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Cheap paint could protect against super-fast wireless

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As wireless communications become faster, it's not just older, slower devices that are left behind. The shielding that protects [sensitive electronic equipment like that used in hospitals](#) is becoming increasingly obsolete as new, higher frequencies are used to send data.

Now Japanese researchers have come to the rescue with a new metal-rich coating designed to protect newly vulnerable devices. The development is timely: while the latest wireless communications use electromagnetic waves with a frequency of over 100 gigahertz, the best wave absorbers commercially available are effective only up to around half that.

The 120 GHz band, for example, can send data at up to 10 gigabits per second. That's fast enough for the real-time transmission of uncompressed video in high-definition TV format, and rivals the speed of the [fastest wired local area networks](#).

Iron constitution

The ability to block electromagnetic (EM) waves comes about when a material's magnetic field resonates at the same frequency as the wave. Wave absorbers are usually made from iron-rich oxides, but higher-frequency transmissions outstrip the power of iron to absorb electromagnetic waves.

However, the standard oxide coating – which contains barium as well as iron – has a maximum resonance frequency that is outstripped at 48 GHz.

[Shin-ichi Ohkoshi's team](#) at the University of Tokyo in Japan has just identified a new aluminium-iron oxide able to block waves with a frequency almost four times higher.

The team used a sensitive magnetometer to confirm that a powder of the new oxide can absorb EM waves of up to 182 GHz at room temperature.

Protective paint

The composition of the new material somehow distorts the bonds between iron and oxygen from their usual shape, which the team believes explains the material's magnetic properties. Learning more about this effect may make it possible to identify new metal oxides that can absorb EM waves at even higher frequencies.

Particles of the new material could be incorporated in a paint to shield sensitive equipment in medical areas, labs, or [aeroplanes](#) from the effects of high-speed wireless communications, says Ohkoshi, who adds that the paint would be relatively cheap to make because aluminium and iron are abundant materials.

"We collaborated with [DOWA Electronics](#), a Japanese industrial company [to make a 100-kilogram sample order]," says Ohkoshi. "The manufacturing cost is very cheap – around £10 (\$14) per kg."