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Title	MBS Performance of WirelessMAN-OFDMA Reference System	
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Re:	Call for Comments on Draft 802.16m Requirements Document (IEEE 802.16m-07/030)	
Abstract	This contribution provides the MBS performance results for WirelessMAN-OFDMA Reference System. Based on that, we propose the target MBS performance for 802.16m.	
Purpose	To incorporate the proposed text changes into the Draft 802.16m Requirements Document (IEEE 802.16m-06/002r3)	
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MBS Performance of WirelessMAN-OFDMA Reference System

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1. Introduction

This contribution provides the MBS performance results for WirelessMAN-OFDMA Reference System. Based on that, we propose the target MBS performance for 802.16m.

2. Simulation Assumptions

The simulation parameters as defined in the baseline and NGMN configurations of the Evaluation Methodology document (IEEE C802.16m-07/080r3) are used. Table 1 below summarizes the simulation assumptions.

Table 1 Simulation Assumptions

Parameters	Value	Comments
Number of Cells (3 sectors)	19	
Bandwidth	10 MHz	
Operating Frequency	2500 MHz	
Minimum Mobile-to-BS Distance	35 m	
Test Sector	Centre Cell any sector	
Sector Orientation	Bore-Sight Pointing	
Antenna Pattern	70° (-3dB) with 20 dB front-to-Back	
BS Height	32 m	
MS Height	1.5 m	
Propagation Model	ITU	128+ 37.6*log ₁₀ (d)
Log-Normal Shadowing Standard Deviation	8 dB	
BS Shadowing Correlation	0.5	
MS Noise Figure	7 dB	
Thermal Noise Density	-174 dBm/Hz	
BS Antenna Gain	17 dB	

MS Antenna Gain	-1 dBi	The evaluation methodology specifies 0 dBi. Therefore the performance presented in this contribution will be slightly worse.
BS Maximum PA Power	46 dBm	
Penetration Loss	20 dB for 500m ISD 10 dB for 1500 ISD	
Hardware loss	2 dB	
Frequency Reuse Factor	1:1	
Antenna Configuration	BS: 2tx, 2rx MS: 1tx, 2rx	
FFT Size	1024	
Cyclic Prefix Duration	11.4 μ s	
MS Rx Combining Scheme	MMSE, and MMSE-SIC	
Channel Estimation	Realistic	
FEC Scheme	Turbo Code	
Modulation and Coding	QPSK $\frac{1}{4}$, QPSK $\frac{1}{2}$, QPSK $\frac{3}{4}$, 16QAM $\frac{1}{2}$, 16QAM $\frac{3}{4}$, 64QAM Rate $\frac{1}{2}$, 64QAM Rate $\frac{4}{5}$	No Adaptation
Effective SINR method	EESM	
Maximum SINR	30 dB	
Minimum Simulation Time Per Drop	Each MS location was simulated many times with different Fast fading realizations, until the variance of the average goodput was less than 1%.	
Overhead considered	Pilot and CP No MAP overhead.	
Fast Fading Model	For ISD of 1500m: 60 % PedB 3km/h, 30% VehA 30km/h, 10% Veh A 120km/h For ISD of 500m: Ped B 3km/h	

3. Simulation Results

The MBS throughput versus coverage for the baseline configuration and the NGMN configuration are plotted in Figure 1 and Figure 2 respectively.

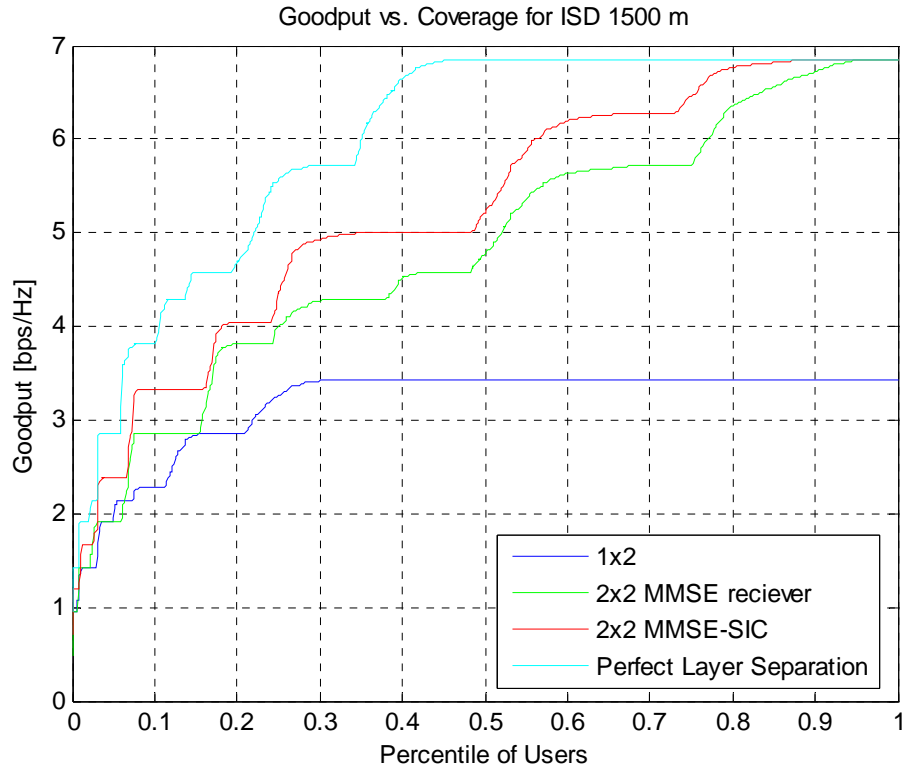


Figure 1 Throughput versus coverage for the baseline configuration

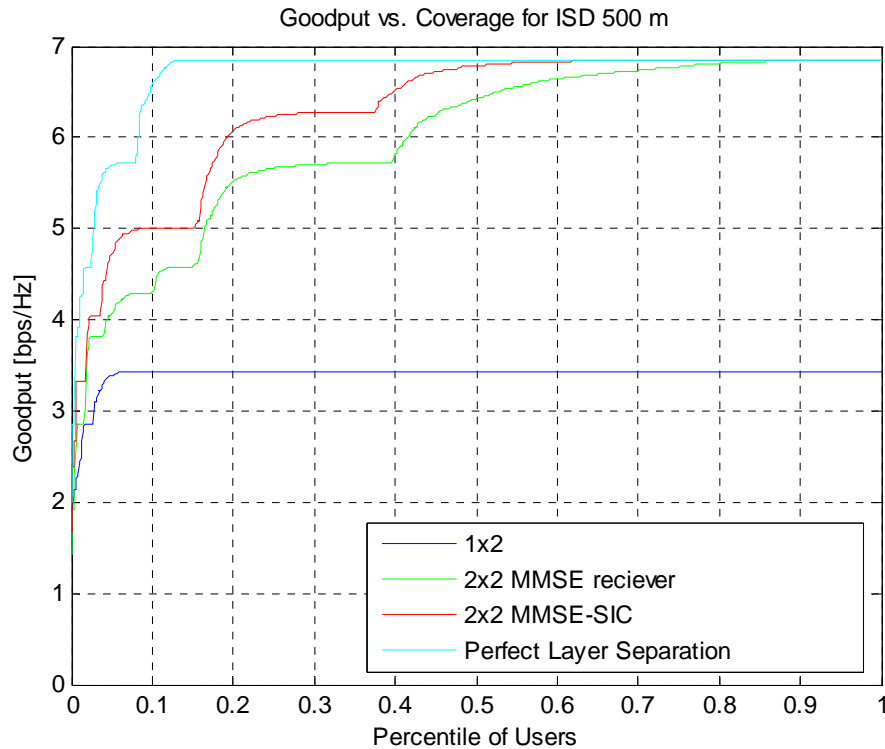


Figure 2 Throughput versus coverage for the NGMN configuration

From Figure 1 and Figure 2, we can see that the 95% MBS throughput of WirelessMAN-OFDMA Reference System is ~ 2.4 bps/Hz and ~ 4.6 bps/Hz respectively for the baseline configuration and the NGMN configuration, when MAP overhead is omitted. With a conservative estimation of MAP overhead for MBS-only services of 4 symbols, the MAP overhead for a TDD2:1 configuration is about 12.5%. This gives the MBS throughput of 2.1 bps/Hz and 4 bps/Hz respectively for the baseline configuration and the NGMN configuration.

It is expected that 802.16m should provide better performance than the WirelessMAN-OFDMA Reference System. We therefore propose to modify the performance target in Table 14 of IEEE 802.16m-07/002r3 to 3 bps/Hz for the case of 1.5km inter-site distance, and 6 bps/Hz for the case of 0.5km inter-site distance. These numbers correspond to 50% improvement over the WirelessMAN-OFDMA Reference System.

4. Proposed Text Change

Modify the 'Min. spectral efficiency' values in Table 14 of IEEE C802.16m-07/002r3. For the 0.5km inter-site distance, replace 4 by 6. For the 1.5km inter-site distance, replace 2 by 3.