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Title:	**Metrics in mobility**
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1. INTRODUCTION

The aim of this document, an attempt is made to show the variations of the C/I metric within a frame due to mobility, and the effect these variations have on the FER curves. A possible method to account for such variations is shown, which might be a viable replacement for the "Doppler penalty" method of previous methodologies[1].

2. METRIC – FER MAPPING IN MOBILITY

In the prior 1X-EV-DV evaluation methodology[1], the average C/I over one frame was estimated, and the corresponding FER is drawn from an AWGN curve. A pre-defined penalty is applied to the C/I metric to account for mobility. This "Doppler penalty" method of mapping is somewhat arbitrary. A more meaningful mapping methodology can be devised to account for the mobility. One possibility is to account for both the mean as well as the variance of a metric within the frame. This gives rise to a 3-dimensional mapping surface, rather than a single mapping curve.

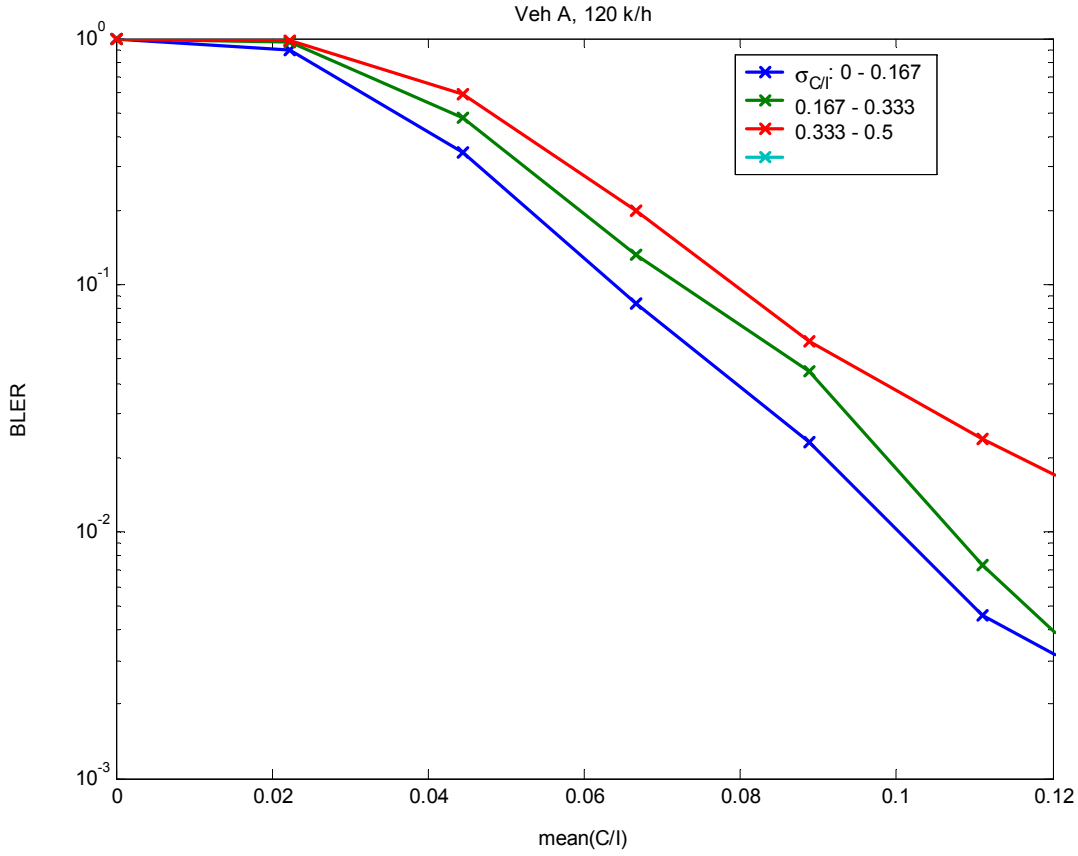
In order to illustrate this idea, we simulated a 1X-EV-DV link (326.4 kbps, 1.25 msec frame, 11 codes, QPSK), at 120 k/h in a vehicular A (3 tap) channel. A 1Tx-1Rx link was considered. A large number of frames (100,000) were simulated. For each frame, 12 samples of the channel coefficients were collected, as also the frame erasures. In each frame, the C/I corresponding to each set of sampled channel coefficients is calculated based on the formula in [1]. Then the mean C/I, as well as the normalized variance of C/I, are calculated. That is to say, in each frame

$$\sigma_{(C/I)} \triangleq \frac{\mathrm{var}(C/I)}{\left(mean\left(C/I\right)\right)^2} \tag{1}$$

The mean and variance are divided into blocks, and the occurrence of frames as well as frame erasures are collected into these blocks. The resultant set of FER curves are shown in figure 1. Thus, the lowest curve in the figure corresponds to a mean(C/I) vs. FER curve for all frames wherein the variance measure $\sigma_{(C/I)}$ fell between 0 and 0.167.

From the figure, we can see that simply using the mean C/I metric for mapping can lead to misleading results. For example, at a mean C/I or 0.08, the low variance curve gives an FER of 4% whereas the high variance mapping gives 15%.

Even though the figure shows the mapping with respect to the C/I measure, it is possible that other metrics can also be incorporated into this method of mapping, in order to account for mobility.



3. REFERENCES

[1] 1X-EV-DV Evaluation Methodology, 3GPP2 WG5 Evaluation AHG, July 2001.