The insertion attenuation characteristics of the two filtering cells belonging to the cascade are depicted on the same graph in Fig. 10. One can see the importance of the secondary filtering cell (blue line) in the upper range around 10 MHz. The retrofitting of a second supplementary cell was compulsory.

Fig. 11 depicts the attenuation characteristics of the filtering cascade. Both characteristics are logarithmically displayed, better highlighting the interest area between 1 MHz and 10 MHz.

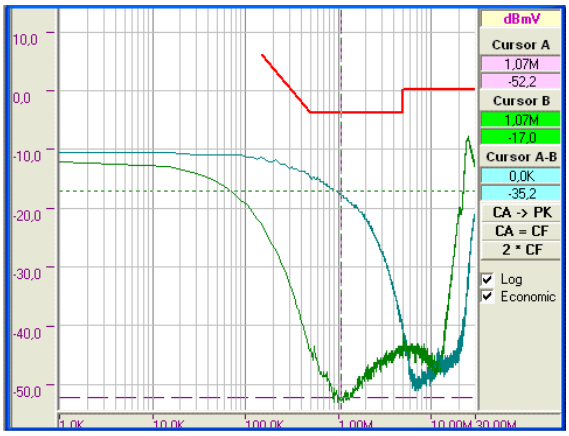

Fig. 10 Insertion attenuation characteristics of the two filters

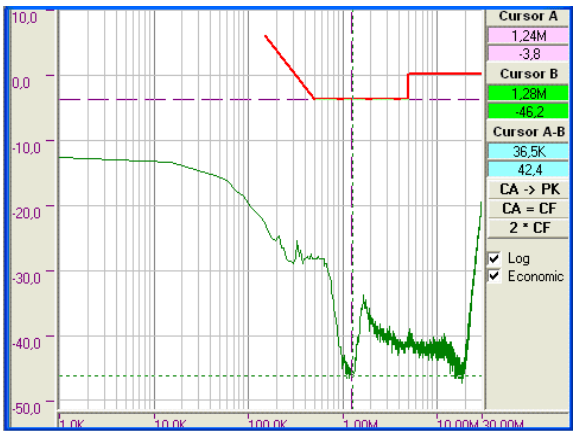

Fig. 11 The two-filters cascade insertion attenuation characteristics

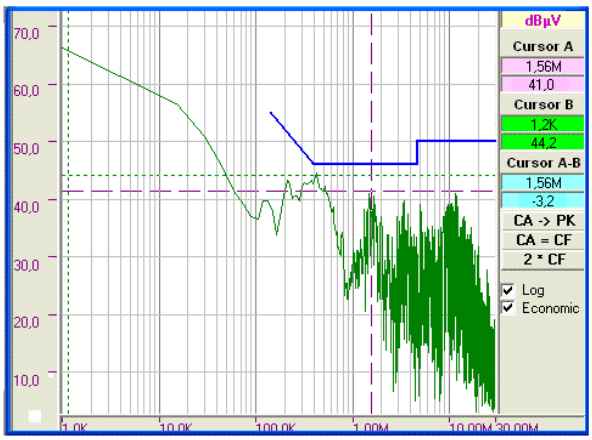

Fig. 12. Electromagnetic emissions led through the power cord after retrofitting the EMI filters cascade connected.

One can see that if prior the introduction of the cascade the standard limits were exceeded by 30 dBµV, after the retrofit of the cascade, the values of electromagnetic conducted emissions have decreased from approximately 90 dBµV to 44.2 dBµV, namely with 45.8 dBµV, which demonstrates the effectiveness of the solution adopted. Moreover, in the frequency range around 10 MHz, the decrease is more pronounced, the maximum recorded values being only of 40 dBµV.

It must be noted that the electromagnetic emission limits for both IEC standards concerning residential, commercial and light-industrial and industrial environments are fulfilled as it can be seen also in Fig. 12. [9], [10]

4. Conclusions

The paper aims to be a brief introduction in the mitigation techniques of electromagnetic conducted emissions into and from single-phase equipment, having rated currents up to 16 A. Passive EMI filtering is one of the most common methods in this matter.

The need for passive filtration arises because the producers of different equipment, design and manufacture them usually in standard laboratory conditions, which generally differ from the real ones.

However, very often, due to the real electromagnetic conditions, especially to various electromagnetic induction phenomena that may occur locally, the standard limits may be easily exceeded.

Therefore, retrofitting one or even more filtering cells becomes compulsory, as it could be observed in the paper.

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