MCS Set Signaling for Assignment A-MAP

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Venue:

    IEEE 802.16m-09/0028r1, "Call for Comments and Contributions on Project 802.16m Amendment Content"

    Target topic: "15.3.6 Downlink control structure".

Base Contribution:

    None

Purpose:

    To be discussed and adopted by TGm for the 802.16m amendment.

Notice:

Outline

- **SLS Environment**

- **SLS Results**

- **Conclusion and Proposed Text**

- **Current AWD: 15.3.6.3.2.2 Assignment A-MAP**

  - … with two different effective code rates. The set of code rates is (1/2, 1/4) or (1/2, 1/8).

  - Need to define how to signal the MCS set

    - Superframe Header vs. Non-user-specific A-MAP

Assumption and Condition

- **Candidate-1: Signaling by SFH**
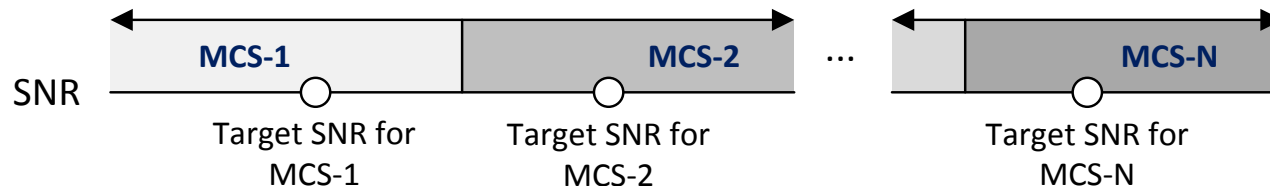 - Set-1: QPSK 1/2 or 1/4
  - Set-2: QPSK 1/2 or 1/8

- **Candidate-2: Signaling by Non-user-specific A-MAP**
  - Assume we can use QPSK 1/2 or 1/4 or 1/8 in a subframe

- **MCS Selection**
  - Based on CQI
  - Target SNR below contains margin value to meet the outage requirement

SNR

| MCS-1 | MCS-2 | ... | MCS-N |

Target SNR for MCS-1   Target SNR for MCS-2   Target SNR for MCS-N

SLS Environments

- **EMD: IEEE 802.16m-08/004r5**

Index	Value
Deployment Scenario	Baseline / Open rural macrocell
MCS for Assignment A-MAP	- QPSK 1/2, QPSK 1/4 - QPSK 1/2, QPSK 1/8 - QPSK 1/2, QPSK 1/4, QPSK 1/8
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)
CQI Reporting Period	8 frames
Other Simulation Assumptions	EMD baseline

SLS Results (1/2)

- ## Baseline Test Scenario

	1/2, 1/4	1/2, 1/8	1/2, 1/4, 1/8
Spectral Efficiency	- **High**	- Medium	- Low
Outage (3%)	- **Meet requirement**	- Meet requirement	- Meet requirement
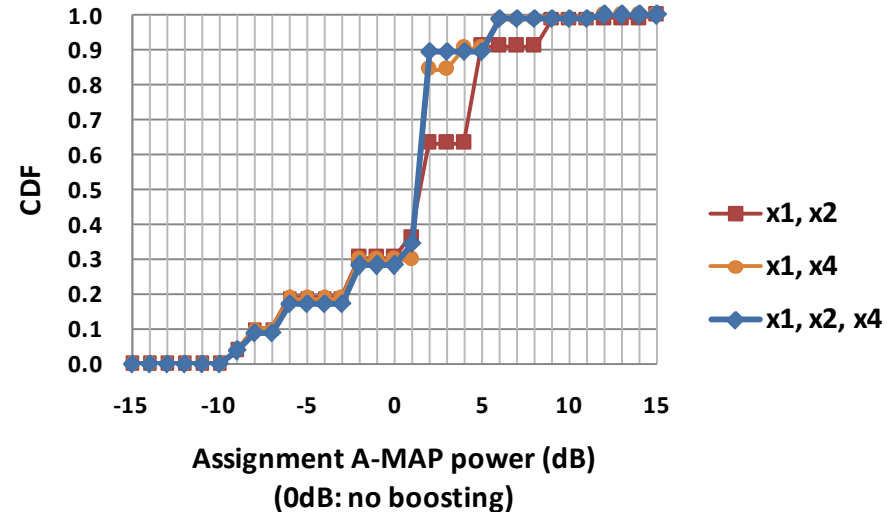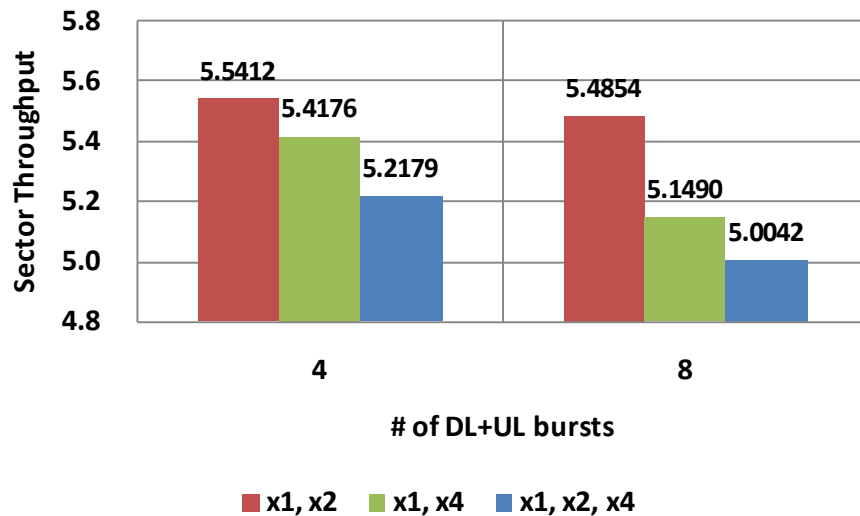
SLS Results (2/2)

- **Open Rural Macrocell (Optional)**

	1/2, 1/4	1/2, 1/8	1/2, 1/4, 1/8
Spectral Efficiency	- Lower	- **Higher**	- Lower
Outage (3%)	- Meet requirement	- **Meet requirement**	- Meet requirement
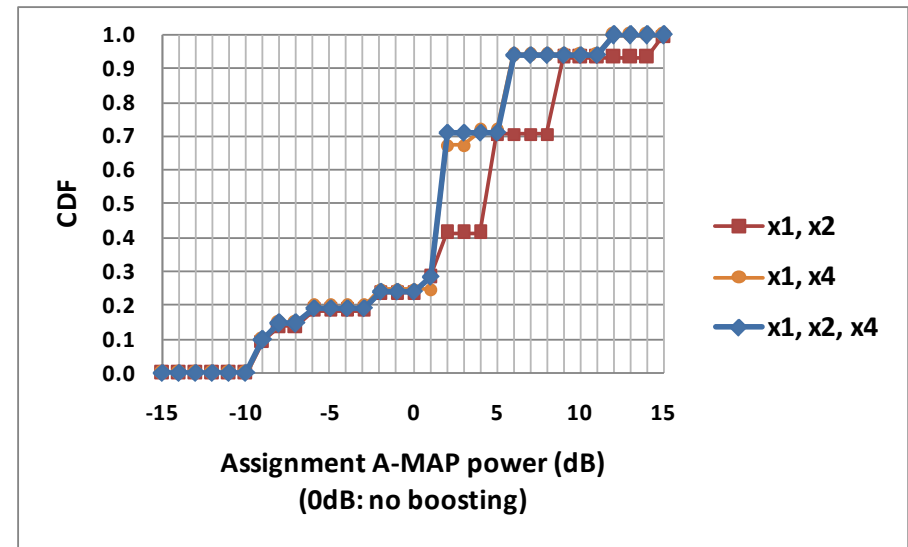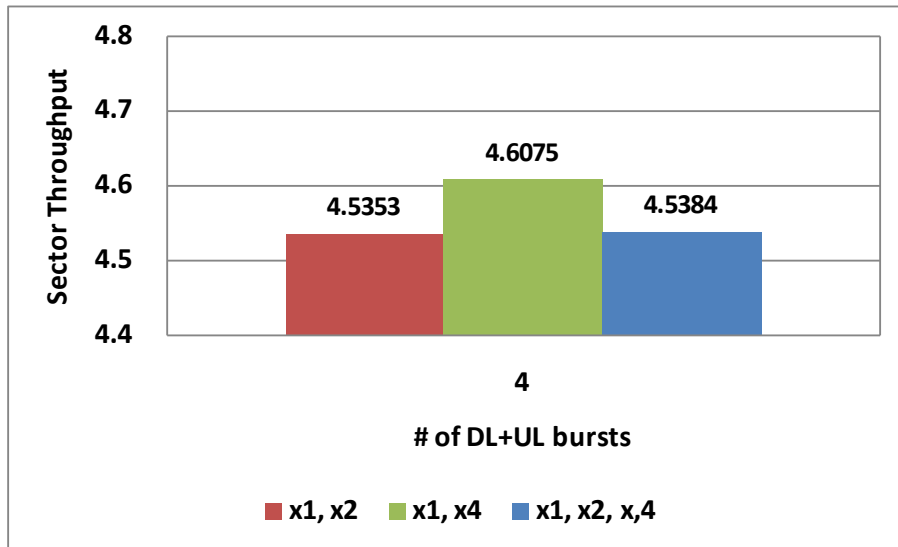
Conclusion

- **To meet both high spectral efficiency and outage requirement efficiently,**

- **Propose to use <u>Two MCS sets signaled by SFH</u>**
  - 0b0: (1/2, 1/4), 0b1: (1/2, 1/8)
  - According to cell geometry, etc

- **Note**
  - Signaling by NUS A-MAP makes it difficult to optimize data burst allocation within given total resources
  - Burden to scheduler Or no advantage of signaling by NUS A-MAP

Text Proposal (1/2)

-- **Text Start** --

15.3.6.3.2.2 Assignment A-MAP

The Assignment A-MAP (A-A-MAP) shall include one or multiple A-A-MAP-IEs and each A-A-MAP-IE is encoded separately.

...

After rate matching and repetition, the encoded bit sequences shall be modulated using QPSK. For a given system configuration, assignment A-MAP IEs can be encoded with two different effective code rates. The set of code rates is (1/2, 1/4) or (1/2, 1/8), and explicitly signaled by SFH.

Text Proposal (2/2)

15.3.6.5.1.2 S-SFH IE

…

Table 663—S-SFH SP1 IE format

Syntax	Size (bit)	Notes
S-SFH SP1 IE format () {		
MSB of superframe number	[8]	Remaining bit of SFN except LSB of SFN in P-SFH
LSB of BS ID	24	Specifies the 24 least bit of BS ID
Periodicity of A-MAP	1	0b0: every subframe 0b1: every 2 subframes
A-MAP transmission format	1	0b0: 1/2 or 1/4 code rate for assignment A-MAP 0b1: 1/2 or 1/8 code rate for assignment A-MAP

⋮

Reserved	TBD	
}		

-- **Text End** ---