Multivariant EMC Analysis with EMC VTA

Reiteration of intersystem EMC analysis for different variants of the radio systems' spatial allocation and frequency planning provides you the information about possibility of the radio systems operation in all probable conditions

Advantages

Extra high informativity of the original Automated Double-Frequency Testing Technique (ADFTT), which is used for characterization of radio receivers – potential receptors of intersystem radio interference

Extra high efficiency of the original EMC Discrete Nonlinear Analysis (EMC DNA) technique, which is used for behavior simulation of receivers' operation in severe (very complicated) electromagnetic environment

High objectivity of electromagnetic environment modeling by the use of modern geoinformation systems, digital area maps, and radio-wave propagation models recommended by International Telecommunication Union (ITU-R models)

High efficiency, accuracy, information security, and low cost of software-controlled physical modeling of the radio receiver in laboratory conditions by using the equipment of Automated Double-Frequency Test System

Efficient and low-cost EMC analysis for many variants of area and frequency allocations of radio systems (and/or for many scenarios of a new radio system allocation in the region of spatially-distributed radio objects)

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VTA

EMC Virtual Testing Area

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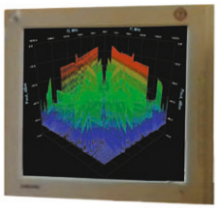
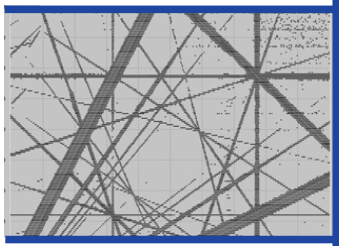
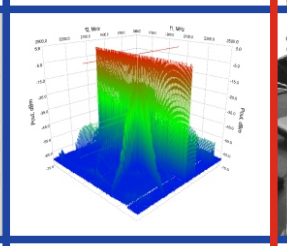
**COST-EFFECTIVE TECHNIQUE
for intersystem electromagnetic compatibility analysis
of spatially-distributed radio objects
allocated at the ground / sea surface
and/or in the air space**



A new era in intersystem EMC analysis!



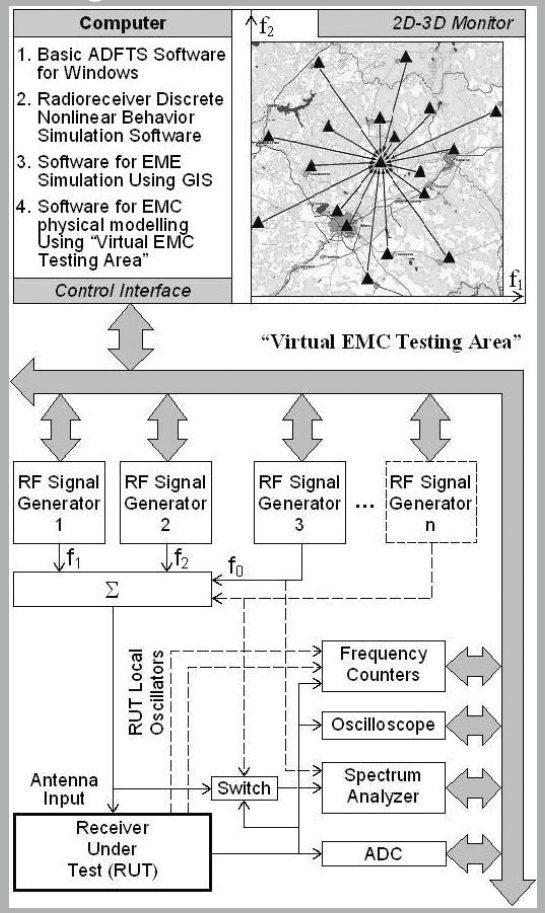


EMC VTA

is based on semi-physical modeling & simulation of:

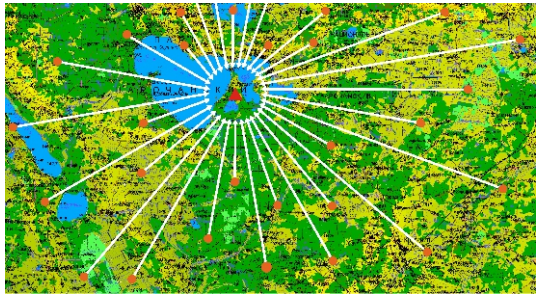
- **complicated electromagnetic environment**
- **radio receivers' operation in this environment**

Hardware & software configuration



More information about EMC VTA is given in the following paper:

Mordachev V., Sinkevich E. "Virtual Testing Area" for Solving EMC Problems of Spatially Distributed Radiosystems based on Automated Double-Frequency Test System // Proceedings of the 9-th International Symposium on EMC "EMC Europe 2010" joint with 20-th International Wroclaw Symposium on EMC, Poland, Wroclaw, Sept. 13-17, 2010, pp.714-720.



Basic situation

to consider when simulating a real-world testing area by EMC VTA

The radio receiver under test (displayed as a red triangle) is a potential victim that may be interfered by signals of spatially-distributed transmitters (which are displayed as red circles) operating in the ambient area

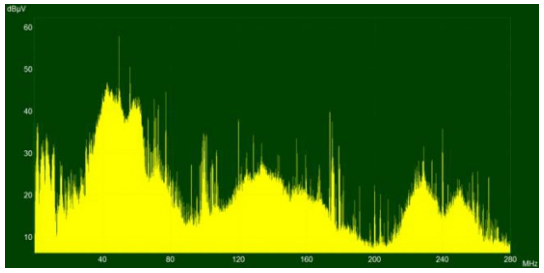
This basic situation must be analyzed for each receiver of each radio system

Main stages of analyzing the basic situation in EMC VTA

1 Generation of electromagnetic environment model for the receiver under test

- Calculate electromagnetic fields from the transmitters at the point of the receiver-under-test antenna location (this is made by the use of GIS technologies and digital area maps; radio-wave propagation models based on ITU-R Recommendations are also involved)

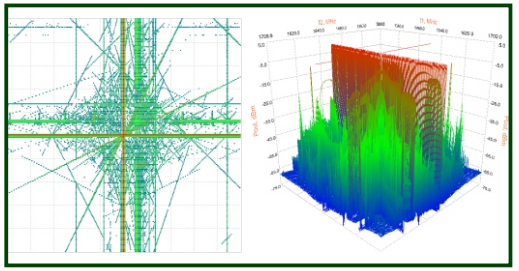
- Compute the levels of the interfering signals at the antenna input of the receiver under test (by taking into account the antenna of the receiver). An example of the total spectrum at the receiver input is shown below



2 Selection of the most dangerous interferers

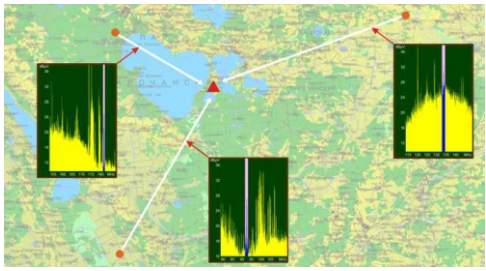
- Find, recognize, and measure the parameters of the receiver interference responses (spurious, intermodulation, desensitization, etc.) by the use of Automated Double-Frequency Testing Technique

- From that measurements, extract the nonlinear model of the receiver (original techniques of high-order polynomial model synthesis are employed)



- Using the extracted model, simulate the receiver by feeding its antenna input with the electromagnetic environment model computed at stage 1 (the EMC Discrete Nonlinear Analysis technology providing excellent accuracy and computational efficiency is used for the simulation)

- If an interference appears at the receiver model output, find the transmitters that create the interference (specialized dichotomic search procedure is used)



3 Physical modeling of the receiver under test

- Set the parameters (frequency, level, modulation) of measurement generators in order to simulate the interfering transmitters found at stage 2
- Feed the receiver under test with the sum of the signals from the measurement generators
- Check the existence and level of interference at the receiver output