

Measured wireless emissions from broadband power line communication in Swiss city exceed guidelines

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An Internet service using broadband over power lines (BPL/PLC) was installed in the city of Fribourg, Switzerland. This system uses the existing power lines to bring internet services to individual homes and businesses. It also uses the household wiring inside the buildings to network computers.

As electrical lines are not designed to transport data signals, they tend to become unintentional antennas, radiating the PLC signal frequencies they carry. The Swiss Federal Office of Communication (OFCOM) investigated whether the Fribourg PLC system could interfere with shortwave radio.

The PLC system uses the frequency band from 2 MHz to 12 MHz for transmissions along power lines from the substation to each household or business. For communication inside each building, the frequency band from 19 MHz to 25 MHz is used. The maximum transmission power is 50 milliwatts.

The OFCOM engineers measured the radiation for the different frequencies and at different locations. They found that the PLC emissions for frequencies below 10 MHz were below ambient levels inside the city. For frequencies higher than 10 MHz, the PLC system rose above ambient levels.

The investigators also travelled across the river to a rural area outside the city. The measured in locations that were between 500 and 1000 meters (1500 to 3000 ft) from the city limits. They were not able to detect any at those distances.

The authors concluded that the wireless emissions from the Fribourg BPL/PLC system were strong enough to violate the German NB30 standard.

Comments

The report does not state whether the power lines in the city are buried or aerial. They are probably buried, as that is common in Swiss cities. Buried cables are less prone to act as antennas, since the conductors are in close proximity to each other. The soil around the cables also dampens the emissions. Higher readings may have been found for aerial power lines, which may have put the PLC signals above ambient levels at all the frequencies.

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The frequencies above 19 MHz are only used by the PLC system that communicates within a building, and are not intended to be carried on the outside power lines. That the OFCOM engineers could still pick up these signals wirelessly from the outdoor lines shows that PLC signals can travel widely in a local area.

Reference:

Assessment of Radio Disturbance Generated by an Established PLC-Network at the Swiss City of Fribourg by Pascal Krahenbuhl and Robert Coray, Swiss Federal Office of Communication (undated).