

## The instruction

### for demo version usage of program complex «The Simulator of Digital Satellite Communication Channel with the Best Systems of Reliability Improvement»

Suggested to your attention demo version of the Simulator provides to the specialists a capability to acquaint with of working technology of a completely unique program complex intended for simulation of satellite and some others communication channels, and also for estimation the efficiency of all the best in the World algorithms of error correcting codes decoding (at a present time). Recommended operating system – is Windows 2000 and later.

Demo version of the Simulator has completely simple and absolutely understandable for the users the interface. It allows viewing all main capabilities of the Simulator, practically not addressing at all to the given instruction.

Nevertheless, sequence of recommended operating is described below to pass all main steps for managing a decoder work simulation in a satellite channel and for obtaining the final results.

After start an **exe**-module of the Simulator it is necessary to assign number of quantizing levels (in demo version they are 2 or 16) of a satellite modem of the receiver, from which one the adopted digital stream goes in the decoder. It automatically adjusts all algorithms, used in this demo-Simulator for work either with hard-, or with the soft-decision modem.

Further it is necessary to select for simulation a method of decoding: the decoder for Hamming codes, Viterbi algorithm for a code of standard length  $K=7$ , multithreshold decoder for code with  $R=1/2$  or decoder for a turbo code.

The volumes of simulation are selected for all methods equal to  $10^7$  bits.

Further it is possible to pass to section of the charts construction. It is necessary to select, for example, ranges of charts construction and representation of simulation outcomes within limits  $-1$  dB up to  $2$  dB of a signal-to-noise level in a Gaussian channel. The probability of an error per bit  $P_b(\mathbf{e})$  of the decoder can be chosen below equal, for example,  $10^{-7}$  (to assign  $BER_{min} = -7$ ). After that it is possible with the help of menu «Simulation» at first to pass to construction a chart of initial probability of an error  $p_0$  in a Gaussian channel by choosing command «Plot graph without coding». It is as a matter of convenience of the curves analysis it is possible to indicate a place for a legend of the creating curves.

After construction of the chart for error probability of a channel it is possible to change formats of the created charts (color, width, marker), and then to choose command «Plot graph with coding» of menu «Simulation». The simulator will plot quickly the efficiency curve of one of selected by you decoding method.

Further you can change number of quantizing levels in the modem for all decoders, and also select parameters of the charts and one of listed above decoders, presenting in demo version of the Simulator.

The different representations of the outcomes decoding charts are possible also: as attitudes of character or bit energies to a channel noise power density ratio, and also selection of arbitrary titles of creating graphical relations, control of grids of the charts and other adjustments. Some unnecessary more constructed already charts can be deleted also, and then they can repeat experiments with any code or algorithm.

After completion of experiments it is possible to take advantage of a very friend capability granted by the Simulator, and to send all obtained graphic data into Microsoft Excel, having clicked on a familiar firm icon of this effective system mean. After that all graphical results of simulation will be submitted by the way charts in this popular spreadsheet. It is possible to conduct further all accessible in this spreadsheet conversions for the charts and data.

All described above capabilities of the Simulator can be seen and on the computer working under Windows 98 control, except for transfer of simulation outcomes in Microsoft Excel.

An experience of demo version using and full scale working version of the Simulator application have shown, that the works acceleration of efficiency comparison of different codes and methods of decoding, achieves some decimal orders (in some cases - up to 10000 times) when they use this unique program complex. It is provided with full readiness of many hundreds thousand codes and different modifications of modeled decoders and channels to instantaneous set-up and very fast testing of studied) methods practically at all possible reasonable values of their parameters. Such friend capabilities of fast selection of codes and adjustments of decoders realized in our full scale Simulator in several ways. It creates conditions for further escalating of capabilities of the Simulator in the field of extremely fast learning of the codes characteristics and algorithms of their decoding, and also for comparison of different decoders among themselves on efficiency.

The main capabilities and specifications of the full working version of the Simulator can be found on main page of our site [www.mtdbest.iki.rssi.ru](http://www.mtdbest.iki.rssi.ru) in section of news. All these and its other potentials of research and developments of decoders can be realized at the Simulator adaptation to your concrete requirements.

Pay attention to the minimum requirements to the screen resolution of the computer monitor indicated in the specifications of the Simulator.

The requests for delivery of full scale custom versions of the Simulator (Russian and English versions) can be routed to **G.V.Ovechkin**: e-mail: [g\\_ovechkin@mail.ru](mailto:g_ovechkin@mail.ru), mob. tel. in Russia: +7 910 644 51 46.