

# 16m Downlink Assignment Channel Design

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Target topic: “11.7 DL PHY control structure, especially mapping”.

Base Contribution:

None

Purpose:

To be discussed and adopted by TGm for use in stage 3 document development

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# Outline

- Objectives
- System Level Performance Evaluation
- Conclusions and Proposed Text
- Appendix

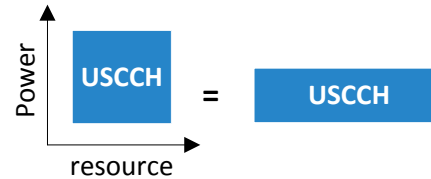
# Objectives

- Fixed MCS vs. Variable MCS
  - IE bit size: 48 bits
  - Fixed MCS
    - QPSK 1/2 or QPSK 1/2 with x2
  - Variable MCS
    - QPSK 1/2 with x1, x2, x4, x6
- *Which One is better for USCCH?*
- Performance Metrics for SLS Verification
  - **Sector Throughput** with satisfying outage requirement
  - **Outage** requirement: Distribution of user whose BLER is larger than 1% < 3% of total users

# System Level Performance Evaluation (1/3)

- Fixed vs. Variable

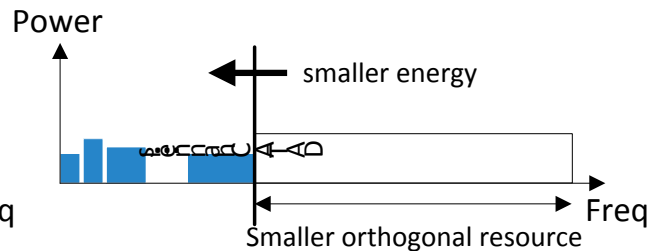
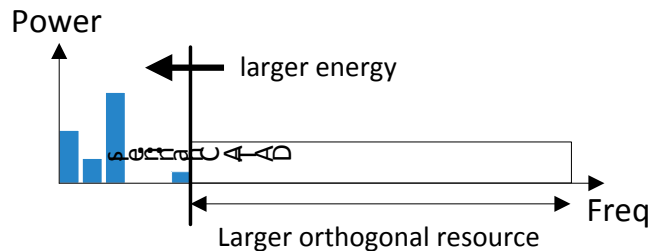
If required energy for USCCH is identical for both boosting and repetition,



Fixed MCS (QPSK, 1/2)

vs.

Variable MCS



**For Data Region,**

- Larger orthogonal resource
- lower power level

vs.

- Smaller orthogonal resource
- Higher power level

– Orthogonal resource is more efficient to increase Data rate

- y dB power gain  $\neq$  y dB capacity (data rate) gain

# System Level Performance Evaluation (2/3)

- Fixed vs. Variable
  - Variable obtains Diversity gain from symbol combining
    - Can reduce required power for USCCH

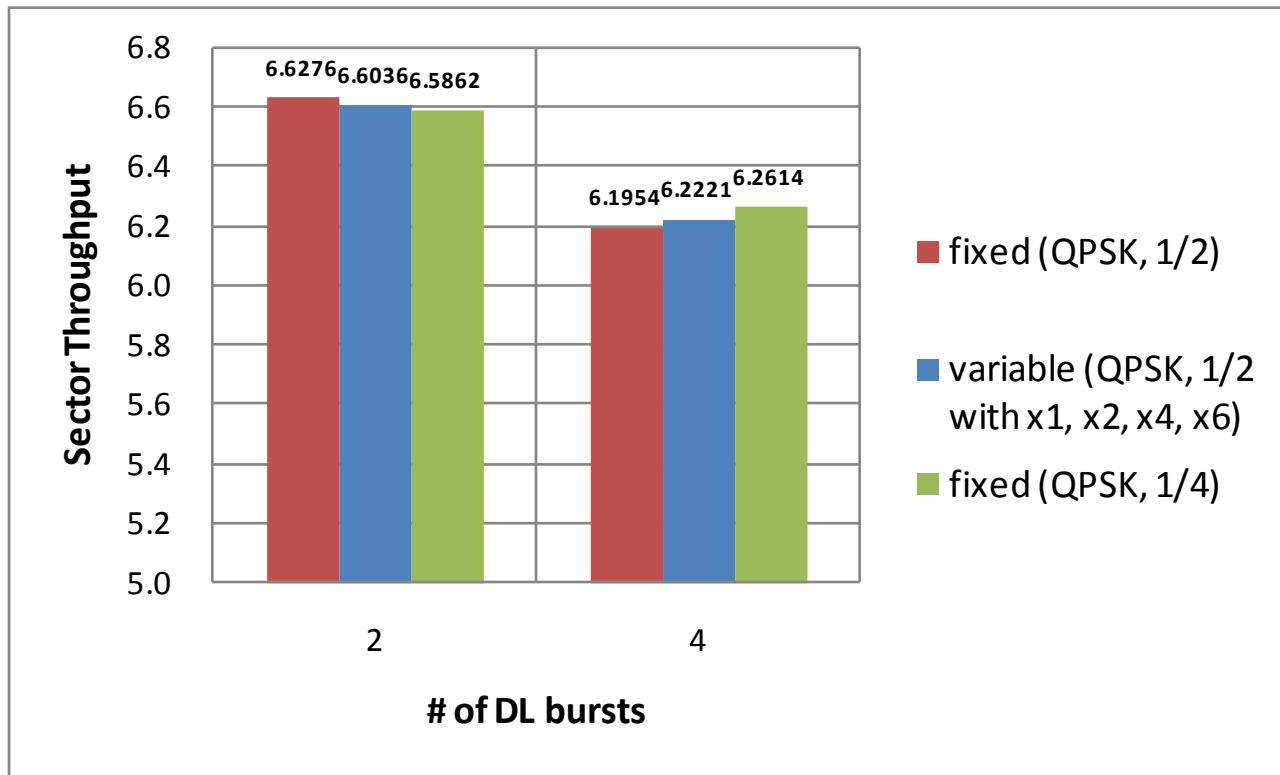


SLS Evaluation includes

- Orthogonal resource vs. power
- Diversity gain
- And other minor effects

# System Level Performance Evaluation (3/3)

- Metric: Data Throughput
  - Outage < 3%



# Conclusions and Proposed Text

- Conclusion
  - Fixed MCS is preferred
  - MCS level: QPSK 1/2 or QPSK 1/4
  - MCS level can be indicated by BCH
- Proposed
  - See C80216m-09/0208

# **Appendix-A**

- Simulation Condition for SLS



# SLS Conditions (1/2)

- Environments/Assumptions

Index	Value
Deployment Scenario	EMD baseline [IEEE 802.16m-07/037r2 ]
MCS for USCCH (Assignment)	Fixed: QPSK 1/2, QPSK 1/4 Variable: QPSK 1/2 with x1, x2 (x4, x6)
HARQ	Asynchronous (DL)
Scheduler	Proportional fairness
# of Users per Sector	20
# of Scheduled Users	2, 4 per subframe (4, 8 for both DL and UL)
Antenna Configuration	SIMO 1x2
Channel Model	Mixed (Ped B-3kmph-60%, Veh A-30kmph-30%, Veh A-120kmph-10%)
Channel Estimation	Real channel estimation (Channel estimation impairment)
Other Simulation Assumptions	EMD baseline

# SLS Conditions (2/2)

- Per User Power Control for Assignment Block

- $P_{\text{MAPIE}}[i] = \text{SINR}_{\text{REQ}} - \text{SINR}(\text{CQI})[i] + \Delta_{\text{MARGIN}}[i]$

- $\text{SINR}_{\text{REQ}}$ : SINR value required to satisfy 1% BLER
    - $\text{SINR}(\text{CQI})[i]$ : i-th user SINR set by CQI feedback value
    - $\Delta_{\text{MARGIN}}[i]$ : Margin value to accomplish required outage