Project	**IEEE 802.20 Working Group on Mobile Broadband Wireless Access** <**http://grouper.ieee.org/groups/802/20/**>
Title	**Comments to the Channel Models Document (802.20 – PD-08)**
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Re:	Channel Models document
Abstract	This document summarizes issues I discovered with the Channel Models document, presented at the 802.20 Plenary meeting on Tuesday, 14 Nov 2006.
Purpose	The comments were to stimulate discussion and present my views. This document is to record my comments.
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802.20 Channel Models document [1]

The document has included a method of developing a correlation matrix based MIMO channel model that can be collapsed to the SISO ITU channel models. Furthermore, it is stated in section 3.6 that a non-SISO system shall use a correlation matrix approach in simulations, using the Spatial Channel Models (SCM) approach etc.

The ITU channel models specify a few typical power delay profiles with fixed channel delays taps (for multipath components). However, the power delay profile is highly dependent on the amount of scattering caused by the channel environment. For example, for a user located at direct Line of Sight (LoS) from the base station, the channel models may be dominated by the LoS path, followed by a small number of multipath components with much lower power level. On the other hand, the channel for a user that has a non-LOS link to the base station may consist of a larger number of multipath components, similar to one of the ITU channel models, but with different path delays and attenuation levels. Thus, the simulation data based on the current 802.20 channel models may be misleading for technology performance evaluation, when it is based on solely the ITU channel models and its MIMO extension.

SCM has been developed jointly by the 3GPP/3GPP2 standards group for system-level MIMO simulations. Each user is assigned a different power delay profile that can reflect the randomness in a typical multi-cell, multi-sector scenario, depending on the users' locations in the coverage area.

On the other hand, the description in Section 6 on how the SCM channel model can be used to generate the correlation matrices in section 3.6 is not clear. While the description in Section 6 is adopted from 3GPP/3GPP2 SCM, the fact that only the spatial parameters are used as input to section 3.6, without using the power delay profiles generated by the procedure, has not been stated explicitly.

Both sections 6 & 7 are referred by section 3.6 to be possible methods to generate the correlation matrix models. As the two methods will result in different correlation matrices, the performance data based on each will be very different. In case some proposals use the method in Section 6 while others use that in Section 7, it will be impossible to compare the data fairly.

The decision made by the WG in 2005 to use MIMO channel models that can collapse to ITU SISO models may need to be re-considered. The decision has traded a realistic, well recognized channel model (SCM) with a simpler model to allow comparison between MIMO and SISO technology.

References

[1] '802.20 Channel models document for MBWA system simulations', IEEE P802.20-PD-08, September 6, 2005.
[2] 'Channel models for IEEE 802.20 MBWA Ver. 8 annotated', March 2005.
[3] 'Channel models for IEEE 802.20 MBWA Ver. 7 Clean', November 2004.