

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	UL Pilot Design for Interference Mitigation	
Date Submitted	2008-07-15	
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Re:	IEEE 802.16m-08/024: Call for Contributions on Project 802.16m System Description Document (SDD). Target topic: "Interference Mitigation "	
Abstract	This contribution proposes for UL Pilot Design for Interference Mitigation	
Purpose	To be discussed and adopted by TGM for the 802.16m SDD.	
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UL Pilot Design for Interference Mitigation

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1. Introduction

In wireless transmission it has many kinds of interferences it includes the interference between a BS and an MS, between MSs and between BSs. We will emphasize in this contribution to consider the interference between the MSs and to propose proper UL pilot patterns so as to reduce the interference between MSs.

Each BS consists of three sectors and three neighboring BSs can be considered as the neighboring of three sectors as shown in Fig.1. Initially in the design of pilot patterns every sector of an MS has the same pilot structure in its UL pilot patterns so that it will result in high interference level.

In this contribution we will discuss several UL interference environments among MSs and to propose the design principle to devise proper UL pilot patterns so as to reduce the interference levels.

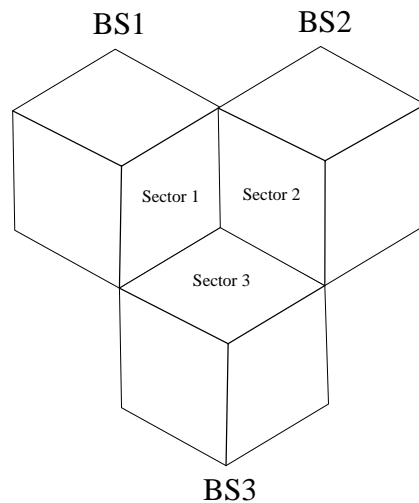


Fig. 1 Neighboring BSs have Three Neighboring Sectors

2. Mutual Interferences among MSs and the UL Pilot Pattern Structure

2.1 Mutual interference among MSs along the cell edges of different BSs

As shown in Fig.2 it has three MSs along the cell edge of sector 1 of BS 1 and it has MS along the cell edge of Sector 2 of BS 2 interference will result for MSs along the cell edge of different BSs because the same UL pilot patterns are used for MSs in different sectors.

2.2 Mutual interference among MSs along the sector edge of the same BS sector

As shown in Fig. 3 is the interference among MSs along the sector edge of the same BS. Along the sector edge of sector 1 of BS 1 it has two MSs, along the sector edge of sector 3 it has one MS so that it will introduce mutual interference.

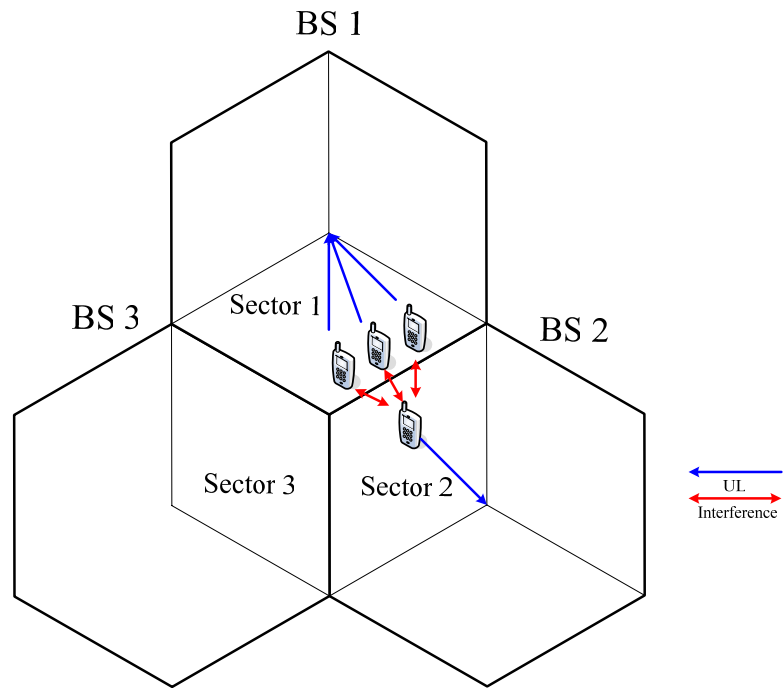


Fig.2 Mutual Interferences among MSs along the Cell Edge of Different BSs

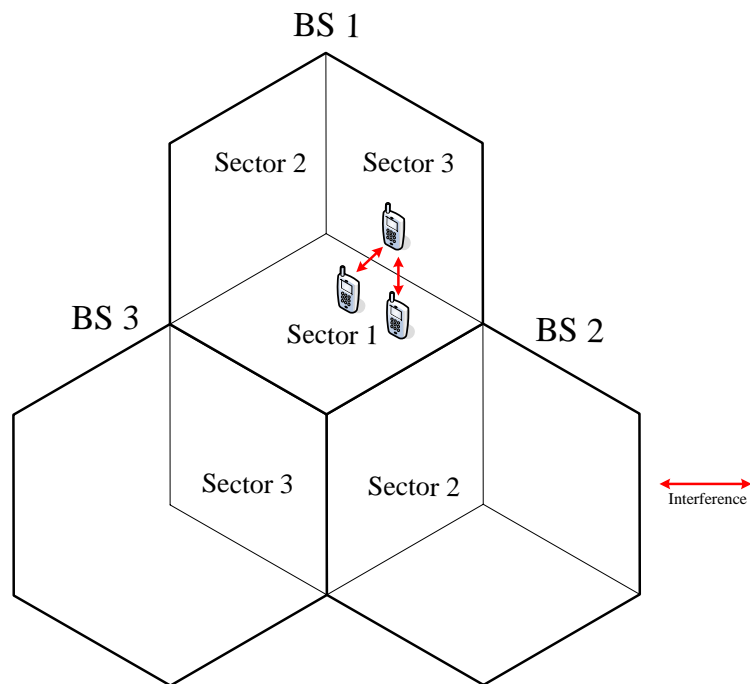


Fig.3 Mutual Interferences among MSs along the Sector Edge of the Same BS

3. Conclusion

We propose in this contribution the design philosophy of UL pilot patterns to reduce the above mentioned mutual interferences among MSs. The UL pilot patterns in the frequency domain are divided into three classes and each pilot pattern in each class is not only different from other pattern in other class but also they are orthogonal each other. Consequently in each sector it has UL pilot pattern that can be selected that is orthogonal to other pilot pattern in other sector as shown in Fig.4. Fig.5 shows the original UL pilot patterns.

Considering the mutual interferences among MSs along the cell edge of different MSs as shown in Fig.2, the MS in Sector 1 of BS 1 is interfering with the MS along the cell edge of Sector 2 of BS 2. The UL plot pattern for MS in Sector 1 of BS 1 can select the first set of pilot pattern for Sector 1 in the frequency domain as shown in Fig. 3 and for the MS in Sector 2 of BS 2 its UL pilot pattern can select the first set of pilot pattern for Sector 2 in the frequency domain so that these two pilot patterns are orthogonal to reduce the mutual interferences among MSs along the cell edges.

Similarly for the mutual interferences among MSs along the sector edge of the same BS, it still can follow the same design principle as we proposed to find proper UL pilot patterns for MSs in the same BS and in the same frequency band but in different sector to have its interference levels greatly reduced.

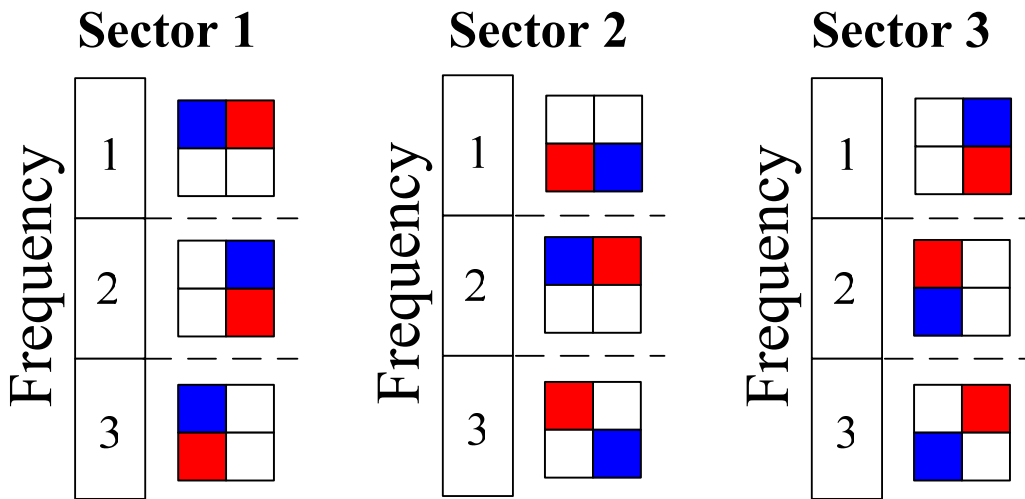


Fig. 4 Proposed UL Pilot Pattern Structure

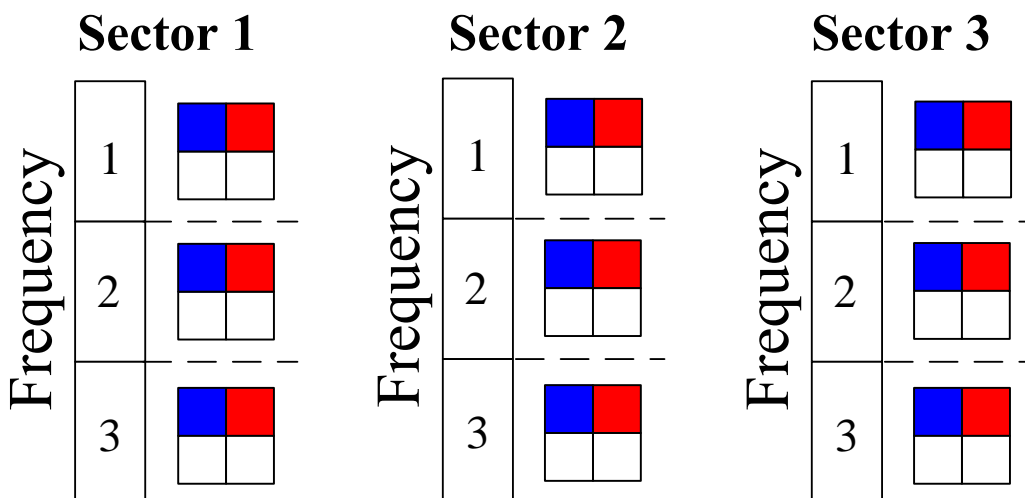


Fig. 5 Original UL Pilot Pattern Structure

Text Proposal for the 'Interference Mitigation'

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XXX. UL Pilot Design for Interference Mitigation

The UL link pilots for MSs in different BSs' sectors can be designed to mitigate the interferences among MSs. For example as shown in Fig.X.1 is the pilot patterns assigned for MSs in different BSs' sectors to have different patterns in the frequency domain or sub-carriers comparing with the original assigned UL pilot pattern as shown in Fig.X.2

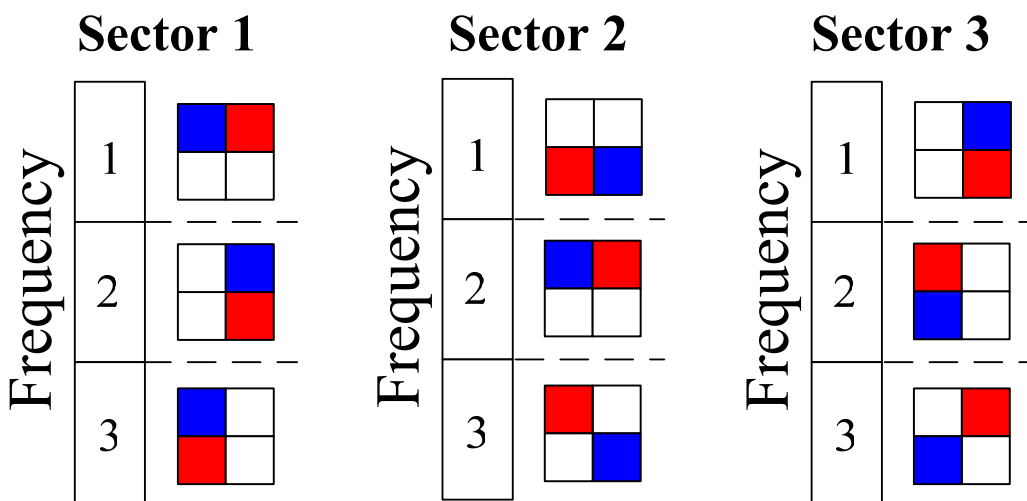


Fig.X.1 Proposed UL Pilot Patterns in the Frequency Domain/Different Sub-carriers

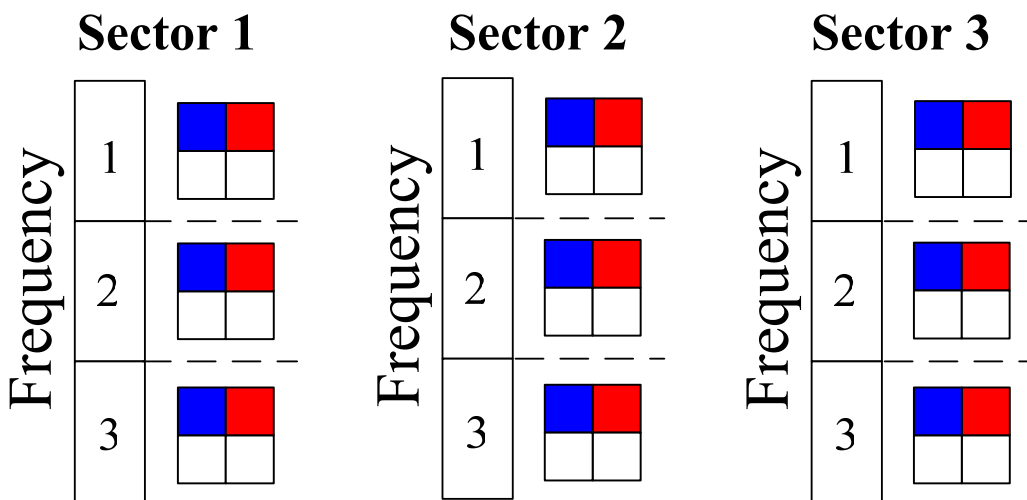


Fig.X.2 Original Interference Effected UL Pilot Patterns

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