DOTITE

Shield Materials for EMI Interference

藤倉化成株式会社
FUJIKURA KASEI CO.,LTD.

Electronics Materials Division

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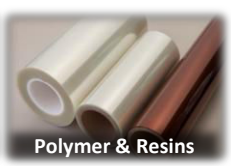
Taking on Challenges and Working Together

Introduction and Business Divisions

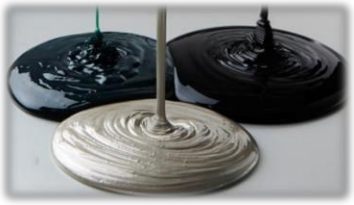
Fujikura Kasei produces polymer materials for a variety of applications, developing unique, value-added products based on our decades of accumulated expertise.



DOTITE Electrically Conductive Pastes

In 1957, we were the first manufacturer in Japan to develop and sell electrically conductive pastes and insulators for electronics under the brand name DOTITE. We have a wide range of inks, adhesives, and EMI shield paints.

This catalogue will introduce some of our current products and latest developments in electrically conductive EMI shield paints.




EMI Shield (For Casing)

Electrically Conductive Paints Offering Cost Effective Options

Model	Resin	Filler	Application Method	Drying Conditions	Resistivity (Ω·cm)	Substrate
XA-9015	Polyester	Ag	Spray, brush/spatula	60°C, 30 mins.	5×10^{-5}	ABS, PC, etc.
FE-107-1	Acrylic	Ag-Coated Cu	Spray, brush/spatula	50°C, 30 mins.	5×10^{-4}	ABS, PC, etc.
FN-101	Acrylic	Ni	Spray, brush/spatula	50°C, 30 mins.	5×10^{-3}	ABS, PC, etc.

Dried Film Appearance

➢ **Different conductive fillers provide different coloration**

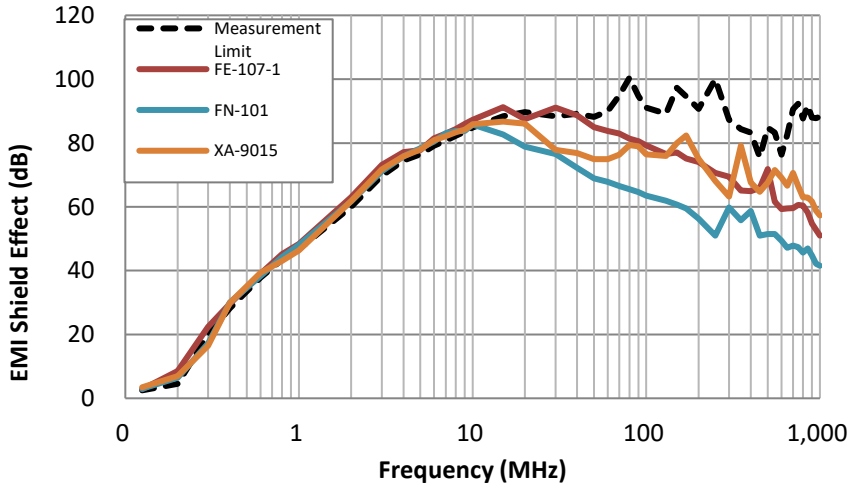
XA-9015 (Ag)

FE-107-1 (AgCu)

FN-101 (Ni)

EMI Shield Effect (KEC)

➢ **Lower resistivity provides higher EMI shield effect**



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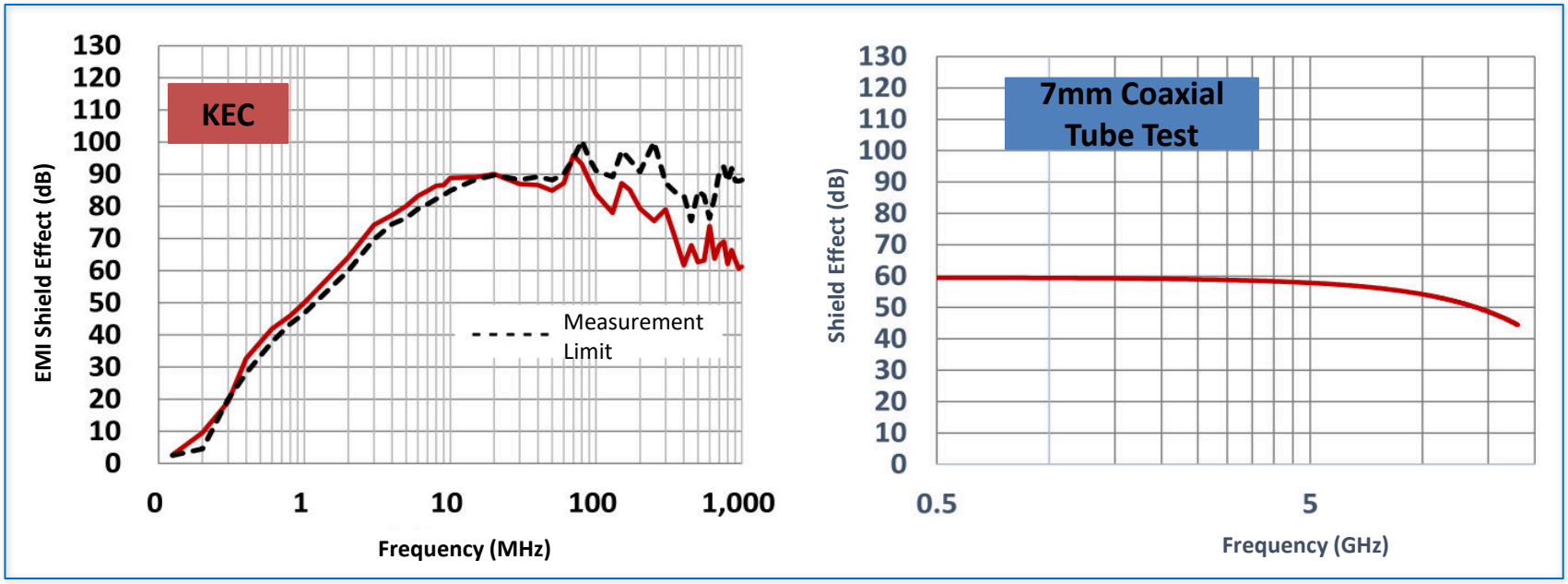
EMI Shield (For Electronic Components)

For Semiconductor Packaging Replacement for Sputtering

Model	Resin	Filler	Application Method	Drying Conditions	Resistivity (Ω・cm)
XA-1110	Phenol	Ag・Cu	Spray, spin coating, screen printing	150℃, 30 mins.	8×10^{-5}
XA-5713EE	Epoxy	Ag	Dispensing, screen printing (vacuum printing)	150℃, 30 mins.	8×10^{-5}
XA-9508	Thermoplastic	Special Ag	Spray, screen printing	150℃, 30 mins.	6×10^{-6}

Effective in Very High Frequency Bands （XA-1110 Shield Properties Graph)



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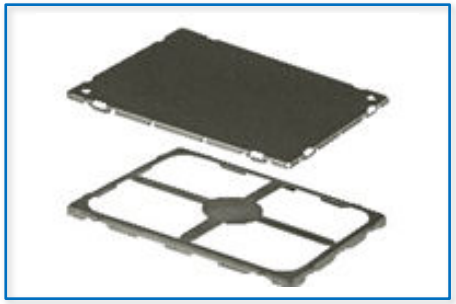
EMI Shield (For Electronic Components)

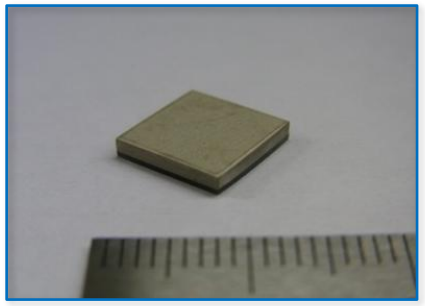
Package Level EMI Shield

Board Level Shield



Convert to Package Level Shield

Package Level Shield



- Metal (electrically conductive) cap attached to circuit board by solder

  Large circuit boards require extra space, add weight and thickness to product design, requiring complex reworking.

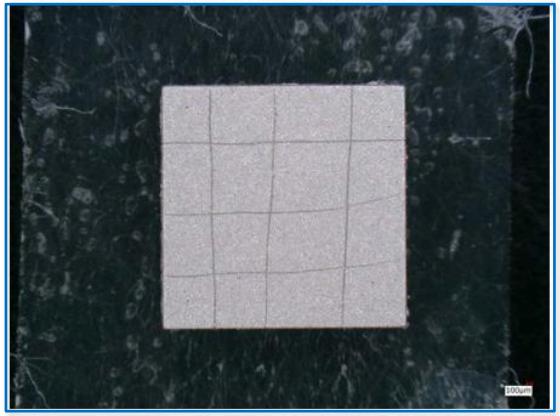
- Paint applied directly to package as a single unit

  Allows for smaller・thinner・lighter designs. Makes high density circuit boards possible, and frees up design choices.

Superior Coating Uniformity (Top and Sides)

➢Uniform coating possible even on angled surfaces

Adhesion



➢Passes cross-cut test

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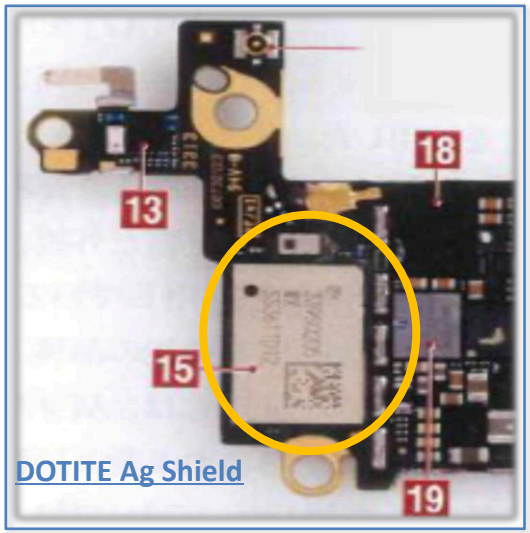
EMI Shield (Typical Usage)

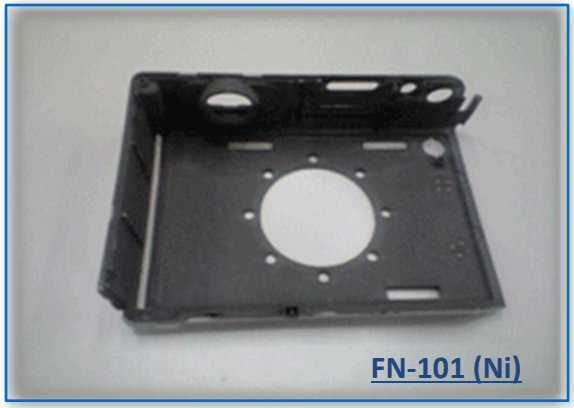
Easily Applied to Complex Surfaces to Provide Shielding Effect

Wi-Fi Module Components



*Source: Nikkei Electronics

Casings for Various Electrical Appliances



- Lighter compared to metal casings
- Contributes to smaller, thinner electronic components
- Also used as EMI shielding in medical device casing (FE-107-1), electric scooter battery peripherals and automotive seat motor control boxes (FN-101)

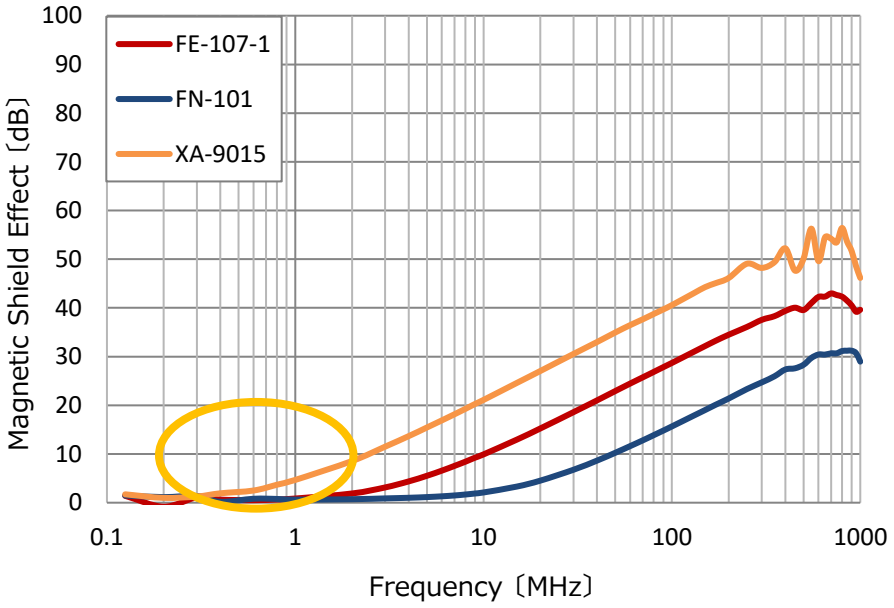
Magnetic Shield

Shield for "Low Frequency Magnetic Field Noise" that Electric Field Shield Materials Ineffective

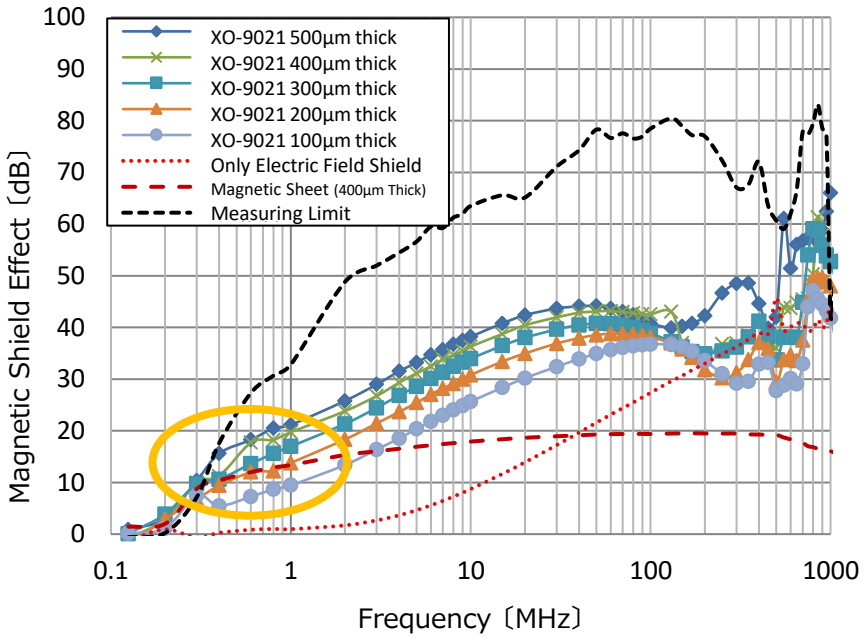
Model	Resin	Filler	Application Method	Drying Conditions	Resistivity (Ω·cm)	Substrate
XO-9021	Urethane	Soft Magnetic Powder	Spray, coater, brush, dipping	25℃, 60 mins. or 50℃, 30 mins.	-	ABS, PC, etc.

Magnetic Shield Effect (KEC)

Electrically conductive paint only



Electrically conductive paint + Magnetic paint



- Magnetic field shielding (magnetic paint) provides wide frequency coverage when combined with an electric field shield (electrically conductive paint)
- Achieves 10-20dB (70-90%) magnetic shielding effect in the AM radio noise band

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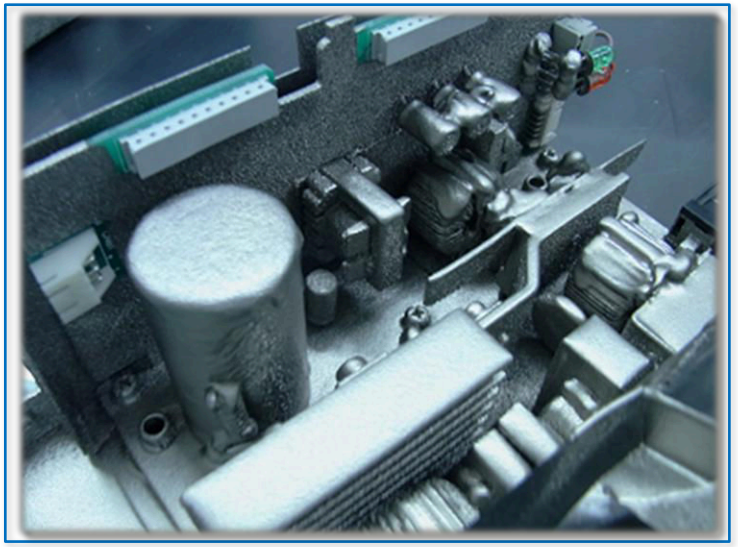
Magnetic Shield (Typical Usage)

Paint or Sheet Available to Best Suit Your Application

RFID Tag (XO-9021 Sheet)

Noise Source: Circuit Board (XO-9052 Paint)



➢ Can be sprayed directly onto circuit boards with complex surfaces and mounted components. Provides shielding with simple spray application.

(*XO-9052 utilizes an electrically insulating magnetic powder, preventing shorts when used with circuit boards.)

➢ Protects against interference of metals or moisture around RFID tags, improving reception.

➢ Currently developing new formulas for various frequencies such as HF・UHF bands.

High Frequency (30-300GHz) Wave Absorbing Paint

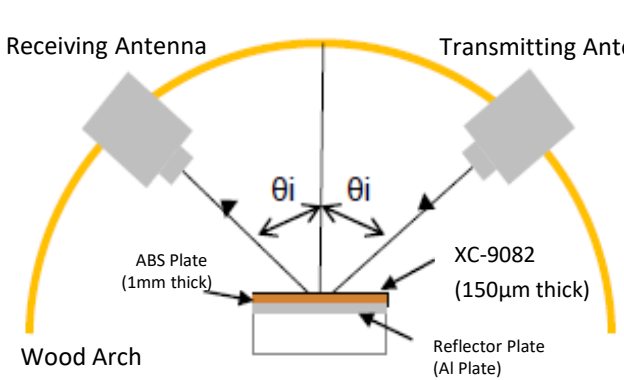
Model	Resin	Filler	Application Method	Drying Conditions	Resistivity (Ω・cm)	Substrate
XC-9082	Epoxy 2-Component	Special Carbon	Spray, coater, brush, dipping	25℃, 24 hrs. or 100℃, 60 mins.	1	Epoxy, phenol, metal, glass

Dried Film Appearance

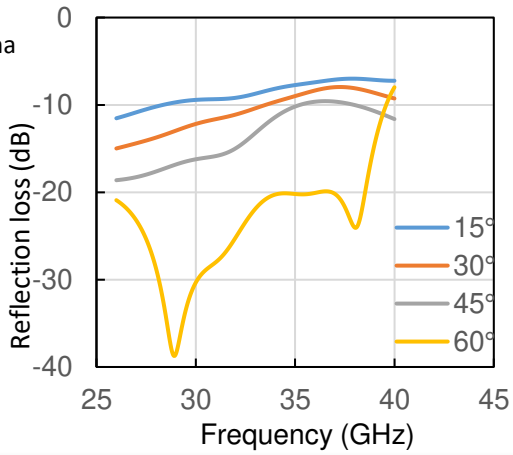
XC-9082 (Special Carbon)

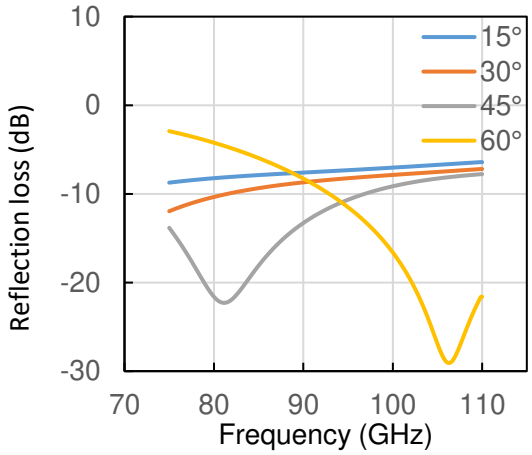
- Effectively absorbs electromagnetic waves through dielectric absorption process provided by the special carbon filler in combination with the dielectric constant of the resin binder.
- Absorption of 20dB (90%) realized as a thin film (150μm thickness)
- Ideal for use as a solution for millimeter wave radar casing (cavity) resonance.

Measurement of Reflection Loss in Free Space



Test Method Diagram



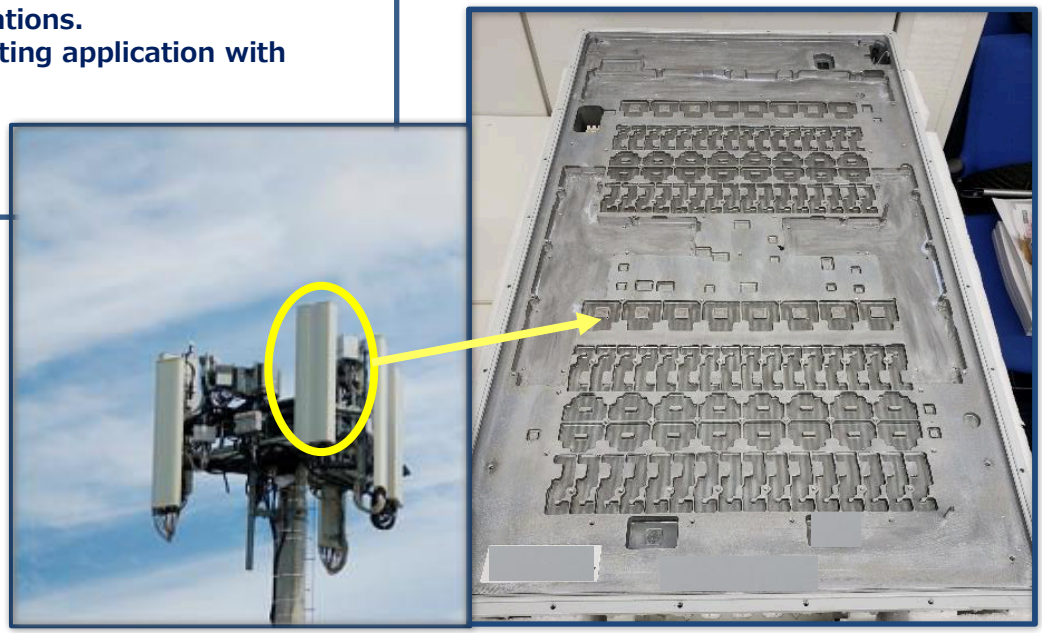


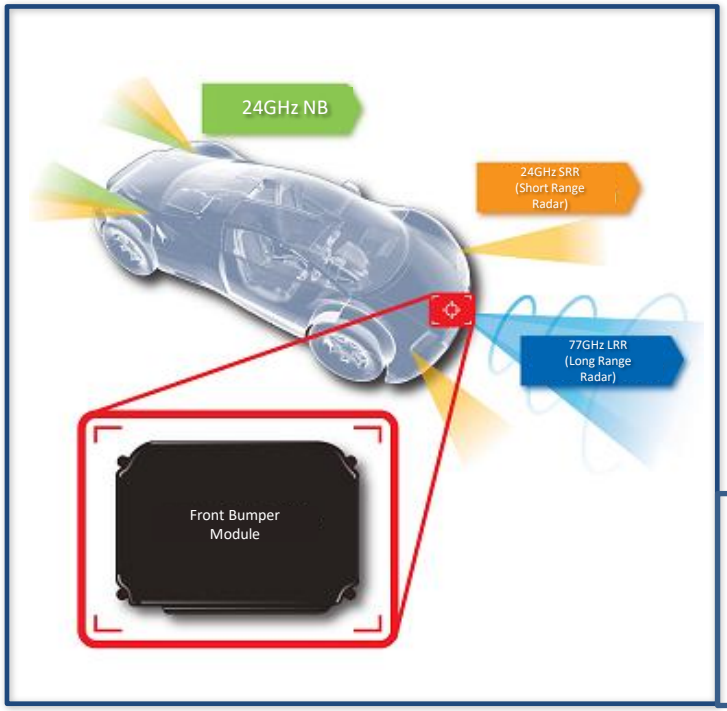
5G・Millimeter Wave (Typical Use)

Can Be Used in 5G Equipment and Automotive Radar Applications

5G Repeater and Antenna

- 5G repeaters mounted on towers have weight limitations. Weight reduction can be realized by combining painting application with the typical metal shield plate.
- Can be sprayed directly on a resin case (on applicable resin substrates). ※





Automotive Millimeter Wave Radar

- Ideal for use as a solution for millimeter wave radar casing (cavity) resonance in automotive radar systems that are becoming more common.

※Inquire for the best material for your substrate

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