

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Text Modification for Draft 802.16m Evaluation Methodology Document: 4. Link-to-System Mapping	
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Re:	IEEE 802.16m-07/023– Call for Comments on Draft 802.16m Evaluation Methodology Document	
Abstract	This contribution proposes to add the subsection to the Section ‘4.5. Per-tone SINR Computation’ for supporting simulation assumptions in the Section 2.2.	
Purpose	For discussion and approval by TGm	
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Text Modification on Section 4 Link-to-System Mapping

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I. Introduction

This contribution proposes text to Section 4 in the evaluation methodology document IEEE C802.16m-07/080r2. In the Section 2.2 simulation assumptions, MIMO 2x2 (Matrix A & Matrix B) is specified as one of the baseline system assumption for the multi-antenna transmission format in downlink. However, the Section 4 only suggests the per-tone SINR description about Matrix B (MIMO multiplexing with the MMSE receiver) and does not include the description about Matrix A.

Therefore, we are proposing to add the subsection about the per-tone post processing SINR for STBC (Matrix A) in front of the Subsection 4.5.1.

II. Proposed Text for Section on *Per-tone SINR Computation*

-----Start of the text-----
[Add the following text after the line#21 of the page62 in C802.16m-07/080r2]

4.5.2. Per-tone Post Processing SINR for MIMO STBC

In order to obtain the per tone post processing SINR for the MIMO STBC (matrix A), we consider a 2 transmit and N_R receive antennas system. The transmission scheme for Interferers is also assumed the STBC. The received signal at the n -th subcarrier in the 1st and the 2nd STBC symbol interval are expressed as

$$\begin{aligned}
 Y_r^{(0)}(n,0) &= \sqrt{\frac{P_{tx}^{(0)} P_{loss}^{(0)}}{2}} \left(H_{0,r}^{(0)}(n) X^{(0)}(n,0) - H_{1,r}^{(0)}(n) X^{(0)}(n,1)^* \right) + \\
 &\quad \sum_{j=1}^{N_I} \sqrt{\frac{P_{tx}^{(j)} P_{loss}^{(j)}}{2}} \left(G_{0,r}^{(j)}(n) X^{(j)}(n,0) - G_{1,r}^{(j)}(n) X^{(j)}(n,1)^* \right) + U_r^{(0)}(n,0), \\
 Y_r^{(0)}(n,1) &= \sqrt{\frac{P_{tx}^{(0)} P_{loss}^{(0)}}{2}} \left(H_{0,r}^{(0)}(n) X^{(0)}(n,1) + H_{1,r}^{(0)}(n) X^{(0)}(n,0)^* \right) + \\
 &\quad \sum_{j=1}^{N_I} \sqrt{\frac{P_{tx}^{(j)} P_{loss}^{(j)}}{2}} \left(G_{0,r}^{(j)}(n) X^{(j)}(n,1) + G_{1,r}^{(j)}(n) X^{(j)}(n,0)^* \right) + U_r^{(0)}(n,1),
 \end{aligned} \tag{x}$$

where

r is the received antenna index,

$Y_r^{(0)}(n,i)$ is the received signal in the i -th STBC symbol interval for the target user, $i = 0,1$,

$X^{(j)}(n,i)$ is the transmitted symbol in the i -th STBC symbol interval, $i = 0,1$,

$H_{t,r}^{(0)}(n)$ is the channel gain between the t -th transmit and the r -th receive antenna, $t = 0,1$,

$U_r^{(0)}(n,i)$ is the receiver thermal noise in the i -th STBC symbol interval, $i = 0,1$.

The 1st and the 2nd STBC symbols are obtained through the following processes as

$$\begin{aligned}\hat{X}^{(0)}(n,0) &= \sum_{r=0}^{N_R-1} \left(H_{0,r}^{(0)*}(n) Y_r^{(0)}(n,0) + H_{1,r}^{(0)}(n) Y_r^{(0)}(n,1)^* \right), \\ \hat{X}^{(0)}(n,1) &= \sum_{r=0}^{N_R-1} \left(-H_{1,r}^{(0)}(n) Y_r^{(0)}(n,0)^* + H_{0,r}^{(0)}(n)^* Y_r^{(0)}(n,1) \right).\end{aligned}\tag{y}$$

After decoding process of STBC, the post-processing SINR of the desired user for the n -th subcarrier is given as

$$\begin{aligned}SINR^{(0)}(n) &= \\ &= \frac{\frac{P_{tx}^{(0)} P_{loss}^{(0)}}{2} \left(\sum_{t=0}^{N_T-1} \sum_{r=0}^{N_R-1} |H_{t,r}^{(0)}(n)|^2 \right)^2}{\left(\sum_{t=0}^{N_T-1} \sum_{r=0}^{N_R-1} |H_{t,r}^{(0)}(n)|^2 \right) \sigma^2 + \sum_{j=1}^{N_I} \frac{P_{tx}^{(j)} P_{loss}^{(j)}}{2} \left(\left| \sum_{t=0}^{N_T-1} \sum_{r=0}^{N_R-1} H_{t,r}^{(0)}(n)^* G_{t,r}^{(j)}(n) \right|^2 + \left| \sum_{r=0}^{N_R-1} H_{1,r}^{(0)}(n) H_{0,r}^{(j)}(n)^* - H_{0,r}^{(0)}(n)^* G_{1,r}^{(j)}(n) \right|^2 \right)}\end{aligned}\tag{z}$$

Note that post-processing SINR for the 1st STBC symbol is the same as that for the 2nd STBC symbol and the equation above is expressed based on the 1st STBC symbol.

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