QUECTEL®
Build a Smarter World

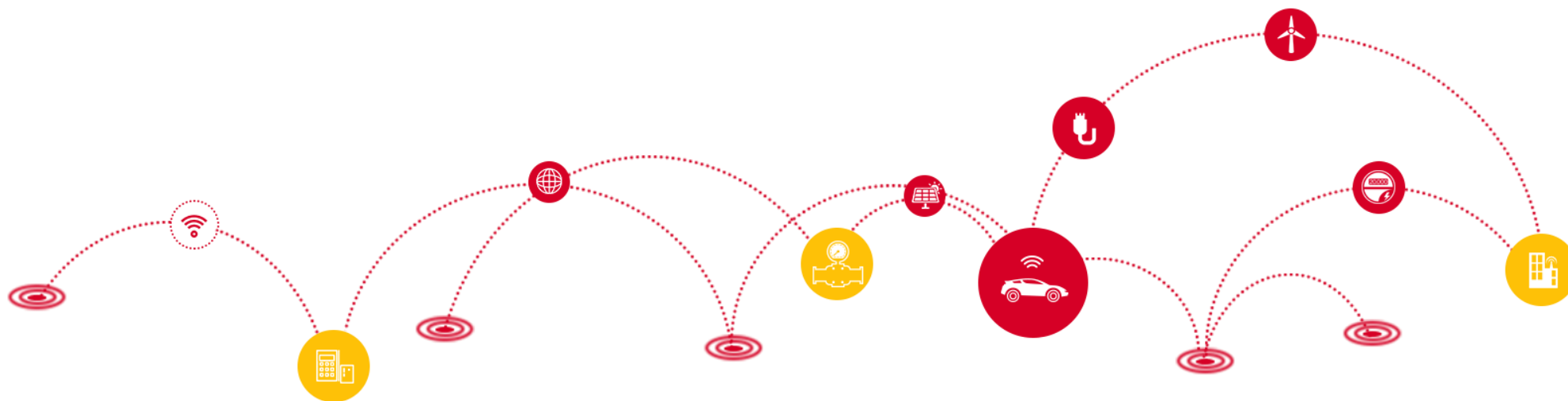# Quectel Wi-Fi/BT Module

Product Overview

February, 2020

Roadmap

Product Introduction

Technical Architecture

Applications

Wi-Fi/BT Modules Roadmap

QUECTEL
Build a Smarter World

Hosted Wi-Fi (Industrial Grade)

FC30R
- 802.11 b/g/n, 1×1, 2.4GHz
- SDIO

FC20
- 802.11 a/b/g/n/ac, 1×1, dual band
- BT 4.2
- SDIO, UART

FC20-N
- 802.11 b/g/n,1×1, 2.4GHz
- BT 4.2
- SDIO, UART

FG50V — *Feb. 2020*
- 802.11 a/b/g/n/ac/ax, 2×2+2×2, dual-band
- BT 5.1
- PCIe UART

Hosted Wi-Fi (Automotive Grade)

AF50T — *Mar. 2020*
- 802.11 a/b/g/n/ac/ax
- 2×2+2×2, dual-band
- BT 5.1
- PCIe, UART

AF20
- 802.11 a/b/g/n/ac, 1×1, dual-band
- BT 4.2
- SDIO, UART

AF30x — *Planning*
- 802.11 a/b/g/n/ac,
- 2×2+1×1, dual-band
- BT 5.1
- PCIe, UART

MCU Wi-Fi

MCU Wi-Fi Name TBD — *Planning*
- 802.11 b/g/n, 2.4GHz
- BT 5.0
- SDIO, UART, I2C…

MM/YYYY *Estimated Engineering Sample Dates*

2017	2018	2019	2020

Rev.: V1.1 | Status: Released

Wi-Fi/BT Modules Specifications

| Feature	FC20	FC20-N	AF20	FC30R	FG50V	AF50T	AF30x*	MCU Wi-Fi*[①]
Chipset	Qualcomm QCA1023	Qualcomm QCA1023	Qualcomm QCA6564A	Realtek RTL8189EM	Qualcomm QCA6391	Qualcomm QCA6696	TBD	TBD
WLAN Protocol	802.11 a/b/g/n/ac	802.11 b/g/n	802.11 a/b/g/n/ac	802.11 b/g/n	802.11 a/b/g/n/ac/ax	802.11 a/b/g/n/ac/ax	802.11 a/b/g/n/ac	802.11 b/g/n/
Wi-Fi Bands	2.4GHz/5GHz	2.4GHz	2.4GHz/5GHz	2.4GHz	2.4GHz/5GHz	2.4GHz/ 5GHz	TBD	2.4GHz
BT Protocol	BT 4.2	BT 4.2	BT 4.2	/	BT 5.1	BT 5.1	BT 5.1	TBD
Dimensions (mm)	16.6 × 13.0 × 2.1	16.6 × 13.0 × 2.1	17.2 × 15.2 × 2.26	12.0 × 12.0 × 2.1	19.5 × 21.5 × 2.1	19.5 × 21.5 × 2.3	TBD	TBD
Working Mode	AP/STA	AP/STA	AP/STA	AP/STA	AP/STA	AP/STA	TBD	TBD
Power Supply Voltage (V)	3.14V~3.46V, 3.3V Typ.	1.71V~1.89V, 1.8V Typ.	3.14V~3.46V, 3.3V Typ.	3.0V~3.6V, 3.3V Typ.	**VDD_CORE_VL:** 0.9~1.0, 0.95 Typ. **VDD_CORE_VM:** 1.28~1.42, 1.35 Typ. **VDD_CORE_VH:** 1.85~2.05, 1.95 Typ. **VDD_RF:** 3.3~4.25, 3.85 Typ.	**VDD_CORE_VL:** 0.9~1.0, 0.95 Typ. **VDD_CORE_VM:** 1.28~1.42, 1.35 Typ. **VDD_CORE_VH:** 1.85~2.05, 1.95 Typ. **VDD_RF:** 3.3~4.25, 3.85 Typ.	TBD	TBD
I/O Pins Supply Voltage Range (V)	1.71V~1.89V, 1.8V Typ.	1.71V~1.89V, 1.8V Typ.	1.71V~1.89V, 1.8V Typ.	1.75V~1.89V, 1.8V Typ.	1.7~1.9, 1.8 Typ.	1.7~1.9, 1.8 Typ.	TBD	TBD
Matched Cellular Module(s)	EC25&EC21& EC20 R2.1& EG2x-G	EC25&EC21& EC20 R2.1& EG2x-G	AG35	EC25&EC21& EC20 R2.1& EG2x-G	RG500Q	AG550Q/AG520R	TBD	TBD

"" means under development.*
①The module name of MCU Wi-Fi needs to be determined.
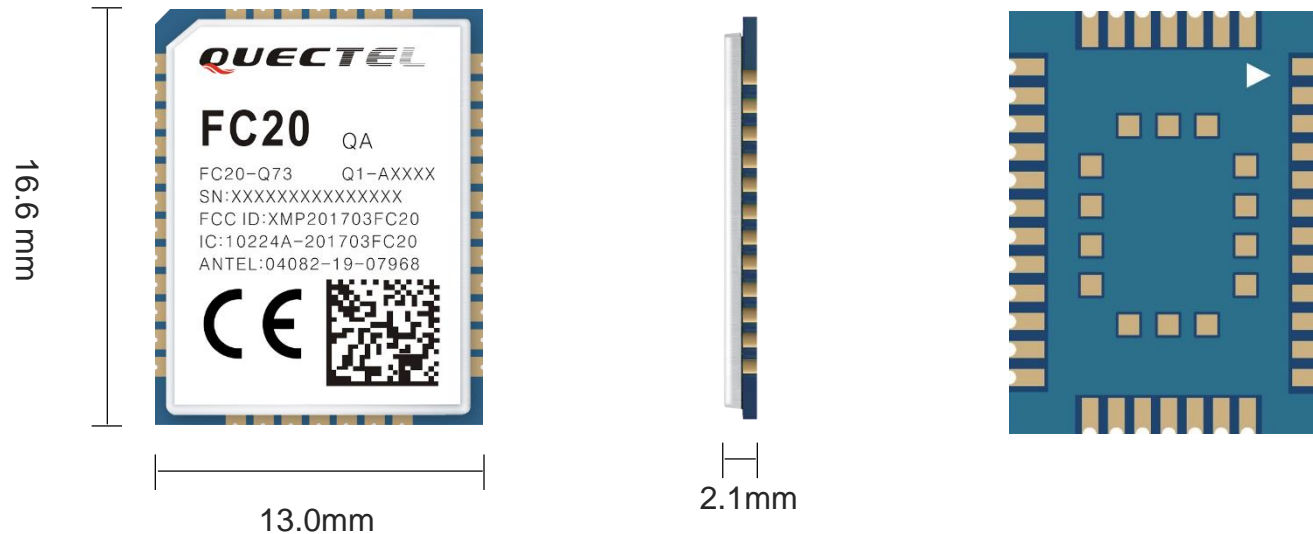
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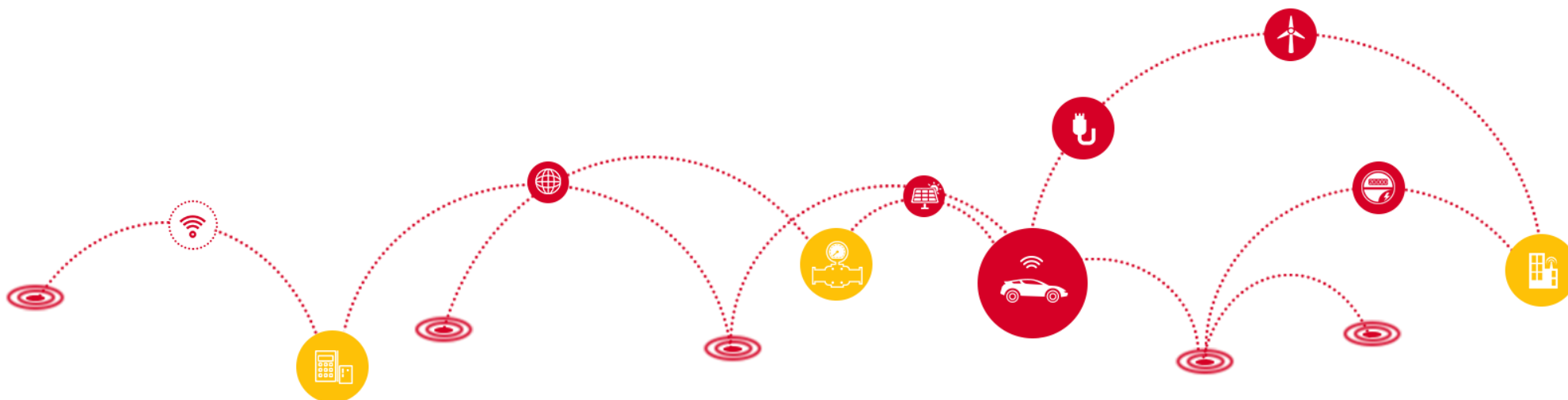
FC20 Highlights

Industrial Wi-Fi/BT Module (QCA1023)

16.6 mm

13.0mm

2.1mm

Length: 16.6mm (±0.15mm)
Width: 13.0mm (±0.15mm)
Height: 2.1mm (±0.20mm)
Weight: Approx. 0.81g

- Based on Qualcomm QCA1023 chipset solution for industrial Wi-Fi and BT applications

- Designed for working with Quectel LTE Standard modules

- 1×1 device supporting 802.11 a/b/g/n/ac BT 4.2 and 2.4GHz/5GHz dual-band

- Operate in soft-AP or station mode

- Wide operation temperature range (-40℃ to +85℃)

- Excellent co-existence with Quectel LTE Standard modules

- Excellent EMC/ESD protection ensures great robustness even in harsh environments

- Compact SMT form factor ideal for integration in slim and size-constrained solutions

FC20/FC20-N Specifications

Feature	FC20	FC20-N
WLAN Protocol	802.11 a/b/g/n/ac	802.11 b/g/n
Wi-Fi Bands	2.4GHz, 5GHz	2.4GHz
Wi-Fi Modulation	BPSK, QPSK, CCK, 16QAM, 64QAM, 256QAM	BPSK, QPSK, CCK, 16QAM, 64QAM
BT Protocol	BT 4.2	BT 4.2
Dimension	16.6mm × 13.0mm × 2.1mm	16.6mm × 13.0mm × 2.1mm
Working Mode	AP/ STA	AP/ STA
Interfaces	SDIO 3.0×1, BT_UART×1, DBG_TXD×1, 32KHz_IN×1, Wi-Fi&BT Antenna×1	SDIO 3.0×1, BT_UART×1, DBG_TXD×1, 32KHz_IN×1, Wi-Fi&BT Antenna×1
Power Supply Voltage Range	3.14V~3.46V, 3.3V Typ.	3.14V~3.46V, 3.3V Typ.
I/O Pins Supply Voltage Range	1.71V~1.89V, 1.8V Typ.	1.71V~1.89V, 1.8V Typ.
Security	WEP/ TKIP/ AES/ WPA-PSK/ WPA2-PSK	WEP/ TKIP/ AES/ WPA-PSK/ WPA2-PSK
Extended Temperature Range	-40°C to +85°C	-40°C to +85°C
Region	Global	Global
Certification	**Regulatory：** CE/ FCC/ IC/ Anatel/ JATE/ TELEC	**Regulatory：** CE/ FCC/ IC/ Anatel/ JATE/ TELEC

"" means under development.*
① FC20/FC20-N must work with EC20CE_FASG, EC25-AF and EC25G/ EG21-G to provide Wi-Fi/BT function, other matched modules are under development.

FC30R Highlights

Industrial Wi-Fi/BT Module (RTL8189EM)
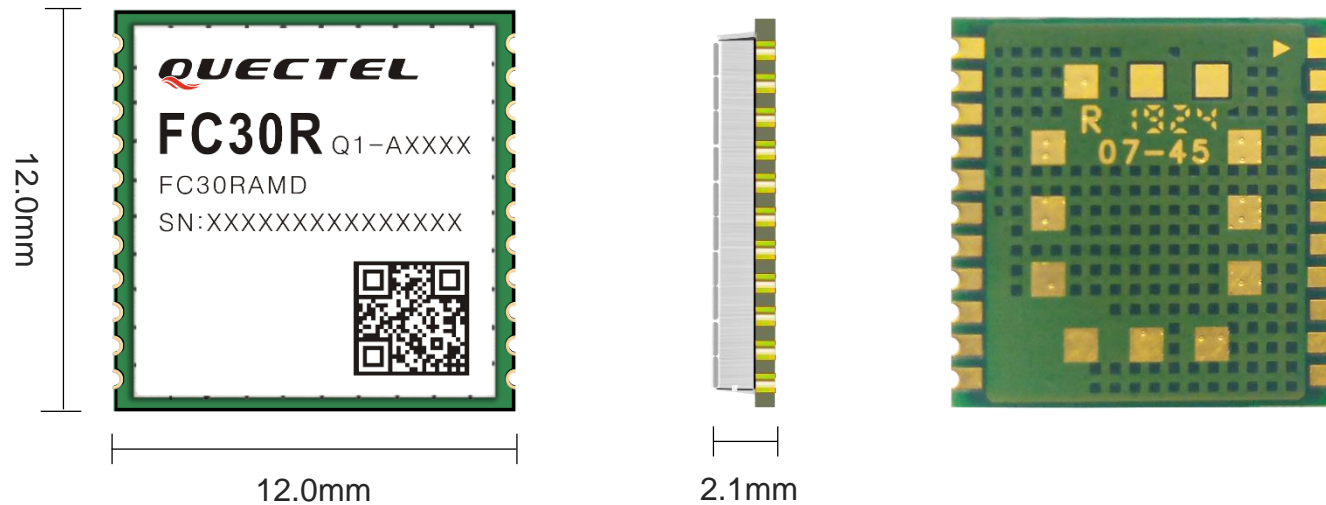
Length: 12.0mm (±0.15mm)
Width: 12.0mm (±0.15mm)
Height: 2.1mm (±0.20mm)
Weight: Approx. 0.57g

- Realtek RTL8189EM chipset solution for industrial Wi-Fi applications

- Designed for working with Quectel LTE Standard modules

- 1 x 1 device supporting 802.11 b/g/n and 2.4GHz

- Cost-effective Wi-Fi only solution

- Wide operation temperature range (-30℃ to +85℃)

- Excellent EMC/ESD protection ensures great robustness even in harsh environments

- Compact SMT form factor ideal for integration in slim and size-constrained solutions

FC30R Specifications

P/N	FC30R
WLAN Protocol	802.11 b/g/n
Wi-Fi Bands	2.4GHz
Wi-Fi Modulation	BPSK, QPSK, CCK, 16QAM, 64QAM
Module Size	12.0mm × 12.0mm × 2.1mm
Work Mode	AP/STA*
VBAT	3.0V~3.6V, 3.3V Typ.
Interface	SDIO 3.0×1, Wi-Fi×1
V I/O	1.75V~1.89V, 1.8V Typ.
Security	TKIP/ AES/ WPA-PSK/ WPA2-PSK
Extended Temperature Range	-30°C to +85°C
Region	Global
Certification	**Regulatory:** CE*/ FCC*/ IC*/ Anatel*/ JATE*/ TELEC*

"" means under development/planning.*

FG50V Highlights

Industrial Wi-Fi/BT Module (QCA6391)
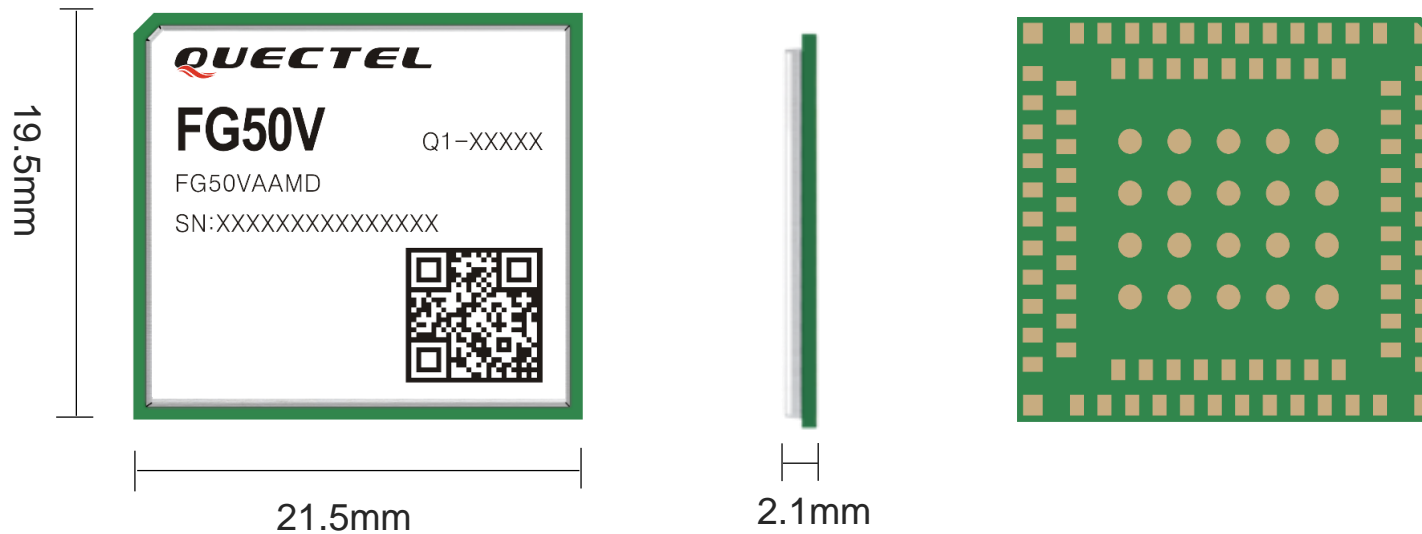
19.5mm

21.5mm

2.1mm

Length: 19.5mm (±0.20mm)
Width: 21.5mm (±0.20mm)
Height: 2.1mm (±0.20mm)

- ▪ Qualcomm QCA6391 chipset solution for industrial Wi-Fi/BT applications

- ▪ Design for working with Quectel 5G module

- ▪ 2×2+2×2 device supporting 802.11 a/b/g/n/ac/ax and 2.4GHz/5GHz dual-band

- ▪ Operate in soft-AP and station mode and support BT 5.1

- ▪ Wide operation temperature range (-40℃ to +85℃)

- ▪ Excellent EMC/ESD protection ensures great robustness even in harsh environments

- ▪ Compact SMT form factor ideal for integration in slim and size-constrained solutions

FG50V Specifications

P/N	FG50V
Chip	QCA6391
WLAN Protocol	802.11 a/b/g/n/ac/ax, 2×2+2×2, dual MAC
Wi-Fi Bands	2.4GHz/ 5GHz
Wi-Fi Modulation	BPSK, QPSK, CCK, 16QAM,64QAM, 256QAM, 1024QAM
BT Protocol	BT 5.1
Module Size	19.5mm × 21.5mm × 2.1mm
Work Mode	AP/STA
VBAT	VDD_RF, VDD_CORE_VL, VDD_CORE_VM, VDD_CORE_VH, VDD_IO
Interface	PCIe, WLAN_EN, UART, PCM, BT_EN, GPIOs
Security	WPA3
Operation Temperature Range	-40℃ to +85℃
Region	Global
Certification	**Regulatory:** FCC*/ IC*/ CE*/ TELEC*/ JATE*/ Anatel*

"" means under planning.*

FG50V Timeline

| 2019			2020									
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.

Project Schedule

FG50V

ES   CS   MP

ES: Engineering samples ready. Basic functions are available for customers' simple demo purpose.
CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.
MP: Hardware and software ready for mass production. For certification status, please refer to the "certification schedule".

Regulatory Certification Schedule

FCC/CE

Start (Planned)   **Complete (Planned)**

AF20 Highlights

Automotive Wi-Fi/BT Module (QCA6564A)
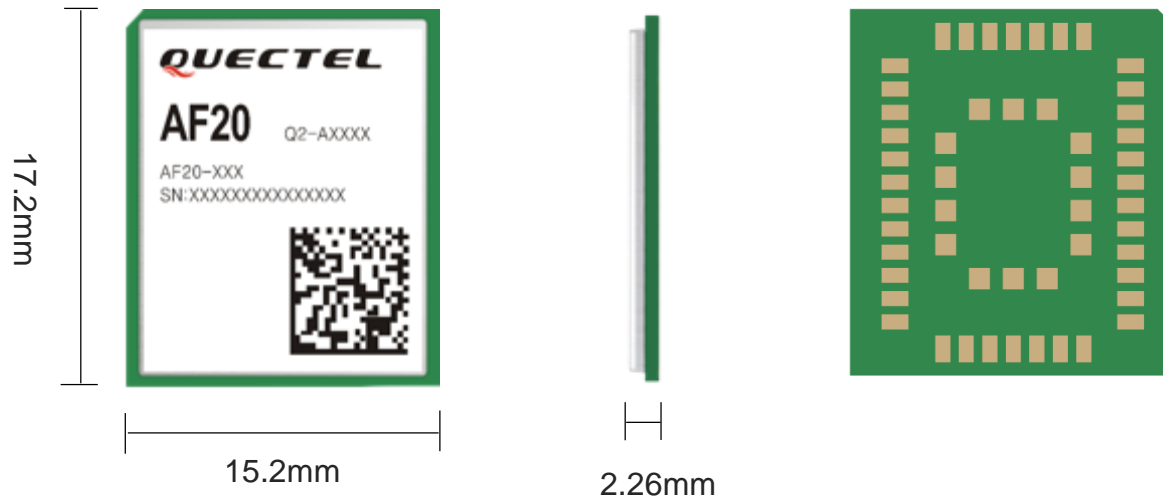
17.2mm

15.2mm

2.26mm

Length: 17.2mm (±0.15mm)
Width: 15.2mm (±0.15mm)
Height: 2.26mm (±0.20mm)
Weight: 1.26g

- Qualcomm QCA6564A chipset solution dedicated for automotive applications
- Designed for working with Quectel AG35 module
- 1×1 device supporting 802.11 a/b/g/n/ac and 2.4GHz/5GHz dual-band
- Operate in soft-AP or station mode and support BT 4.2
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Wide operation temperature range (-40℃ to +85℃)
- Excellent EMC/ESD protection ensures great robustness even in harsh environments
- Compact SMT form factor ideal for integration in slim and size-constrained automotive solutions

AF20 Specifications

Item	AF20
Chip	QCA6564A
WLAN Protocol	802.11 a/b/g/n/ac, 1×1
Wi-Fi Bands	2.4GHz/ 5GHz
Wi-Fi Modulation	BPSK, QPSK, CCK, 16QAM, 64QAM, 256QAM
BT Protocol	BT 4.2
Work Mode	AP/ STA
Power Supply	3.14V~3.46V, 3.3V Typ.
Interface	SDIO 3.0×1, LTE_UART×1, 32KHz_IN×1, Wi-Fi/BT×1
I/O Port Power Domain	1.71V~1.89V, 1.8V Typ.
Security	WEP/ TKIP/ AES/ WPA-PSK/ WPA2-PSK
Extended Temperature Range	-40℃ to +85℃
Region	Global
Certification	**Regulatory：** FCC*/ IC*/ CE*/ TELEC*/ JATE*/ Anatel*

"" means under planning.*

AF50T Highlights

Automotive Wi-Fi/BT Module (QCA6696)
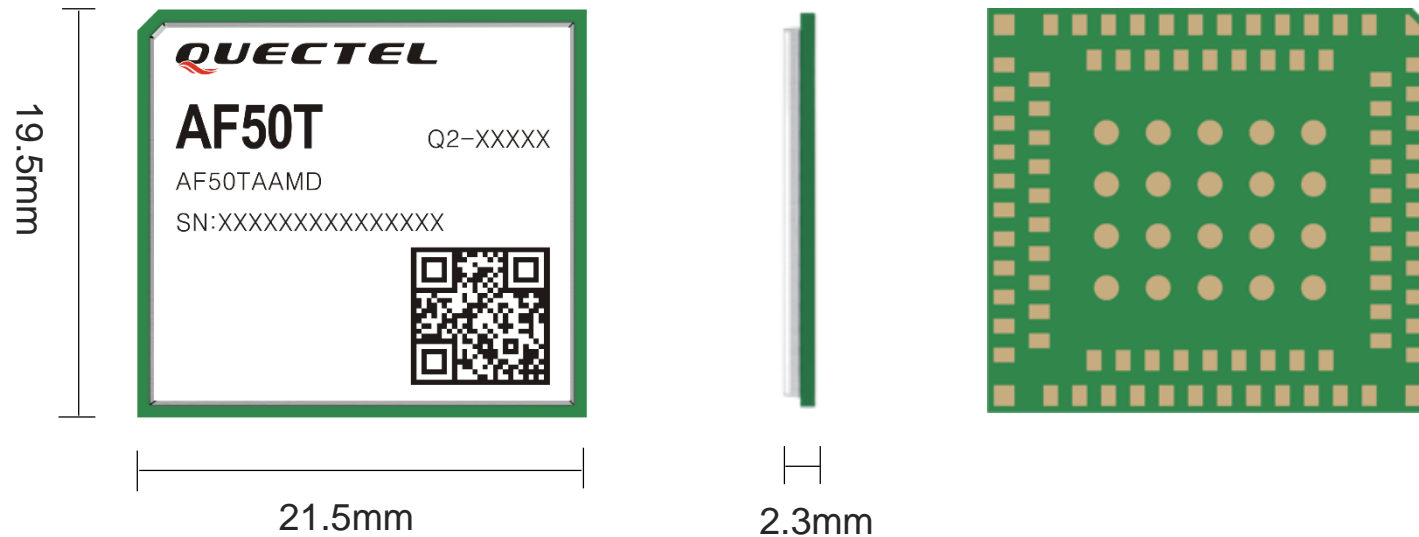
Length: 19.5mm (±0.20mm)
Width: 21.5mm (±0.20mm)
Height: 2.3mm (±0.20mm)

19.5mm

21.5mm

2.3mm

- Qualcomm QCA6696 chipset solution dedicated for automotive applications
- Designed for working with Quectel AG550Q/AG520R module
- Support 802.11 a/b/g/n/ac/ax Wi-Fi and Dual-Band Simultaneous (DBS) with dual-MAC
- Operate in soft-AP and station mode and support BT 5.1
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Wide operation temperature range (-40℃ to +85℃)
- Excellent EMC/ESD protection ensures great robustness even in harsh environments
- Compact SMT form factor ideal for integration in slim and size-constrained automotive solutions

AF50T Specifications

Item	AF50T
Chip	QCA6696
WLAN Protocol	802.11 a/b/g/n/ac/ax, 2×2+2×2, dual MAC
Wi-Fi Bands	2.4GHz/ 5GHz
Wi-Fi Modulation	DBPSK, DQPSK, CCK, BPSK, QPSK, QAM, MU-MIMO-OFDMA
BT Protocol	BT 5.1
Work Mode	AP/ STA
Power Supply	VDD_RF, VDD_CORE_VL, VDD_CORE_VM, VDD_CORE_VH, VDD_IO
Interfaces	PCIe, WLAN_EN, UART, PCM, BT_EN, GPIOs
Security	WPA3
Extended Temperature Range	-40℃ to +85℃
Region	Global
Certification	FCC*/ IC*/ CE*/ TELEC*/ JATE*/ Anatel*

"" means under planning.*

AF50T Timeline

2019			2020									
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
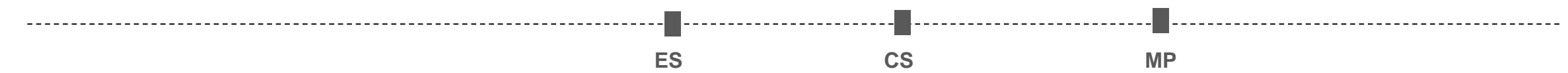
Project Schedule

■ ES   ■ CS   ■ MP

ES: Engineering samples ready. Basic functions are available for customers' simple demo purpose.
CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.
MP: Hardware and software ready for mass production. For certification status, please refer to the "certification schedule".
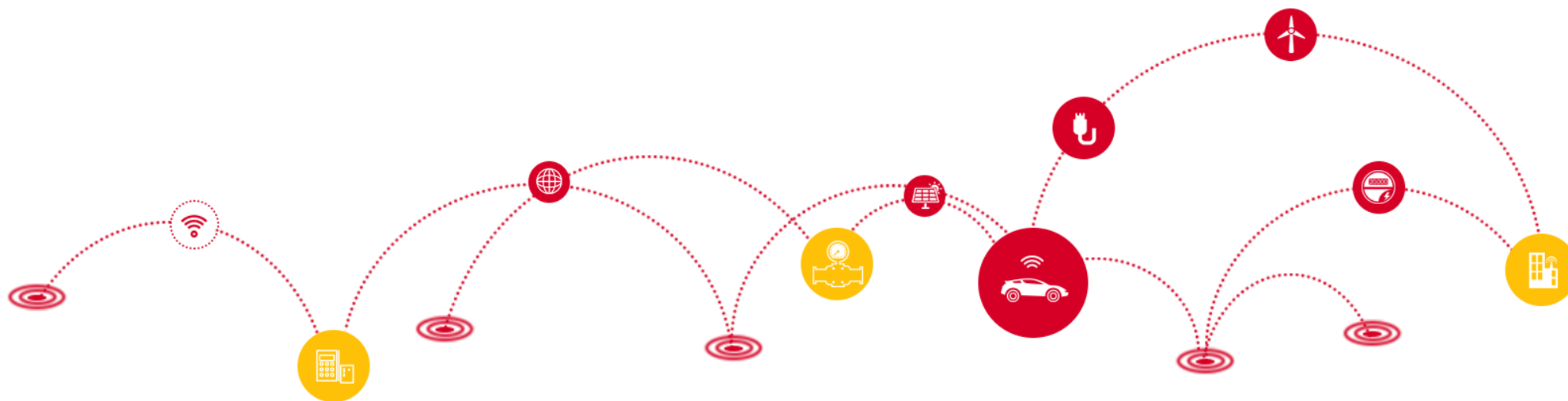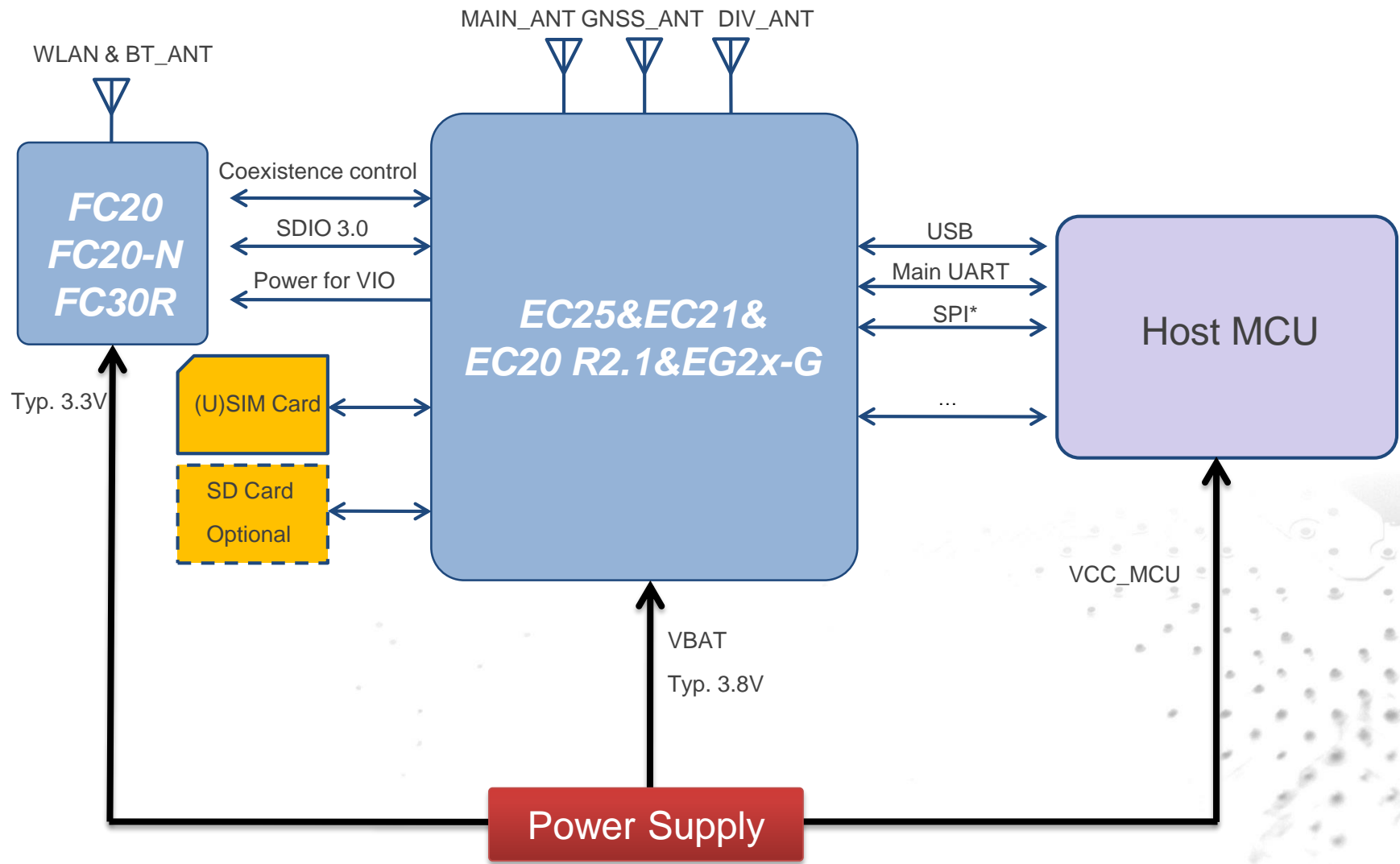
Regulatory Certification Schedule

CE/FCC ────── **Start (Planned)** ───────────→ **Complete (Planned)**

Roadmap

Product Introduction

Technical Architecture

Applications

EC2x + FC20/FC30R Solution

WLAN & BT_ANT

MAIN_ANT GNSS_ANT DIV_ANT

**FC20
FC20-N
FC30R**

Coexistence control

SDIO 3.0

Power for VIO

Typ. 3.3V

(U)SIM Card

SD Card

Optional

**EC25&EC21&
EC20 R2.1&EG2x-G**

USB

Main UART

SPI*

...

Host MCU

VCC_MCU

VBAT

Typ. 3.8V

Power Supply

"" means under development.*

RG500Q + FG50V Solution
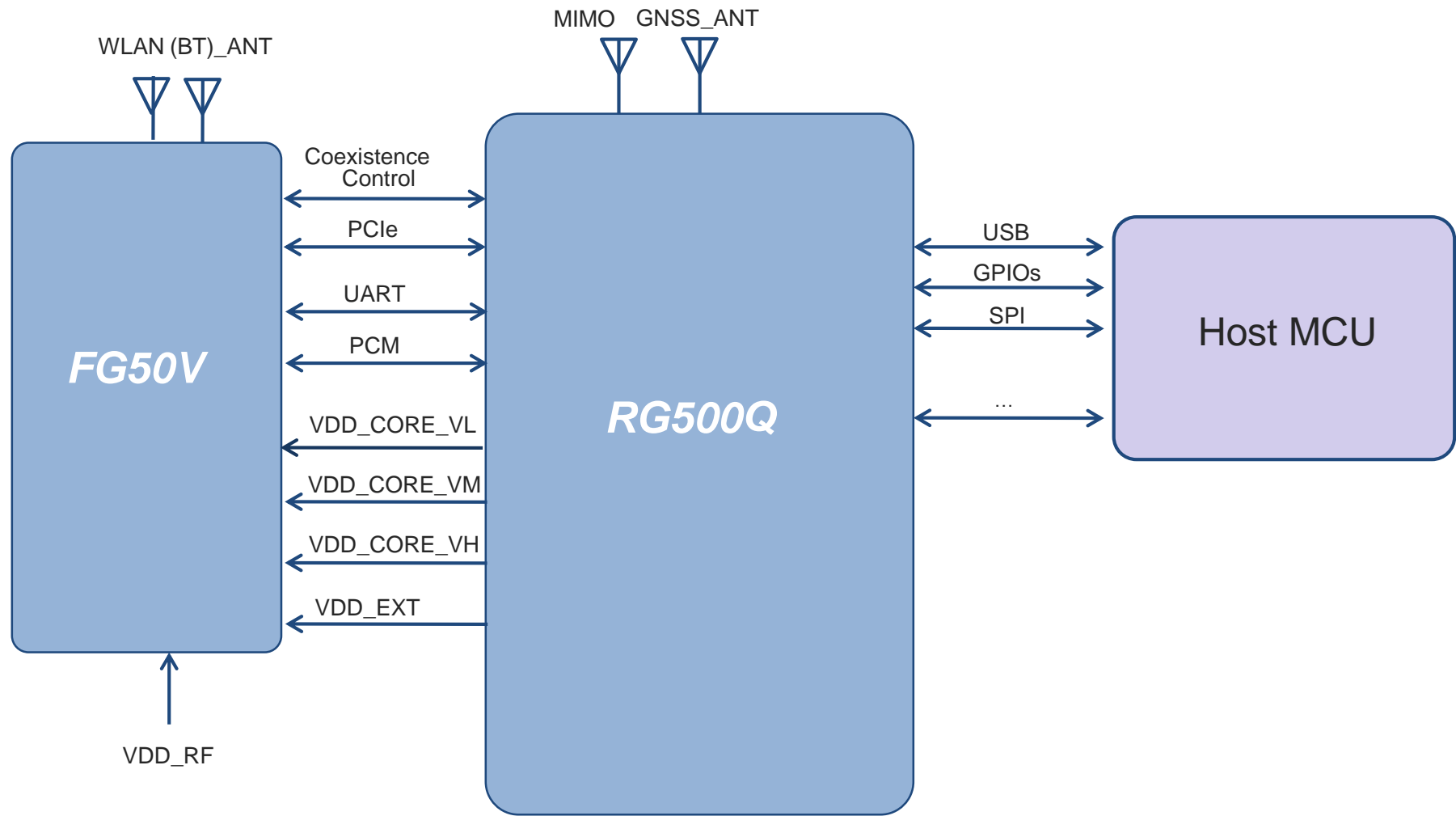
AG35 + AF20 Solution
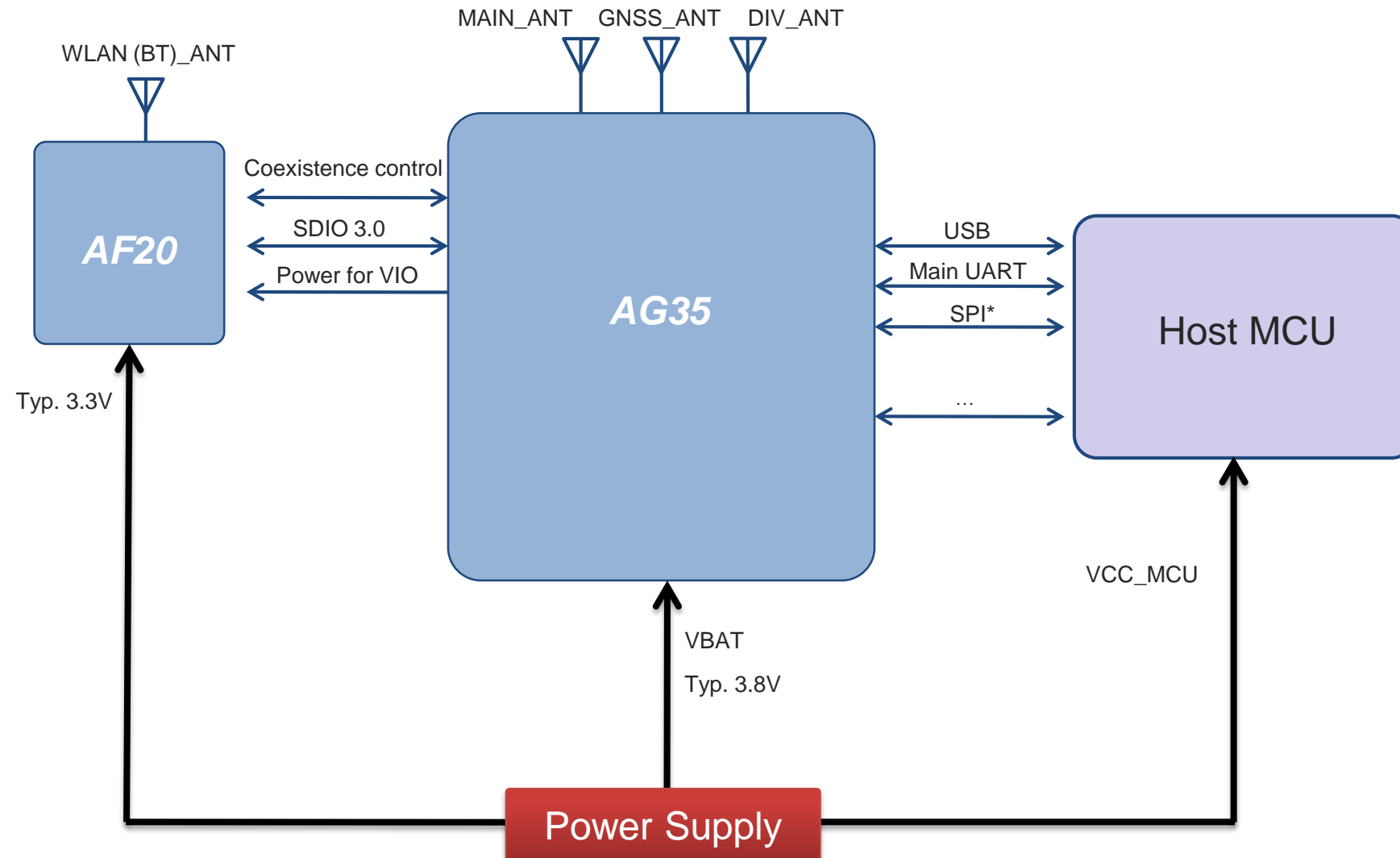
"*" means under development.

AG550Q/AG520R + AF50T Solution

WLAN (BT)_ANT

MIMO   GNSS_ANT

AF50T

AG550Q/AG520R

Host MCU

Coexistence Control

PCIe

UART

PCM

VDD_WiFi_VL

VDD_WiFi_VM

VDD_WiFi_VH

VDD_EXT

VDD_RF

USB

GPIOs

SPI

...
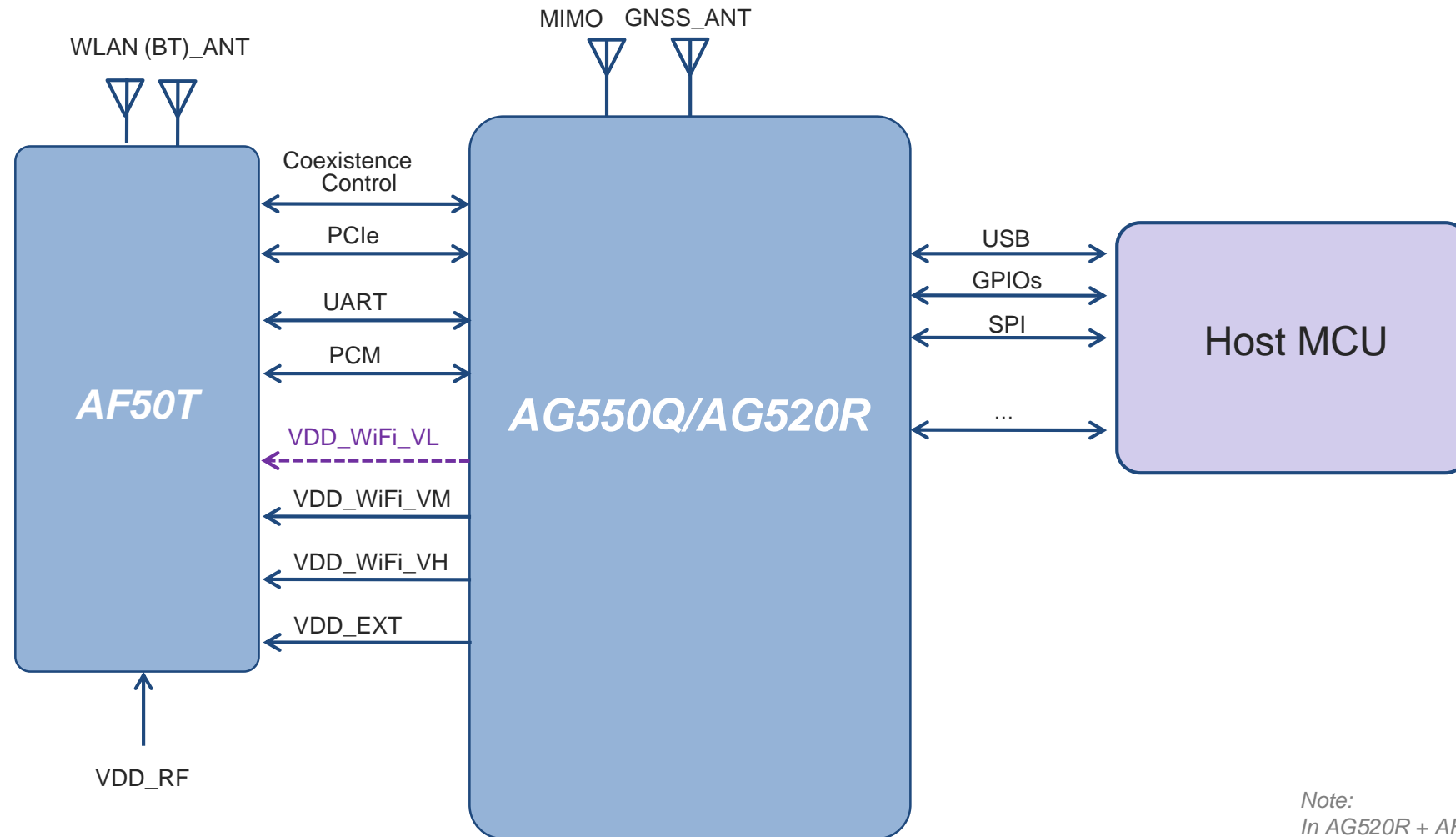
Note:
In AG520R + AF50T solution, VDD_WiFi_VL
is inputted by an external DC-DC converter.

Wi-Fi/BT Module Advantages

Best Co-existence

- The best co-existence of Wi-Fi and LTE/5G
- The best co-existence of Wi-Fi and BT

Quality

- Stable and robust network connectivity
- Wide working temperature
- Low power consumption

One-stop Solution

- Used with Quectel cellular modules
- One-stop LTE/5G + Wi-Fi/BT solution
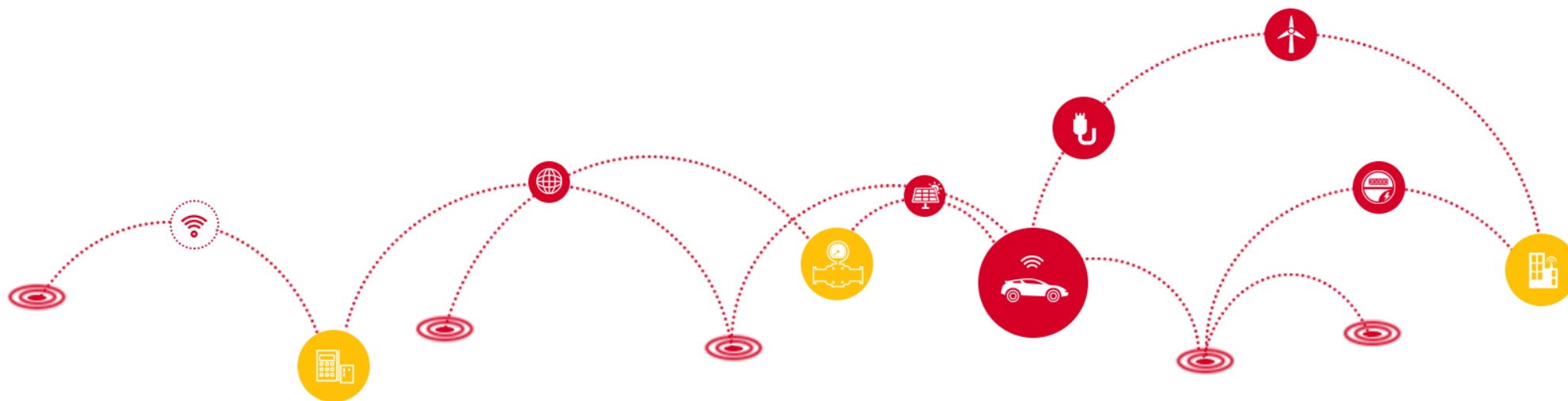- Provide the best performance

Easy Design

- Compact module package
- Convenient for test
- Convenient for automatic mass production
- Reduced manufacturing cost

Roadmap
Product Introduction
Technical Architecture
Applications

Applications

Network

- DTU
- Routers
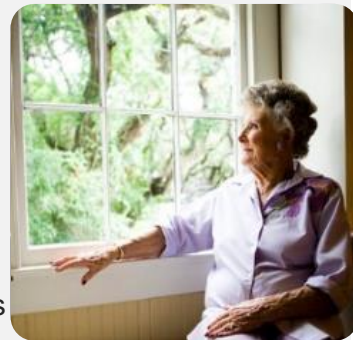- Industrial gateway
- Wi-Fi hot spot

Automotive

- T-box
- Infotainment
- Tracking
- OBD
- DVR

Home

- Home automation
- Smart TV
- OTT box
- Smart speaker
- Smart home appliances

Others

- Wireless POS
- IP camera
- ATM

Thank you!

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[f] https://www.facebook.com/quectelwireless

[twitter] https://twitter.com/Quectel_IoT