



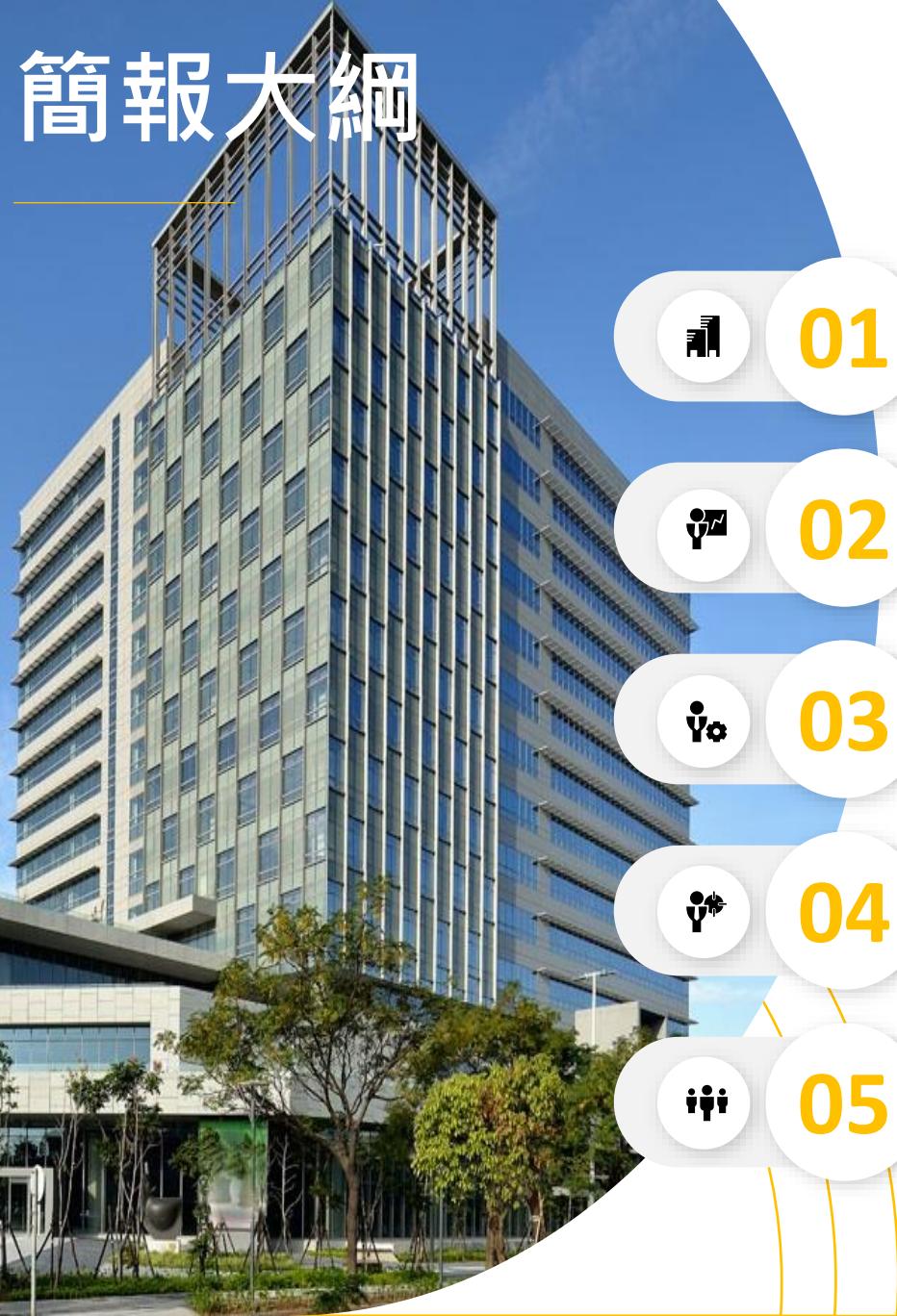
晶心科技股份有限公司

投資安全聲明

除簡報內所提供之歷史信息外，簡報事項係屬預測性陳述，受到風險及不確定性因素影響，可能造成實際結果與陳述內容發生不符，這些不確定性因素包括但不限於：天氣、競爭性產品及其定價的影響、產業及市場對半導體產品之供給及需求移轉、新產品大量量產之能力、技術急遽演進、半導體產業景氣以及整體經濟環境之變化。



簡報大綱



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公司簡介



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營運成果



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產品應用



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新產品及生態系統



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總結



公司簡介

<http://www.andestech.com>





晶心亮點

- 2005年3月設立於台灣新竹科學園區。
- 根基穩健的高科技上市公司。
- 員工人數達300人；80%為工程師。
- 獲得TSMC 2015年新的 IP OIP Award。
- 晉升為RISC-V國際聯盟(前身為RISC-V基金會) 首席會員。(2020)
- 獲得AI Global Media頒發「2020年最傑出嵌入式處理器IP供應商」。
- 向量處理器核心NX27V獲頒「新竹科學園區優良廠商創新產品獎」(2020)
- EE Awards亞洲金選獎 - 「Taiwan 產品獎」, 「Asia 企業獎」(2021)

晶心任務

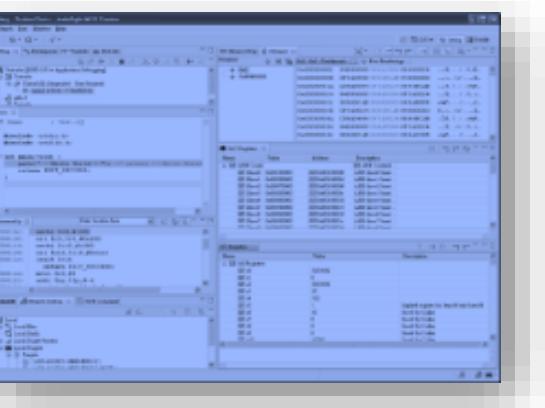
- 創新架構高效能/低功耗嵌入式處理器。

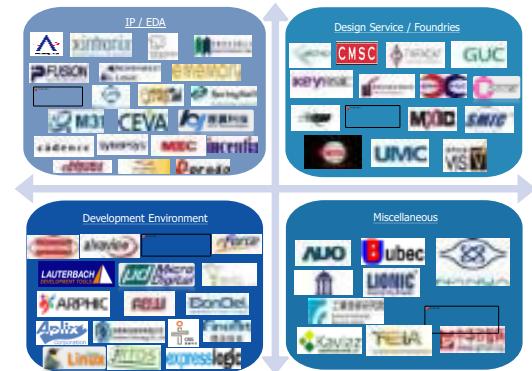
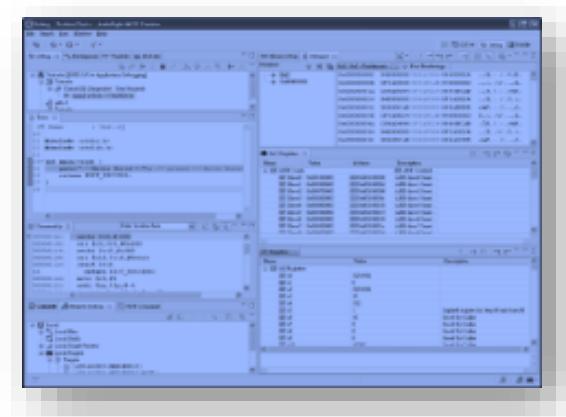
晶心利基

- 智能及環保之電子設備
- 雲端應用,人工智慧及物聯網

ANDES
TECHNOLOGY

重要里程碑

- ❖ **250+** commercial licensees
 - Geographically distributed in Taiwan, China, Korea, Japan, Europe, and USA
 - **600+** license agreements signed
 - ❖ AndeSight™ IDE:
 - **22,000+** installations
 - ❖ Eco-system:
 - **500+** partners
 - ❖ **10B+** Accumulative SoC Shipped



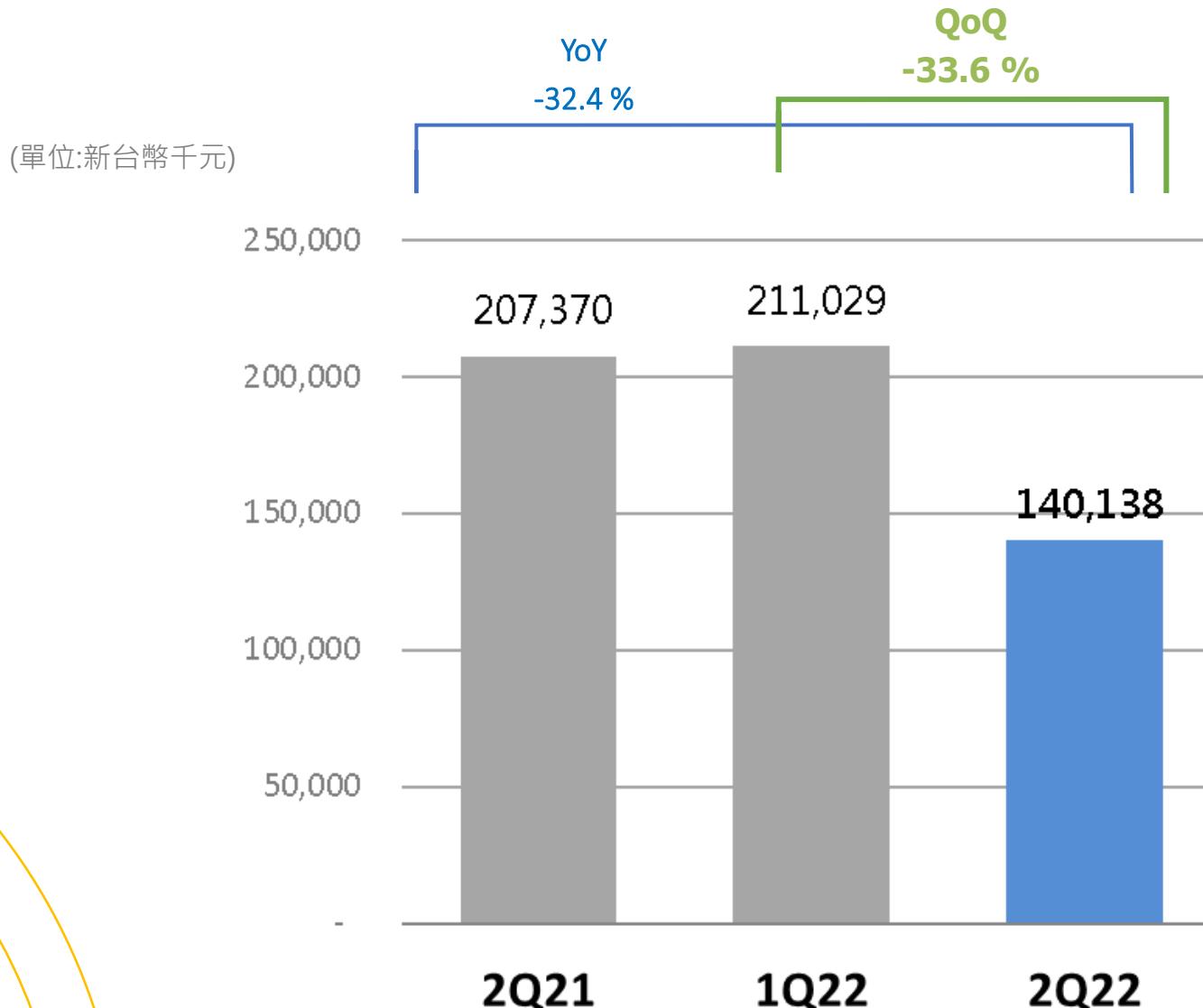


營運成果

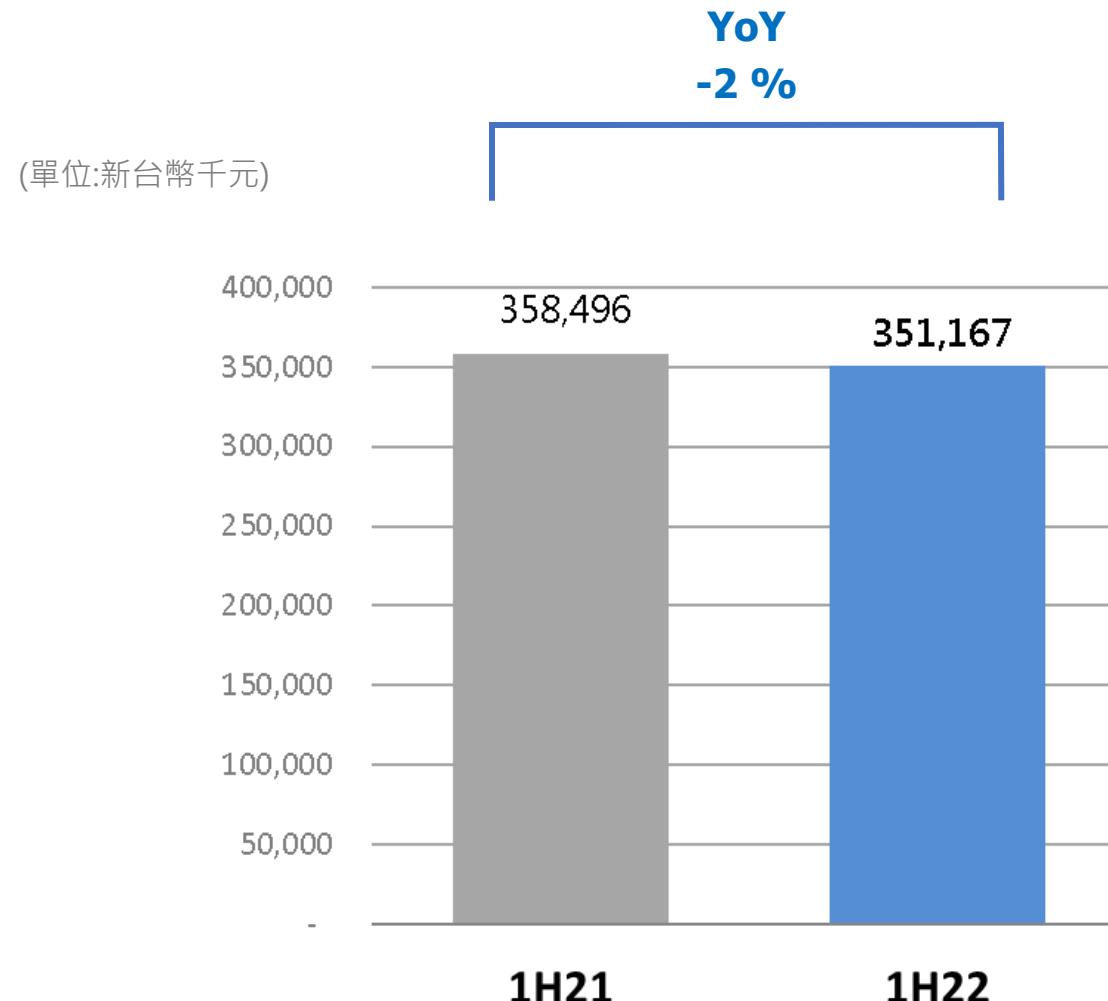
<http://www.andestech.com>



2022年第二季營業收入



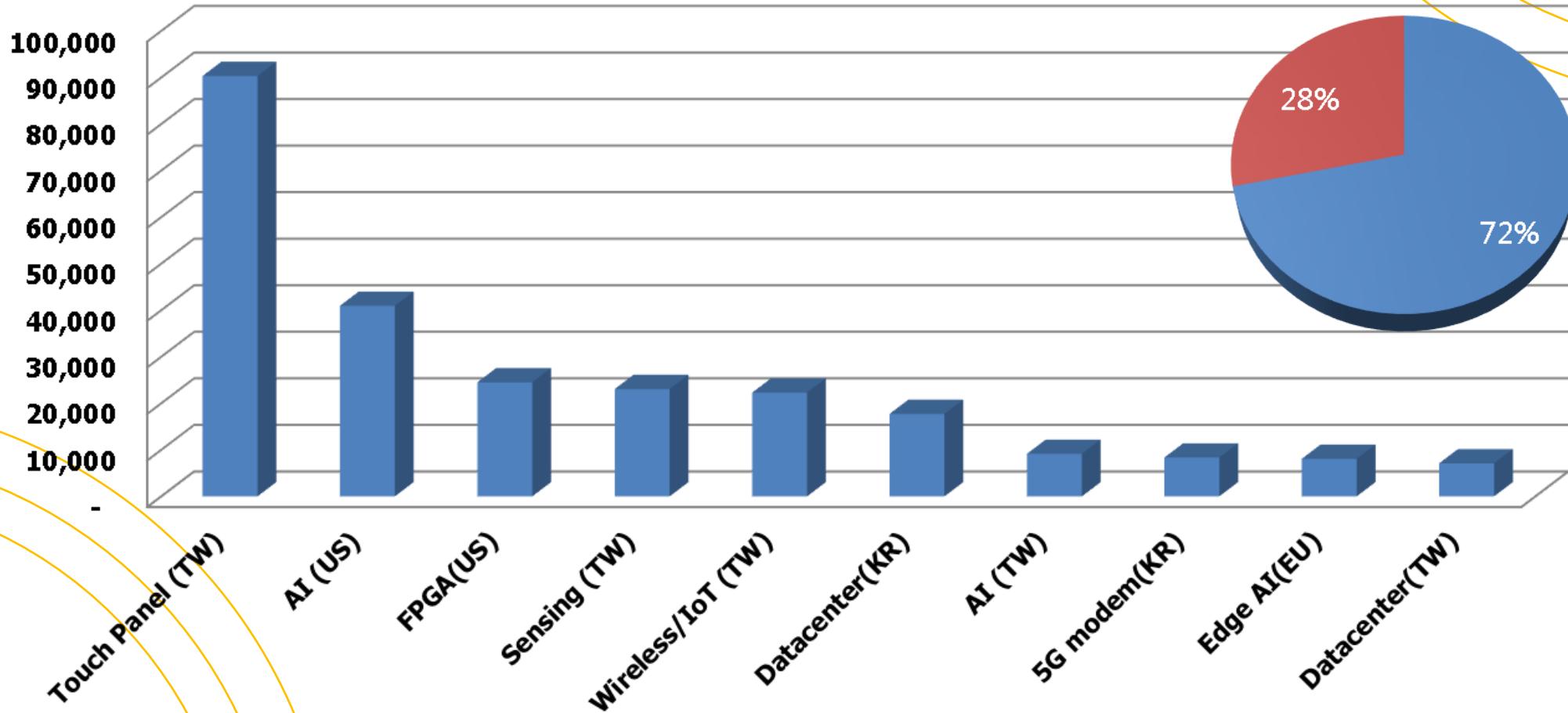
2022年上半年度營業收入



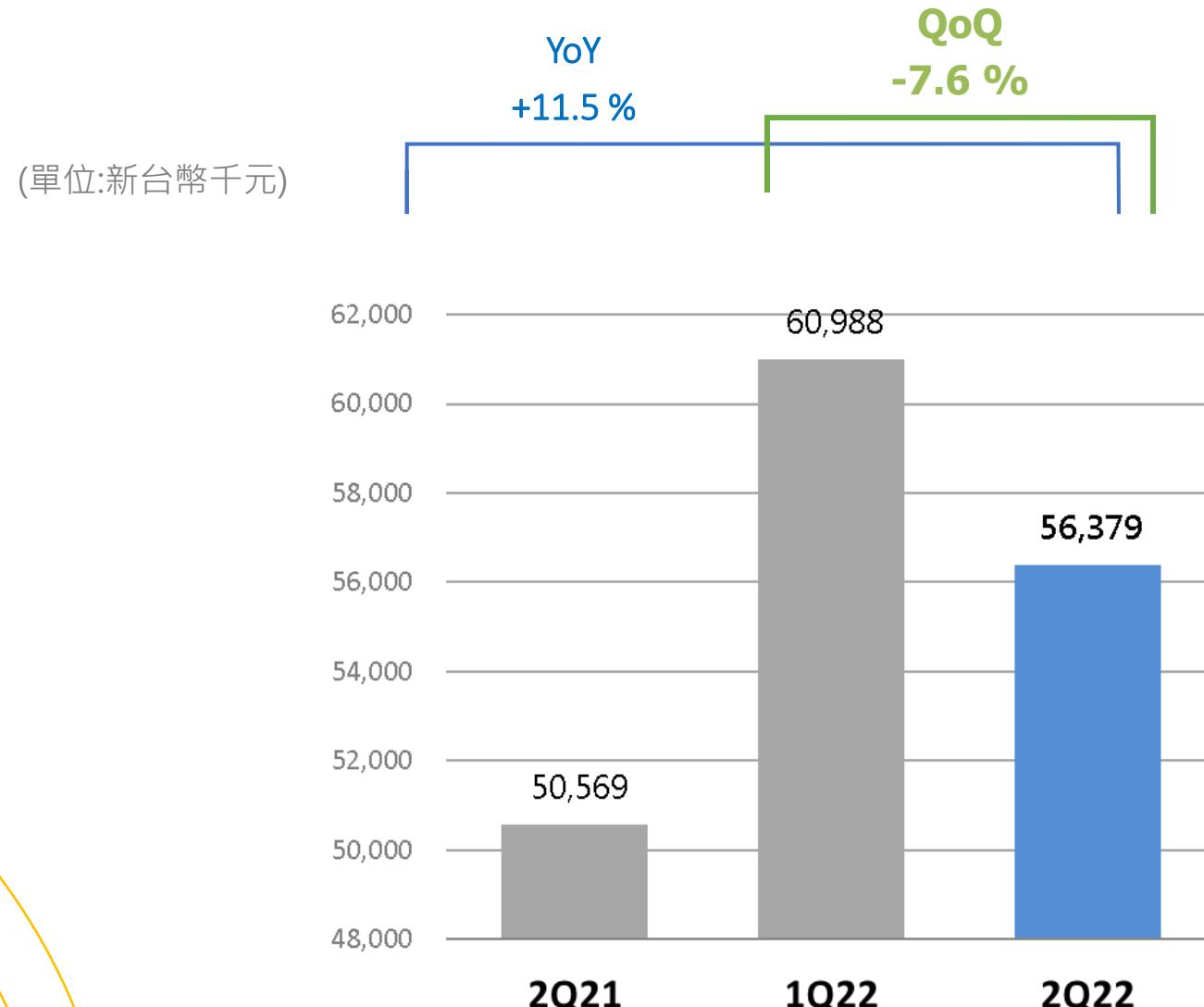
2022年上半年度前十大客戶之應用分析

單位: 新台幣千元

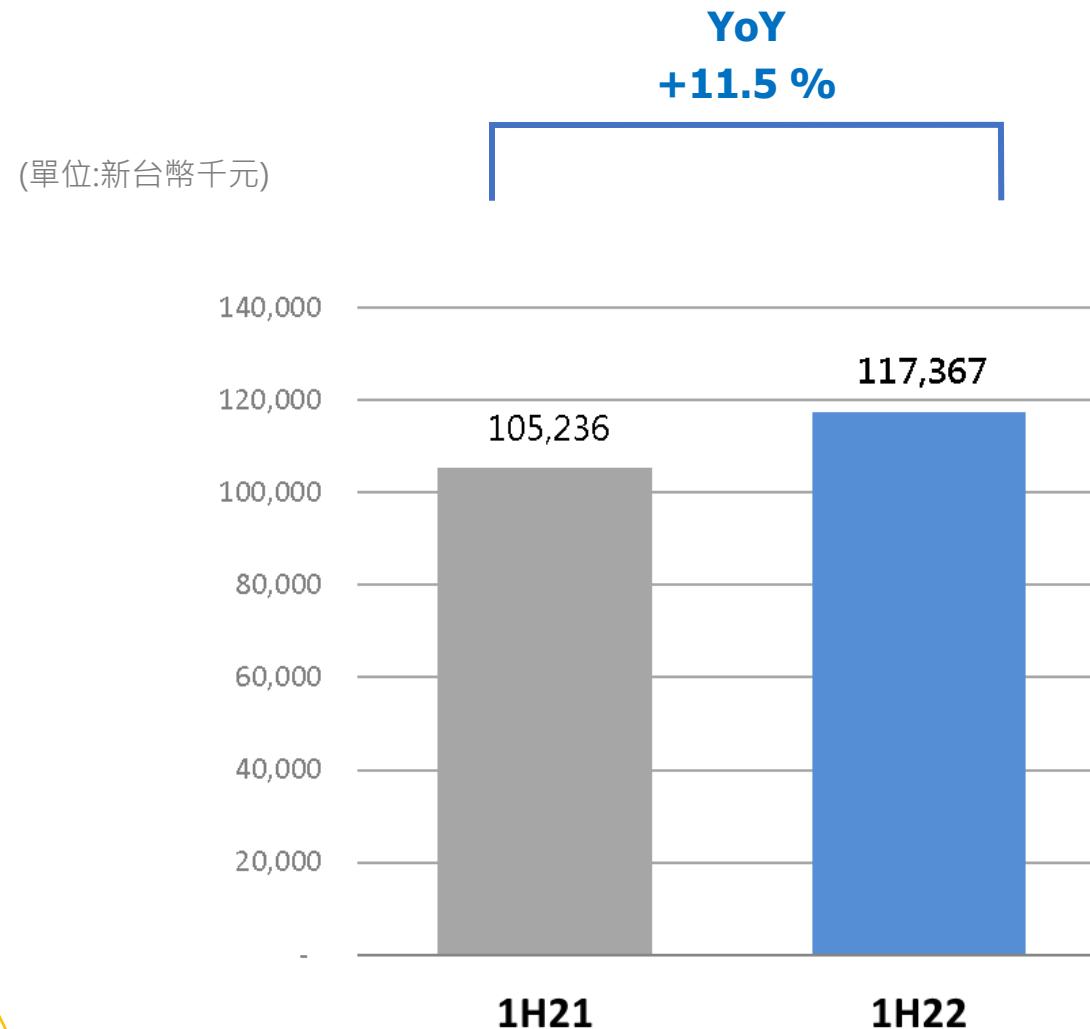
前十大客戶貢獻72%的營收



2022年第二季度權利金收入



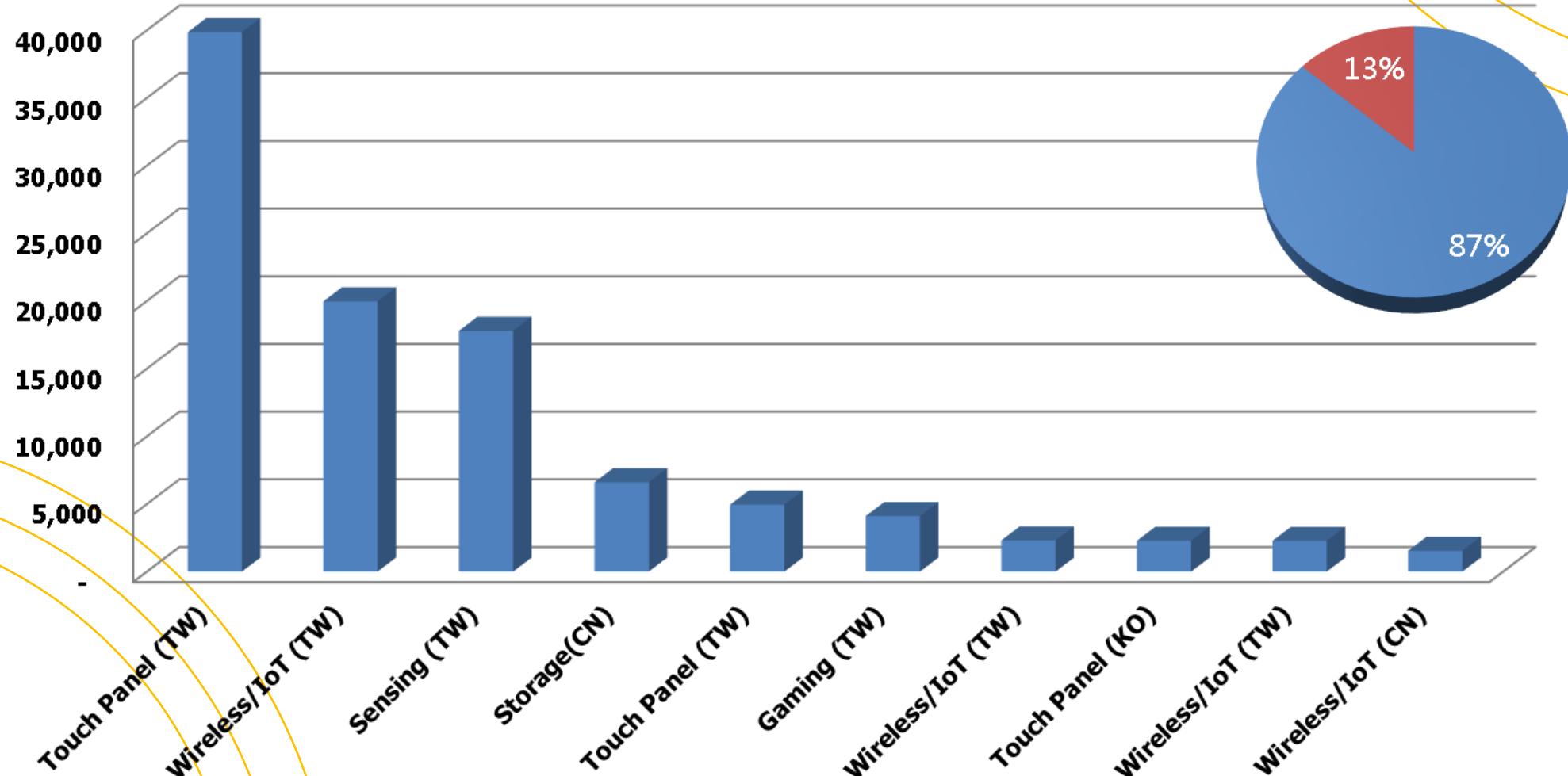
2022年上半年度權利金收入



2022年上半年度權利金應用分析

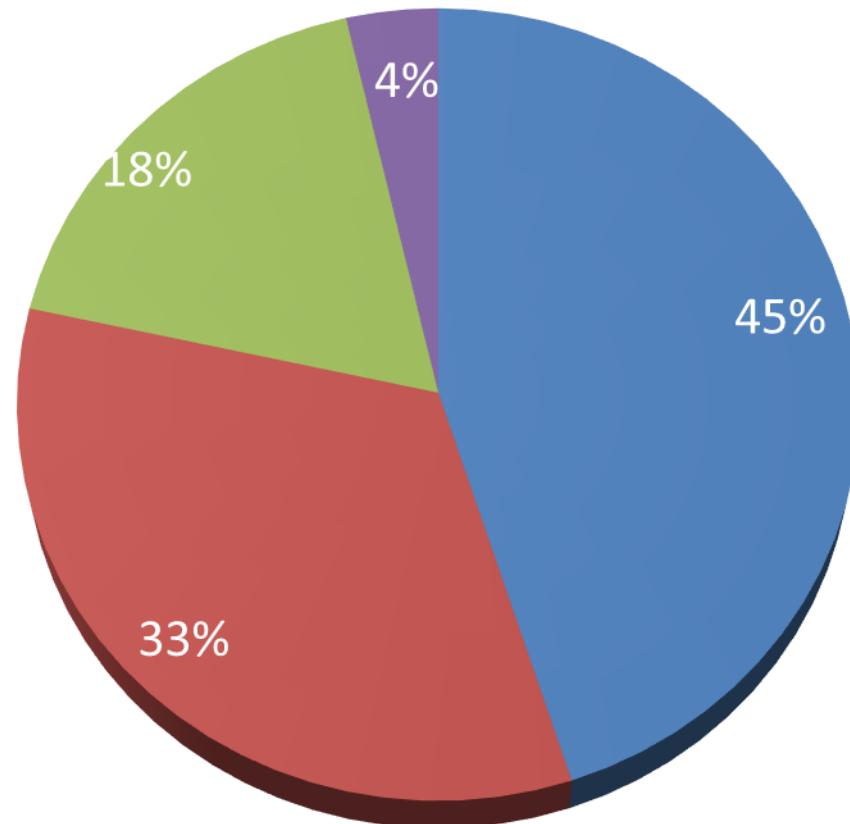
單位: 新台幣千元

前十大權利金客戶貢獻比率 87%



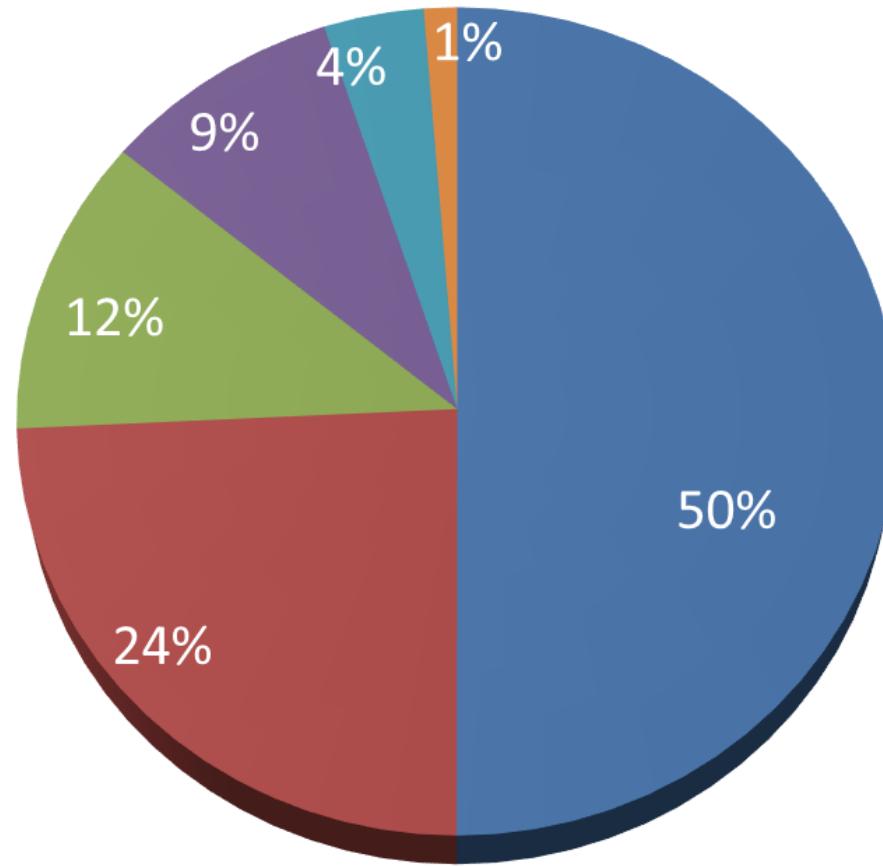
2022年上半年度銷售分析-收入模式

■ 研智財授權收入 ■ 權利金收入 ■ 維護服務收入及其他 ■ 技術服務收入

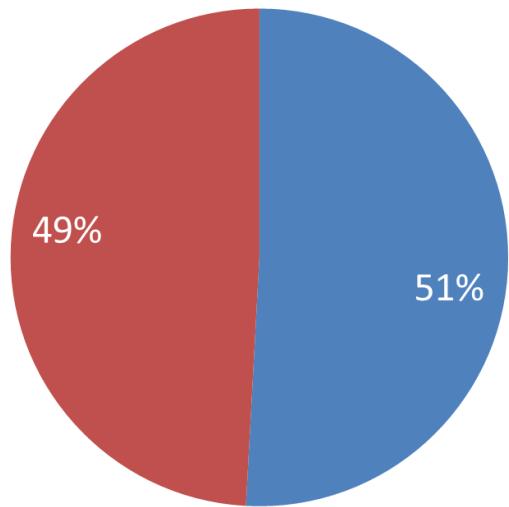


2022年上半年度銷售分析-地區別

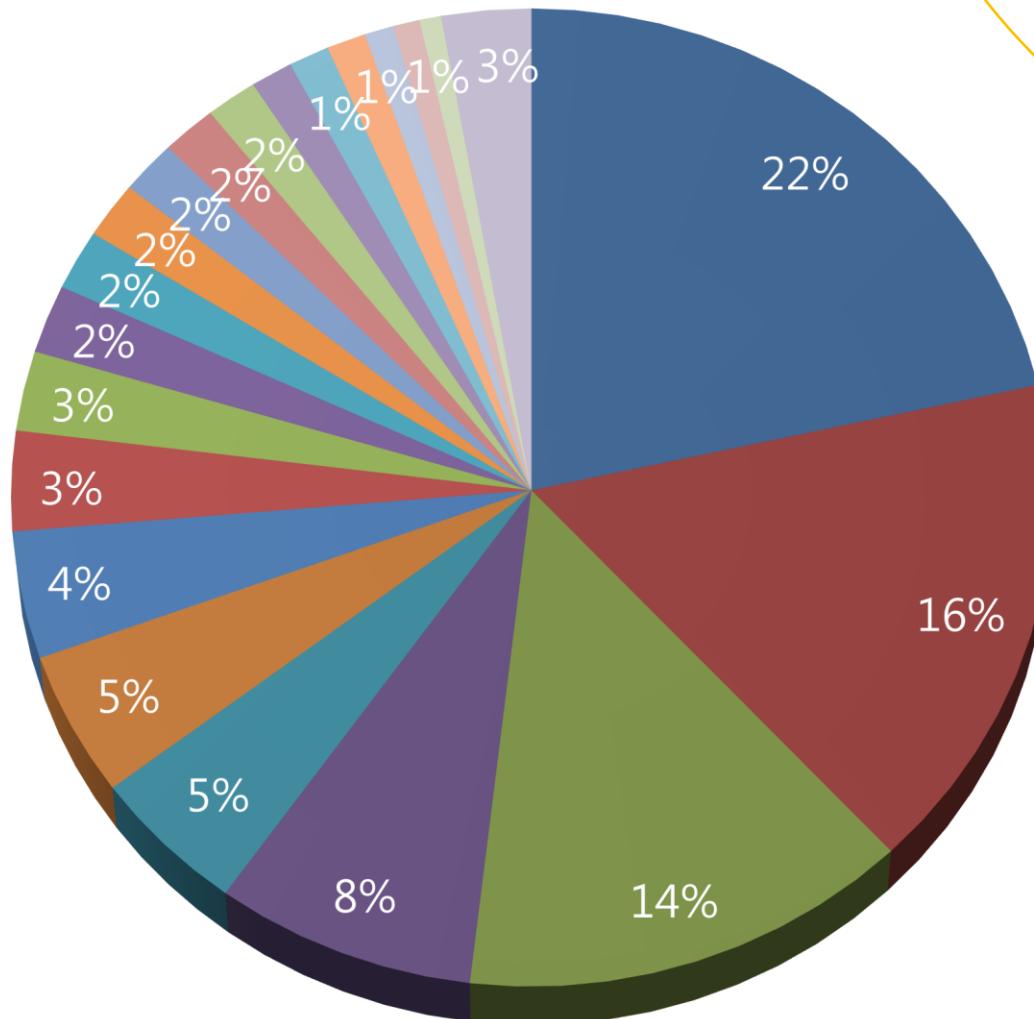
■ 台灣 ■ 美國 ■ 中國 ■ 韓國 ■ 歐洲 ■ 日本



2022年上半年度銷售分析-產品別



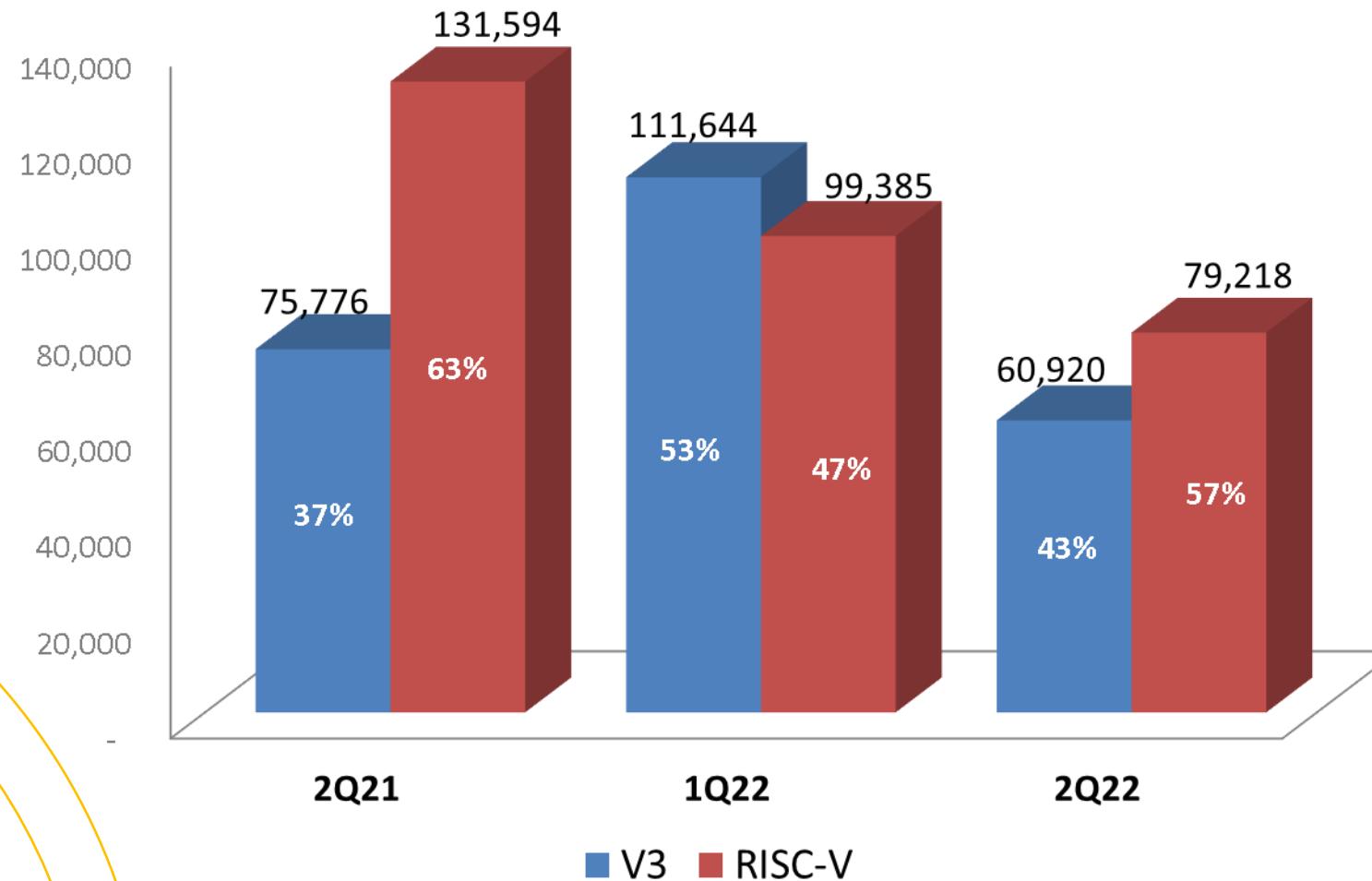
■ RISC-V
■ V3



- N9
- N8
- N25
- NX27
- D45
- AX25
- N13
- ACE
- N10
- E8
- AX45
- N22
- D25
- N45
- AE250
- NX25
- IAR
- Customized IP
- N7
- D10
- AE350
- Other

2022年上半年度銷售分析- RISC-V

(單位:新台幣千元)





產品應用

<http://www.andestech.com>



晶心概況

- ❖ A 17-year-old public CPU IP company
- ❖ 3B+ Andes-Embedded SoC annually in 2021



- ❖ A **founding premier member** of the RISC-V International
- ❖ An active role in RISC-V International & its extension task groups
 - RISC-V Board Director
 - Member of Technical Steering Committee
 - RISC-V Ambassador
 - Chair of P-extension (Packed DSP/SIMD) Task Group
 - Co-chair of Fast Interrupt Task Group
 - Vice Chair of TEE Task Group
- ❖ A major open source maintainer/contributor

GNU-Based Toolchains

- binutils, GCC: May, 2017
- glibc: February, 2018
 - only supports rv64i-based ISAs
- newlib: August, 2017
- "Probably not a compiler bug"

GNU Toolchains

RISC-V LLVM Porting Effort

- Alex Bradbury is in charge of RISC-V LLVM/SM
 - Talk yesterday afternoon
 - Poster on Tuesday night
- RV32IM(A)FI support upstream
 - Missing hard-float calling convention
 - Missing 64-bit support
 - Missing compressed support
- Clang, Go, and OpenJDK have run code
 - Rust port in progress
 - Poster on Tuesday

LLVM

RISC-V Linux Kernel Port

- Linux: January, 2018
 - Only RV64i-based systems
 - Drivers are trickling in now

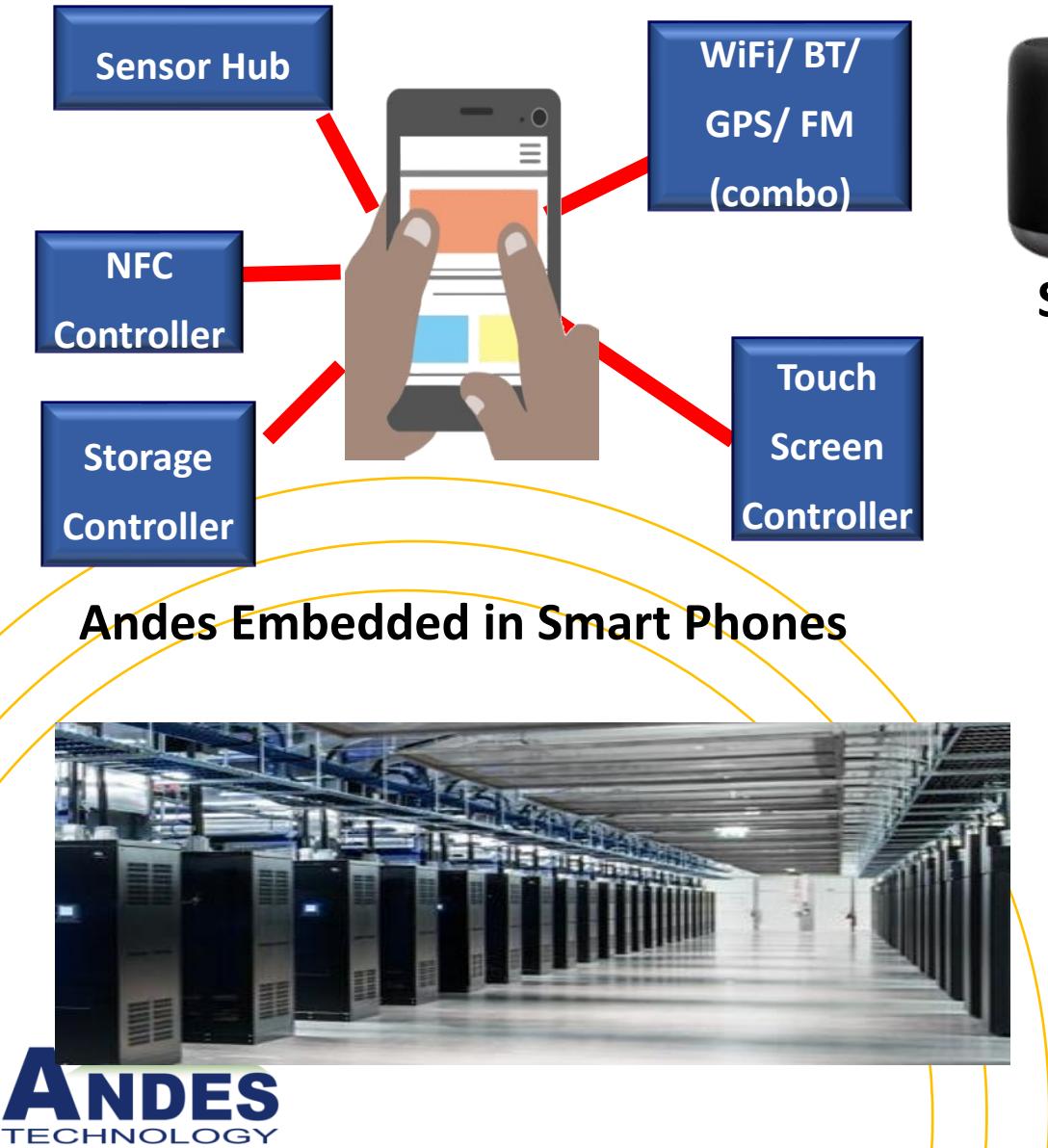
Berkeley

SiFive

ANDES TECHNOLOGY

Linux

晶心嵌入各式各樣新的應用



Smart Speakers:
WiFi IoT



Bike Sharing:
GPS Ctrl



X-Trail:
ADAS Ctrl



Switch:
Game Flash Ctrl

- ❖ In leading machine learning computers for datacenter
- ❖ In tier-one switch routers for datacenter
- ❖ Recent applications: 5G networking, WiFi 6/7, AI processors (using Andes Custom Extension, ACE)

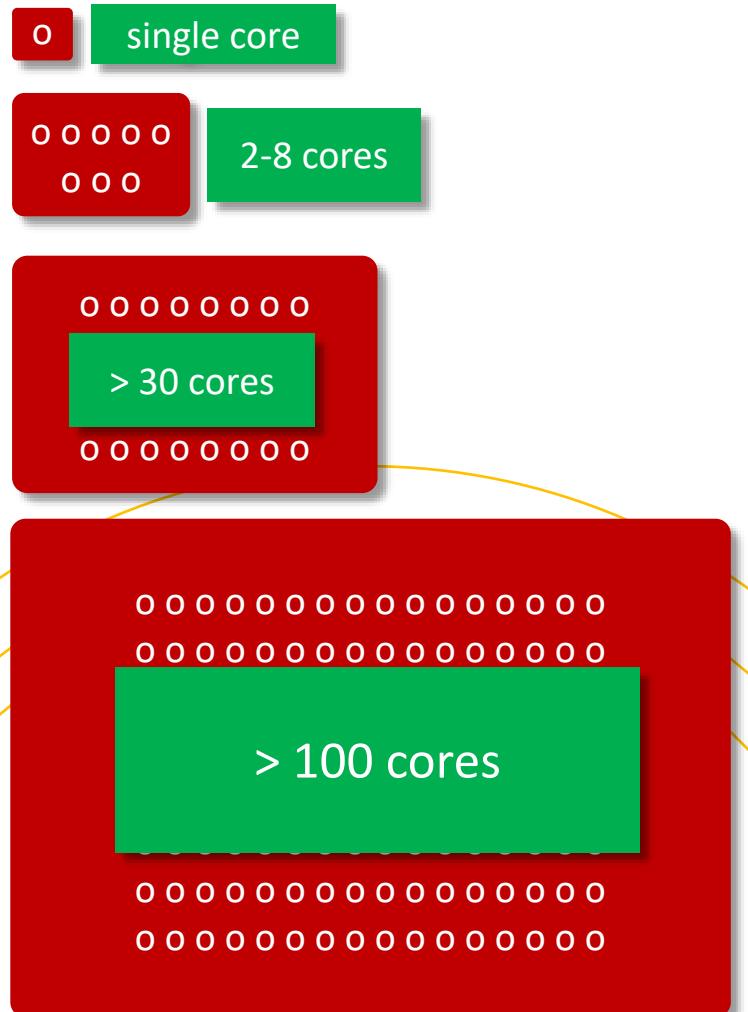
晶心RISC-V已應用在邊緣到雲端運算的SoC

❖ Edge to Cloud

- ADAS
- AIoT
- Blockchain
- FPGA
- MCU
- Multimedia
- Security
- Wireless (BT/WiFi)
- Datacenter/server AI accelerators
- SSD: enterprise (& consumer)
- 5G macro/small cells



晶心RISC-V核心在SoC中被採用的數目



> 1000 cores



新產品及生態系統

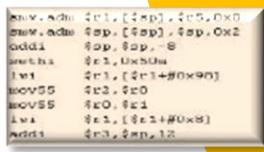
<http://www.andestech.com>



晶心RISC-V產品概述

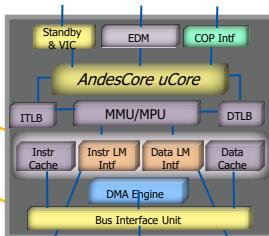
Best extensions to RISC-V; EDA tools

AndeStar™ Architecture V5



AndesCore™

Processors



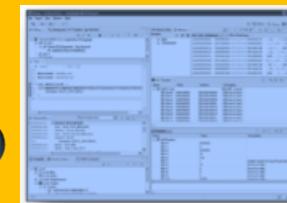
Highly optimized
design with
leading PPA

Handy peripheral
IPs to speed up
SoC construction



AndeShape™ Platforms

AndeSight™
Tools



Professional IDE
with high code
quality



Extensive SW stacks
from bare metal, RTOS
to Linux; NN lib

AndeSoft™ Stacks

Andes V5 適用於廣泛的運算架構

AndeStar™ V5 CPUs



RV32/64



Andes Extension

Conventional Computing Architecture

N/D-series

N22 N(X)25 D25...

Leading PPA Embedded Processor

IoT, Sensing, Storage, Audio, GPS

A-series

A(X)25 A(X)27 A(X)45
Multicore...

High Performance and Power Efficient AP

5G, AI, Datacenter, Video Surveillance, Networking

Vector

NX27V NX45V...

Cray Style, Scalable Vector Processor

Datacenter, Server, Deep Learning

Domain Specific Architecture (DSA)



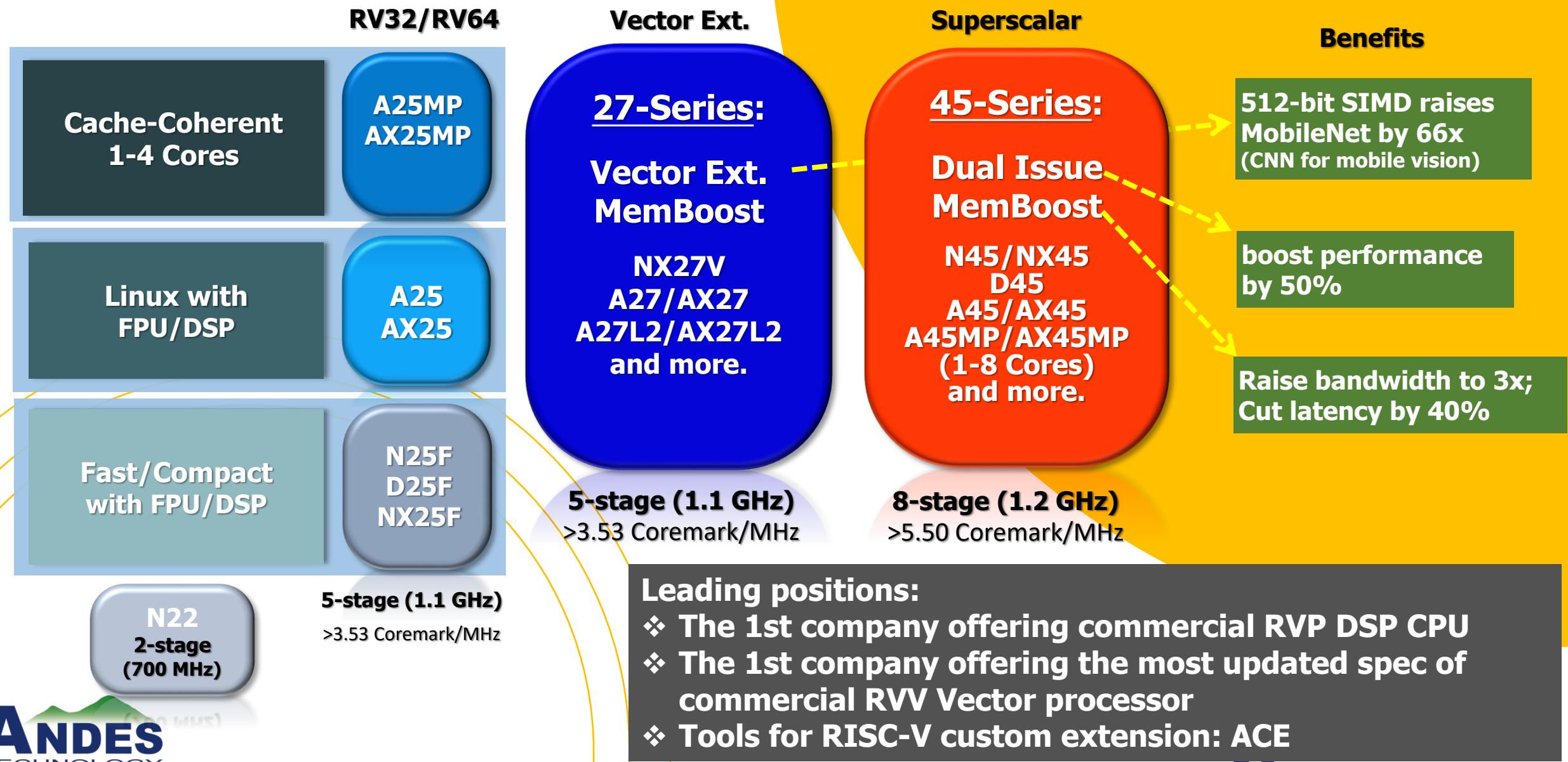
Define custom instruction to handle time critical codes

Andes Custom Extension

Better approach for accelerator /co-processor to do particular jobs

Automation Tool for the generation of toolchain, ISS, partial RTL and verification

晶心RISC-V產品路線圖

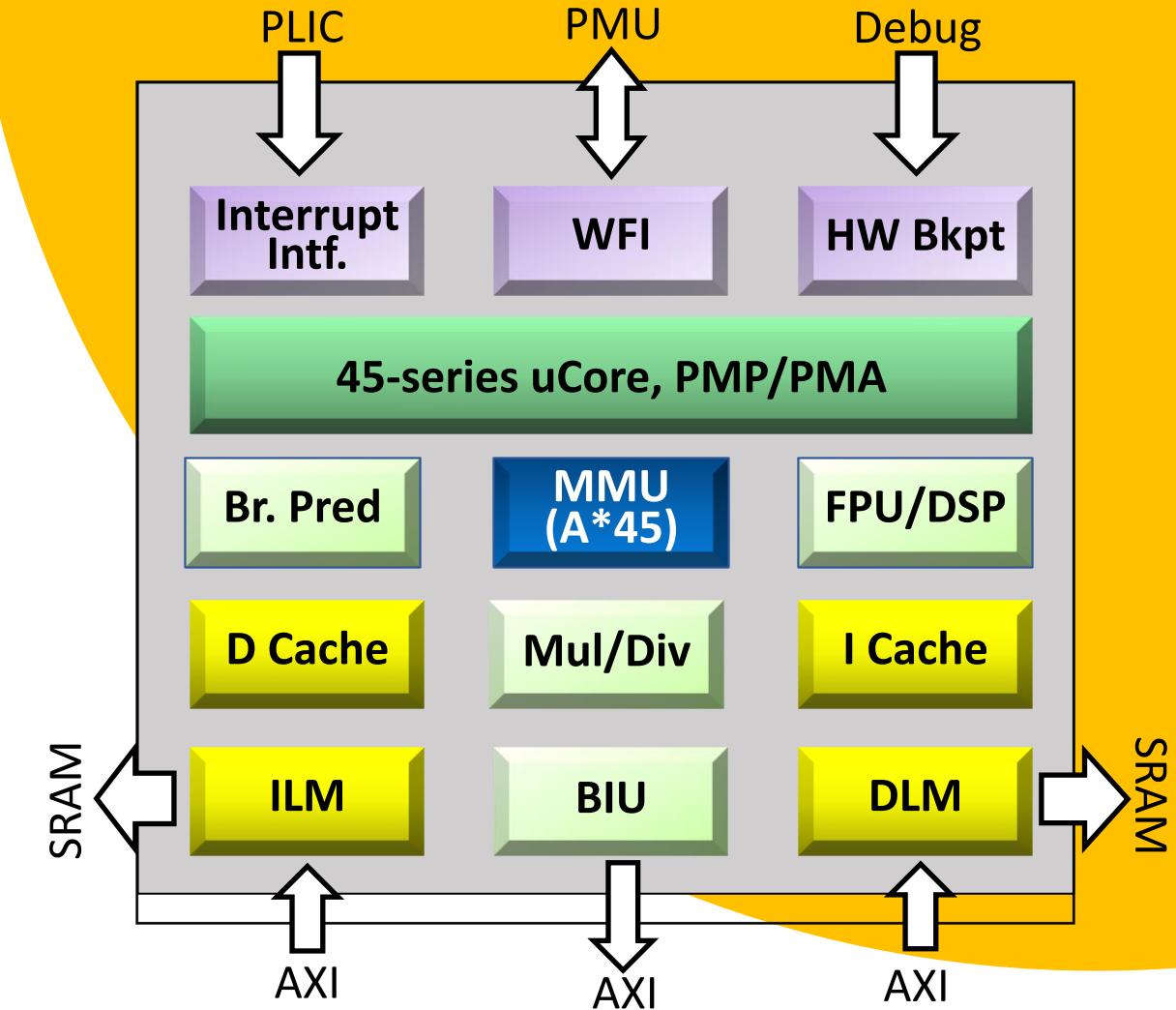


AndeCore™ 45 系列產品

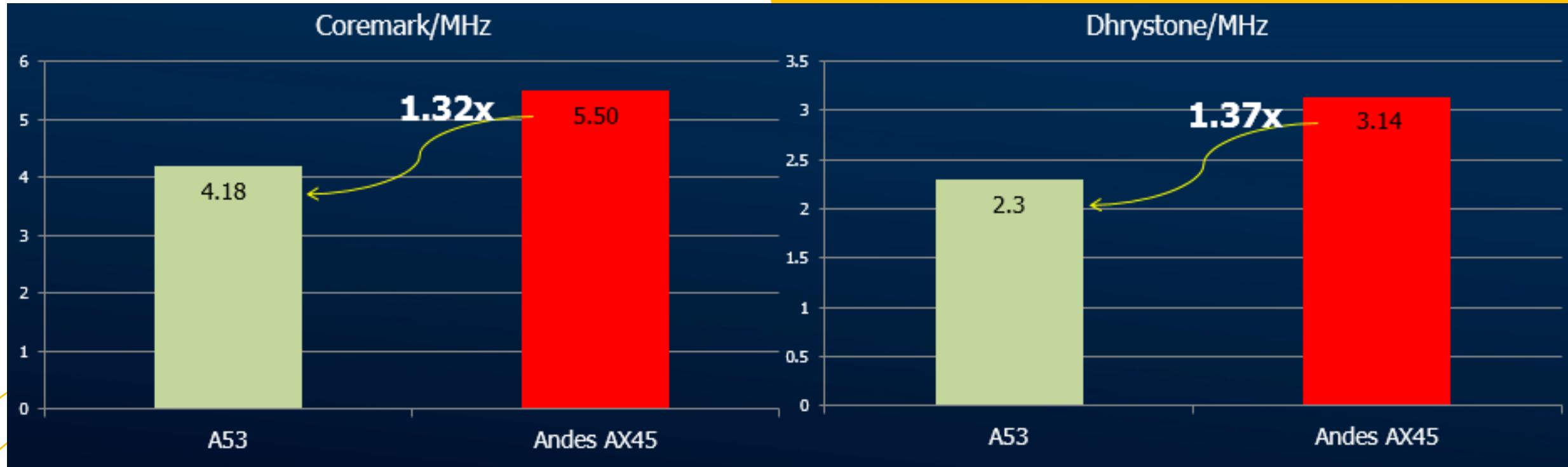
32-bit AndesCore™ N45/D45/A45/A45MP
64-bit AndesCore™ NX45/AX45/AX45MP

AndesCore™ 45-Series概述

- 8-stage In-Order Dual-Issue
- AndeStar™ V5 ISA:
 - RV*GCN (S/D FPU): All Series
 - RV*P-ext (DSP/SIMD): D45/A(X)45
 - MMU for Linux Applications: A(X)45
- MemBoost memory subsystem
- Low power dynamic branch prediction
- Unaligned data accesses
- Fast or small multiplier
- StackSafe™ (Andes Ext.)
- CoDense™ (Andes Ext.)
- Multi-core support: A(X)45MP
 - Up to 8 cores



AX45 Can Do More (vs. 64bit A-series)



- **A53**
 - 8-stage In-Order Dual Issue
 - **Widely adopted by industries in many applications**

- **AX45**
 - 8-stage In-Order Dual Issue
 - **Performance is better!**
 - Coremark/MHz: 1.32x
 - Dhrystone/MHz: 1.37x

27 & 45系列產品的目標市場

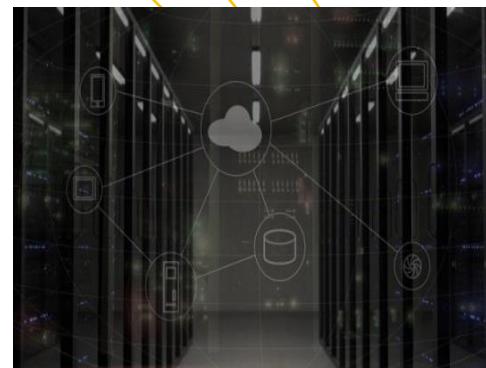
- AI/Deep Learning
- AR/VR
- 5G



- Networking



- Storage



- Video Surveillance



- ADAS

- V2X (Vehicle to Everything)



- IVI (In-Vehicle-Infotainment)



Metaverse and more...

晶心RISC-V產品的優勢

Performance & Extensibility

- Leading PPA and code size
- Rich data processing in P, V, and ACE

Configurability

- Flexible configurations for rich features

Maturity

- Compiler optimizations, and SW stacks
- Comprehensive features in AndeSight IDE



總結

<http://www.andestech.com>



A Trusted Computing Expert



Thank You

<http://www.andestech.com>

+886-3-5726533

