

The Characteristics of Radio Noise for Different Traffic Densities

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Abstract

In urban areas, the pollution of electromagnetic environment is mainly due to man made radio noise. Man made radio noise sources may be classified as three types: (a) Incidental radiation: Ignition systems, electric power lines, and electric motors, (b) Intentional radiation: Wireless systems, radio stations, and licensed transmitters, (c) Unintentional radiation: Cable TV systems, microwave ovens, and RF-stabilized arc welders (John R. Herman, Electromagnetic ambients and man-made noise, Don White Consultants, Inc. 1979). The metropolitan area noise maxima exist at the center of an urban area coincident with the greatest concentration of either vehicular traffic or industrial facilities (Edward N. Skomal, Man-made radio noise, Van Nostrand Reinhold Company, 1978). The vehicles ignition system radiates highly impulsive noise. This paper presents information on the variation in the radio noise among different vehicles. Taiwan is one of world's most densely populated places and much more motorcycles and cars are used there. The electromagnetic environment is unique and the information about radio noise is not sufficient at this time. The interference which noise environment causes is important to wireless communication system. Thus, we need to consider the influence that the noise causes. In order to obtain the information necessary for evaluating the degradation of the performance of communication system, we measured the statistical distributions of the noise envelope. The most useful parameter for describing ambient electromagnetic environment is noise power. Noise power is usually related to noise figure. This paper describes the method for measuring urban radio noise, the relationship of noise figure between frequencies, the values of standard deviation for observation frequency and the properties of urban radio noise in time domain by the statistical analysis. Because of this paper must take traffic density into account. We measured at different places of the city in Taiwan. Each place for the measurement represents the different noise environment. The difference lies in the number and kinds of vehicles. The purpose of this paper is to provide an overview of the electromagnetic environment in the city. The information is important for design of UHF mobile communication systems.