

Uplink Power Control in the Base Station

Document Number:

IEEE C802.16m-08/668r1

Date Submitted:

2008-07-14

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Re:

IEEE 802.16m-08/024: Call for Contributions on Project 802.16m System Description Document (SDD) (2008-06-18), Power Control.

Abstract:

Discussion on interference mitigation for uplink of IEEE 802.16m SDD

Purpose:

Adoption of proposed text into SDD

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Rationale

- Total throughput is increased as intercell interference is reduced.
- Thus, an uplink power control method covering users in the cell edge is required.

Uplink Power Control with Loading Factor

- Interference over Thermal (IoT) parameter
 - Loading factor
 - $\frac{\text{the number of used subcarriers in the monitoring sector } i}{\text{the number of total subcarriers}}$
- For example,
 - Sector i in BS_1 has intercell interference by MS_0 connected to BS_0 .
 - BS_1 transmits the average loading factor of the $(n-1)$ -th frame to BS_0 .
 - According to the value of loading factor, the power of MS_0 in the (n) -th frame is reduced or increased.

Uplink Power Control with Loading Factor (Cont'd)

- Thus,

- $P_{MS} = P_{OLPC \text{ or } CLPC} + \Delta P$

- , where

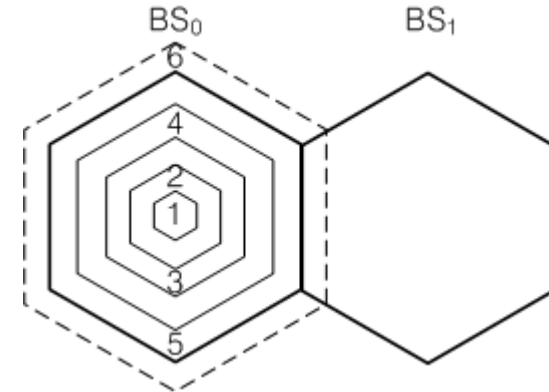
- $P_{OLPC \text{ or } CLPC}$: open loop power control (OLPC) or closed loop power control (CLPC) in the legacy system

- ΔP : power control by loading factor

Simulation Results

- Throughput per zone

Zone	w/o power control (max. power)	Open loop power control	Loading factor power control
1	1.176	1.457	1.518
2	1.139	1.343	1.444
3	1.050	1.331	1.472
4	0.917	1.272	1.355
5	0.884	1.059	1.221
6	0.740	0.819	1.228



- Total throughput

w/o power control (max. power)	Open loop power control	Loading factor power control
1.515	1.817	2.132

Proposed Texts into SDD

- 11.x. Uplink Power Control
 - *Power control adjusted by the base station should be supported. And, Power control covering intercell interference should be supported. Also, power control using the information of neighbor cells should be supported.*