IEEE 802.15.4 MAC/PHY transceiver built on the phones, and interferences of specific electromagnetic aspects have been exposed; secondly, the operators work with ground preparations within the laboratory. The GPR antenna is a few mm to tens of m in size. The antenna shielding efficiency is 300 kHz – 18 GHz: 120 dB. The measured value of the electric field is 0.018 V/m, which is lower than the limits imposed by the rules.

In order to evaluate interferences generated by transmitters located near the GPR antenna, the operator considered two different measurements, that include one at a time cellular and, Xbee transceiver. First test considers an LMTS cellular phone. The distance between GPR antenna and phone is 1.4 m. The phone transmits LOS.

For the second test a transceiver XBee PRO-S2, international variant by Digi International, is arranged on the top at direct contact with GPR antenna. The XBee’s antenna: Specifications of the RF module are: transmitting power output 10 mW, outdoor RF LOS range 1500 m, operating frequency band ISM 2.4 GHz, RF data rate 250 kbps, 14 direct sequence channels.

In figures are shown typical pulses generated by UWB GPR, respectively in time, and in frequency domains.

SIR2000 Georadar generates single pulse that have a time duration of about 2.7 ns and a variable Pulse Repetition Time (PRT-T). Measures carried out in the controlled room confirm the presence of spectral traces separated among them by a constant PRT+1/T (Pulse Repetition Frequency).

In our experimental results the value of electrical field peak has been measured equal to Epeak = 1.7 mV. Consequently, the rms values of electrical field are: ERMS = Epeak/√(T/2) = 0.025 V/m, for setup: 900TAS, 300S, 2500MHz. ERMS = Epeak/√(T/7) = 0.018 V/m for setup 500DPH. In any case, these measured values are very low, lower than imposed by rules. The following figures exemplify rules.

The norm CEI 211-78 regulates how to measure the electric field peak, is the dB value, estimated by means of analyzer at carrier frequency, corrected by adding the sensibility factor (dB) = 20 log(T/2), where T is the pulse duration time. Frequency, peak value, and average intensities of electromagnetic field (V/m vs m) are entities that must be measured for this purpose.

Intensity of electric field E is evaluated by means of equation E = AC-I/VAc + AC-I/VAc, where VAc, AC-V, and AC-I are respectively: the voltage across output of receiving antenna, cable attenuation, intensity of voltage measured by receiver, and the Antenna Calibration Factor. GPR’s setup can be changed. In the case of setup 900TAS, 300S, 2500MHz, we measured a PRT of 12 µs, different from that shown when setup is 500DPH (PRT=23.3 µs). In our experimental results the value of electric field peak has been measured equal to Epeak = 1.7 mV. Consequently, the rms values of electrical field are: ERMS = Epeak/√(T/2) = 0.025 V/m, for setup: 900TAS, 300S, 2500MHz. ERMS = Epeak/√(T/7) = 0.018 V/m for setup 500DPH. In any case, these measured values are very low, lower than imposed by rules. The following figures exemplify rules.

In figures shows radarogram output (XSA9 scan), which includes record of data in absence (a) and in presence (b) of the cellular transmission. The oscilloscope representation allows to put in evidence very limited spread of traces.

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