Taiyo Yuden SAW and BAW Band 7 Duplexer integrated into Skyworks’ System in Package

Taiyo Yuden’s Well-Proven Metal Seal Packaging and SAW/BAW technology in LTE Band 7 high isolation duplexer used in Skyworks’ PAMiD

In the last five years, Skyworks has been the largest radio-frequency (RF) component supplier for Huawei. In Huawei’s last flagship, the Mate 9 Pro, and the P10 series, Skyworks supplies entire Long-Term Evolution (LTE) front-end solutions based on its SkyOne® Technology. The solutions comprise Low-, Mid- and High-Band front end modules (FEMs) featuring Surface Acoustic Wave (SAW) and Bulk Acoustic Wave (BAW) filters. Skyworks is known to produce its own SAW filter and to outsource the BAW filter. In its High-Band PA Module integrated Duplexer (PAMiD), Skyworks integrates a duplexer supplied by Taiyo Yuden in metal seal packaging featuring a SAW and a Thin Film Bulk Acoustic Resonator (FBAR)-BAW filter based on Taiyo Yuden Technology.

The filters are located in a System In Package (SiP) with a power amplifier, switch and a RF integrated circuit. The device is a custom version of a Taiyo Yuden commercial device. The duplexer’s SAW filter uses sapphire and lithium tantalate substrates and its BAW filter has an original FBAR design using an air gap cavity on a silicon substrate.

In this report, the complete duplexer is analyzed, from the filters to the packaging developed by Fujitsu Media Limited, which was bought by Taiyo Yuden. The report includes a complete analysis of the package, the SAW filter and the BAW filter, featuring a cost analysis and price estimation for the device. A schematic of the BAW filter is also provided to understand the difference between shunt and series cells.

Finally, the report includes complete performance and technology comparisons with the previous generation of the band 7 duplexer from Taiyo Yuden and a technology comparison with BAW filters and packaging solutions from Qorvo and Broadcom.
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ANALYSIS PERFORMED WITH OUR COSTING TOOLS MEMS COSIM+ AND 3D-PACKAGE COSIM+

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Avago AFEM-9040 Avago’s New Generation Front-End Module

Murata SAW Thermo-Compensated Band 8 Filter in Low Band Front-End Module

Review of RF front-end modules and components found in 5 flagship smartphones: Apple iPhone 7 Plus, Samsung Galaxy S7, Huawei P9, LG G5, and Xiaomi Mi5.

Avago has introduced a new generation of film bulk acoustic resonator (FBAR-BAW) technology in the Samsung Galaxy S7.

Murata has introduced thermo-compensated filter technology with a ceramic substrate in the Samsung Galaxy S7’s front-end module.

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