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AB 5020R

Electromagnetic Absorber for RFID Application

Product Description

3M™ AB5020R is magnetic sheet for the radio frequency identification application.

3M™ AB5020R is designed to have high magnetic permeability at 13.56MHz. This product effectively solves the interference effect of tag and reader in the metal surrounding atmosphere.

3M™ AB5020R consists of dark color magnetic material layer and pressure sensitive adhesive.

3M™ AB5020R is available in standard size and custom widths and lengths. Standard size is 210mm X 297mm (standard A4) in sheet

Applications

3M™ AB5020R is typically used for the 13.56MHz RFID reader and tag to be mounted directly upon highly conductive surface. This might be the reader antenna surrounded by metallic body or tag mounted on conductive substrate such as gas bottles. However, it is not possible to communicate each other under this

metallic atmosphere. The magnetic fluxes through the conductive surface induce eddy current within the conductor, which opposes the field responsible for their creation. It reduces the magnetic field on the surface of the conductor to such a degree that communication between reader and tag becomes no longer possible. By inserting 3M™ AB5020R between antenna and conductor surface it is possible to largely prevent the occurrences of the eddy currents. This makes it possible to mount the antenna on metal surface

AB5020R Effectiveness

Many factors determine true communication range such as antenna size, sensitivity, field intensity, modulation algorithm and environment. As shown in Fig. 2, just simple inserting AB5020R can increase communication distance. To maximize the performance, it is necessary to take into account the fact that the inductance of antenna may be increased by AB5020R. So, it is necessary to adjust the resonance frequency by the change of capacitance and inductance value.

AB5020R — Typical Properties

Properties	Typical Value
Type of absorber material	Magnetic particle embedded in polymer resin composite
Product Structure	Absorber sheet with one side double coated adhesive tape
Total thickness	0.2mm (0.17mm absorber, 0.03mm adhesive layer)
Magnetic permeability ₁	45
Standard size	210mm X 297mm
Resistivity ₂	1x10 ⁶
Operating temperature	-30 ~ +85
Density	3.9g/cm ³
Tensile Strength ₃	6MPa (min.)

1. This value was measured with Agilent E4991A RF Impedance/Material analyzer

2. Test method is ASTM D257

3. Test method is JIS K6251

Fig.1 Real and Imaginary part of Permeability with Frequency

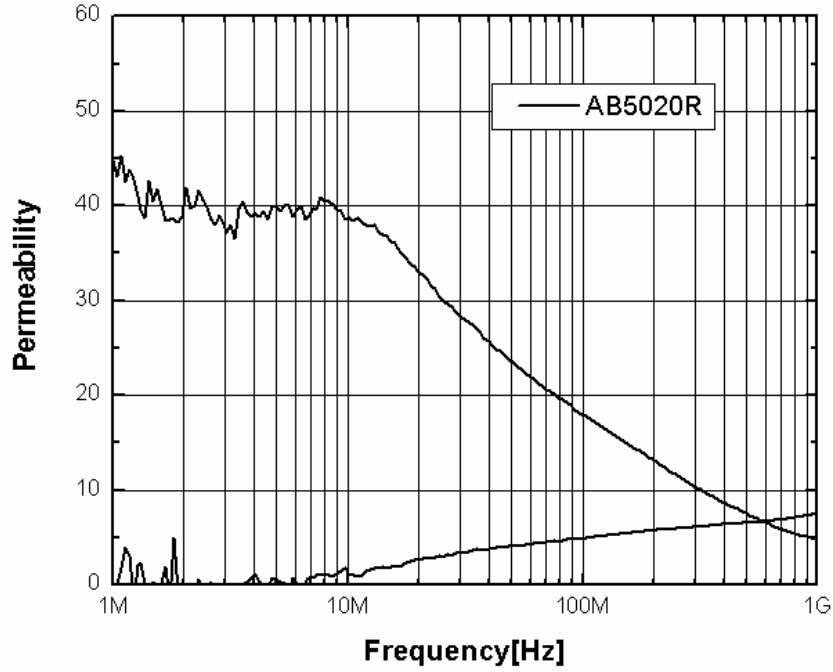
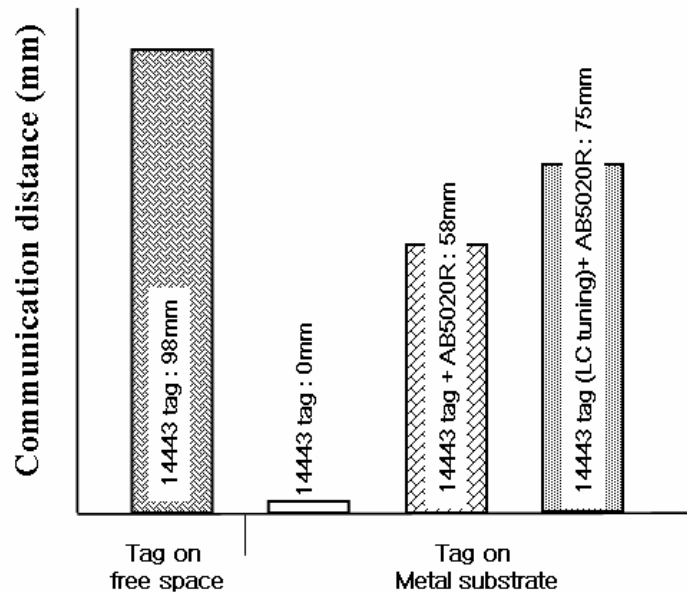


Fig. 2 Data Communication Length between TRH031 Reader (3ALogics Inc.) and 14443A Type Standard Card with Different Slotting Condition.



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Electrical Products Division

6801 River Place Blvd.
Austin, TX 78726-9000

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