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## Cell Phone Teardown Analysis Highlights Handset Business Challenges for 3G Systems

***Portelligent analysis reveals 3G cell phone chip content and manufacturing cost details for W-CDMA and CDMA 2000 handsets***

Austin, Texas — October 25, 2002 – One of the key pieces in the puzzle of achieving success in the 3G wireless market will be the timely availability of handsets that deliver compelling new services at an acceptable price point. Japan has led the way in the deployment of commercial 3G systems, with NTT DoCoMo rolling out its W-CDMA-based FOMA (Freedom of Mobile Multimedia Access) system in October 2001 after a five-month field trial, and KDDI following in April 2002 with an upgrade of its CDMA network to CDMA 2000. Korea, where wireless service providers raced to get CDMA 2000 in the field in advance of the July 2002 World Cup tournament, has also been an early leader in 3G. A number of European carriers will begin operating their 3G networks during the next year, with the U.S. to follow.

	Technology	Component Count	IC Die Area (cm <sup>2</sup> )	Estimated Total Manufacturing Cost
Recent European Handset	2G GSM	331	1.26	\$ 56
Samsung SPH-X4200	3G CDMA2000 1xRTT	544	3.30	\$ 127
Panasonic P2101V	3G (FOMA) W-CDMA	702	9.48	\$ 280

Comparison of Component Count, IC Die Area and Estimated Total Manufacturing Costs for 3G vs. 2G cell phones – Source: Portelligent, Inc., [www.portelligent.com](http://www.portelligent.com)

Portelligent, Inc. (USA) – a leading provider of technology product intelligence in the consumer domain – has analysed available 3G cell phones from Japan and Korea, with a goal of better understanding the evolving cost structures of the handset side of the 3G network environment. The results provide detailed

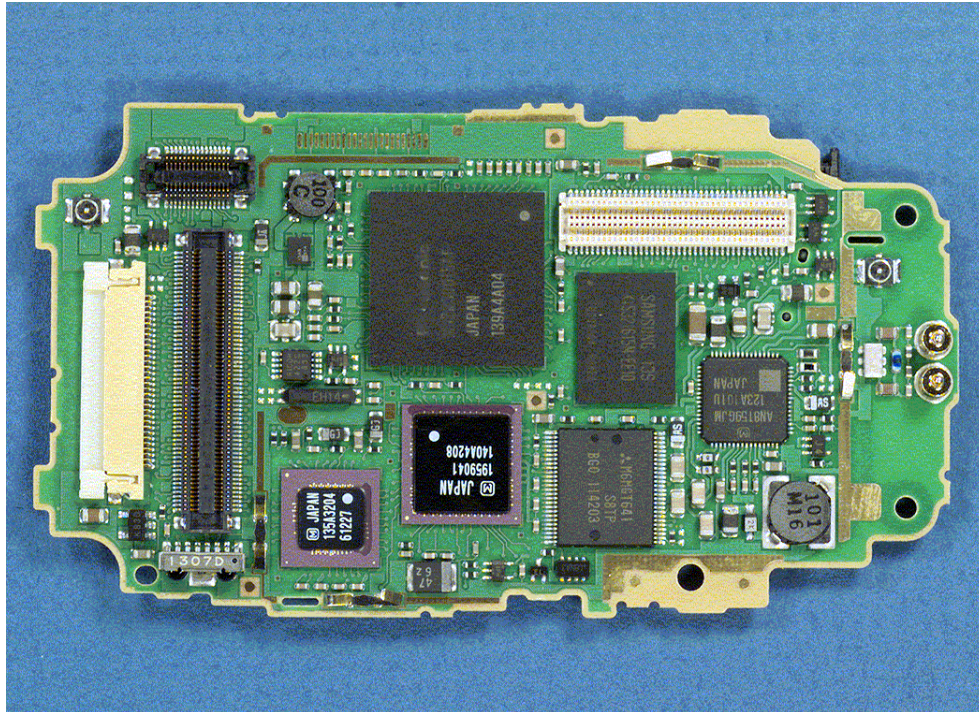
information on chip content and manufacturing costs, as well as clear recommendations on lessons learned in Asia. Of particular significance is the discrepancy in complexity and cost between W-CDMA and CDMA2000 handsets.

Among the 3G handsets that Portelligent has subjected to rigorous teardown analysis are the Panasonic P2101V and the Samsung SPH-X4200. Results are compared to a typical 2G GSM phone of recent design, in order to calibrate complexity and cost.

- 1- The **Panasonic P2101V**, a wireless reincarnation of the videophone in a 147-gram package, emphasizes the capacity of the W-CDMA infrastructure to support visual communications. Video image capture is accomplished with a CMOS image sensor, while video is played on a 176 x 222 pixel TFT-LCD display (57mm in diagonal dimension) that supports 260,000 colors.



- 2- The **Samsung SPH-X4200** (shown above) is a representative handset designed for 3G CDMA2000 networks. This handset supports the initial 1xRTT CDMA2000 specification with a peak data rate of 144 kbps, versus the 384 kbps W-CDMA standard. The SPH-X4200 features a 45mm color TFT-LCD display and an innovative navigation wheel.



The main PCB of the Panasonic P2101V W-CDMA cell phone.

(contact [hcurtis@portelligent.com](mailto:hcurtis@portelligent.com) for a high-resolution electronic photo of above)

The complexity of the Panasonic W-CDMA cell phone with videophone features is startling when compared to the Samsung CDMA2000 phone and the European GSM phone. The total silicon die area in the Panasonic phone exceeds that in the CDMA2000 and GSM handsets by factors of 3X to 7X respectively, and the impact is reflected in an estimated manufacturing cost that is more than five times that of the GSM handset (see table for details).

"Even more astounding is how Panasonic engineers have packed all this silicon in the available board space, making extensive use of stacked Chip-Scale-Packaging for processor and memory devices, and flip-chip device attach," notes David Carey, President of Portelligent. "But this complexity comes at a price," adds Carey. "One open question is whether such a design offers more capabilities than the average user wants. On the business side, the key issue is whether these high-complexity, high-cost W-CDMA handsets will further erode hopes of creating profitable subscription plans as part of jump starting the 3G market".



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Despite a 6-month lead in roll out compared to CDMA 2000 in Japan, FOMA has not yet met NTT DoCoMo's growth expectations. As of July 2002 there were 1.6 million Japanese CDMA 2000 subscribers, ten times more than FOMA has attracted. Korea has witnessed an even bigger CDMA 2000 success story with total subscribers reaching the 11 million mark in July 2002.

A more detailed account of Portelligent's investigation of 3G handsets will be published in Europe in the near future.

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**About Portelligent:** Portelligent, based in Austin, Texas, offers teardown analyses of electronic products in four categories, or "Channels": Cellular Phones and Wireless Terminals, PDAs and Personal Appliances, Digital Cameras and Imaging, and Wireless Home and Mobile Computing. The Portelligent TechAlert newsfeed provides tracking of developments in key enabling technologies for consumer electronics, with emphasis on recent trends in Japan and Asia. Portelligent's information services are used by technical marketing managers, product designers, procurement and sourcing specialists, competitive analysts, strategic planners, engineering managers, and senior executives in the semiconductor, component supplier, electronics manufacturing, OEM, and wireless service provider industry segments.

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