

Interference level
in
Broadband Interference tolerance test

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This is a calculation of recommended total interference levels in receiver interference tolerance testing. I assume that broadband interference is used and that the total is found by integrating the interference power spectral density.

I am calculating a value for the test by finding the maximum amount of total crosstalk a channel with the same loss as the interference tolerance test channel could see for a channel meeting the informative specification. I assume that Rich Mellitz' comment 12 is accepted.

In determining the total interference we should have some way of discounting very high frequency noise since receivers can, and should be designed to ignore out of band frequencies. In my calculations I do not do so but pulse shape and the crosstalk gain strongly limit the high frequency components.

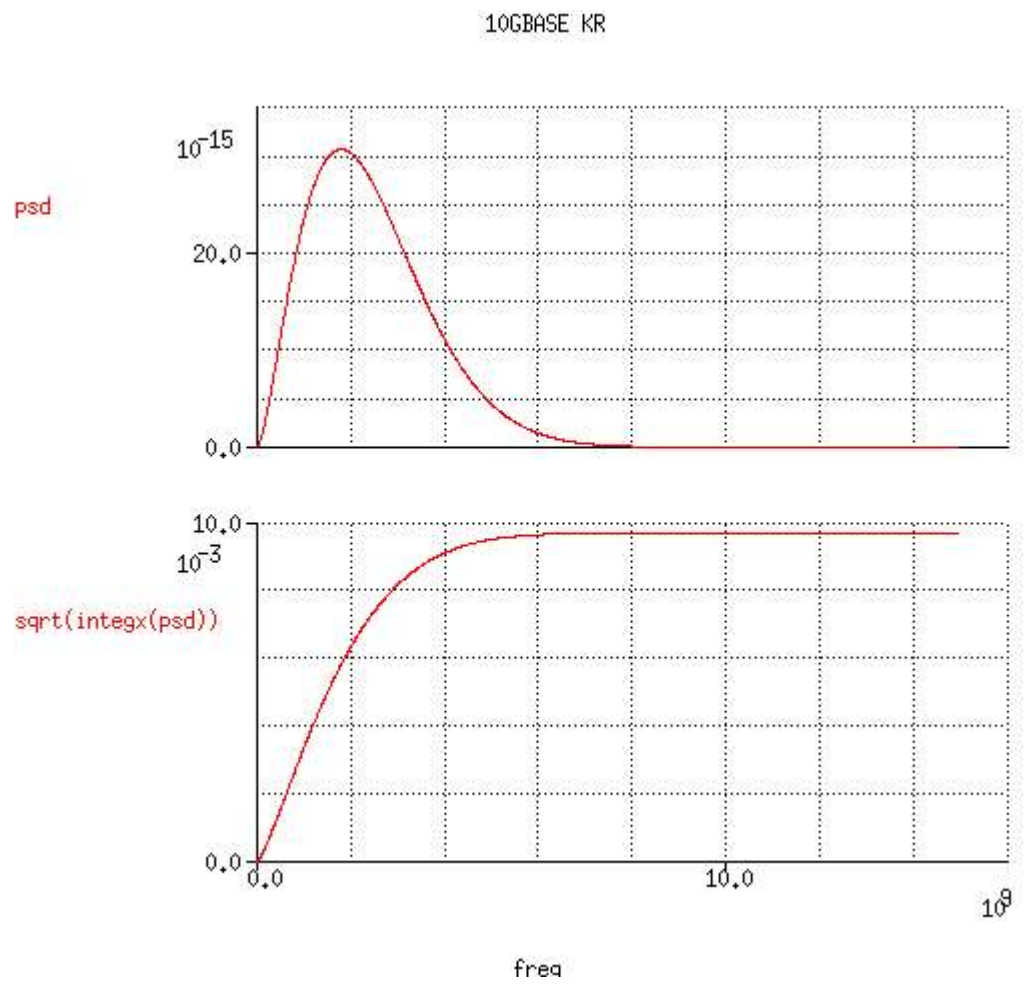
The equations I use are:

$$RMSinterference = \sqrt{\int_0^{15GHz} PSD * df}$$

$$PSD = 2 * VPeak_{max} * sinc\left(\frac{\pi * f}{f_s}\right)^2 * 10^{\frac{(-A_{max} - ICR_{min})}{10}} * equalization^2 * TxLP^2 / f_s$$

I used no equalization for 1000KX and 10GKR and 3dB of equalization for 10GKX4. The TxLP function is a Gaussian low pass which gives the specified minimum rise-time.

A typical integration is:



Calculated values are:

Port type	Recommended Interference
1000BASE_KX	8.6mV
10GBASE_KX4	10.8mV
10GBASE_KR	9.7mV

Possible corrections to KR:

<i>Reason for correction</i>	<i>Amount</i>	<i>Remarks</i>
Negative ICR penalty	+2.3dB	For ITTC_20dB_returnloss ILD would be -2.3dB if negative values were permitted
Reduce Maximum Tx amplitude	-3.5dB	Not recommended
Require 6dB of	-2.7dB	Not recommended