Aptiv’s Third Generation of 77 GHz-Based Short-Range Radar (SRR3)

This year, we have seen radar applications use two frequencies, 24 GHz and 77GHz. For a long time, 24 GHz has been dedicated to Short Range Radar (SRR) detection applications like Blind Spot Detection (BSD) or Rear Side Detection (RSD). But due to spectrum regulations, the 24 GHz ultra-wide band (UWB) will soon phase out in Europe and the USA. This, and the need for higher performance in emerging radar applications, makes 24 GHz unattractive. And now manufacturers have turned their interest to the 76-81 GHz band. Aptiv, formerly known as Delphi, has taken a step ahead of its competitors since the first generation of SRR radar by using 77GHz for BSD. Using this band has allowed to Aptiv to propose high resolution and accuracy SRR with even smaller form factor in the third generation, SRR3.

The SRR3 device, FCC certified in 2015, is a side and backside SRR. It is designed for various Advanced Driver Assistance Systems (ADAS) applications such as capturing the blind spot, assisting lane changes and warnings against cross traffic. It features three different PCB substrates with two dedicated to Radio Frequency (RF) signal processing and transmission.

Working in the 76-77 GHz un-licensed band, the device contains forty H-pole planar antennas fed by cavity waveguides. With its small form factor, it could compete with the standard dual board radar modules.

Compared to its competitors, Aptiv is still the only one that uses bare die Monolithic Microwave Integrated Circuits (MMICs) and cavity waveguides. In this module, the innovation is in the single chip from Infineon that integrates four receive (Rx) and two transmit (Tx) channels using SiGe Heterojunction Bipolar Transistor (HBT) technology. And, the RF Printed Circuit Board (PCB) substrate uses glass-reinforced hydrocarbon ceramic laminate, completely PTFE free.

Based on a complete teardown analysis of the Aptiv Radar, the report provides the bill-of-material (BOM) and the manufacturing cost of the radar sensor. The report also includes a complete physical analysis of the MMIC. Also, the complete cost analysis and a selling price estimation are calculated.

COMPLETE TEARDOWN WITH
• Detailed photos
• Materials analysis
• RF chipset
• Block diagram
• PCBs cross-section
• Physical analysis and estimation of the cost of the MCU and MMIC
• Complete and priced bill-of-materials
• Manufacturing process flow
• Manufacturing cost analysis
• Estimated cost and sales price
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