

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >
Title	Text Proposal for Shadowing Modeling
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Re:	Response to a call for contributions for the Relay TG, see C80216j-06/001.pdf
Abstract	This document captures correlated shadowing model and path loss dependent shadowing model for IEEE802.16j
Purpose	Text proposal for IEEE C802.16j-06/040
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Text Proposal for Shadowing Modeling

1 Introduction

This is a text proposal input to the contribution IEEE C802.16j-06/040: "Multi-hop System Evaluation Methodology".

+++++Start Text Proposal+++++

1.1.1 Shadowing modeling

[Editor's note: adopt the model in [7]]

Place holder for the text, update required

1.1.1.1 Correlated Shadowing

$$L(dB) = \begin{cases} -1.5\sigma \cos(|\phi - \phi_s|) + \sqrt{\frac{2\sigma}{3N}} \sum_{n=1}^N \cos(k_n^r r + \psi_n^r) & \text{for } |\phi - \phi_s| < 5^\circ \\ \sqrt{\frac{4\sigma^2}{N}} \sum_{n=1}^N \cos(k_n^r r + \psi_n^r) \cos(k_n^\phi \phi + \psi_n^\phi) & \text{for } |\phi - \phi_s| \geq 5^\circ \end{cases}$$

where,

σ = standard deviation of the lognormal shadowing

ϕ = mobile bearing from the basestation

ϕ_s = Street orientation at mobile location

r = range of mobile from basestation

k_n^r = n^{th} wavenumber in the radial direction

k_n^ϕ = n^{th} wavenumber in the ϕ direction

ψ_n^r, ψ_n^ϕ = Random phase terms

1.1.1.2 Path Loss Dependent Shadowing

$$\sigma(r) = \sigma_u \left[1 - e^{-\frac{|P(r) - P_{fs}(r)|}{4}} \right] + 1.5$$

where,

σ_u = Maximum standard deviation

$P(r)$ = Mean path loss (dB)

$P_{fs}(r)$ = Free Space path loss (dB)

- For BS-RS with RS above rooftop:-
 - For wanted BS, assume RS is deployed with LOS back to BS. $\sigma_u=1.9\text{dB}$
 - For neighbouring BS's, no guarantee of LOS so shadowing will be greater. $\sigma_u=4.5\text{dB}$
- For BS-MS/BS-RS with MS/RS below rooftop:-
 - Use (Okumura equation [1] – 1.5) for σ_u
- For RS-MS with MS on same or different street:-
 - $\sigma_u=6.5\text{dB}$

++++++*End of Text Proposal*++++++

2References

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