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Analysis of lightning-induced transient in 2.4 GHz wireless communication system

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Abstract

This paper analyzes the effects of transient from lightning channel to wireless communication system operating in microwave band at 2.4 GHz. Received Signal Strength Indicator (RSSI) measurement method has been used to capture 3 lightning flashes (naked eyes method) with 7 spikes recorded at r distance from the lightning channel base with fixed d Transmitter-Receiver (T-R) separation at 1 meter. The transient effects have been evaluated in terms of Electric Field Strength, Signal-to-Interference-Noise Ratio (SINR), Bit Error Rate (BER) and Packet Error Rate (PER). During the first lightning flash event, more than 50% of total transmitted packets were corrupted for at least 3 seconds duration. The same happens during the second and third lightning flash events with more than 40% and 15% packets corrupted for durations of 3 and 2 seconds respectively. Interestingly the most suffered traffic types are video and speech signal transmission while data transmission is not affected at all. © 2011 IEEE.

Author Keywords

lightning; transient; wireless communications

Index Keywords

Electric field strength, Lightning channel, Lightning flashes, Measurement methods, Microwave bands, Naked-eye, Packet error rates, Received signal strength indicators, Signal-to-interference noise ratio, Speech signals, Transient effect, Wireless communication system, wireless communications; Astronomy, Communication systems, Electric fields, Global system for mobile communications, Lightning, Lightning protection, Power quality, Signal receivers, Speech communication, Speech transmission, Transients, Wireless telecommunication systems; Bit error rate

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