



Mobile Storage: Today and Tomorrow

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More than just communication

MOBILE TRENDS



Mobile phone = communication





Mobile phone = communication





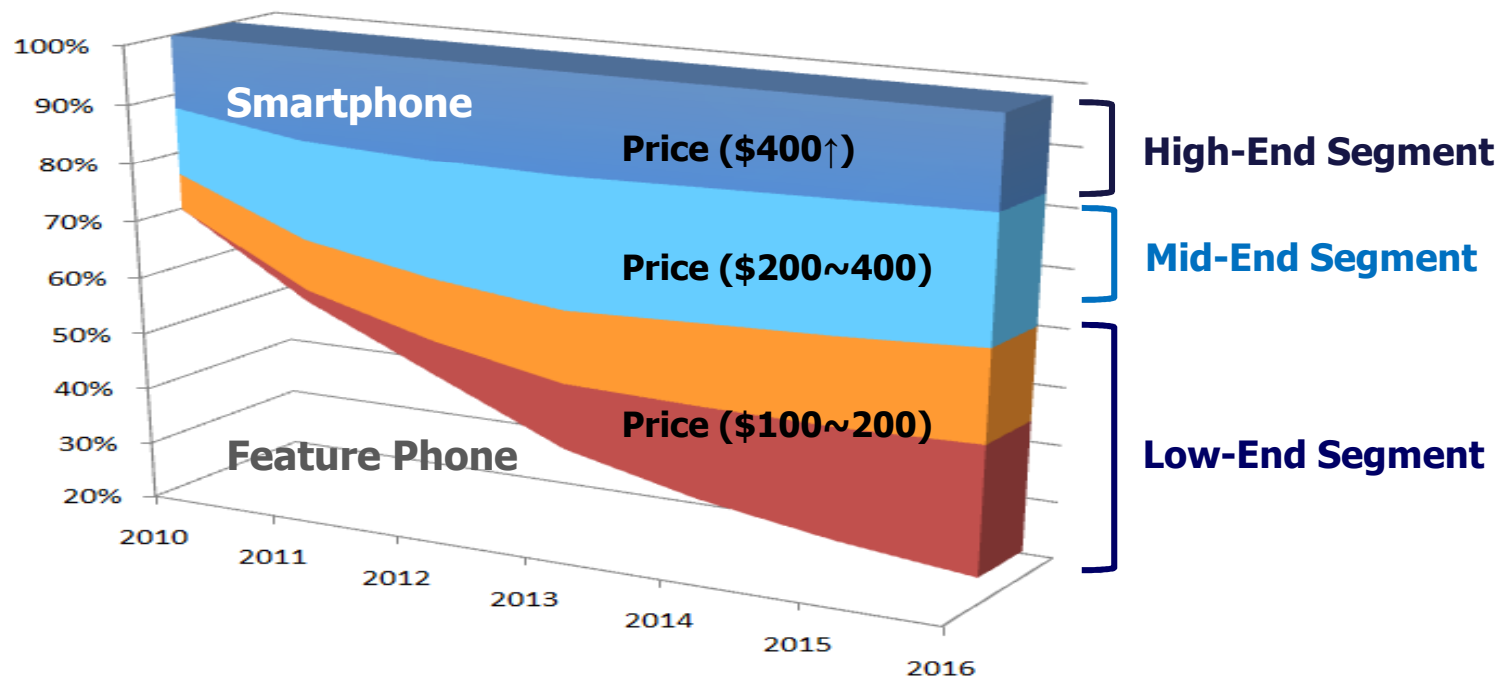
More than just communication





Smartphones have become Major Part of Mobile Industry

- By 2013, over 60% of mobile phones will be smartphones



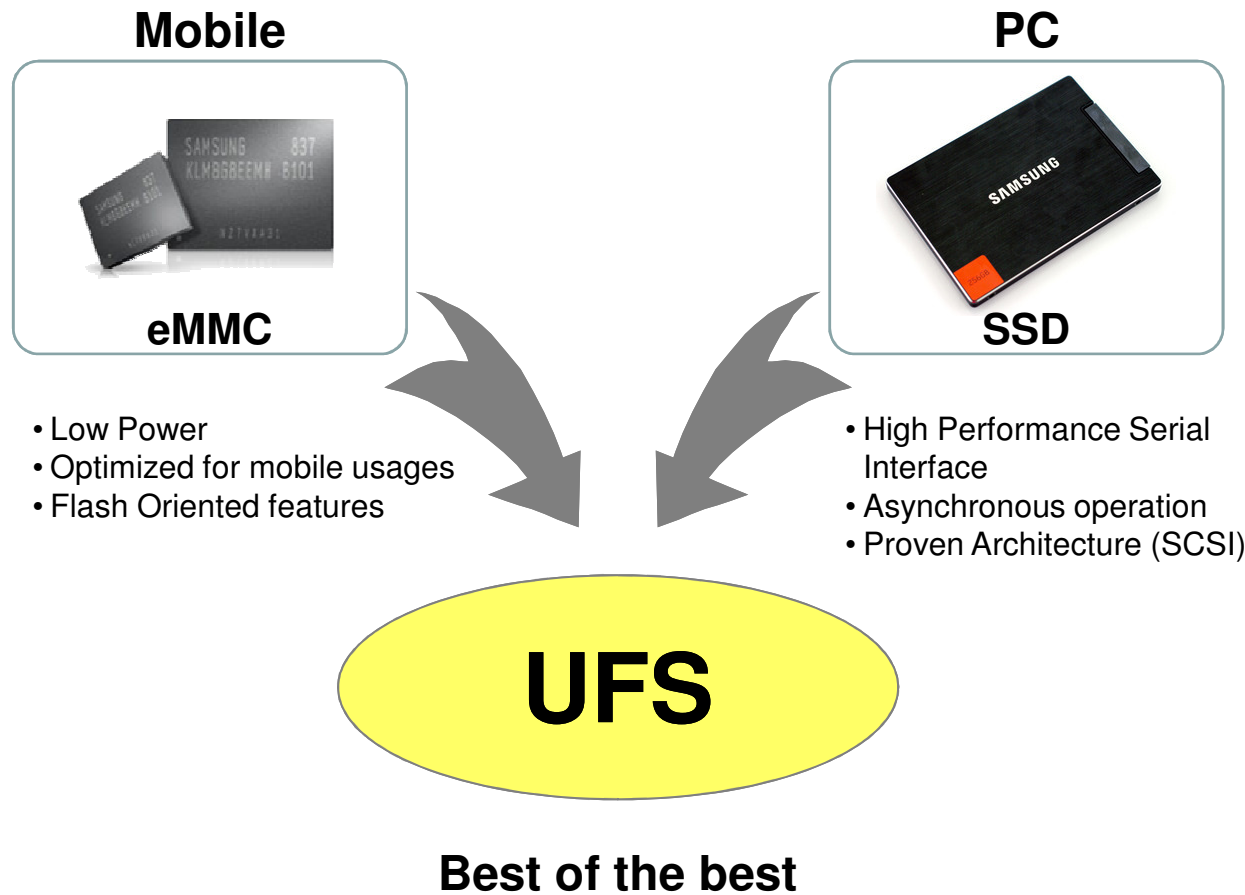
[Source : 2012 Samsung Mobile Marketing Team]



The solution for the future

UNIVERSAL FLASH STORAGE

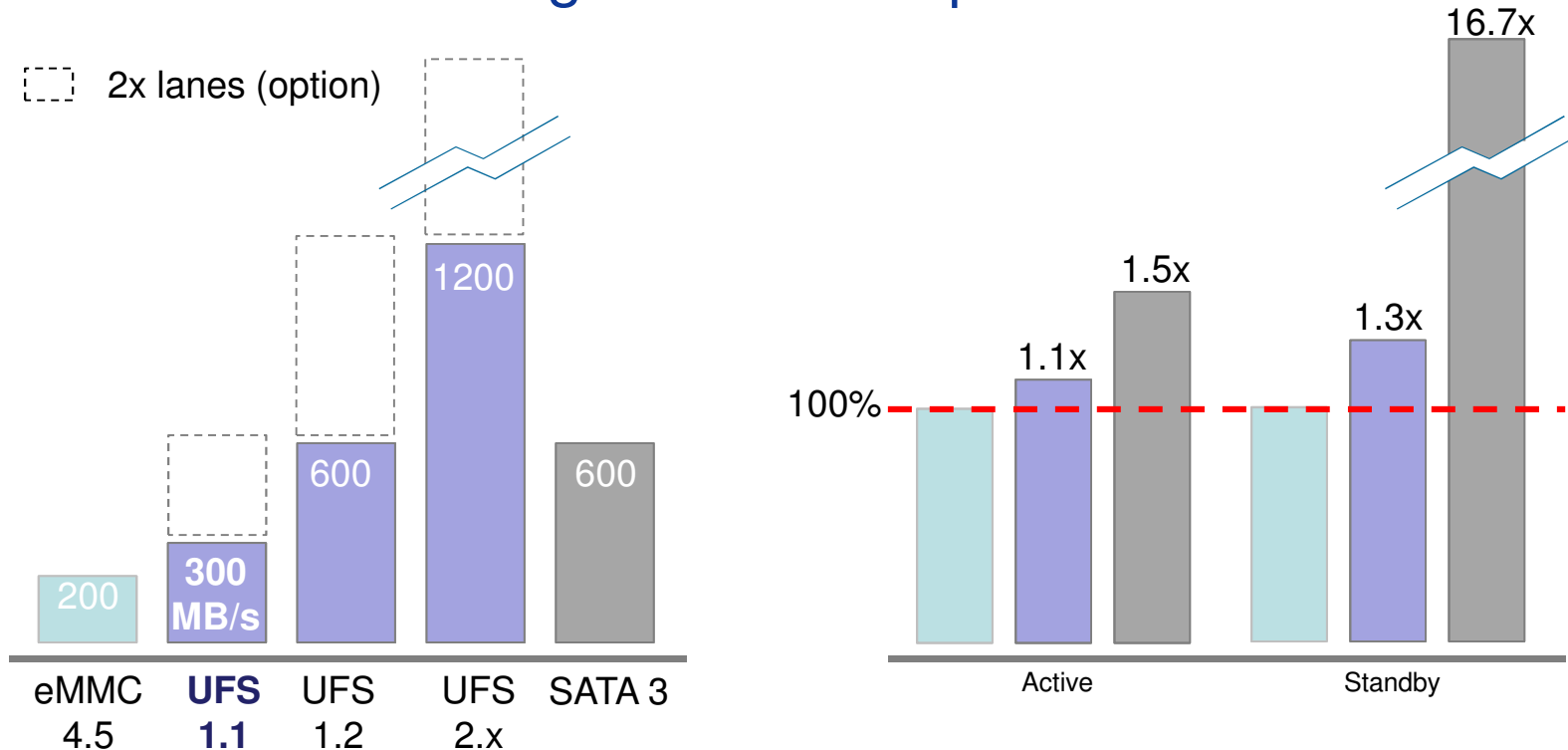
SSDs for Mobile Applications





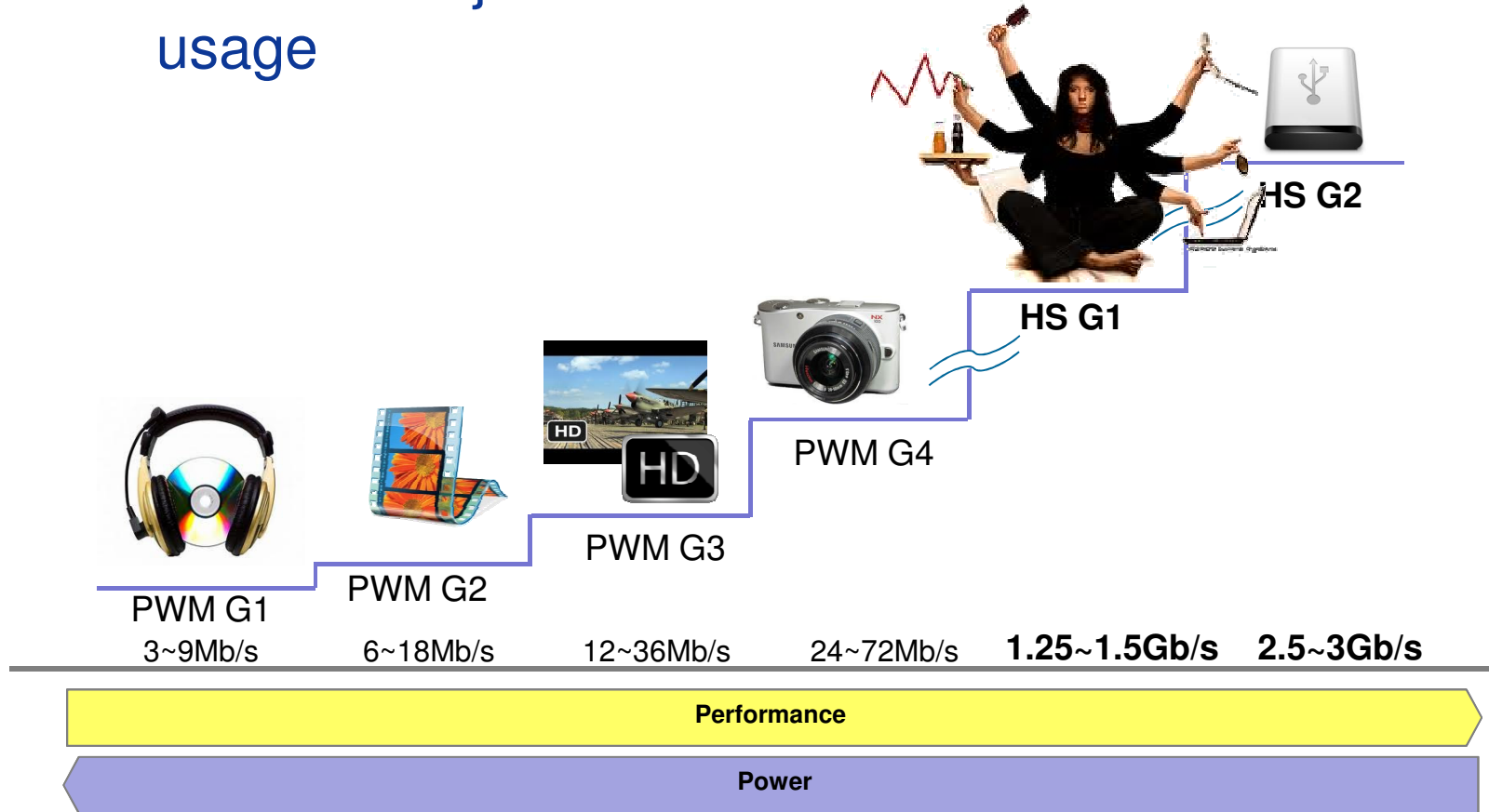
The Fastest Low Power Interface

- **UFS exceeds current interface with lower active and standby power**
 - MIPI is working on 6G/12Gbps interface



Scalable Interfaces

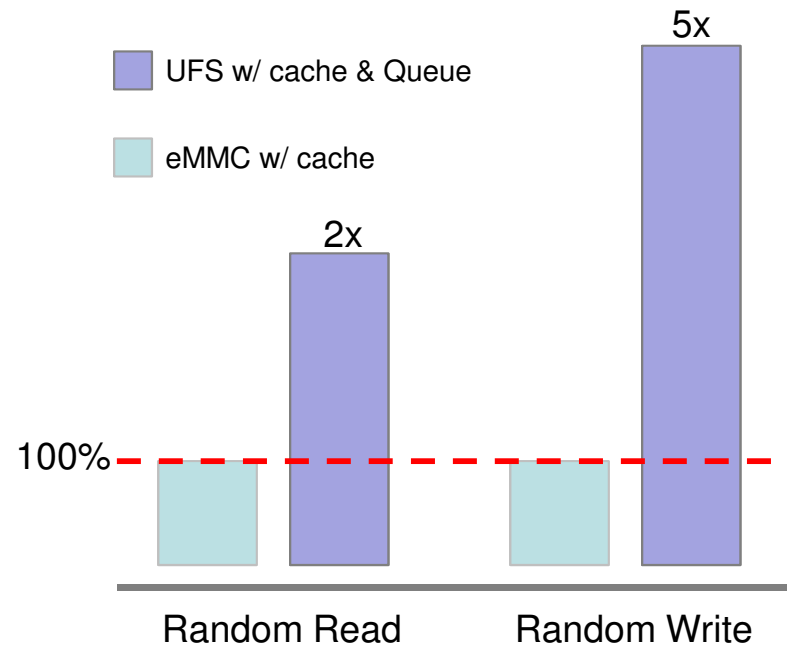
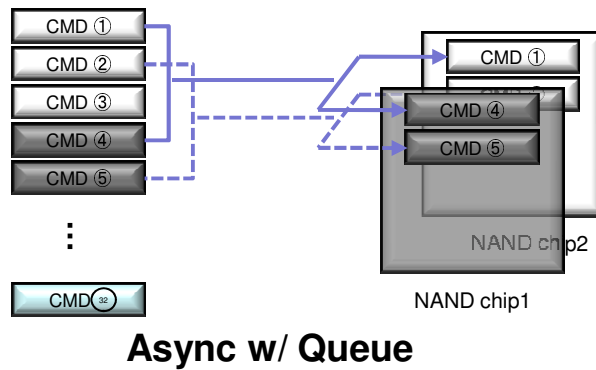
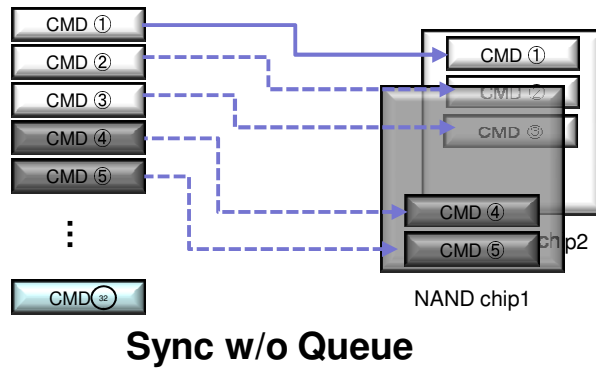
- **UFS supports multiple interface speeds**
 - Host can adjust interface in real time based on usage





Optimized for Random Performance

- Asynchronous operation & queuing improve random operations
 - Better user experience with lower latency





UFS Includes eMMC Features and More

		e.MMC4.5	UFS	SATA
Interface	Operation	-	Full Duplex	Dual Simplex
Future Expandability		~200MB/s	3Gbps ~12Gbps, Multi-Lane (option)	6Gbps
H/W reset		Yes	Yes	No
Alternative Boot		Yes	Yes	No → Rom
Multi-Partition		Yes(4)	Yes(8)	No
Security feature	Trim	Yes	Yes	Yes
	Discard	Yes	Yes	No
	RPMB	Yes	Yes	No
	Secure Erase	Sanitize	Sanitize	No
	Secure Trim			
Performance Feature	High Priority Interrupt	Yes	Yes (LU/Queue)	No
	Back Ground Operation	Yes	Yes	No
	Operation Mode	Sync	Async	Async
	Packed CMD	Yes	Command Queuing	Command Queuing
	Data Tag	Yes	Yes	No
	Context ID	Yes	Yes	No
	Cache Operation	Yes	Yes	Yes
Reliability	Dynamic Capacity	Yes	Yes	No
	Power off notification	Yes	Yes	No
	Real Time Clock	Yes	Yes	No



Are we ready?

READINESS FOR UFS



UFS is Coming Sooner than you Think ...

- Toshiba unveiled UFS at MIPI alliance meeting in Berlin, June 2012

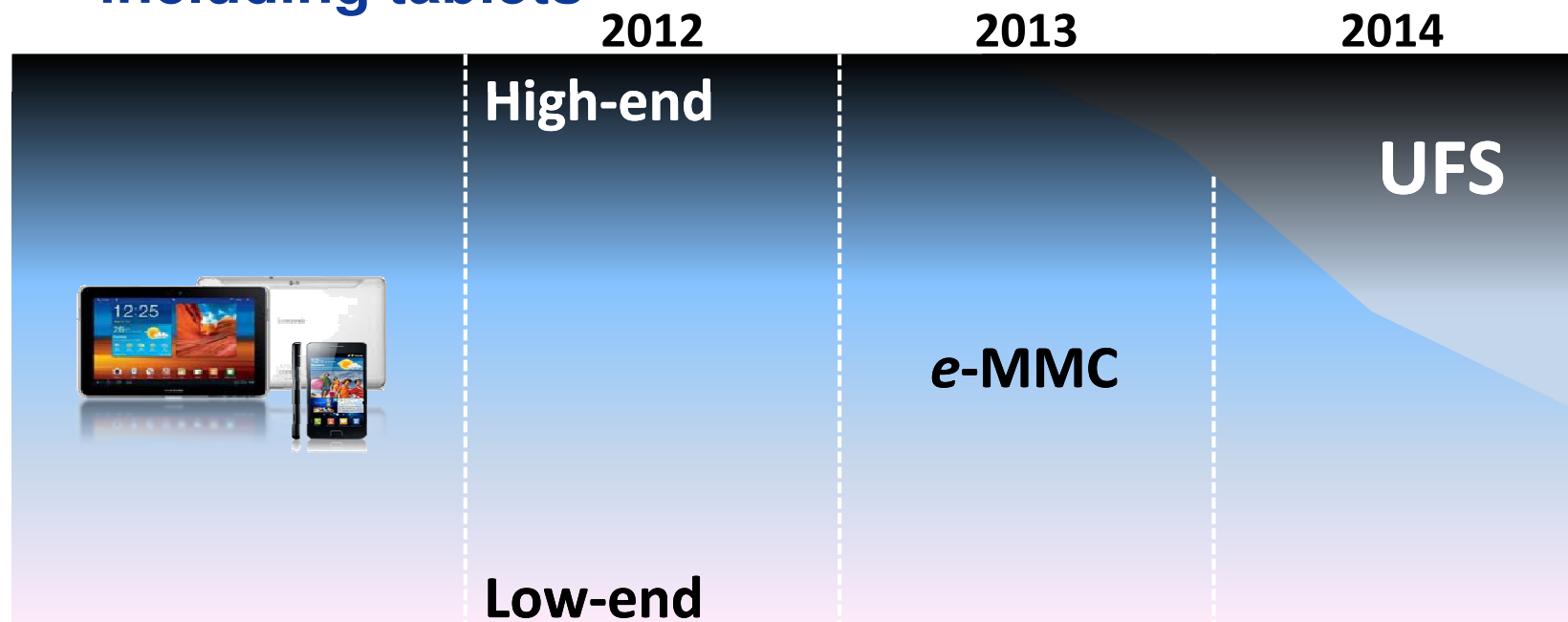
A screenshot of the EE Times website. The header features the "EE Times News & Analysis" logo. Below the header is a navigation menu with categories: News & Analysis, EE Life, Design, Products, Education & Training, Events, Video, Embedded.com, and Car. The main content area displays a news article titled "Toshiba shows first SCSI-like Universal Flash demo system" by Nick Flaherty, dated 6/13/2012 3:04 PM EDT. The article text states: "Toshiba Electronics Europe has shown the first demonstration system for the next-generation Universal Flash Storage (UFS) specification that moves the control interface to a new SCSI-like protocol." Social media sharing buttons for Facebook (Like), Google+ (+1), LinkedIn (Share), and Twitter (Tweet) are visible above the article. On the left sidebar, there is a section for "News & Analysis" with links to "Latest News", "Semiconductor News", "Digital Editions", and "EE Times: Confidential". Below this is a promotional banner for "Test & MEASUREMENT WORLD" with the URL "TMWorld.com".

[Source: EETimes 6/13/2012]



Embedded Storage for Mobile Forecasting

- eMMC will be a strong market driver for mobile throughout remainder of '12
- Transition to UFS will start at high-end in '13, including tablets





THANKS