Current Analysis

Current Analysis Webinar

2010: The Year Competition and Stakes Rise Dramatically in the Mobile Device Silicon Market

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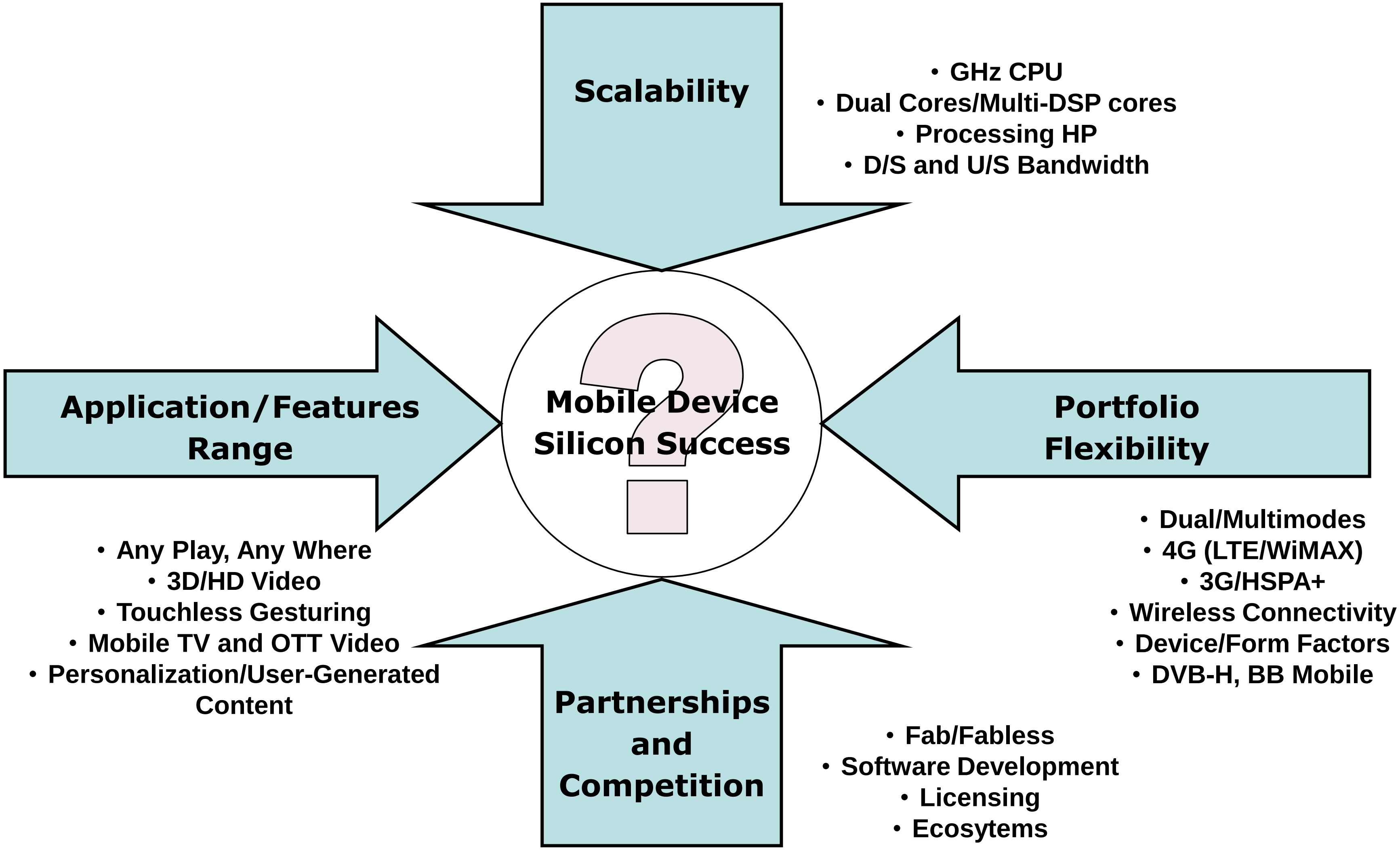
Mobile Device Silicon Webinar: Major Drivers Driving Evolution



Mobile Device Silicon Webinar: Overall Silicon Market Leaders

Snapshot of Overall Semi/Silicon Industry

- **Overall Silicon Industry Shrunk -12.4% (Y/Y) in 2009**
- **Supply Chain Inventories and Fab Capacities hit Record Lows in H2 2008/H1 2009**

Good News on Horizon:

- **Overall Industry Expected to Grow up @10% during 2010**
- **Inventory Corrections and Fab Capacities Have Significantly Rebounded**
- **High Stakes in Mobile Device Silicon Segment (Green)**

2009 Rank	Company	Country of Origin	Revenue (Billion $ USD)	2009/2008 % Change	Market Share
1	Intel	USA	32.1	-5.0%	14.2%
2	Samsung Electronics	S. Korea	17.1	+1.3%	7.6%
3	Toshiba Semiconductor	Japan	10.6	-4.0%	4.7%
4	TI	USA	9.6	-9.8%	4.3%
5	STM	France/ Italy	8.4	-18.6%	3.7%
6	Qualcomm	USA	6.5	0.0%	2.9%
7	Hynix	S. Korea	5.9	-1.4%	2.6%
8	Renesas	Japan	5.7	-19.3%	2.5%
9	AMD	USA	5.0	-7.6%	2.2%
10	Sony	Japan	4.7	-32.8%	2.1%

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- **Mobile Silicon Segment Spearheading Recovery**
- **Characteristics . . .**
  - Over $57 B in WW Revenues for WW Wireless Silicon Industry (according to Databeans – estimates vary)
    - 19% Y/Y Growth Projected for 2010
    - Correlates to Handset Growth Demands
    - 3G in China; 2/2.5G in India/Emerging Countries
  - Handset OEM Customer Demand Clear
    - Smartphone High-end (e.g., Motorola Android, Apple, etc.)
    - Basic Handset Expansion in Emerging Markets
  - R&D Pressures
  - Scale as Important as Ever

Mobile Device Silicon Webinar – Why 2010 Rebound?

- Mobile handsets are a key area of competitive differentiation to which operators need to dedicate CapEx and capitalize on upside of high margin smart phone market
- This is a growing market in terms of product and service revenue and household penetration
- All the major handset vendors have recently and continue to release new products
- Wide variety of established and start-ups competing
- Open-ended competition

Mobile Device Silicon Webinar: Competitive Landscape

Vendor	Application Flexibility	Scalability	Portfolio Range	Wireless Connectivity	Marketing	Overall MDS Solution
Qualcomm	Snapdragon	Competitive	Most Diverse	Diverse	Somewhat Unfocused	Threatening
TI	OMAP	Threatening	Baseband Exit	WiLink 7.0	Strategy Clear	Threatening
ST-Ericsson	U8500	Solid	Very Competitive	Respectable	Effective	Threatening
Infineon	X-Gold	Unthreatening	Limited	Partners/Gap	Needs Refresh	Rebuilding Momentum
Broadcom	BCM2820	Competitive	4G Concerns	Robust	Clear Messaging	Prove App. Processor
Marvell	Armada	Niche-dependent	Limited	GPS/Others Gap	Static	New Wins Needed
Intel	Atom: Handset Apps TBD	Competitive (but not handsets)	Competitive	Partners/Gap	Influencer	New Opps.
MediaTek	MT6000: Nascent/:Low-end Smatphones	Competitive; More Cohesion Though	4G Applications = New Challenges	Emerging Threat	Limited	Asia-Pac Threat

Ratings Key

- Positive
- Neutral
- Negative

Mobile Device Silicon Webinar: Sample of Silicon and OEM Relations

Mobile Silicon/Handset OEM Relations

Not Exhaustive, but Gives Good Idea on Key Relations

Dynamic Element for 2010 and Beyond

Mobile Device Silicon Vendors	Mobile Device/Handset OEM Partners
Qualcomm	Nokia, Samsung, LG, Motorola, Sony Ericsson, RIM, HTC
TI	Nokia, LG, Motorola, Sony Ericsson, HTC
ST-Ericsson	Nokia, Samsung, LG, Sony Ericsson,
Broadcom	Nokia, Samsung
Infineon	Nokia, Samsung, LG, Apple
Marvell	RIM
MediaTek	LG, Chinese Handset OEMs
Spreadtrum	Chinese Handset OEMs
Freescale	Motorola, Amazon

Mobile Device Silicon Webinar: Key Overall Challenges

Near-Term Challenges

- 3G/HSPA+ Enhancements
- 4G Planning/Overlay
- LTE Build-out and Backhaul
- Power Conservation/Management
- Application Diversification Support
- Price Points

Meeting Long-Term Challenges Head-on

- Evolving market diversification for vendors
- Back-office integration and migration challenge and opportunity
- Quality of Experience considerations; Wireline Integration
- Improving network application awareness capabilities
- Horizontal Layers model advancing (SDP/IMS)

Mobile Device Silicon Webinar: Key Overall Trends

Sustained Trends

- Integrated/Discrete Architecture Debate
- CPU Evolution: 90nm/65nm/45nm/32nm
- Mobile TV Expansion
- Continue Blurring of Mobile Devices Category
- Portfolio/Application Range Stretching
- Patents and R&D

More Recent Trends

- Mobile O/S Fragmentation
- ARM/x86/MIPS Clashes
- SoC Integration will Take More Forms
- Application Intelligence
- 3rd Party Developers More Important
- Smartphone to Superphone?

3G Challenges

- GSM/GPRS/EDGE
- CDMA2000/EV-DO
- HSPA+/WCDMA
- Data-driven BW Capacity/Management
- TD-SCDMA
- 4G Gains Momentum

3G Trends/Solutions

- Dual/Multimode Flexibility
- QWERTY keyboards
- Higher-megapixel cameras
- Multimedia Options
- Power Conservation Enhancements

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4G Challenges

- Chinese Home Grown Silicon Expanding
- 3G Revenue Models
- Support of Bands w/in 4G Spectrum
- Power Conservation still TBD
- Carrier Strategies Remain Unproven
- WiMAX Over Hype Lessons Learned

4G Trends/Solutions

- Multimode Flexibility
- SDR Approach Needed for Multimode
- Avoid Hard-wire Constraints
- 4G Can Solve 3G Capacity Constraints
- Power Conservation May Need Short-term Custom Option

Video Near-Term Trends/Solutions

- Support of More Video Codecs
- Projector Capabilities
- 1080p 30/60 fps Decoders
- Auto/Quality Enhancements
- Video Processing Advances
- Flash Player 10.1 Support
- Multi-display Options

Video Long-Term Trends/Solutions

- Enhanced Sensors
- 720p HD Video Capture
- 1080p encoders
- Image Searches
- Video Intelligence

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Mobile Device Silicon Segment Evolution: 2010

- **Mobile Device Silicon Integration Rapid: System on Chip (SoC) and Dual-Core Burgeoning**
- **DSP Suppliers = Driving Mobile Device Silicon Innovation and Direction**
- **Traditional Lines are Blurring**

Market Segmentation Evolving
Mobile Device Silicon Overall (incl. RF, Power Mgmt., Baseband)
Mobile Device Applications (incl. Software Evolution, etc.)

DSP Vendors
CEVA
Verisilicon

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Mobile Device Application Processors

Presented by: **Jeff Ogle**

Date: March 11, 2010

Mobile Device Application Processors

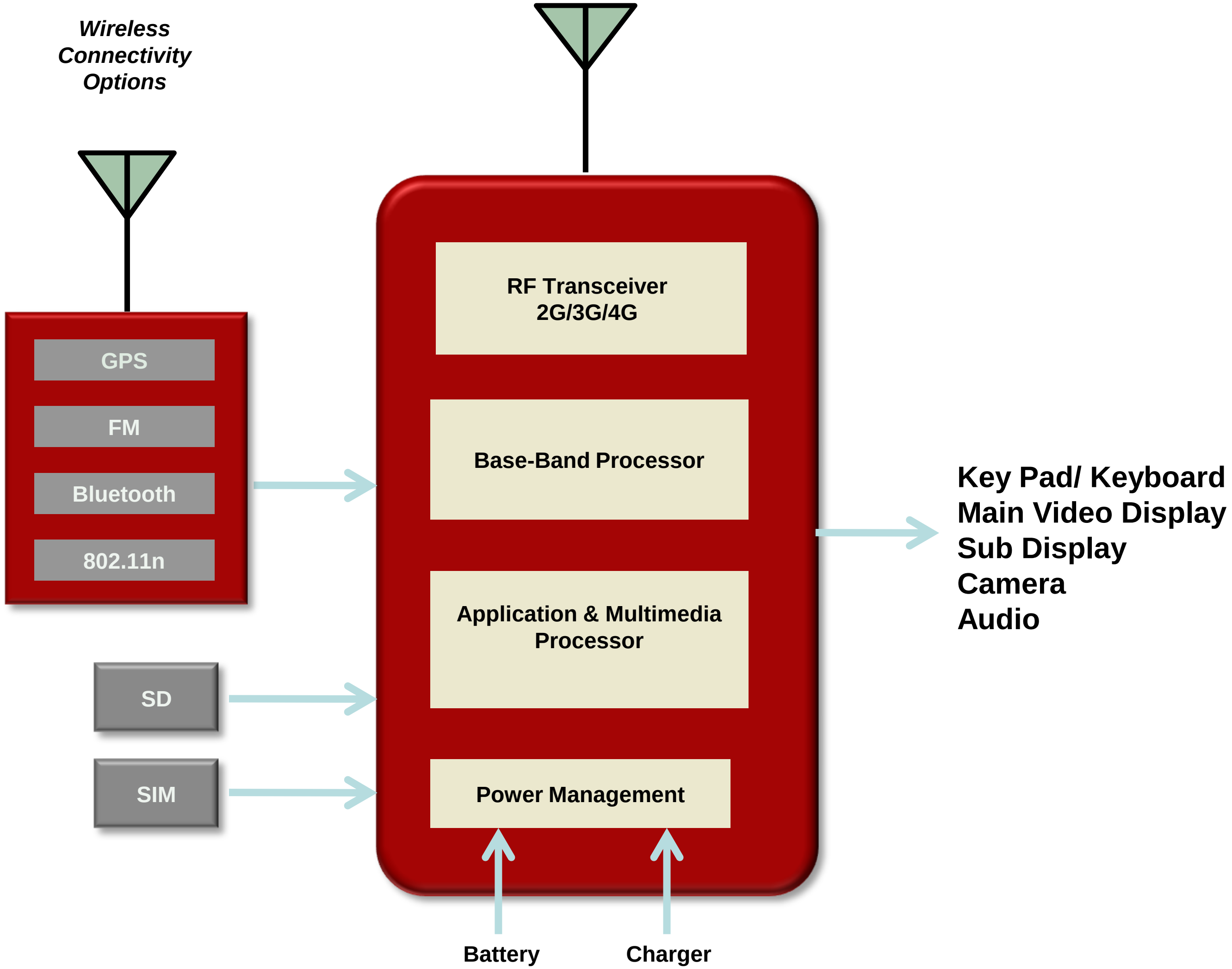
Definition of Application Processor

- Processor Dedicated to a Specific Data Processing Function, Generally not Control or Signaling
- a.k.a. Multimedia Processor, Co-Processor, Video Processor, Graphics Processor

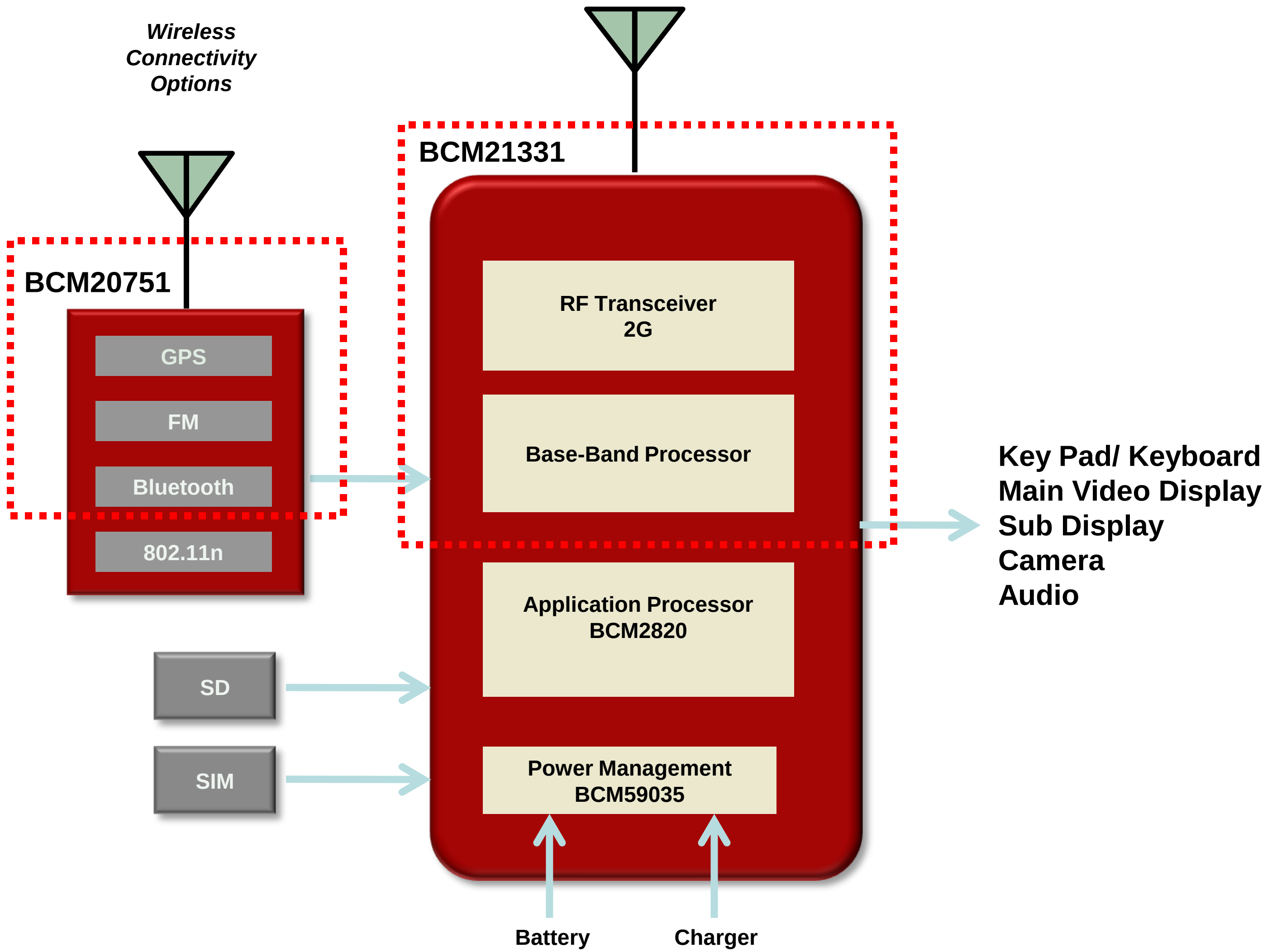
Used in

- Smartphones, Netbooks, Mobile Internet Devices (MID), Portable Media Players, Personal Navigation Devices (GPS), PDA’s and Gaming Consoles

Standard Reference Diagram for Smart Mobile Devices

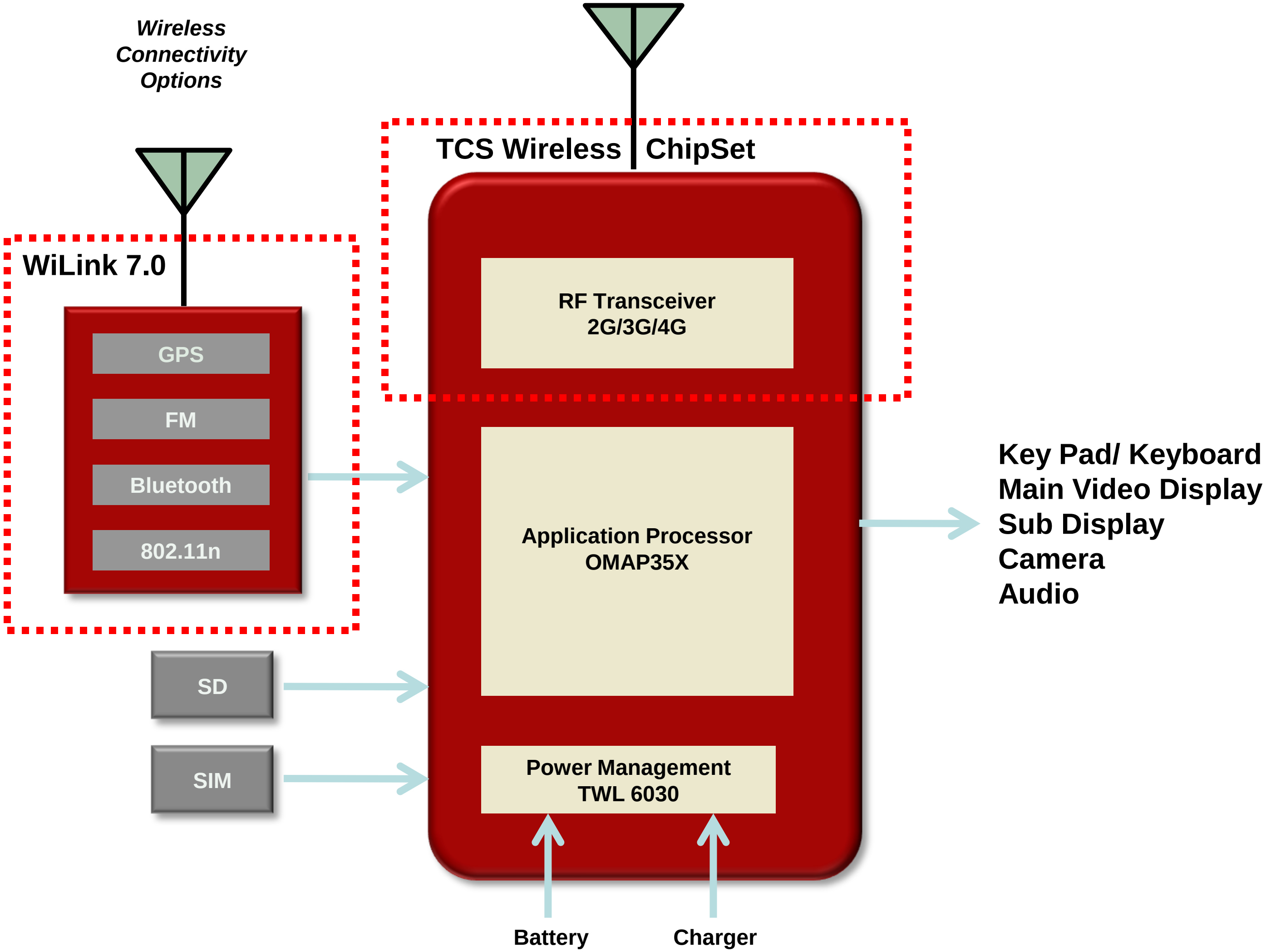


Broadcom

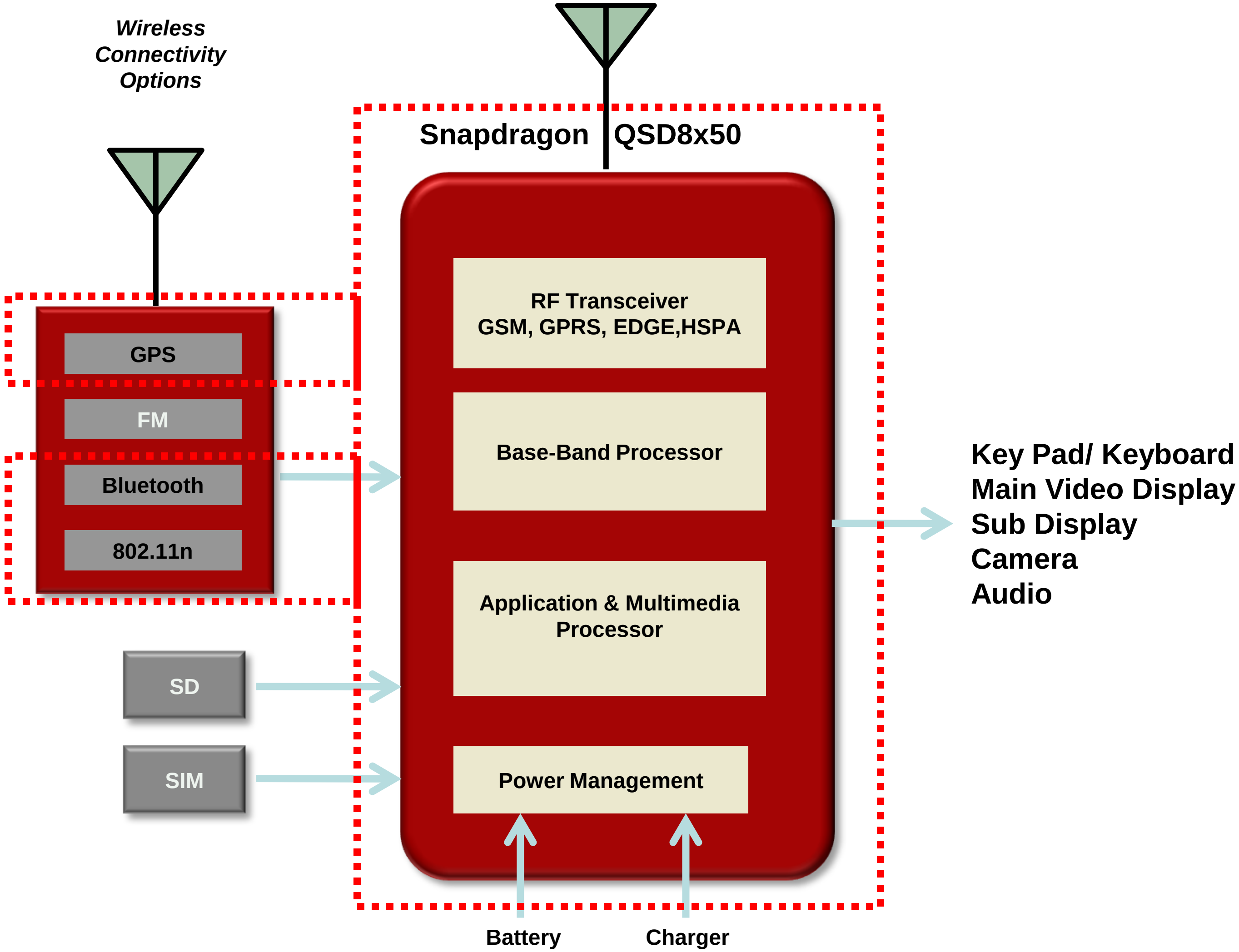


Wireless Connectivity Options
BCM20751
GPS
FM
Bluetooth
802.11n
SD
SIM
BCM21331
RF Transceiver 2G
Base-Band Processor
Application Processor BCM2820
Power Management BCM59035
Battery
Charger
Key Pad/ Keyboard
Main Video Display
Sub Display
Camera
Audio

Texas Instruments



QualComm



Wireless Connectivity Options
GPS
FM
Bluetooth
802.11n
SD
SIM
Snapdragon QSD8x50
RF Transceiver GSM, GPRS, EDGE,HSPA
Base-Band Processor
Application & Multimedia Processor
Power Management
Battery
Charger
Key Pad/ Keyboard
Main Video Display
Sub Display
Camera
Audio

Vendor Summary Application Processors

	Broadcom	Freescale	Infineon	Marvell	Texas Inst.	Qualcomm
Application Processor	BCM	iMX 51X	X-Gold	ARMADA	OMAP	SnapDragon
Model	BCM 2820	iMX 515	X-Gold 618	610	OAMP 3530	QSD8250
Technology	40 nm	45 nm	65 nm	65 nm	45 nm	45 nm
Processor Type	ARM Cortex- A8	ARM Cortex- A8	ARM 1176	ARM V7	ARM Cortex- A8	ARM Cortex- A8
Processor Speed	800 Mhz	800 Mhz	416 Mhz	1 Ghz	600 Mhz	1 Ghz
Operating System	Linux Open OS	Linux Android Windows	Linux Symbian Windows	Linux Android Windows	Linux Android Windows	Linux Android Windows
Camera	8 Mpixel	3 Mpixel	5 Mpixel	16 Mpixel	8 Mpixel	12 Mpixel
Display	WVGA (800x480)	WXGA (1024x600)	WVGA (800x480)	WVGA (800x480)	WVGA (800x480)	WXGA (1280x720)
GPS	External	External	External	External	External	Internal
Bluetooth	External	External	External	External	External	Internal
Power Management	BCM 590X	MC 13892	Internal	Internal	SmartReflex	Internal
Development Support	Reference design, Source Samples, Tools	SABRE	Evaluation Boards, Software, Training	Reference Design Production Ready	Evaluation Module, Beagle Board	Development Network, Training
Products Fielded	NPA’s	Netwalker Pagatron	No Public Announcements		TouchBook	Toshiba TGO Skylight, HP
Special Notes		Consumer & Industrial	Automotive & Industrial	Security & Graphics	Automotive & Industrial	
Announced Availability	12-Dec-09	4-Jan-10	16-Feb-09	10-Jan-10	16-Feb-09	4-Jan-10

Current Analysis Webinar: Thank You

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