Another big benefit of in-cell touch on Apple’s iPhone 5: Larger battery capacity

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 In the run-up to the iPhone 5 unveiling next month, there is a great deal of discussion about potential new features, including an A6 SoC with quad-core structure, higher clock speed CPU and GPU, larger display with in-cell touch, higher resolution camera, and advanced OS. While it is not clear which of these features will be realized, any that are will result in higher power consumption. The most obvious is the display, which is expected to be 4”, up 18% from 3.54” in the iPhone 4, while maintaining the “Retina Display” 326 ppi resolution. If the optical transmission through the display is the same (while there will likely be more layers in the iPhone 5 cell structure, the removal of the touch panel substrate should offset this), the increase in display size means that more LEDs will be needed in the backlight unit, increasing the power consumption.

The faster, quad-core CPU is also likely to consume more power. First, we assume the A6 SoCs will be manufactured by Samsung using its 32 nm High-K metal gate process, so power consumption per MHz will not be much lower than for the A5; combined with a doubling of the CPU cores, higher power consumption is likely.

Since the CPU and display account for much of the power consumption in a smartphone, any improvements in power consumption from other components or overall design are not likely to make up for these increases. What about battery performance? Polymer battery density is expected to improve from 550 Wh/l (Watt-hours per liter) in 2012 to 630 in 2013; but this is not likely to be enough to account for the additional power demand without sacrificing operating time.

The bottom line is that the battery will need to be bigger. With phone thickness and volume at a premium, Apple and other smartphone makers need all other components to be thinner to make space for a larger battery. This is where in-cell touch can bring additional benefits (first to the iPhone 5): enabling greater battery capacity. We assume that in-cell touch could result in the display module being 0.5 mm thinner, which, combined with battery density of at least 600 Wh/l, would result in an increase in battery capacity of at least 40% in the iPhone 5.

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