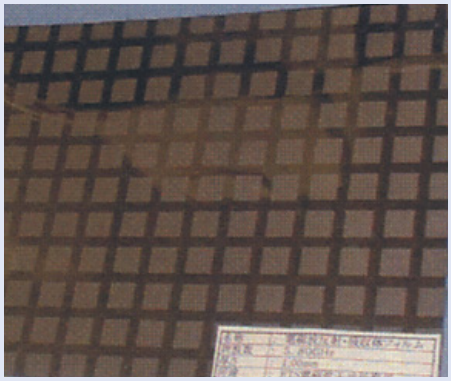
Japanese Patent Application No.2545721

Radar Cross Section Reduction Sheet

Invented by:OJIMA Takeyuki



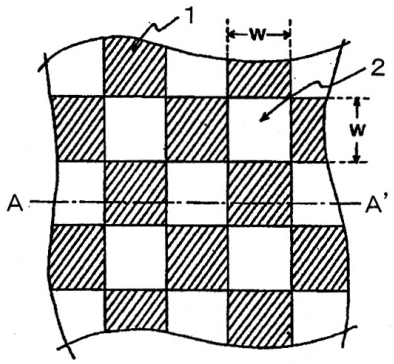
Electromagnetic wave absorption sheet (5.8-GHz band) Photo courtesy of Suntechnos Co., Ltd.

Outline of the technology

This invention pertains to a sheet to be applied or affixed to a radar reflective body for the purpose of eliminating erroneous images that appear on radar screens. The sheet achieves this effect by reducing the radar cross section and decreasing the radar reflection strength.

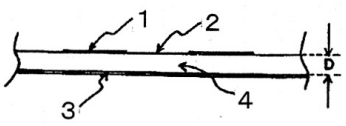
As shown in the diagram below, a specific metal shape (rectangular, circular, polygonal) arranged in a checkered pattern on the sheet disperses the reflection of incident waves almost uniformly, thus minimizing the reflection strength in specific directions. In providing this effect, the design of the metal section, and the dielectric constant and magnetic permeability of the sheet, significantly affect the resultant reflection characteristics. Furthermore, by inserting a resistive film into the sheet, the applicable frequency band can be widened.

This invention enables considerable reductions in the thickness and weight of a radar cross section reduction sheet, relative to the use of conventional ferrite. When used on large bridges and structures that cause undesirable reflection or scattering of television waves, this invention can eliminate radio interference. When it is used on the walls inside an office, the invention can effectively minimize the leakage of radio waves of a wireless LAN.



Front view

1: Metal section of metal pattern on the surface of base material
2: Non-metal section on the surface of base material
3: Metal plate on the reverse side of base material
4: Base material



Side view

Schematics of electromagnetic absorption sheet

Commercialization

The ownership of this patent has been transferred to Suntechnos Co., Ltd. through Japan Science and Technology Corporation. Since fiscal 2000, Suntechnos has been producing prototypes, taking measurements, and evaluating performance in order to apply the technology to products for wireless LANs (2.44 GHz) and ETS (Electronic Toll Collection Systems, 5.8 GHz). These efforts have led to the completion of sample products scheduled for shipment at the end of 2002.

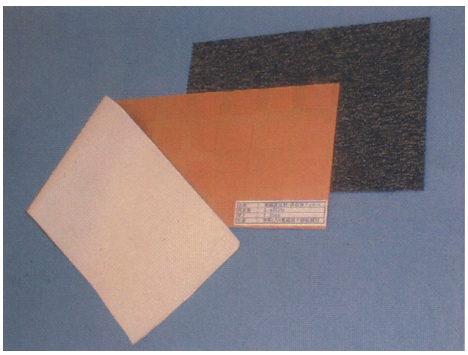
[Structure of shielding absorber] (Following data and photos were provided by Suntechnos Co., Ltd.)

1st layer	Metallic thin-film layer	Electromagnetic wave reflecting layer	20μm$^+$
2nd layer	Semi-hard polyvinyl chloride	Dielectric loss layer	0.8 to 2.0 mm
3rd layer	Metallic pattern thin-film layer	Electromagnetic wave absorbing layer	20μm$^+$

[Comparison with conventional products]

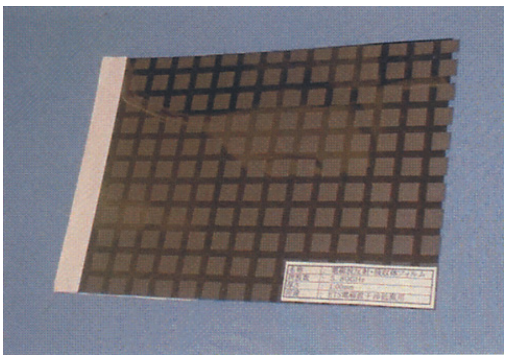
Type of sheet material	Weight (g/m^2)	Thickness	Absorption performance	Price	Absorption range
Conventional rubber ferrite absorber	19kg	6.3mm	25dB or higher	High	1-10GHz
Conventional coherent absorber	2kg	30.0mm	25dB or higher	High	1-10GHz
Conventional urethane absorber	0.4kg	2.2mm	15dB or higher	Moderate	1-10GHz
Newly developed sheet absorber	0.38kg	2.0mm	15dB or higher	Low	2.44GHz

[Product appearance] For 2.44 GHz

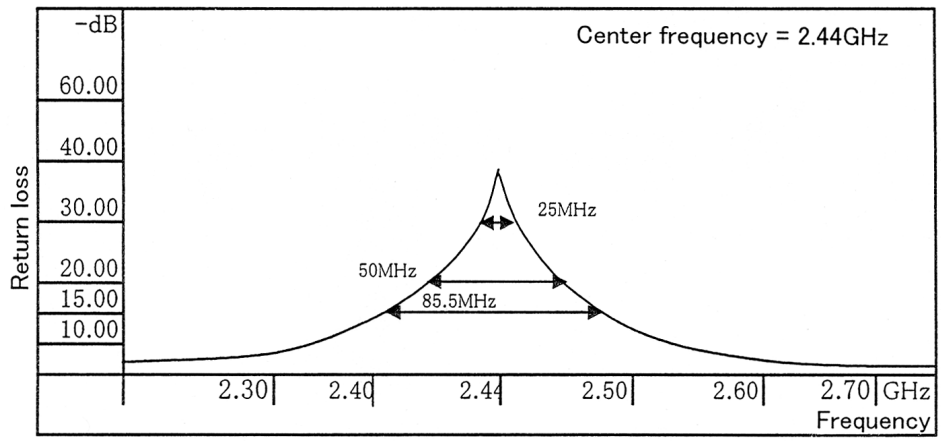


* Example of use in polyvinyl chloride interior wallpaper (base: ordinary base wall material; surface layer: ordinary polyvinyl chloride wallpaper)

For 5.8 GHz



* Example of use in polyvinyl chloride interior material



Electromagnetic wave absorption characteristics

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