

Market Report on High Frequency PCB & PCB Material for Automotive Radar

Publication Date: July 19, 2022
Format: A4 Size 205 Pages book & a CD
Price (Corporate Price*): JPY660,000

*This contract allows for use within the purchasing company / organization.

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1. The adoption status of automotive millimeter wave radars by automobile manufacturers, product trends of radar manufacturers, frequency usage status by country / region, and the global market for automotive millimeter wave radars.
2. Manufacturers and their business trends of high frequency PCB for automotive millimeter wave radar. Furthermore, the market forecast of high frequency PCB for automotive radar by frequency band / PCB structure / adoption material type.
3. Manufacturers' business trends of high frequency PCB material for automotive millimeter wave radar. In addition, the market forecast of high frequency PCB material for automotive radar by frequency band / Df class / material form and type.
4. Technical trends, supply relations, price trends, ... of high frequency PCB / PCB materials.
5. Company case studies of major high frequency PCB manufacturers / PCB material manufacturers.

1. Surveyed Products/Classification

1) High Frequency PCB Materials (Products) for automotive millimeter wave radar

JMS roughly define its Dk / Df value is approximately Dk: 3.6 or less / Df: 0.007 or less (@ 10GHz).

-Form: Film (Insulation film, film with copper foil and FCCL) / Rigid material (CCL and prepreg)

-Df class: $Df \leq 0.0025$ and $Df > 0.0025$ (@10GHz)

-Material: Fluororesin (PTFE and others), LCP (liquid crystal polymer), PPE/PPO, Hydrocarbon and others

-Application/Frequency band: automotive ADAS radar (24GHz, 76-77/77-81GHz)

2) High frequency PCBs for automotive radar

-Structure: Single sided or Double sided high frequency hybrid multi-layer PCB, and All high frequency multi-layer PCB

-Material (type by adoption PCB material) : Fluororesin, LCP, PPE/PPO, Hydrocarbon and others

3) Automotive millimeter wave radar and Automotive (ADAS system) manufacturers

2. Surveyed Manufacturers

Surveyed products	Manufacturers
ADAS (Automotive)	Subaru, Toyota Motor, Nissan Motor, Honda Motor, Mazda Motor, BMW, BYD, Daimler, Ford, Geely/Volvo, GM, Hyundai Motor, Renault, Tesla, Volkswagen and others
Automotive millimeter wave radar (Automotive device)	Denso Group, NIDEC Elesys, Panasonic, Hitachi Astemo, Furukawa Automotive Systems, Mitsubishi Electric, Alpha Networks, Aptiv, Continental Automotive, Hella, Hyundai Mobis, LG Innotek, Magna International, Robert Bosch, Valeo, Veoneer, Winstrom NeWeb, ZF Friedrichshafen and others
High frequency PCB for automotive radar	Kyocera, CMK, FICT, Meiko Electronics, AT&S, China Circuit Technology, Chin Poon Industrial, IsuPetasys, Kinwong, Multek, Schweizer, Shenzhen Shennan Circuits, TTM Technologies, Unimicron, Unitech Printed Circuit Board, WUS Printed Circuit, ZDT and others
High Frequency PCB Material for automotive radar	AGC Group, Kuraray, Showa Denko Materials, Chukoh Chemical Industries, NMICS, Zeon, Nippon Pillar Packing, Panasonic, Mitsubishi Gas Chemical, RISHO Kogyo, Doosan Electro-Materials, Isola Group, ITEQ, Rogers Corporation, Shengyi Technology, TUC, Wang Ling Insulating Materials and others

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2. Publication Date: July 19, 2022

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