑ Sounding symbol (current WiMAX)
 - Cell-edge users have noisy sounding
- ❑ Sounding channel distributed over an UL subframe
 - Sounding channel spans over 1 subframe (6 symbols)
 - Same overhead as sounding symbol in WiMAX
 - Cell-edge users can use 6x power compared to sounding symbol
 - Better inter-cell interference control (by cell-specific permutation)

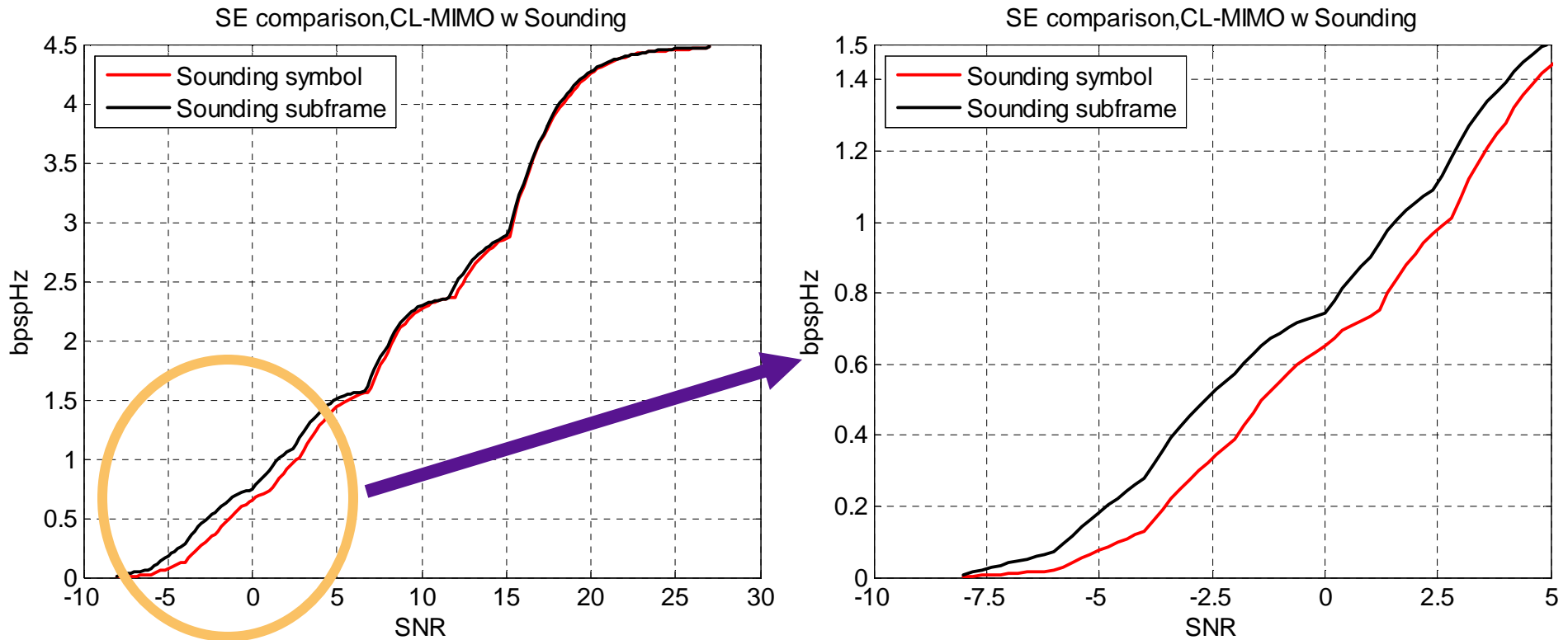
Example Design

UL Sounding CH



Sounding Channel Performance

SE for 4x2



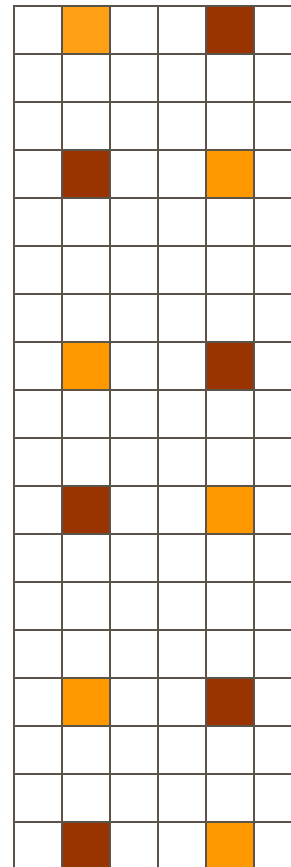
2 ~ 3 dB gain on DL beamforming for cell edge users

Link Simulation Parameters 1

Parameter	Value
NFFT	1024
Carrier frequency	2.6 GHz
# Tx antennas x #Rx antennas	4 x 2
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 sounding delay	5ms (last sounding symbol to beamforming delay)
DL Pilots	Dedicated, 2.5dB boosted
Sounding Symbol parameters	4.9dB per-subcarrier UL/DL SNR difference for a sounding band, 1Tx Antenna Sounded, Linear CE at BS, Rank-1 transmit weights are equal gain
Sounding Channel (subframe)	6.2dB – (7.8dB due to 6x power)=-1.6dB per-subcarrier UL/DL SNR difference for sounding channel, 1Tx antenna Sounded, Linear CE at BS, Rank-1 transmit weights are equal gain
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

Link Simulation Parameters 2

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



Sounding Channel Proposal

- ❑ Sounding signal in 16m may be transmitted through a sounding channel that spans multiple OFDM symbols