Samsung System LSI
Application processor for Netbook

PC performance in your hand !!

System LSI Div.
November 2009

Samsung Electronics

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Agenda

Samsung Confidential

I. Mobile Device Trends

II. Samsung AP solution for netbook

III. Product Introduction

- S5PV210
- S5PC100

VI. Solution

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Mobile Device Trend

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Latest News on Netbook Market

Samsung Confidential

APPLE seems to launch a new concept of Netbook

-

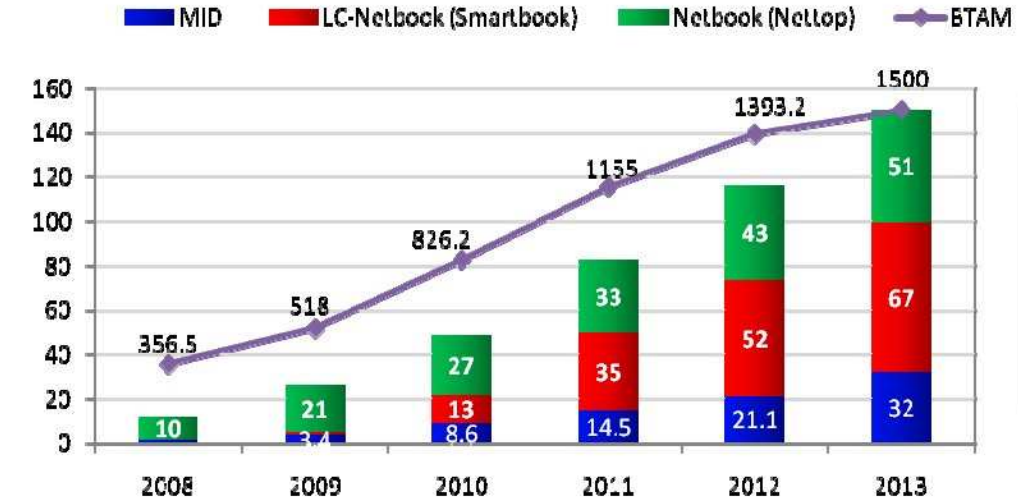
SONY VAIO

-

-

Netbook Market heads for ..

Samsung Confidential



Source: Market Analysis based on ABI, Gartner , IDC, etc

ARM based Netbook solution getting interest

Linux OS (Android, Chrome, Ubuntu etc) getting attentions

Operator subsidy biz model

Samsung AP solution for Net-book

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Competitive Core Technologies Overview

Samsung Confidential

Process

Only few companies can commit on 32nm/28nm
- World first 45nm SOC
- 32nm SOC 6 mos. Ahead
- Taurus-L by Q2.'10
- 28nm ready by Dec. 2010

CPU

Advanced Circuit for Low leakage & high perform.
- >25% better on leakage current
- 1GHz Taurus1
- Typ: 11mW vs. >30mW (Q)
- 1GHz x 2 Orion

Multimedia

Only S.LSI supports all major codec and profiles
- Taurus1: 1080p@30fps for codec
- Q: 1080p@30fps only for Decoding
  720p for encoding
- T: 720p decoding/encoding

3D Graphics

Close collaboration w/ Leading 3D IP providers

World Best Performance
- Taurus1: 89.5Mtri/s &1Gpix/s
- Orion: 267Mtri/s & 1.6Gpix/s

Small Form Factor

OneDRAM 14x14 POP

10x10 POP by Oct. '09
Advanced POP solution, TSV, under development

Power

Power Save Technology
- DVFS / AVS

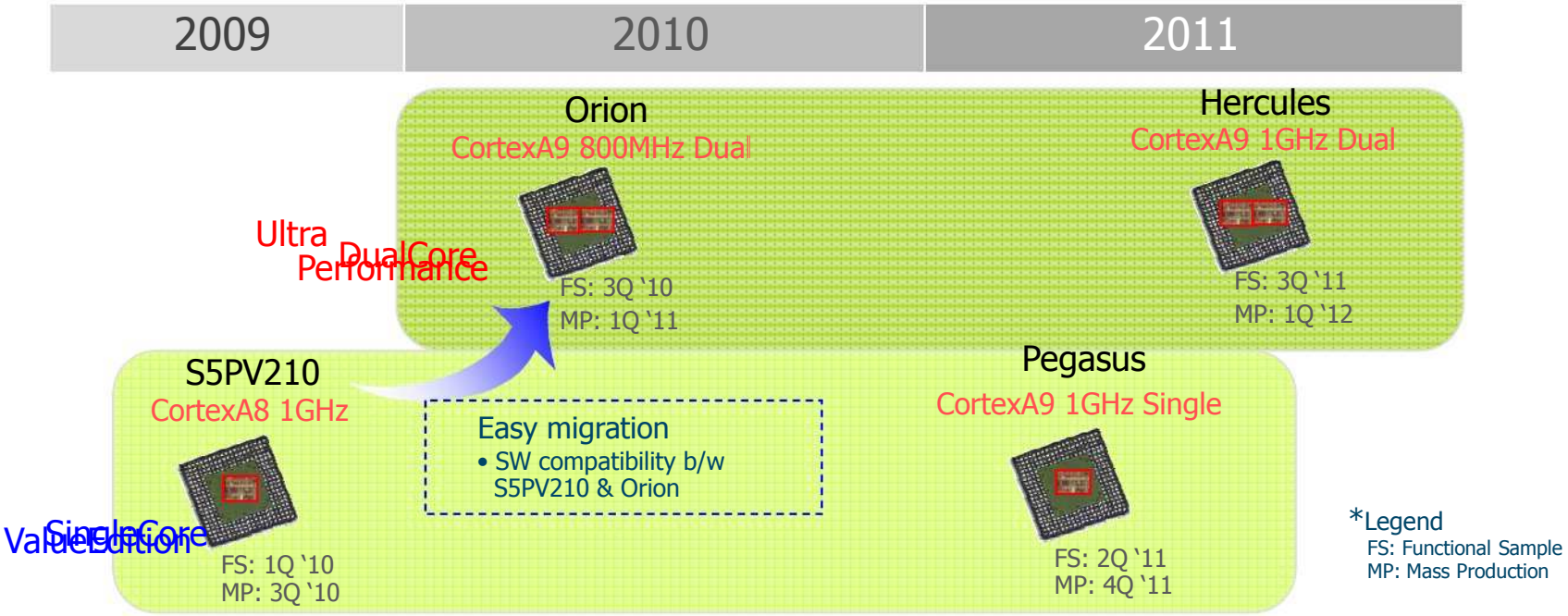
Dedicated HW Engine for Low Power MP3 & Video
- MP3: >100hrs @1200mAh
- 720p Video: 320mW vs. 770mW (Q)

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Roadmap for Netbook

Samsung Confidential

Evolutionary & seamless Netbook Solution



Seamless & solid product line-up for Netbook

Easy S/W & H/W migration, reducing time to market

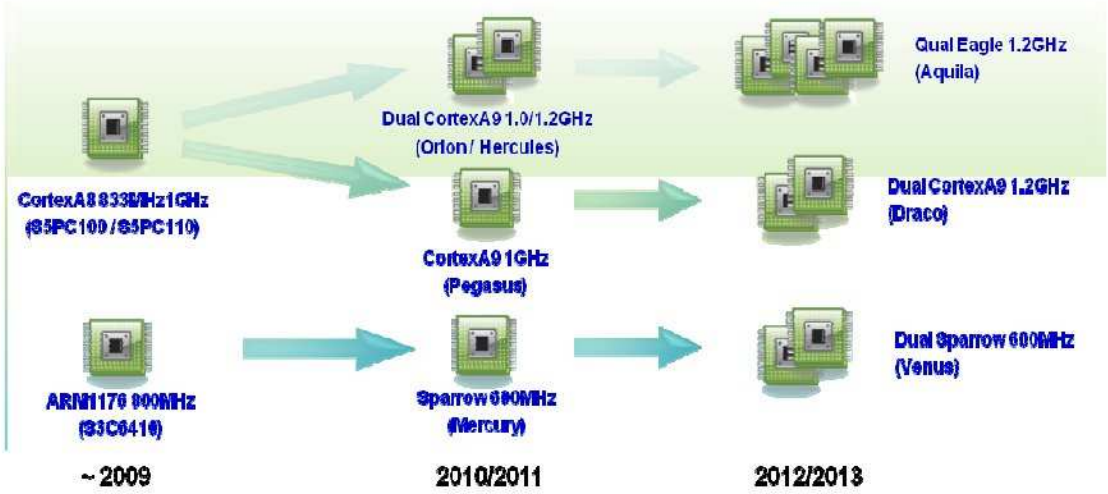
Cost effective & complete reference platform

yilan qin06587082SSS-SLSI MKT Group 20091117085747

High Performance PC on your hand

Samsung Confidential

PC-like experience with your mobile devices with Samsung



What Samsung can offer

Samsung Confidential

Hardware

- Ultra Low power & high performance CPU (>1GHz)
- Outstanding Video/Graphic performance (1080p)
- Netbook Friendly & BOM cost-effective I/F support
  - USB2.0 Host, PATA, DDR2, ADC, HDMI
- Advanced Low Power Scheme (MtCMOS, ABB, DVFS)
- Various synergetic silicon solution offer

Software

- Low cost Linux OS (Ubuntu, Android, Chrome* etc)
- Abundant & cheap applications thru solution partners
- Wireless solution (3G/WiFi) with partners

Business

- Reliable chip supply capacity (IDM)
- Strong customer support
- Time to market solution

Full-browsing platform

All day use ++

ubuntu

User Friendly Solution

Target BOM < $99

* Other names and brands may be claimed as the property of others.

yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PV210

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Cortex product Positioning in Netbook

Samsung Confidential

ARM Netbook of '10

Note PC like net-book

HD Cam. Phone & MID

PC application 2D/3D UI Chrome OS

TAM 5M units

Connected net-book

China Operators

MP3, Divx 2D/3D UI Android Linux

TAM 1M units

V210

Full HD - Multimedia Rich

World 1st Full HD (FS:'09.Q4)

- Cortex A8 800Mhz/1Ghz
- Full HD 1080P MFC (DviX)
- HDMI 1.3
- Improved 3D (40M triangles/s, 2000Mpixels/s)
- 45nm
- MP3 Play: 70~90 Hour target

C100

HD – 720p Volume zone

Ready to M.P.

- Cortex A8 667/833Mhz
- HD 720P MFC (Dvix)
- HDMI1.2
- HW 3D (10M triangles/s, 167Mpixels/s)
- 65nm
- MP3 Play:50 Hour

S5PV210 Overview

Samsung Confidential

Full Multimedia Coverage

Support of Widest Range of Video Profiles with HD(1080p) level MFC

- World 1st 1080p solution
- You can have a World best multimedia portfolio!

Solution for attractive UI

Support OpenGL ES 2.0 and Open VG 1.1 running on H/W 3D

- You can experience fantastic 3D world!

S5PV210

800 MHz / 1 GHz

Cortex A8

Power Efficiency

MPD and power efficient HW engines

- Low power MP3 & video play
- Adaptable for 3D UI

Power save Technology (AVS/DVFS)

- More room to reduce power

Flexibility

Ease to design what you imagine

- Amazing System Performance
- world best 3D & Multimedia solution
- fully covered Interface

Package for MID/Net-book

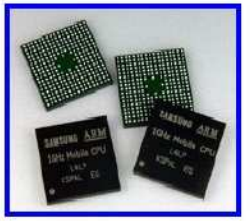
* AVS: Adaptive voltage scaling / DVFS: Dynamic Voltage Frequency scaling

yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PV210 Value points

Samsung Confidential

Benefits to customers – PC in your hand !!



1) 1GHz CPU + 512KB L2 Cache + 200MHz Bus

Capacity to realize web browsing speed as fast as X86 !!

- Reaction speed will be also improved !
- C110 fits cloud computing atmosphere

2) 3D performance up to 40M tri/sec + 2G pixel fill rate

C110 has capacity of high quality 3D game and special 3D UI

- Mobile games in smart phone become more and more qualified
- Smart phone will have 3D obstacle like Avatar for UI

3) Encode and Decode 1080p + support full profiles

Realize home theater in your mobile devices !

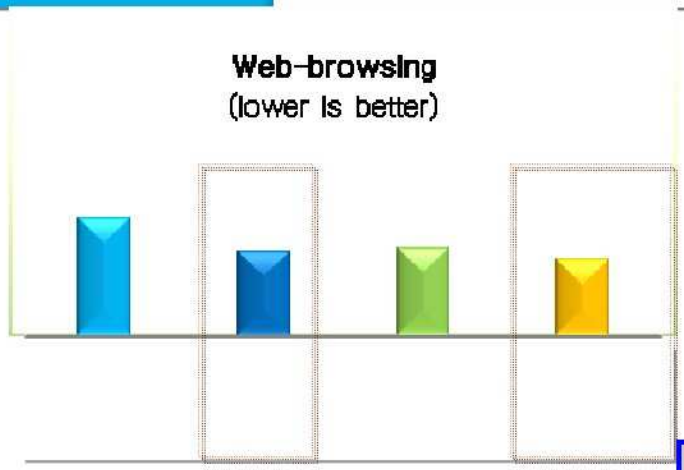
- Deliver 1080p video through HDMI1.3 to TV without sacrifice quality
- Beneficiary : High end smart phone, Net-book & Full HD Camcorder

yilan qin06587082SSS-SLSI MKT Group 20091117085747

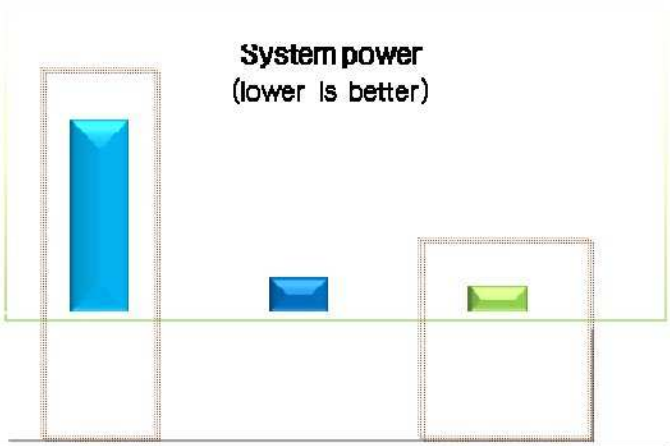
Why does V210 fit Netbook?

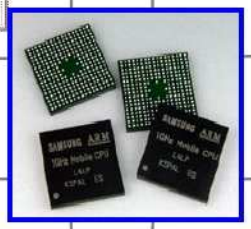
Samsung Confidential

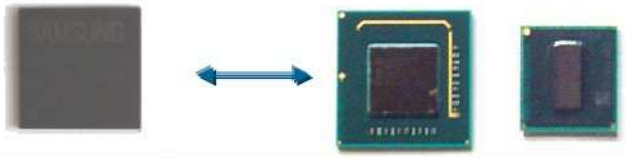
Performance



Power







Beyond imagination: Fun

Samsung Confidential

Console level games with Mobile Phone

Plenty of SW & Game titles (Open GL ES, Open VG support)

S5PC110 3D Performance versus Game Machine

	PSP	S5PC110	PS2
Geometry	35M tri/s	20M tri/s	75M tri/s
Fill Rate	667M pix/s	1,000M pix/s	2,400M pix/s

S5PC110 3D Performance

FutureMark Benchmark
(Samurai scene)

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Beyond imagination: Entertainment Center

Samsung Confidential

S5PV210 – Powering your Mobile Entertainment Center

Widest range of 1080p Codec Profiles for instant play

H.264 (bp,mp,hp), MPEG4 (sp, asp), VC1 (sp, mp,ap), DivX (v4, v5), etc.

High performance SoC for Multiple Functions

Internet TV, Video Conferencing, Multi-Tasking, etc.

1GHz Mobile CPU

Hi-Fi Surround Sound

3 Channel I2S, SPDIF, 5.1 Channel Surround, SRS, etc

High Resolution Display output through HDMI 1.3

Deepest color using the latest HDMI standard

Dual display

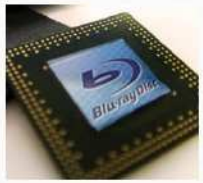
* Other names and brands may be claimed as the property of others.

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Advanced Low Power Technologies

Samsung Confidential

All day use ++
More flexibility for sleek design by slim battery



Hardware MFC & Audio DSP

- 1080p Multi Format Codec for S5PV210
- Optimized Cache / SRAM for LP Audio

Multi power domain

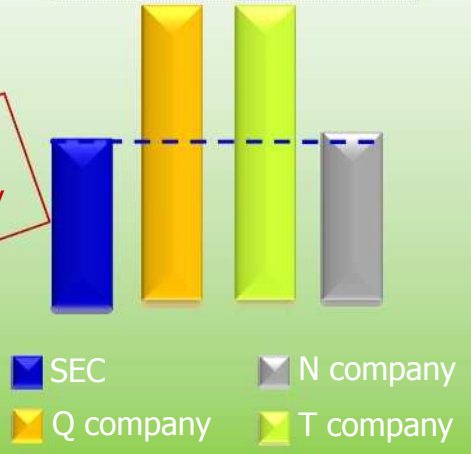
- Isolated power domain & bus architecture
- Dynamic power on/off scheme

Low power process

- 45nm Low power process
- Appropriated LVT/RVT/HVT portion
- Fastest movement in process

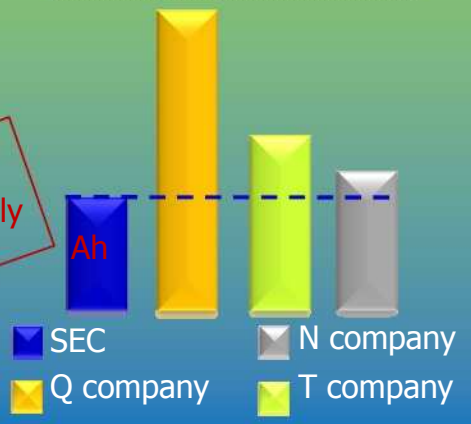
720p Video Power

7hrs Overplay only Video@1 400mAh



MP3 Audio power

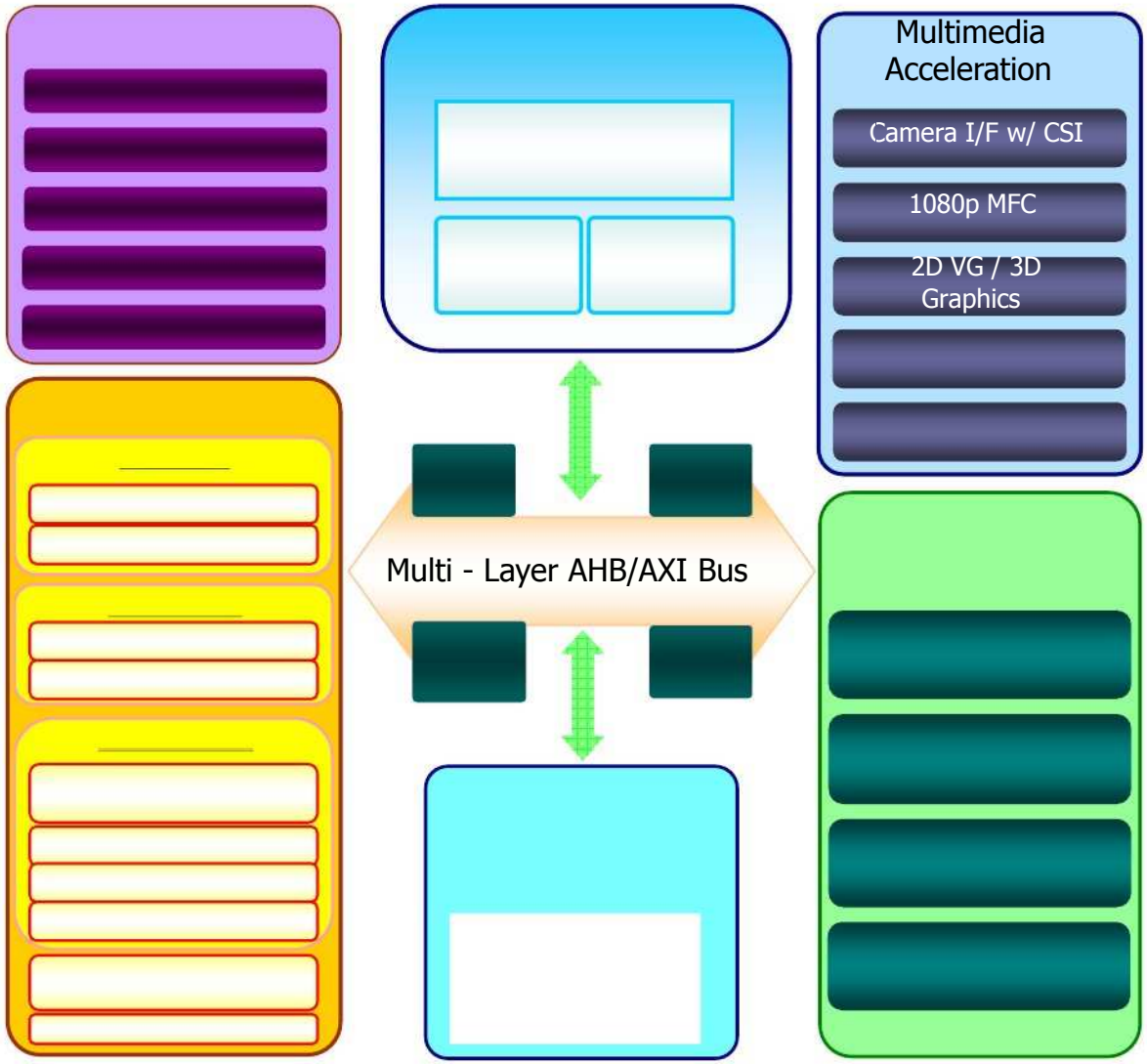
0hrs Over play only Audio@1 400mAh



yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PV210 Block Diagram

Samsung Confidential



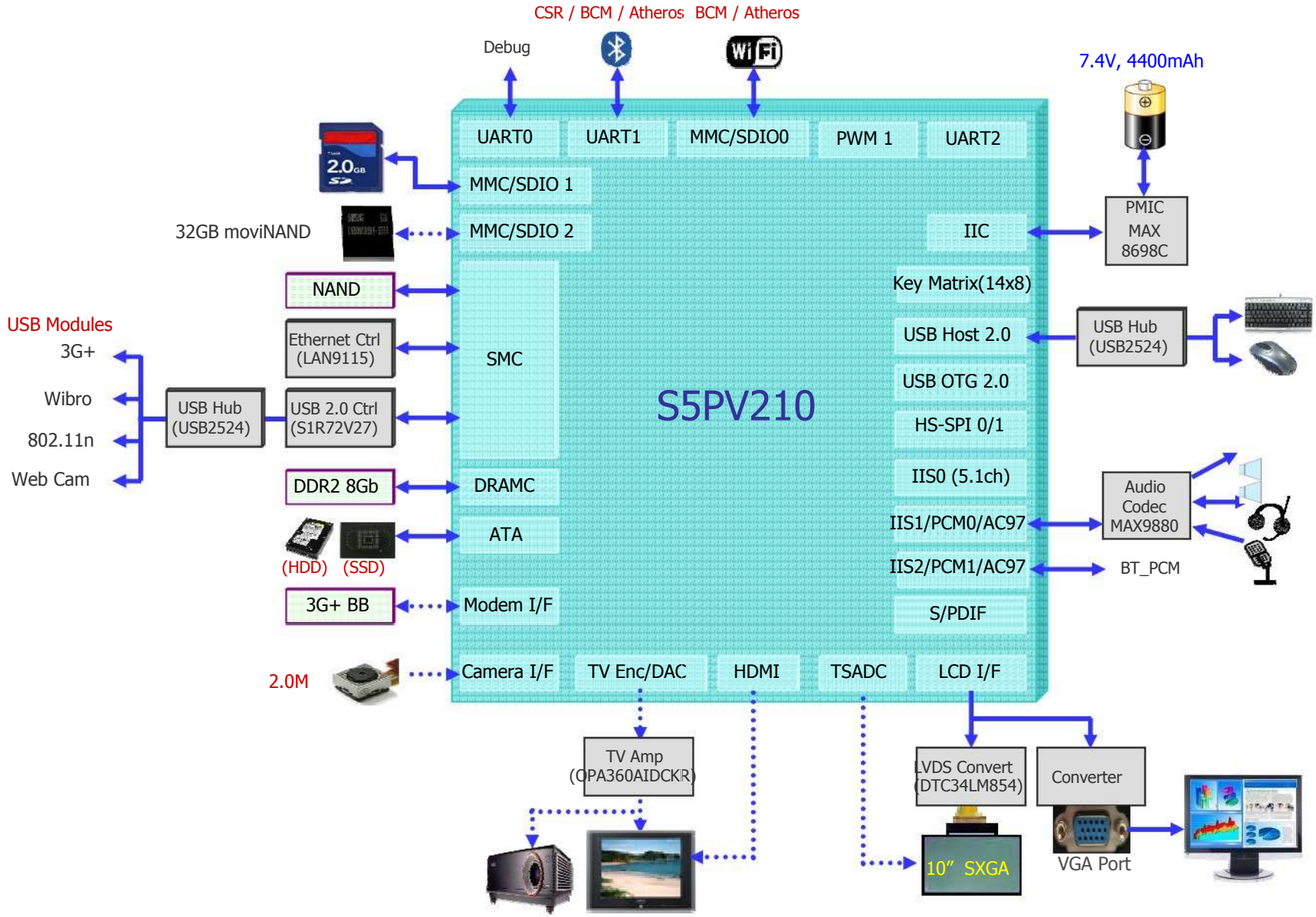
"Multimedia Experience beyond Imagination"

- Cortex A8
- 800MHz / 1GHz
- Advanced Low leakage Process
  (45nm Low Power – power gating)
- 1080p MFC (Multi Format Codec) 30fps
  - H.264 codec (BP/MP/HP)
  - MPEG-4 codec (SP/ASP)
  - H.263 codec (P3 / MPEG-4 ERT)
  - MPEG2 decode (MP)
  - Divx / Xvid decode,
  - VC-1 decode
  - (Simple/Main/Advanced profile)
- Hard wired 3D acceleration
  - OpenGL ES 1.1/2.0, FSAA/MSAA
  - 20M tri/sec,1000MPixel/s shaded fill
- Support 16-bit ECC for MLC NAND

FS on Jan '10

S5PV210 Reference Platform (Example)

Samsung Confidential



yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PC100

yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PC100 Value Proposition for Highend Device

Samsung Confidential

Full Multimedia Coverage

Support of Widest Range of Video Profiles with HD(720p) level MFC

It can provide PMP-like multimedia solution

Solution for attractive UI

Support OpenGL ES 2.0 runs on H/W 3D

It has been proven in real handset !

You can experience the real 3D world.

S5PC100

667/833 MHz

Cortex A8

Power Efficiency

MPD and power efficient HW engines

Low power MP3 & video play

Adaptable for 3D UI

Power save Technology (AVS/DVFS)

More room to reduce power

Cost Efficiency

Supporting PoP and Dedicated PMIC

Reducing Foot Print

Integrated components can help you save the System BOM

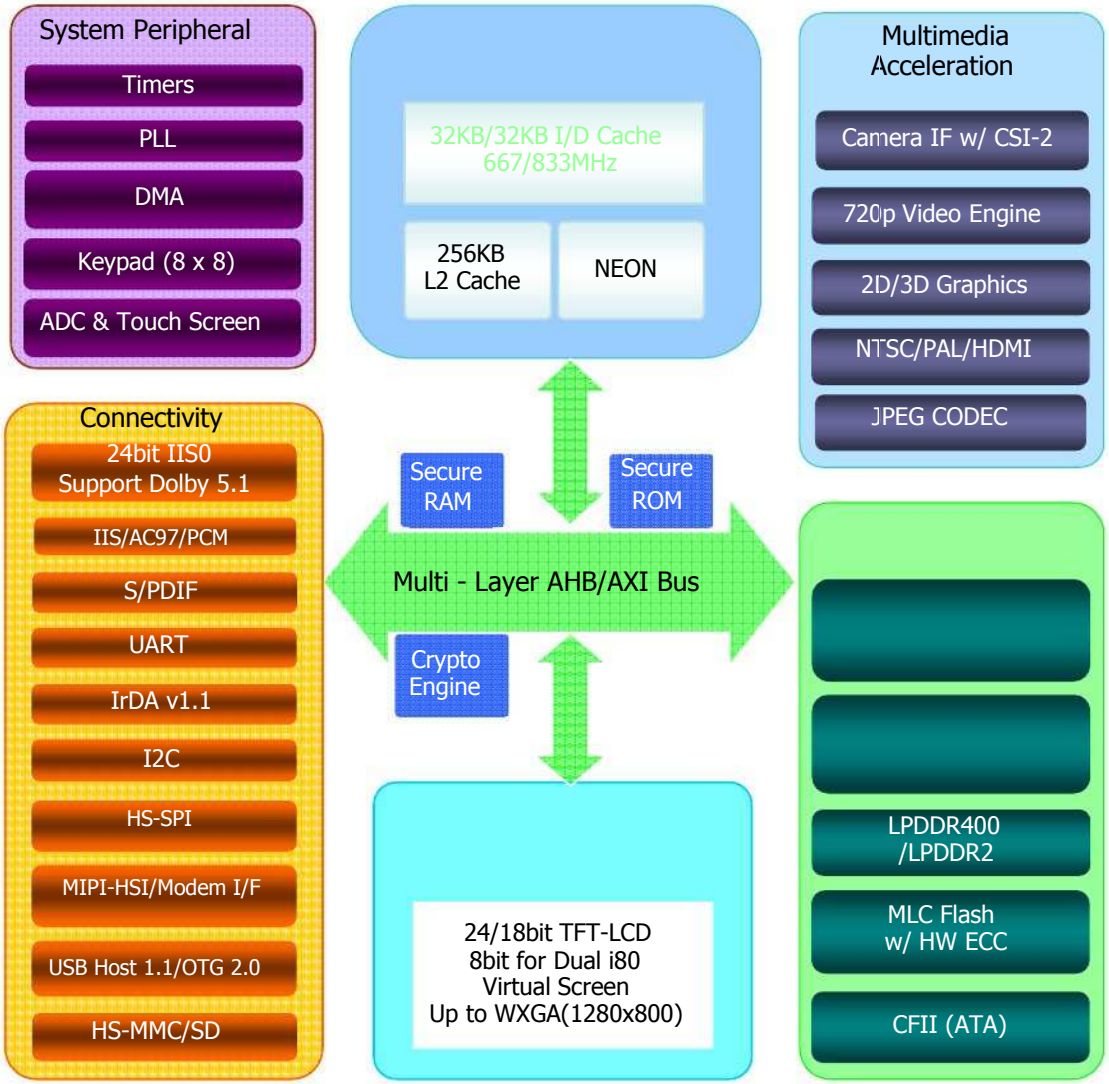
TV Enc, HDMI, USB, TS-ADC, DPSRAM

* MPD: Multiple Power Domain / AVS : Adaptive voltage scaling / DVFS : Dynamic Voltage Frequency scaling

yilan qin06587082SSS-SLSI MKT Group 20091117085747

S5PC100 Block Diagram

Samsung Confidential



"Real Multimedia Convergence"

- Cortex A8
- 667/833MHz
- Advanced Low leakage Process
  (65nm Low Power – power gating)
- 720p MFC (Multi Format Codec) 30fps
  - H.264 codec (BP/MP/HP)
  - MPEG-4 codec (SP/ASP)
  - H.263 codec (P3 / MPEG-4 ERT)
  - MPEG2 decode (MP)
  - Divx / Xvid decode,
  - VC-1 decode (Simple/Main/Advanced profile)
- Hard wired 3D acceleration
  - OpenGL ES 1.1/2.0, FSAA
  - 10M tri/sec, 167MPixel/s shaded fill
- Support 8 bit ECC for MLC NAND

Sample available

yilan qin06587082SSS-SLSI MKT Group 20091117085747

C100 Performance

Samsung Confidential

Multimedia

	Description
HD level MFC	•MPEG4 ASP / H.264 HP codec : 720p 30fps •H.263 Profile 3 : CIF 30fps •VC-1 (Advanced) / MPEG2 ASP / DivX (up to 6.1) decoder : 720p 30fps
JPEG Engine	•66Mpixels/s encoding/decoding
LCD	to WXGA (1280x800)
TV out	TV-out 1.2(w/ PHY)+ S/PDIF

3D Graphic Engine

	Description
3D Performance	•Geometry Performance - 33M polygons / s (peak) •Fill Rates - 167Mpixels/s shaded fill
2D Engine	•Bitblt & rotation •166Mpixels/s operation

Support HD MFC for high quality video play

C100 3D - enough to cover 3D UI of phone/MID

names and brands may be claimed as the property of others.

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Solution

yilan qin06587082SSS-SLSI MKT Group 20091117085747

System LSI Netbook Solution Readiness

Samsung Confidential

SW Readiness

OS

Application

Partnership & Benefits

Connectivity

Reference Solution

Complete and Cost effective Netbook solution~!

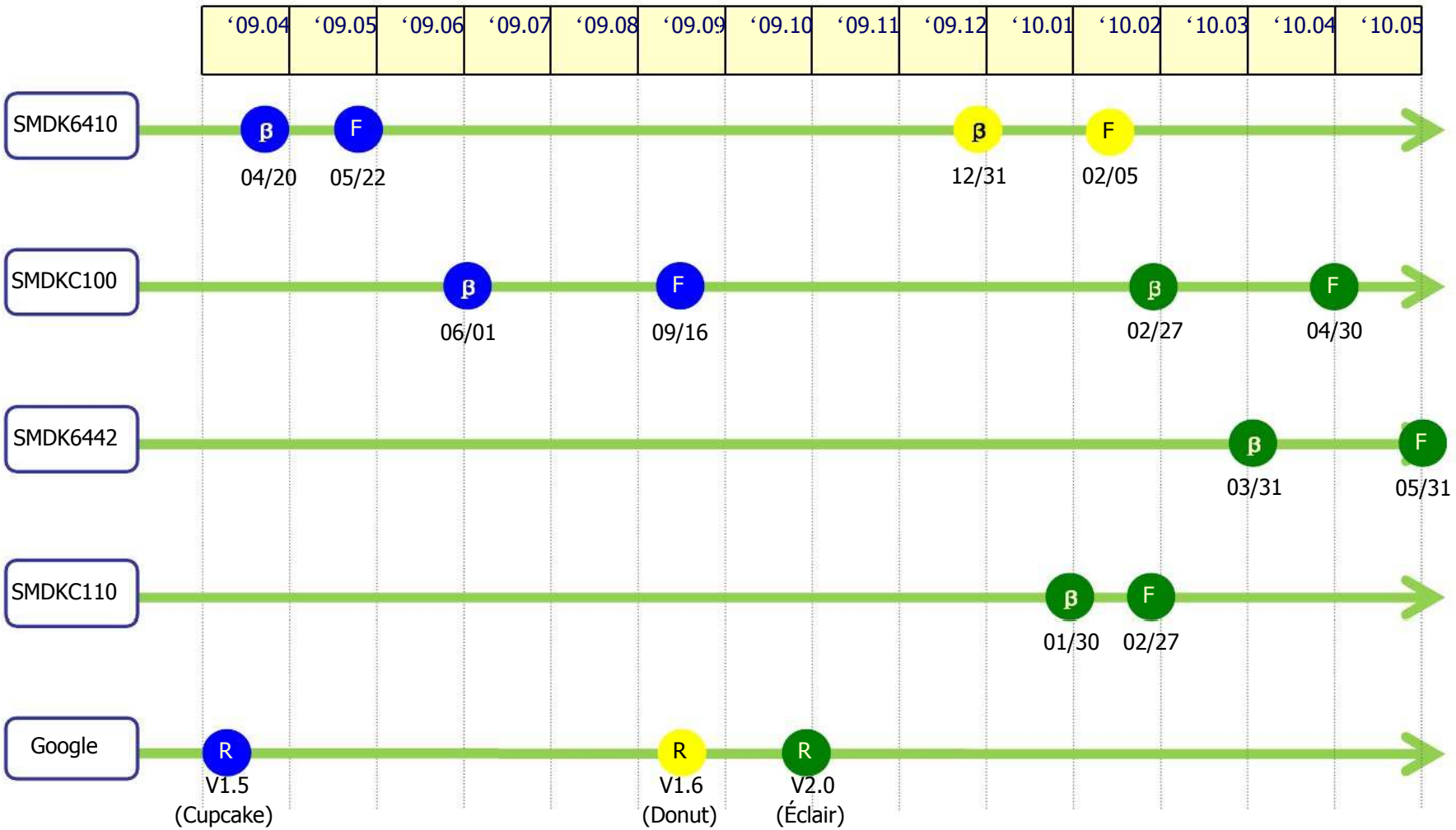
* Other names and brands may be claimed as the property of others.

All plans, features and dates are preliminary and subject to change without notice

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Android BSP Release Plan

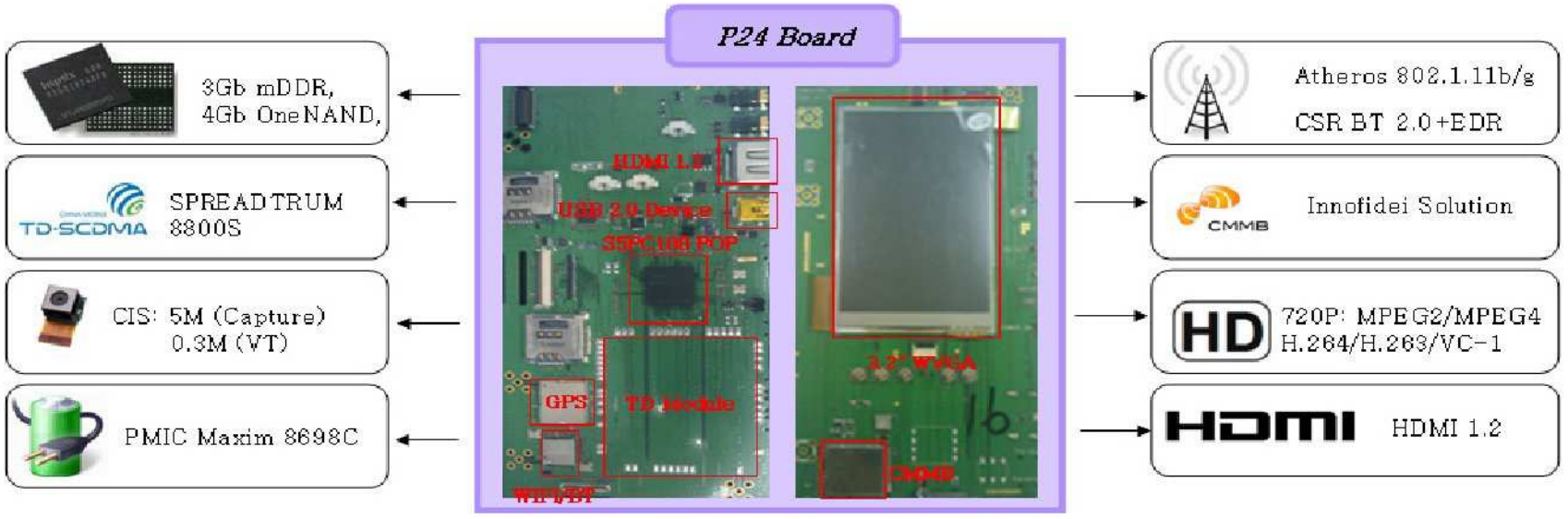
Samsung Confidential

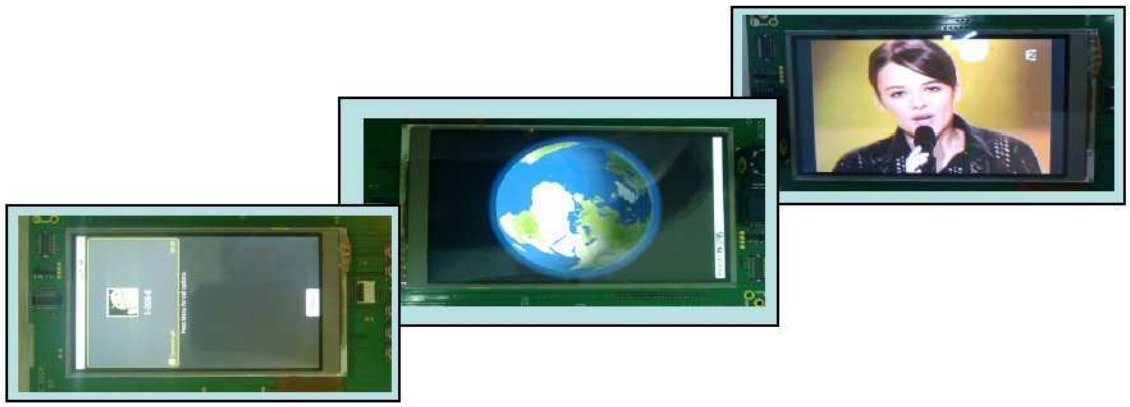


yilan qin06587082SSS-SLSI MKT Group 20091117085747

SSCR Android Reference Platform – C100

Samsung Confidential





* SSCR: Samsung Semiconductor China R&D Center

yilan qin06587082SSS-SLSI MKT Group 20091117085747

Thank You

yilan qin06587082SSS-SLSI MKT Group 20091117085747