(a) Traditional approach: deploying multiple cells with active users in each cell. (b) Proposed approach: employing pre-computed interference patterns to virtually create a multi–cell interference environment.

Fig. 1. Illustration of cost/complexity/time savings of the proposed approach to uplink performance analysis.

effectively create a virtual multi–cell interference environment without the need of actually deploying multiple cells (See the illustration in Fig. 1). Additionally, the proposed approach offers the advantage of reproducible interference signals which can be used to compare the performance of competing algorithms or products in field trials.

The remainder of this paper is organized as follows: Section II describes the system–level simulator employed to obtain the interference power patterns. In Section III the approach used for converting these into time–domain interference signal is presented. Section IV presents the details of scenarios used for the generation of the publicly available LTE uplink interference signal files. Section V contains some simulation results to illustrate the importance of using realistic interference modeling for LTE uplink performance analysis. Section VI outlines the usage of the proposed interference patterns, and Section VII concludes the paper.

II. SYSTEM–LEVEL SIMULATOR FOR LTE NETWORKS

Fig. 2 illustrates the structure of the system–level simulator employed in this work. Apart from a graphical user interface that is not shown here, it consists of three major entities: the network simulator itself, a channel model block, and a block for modeling the link–level transmission errors.