In the iPhone 7 Plus, Apple introduced a new rear camera module. Like its competitors LG and Huawei, they have chosen to integrate a dual camera. The module features two sensors, one closed to the sensor in the previous flagship, and another with a totally new structure.

Competition for the best camera phone was revived by Huawei with its flagship, the P9, using a dual camera. Like the other main players except Samsung, Apple has now introduced a dual camera module. This module integrates two 12 megapixel resolution CMOS Image Sensors (CISs) from Sony, using Exmor-RS Technology. The wide-angle objective lens assembly features an aperture of f/1.8 and a pixel size of 1.22 µm. The telephoto has a pixel size of 1 µm but a smaller aperture of f/2.8.

The iPhone 7 Plus dual camera module, with dimensions of 20.6 x 10.0 x 5.9 mm, is equipped with two sub-modules each including a Sony CIS. The wide-angle module is equipped with an optical image stabilization (OIS) voice coil motor (VCM), while the telephoto only comes with a general VCM. The CISs are assembled using a flip-chip process on a ceramic substrate with a gold stud bumping process.

With this new dual camera module and Sony’s Exmor-RS technology, Apple has innovated its offering in areas including phase detection autofocus (PDAF), its objective lens assembly structure, its sensor, and adopts a second generation of through-silicon vias (TSVs). Surprisingly both logic circuit sensors for controlling PDAF are very similar.

The report includes technology and cost analysis of the iPhone 7 Plus dual camera module. Also, comparisons with the Huawei P9, Samsung Galaxy S7 and iPhone 6S rear camera modules are provided. These comparisons highlight differences in structures, technical choices and manufacturing cost.
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