

An analysis of the disabling potentialities of UWB electromagnetic Non-Lethal Weapons on sensitive electronic apparatus

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The possibility to disable electronic devices by means of high-power ultra-wideband (UWB) electromagnetic non-lethal weapons represents an important aspect to be taken into account in the design of electronic apparatus and circuits working into several scenarios (e.g. airports, banks, etc.). To provide an appropriate level of protection of these equipment, reducing by means of shielding the effects of the induced electromagnetic interferences, it is necessary a deep knowledge of the disabling potentialities of these new non-lethal weapons.

It's well known that the efficiency of this type of threat strictly depends on the adopted high-power microwave generator and antenna, and on the characteristics of the transmitted UWB signals. At present, as concern the first ones, it is possible to find in the scientific literature detailed information about modeling and working properties, while for the latter, results obtained by means of experimental approaches are reported.

In this work, a detailed analysis of the disabling potentialities of UWB electromagnetic non-lethal weapons on sensitive electronic apparatus has been carried out, using the information available in literature. For the investigation, the type of microwave generator, the distance from source to target, the characteristics of the UWB impulse, and the nature of the target devices have been taken into account, focusing the attention mainly on the evaluation of the breakdown and of the destruction failure probability of the victim.

The analysis highlights that in order to obtain an accurate individuation of the interaction mechanisms and of the protection techniques, it is necessary to develop a complete model of the interaction process which takes into account the full description of the electromagnetic characteristics of the specific target and of the working scenario.

Keywords: non-lethal weapon, high-power microwave generator, UWB, breakdown failure probability, destruction failure probability.