3M
AB 5010R
Electromagnetic Absorber for RFID Application

Product Description

3M™ AB5010R is magnetic sheet for radio frequency application. 3M™ AB5010R is designed to have a high magnetic permeability at 13.56MHz. This product effectively solve the metal interference effect of tag and reader when the metal surrounding atmosphere.

3M™ AB5010R consists of dark color magnetic material layer and pressure-sensitive adhesive.

3M™ AB5010R is available in standard size and custom widths and lengths. Standard size is 300mm X 100Meter in roll.

Applications

3M™ AB5010R is typically used for the 13.56MHz RFID reader and tag be mounted directly upon a highly conductive surface. This might be the reader antenna surrounded by metallic body or tag mounting 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 oppose the field responsible for their creation. It reduces the magnetic field in the surface of the conductor to such a degree that communication between reader and tag is no longer possible. By inserting 3M™ AB5010R between the 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 surfaces

AB5010R Effectiveness

Many factors determine the true communication range such as antenna size, sensitivity, field intensity, modulation algorithm and environment. As shown in Fig. 2, just the simple inserting AB5010R 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 AB5010R. So, it is necessary to adjust the resonance frequency by the change of capacitance and inductance value.

AB5010R ─ 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
Thickness	Total 0.15mm (0.12mm absorber, 0.03mm adhesive layer)
Magnetic permeability [1]	50 (Typical value)
Standard size	300mm X 100Meter
Resistivity [2]	$1 \times 10^6 \, \Omega$
Operating temperature	-30 ~ +85℃
Tensile Strength [3]	4MPa(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

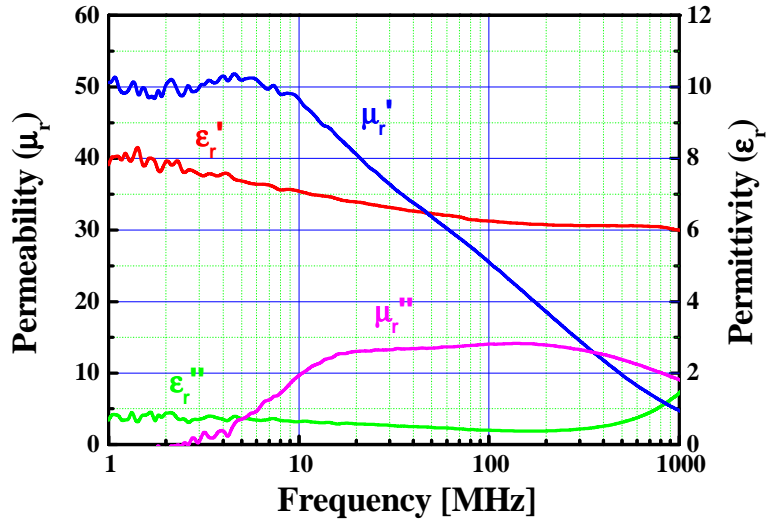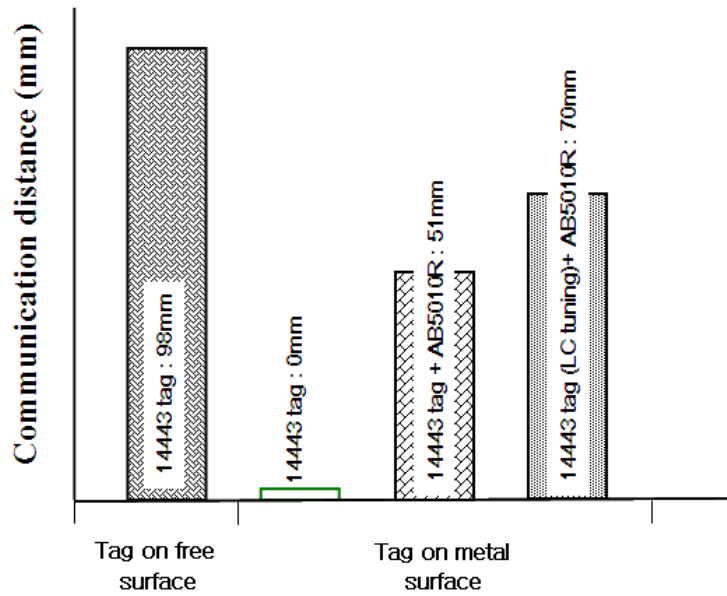Fig.1 Real and Imaginary Part of Permeability, Permittivity with Frequency

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

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