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Implementing Profitable Growth

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Wireline Access

Infineon technologies

Never stop thinking.

Disclaimer

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Agenda

Access Semiconductor Market Segmentation

Environment

Infineon's Performance in the Access Segment in 2004

DSL/VoIP Strategy

Summary

Agenda

Access Semiconductor Market Segmentation
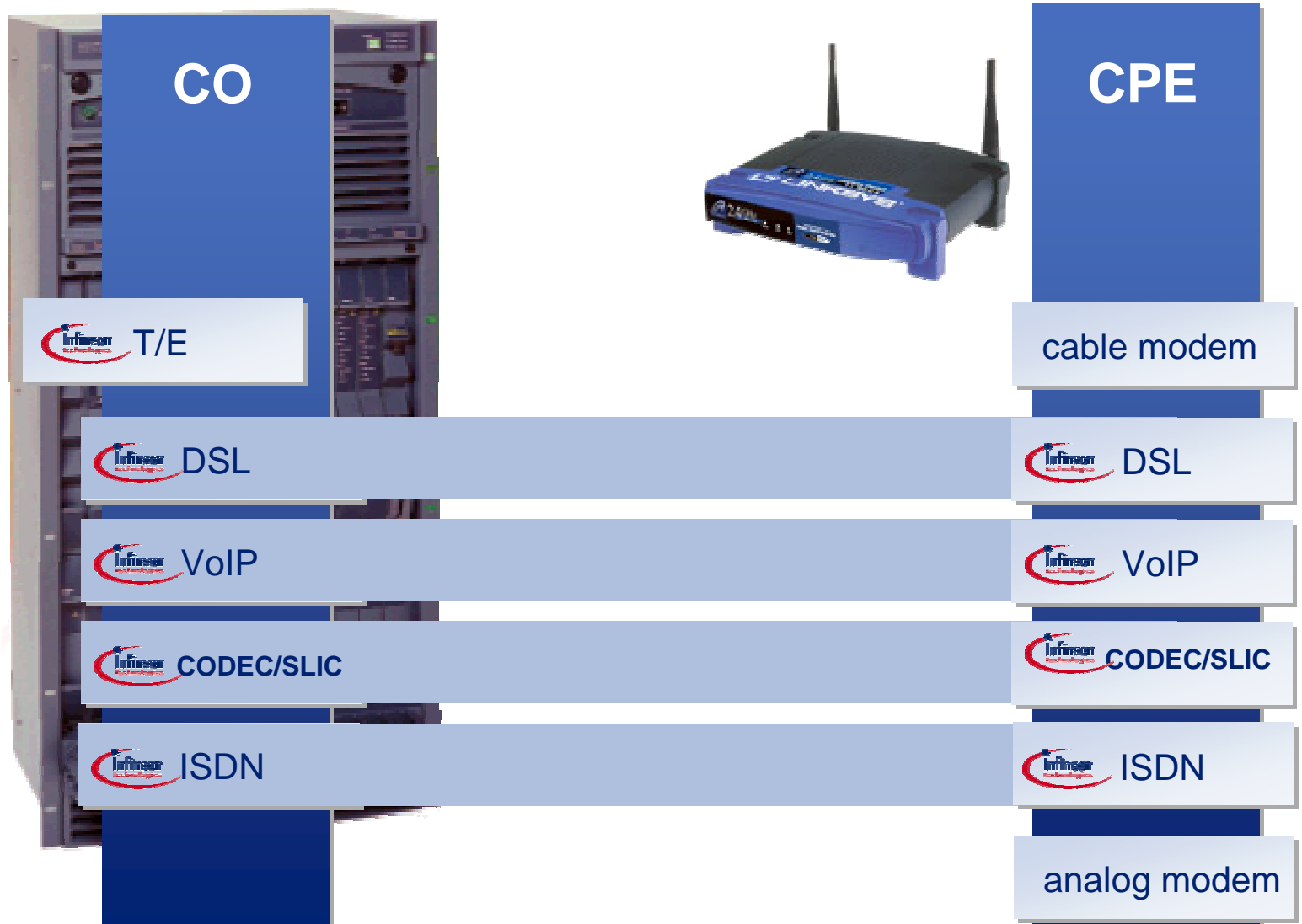
Environment

Infineon's Performance in the Access Segment in 2004

DSL/VoIP Strategy

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Access semiconductor market segmentation

CO

CPE

CO	CPE
T/E	cable modem
DSL	DSL
VoIP	VoIP
CODEC/SLIC	CODEC/SLIC
ISDN	ISDN
	analog modem

Never stop thinking

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Summary

Environment today

Significant growth,
extremely competitive

VoIP

DSL

DSL

POTS/ISDN

CO

Network

Growth driven from
3G infrastructure
deployment

T1/E1

3G base station

T1/E1

2G base
station

IP PBX

T1/E1 or
SHDSL

PBX

T1/E1 or
SHDSL

Replacement,
positive surprise ARCOR

Migration
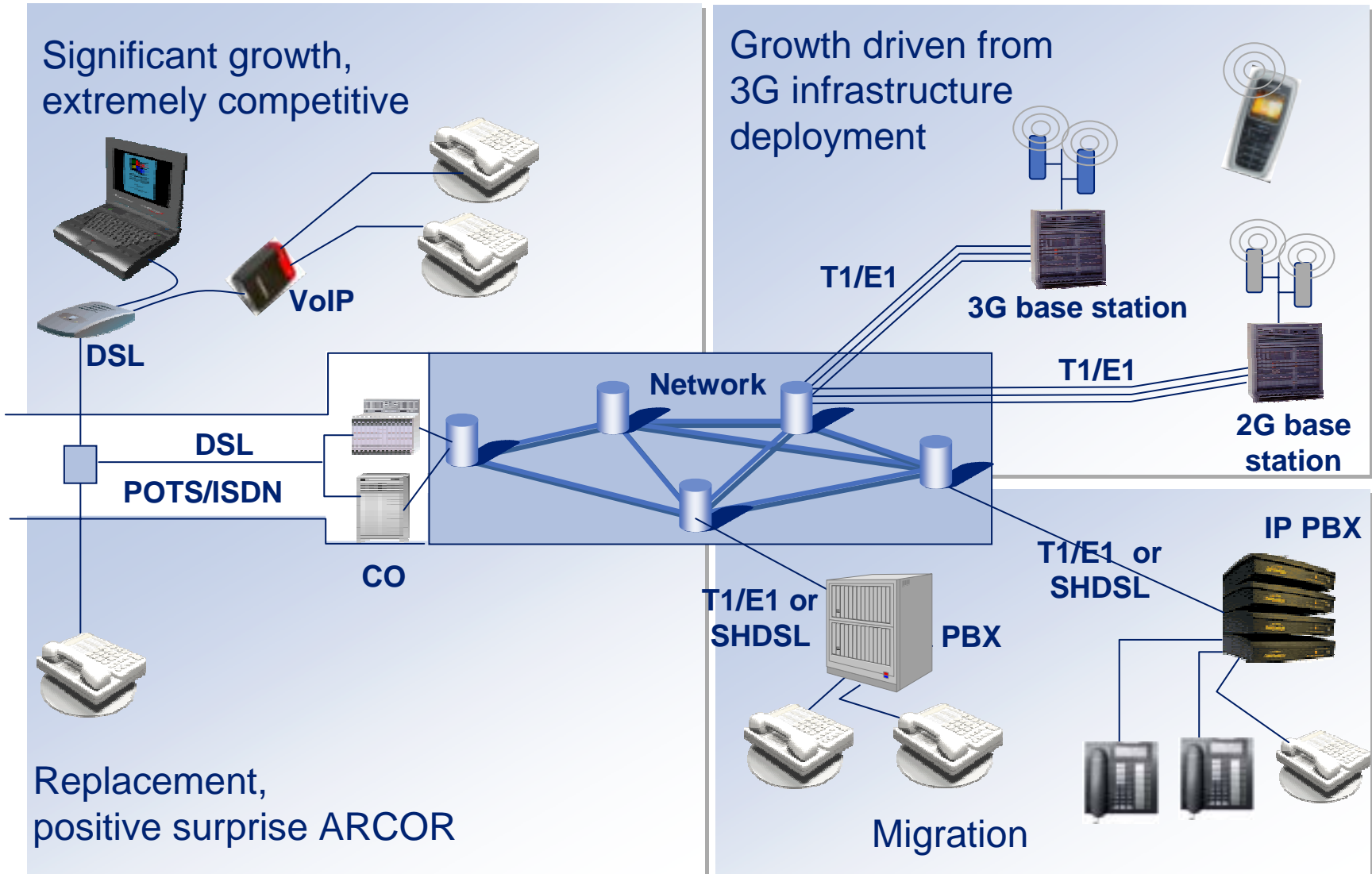
Environment – mid-term
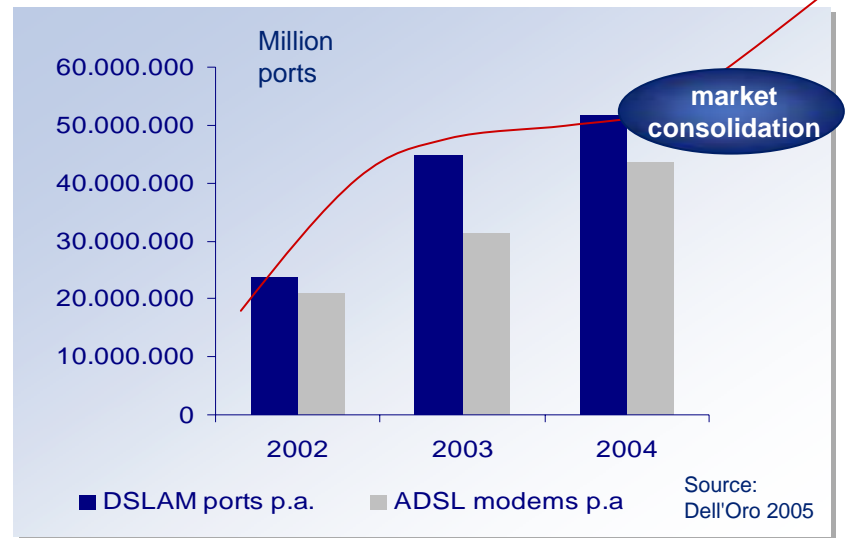
NEW services

Next to come:

- VoIP is growing fast due to cheap telephony (non-PC driven)

- New video services are attracting a broad audience

Microsoft's IPTV

Network Replacement

- Major carriers are starting to REPLACE their existing network with a new, DSL+IP-based infrastructure, e.g. to save operating expenses

21st Century Network

Million ports

market consolidation

- 60.000.000
- 50.000.000
- 40.000.000
- 30.000.000
- 20.000.000
- 10.000.000
- 0

2002   2003   2004

■ DSLAM ports p.a.   ■ ADSL modems p.a

Source: Dell'Oro 2005

**DSL, Consolidation is progressing
Projection for 2008: 2-3 players left**

comments on market share	2002	2005
Competitor A	dominating	weak
Competitor B	strong	left the market
Competitor C	entering	left the market
Competitor D	strong	loosing
Competitor E	strong	loosing
Competitor F	strong	left the market
Competitor G	entering	loosing
Competitor H	entering	winning
IFX	entering	winning

IFX' success factors:

1) Broadest port folio in the industry
2) Unique features: IVD, ultra low power, …
3) Strong execution
4) System development/support
5) Early with new standard
6) End-to-End solution

**IFX' Track Record
in the Access market**

ISDN (not ranked)	
1995	2005
Competitor A	left the market
Competitor B	left the market
Competitor C	left the market
Competitor D	left the market
Competitor E	left the market
IFX	IFX

CODEC/SLIC (not ranked)	
1995	2005
Competitor A	left the market
Competitor B	left the market
Competitor C	left the market
Competitor D	left the market
Competitor E	Competitor **G**
Competitor F	Competitor F
IFX	IFX

T1/E1 (not ranked)	
1995	2005
Competitor A	left the market
Competitor B	left the market
Competitor C	left the market
Competitor D	left the market
Competitor E	Competitor **G**
Competitor F	Competitor F
IFX	IFX

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Access Semiconductor Market Segmentation

Environment

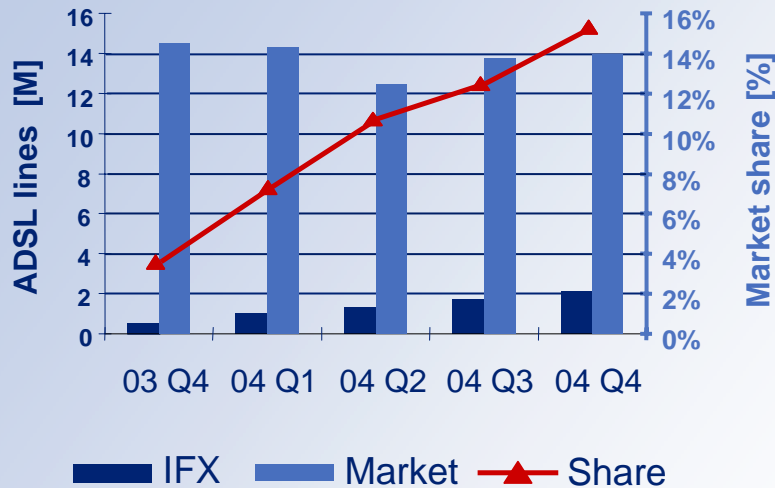**Infineon's Performance in the Access Segment in 2004**

DSL/VoIP Strategy

Summary

Competitive environment access semiconductors, recent development

DSL

CO – significant share increase in 2004

Legend: IFX | Market | Share

Source: Dell'Oro 2005, IFX 2005

CPE – successful market entrance for ADSL2+ deployments

End-to-end strategy

T/E growth in CY 2003

IFX: 29.7%; market: 5.4%,
Source: Gartner 07/2004

2004: Enjoyed growth due 3G infrastructure builds

CODEC/SLIC growth in CY 2003
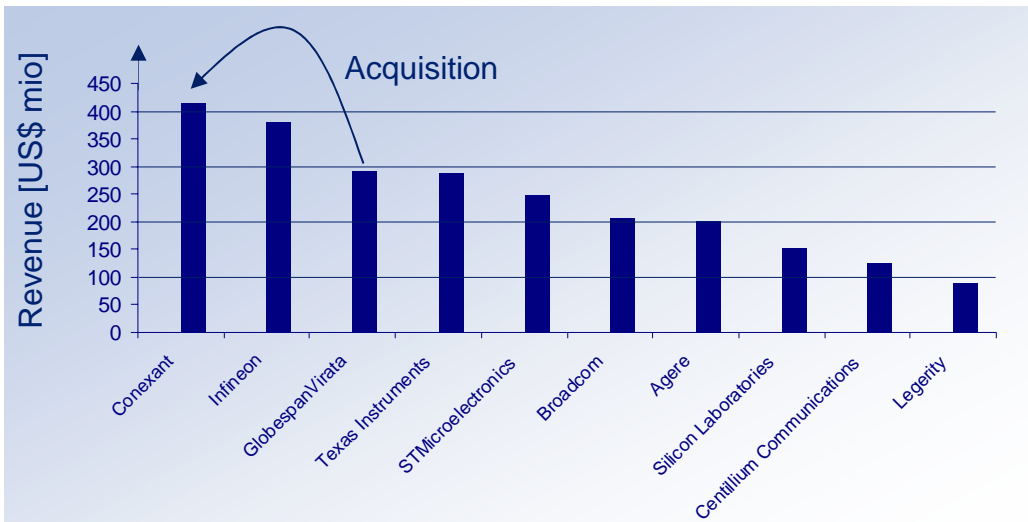
IFX: 33.7%; market: -9.2%,
Source: Gartner 07/2004

2004: Overcompensated declining analog line card with VoIP

ISDN growth in CY 2003

IFX: 35%; market: 9.8%,
Source: iSuppli 10/2004

2004: Positive surprise Arcor

Competitive environment access semiconductors, recent development


Acquisition

Revenue [US$ mio]

450, 400, 350, 300, 250, 200, 150, 100, 50, 0

Conexant, Infineon, GlobespanVirata, Texas Instruments, STMicroelectronics, Broadcom, Agere, Silicon Laboratories, Centillium Communications, Legerity

Access Semiconductor Market 2003, Source: Gartner 07/2004

Access market =

DSL+ VoIP
+ cable modem
+ analog/fax modem
+ T/E + Codec/Slic + rest

In 2003
Conexent N1 – large analog modem business

Revenue [US$ mio]

300, 250, 200, 150, 100, 50, 0

Q1/04, Q2/04, Q3/04, Q4/04
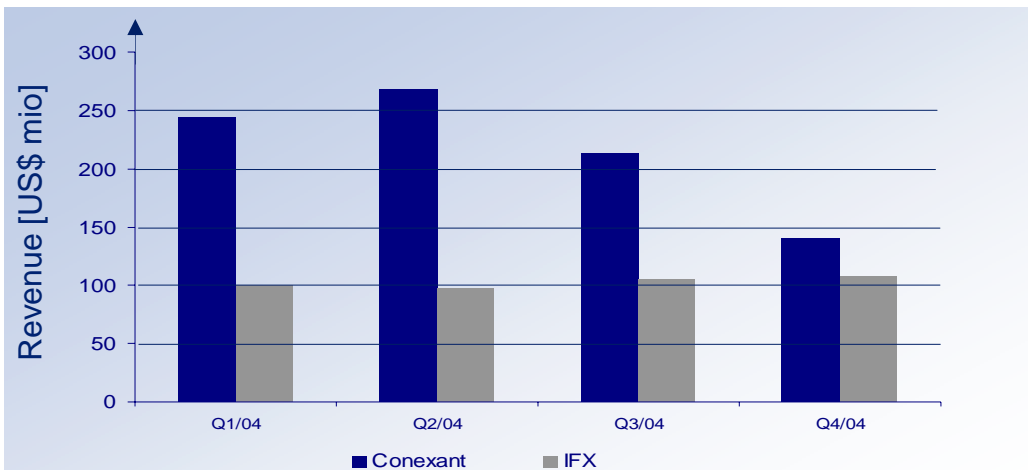
■ Conexant ■ IFX

Total Conexant versus IFX access, 2004, Source: IFX, public information

Conexant =

Conexant
+ GSPN
+ Intersil
+ Virata

Conexant's revenue here includes access, WLAN, video compression, etc.

Agenda

Access Semiconductor Market Segmentation

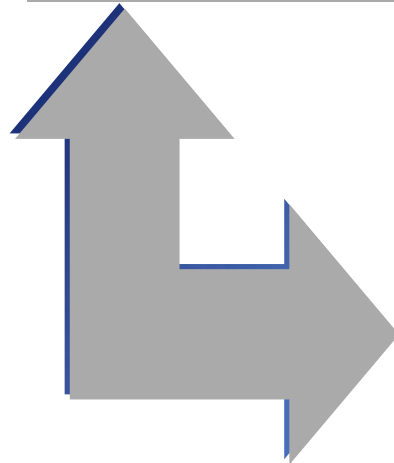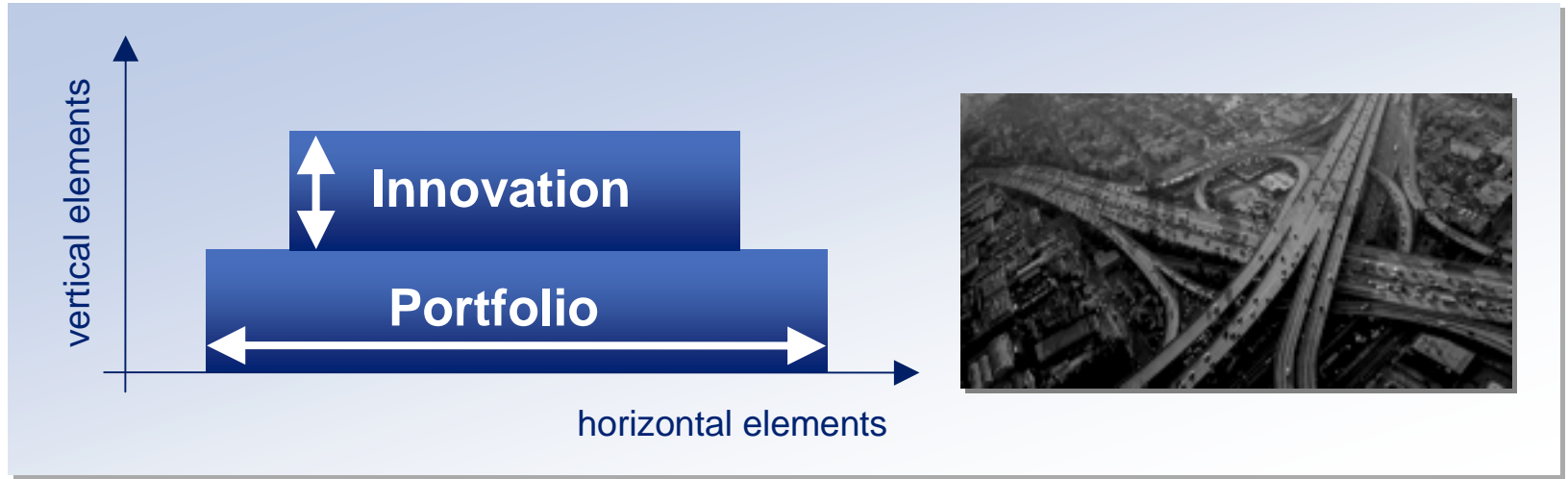**Environment**

Infineon's Performance in the Access Segment in 2004
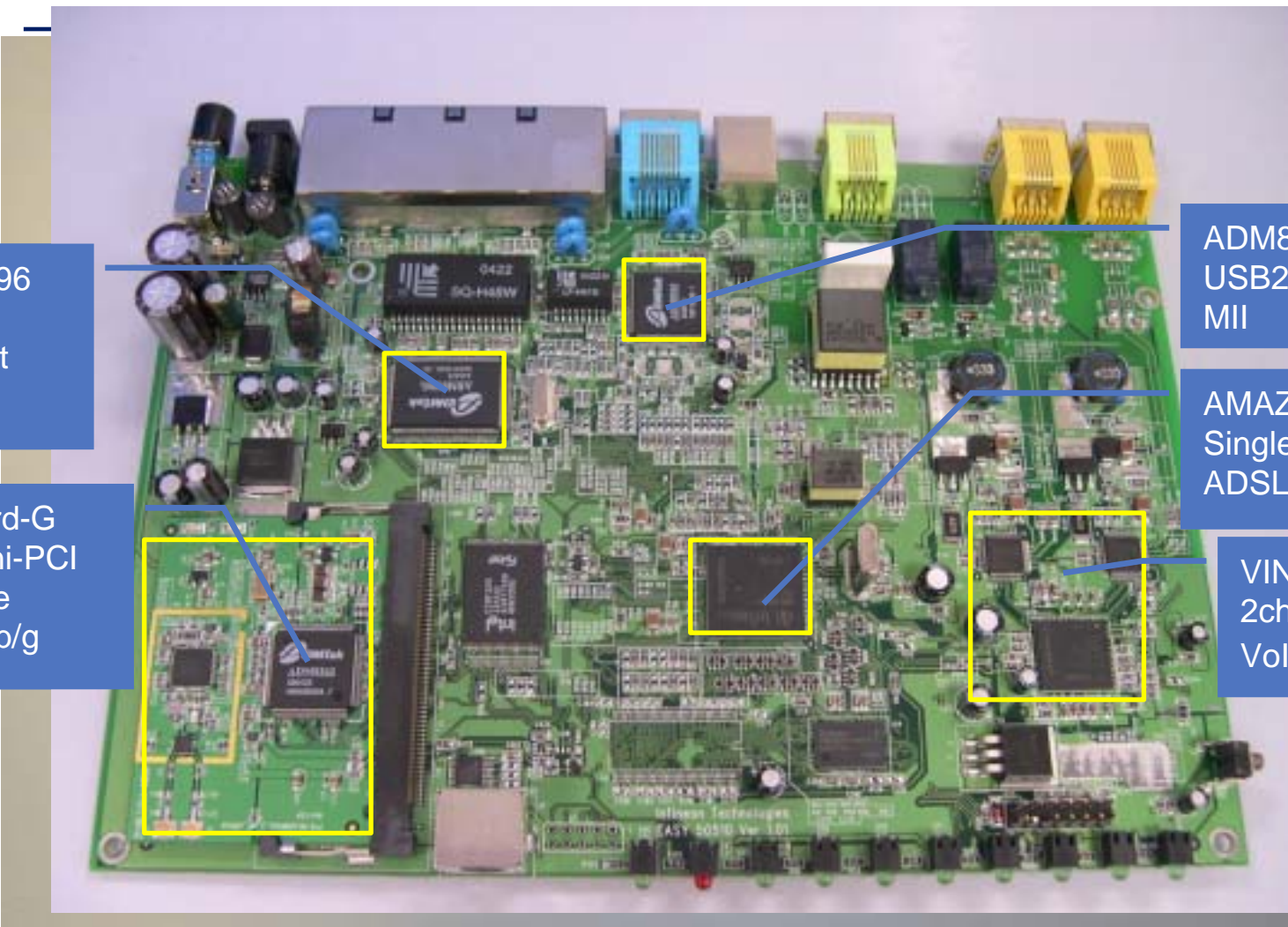
DSL/VoIP Strategy

Summary

DSL and VoIP strategy

Implementing profitable growth
The most complete product portfolio in the industry

ADM6996
5-ports
Ethernet
Switch

WildCard-G
with Mini-PCI
interface
802.11 b/g

ADM8515
USB2.0 to
MII

AMAZON
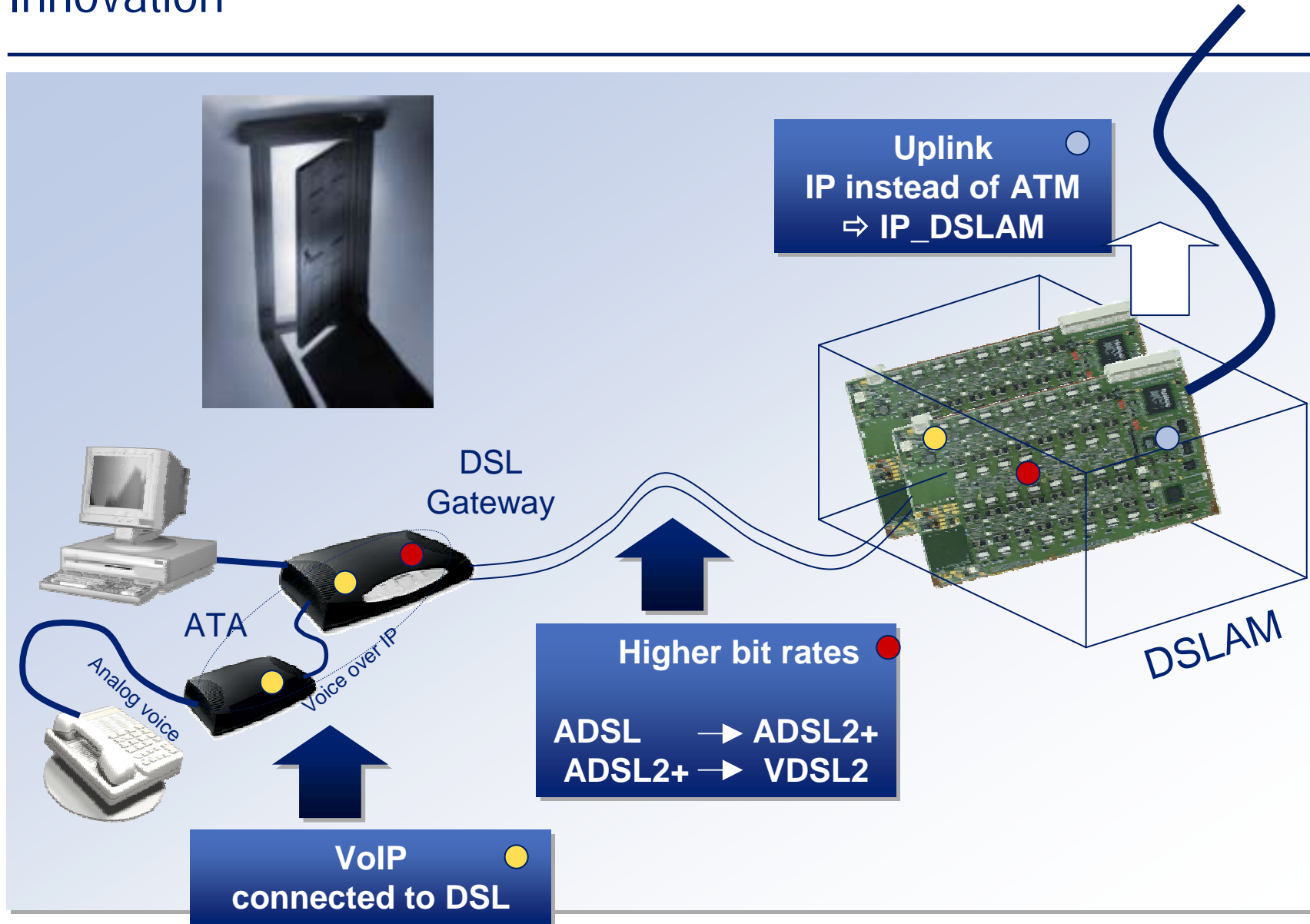Single Chip
ADSL2+

VINETIC
2channel
VoIP

wirel. DSL/VoIP Gateway

DSL and VoIP strategy
Innovation

Uplink
IP instead of ATM
⇨ IP_DSLAM

DSL
Gateway

ATA

Analog voice

Voice over IP

Higher bit rates

ADSL → ADSL2+
ADSL2+ → VDSL2

DSLAM

VoIP
connected to DSL

ADSL ⇨ ADSL2 ⇨ ADSL2+

features

spectral shaping

L2 low power
mode flexible
framing seamless
rate adaptation
pilot tone selection
short initialization
:

ADSL2+

ADSL2

ADSL

backwards
compatibility

bandwidth
bit rate

1.1 MHz
up to 12 Mbit/s DS

2.2 MHz
up to 24 Mbit/s DS

ADSL

ADSL2+

1998
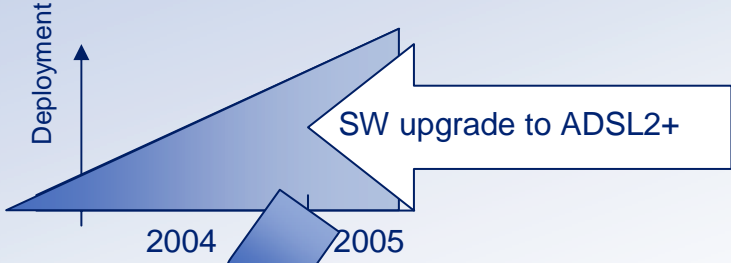
2005
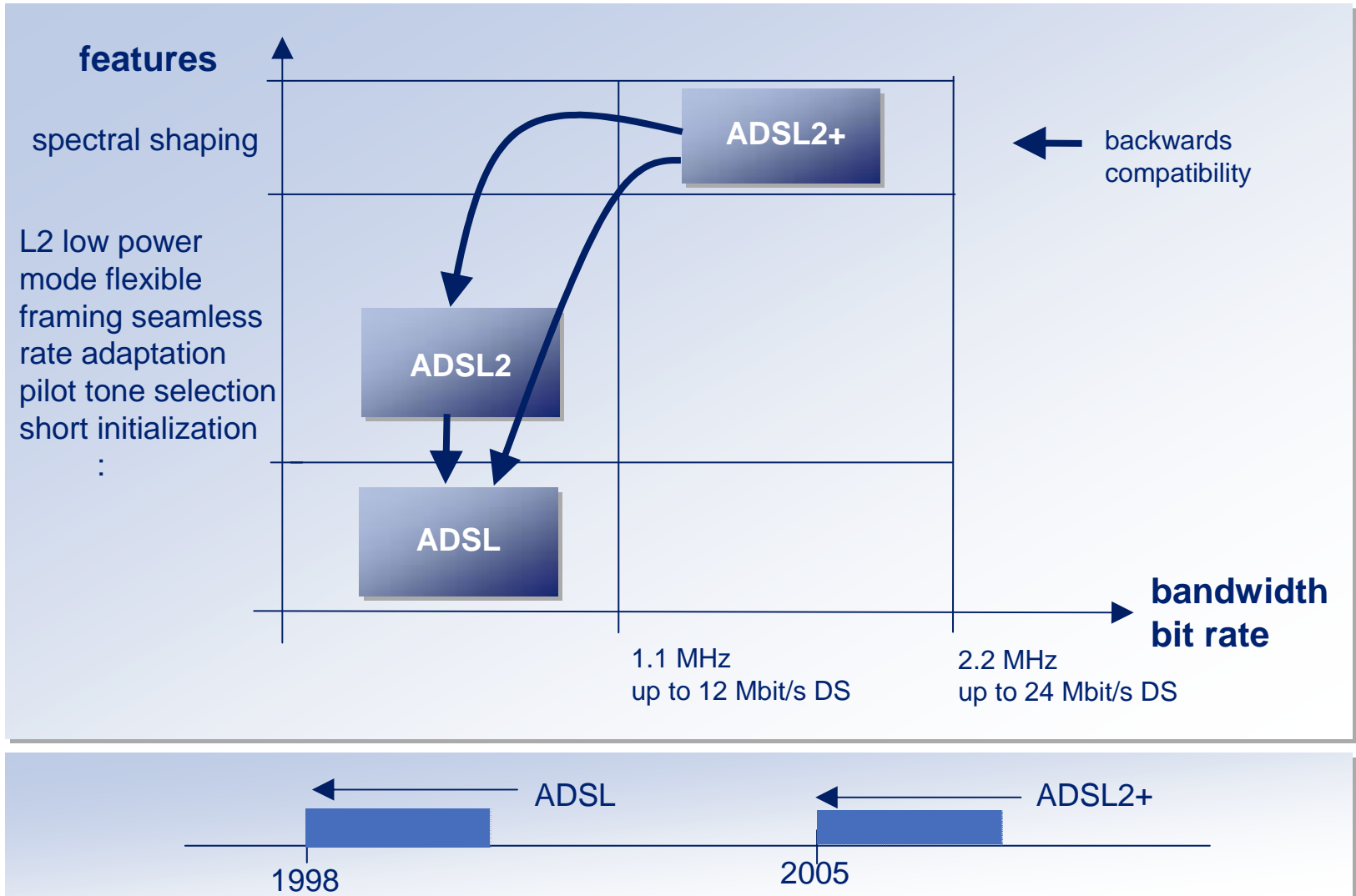
Implementing profitable growth
ADSL2+ installed base, end-to-end solution

CO

ADSL2+ CO Platform, GEMINAX_MAX

Deploying since Q4 CY03 in large volume

ADSL2+ SW upgrade since Q4 CY04

Deployment

SW upgrade to ADSL2+

2004   2005

GEMINAX chip set

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX A8

GEMINAX_MAX D8

single-chip lowest cost ADSL2+ modem/router

AMAZON

CPE

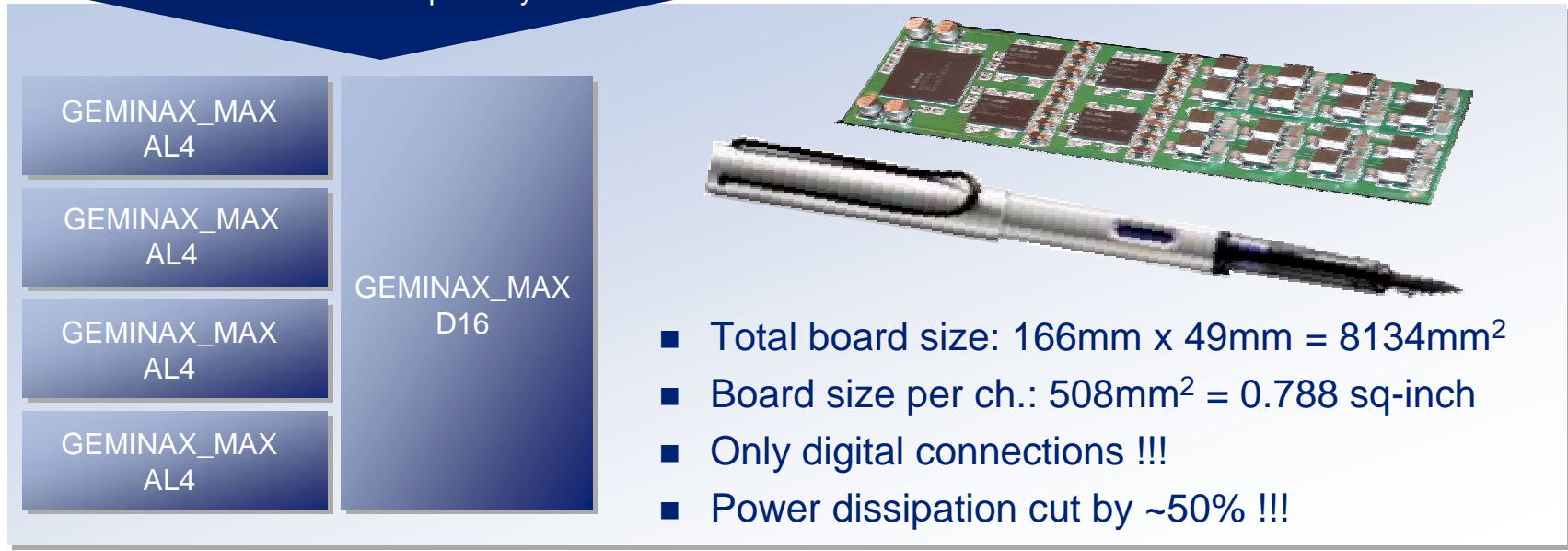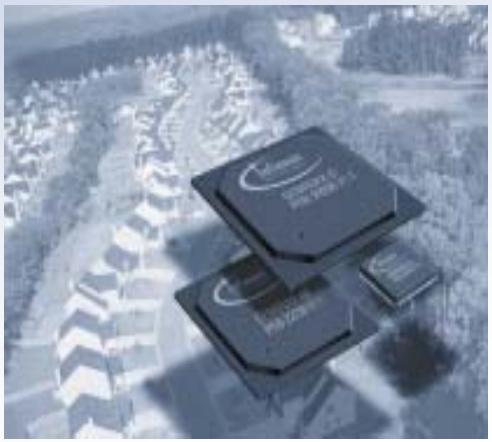### ADSL2+ CPE Platform, Amazon

Deploying since Q4 CY04
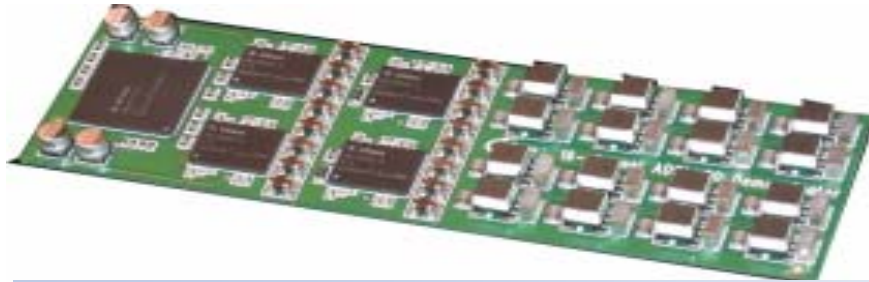
end-to-end solution

AMAZON - GEMINAX_MAX

supports also Annex-B and bonding

Implementing profitable growth
ADSL2+ roadmap – cost reduction

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX L2

GEMINAX_MAX A8

GEMINAX_MAX D8

ADSL2+ Platform
GEMINAX_MAX

Innovation
&
Backwards Compatibility

GEMINAX_MAX AL4

GEMINAX_MAX AL4

GEMINAX_MAX AL4

GEMINAX_MAX AL4

GEMINAX_MAX D16

- Total board size: 166mm x 49mm = 8134mm^2
- Board size per ch.: 508mm^2 = 0.788 sq-inch
- Only digital connections !!!
- Power dissipation cut by ~50% !!!

# Reduction power dissipation saves cost at all levels

Value for our customer (DSLAM manufacturer)

- very high density
  - more ports on the LC
  - more LCs in a shelf
  - e.g. to fulfill W/Volume requirement according to NAPS

- less external components
- cheaper DC/DC converter
- only digital interconnection

- higher yield

- fully SW compatible to existing solutions

Value for the customer of our customer (carrier)

1 KW
550 W
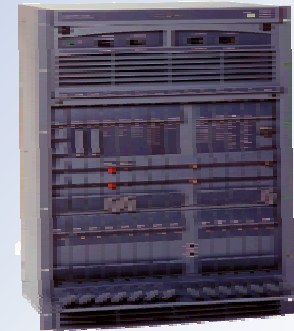
Investment:
- battery buffering
- cooling measures

Operation:
- Cost of power for
  - DSLAM
  - air-condition
- MTBF

Value Creation

The major next innovation step in DSL is VDSL2

VDSL2: the universal and ultimate DSL standard

Short loop: very high data rates
up to 100 Mbit/s symmetric

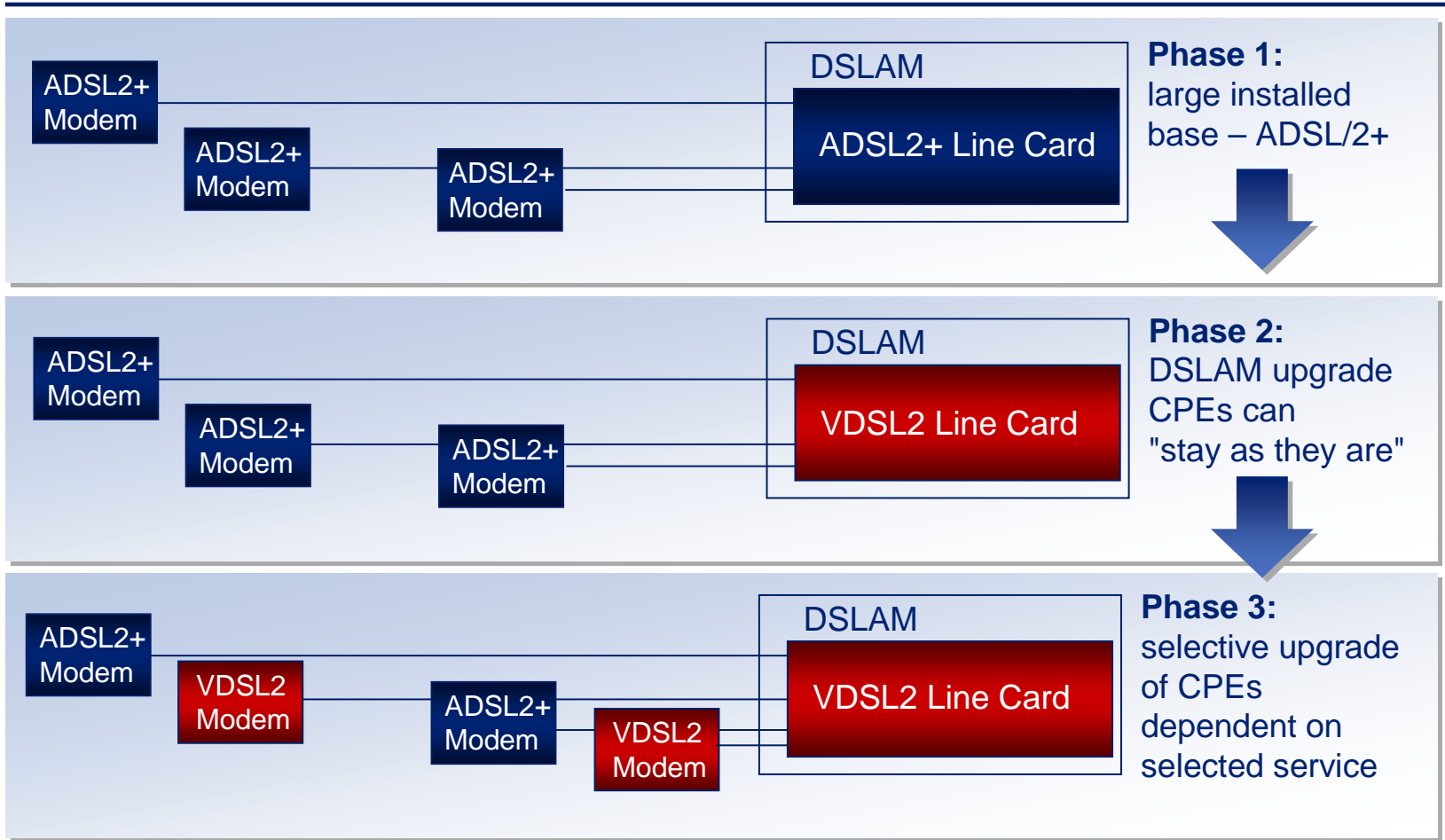Longer loop: "good" data rates
backwards compatible to ADSL2+

IFX is a key contributor to the VDSL2 standard
- closely alignment with major carriers
- more than 50 contributions

Why is ADSL backward compatibility so important?

Phase 1: large installed base – ADSL/2+

Phase 2: DSLAM upgrade CPEs can "stay as they are"

Phase 3: selective upgrade of CPEs dependent on selected service

ADSL2+ backwards compatibility will make VDSL2 deployment scenario much more attractive for the Carriers and will speed up the technology adoption.

Implementing profitable growth
What is needed to become a leader in VDSL2?

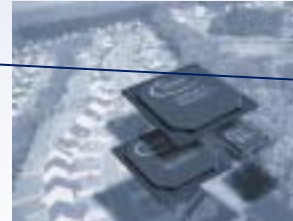- Early availability of standard compliant VDSL2 silicon

- Experience

  - short loops
    3 mio lines deployed in VDSL environment

  - long loops
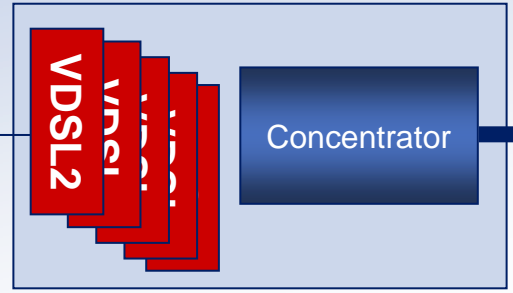   successful ADSL/2+ product family
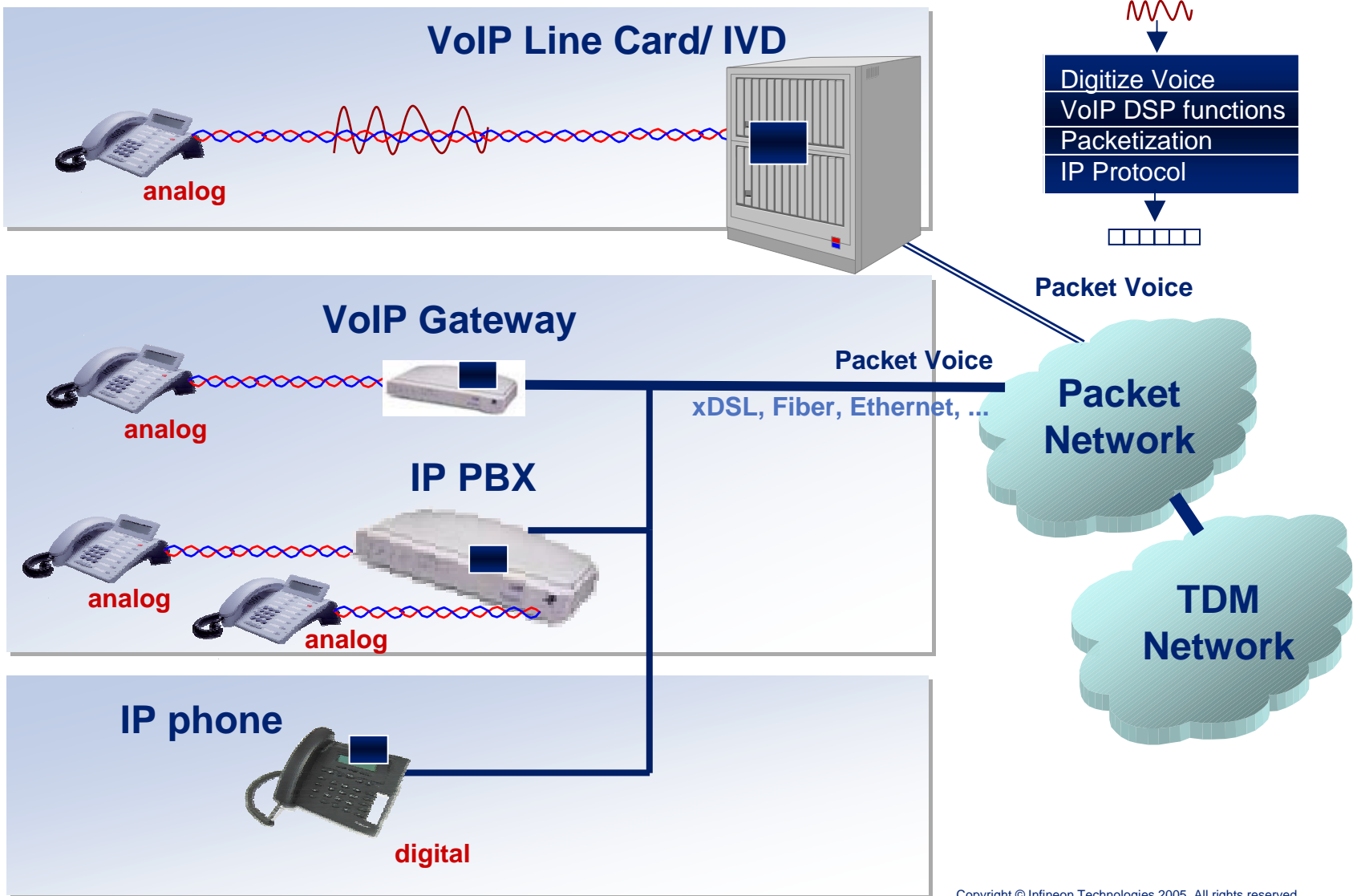
- Complete solution

Gateway

VDSL2 IP_DSLAM

| VoIP | | VDSL2 |
| WLAN | | |

VDSL2 · Concentrator · GbE

The three options for VoIP
How can we address all options efficiently?

VoIP Line Card/ IVD

analog

Digitize Voice
VoIP DSP functions
Packetization
IP Protocol

Packet Voice

VoIP Gateway

analog

Packet Voice

xDSL, Fiber, Ethernet, ...

Packet Network

IP PBX

analog

analog

TDM Network

IP phone

digital

Implementing profitable growth: One chipset family for all VoIP applications ⇨ synergies on all levels

SLIC   SLIC   SLIC   SLIC

VINETIC_S

A/D   Conversion

traditional CODEC functions

INCA_P

VINETIC_VIP

Echo Cancellation
Voice Compression

Jitter Buffer

INCA_IP

5120

TCP/IP

SIP

TDM voice

TDM voice

HW Synergies

SW Synergies

Analog
Line Card

Voice
over
IP

VoIP Router
IP PBX, …

IP_Phone

Voice
over
IP

PBX_Phone
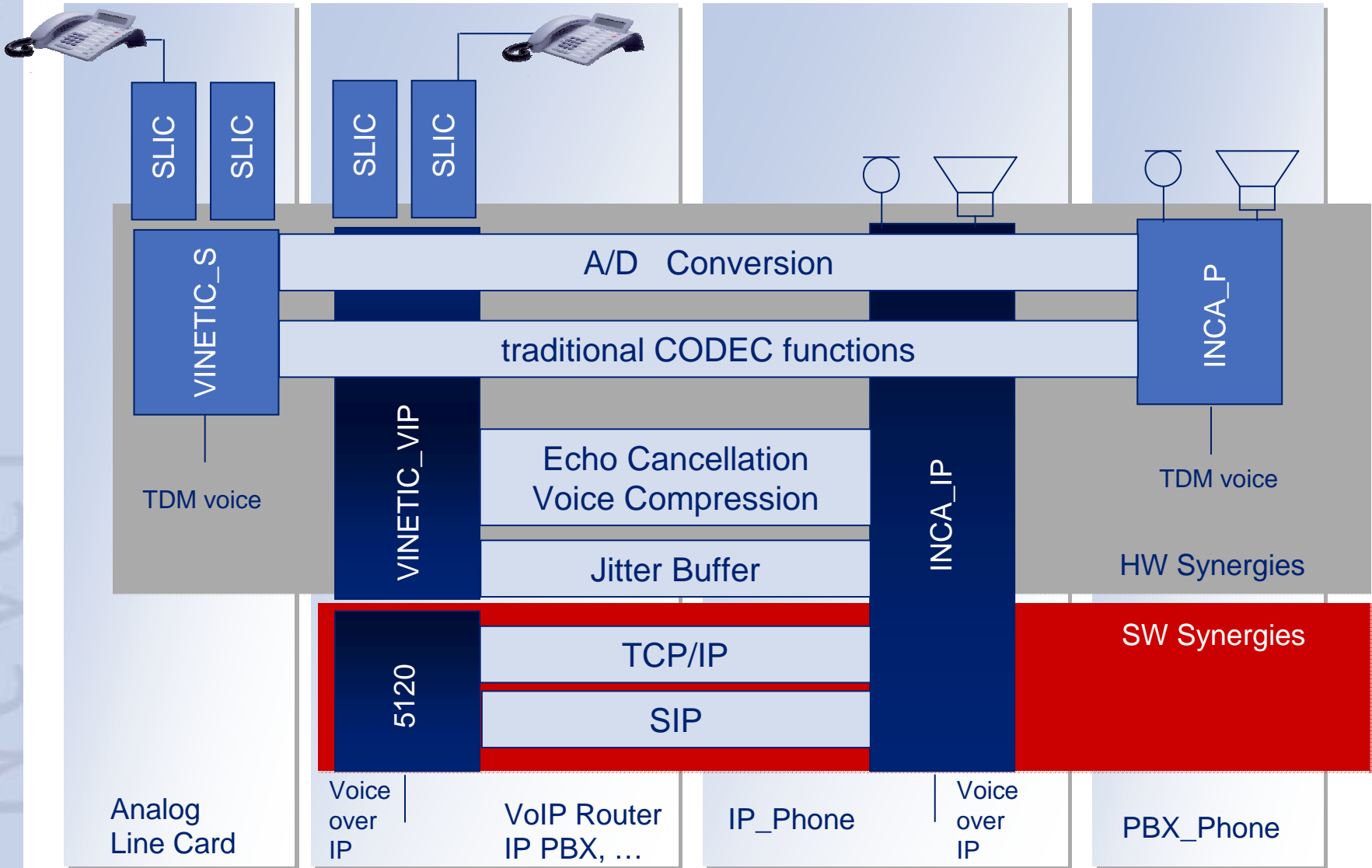
Ready to use reference designs

Wireless VoIP Router

IP Phone
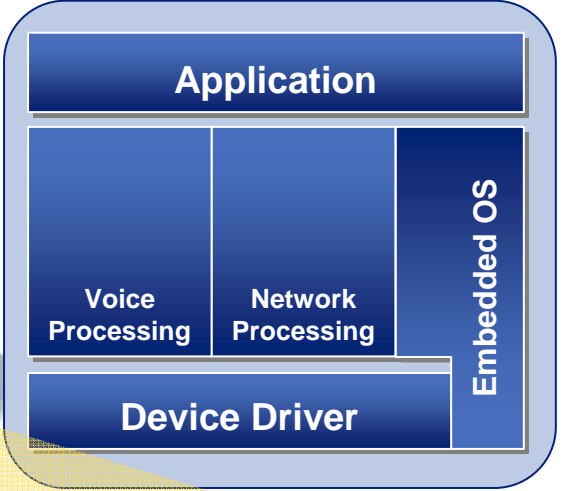
Wire/Wireless ADSL2+ Router

Application		
Voice Processing	**Network Processing**	**Embedded OS**
Device Driver		

Agenda

Access Semiconductor Market Segmentation

Environment

Infineon's Performance in the Access Segment in 2004

DSL/VoIP Strategy

Summary

Summary

Market potential:

Services and voice network replacement
will create significant DSL demand.

Our Strategy:

Complete portfolio
⟷

on Access level
- ■ Contributes to profitability and predictability

for DSL and VoIP
- ■ allows to control the BOM
- ■ allows future integration and cost reduction
- ■ creates value for our customers
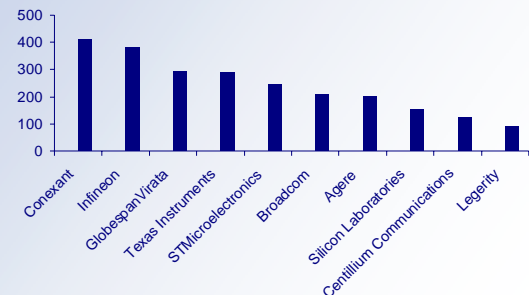- ■ grows market share

↕ Early innovation
- ■ **translates into market share**

Our track record:

Growing market share with
in the last 3 years.

ADSL share increased
significantly.

Successful in several
consolidation rounds.

	500 400 300 200 100 0

Conexant, Infineon, GlobespanVirata, Texas Instruments, STMicroelectronics, Broadcom, Agere, Silicon Laboratories, Centillium Communications, Legerity

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