A computational approach is offered for smoothing asphalt concrete complex modulus test results in a way that forces compliance with linear viscoelastic theory and thermorheological simplicity. Essentially, it is based on presupposing the shape of the relaxation spectrum with calculations carried out in the wicket domain. The suggested scheme calls for the determination of six free parameters-three of which are associated with the mechanical (viscoelastic) response, while the remaining three are related to the time-temperature shifting properties and include (as unknown) the reference temperature level. In the evaluation process, it is shown how the first three parameters can be obtained directly from the measurements and separately from the other three, while the determination of the latter set follows as a second independent step. This decoupled process simplifies the analysis and includes additional advantages. In this paper, the smoothing approach is described and discussed, and its appropriateness and relevancy for asphalt concrete materials is demonstrated using a sample data set.