Abstract:
According to the standard CISPR 16-2-3 measurements of electromagnetic interferences (EMI) are carried out either in anechoic chambers or on open area test sites. For testing on open test sites it is necessary to choose a remote location where man-made noise is minimum to avoid covering of the emissions of the device under test by ambient signals. The regulated measurement setup and procedure, described in the standard, is mandatory for compliance measurements and reproducible measurement results of radiated emission measurements in the range of 30MHz to 1 GHz. In this paper methods are presented to suppress unwanted ambient noise and thus allow to perform measurements on noise polluted open test sites. By using ultra high-speed analog-to-digital converters sampling the emissions signal in time-domain and applying the fast Fourier transformation EMI measurements are sped-up by several orders of magnitude compared to measurements carried out with traditional heterodyne receivers operating in frequency domain. Combining the time-domain technology together with adaptive filter techniques the presented system can perform ultra-fast emission measurements in the presence
of ambient noise. Advanced strategies with real-time capability for adaptive noise cancellation based on a powerful hardware platform are shown. Frequency domain and time-domain adaptive filtering are compared. The adaptive filter algorithms are investigated and enhanced in respect of implementing the noise cancelling algorithm on field programmable gate arrays ensuring a continuously high data-throughput by an optimized digital signal processing in real-time. Measurements up to 1 GHz are carried out on inner urban sites. Ambient noise suppressing in real-time is shown in frequency bands of over 125MHz at once.

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