

## Global and China Smartphone Industry Report, 2009-2010



There are two ideas for the design of smartphone. The first one is based on a single chip integrated with Modem (Baseband), multimedia application and float-point unit. The second features one RF transceiver, Modem chip integrating most functions of analog baseband, and an application processor chip.

The first design is applied by Nokia, HTC, Sony Ericsson, LG and RIM, the baseband IC is primarily provided by Qualcomm and Marvell, but the baseband IC of nokia's smartphone is developed by Nokia and Freescale/TI. The Snapdragon platform of Qualcomm is the most popularized chip of such kind, including QSD8250, DSD8650 and QSD8672 followed by MSM series like MSM7201, MSM7227, MSM7600 and MSM7627. In reality, MSM7600's sample was launched early in 2002, and it still has been widely applied until now. In addition, Marvel only has PXA910/920/930, of which PXA910/920 is for TD-SCDMA while PXA930 targets WCDMA.

The first design features short design cycle. There is little difference in core hardware of mobile phone, but other aspects like software, screen and case vary a lot. It has the disadvantage of being highly homogenized and lacks of unique features, as a result of reliance upon brand promotion to survive. The main chip should answer for multimedia processing, data algorithm and data communication simultaneously, thus leading to the insufficient performance.

Manufacturers like Apple, Motorola, Samsung, Microsoft and HP mainly adopt the second design. iPhone, launched by Apple, has long applied Modem (Baseband) of Infineon plus application processor of Samsung, while the new models of Motorola applied QSC6085 of Qualcomm plus OMAP3430 of Texas Instruments. As for Samsung, it has its own application processor products, including S3C6410, S5PC110 and S5PV210 which are largely applied (little modified) by Apple and rarely used by other manufacturers. In 2010, Samsung launched its new models, the application processors of which are included in the abovementioned ones.

QSC6085 launched by Qualcomm is widely used in CDMA EV-DO system, while MSM6246 or MSM6290 is usually applied as a Modem in HSDPA. As for WCDMA, Qualcomm has not rolled out any independent Modem chip yet, and mobile manufacturers have to employ QSF8250.

In addition, QSC6085 gets also applied by KIN TWO of Microsoft, and it is used with application processor by many Chinese manufacturers like Coolpad, ZTE, Huawei, Hisense and K-Touch, so is the case with ET series of Lenovo. Yet, Lephone of Lenovo applies QSD8250.

In terms of application processor, only OMAP3430 of Texas Instruments and Samsung's products are alternative, and Marvell's gets rarely used. Moreover, the Tegra APX2600 of Nvidia, the emerging enterprise in the industry, is employed in KIN TWO of Microsoft.

The highly-integrated design holds no advantage in cost. Although no application processor is needed, both transceiver and power management chips are required. In terms of size, they are very close to each other. And for the performance, it is beyond doubt that discrete design is provided with powerful performance. Nevertheless. Yet, Qualcomm is also improving its permanence.

The largest beneficiary of smartphone is definitely Qualcomm. No matter which kind of design idea, Qualcomm is the first choice. Except for Nokia, at least 60% smartphones apply Qualcomm's chips. Moreover, 3G mobile products of Nokia also depend on the patent licensing of Qualcomm.

Followed by Qualcomm, Infineon is the secondary beneficiary. All mobile products of Apple employ the baseband of Infineon, which is also the only provider. Further, Infineon is the only professional vendor wholly of 3G baseband with comprehensive strength, featuring proprietary technologies, which push Apple to make the only choice, even for iPad and the fourth-generation iPhone.

In addition, mobile memory manufacturers are also beneficiaries. The memory capacity of smartphone far exceeds that of ordinary phones, especially the usage of NAND. Toshiba and Samsung are the major suppliers of NAND memory for mobile phones. What's more, RAM characterizes huge using amount as well, and its major providers include Samsung, Hynix and Elpida. Touch screen and display screen manufacturers also share a slice of pie. Nearly all smartphones employ touch screens with big-sized and high-definition display screen featuring high unit price and high gross margin. Manufacturers in this regard include Samsung, Wintek, AUO and Chimei Innolux. Lastly, battery manufacturers benefit from this, but it is at a limited level.

By contrast, Media Tek and ST-ERICSSON are not beneficiaries. Media Tek encountered great difficulty in the promotion of smartphone chips since it is bundled with Windows Mobile which is on the wane.

Not supporting 3G, Media Tek is not specialized in multimedia performance, 3D graphic generation and floating point arithmetic capability in comparison with the mainstream smartphone. All those need to be accumulated in a long period of time and with early making of layouts. At present, only Qualcomm and Marvell are capable of producing smartphone CPU with single chip containing Modem. In particular, Qualcomm entered the industry as early as a decade ago.

In terms of technology, ST-ERICSSON is in the position to compete with Qualcomm. ST had poured much effort and capital to develop Nomadik application processor, but all these efforts seem in vain and it is downright abandoned. For ST-ERICSSON, U6715 is its leading chip for smartphone. U6715 employs the old-fashioned ARM926 core of 468MHz, but its competitors are QSD8250 or MSM7201A, of which MSM7201A features dual cores of ARM11 plus ARM9 in spite of 528MHz.

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