We revisit the global-in-time existence theory for the LeFloch-Ma-Wang model which couples together a nonlinear wave equation and a nonlinear Klein-Gordon equation. By adapting the hyperboloidal foliation method, we establish that a weighted energy of the solutions remains (essentially) bounded for all times. The new ingredient in the proof is a hierarchy of fractional Morawetz energy estimates for the wave component involving two conformal transformations. The optimal case for these energy estimates corresponds to using the scaling vector field as a multiplier for the wave component. (Received July 03, 2019)