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Fibre optic communication system design guides –
Part 10: Characterization of the quality of optical vector-modulated signals with the error vector magnitude

CORRIGENDUM 1

4.2 Normalization of the measured data

Replace the existing text of the second paragraph by the following new text:

The normalization factor α is chosen to match the measured vectors to the reference by first finding the value of a scaling factor β for the reference vectors that minimizes the corresponding unnormalized EVM_{rms} without changing the distribution of the measured vectors. Then the inverse of β is used as α to scale the measured vectors to the normalized reference. For this purpose, the unnormalized EVM_{rms} is expressed as

$$U = \sqrt{\frac{1}{N}\sum_{n=1}^{N}\left|\beta \times \mathbf{S}_{\text{ref}}^{r(n)} - \mathbf{S}_{\text{meas}}(n)\right|^2} \quad \text{where} \quad \mathbf{S}_{\text{meas}}(n) = \begin{pmatrix} I_{\text{meas}}(n) \\ Q_{\text{meas}}(n) \end{pmatrix} \tag{6}$$

The value of β that gives minimum U is determined by solving

$$\frac{\partial U}{\partial \beta} = 0 \tag{7}$$

leading to

$$\alpha = \frac{1}{\beta} = \frac{\sum_{n=1}^{N}\left(I_{\text{ref}}^{r(n)2} + Q_{\text{ref}}^{r(n)2}\right)}{\sum_{n=1}^{N}\left(I_{\text{ref}}^{r(n)} \times I_{\text{meas}}(n) + Q_{ref}^{r(n)} \times Q_{\text{meas}}(n)\right)} \tag{8}$$