



Auto IOT Solution Introduction

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Automotive Product and Solution

TC provides solutions from chip selection to product mass production



Infortainment Domain HW

- SA6155&8155 Domain Controller Unit
- FSE Front Seat Entertainment
- RSE Rear Seat Entertainment
- AVM Around View Monitor
- Smart DVR Digital Video Recorder



Infortainment Domain SW

- eCockpit OS
- HMI Design Kanzi
- CMS Camera Monitor System
- DMS Driver Monitor System



Internet Information System

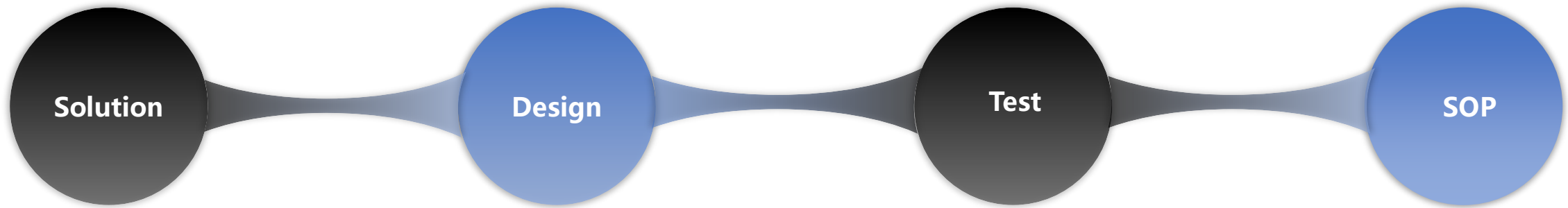
- IOV Internet Of Vehicle platform
- Automated test platform
- Mobile phone intelligent interconnection system



Automotive Chipset

- CM6125A Automotive

Value added services



Chipset solution

SOM Design and mass production experience

Automotive product Proposal

Analyze the market and competitive products and recommend competitive solutions

OS development Experience

Android&Wear&Automotive/QNX/Linux

HW/ME development Experience

consumer electronics, such as watches,AR eyes,mobile phone&table

Testing capability

Complete EV/DV/PV test cases and capabilities, and abundant channels of certified cooperative laboratories

Vehicle related automated test solution

Test management cloud platform, based on the test bench, CAN/Ethernet/Display/navigation/Bluetooth /FA/AM/USB/ etc

Qualification certificate

CMMI ML3/A-SPICE CL3
ISO9001/45001/16949 (Q422)/27001

Manufacturing facility

SMT/ICT/AOI/FCT/etc

Infotainment Domain HW

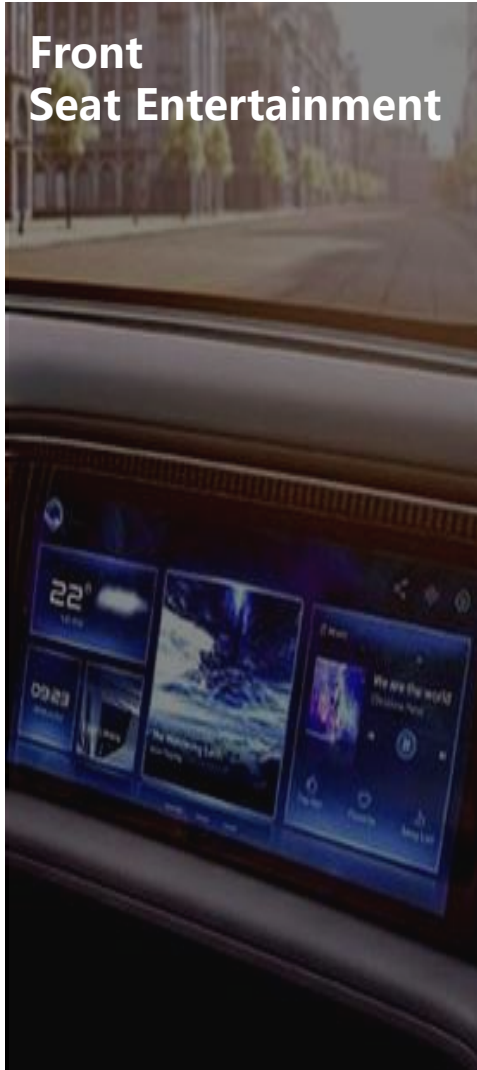


Infortainment Domain HW

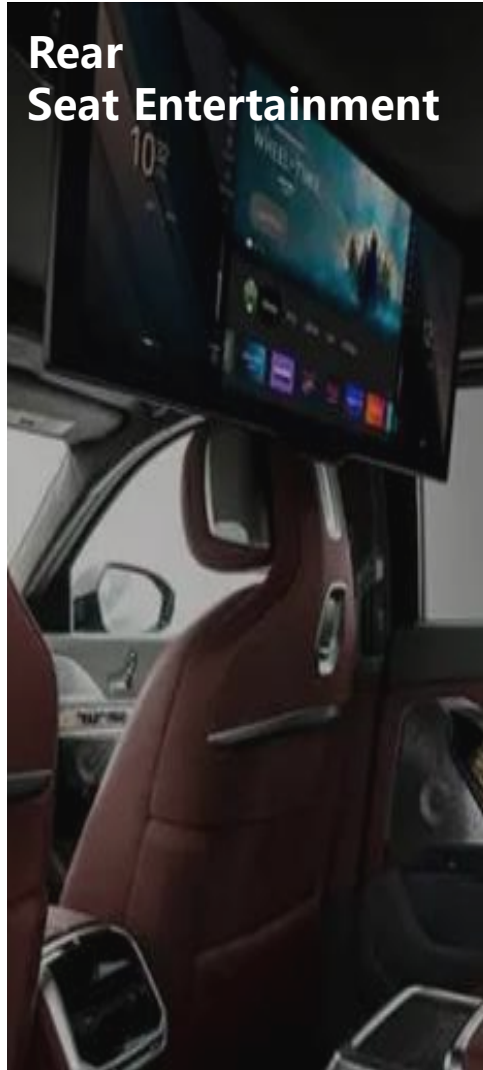
**Domain
Controller unit**



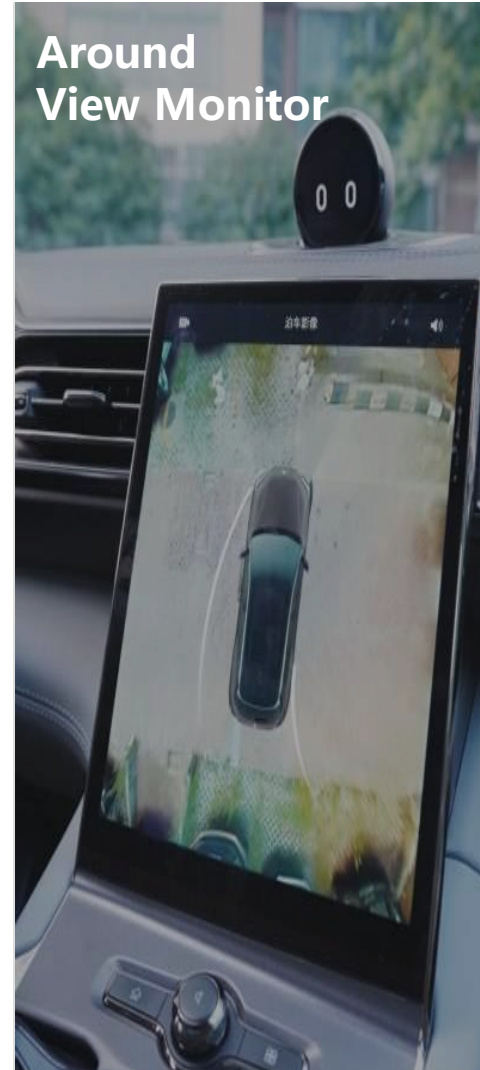
**Front
Seat Entertainment**



**Rear
Seat Entertainment**



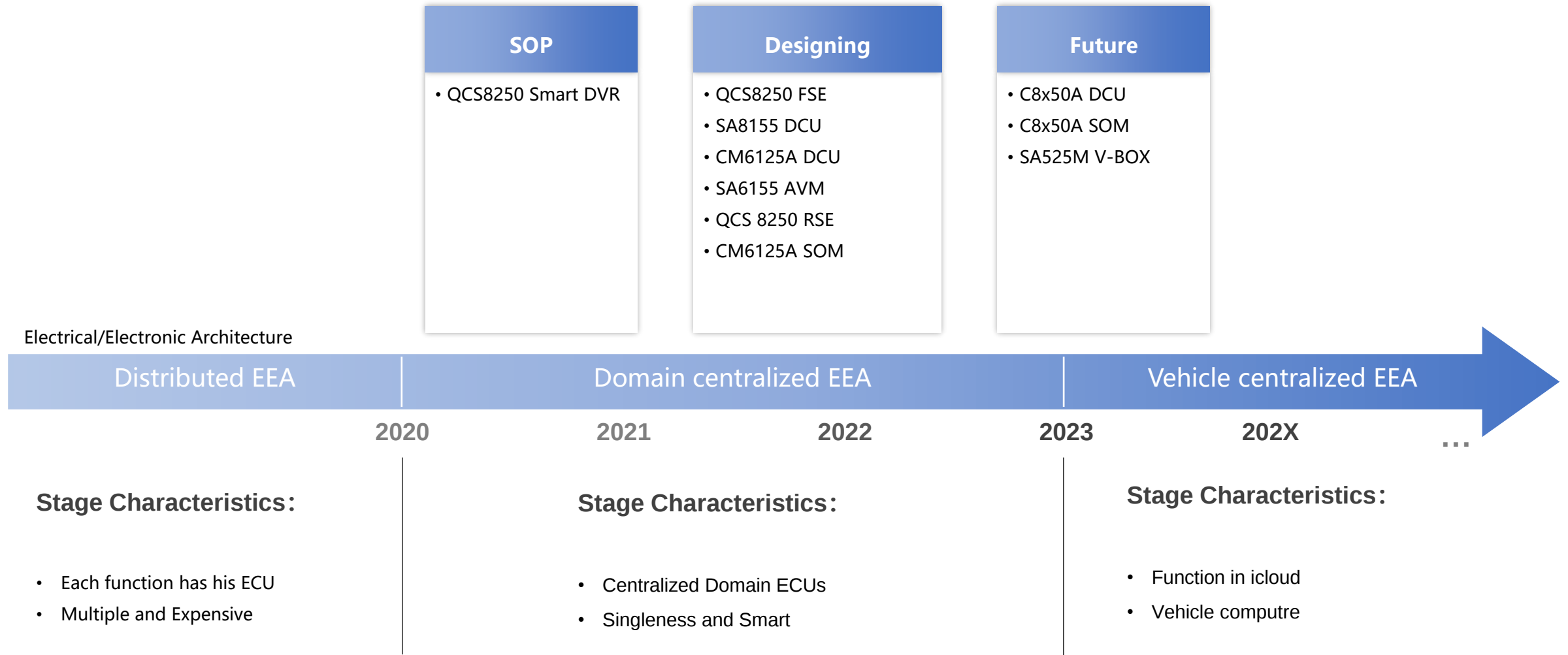
**Around
View Monitor**



**Digital
Video Recorder**



Developing route-Infortainment Domain HW



DCU Solution- Low grade CM6125A

Thundercomm

C6125A SOM

A Sample

Machine

Highlights of Functions

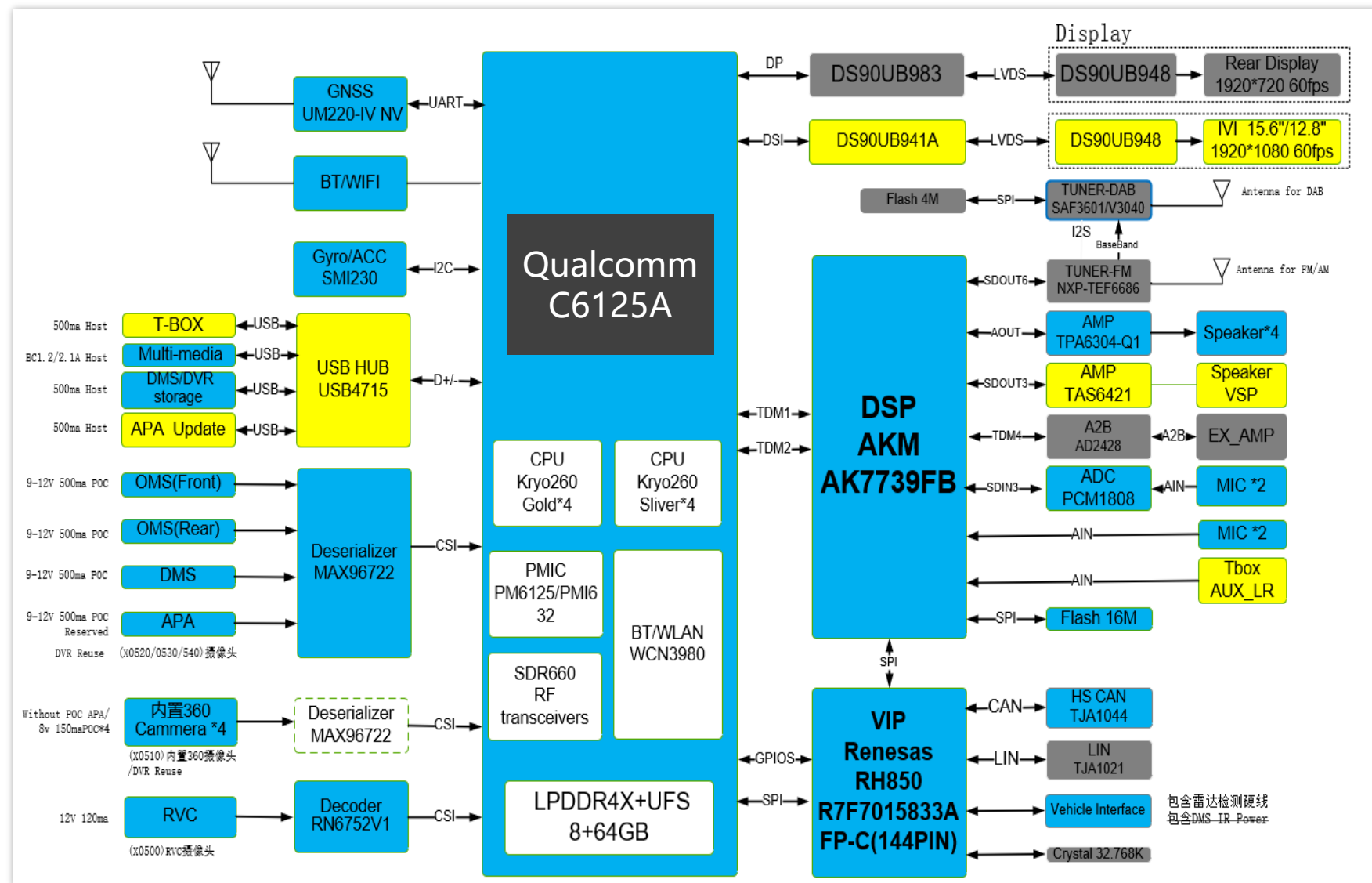
- Supports the T-BOX function
- Supports the AVM function
- Supports the DRC function
- Supports the DMS function

Recommend

- Cars costs about \$15,000

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design



DCU Solution- High grade SA8155

Qualcomm

SA8155

A Sample

Machine

Highlights of Functions

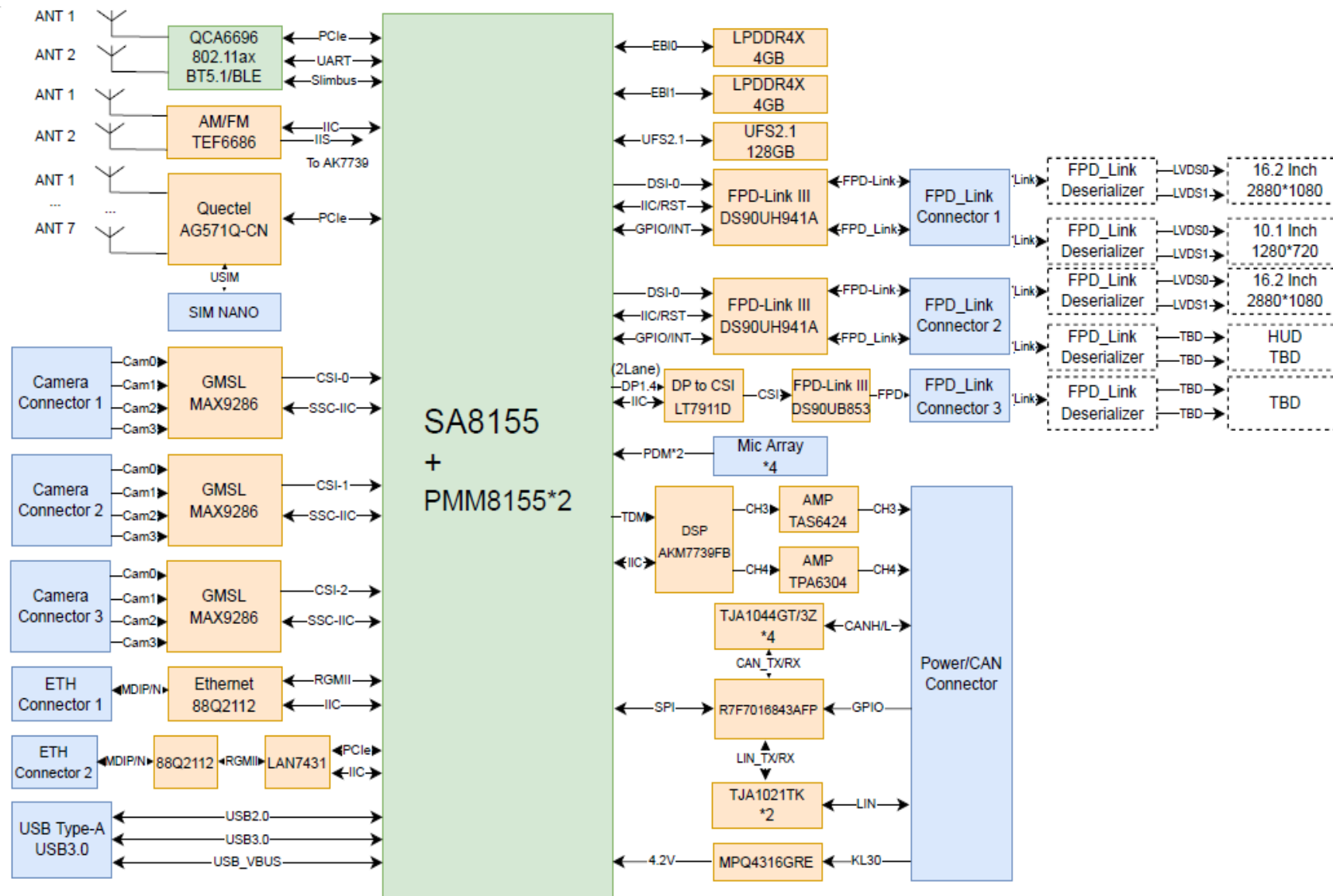
- Supports the T-BOX function
- Supports the AVM function
- Supports the DRC function
- Supports the DMS function

Recommend

- Cars costs about \$21,000

TC Offer

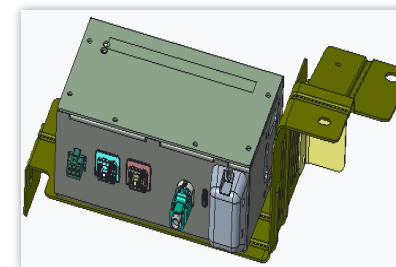
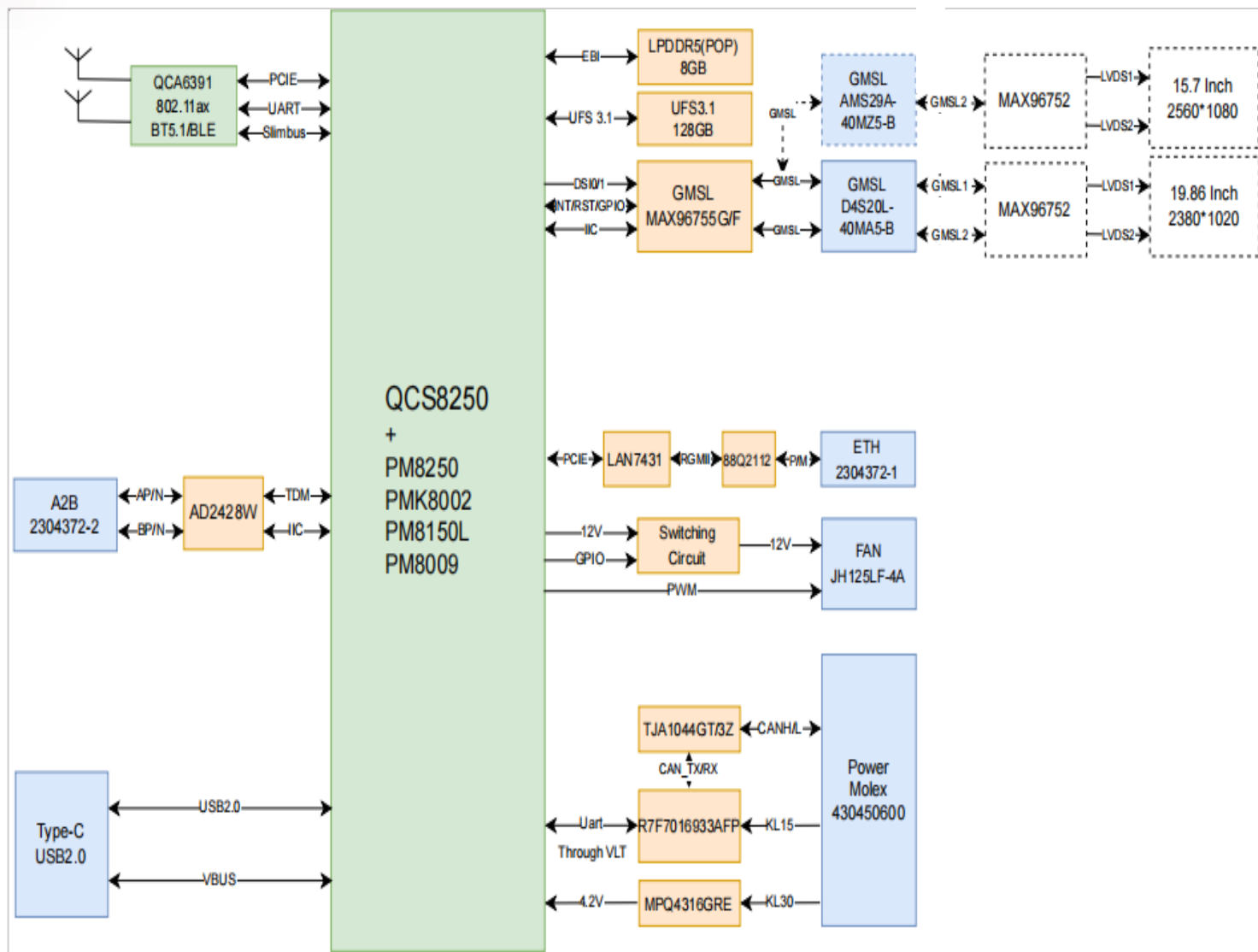
- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design



DCU SPEC

Item	Classify	SA8155	CM6125A (SOM)
SOC	AEC	AEC-Q100 Grade 3	AEC-Q104 Grade 3
	ASIL	ASIL-B	NA
	Operating temperature	-40°C~105°C	-40°C~85°C
Performance	Applications	Automotive	Automotive
	Process	7 nm	11nm
	CPU	1x gold – 2.419GHz 3x gold – 2.131 GHz 4x silver – 1.785 GHz	4x gold – 2.0 GHz 4x silver – 1.8 GHz
	GPU	Adreno™ 640 GPU	Adreno™ 610 GPU
	NPU (TOPS)	8	3
	WIFI	External 2x2 802.11ax	External 2x2 802.11ax
	BLE	BT5.0	BT5.0
	Display	2K @90hz	2.5K @60Hz
	Video	4K120/4K60 Encode / 4K60/4K30 Decode	4K60 Encode / 4K60 Decode
	Memory	LPDDR4 +UFS2.1	LPDDR4 +UFS2.1
	Camera	2x ISP (4x 4-lane MIPI-CSI)	2x ISP (3x 4-lane MIPI-CSI)
	Ethernet	2x PCIE	USB HUB

FSE Solution



Qualcomm

QCS8250

C Sample

Machine

Highlights of Functions

- ✓ Mihoyo <Genshin Impact> CPU/GPU usage is only 50%
- Single terminal solution, domain control no load
- Multi-screen linkage/navigation push/audio-visual entertainment/comfort system adjustment
- Immersive video/game experience

Recommend

- C/D class sedan, SUV

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design

RSE Solution - Hanging



Qualcomm
QCS8250

B Sample
Machine

Highlights of Functions

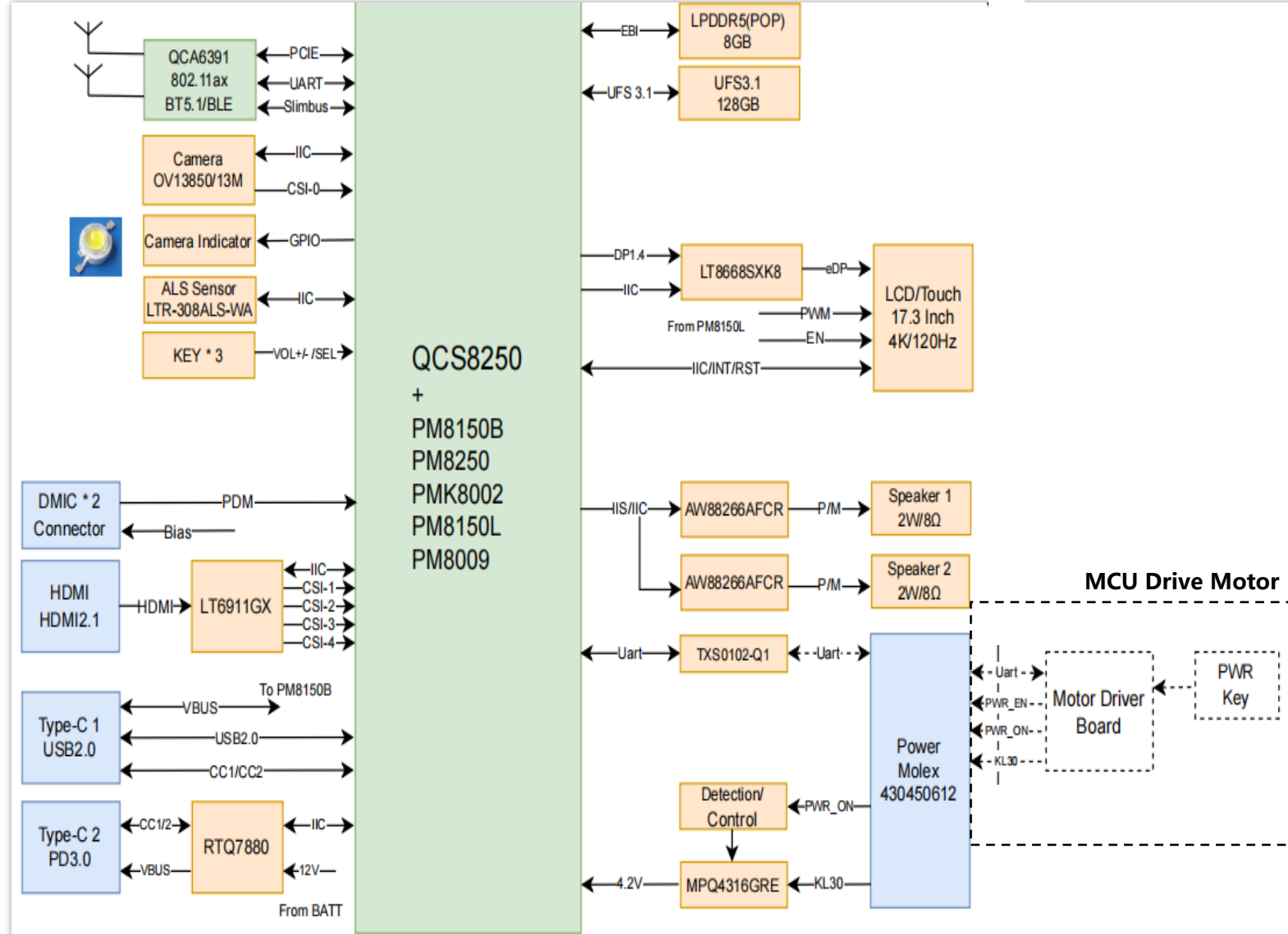
- ✓ 15.6" and Very narrow frame
- Pop-up Camera
- Multi-screen linkage/navigation push/audio-visual entertainment/comfort system adjustment
- Immersive video/game experience
- Switch/Phone connections

Recommend

- C/D class sedan, SUV, MPV

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design



RSE Solution - Removable



Qualcomm
QCS6490

B Sample
Machine

Highlights of Functions

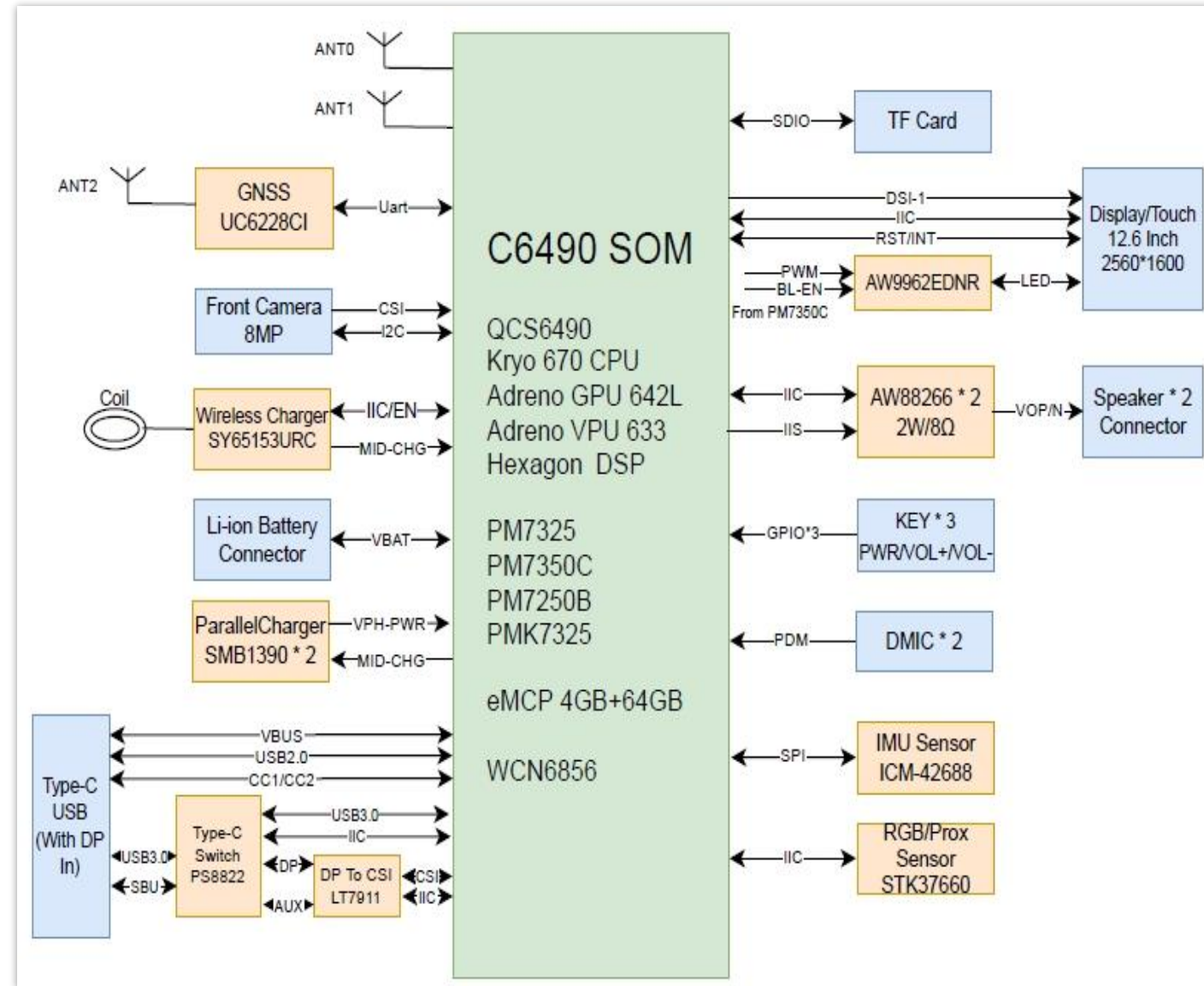
- ✓ 11" and Very narrow frame
- Outside the car : Tablet , In-car : Multi-screen linkage
- navigation push/audio-visual entertainment/comfort system adjustment
- Immersive video/game experience
- Switch/Phone connections

Recommend

- B class sedan, SUV, MPV

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design



FSE/RSE SPEC

Symbol	Scheme 1: Industrial grade	Scheme 2: Industrial grade	Scheme 3: Automotive	IPAD PRO WLAN Performance Reference	MatePad PRO 5G Performance Reference
Chipset	QCS8250	QCS6490	CM6125A	A13/M1	骁龙888
Memory	8GB+128GB	8GB+128GB	8GB+128GB	8GB+128GB	8GB+128GB
Connectivity	WIFI 6/BT 5.1	WIFI 6/BT 5.2	WIFI 6/BT 5.1	WIFI 6/BT 5.0	WIFI 6/BT 5.1
Display	OLED/16:10/2K90hz/8bit	OLED/16:10/2K90hz/8bit	OLED/16:10/2K60hz/8bit	LCD/4:3/2K120hz/8bit	OLED/16:10/2K120hz/10bit
Front Camera	12M	12M	12M	12M	16M
Rear Camera	13M+8M	13M+8M	13M+8M	12M+10M	13M+8M
Sensor	5	5	5	6	5
Speakers	4	4	4	5	4
Audio	4	4	4	4	6
Operation Temperature	-20℃~+70℃	-20℃~+70℃	-40℃~+85℃	0℃~+60℃	0℃~+60℃

AVM Solution

Qualcomm

SA6155

A Sample

Machine

Highlights of Functions

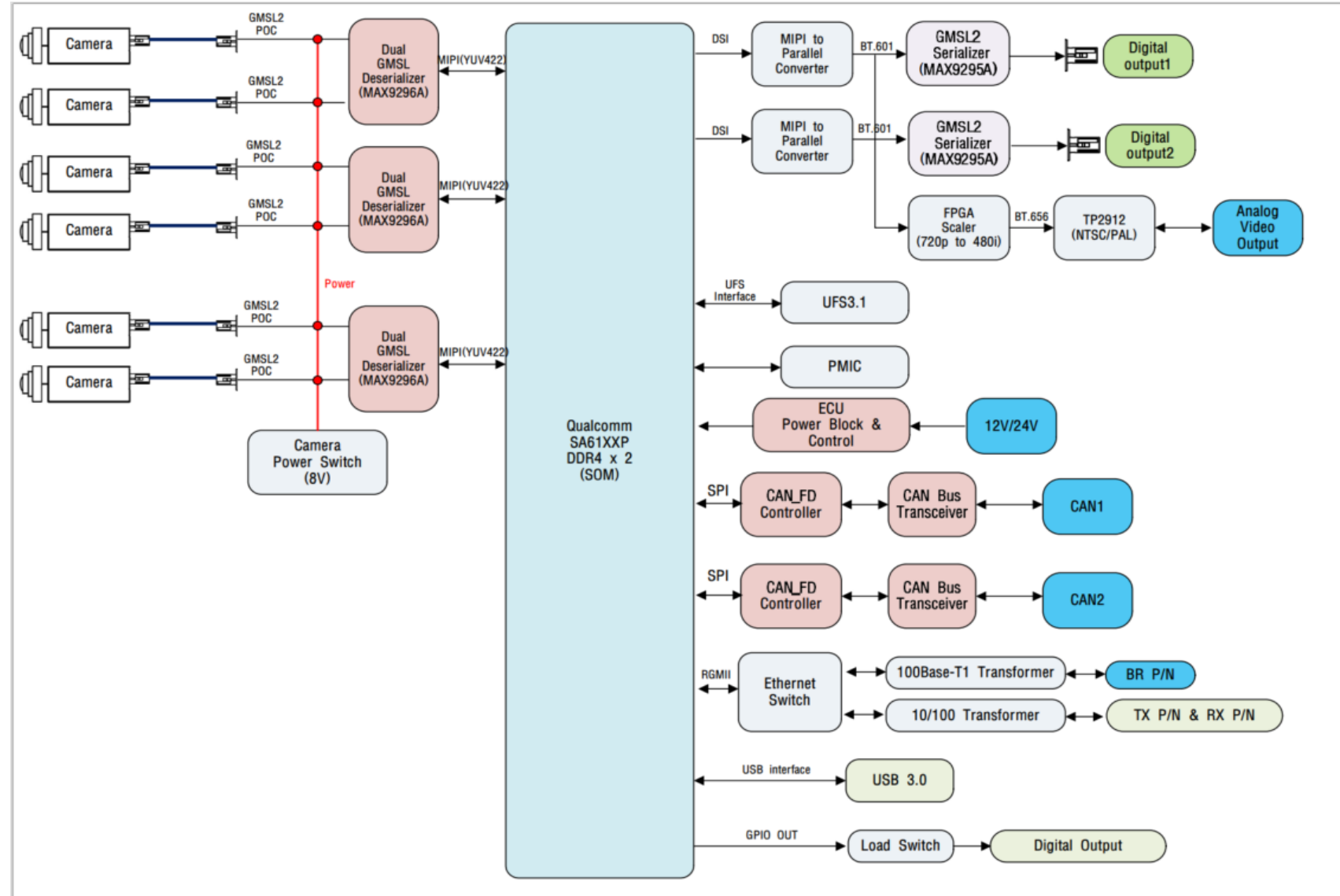
- Qualcomm SA6155 platform
- Supports at least six cameras
- Support CAN/Ethernet communication
- Support ADAS function expansion, such as image recognition and segmentation

Recommend

- 6-cameras Stitching , MPV

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design



AVM Solution -SW

Full stack AVM products and capabilities

Camera/ISP

Image quality

VideoCat

Complete toolchain

BSP/Bring up

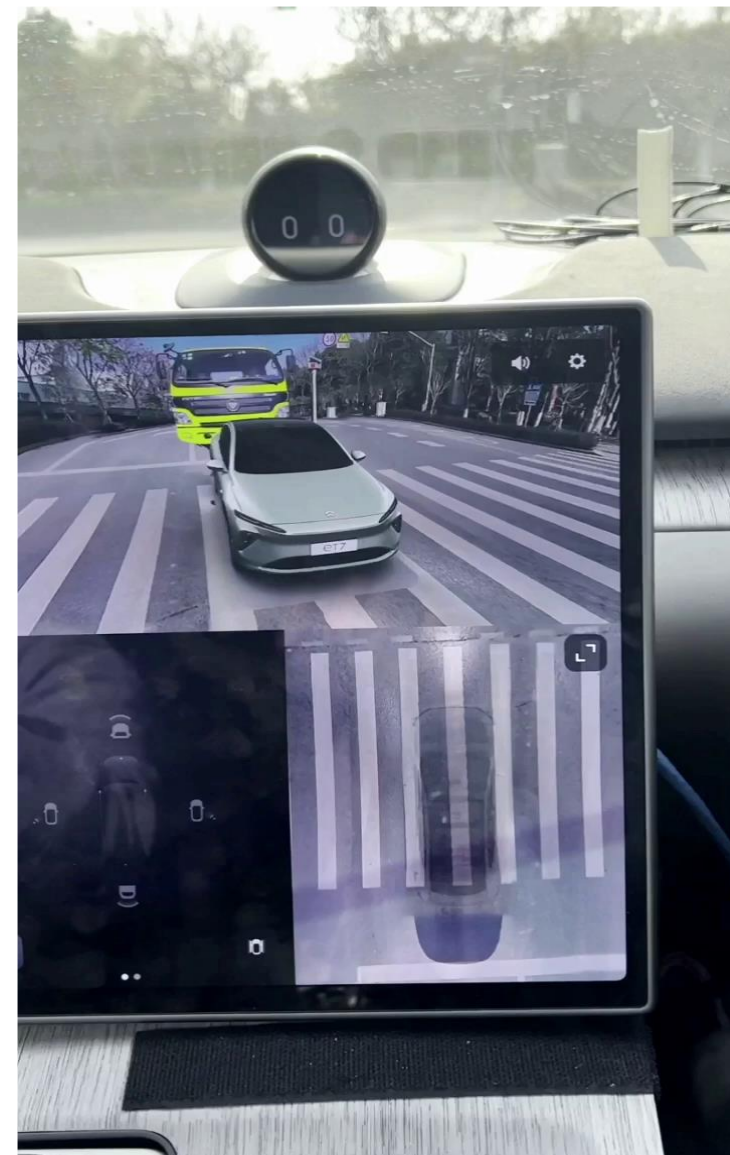
ISP Tuning

Core algorithm

- AVM Simulator Lite
- AVM Simulator
- Virtual Camera Platform
- Reference parameter
- Scenario pool
- Automatic testing tool
- Calibration tool

Application

SDK



Item		Classify	SPEC
HW	Platform	Platform	Qualcomm SA6155
		Memory	8GBLPDDR5 + 128GB Flash
	Camera	Resolution	1MP*6
		FOV	80° V, 68° H
	Interface	Ethernet	1000M, T1
		CAN	CAN Connector
		Video Out	LVDS
		Power in	12V DC in
		USB	Micro USB debug port
SW	OS	OS	Android
	Video	HDR	TBD
		Algorithm	EIS, Digital zoom, Time-lapse photography,
	Video Out	Picture in Picture	Yes
	Picture	Output Resolution	5MP Max
		Algorithm	EIS, Digital zoom
	General Features	Camera Control	through CAN
		Power on/off	always on with sleep mode

Smart DVR Solution

Qualcomm

QCS8250

SOP

PCBA+SW+SMT

Highlights of Functions

- ✓ IVI interconnection
- ✓ Voice control
- ✓ picture/video sharing with one click
- 100 million pixels
- Support for ADAS fusion

Recommend

- Cars costs about \$25,000

TC Offer

- DCU HW/ME Design
- BSP/HMI/OS Design
- ME/Thermal Design





4K Video Recording

4K@60FPS Video Recording

Night Scene Mode

ISO12800 high sensitivity, Capability at Super low light, more delicate picture

HDR Mode

3D HDR 104DB super brightness, bringing more vivid image shading and color performance

Time-lapse Mode

Meteor shower, city night view, record unforgettable moments

Slow Motion Shots

480 frames, bring more vivid picture sensitivity and color performance

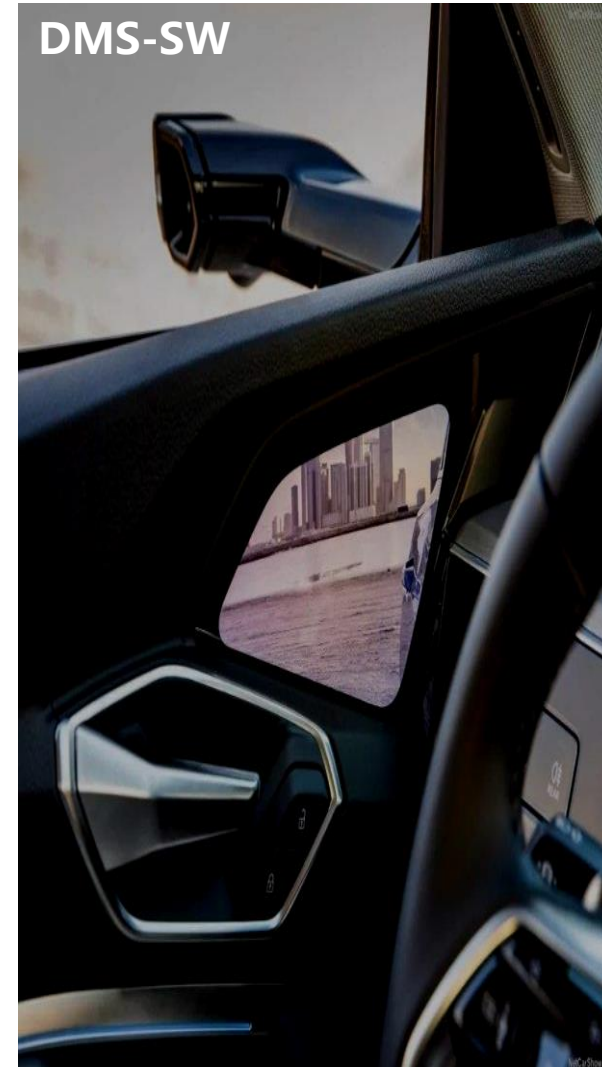
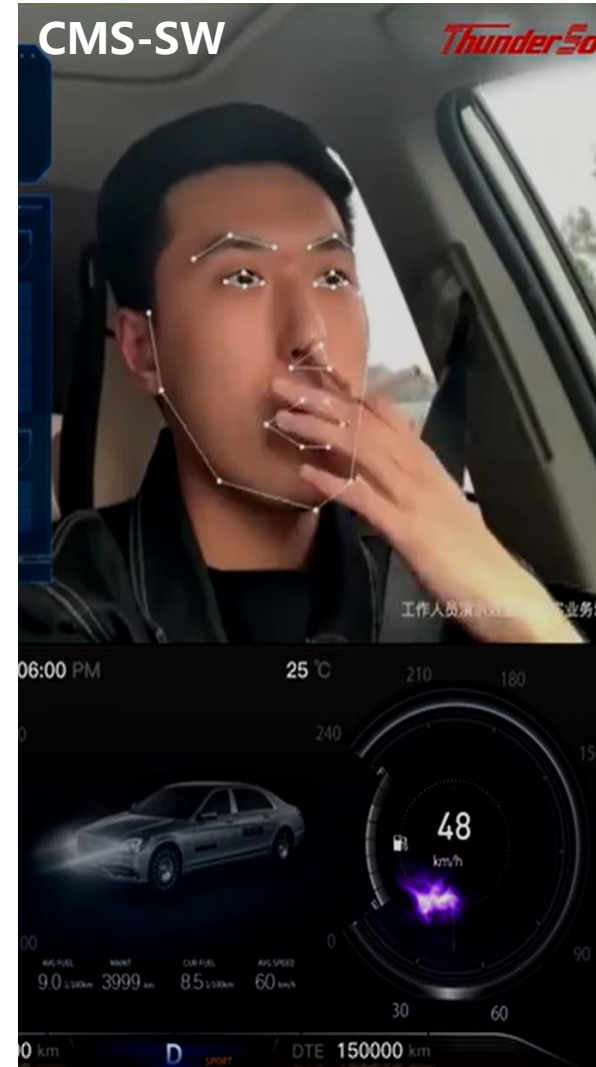
Smart DVR SPEC

Item		Classify	SPEC
HW	Platform	Platform	Qualcomm QCS 8250
		Memory	8GBLPDDR5 + 64GB Flash
	Camera	Resolution	48M (binning to 12M), SONY IMX586
		FOV	80° V, 68° H
	Interface	Ethernet	100M, T1
		CAN	CAN Connector
		Video Out	LVDS
		Power in	12V DC in
		USB	Micro USB debug port
	Mechanical	Dimension	180*150, T=45
		Waterproof	IP69K
		Working Temp.	-20°C ~ 65°C
SW	OS	OS	Android
	Video	Output Resolution	Stitched 4K@60fps
		HDR	TBD
		Algorithm	EIS, Digital zoom, Time-lapse photography,
	Video Out	Picture in Picture	Yes
	Picture	Output Resolution	75M Max
		HDR	TBD
		Algorithm	EIS, Digital zoom, Time-lapse photography,
	General Features	Camera Control	through CAN
		Power on/off	always on with sleep mode

Infortainment Domain SW



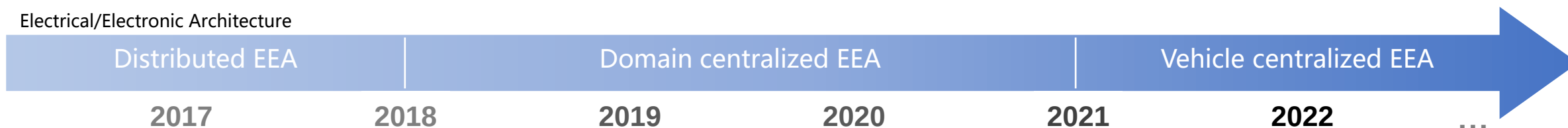
座舱软件产品



Developing route-Infotainment Domain SW



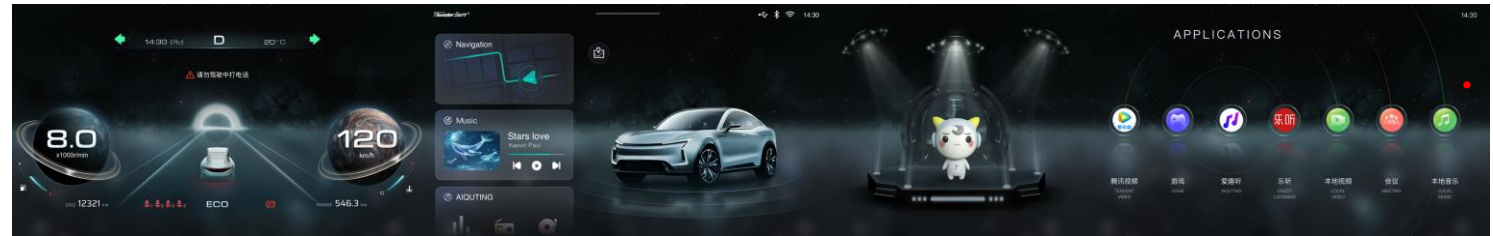
Electrical/Electronic Architecture



eCockpit 6.0 Introduction



- Qualcomm Chipset SA8295
- VPA intelligent assistant
- QNX + Android ,HypervisorImmersive intelligent driving, APA and high precision map navigation
- AVM, DMS/FACEID, OMS
- SOA serves interdomain communication middleware



eCockpit 6.0 Introduction

ThunderSoft

e-Cockpit 智能座舱解决方案

HMI Design-Kanzi

No Code

- Independent 3D development tool chain, providing unique rendering solutions
- Visual editing without writing code
- Preview HMI effect in real time

Cross platform

- QNX,Android,Linux

TC Offer

- HMI Design
- Training Services

Mass-Produced&Car

- Audi/Benz/Porsche/VW/Byd...



CMS Solution-SW

Audi e-tron is equipped with the world's first mass-produced electronic rearview mirror system



DMS/OMS Solution-SW



Highlights of Functions

- Driver status recognition
- Status recognition of rear passenger
- Children's safety and health monitoring

Recommend

- Provides algorithm integration and testing services

Mass-Produced&Car

- WM Motor W6
- Faw Group、GAC Group

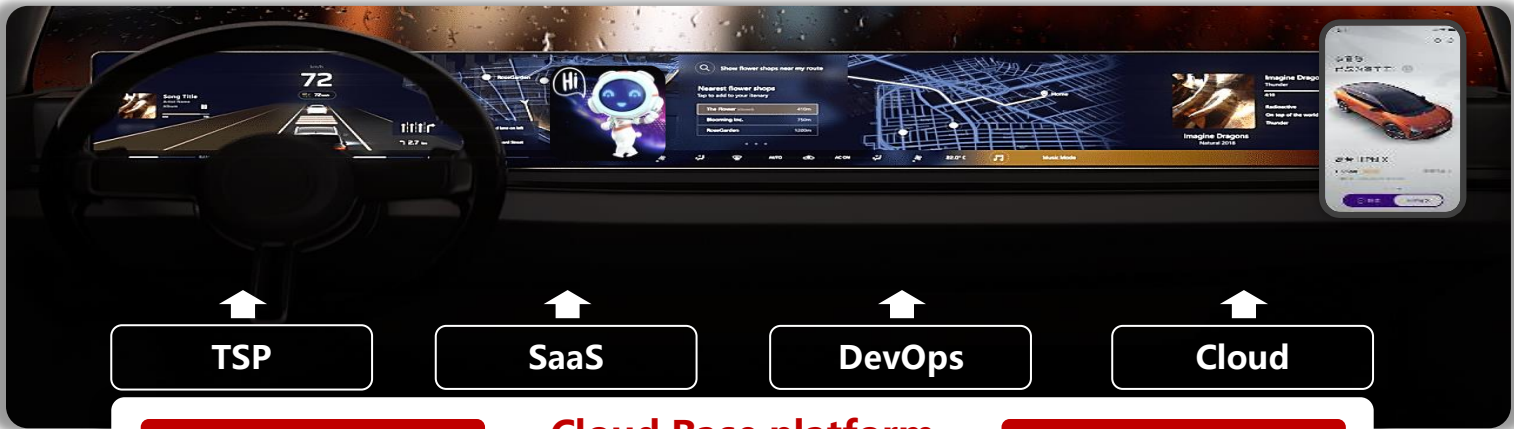
Internet Information System



Internet Of Vehicle platform

End-to-end cloud complete chain solution, support cloud platform local or private deployment

Service



Cloud



Device

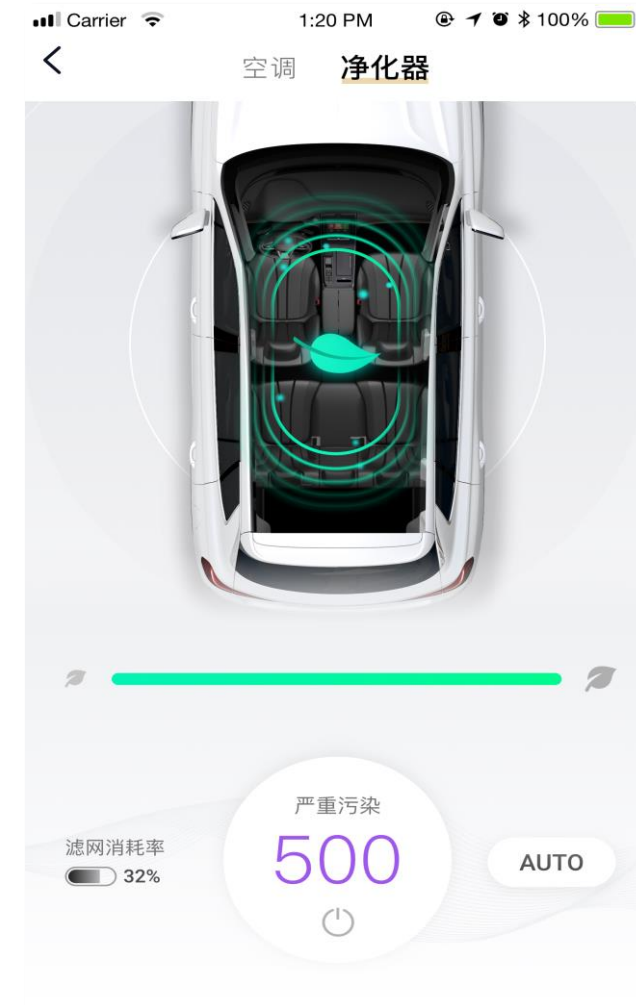
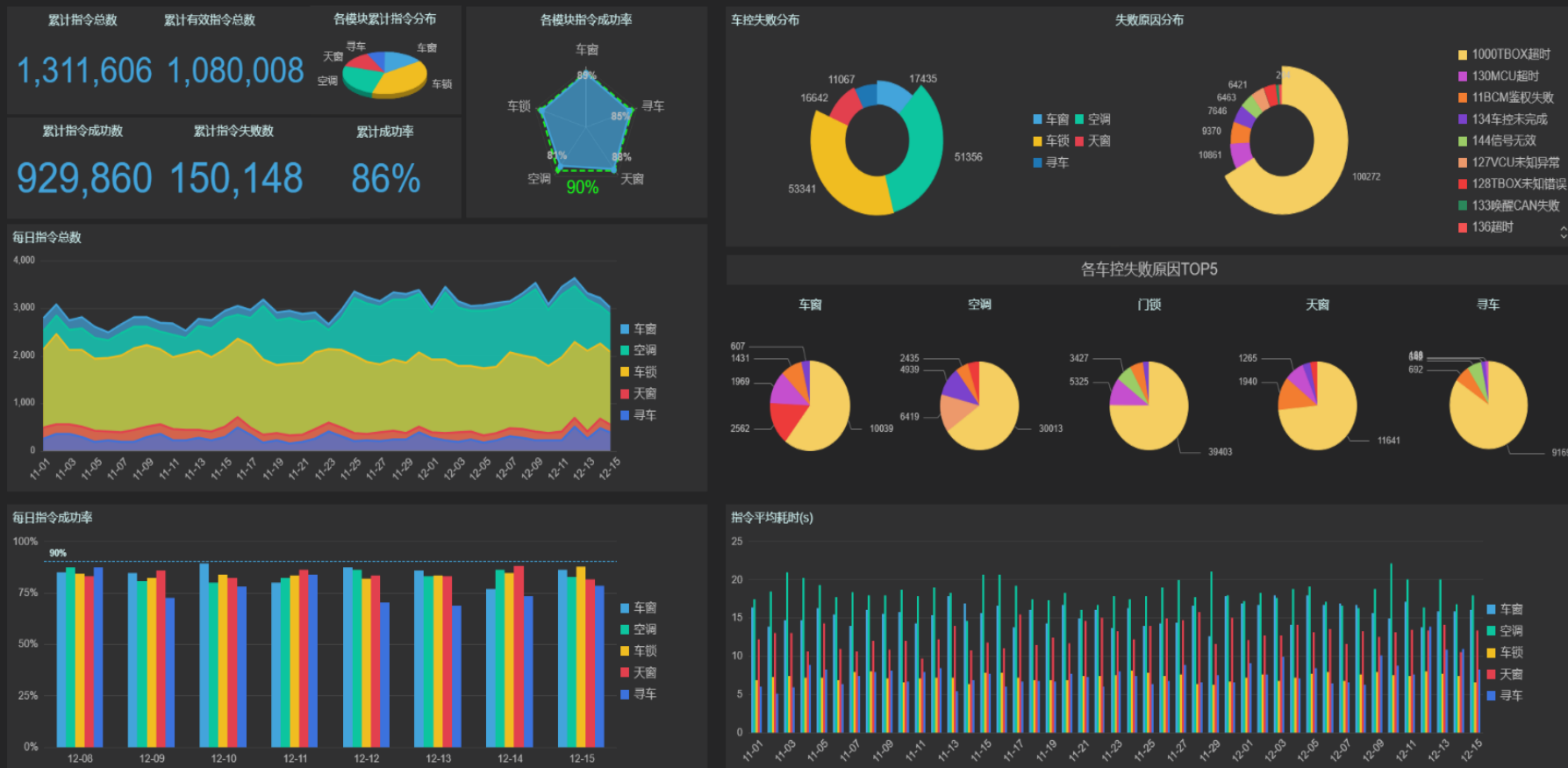


Internet Of Vehicle platform

Enterprise side: Provides automatic operation and maintenance services for automobile enterprises to reduce operation and maintenance costs

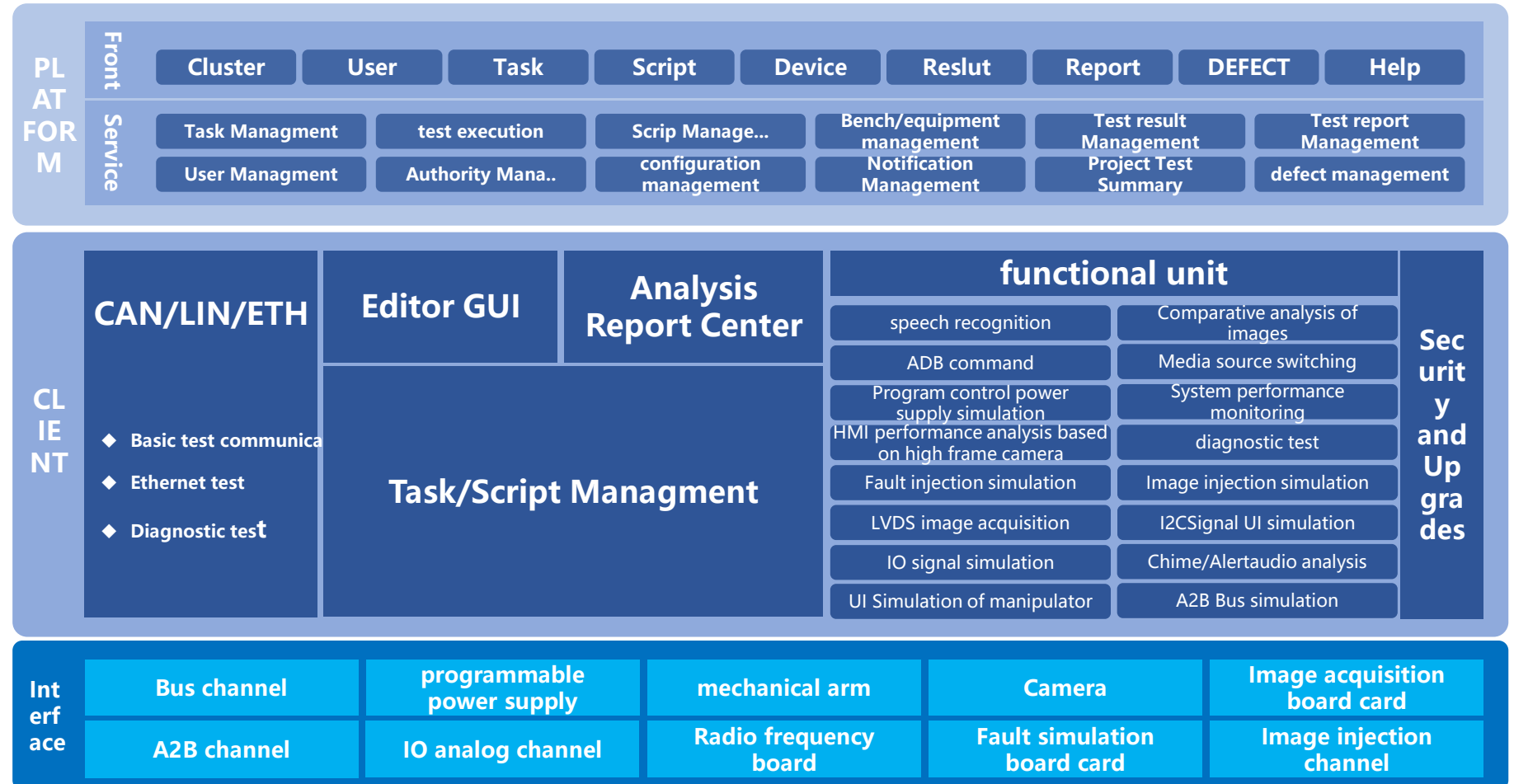
Client: remote startup and other convenient services

远程车控

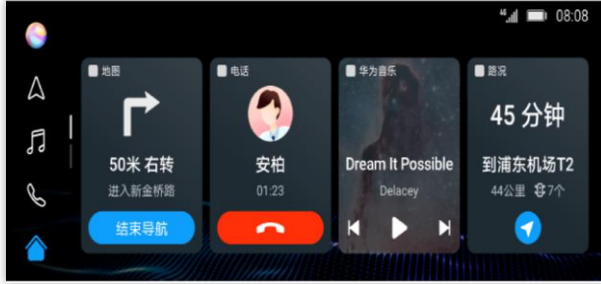


Automated test platform

- Java, Python language
- Support for mainstream communication tools
- Cloud BS architecture, client CS architecture
- HTML Report
- Supports multi-client login
- Support for use case repository sharing
- Integrating rich apis
- Local Server Deployment
- Private Cloud Deployment



Phone intelligent interconnection system



HiCar

- Huawei Share connection
- HiLink connects cars and homes
- Huawei and Android ecological
- Car and mobile phone hardware virtualization mutual aid
- Computing power has migrated to mobile phones



CarPlay

- Siri Speech recognition
- Bluetooth telephone
- Music, audio programs, audio books
- iPhone APP 3rd
- USB, IAP2



Android Auto

- Speech recognition
- Google Navigation
- Online music/radio
- Bluetooth telephone
- Sending and receiving Messages
- Android phones (Android 5.0 and above)
- USB Connection



Others

- CarLife
- WeLink
- Miracast
- HDMI+BT Back Control

Automotive Chipset



SOC/SOM Solution

D

DCU

R

RSE

A

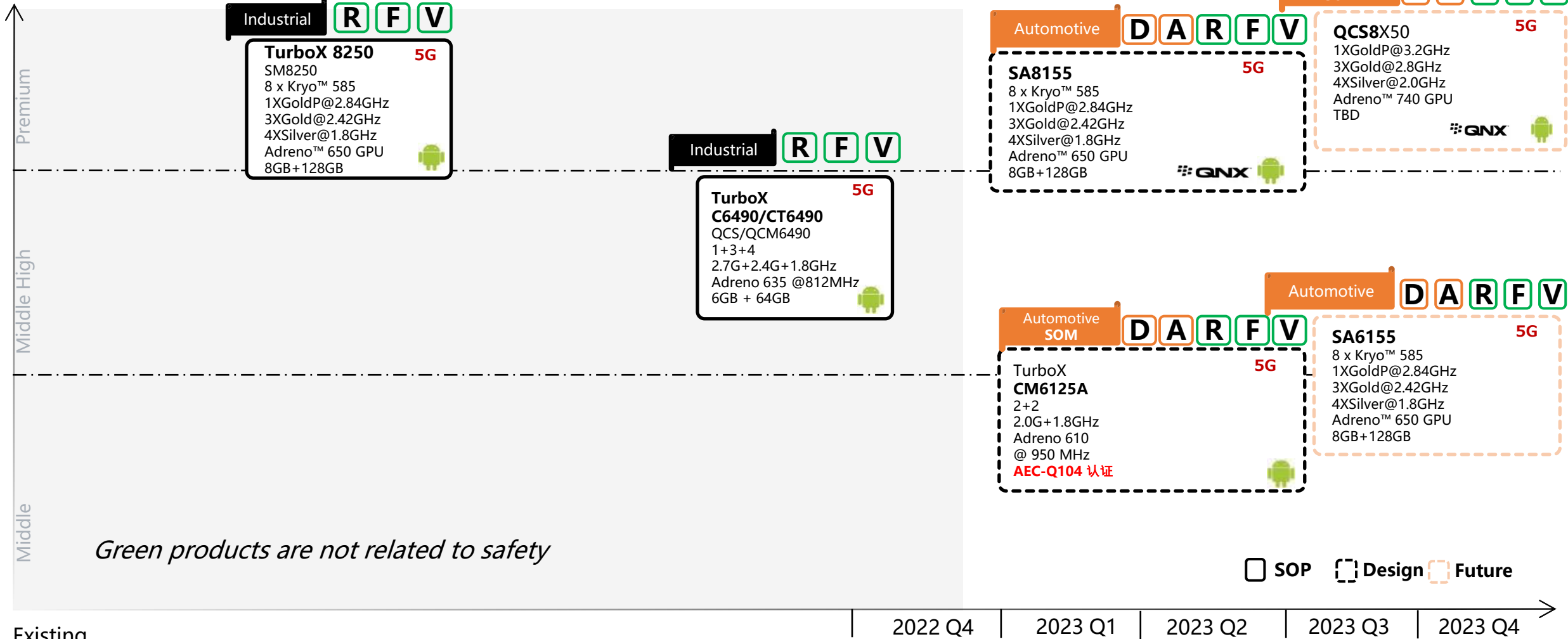
AVM

F

FSE

V

DVR



SOC/SOM SPEC

Item	Classify	SA8155P	SA6155P	CM6125A SOM	QCS8X50	QCS8250	QCS6490
SOC	AEC	AEC-Q100 Grade 3	AEC-Q100 Grade 3	AEC-Q104 Grade 3	NA	NA	NA
	ASIL	ASIL-B	ASIL-B	NA	NA	NA	NA
	Operating temperature	-40°C~105°C	-40°C~105°C	-40°C~85°C	-20°C~70°C	-20°C~70°C	-20°C~70°C
Performance	Applications	Automotive	Automotive	Automotive	Industrial IOT	Industrial IOT	Industrial IOT
	Process	7 nm	11nm	11nm	4nm	7 nm	6 nm
	CPU	1x gold – 2.419GHz 3x gold – 2.131 GHz 4x silver – 1.785 GHz	2*1.9GHz 6*1.59GHz	4x gold – 2.0 GHz 4x silver – 1.8 GHz	1XGoldP@3.2GHz 3XGold@2.8GHz 4XSilver@2.0GHz	1XGoldP@2.84GHz 3XGold@2.42GHz 4XSilver@1.8GHz	1XGoldP@2.7GHz 3XGold@2.4GHz 4XSilver@1.95GHz
	DIMPS	100K	50K	50K	230K	150K	100K
	GPU	Adreno™ 640 GPU	Adreno™ 612 GPU	Adreno™ 610 GPU	Adreno™740 GPU	Adreno™ 650 GPU	Adreno™ 643 GPU
	TOPS	8	1	1	50	15	12
	WIFI	External 2x2 802.11ax	External 2x2 802.11ax	External 2x2 802.11ax	External 2x2 802.11be	External 2x2 802.11ax	External 2x2 802.11ax
	BLE	BT5.0	BT5.0	BT5.0	BT5.3	BT5.1	BT5.2
	Display	2K 90hz	2K 90hz	2.5K 60Hz	4K 120 Hz	4K 60Hz/2K 120Hz	2K 90hz/FHD+ 144hz
	Video	4K120;4K60	4K120;4K60	4K60; 4K60	4K240/8K60	4K240;4K120	4K120;4K60
	Memory	LPDDR4 +UFS2.1	LPDDR4 +UFS2.1	LPDDR4 +UFS2.1	LPDDR5 +UFS3.1	LPDDR5 +UFS3.1	LPDDR5 +UFS3.1
OS		Android+Hypervisor	Android+Hypervisor	Android	Android+Hypervisor	Android	Android



Thundercomm

Empowering Every IoT Device with Our Technology



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