Quectel

SRG091X&SRG093X&SRM095X Series Short-Range Module Introduction

Duty of confidentiality

The Receiving Party shall keep confidential all documentation and information provided by Quectel, except when specific permission has been granted by Quectel. The Receiving Party shall not access or use Quectel's documentation and information for any purpose except as expressly provided herein. Furthermore, the Receiving Party shall not disclose any of the Quectel's documentation and information to any third party without the prior written consent of Quectel. For any non-compliance to the above requirements, unauthorized use, or other illegal or malicious use of the documentation and information, Quectel will reserve the right to take legal action.

Contents

NXP i.MX solution services

Module

Quectel module advantages

- Multi-platform and multi-OS
- Rich hardware configuration
- Rich multimedia features
- Rich value-added service
- Global/ regional variants and certifications

ODM/ JDM/ EMS PCBA

PCBA advantages

- Multi-platform and multi-OS
- Rich design capability
- Domestic & overseas self-owned manufacturing plants
- Global certifications and support

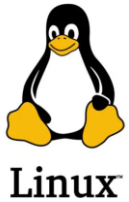
ODM/ JDM/ EMS device

Device advantages

- Full ID/ MD design services
- Strong delivery assurance capability
- Domestic & overseas self-owned manufacturing plants
- Complete experimental equipment
- Global certifications and support

NXP i.MX product and solution advantages

- **Long lifecycle**
  The lifecycle of i.MX chipset is 15 years, among which the i.MX9 chipset will be up to 2038, even longer.
- **Multiple products**
  Quectel provides entry/ medium/ high products
- **Multimedia features**
  Support display, camera, audio, motor and so on
- **Multiple operating systems**
  Yocto Linux/ Zephyr/ Android
- **Customized services**
  Customize different NXP i.MX products for the PCBA/device



NXP module highlights

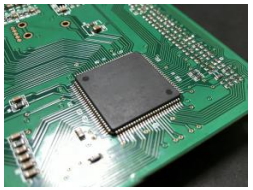
- **Multi-chip platform**
  i.MX91/ 93/ 95
- **Compatible design**
  i.MX93 module can be pin to pin with i.MX91
- **All-in-one module**
  Include CPU/ PMIC/ Wi-Fi combo/ LPDDR/ eMMC (or SPI Nand flash)
- **Wi-Fi/ Bluetooth/ 802.15.4 (Thread/ Zigbee) support.**

- **Matter**
  over Wi-Fi or Thread
- **Global certification**
  Compatible design
- **Multiple packaging**
  LGA, OSM, and the SMARC will be released
- **Supports coexistence between 5G/ 4G/ 3G/ 2G modules and Wi-Fi**
  The Wi-Fi and cellular modules can work together
- **Support Europe Cyber Resilience Act (CRA)**

The advantages of the SRG series module(MOB type) over the COB type

What's MOB

Module on board (MOB) is a board-level circuit that integrates a system function in a single module. It may integrate digital and analog functions on a single board.



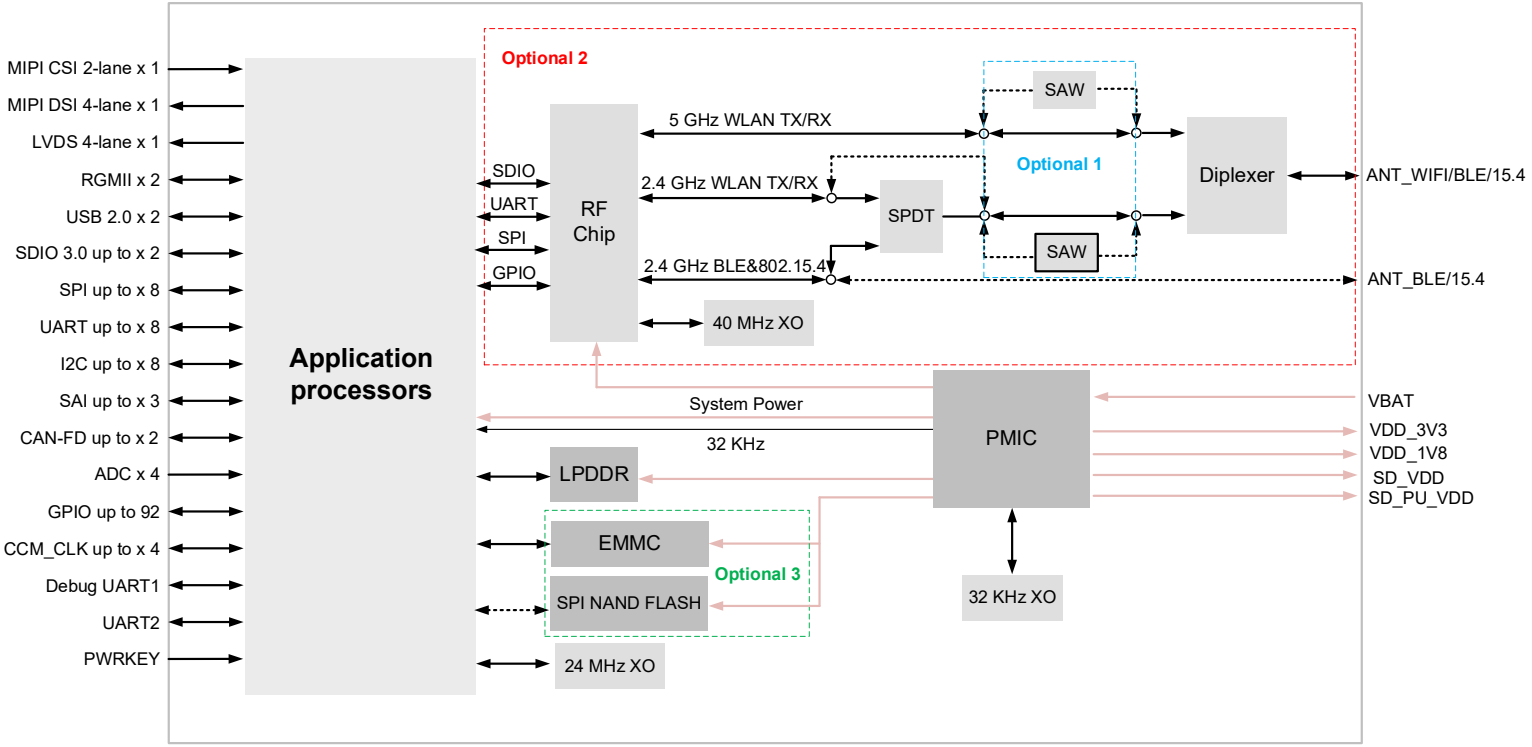
What's COB

Chip on board (COB) is a method of circuit board manufacturing in which the integrated circuits (e.g. microprocessors) are attached (wired, bonded directly) to a printed circuit board, and covered by a blob of epoxy.

The advantages for MOB type:

- **Easy design for customer. No design cost for i.MX solution**
  The module integrates CPU/ PMIC/ Wi-Fi/ LPDDR4(or LPDDR4X)/ Flash, the customer only needs to design the required interface on the PCBA.
- **Reduced PCB costs for customers**
  IMX9 chips require 6-layer or even 8-layer boards, while choosing a module typically only requires 4-layer or even 2-layer boards.
- **Reduced supply chain and inventory risks**
  Quectel manages the procurement of key materials, such as CPU/ PMIC/ Wi-Fi/ memory chip.
- **No need for in-house RF design expertise**
- **No cost for setting up manufacturing and test for i.MX solution**
- **Customer's product can refer to the certifications of Quectel module**

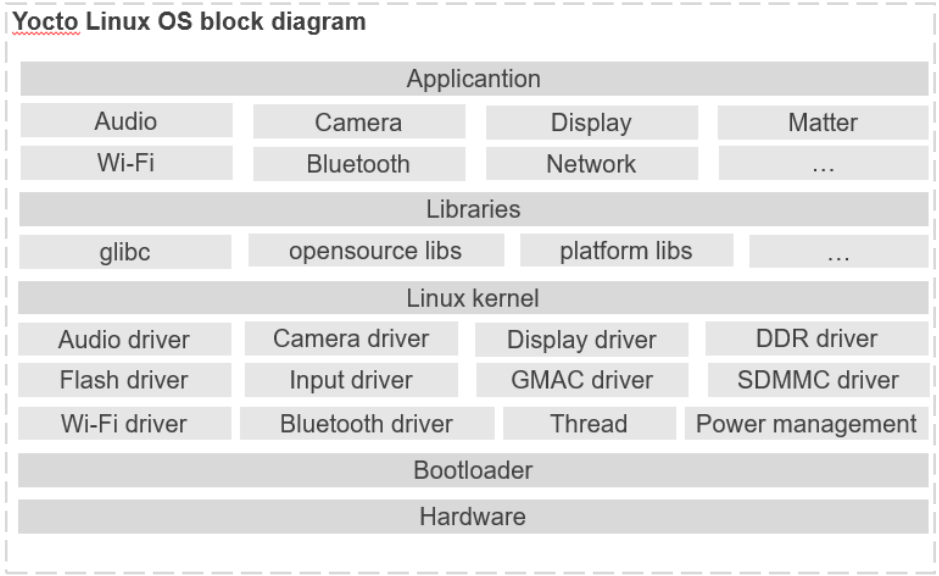
NXP i.MX module hardware block diagram

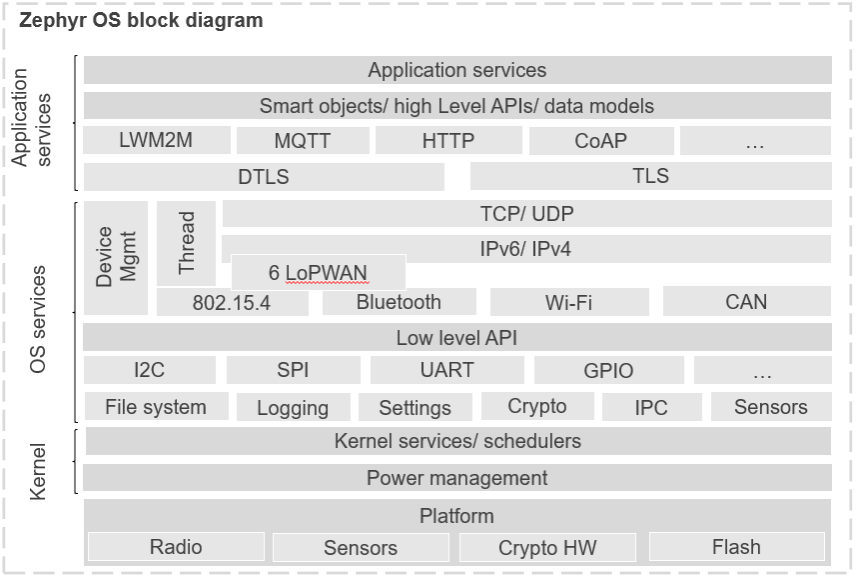


Optional 1: When paired with Quectel 2G/ 3G/ 4G/ 5G cellular modules, SAW can be selected to achieve excellent coexistence.
Optional 2: Depending on your wireless connectivity needs, you can choose other Quectel Wi-Fi/ Bluetooth modules.
Optional 3: Quectel module offers eMMC or low-cost SPI NAND flash for ROM.

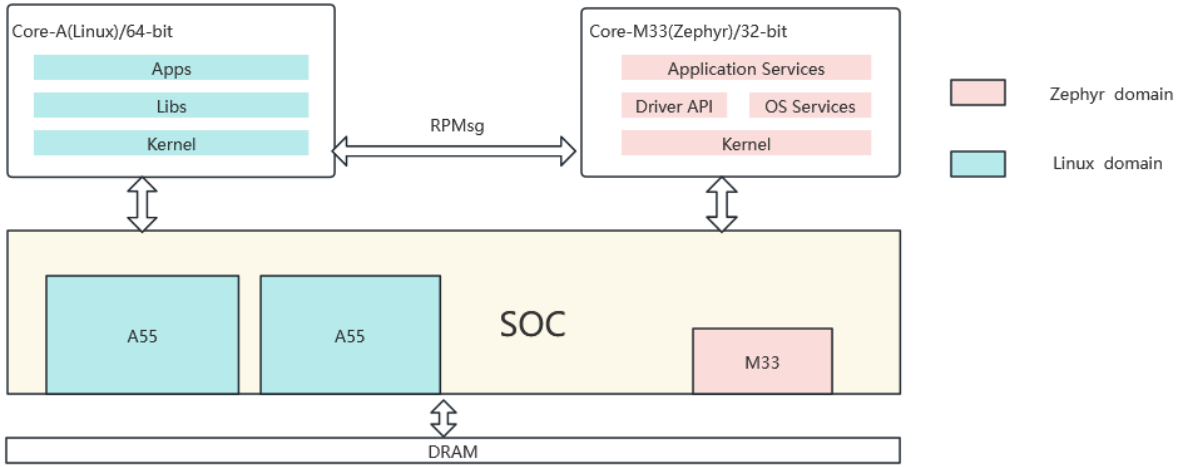
NXP i.MX module SDK

Quectel provides Yocto Linux and Zephyr SDK which include libs and source code to customer under NDA, will release android SDK.





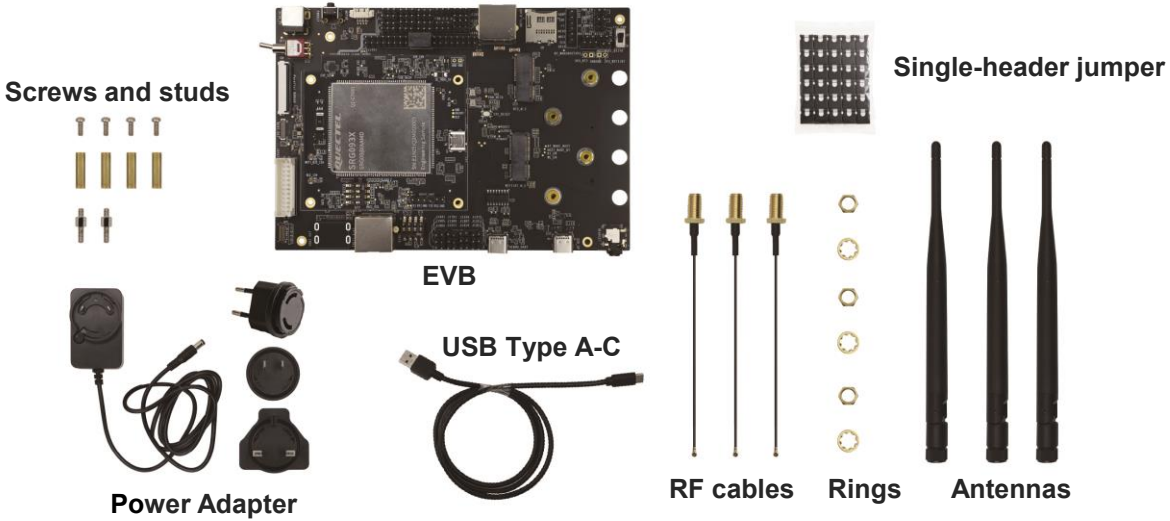
Two system advantage (only for SRG093X series and SRM095 module)



SRG093X series and SRM095X modules support Linux and Zephyr systems at the same time.

- Zephyr features millisecond-level startup time, allowing customers to achieve rapid system startup. At the same time, it also supports concurrent booting with the Linux system.
- Zephyr running on Cortex-M33 can achieve low-power operation and wake up Linux system when higher-performance processing is needed.

NXP i.MX module evaluation Kit for SW development




The back of EVB

Multiple interfaces on EVB

- UART
- USB Type C
- Mini PCIe for Quectel 5G/4G/3G/2G module
- M.2 for Quectel Wi-Fi/BT module
- Ethernet
- LCM(display)
- Audio
- Camera
- SIM
- SD
- Motor

Accessories List

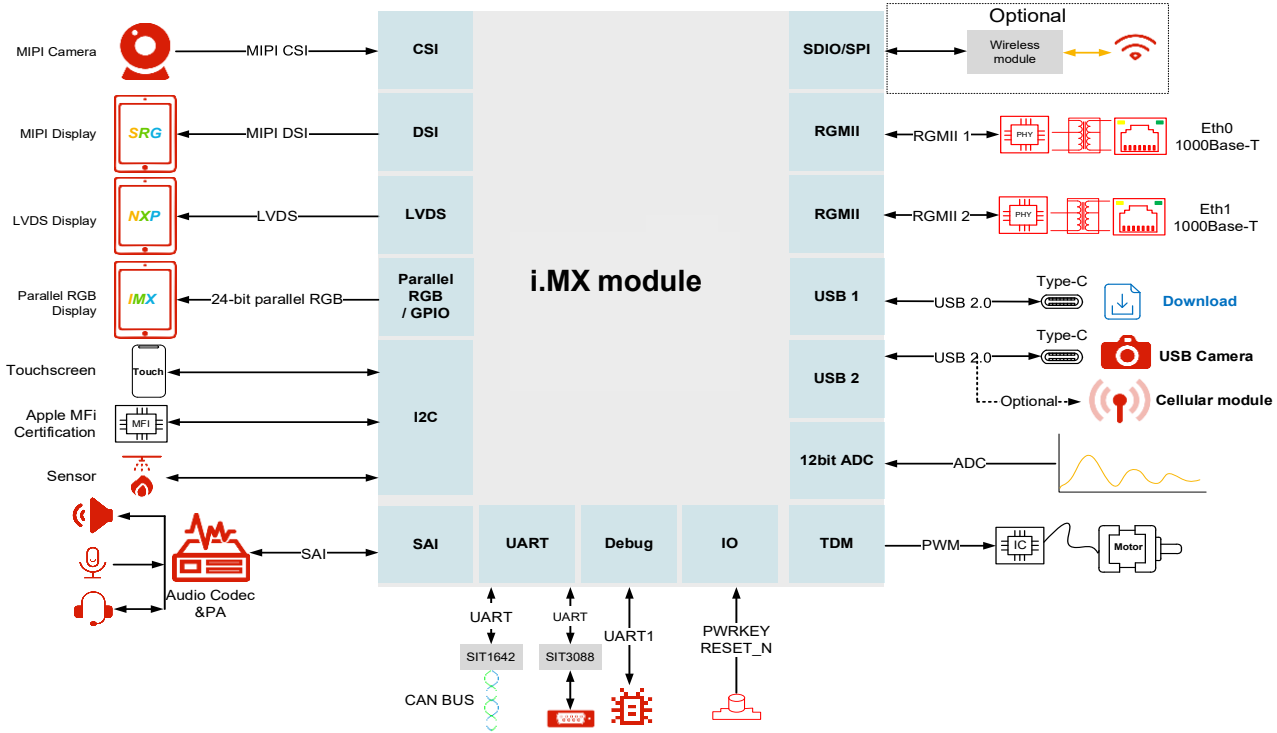
- Power Adapter × 1
  a) BS standard × 1
  b) EU standard × 1
  c) US standard × 1
- USB Type A- Type C × 1
- RF cable × 3
- Antenna × 3
- Single-header jumper × 30
- Screws for M.2 module × 2
- Screws for EVB × 4
- Studs for EVB × 4

Reference documents

- EVB User guide

How to design hardware base on Quectel module

The customer simply needs to connect the pins of the module to the corresponding driver ICs to enable the the desired functions, such as the screen or camera.



NXP i.MX9 module portfolio

High level	 (For reference only)	**SRM095X** (OSM packaging) Q3/26 • i.MX 9546 (OSM packaging) • Six arm Cortex-A55 1.8 GHz & Cortex-M33 • 2 GB LPDDR4X/ 64GB eMMc(Default) • Android/ Linux/ Zephyr system • Support display: RGB, MIPI, LVDS • Support camera • Temp.: -40 ℃ to +85 ℃ • Size: 45 × 45 × 3 mm
Medium level		**SRG093X** • i.MX 9332 • Dual arm Cortex-A55 1.7GHz&Cortex-M33 • 1 GB LPDDR4X/ 16 GB eMMc (default) • Linux/ Zephyr system (support two system at the same time) • Support display: RGB, MIPI, LVDS • Support camera • Temp.: -40 ℃ to +85 ℃ • Size: 46 × 41.5 × 3 mm
		**SRG093X-W** • i.MX 9332 + IW610G • Dual-arm Cortex-A55 1.7 GHz & Cortex-M33 • 2.4/ 5 GHz Wi-Fi6 • BLE 5.4 • 802.15.4 (Thread/ Zigbee) • 1 GB LPDDR4X/ 16GB eMMc (default) • Linux/ Zephyr system (support two system at the same time) • Support display: MIPI, LVDS • Support camera • Temp.: -40 ℃ to +85 ℃ • Size: 46 × 41.5 × 3 mm
Entry level		**SRG091X** • i.MX 9131 • Arm Cortex-A55 1.4GHz • 1GB LPDDR4/ 16GB eMMc (default) • Linux/ Zephyr system • Support display: RGB • Temp.: -40 ℃ to +85 ℃ • Size: 46 × 41.5 × 3 mm
		**SRG091X-W** • i.MX 9131 + IW610G • Arm Cortex-A55 1.4 GHz • 2.4/ 5 GHz Wi-Fi 6 • BLE 5.4 • 802.15.4 (Thread/Zigbee) • 1 GB LPDDR4/ 16 GB eMMc (default) • Linux/ Zephyr system • Temp.: -40 ℃ to +85 ℃ • Size: 46 × 41.5 × 3 mm

SRG091X/ SRG093X series specifications (NXP i.MX module)

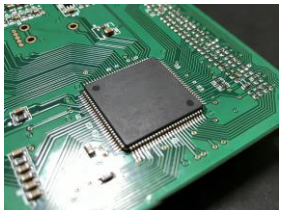
Module	SRG091X	SRG091X-W	SRG093X	SRG093X-W
Chipset	MIMX9131CVVXJAB	MIMX9131CVVXJAB; IW610G	MIMX9332CVVXMAC	MIMX9332CVVXMAC; IW610G
Size (mm)	46.0 × 41.5 × 3.0			
CPU	1 Arm Cortex-A55 @ 1.4 GHz Nominal mode; L2 cache 256 KB		2 Arm Cortex-A55 @ 1.7 GHz Nominal mode; L2 cache 64 KB; L3 cache 256 KB	
Micro controller	-		a Cortex-M33 @ 250 MHz	
Memory	LPDDR4, Default 1 GB, Max. 2 GB eMMC, Default 16 GB, Max. 256 GB;SPI NAND Flash, 512 MB(optional)		LPDDR4X, Default 1 GB, Max. 2 GB eMMC, Default 16 GB, Max. 256 GB; SPI NAND Flash, 512 MB(optional)	
OS	Linux or Zephyr		Linux, Zephyr(support two system at the same time)	
MIPI CSI	-		One 2-lane MIPI CSI-2 camera input	
Ethernet	Max. 2x Gbps Ethernet: AVB and IEEE 1588 for sync and EEE for low power. 1 w/TSN			
LCM(Display)	Parallel display: Max.1366 × 768p60 or 1280 × 800p60,24bpp RGB/YUV	-	4-lane MIPI DSI 1.2: up to 1920 × 1200p60; up to active pixel rate of 140 Mpixel/s with 24-bit RGB; up to 80 Mbps—1.5 Gbps per lane in high-speed operation; up to 10 Mbps in low power operation; 4-lane LVDS: Up to 1366 × 768p60 or 1280 × 800p60 Parallel display: Up to 1366 × 768p60 or 1280 × 800p60,24 bpp RGB(only SRG093X support)	
Camera	8-bit parallel YUV / RGB camera①	-	2-lane 1080p30 MIPI CSI/ parallel camera①	2-lane 1080p30 MIPI CSI
Audio	Serial audio interface, PDM, SPDIF			
USB	× 2, USB 2.0 with PHY			
GPIO	Max. × 92	Max. × 73	Max. × 92	Max. × 73
WLAN	-	2.4 & 5 GHz, Wi-Fi 6,802.11a/ b/ g/ n/ac/ax	-	2.4 & 5 GHz, Wi-Fi 6,802.11a/ b/ g/ n/ac/ax
Bluetooth	-	BLE 5.4	-	BLE 5.4
IEEE 802.15.4	-	Thread, Zigbee	-	Thread, Zigbee
Antenna	-	× 1, Wi-Fi/ Bluetooth & 802.15.4	-	× 1, Wi-Fi/ Bluetooth & 802.15.4
ADC	× 4, 12 bits		× 4, 12 bits	
CAN-FD	Max. × 2			
Other interference	SPI Max.× 8, UART Max.× 8, I2C Max.× 8	SPI Max.× 4, UART Max.× 6, I2C Max.× 7	SPI Max.× 8, UART Max.× 8, I2C Max.× 8	SPI Max.× 4, UART Max.× 6, I2C Max.× 7
Operating temperature	-40 °C to +85 °C			
Certification	CE② / FCC② / IC② / RCM② / SRRC②			
Project stage	ES			

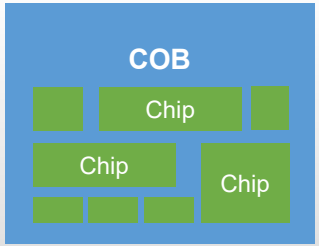
①: To be developed ②: In progress

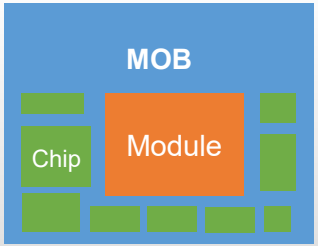
ODM/ JDM/ EMS introduction

- Focusing on customer needs, we provide ODM/ JDM/ EMS services and comprehensive hardware/ software customization solutions for devices.

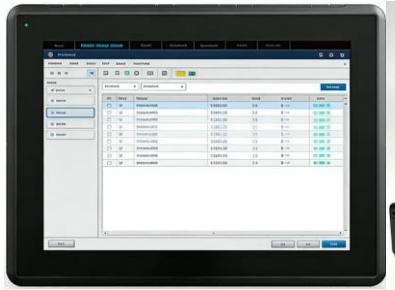
Type 1: PCBA







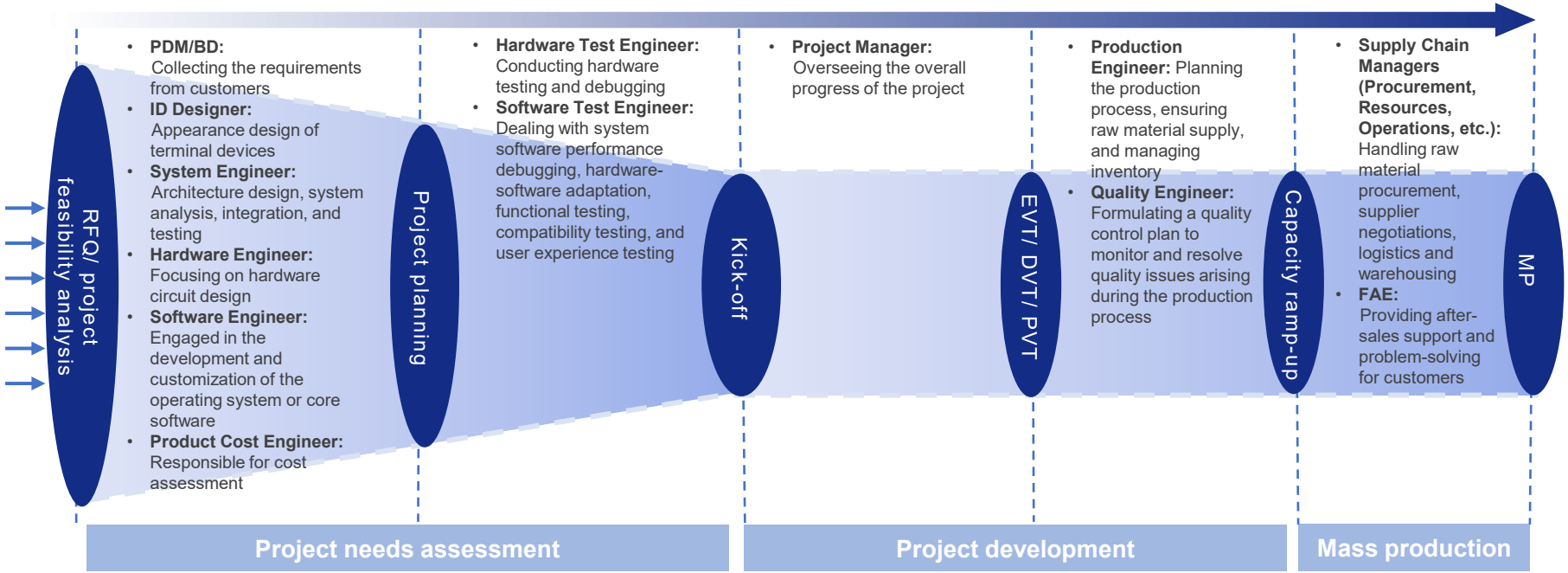
Type 2: Device



Customer benefits

	**R&D** ● A team of more than 300 R&D professionals ● Hardware: baseband design, RF design & antenna design ● Software: Architect, Protocol Stack Engineer, BSP, Kernel, Embedded Engineer
	**Supply Chain** ● Cost efficiency and shorter lead times, leveraging Quectel's robust supply chain network capable of delivering 400M+ modules annually
	**Production** ● Production in Quectel-owned factories or partnered CM facilities both within and outside China
	**Quality** ● Complete quality system, covering with hardware testing, software test and reliability test

Product development process



- Customization requirements and market analysis
- Initial product definition and feasibility study (hardware & software)
- Resource and budget estimation
- Milestone planning
- Key component BOM
- Preliminary industrial/structural design
- Business cooperation model finalization
- Project collaboration proposal

- Key material procurement
- Detailed project planning
- Detailed ID/MD design and tooling
- Hardware design and PCB layout
- Software development
- Prototype testing (functional & performance)
- Optimization and issue resolution

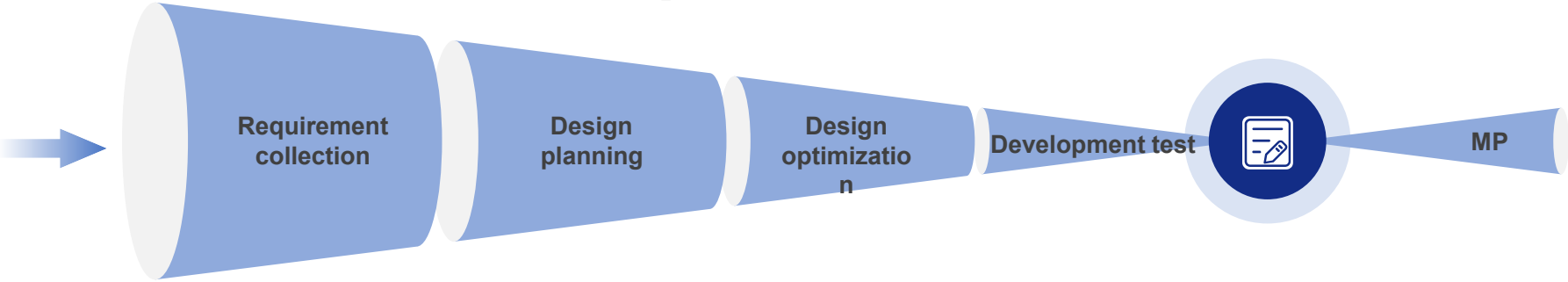
- Production line capacity assessment
- Mass production and delivery

ID/ MD service capability

ID: IoT products covering multiple vertical market, plus the ability to design the overall appearance of terminal

MD: Independent professional structural design team covering processes including stacking design, ID modeling, structural design, tooling and assembly.

Hardware service capabilities



Requirement analysis capability

- ODM development experience of more than 50 products across 6 industries such as AI Toy and USB dongle
- Massive industry requirement analysis with demand distillation
- Professional system architecture design team

Product design

- Extensive peripheral design capabilities (USB/ Charging/ PHY, etc.)
- Device antenna layout analysis and simulation
- Device antenna layout analysis and simulation
- EMC design

Thermal design

- Pre-design thermal simulation and thermal dissipation planning
- Post-design temperature rise testing
- Thermal performance optimization

Development test

- RF testing
- Power consumption testing
- Audio testing
- Reliability and environmental testing
- ESD testing

Mass production

- Automated test solution
- Production & test guidelines
- Production line maintenance guide

MOB utilizes self-developed modules, advanced and comprehensive hardware facilities, rapid-response technical support, and an extensive service network

System SW capabilities - Bluetooth stack

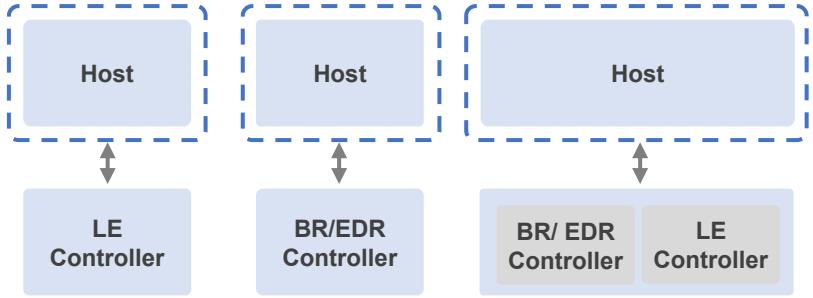
DynaBlue: Fully Supports BT V6.1 & LE Audio

- Multi-Platform support (x86/ x64/ ARM/ RISC-V...)
- Multi-OS compatibility (Linux/ Android)
- Broad Chipset Support (TI/ CSR/ Broadcom/ Qualcomm/ Cypress/ Amlogic...)
- Dual mode (BR/ EDR + BLE)
- Full feature set
- Multiple concurrent connections (classic Bluetooth & BLE)
- Dual role (BLE server/ client + classic dual role)
- Customizable code tailoring
- User-Friendly API interface

Quectel Bluetooth Stack

Fully compliant with Bluetooth specifications and BQB certified (DN: Q334135).

More detailed information:
https://qualification.bluetooth.com/ListingDetails/260621



De-sense service

De-sense Service advantages

De-sense team

De-sense methodology

EMC test system

OTA chamber

Diversity of IoT projects








De-sense service scope

R&D

- Device layout design review
- Schematic diagram & layouts review

EVT

- Noise/harmonic scanning
- Full channel De-sense testing

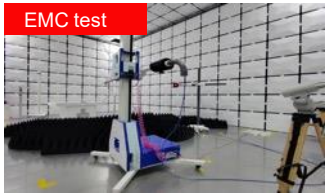
DVT

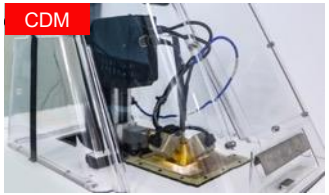
- OTA/ De-sense testing and debugging

State of the art laboratory facilities

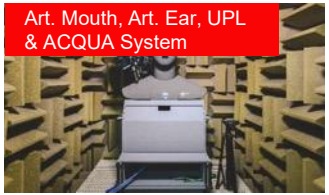
Our advanced laboratory ensures the reliability of Quectel modules. We also offer testing services for our customers' devices, thus saving them costs and accelerating time to market.

EMC



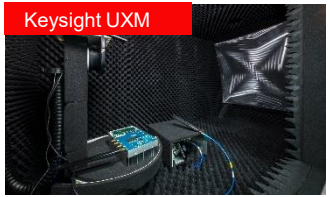


Audio



4000+ sqm
Total laboratory area

RF



Robot

5000+
Test stations

Failure analysis

Reliability

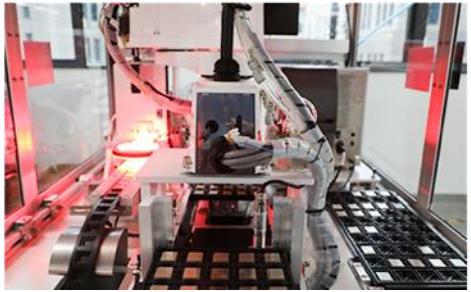
2500+
Global certifications achieved

Automatic production line

1 Automatic de-paneling machine & optical inspection system

2 Automatic download & RF calibration test station

3 Automatic module flatness inspection system



6 Real-time monitoring system for production line quick response

5 Automatic tape and reel packaging system

4 Convection oven for module de-humidification

Automation video link

Headquarters and global locations

Europe

Czech Republic: Prague
Denmark: Copenhagen
France: Nice/ Paris
Germany: Augsburg/ Berlin/ Hannover/ Munich
Ireland: Navan
Italy: Casatenovo/ Milan

Poland: Gdynia/ Warsaw/ Wroclaw
Serbia: Belgrade
Slovenia: Ljubljana
Spain: Barcelona
Sweden: Sollentuna/ Stockholm

Switzerland: Zurich
The Netherlands: Eindhoven
Turkey: Istanbul
UK: Birmingham/ London/ Manchester/ Oxford

North America

Canada:
Mississauga/ Toronto, ON
Vancouver, B.C

United States:
Alpharetta, GA
Chicago, IL
Houston/Round Rock/ San Marcos, TX
Irvine/Orange County/ San Diego/ Scotts Valley/ Silicon Valley, CA
Point Roberts, WA

Israel / Africa

Israel: Tel Aviv
South Africa:
Gauteng/ Johannesburg
Egypt: Cairo

Asia Pacific

Australia: Melbourne/ Sydney
India: Bangalore/ Delhi/ Hyderabad/Mumbai
Indonesia: Bandung/ Jakarta
Japan: Tokyo
Korea: Seoul
Malaysia: Penang

Pakistan: Lahore
Philippines: Manila/ Pasay City
Singapore
Thailand: Bangkok/ Samutprakarn
Vietnam: Hanoi/ Ho Chi Minh City

Latin America

Argentina: Buenos Aires
Brazil: Sao Paulo
Mexico: Mexico City/ Queretaro

Quality system (1)

Quectel obtained various quality certifications

ISO9001

INGGER

IATF16949

TUV

ISO 14001

INGGER

ISO45001

INGGER

ISO27001

XINGYUAN

ISO 21434

TUV

ASPICE

XIANQI

CMMI3

ZHITENG

ISO 17025

CNAS

ISO26262

BUREAU

Quality system (2)

Quectel products have been certified by various certification authority

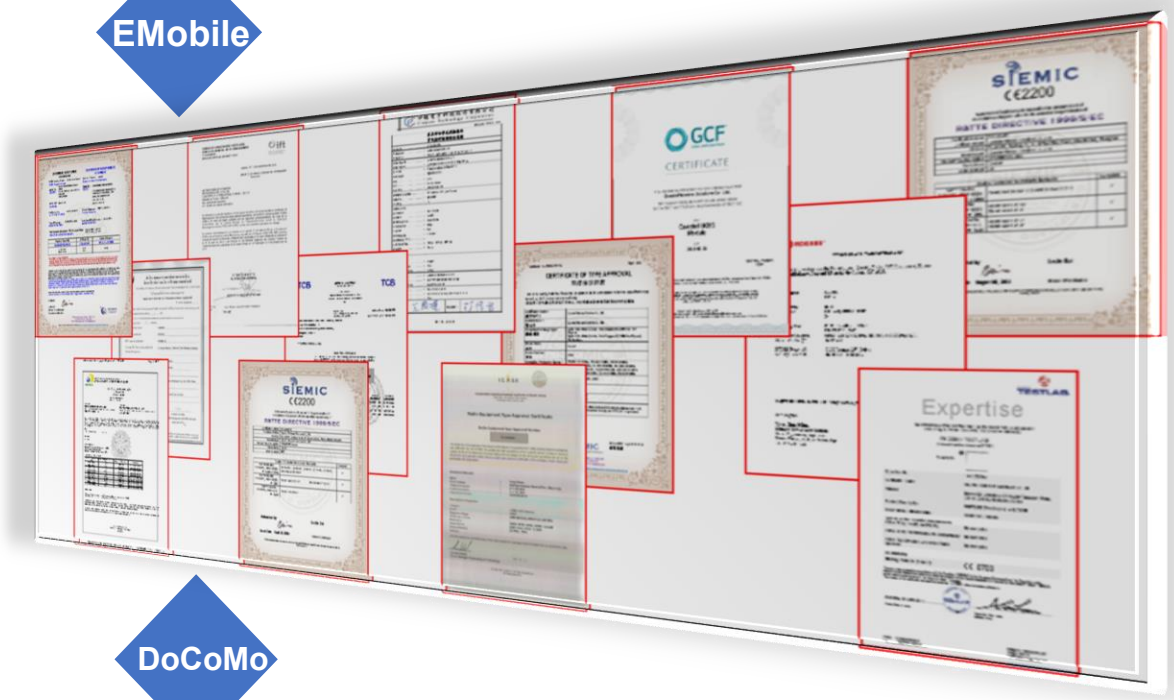
EMobile

Softbank

AT&T

CE

DoCoMo



Quality system (3)

Eight main factories, four of them are international factories.

Changzhou
China

Suzhou
China

Kunshan
China

Dongguan
China

Penang
Malaysia

Kulim
Malaysia

Gurugram
India

Manaus
Brazil

Name	Location	ISO 9001	IATF16949	ISO 14001	ISO 45001	ESD20.20	ISO13485	ODM Level
QWC	Changzhou	√	√	√	√	√	√	√
Qisda	Suzhou	√	√	√	√	√	√	√
MITAC	Kunshan	√	√	√	√	—	√	√
Sintave	Dongguan	√	√	√	√	—	—	√
IoTronix	Malaysia	√	Planning	√	√	Planning	—	√
BCM	Malaysia	√	√	√	√	—	—	√
SGS	India	√	√	√	√	—	—	√
New Kinpo	Brazil	√	√	√	√	—	—	—

Value-added services

To address the potential lack of suitable accessories, Quectel can provide these items together with its i.MX solutions

Key components:

- Display (LCM + TP) and driver chip
- Camera and driver chip
- Audio and driver chip
- Generator
- Chip for expanding GPIO

Applications

HMI

Industrial gateway

Camera

Smart home terminal

Medical device

Energy meter/ EV charging pile

Home energy management system

Smart lighting/ traffic control

Smart speaker

Printer/ scanner

POS

IP Phone

Thank you

For more information, please visit: quectel.com, LinkedIn, Facebook and X.
Media contact: media@quectel.com

Sales support: **sales@quectel.com**
Technical support: **support@quectel.com** General: **info@quectel.com**

QUECTEL