

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Link Availability in a Joint C/N + C/I Transmission Environment	
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Abstract	This document examines the sensitivity of link availability to transmission environments in which the composite co-channel interference level causes a total noise floor degradation of 1 dB or greater	
Purpose	Draft text and graphics for discussion and possible inclusion in Section 6.3.1 of the Coexistence Practice Document. This document is in support of the rationale for the selection of a 1dB threshold impairment allocated to individual co-channel interference mechanisms	
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Link Availability in a Joint C/N + C/I Transmission Environment

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1.0 Document Rationale

This document has been prepared as a result of discussions at meeting #9.5 of the IEEE 802.16.2 Coexistence group. As the document contains new input, it is being submitted in a formal format. The proposed text and graphics are as follows.

2.0 Proposed Text and Graphics

Simulation results described in other sections of this document indicate that limiting co-channel interference impairments will likely occur as the result of some-one major interference conflict. Such worst case impairments are expected to be rare, as they require a boresight alignment between interference and victim antennas.

The simulation results indicate that the proposed receiver interference tolerance of a 1-dB threshold impairment is sufficient in terms of establishing acceptable coordination design objectives. However, the possibility still remains that multiple interferers can exist and may add to the threshold impairment. The following example examines the significance of these interference sources.

The system design model is based on the "typical" parameters for BWA @ 26 GHz as identified in Section 6.1.1. A 4-QAM modulation system is assumed with an excess bandwidth of 15% and a receiver noise figure of 6 dB. Availability objectives of 99.995% for a BER= 10^{-6} , based on a threshold C/N=13 dB, translate to a maximum cell radius of R=3.6 km in ITU-R rain region K with a corresponding interference-free fade margin of 26 dB. Worst case H-POL transmission has been assumed.

For I/N = -6 dB, C/I = 19 dB and receiver threshold becomes approximately C/N = 14 dB. A 3 dB impairment to threshold (C/I =16 dB) would move the C/N requirement to 16 dB. Figure [xxx] illustrates the reduction in availability as C/I increases, referenced to R fixed at 3.6 km. It is apparent that link availability degrades modestly as C/I increases. At C/I = 16 dB, availability has degraded to only 99.9925%.

Figure [yyy] indicates the necessary reduction in cell radius R that would be required to maintain availability at 99.995%. At C/I = 16 dB, R is reduced to 3.25 km, a reduction of 10%. Consequently, if system operation in a strong interference environment is anticipated, a system design with modestly reduced cell dimensions may be prudent.

It is thus concluded that the selected I/N = -6 dB is a conservative metric for specification of interference criteria.

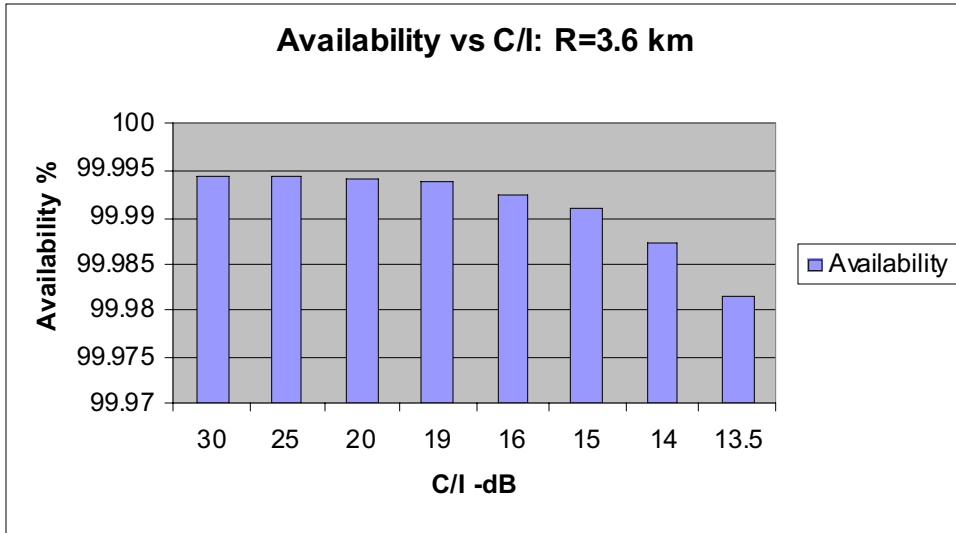


Figure [xxx] Availability vs C/I for a Fixed Cell Radius

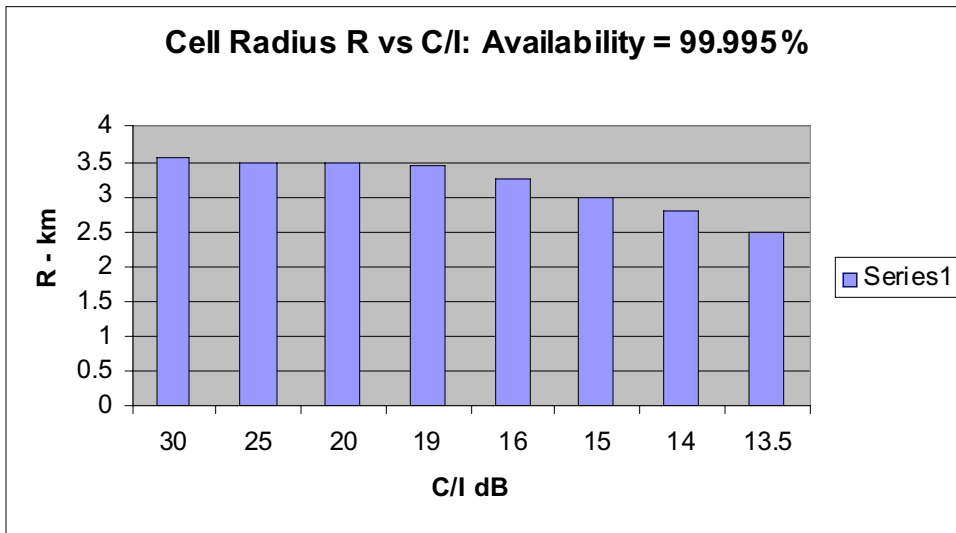


Figure [yyy] Cell Radius vs C/I for a Fixed Availability