
The E-Model, R Factor and MOS

Overview

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Overview

The E-Model is a planning tool for estimating the overall quality in a telephone network. It was first submitted to standards bodies in 1993 although its origins date back to the models first developed in the 1960's by BT, Bellcore and others.

The basic premise for the model is that impairments are always psychologically additive. Simply put, if network impairments such as noise, echo, delay, codec performance, jitter, etc. are cleverly added then an overall objective rating of quality or "caller experience" can be estimated.

The Basic Formula

The basic formula for the E-Model is below.

$$\mathbf{R\ Factor = Ro - Is - Id - Ie + A}$$

R Factor: Overall network quality rating (ranges between 0 and 100)

Ro: Signal to noise ratio

Is: Impairments simultaneous to voice signal transmission

Id: Impairments delayed after voice signal transmission

Ie: Effects of Equipment (e.g. codecs)

A: Advantage factor (attempts to account for caller expectations)

In simple terms, the overall quality (R Factor) is calculated by estimating the signal to noise ratio of a connection (Ro) and subtracting the network impairments (Is, Id, Ie) that in turn are offset by any expectations of quality had by the caller (A).

