Assessing the Security of TEMPEST Fonts against electromagnetic eavesdropping by Using Different Specialized Receivers

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Abstract: The main topic of the present paper is the printed text protection against electromagnetic infiltration. There are many solutions to protect such data. One of these methods is the one that uses computer fonts that are characterized by special shapes. The suitability of the solution has to be confirmed by many tests and analyses. An important element of such researches is the class of receiving devices used. In the case of measurements of the valuable emissions arising from electronic data processing of the printed text, typical receivers that are used for measurements of electromagnetic compatibility cannot be used. They have to be dedicated devices for measuring the very low level of signal that arises unintentionally. The sensitivity of the receiver must be very high in wide measuring bands. In addition, in order to assess the method of preventing electromagnetic infiltration, it is important to verify it by independent institutions. An additional advantage is the use of different receivers in the assessment process. This paper presents the results of studies made regarding the suitability of two sets of fonts with special shapes (secure symmetrical and secure asymmetrical) in secure information processing. The analysis of the fonts was based on visual examination, a basic method of preliminary assessment of electromagnetic emissions correlated with processed text information, of the images reproduced from unwanted emissions. The tests were carried out at two independent institutions, Military Communication Institute—Poland, Special Telecommunications Services—Romania, using three different types of receivers: Tempest Test System DSI-1550A, Rohde & Schwarz FSET22 and Rohde & Schwarz FSWT. The images obtained in the two independent laboratories with different setup and test equipment confirmed thus without doubt the possibility of using special fonts as the solution against an effectiveness of electromagnetic infiltration. The above assessment is correct, regardless of the used receiver and the environment of implementation of the secure fonts.

Keywords: electromagnetic eavesdropping; electromagnetic infiltration; valuable emission; TEMPEST font; electromagnetic propagation; electromagnetic devices; electromagnetic measurements; software protection; information security; computers and information processing

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