
Opportunity

Seeking a licensing and development partner to bring this antenna design into wireless device manufacturing.

Development Stage

Validated through full-wave electromagnetic simulation, benchmarked against meander, patch, and Inverted-F antennas.

Intellectual Property

Patent application published as US 2026/0066546 A 1

Publication

Coming Soon

IDF#

24-MST-038

Compact Noise Immune Antenna For Wireless Device

Reza Yazdani, PhD and Chulsoon Hwang, PhD

PROBLEM STATEMENT

Every wireless device faces the same internal interference problem. As an antenna tries to pick up a weak signal, nearby electronics such as the circuit board and processor create near-field noise that interferes with reception. This effect is called RF desensitization, and it grows worse as devices shrink and pack in more electronics. Present shielding methods can reduce the noise, but only at the cost of added size, weight, and cost that compact devices cannot spare. Common antenna designs such as the Inverted-F, patch, and meander antennas make the problem harder to solve because their current distribution rotates constantly, making it impossible to position noisy components to avoid interference. A compact antenna is needed that resists this noise without added cost or size.

SOLUTION

Researchers at Missouri University of Science and Technology have developed a compact slot antenna built around a C-shaped slot and a metal trace to address noise interference on circuit boards. Unlike the Inverted-F, patch, and meander antennas commonly used today, this design produces a non-rotating, largely uniform current distribution across the ground plane. That predictability lets engineers orient noisy components so their interference runs perpendicular to the antenna current rather than working against it. Full-wave electromagnetic simulations show the design delivers a 20.62 dB improvement in noise immunity, well ahead of the 4.97 to 8.69 dB range of the antennas it was benchmarked against. It also fits into a smaller footprint than each of those designs while matching their ease of manufacture.

VALUE PROPOSITION

This antenna is smaller than the meander, patch, and Inverted-F antennas it was tested against while delivering far greater immunity to internal electronic noise. Its simple geometry keeps manufacturing straightforward, matching the ease of production already common in today's compact antennas. As wireless devices keep shrinking and packing in more electronics, this design gives manufacturers a way to improve signal reception without turning to costly shielding.