Deployable Broadband Emergency Communications Network

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When natural disasters hit, they routinely destroy cellular and WiFi networks, eliminating these indispensable tools for emergency responders. Ideally, first responders could arrive, connect to an emergency network with a phone or computer, and immediately send images, text, and voice communications through the network. The researcher's deployable broadband emergency communications network uses atypical radio bands not subject to crowding or commercialization. To solve this problem, the researcher modified commercial routers and created a device to operate on 10 GHz, licensed under FCC Part 97 regulations instead of unlicensed under Part 15 on 5 GHz. This difference allows much higher power levels and higher gain antennas. In testing, the 10 GHz network was an average of 26.9% and 28.7% slower than the 5 GHz network in TCP and UDP mode, respectively, at an effective distance of 1 Km. When tested at a 15 Km effective distance, the 10 GHz network was an average of 26.9% and 28.1% slower than the 5 GHz network in TCP and UDP, respectively. The 10 GHz prototype provides an excellent alternative band of operation for emergency responders despite the drop in bandwidth. The router modifications and external circuitry can be applied to most commercial routers to allow operation on 10 GHz. In addition, the prototype's variability allows Part 97 operators to easily switch to this band without high costs or complexity of operations. This novel device is an alternative network with similar utility to current devices but without their threat of obsolescence.

Awards Won:

The Scientific and Technological Research Council of Türkiye TUBITAK: 1st Prize Award

Qorvo: Qorvo Innovator Award - 2nd Place

Missouri University of Science and Technology: $1,250 tuition scholarship (renewable for up to 4 years)