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Title	A distributed antennas in Advanced Multiple Antenna Schemes	
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Source(s)	Chang-Lan Tsai, Ren-Jr Chen, Chung-Lien Ho, Chang-Lung Hsiao, Chi-Fang (Richard) Li, Ting-Chen (Tom) Song, ITRI, Wem-Ho Sheen, NCTU/ITRI,	Voice: E-mail: tsaichangl@itri.org.tw richard929@itri.org.tw
Re:	IEEE 802.16m-07/040 - Responds to Call for Contributions on Project 802.16m System Description Document (SDD)	
Abstract	This document presents the text proposal for the section of advanced multiple antennas schemes deploying distributed antennas for 802.16m system.	
Purpose	For discuss and approval by TGm	
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A Distributed Antennas in Advanced Multiple Antenna Schemes

Chang-Lan Tsai, Ren-Jr Chen, Chung-Lien Ho, Chang-Lung Hsiao,

Chi-Fang (Richard) Li, Ting-Chen (Tom) Song,

ITRI,

Ween-Ho Sheen,

NCTU/ITRI

Summary

To achieve the high throughput demand in IEEE 802.16m System Requirements [1], a Distributed Antennas (DA) in advanced multiple antenna schemes shall be considered aiming to cover the dead spots, improve system capacity, and increase the cell-edge throughput. Distinct from relay stations, distributed antennas are RF units placed distant from each other and are connected to a central processing unit via fiber. The spectral efficiency improves significantly. All the signal processing is centralized at the central processing unit. This facilitates the coordination between the multiple antennas for advanced transmit/receive techniques such as spatial multiplexing, micro-diversity, etc. This contribution proposes to adopt the use of DA as one of the alternative schemes in Advanced Multiple Antenna IEEE 802.16m systems.

Text Proposal

The following text is proposed to be adopted as a section of advanced multiple antennas schemes in 802.16m SDD.

----- **Start of the text** -----

X Distributed Antennas System

A number of supplementary distributed sites (antennas), which have only RF functionality, are placed in the cell coverage, and are connected to the central base station, where the signal processing is taken place, via high speed lines. There could be only one, or multiple antennas at a distributed site. The base station (or the central processing unit) collects the link information between the user equipment (UE) and all of the antennas (including those at the base station and the distributed sites). Applying advanced multiple-antenna algorithms, antennas at different site are cooperated to transmit/receive signal to/from UE according to some antenna-selection scheme to optimize the connection.

----- **End of the text** -----

1. Distributed Antennas

To support legacy cell size and co-location of WirelessMAN OFDMA Reference System deployments, in addition to the base station of a cell, a number of supplementary distributed sites (antennas), which have only RF functionality, are placed in the cell coverage, and are connected to the central base station, where the signal processing is taken place, via high speed lines.

There could be only one, or multiple antennas at a distributed site, as illustrated in Figure 1. The base station (or the

central processing unit) collects the connection information, such as channel impulse response between the user equipment (UE) and all of the antennas (including those at the base station and the distributed sites). Applying advanced multiple antenna algorithms, the base station (central processing unit) decides which and how the antennas transmit/receive signals to achieve maximum capacity, or data rate. As illustrated in Figure 1, UE could communicate with one distributed site, base station, or multiple antenna sites. For the case of UE communicating with the nearest distributed site, path loss is reduced, thus the UE can transmit with much higher data rate. For the case of UE communicating with more than one distributed sites, the benefit of spatial diversity or spatial multiplexing is gained.

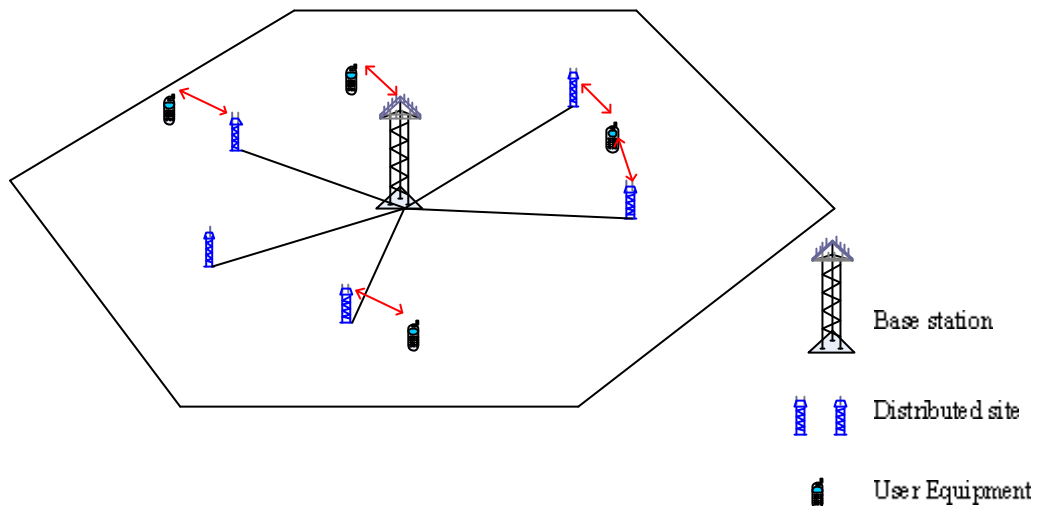


Figure 1. Deployment of distributed sites (antennas) and base station.

References

- [1] C80216m-07/002r4, "IEEE 802.16m System Requirements," 2007-10-19.