

Infopoverty Community of Expertise e-services for development

LOW COST STRATEGY FOR DIGITAL INCLUSION IXEM WIRELESS NETWORKS UP TO 300 KILOMETERS



The trial network

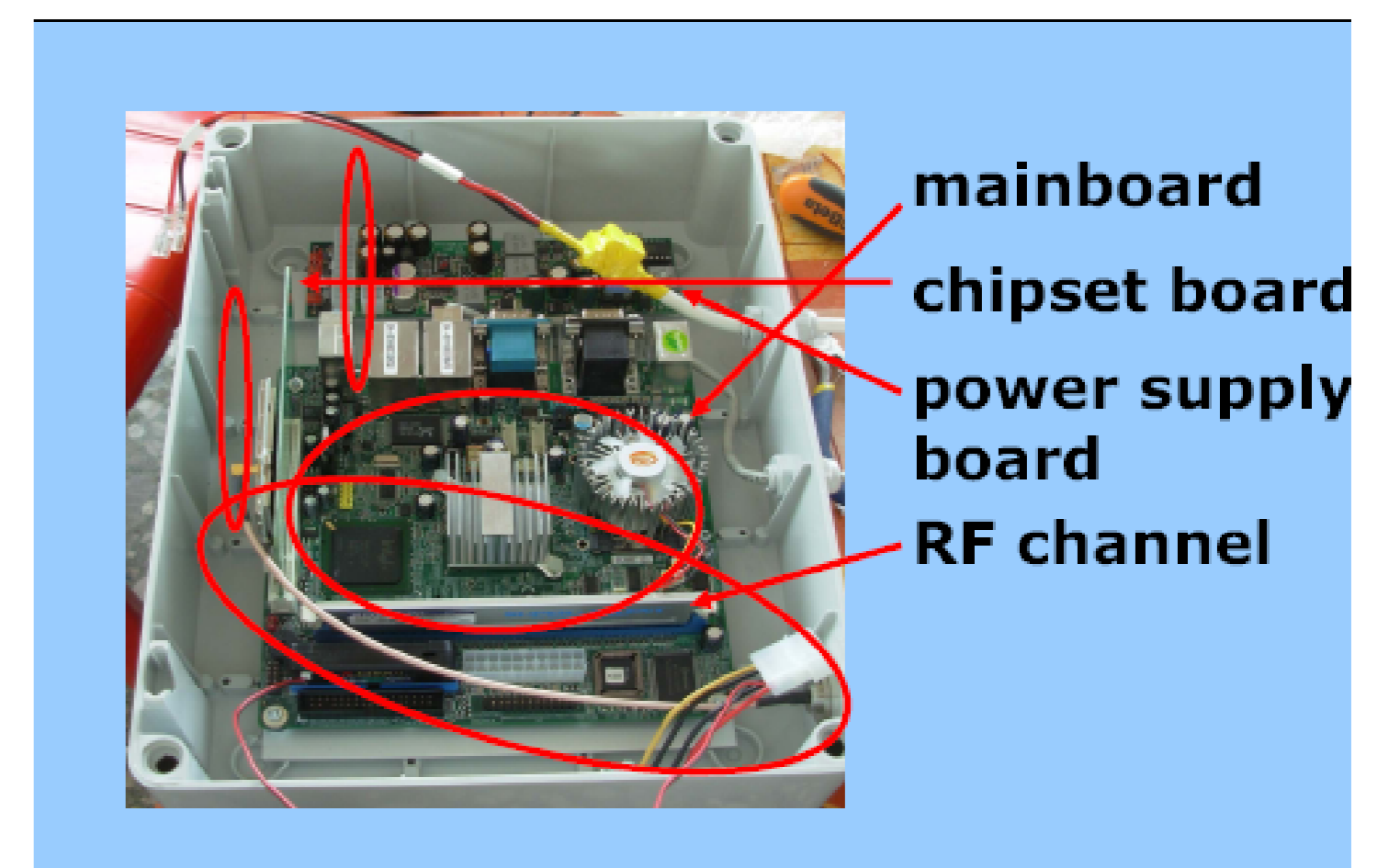


During 2007 the ixem Labs of Politecnico di Torino, the oldest and most rated Italian technical University, developed an extremely low cost method for the realization of long distance (MultiKiloMetric) point to point telecommunication infrastructures by use of wireless technology. The method was based on the use of commercial IEEE 802.11a/g radios controlled by means of an open source firmware. The transmission protocol was developed introducing improvements on Layers 1 and 2 of the OSI standard. To demonstrate the reliability of the solution, a network consisting of several links with relative distance ranging from 10 to 300 kilometres, was released, optimized and tested.

Experimental results show excellent performance and stability, even when the link ranges more than 100 km, showing that this solution can be extensively, reliably and efficiently applied, to provide internet connectivity, telemedicine, health assistance and distant learning in poor regions, remote villages, to start digital inclusion processes with important capabilities, especially in harsh and isolated environments. In 2008 a proposal of application in the Amazon province of Coca, Ecuador, received a grant from the Inter American Development Bank, under the program "Innovation for Inclusive Development", while the wireless network will also be tested in Sambaina ICT-Millennium Village in Madagascar.

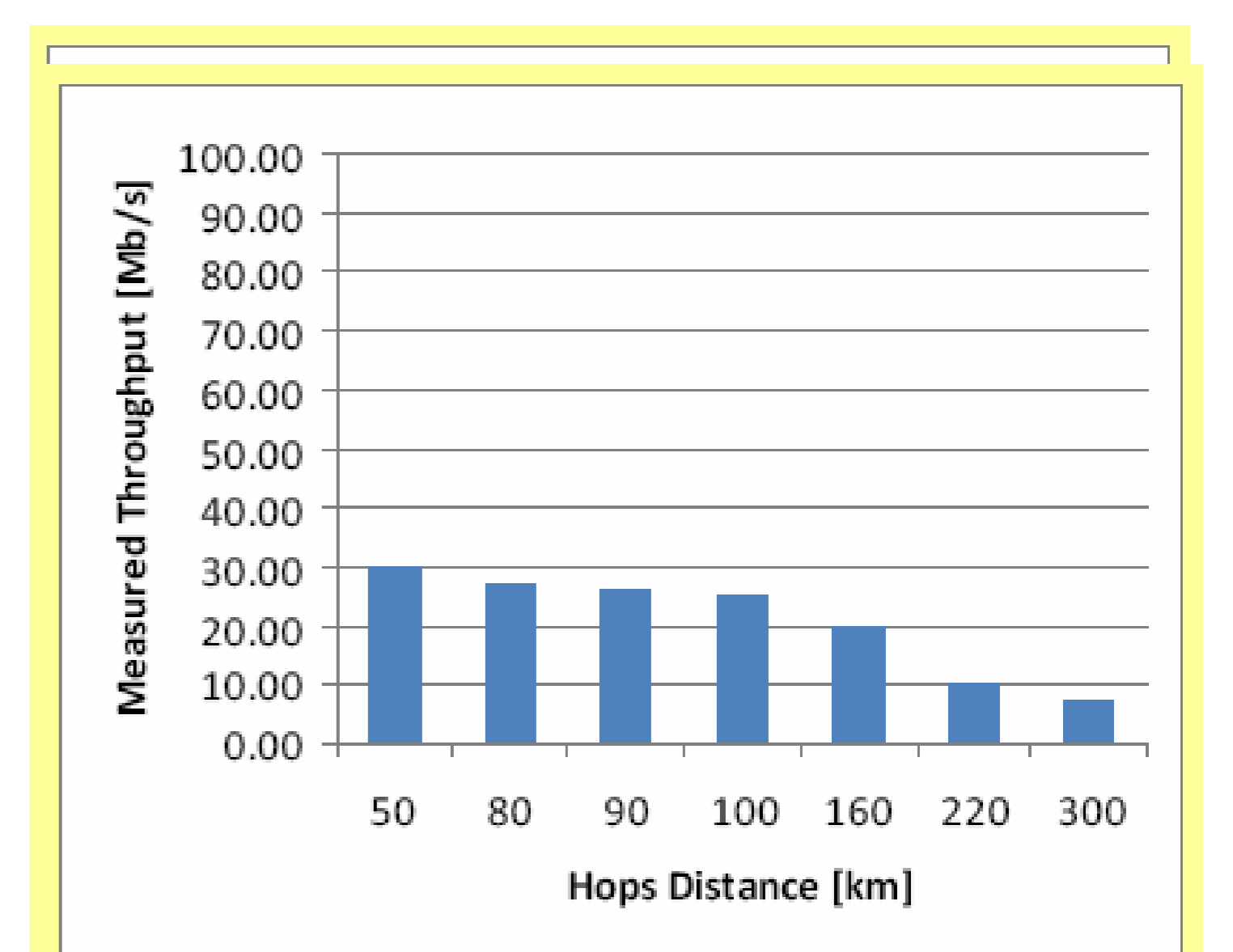
Radio design and engineering

For the purpose of the research the transmitters were designed using commercial low cost or recycled components and assembled using medium-performance PCs or micro-PC motherboards.

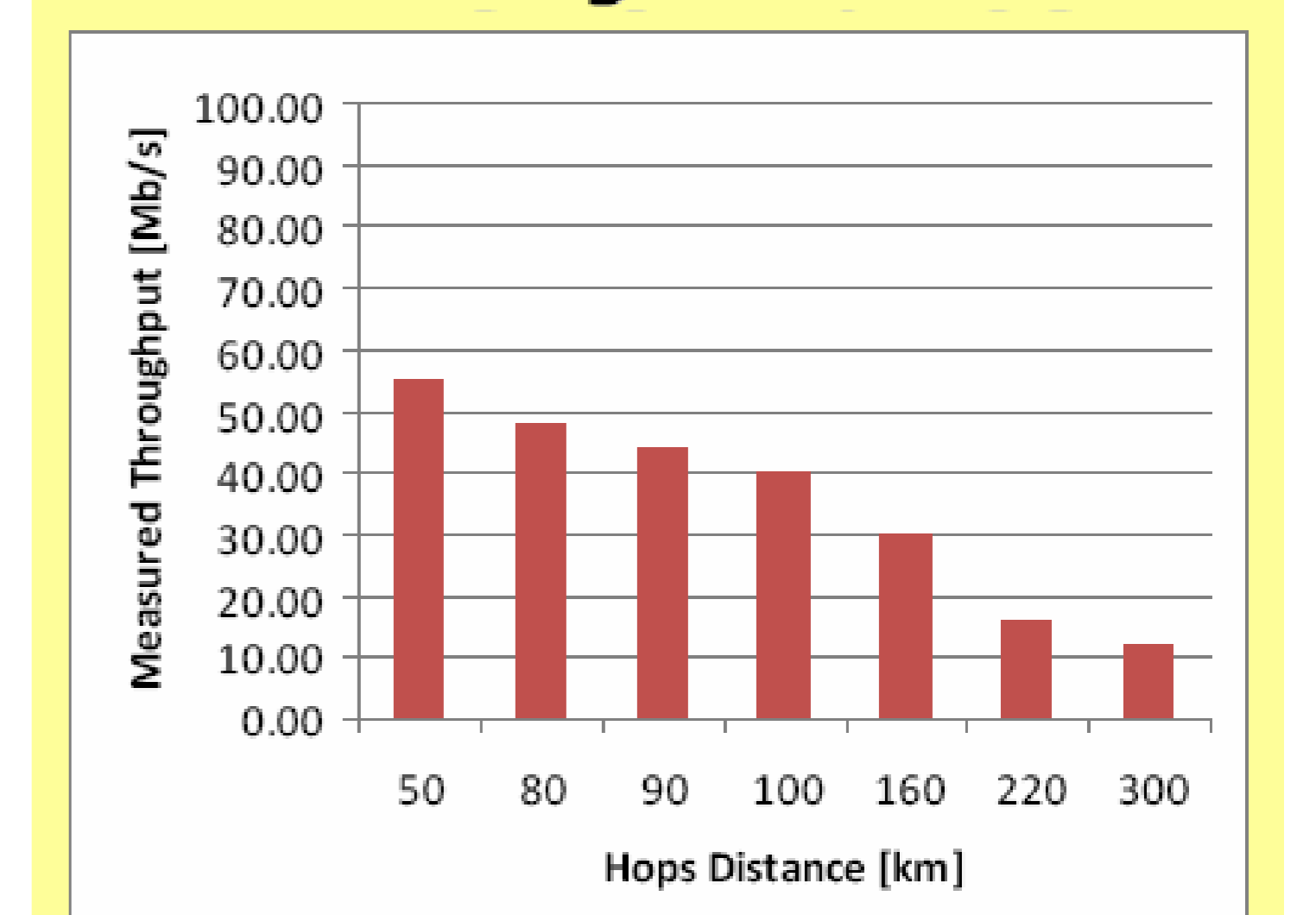


Motherboards and power supplies were inserted in cases appropriately designed to favour energy dissipation and circuit protection. As a matter of fact these components can be found at very low costs, compared to the investment needed for a standard backhaul radio (down to 1/1000).

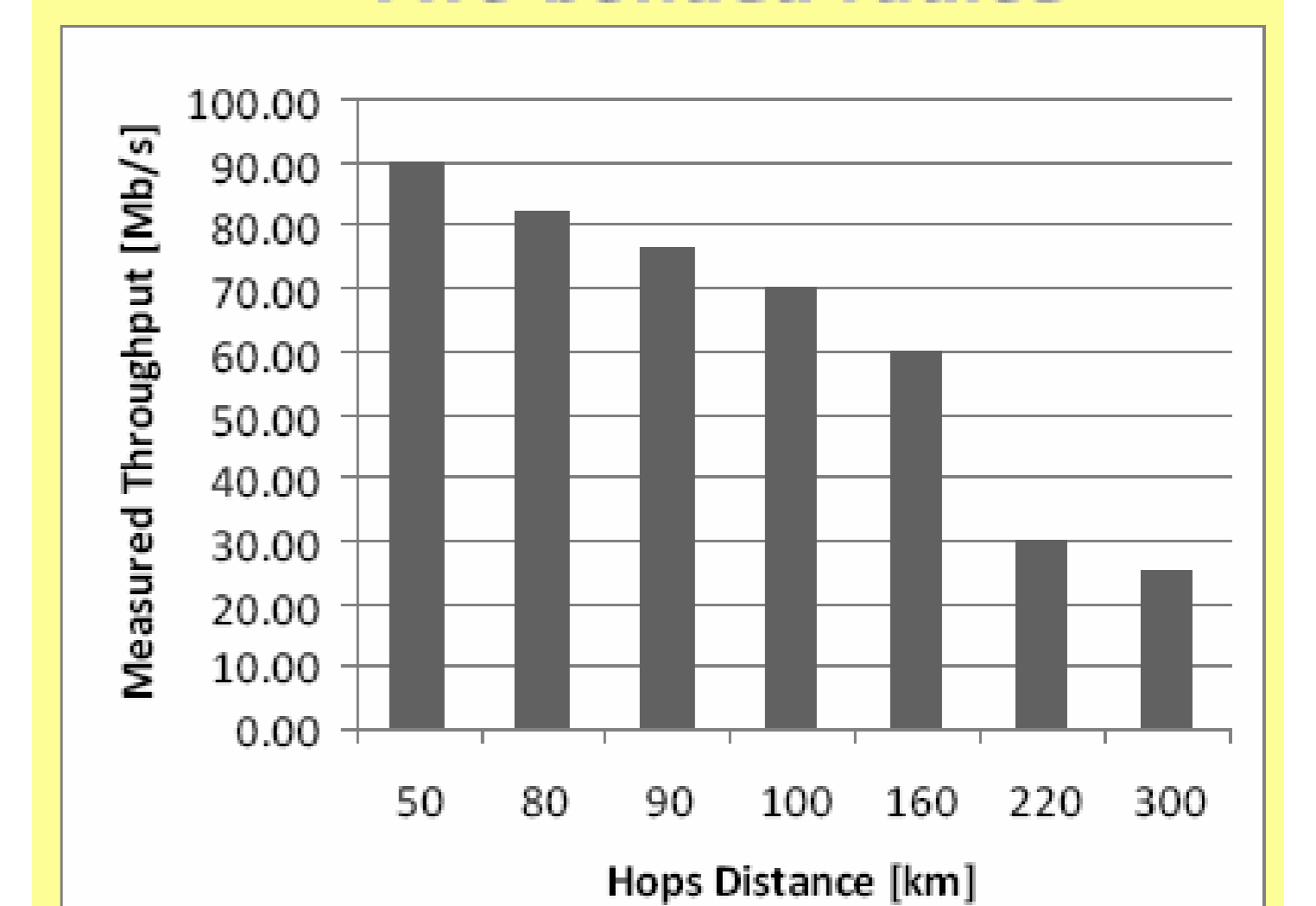
Performance



Single radio



Two bonded radios



Four bonded radios