Quectel Automotive GNSS & Connectivity

Product Overview

December, 2020

Build a Smarter World

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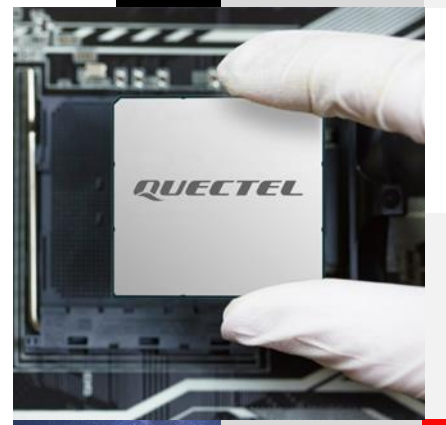
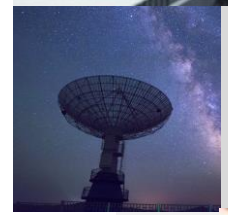
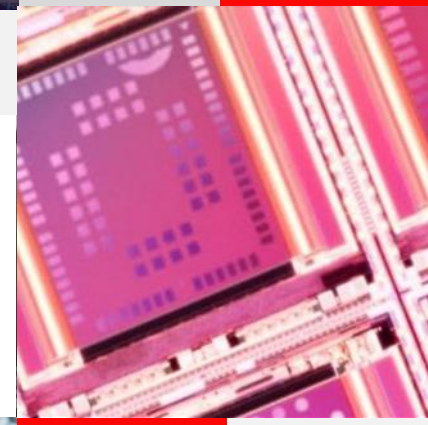
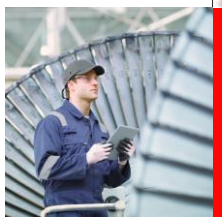






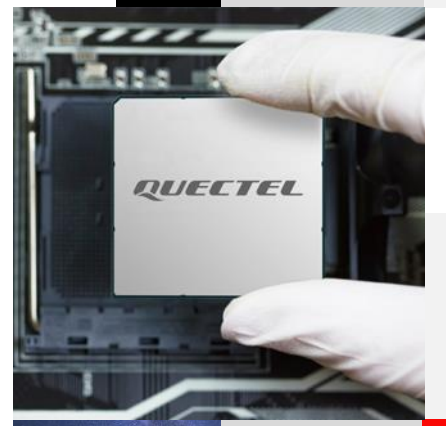


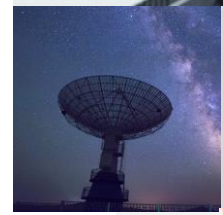
Build a Smarter World

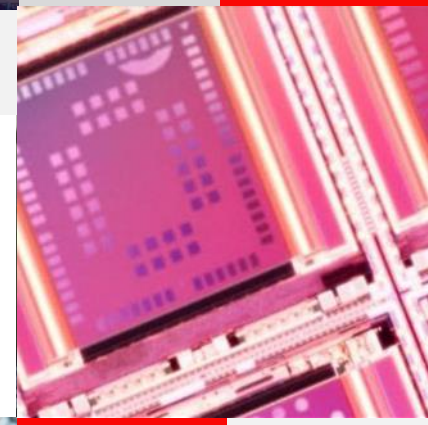
Automotive GNSS Modules

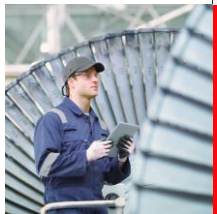
Automotive Wi-Fi&Bluetooth Modules

Build a Smarter World









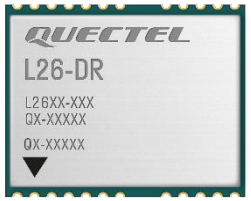
Automotive GNSS Modules Roadmap

LC98S
ST Teseo III

1.5 m

- Single Frequency

GNSS+DR
L26-DR
ST Teseo III



1–2 m

- Single Frequency
- Dead Reckoning

1 m

RTK+DR
L26-P Note
ST Teseo III

< 1 m

- Single Frequency
- Dead Reckoning
- RTK (PPE)

Dual-Frequency
LG69T
ST Teseo V

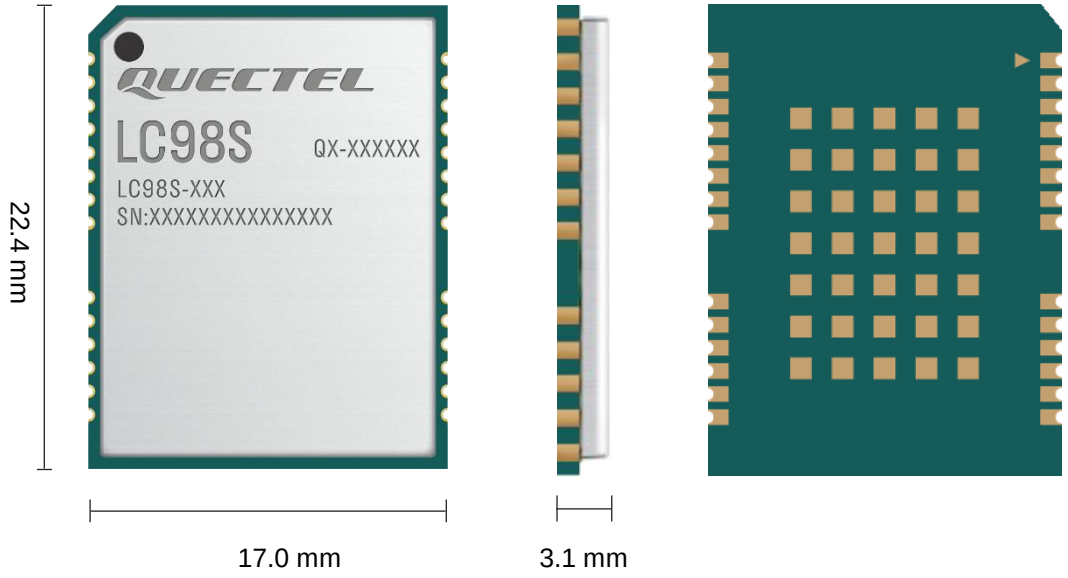
cm

- Multi-Frequency
- Dead Reckoning
- RTK (PPE)
- AA/ AD/ AQ/ AB/ AS/ AM Variants

Note: External AP is required.

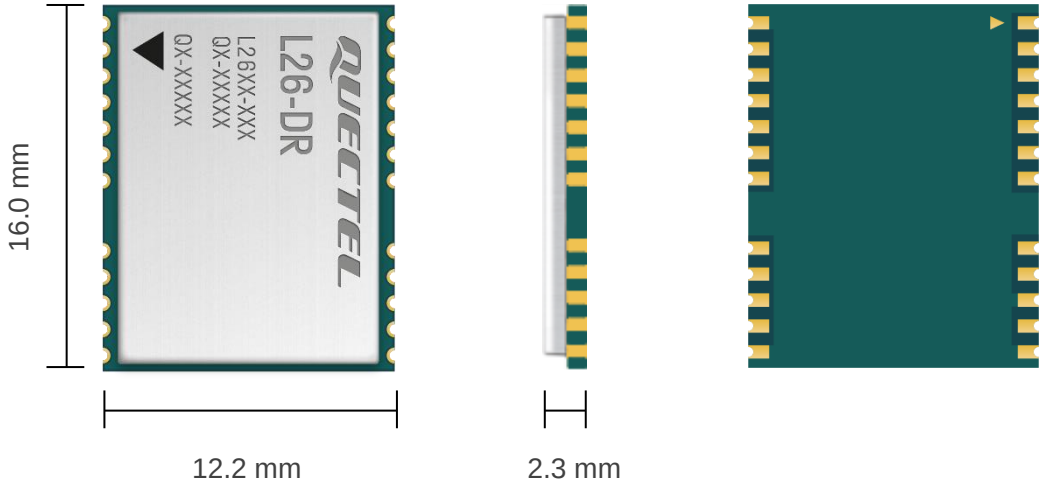
LC98S GNSS Module Specifications

- Teseo III
- Supports GPS, BeiDou, GLONASS, Galileo and QZSS
- High sensitivity: -157 dBm @ Tracking
- Default baud rate: 115200 bps
- Supply voltage: 3.0–3.6 V, typ. 3.3 V
- Low power consumption:
  - 75 mA (GPS + BeiDou) @ Tracking mode
  - 75 mA (GPS + BeiDou) @ Acquisition mode
- Built-in LNA for better sensitivity
- Supports AGPS
- Supports timing function
- Supports GNSS raw data output (Optional)



L26-DR GNSS Module Features

- Teseo III
- Speed information that can be obtained via UART, WHEELTICK or CAN bus interfaces (L26-ADR)
- Dead reckoning algorithm
- Transfer of the sensor’s raw data together with the NMEA message
- Additional WI signal to wake up the host
- Active antenna detection function
- Short calibration time (less than 3 min. during evaluation stage) without the need for calibration during the production
- Flexible installation angle
- ADR and UDR supported based on different software versions
- Industrial and automotive grade versions to meet versatile demands
- Manufactured in ISO/TS 16949 certified factory

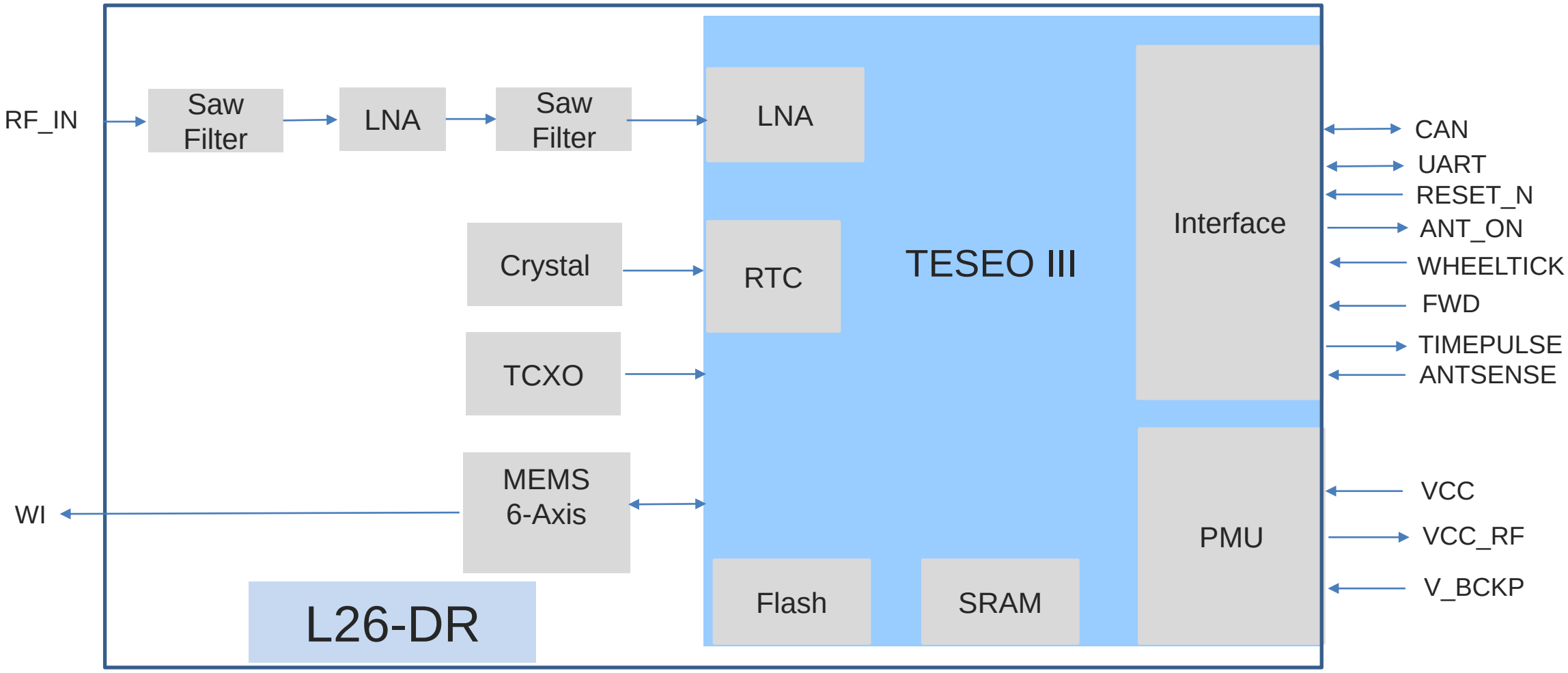


L26-DR GNSS Module Specifications

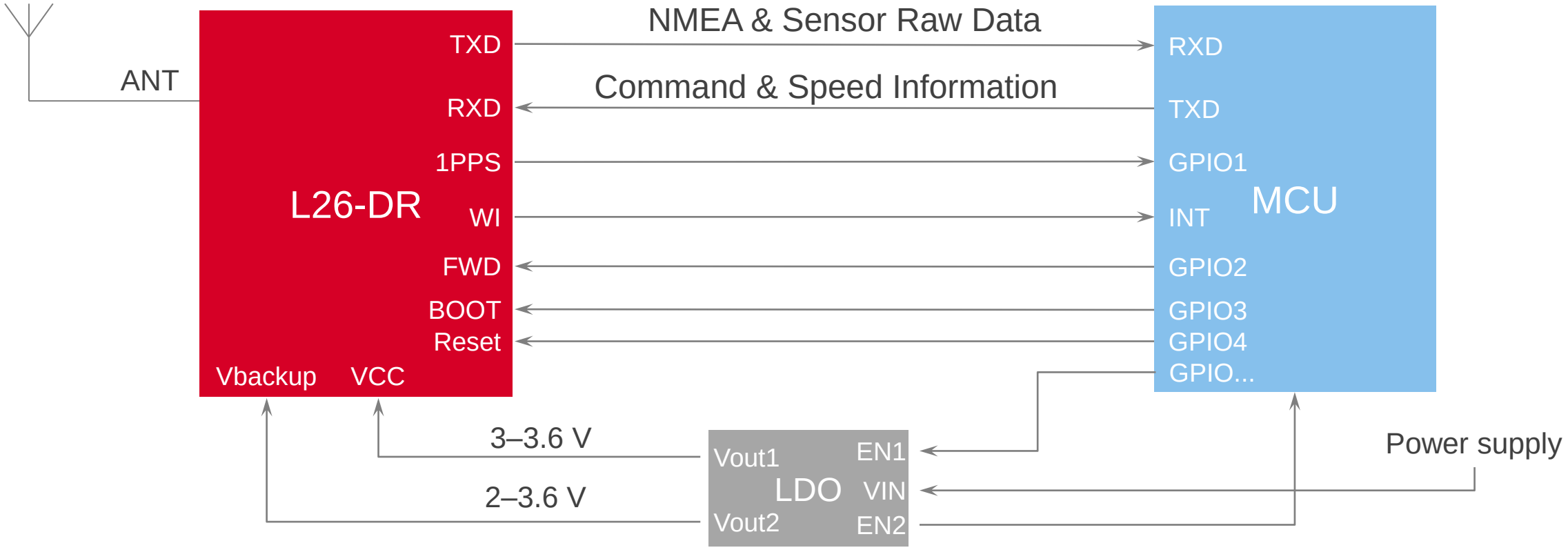
Items	Specifications	
Multi-Constellation GNSS	• GPS L1 C/A • GLONASS L1 • BeiDou (BDS) B1 • QZSS L1 • Galileo (GAL) E1	
SBAS	WAAS, EGNOS, MSAS, GAGAN	
Channels	48 (Tracking)/ 2 (Fast Acquisition)	
Horizontal Position Accuracy	Autonomous	1.5 m CEP
Velocity Accuracy	Without Aid	< 0.1 m/s
Acceleration Accuracy	Without Aid	< 0.1 m/s^2
Timing Accuracy	1PPS	< 100 ns CEP
TTFF @ -130 dBm (with AGPS)	Cold Start	< 13 s
TTFF @ -130 dBm without AGPS	Cold Start	< 32 s
	Warm Start	< 25 s
	Hot Start	< 2 s

Items	Specifications	
Sensitivity	Acquisition	-145 dBm
	Tracking	-162 dBm
	Reacquisition	-152 dBm
Supply Voltage Range	3.0–3.6 V, typical 3.3 V	
Operating Temperature	-40 °C to +85 °C	
Dimensions	(12.2 ±0.15) mm × (16.0 ±0.15) mm × (2.3 ±0.20) mm	
Weight	Approx. 0.9 g	
Low Power Consumption	Acquisition: 72 mA @ 3.3 V	
	Tracking: 58 mA @ 3.3 V	
Power Saving Modes	17 μA	
UART	• UART port: UART_TX and UART_RX • 115200–921600 bps baud rate (115200 bps by default) • Used for NMEA/PSTM transmission and firmware upgrade	
Remark	Two Versions: • Industrial Grade • Automotive Grade	

L26-DR GNSS Module Hardware Block Diagram



L26-DR GNSS Module Application Diagram

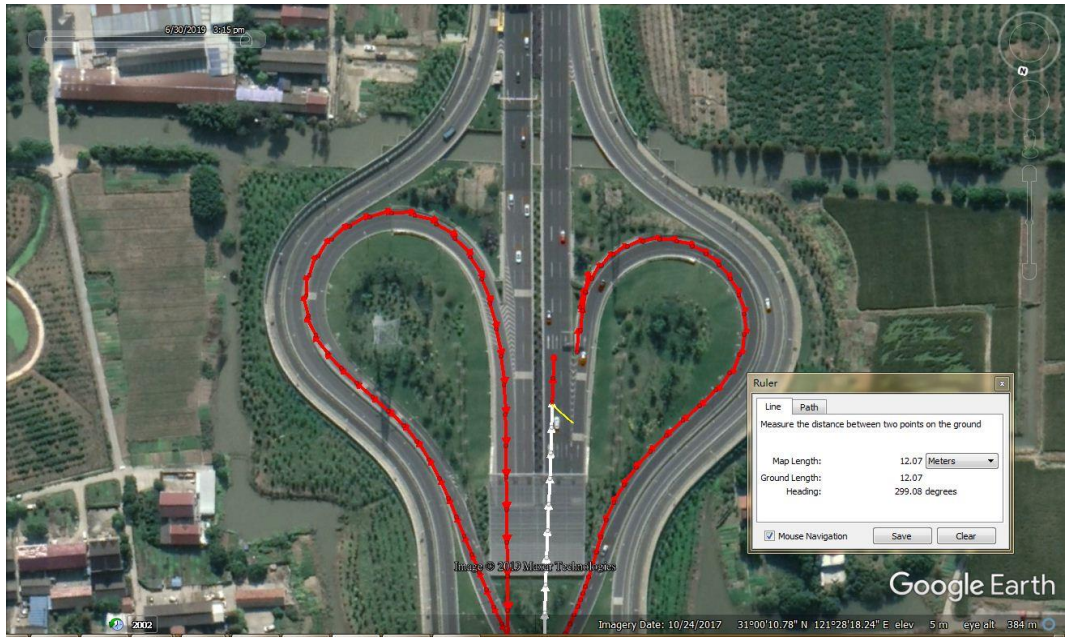


Note: UDR version requires no speed and direction input.

L26-DR - Comparative Test in Long Open-Area Tunnel

In the long open-area tunnel, L26-DR's performance is better than its counterpart.

L26-DR (ADR)



GNSS+DR

U company standalone module

GNSS only

U-XXX

Long Tunnel (5260 meters)		
Example	Error distance	Error percent
L26-DR (ADR)	12 m	0.23%
U-XXX	52 m	0.99%

L26-DR - Comparative Test in Urban-Area Tunnel

East of Yan'an Road, 2261 meters		
Example	Error distance	Error percent
L26-DR(ADR)-1#	18 m	0.80%
L26-DR(ADR)-2#	15 m	0.66%
U-XXX	70 m	3.10%

In the urban-area tunnel, L26-DR's performance is better than its counterpart

L26-DR - Comparative Test in Curved Tunnel

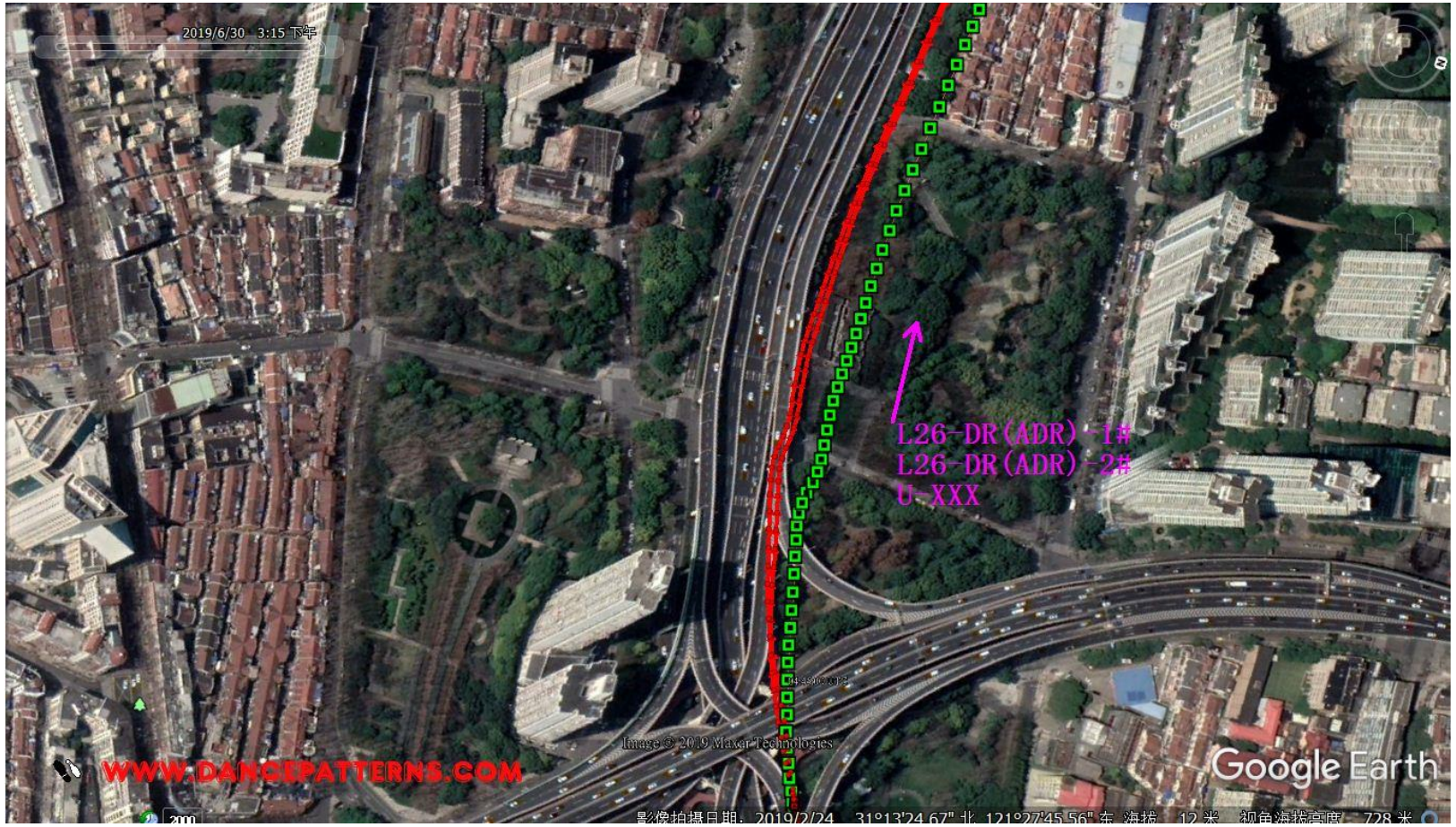
Curved Tunnel, 2860 meters		
Example	Error distance	Error percent
L26-DR(ADR)-1#	3 m	0.10%
L26-DR(ADR)-2#	15 m	0.52%
U-XXX	45 m	1.57%

In the curved tunnel, L26-DR's performance is better than its counterpart

U-XXX
L26-DR(ADR)

L26-DR - Comparative Test Under Elevated Highway

Under elevated highway, L26-ADR's performance is better than its counterpart



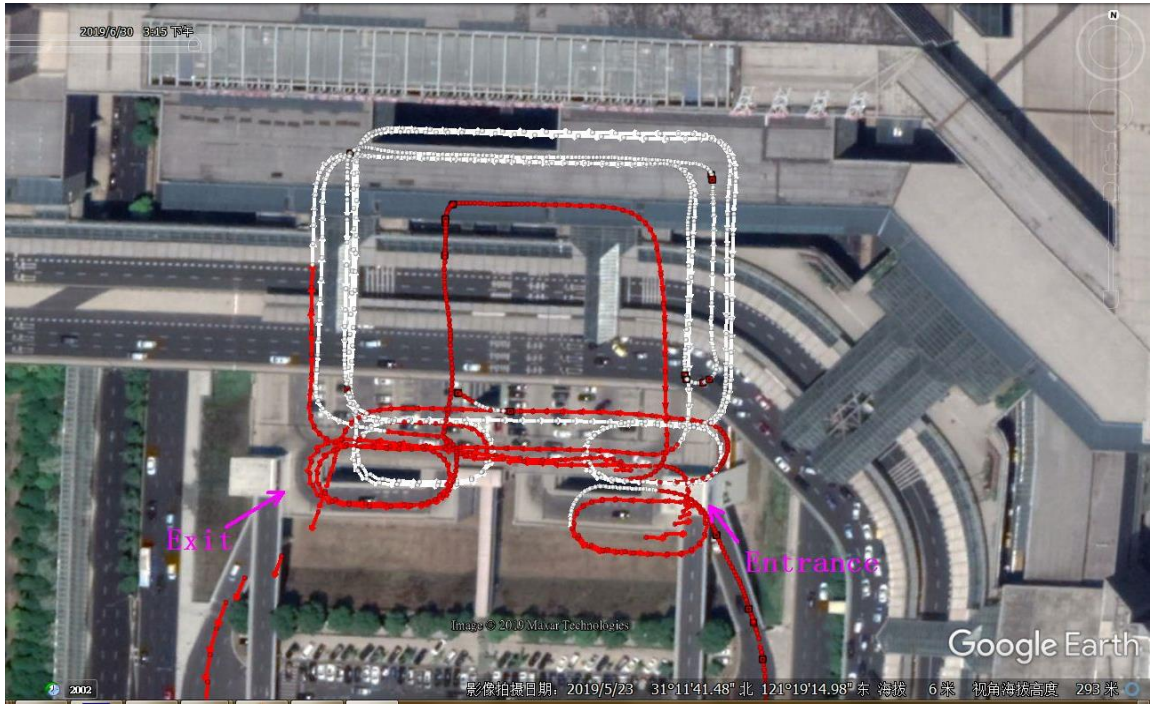
L26-DR(ADR)
U-XXX

L26-DR - Comparative Test in Multi-layer Parking Garage

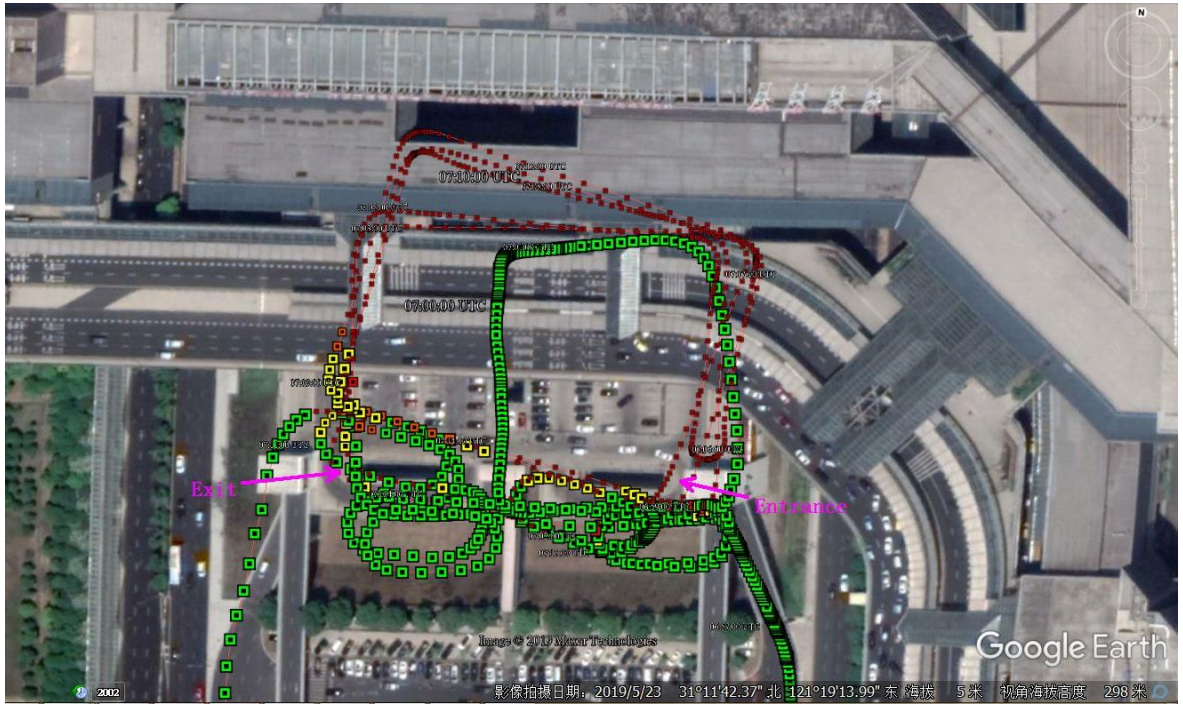
(Shanghai Hongqiao Airport)

Under multi-layer parking system, L26-DR's performance is better than its counterpart.

L26-DR(ADR)

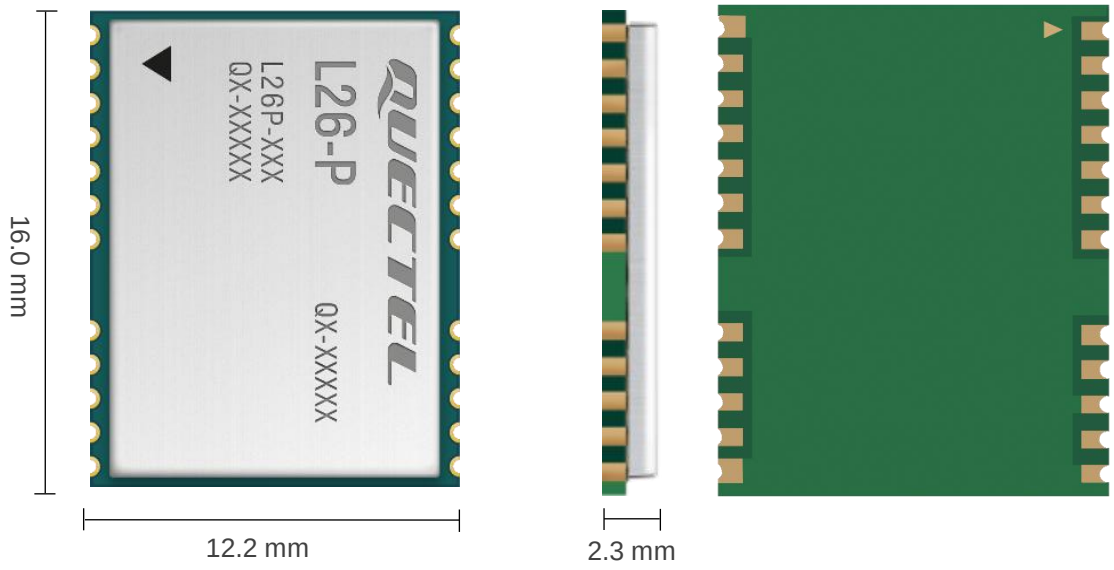


U-XXX



L26-P GNSS Module Specifications

- Teseo III
- Supports GPS, BeiDou, GLONASS, Galileo and QZSS
- Default baud rate: 460800 bps
- Supply voltage: 3.0–3.6 V, typ. 3.3 V
- Low power consumption:
  - 52 mA (GPS) @ Tracking mode
  - 65 mA (GPS) @ Acquisition mode
- Integrated LNA
- Supports GNSS raw data and sensor raw data output
- Supports AGPS
- Short-circuit protection / detection for active antenna



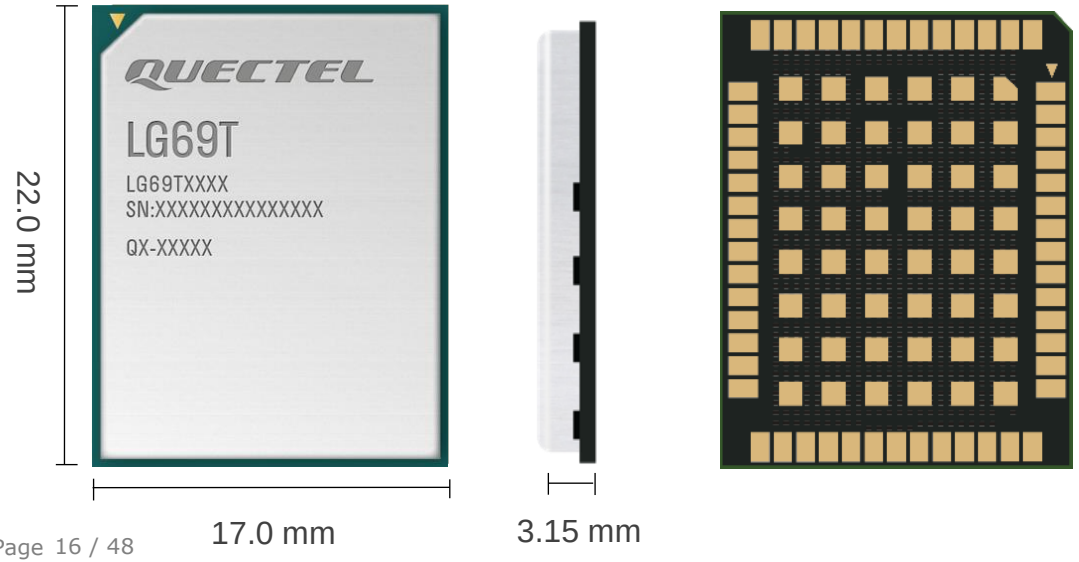
LG69T GNSS Module Overview

Dual-Band Automotive Grade GNSS Module (TESEO V)

LG69T is a series automotive grade, dual-band, high precision GNSS modules based on the fifth generation platform of ST.

The module includes variants listed below:

- LG69T (AA) [1] features raw data output and integrates DR.
- LG69T (AD) features L1+L5 dual bands PVT.
- LG69T (AQ) integrates RTK and DR, and therefore outputs high precision results (industrial sensor).
- LG69T (AB) is ASIL B compliant and supports raw data output.
- LG69T (AS) features L1+L5 dual bands base station.
- LG69T (AM) integrates RTK function.



[1] *LG69T (AA) can also supports DR function based on a separate firmware version. LG69T series are distinguished from each other with different OCs (ordering codes).*

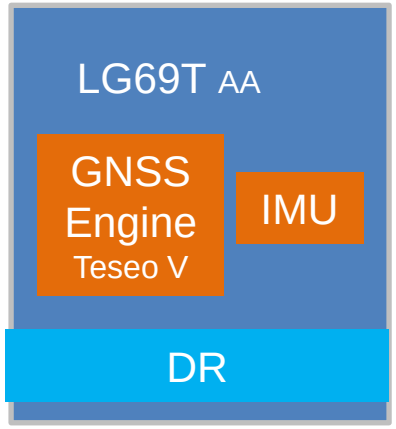
LG69T GNSS Module

Dual-Band Automotive Grade GNSS Module

Automotive Grade

LG69T (AA)

Raw Data+DR



- ST Teseo V
- L1+L5 Dual-Band GNSS
- GNSS Raw Data Output
- Sensor Raw Data Output
- DR Integrated (Optional)

Automotive Grade

LG69T (AD)

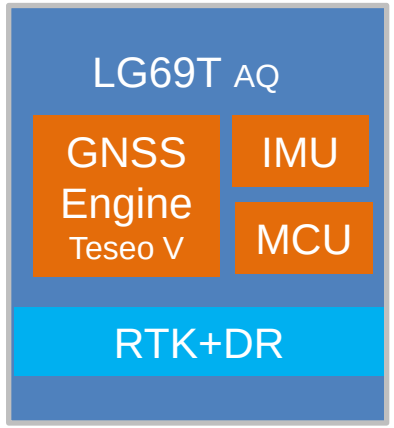
L1+L5 Dual-band

- ST Teseo V
- L1+L5 Dual-Band GNSS
- GNSS Raw Data Output

Automotive Grade

LG69T (AQ)

RTK+DR Integrated



- ST Teseo V
- L1+L5 Dual-Band GNSS
- High Performance MCU Embedded
- RTK+DR Integrated for High Precision Positioning (cm level)
- Sensor Raw Data Output (Optional)

LG69T series are distinguished from each other with different OCs (ordering codes).

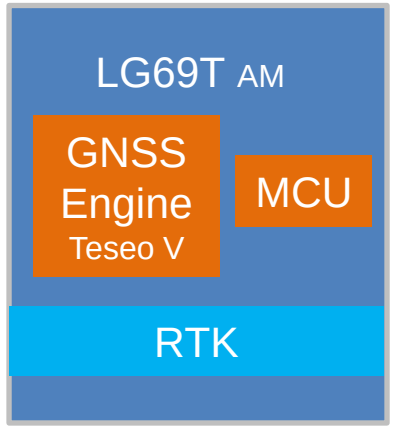
LG69T GNSS Module

Dual-Band Automotive Grade GNSS Module

Automotive Grade

LG69T (AM)

RTK+DR Integrated

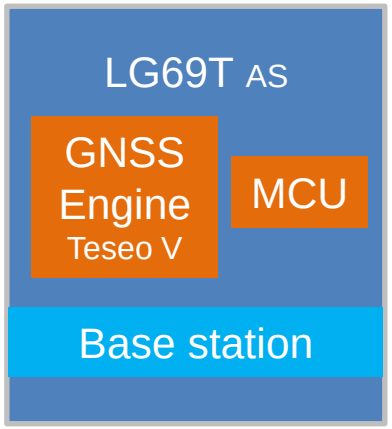


- ST Teseo V
- L1+L5 Dual-Band GNSS
- High Performance MCU Embedded
- RTK Integrated for High Precision Positioning (cm level)

Automotive Grade

LG69T (AS)

Base station



- ST Teseo V
- L1+L5 Dual-Band
- MCU Embedded
- Base station

Automotive Grade

LG69T (AB)

ASIL B Compliant

- ST Teseo App
- L1+L2 Dual-Band GNSS
- GNSS Raw Output
- ASIL B Compliant
- L1+L5 Dual-Band (Optional)

LG69T series are distinguished from each other with different OCs (ordering codes).

LG69T Key Features

Product		LG69T (AQ)	LG69T(AS)*	LG69T (AA)*
Constellation		GPS/Galileo/BeiDou	GPS/Galileo/BeiDou	GPS/GLONASS/Galileo/BeiDou/QZSS/ IRNSS
Dimensions (mm)		22.0 × 17.0 × 3.15	22.0 × 17.0 × 3.15	22.0 × 17.0 × 3.15
Channels		4 Fast Acquisition 80 Tracking	4 Fast Acquisition 80 Tracking	4 Fast Acquisition 80 Tracking
Accuracy		Autonomous: < 1.0 m CEP RTK [1] : Horizontal Accuracy: < 0.2 m + ppm CEP	-	Autonomous: < 1.0 m CEP [2]
TTFF (With AGNSS)	Cold Start	TBD	-	TBD
TTFF (Without AGNSS)	Cold Start	< 35 s	-	< 35 s [2]
	Warm Start	< 30 s	-	< 30 s [2]
	Hot Start	< 3 s	-	< 3 s [2]
Sensitivity	Acquisition	-145 dBm	-	-145 dBm [2]
	Reacquisition	-153 dBm	-	-153 dBm [2]
	Tracking	-160 dBm	-	-160 dBm [2]
Interfaces	UART	× 2	× 2	× 2
	CAN	× 1	-	-
Update Rate		1 Hz (Default), Max. 10 Hz	1 Hz (Default)	1 Hz (Default), Max. 10 Hz
Temperature Range	Operating	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
	Storage	-40 °C to +90 °C	-40 °C to +90 °C	-40 °C to +90 °C
Power Supply		3.0–3.6 V, typ. 3.3 V	3.0–3.6 V, typ. 3.3 V	3.0–3.6 V, typ. 3.3 V
Power Consumption (@ 3.3 V)	Acquisition	360 mA [2]	TBD	260 mA [2]
	Tracking	366 mA [2]	TBD	260 mA [2]
Power Saving Mode Consumption		TBD	TBD	TBD
Key Features	DR	●	-	●
	RTK	●	-	-
	AGNSS	-	-	●
	SBAS	-	-	●
	PPS	●	●	●
	Anti-Jamming	-	-	-
	Jamming Detection	-	-	-
	Antenna Short Circuit Protection	-	-	-
	Antenna Open Circuit Detection	-	-	-
	Geo-fence	-	-	-
	Odometer	-	-	-
	GNSS Raw Data	-	-	●
	Sensor Raw Data	●	-	●

[1] Measured by using active high-precision antennas in an open-sky environment and within 1 km from the base station
*[2] Preliminary data * Under development/planning - Unsupported ● Supported TBD: To Be Determined*

LG69T Key Features

Product		LG69T (AD)*	LG69T (AB)*	LG69T(AM)*
Constellation		GPS/BeiDou/Galileo/QZSS/IRNSS	GPS/GLONASS/Galileo/BeiDou/QZSS	GPS/Galileo/BeiDou
Dimensions (mm)		22.0 × 17.0 × 3.15	22.0 × 17.0 × 3.15	22.0 × 17.0 × 3.15
Channels		4 Fast Acquisition 80 Tracking	4 Fast Acquisition 80 Tracking	4 Fast Acquisition 80 Tracking
Accuracy		Autonomous: < 1.0 m CEP	Autonomous: < 1.0 m CEP [2]	RTK [1] : Horizontal Accuracy: < 0.05 m + ppm CEP
TTFF (With AGNSS)	Cold Start	TBD	TBD	TBD
TTFF (Without AGNSS)	Cold Start	< 35 s [2]	< 35 s [2]	< 35 s [2]
	Warm Start	< 30 s [2]	< 30 s [2]	< 30 s [2]
	Hot Start	< 3 s [2]	< 3 s [2]	< 3 s [2]
Sensitivity	Acquisition	-145 dBm [2]	-146 dBm [2]	-146 dBm [2]
	Reacquisition	-153 dBm [2]	-152 dBm [2]	-152 dBm [2]
	Tracking	-160 dBm [2]	-152 dBm [2]	-152 dBm [2]
Interfaces	UART	× 1	× 2	× 2
	CAN	-	-	-
Update Rate		1 Hz (Default), Max. 10 Hz	1 Hz (Default), Max. 10 Hz	1 Hz (Default)
Temperature Range	Operating	-40 °C to +85 °C	-40 °C to +105 °C	-40 °C to +105 °C
	Storage	-40 °C to +90 °C	-40 °C to +105 °C	-40 °C to +105 °C
Power Supply		3.0–3.6 V, typ. 3.3 V	3.0–3.6 V, typ. 3.3 V	3.0–3.6 V, typ. 3.3 V
Power Consumption (@ 3.3 V)	Acquisition	221 mA [2]	TBD	TBD
	Tracking	218 mA [2]	TBD	TBD
Power Saving Mode Consumption		48 μA [2]	TBD	TBD
Key Features	DR	-	-	-
	RTK	-	-	-
	AGNSS	●	-	-
	SBAS	●	-	-
	PPS	●	●	●
	Anti-Jamming	-	-	-
	Jamming Detection	-	-	-
	Antenna Short Circuit Protection	-	-	-
	Antenna Open Circuit Detection	-	-	-
	Geo-fence	-	-	-
	Odometer	-	-	-
	GNSS Raw Data	●	●	-
	Sensor Raw Data	-	●	-

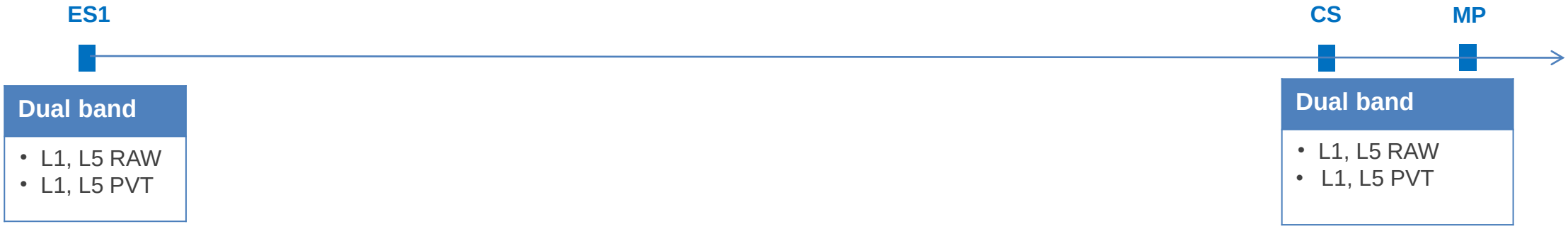
[1] Measured by using active high-precision antennas in an open-sky environment and within 1 km from the base station
*[2] Preliminary data * Under development/planning - Unsupported ● Supported TBD: To Be Determined*

LG69T Timeline

2021												2022				
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May

LG69T (AA)

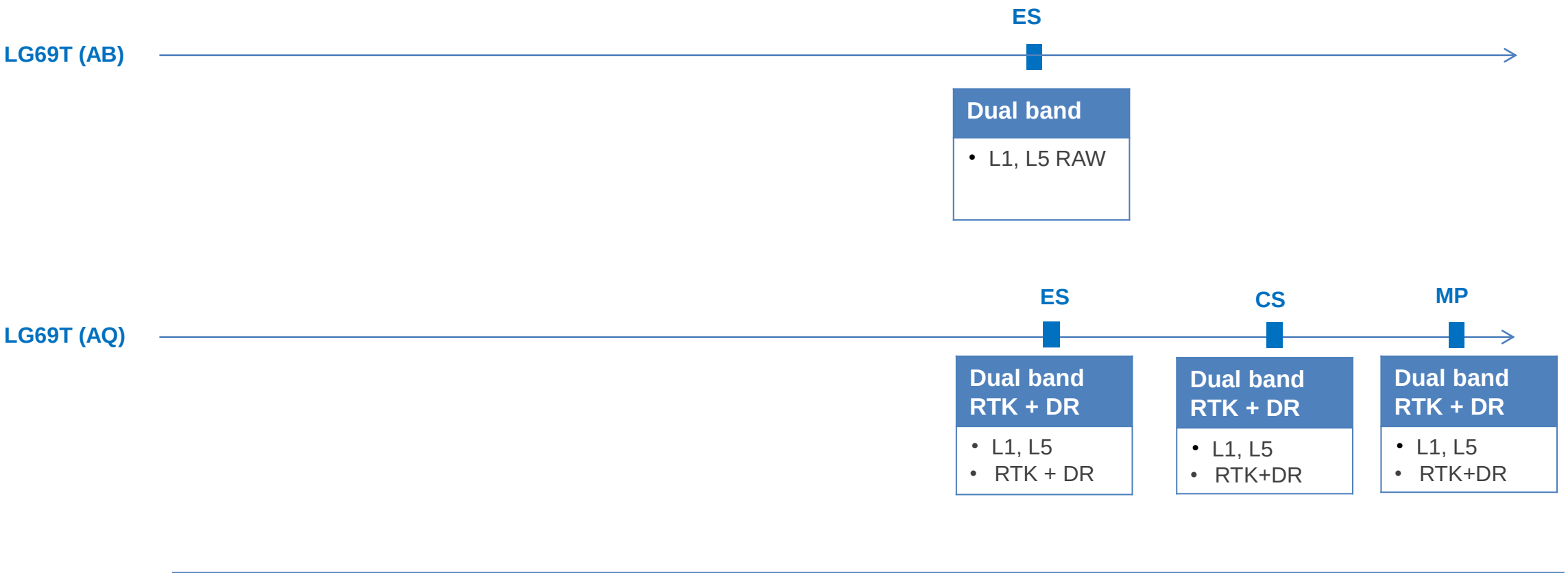
LG69T (AD)



The timeline may be adjusted according to the actual development status.

LG69T Timeline

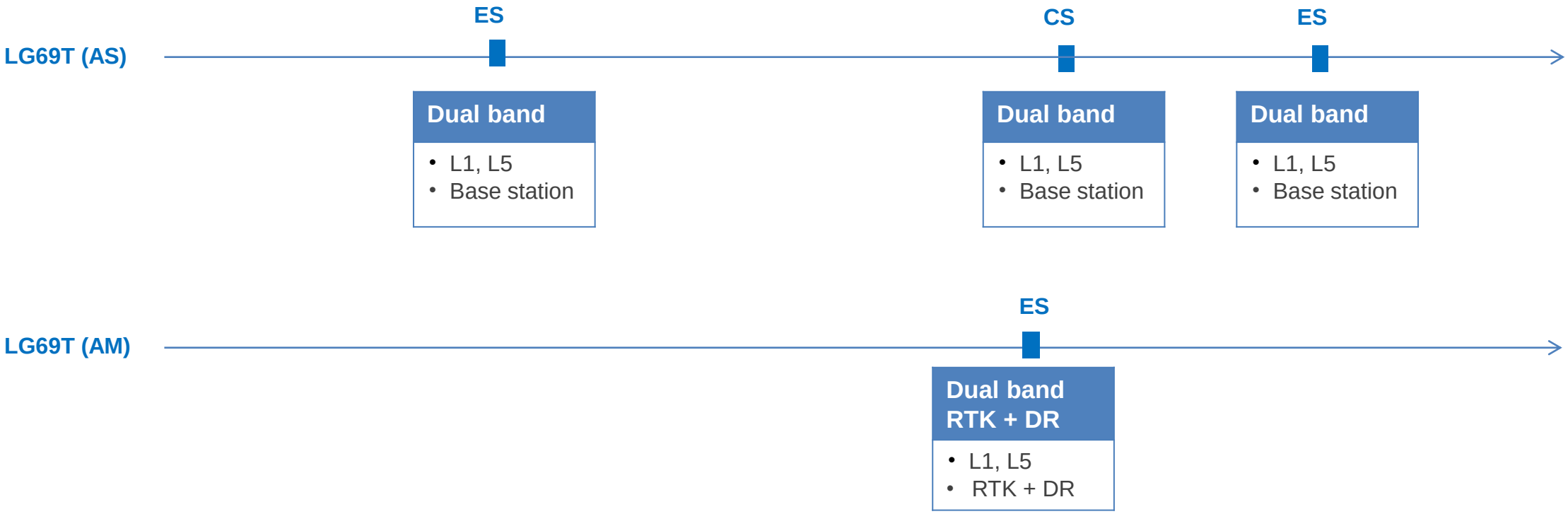
2021												2022				
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May



The timeline may be adjusted according to the actual development status.

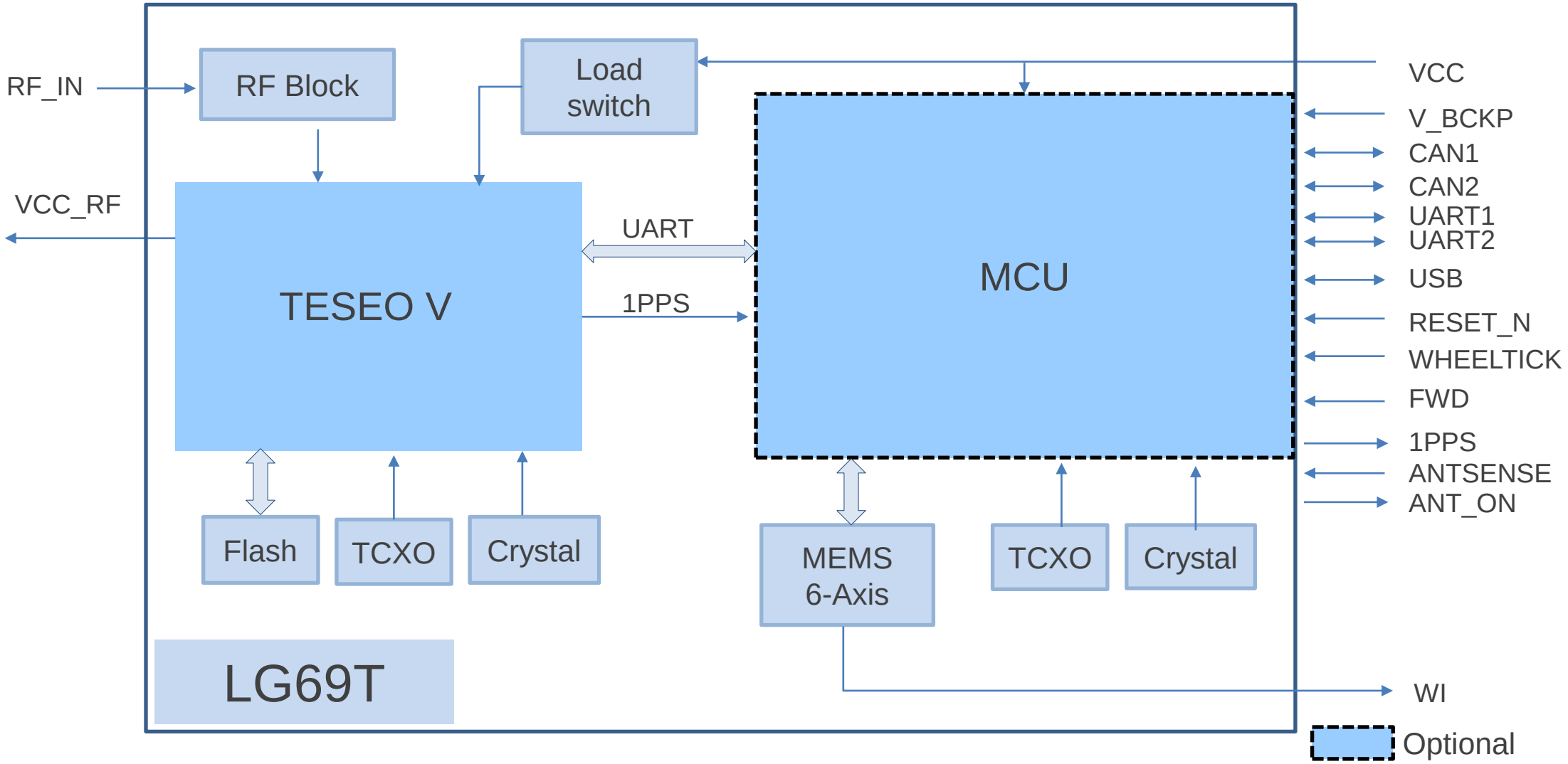
LG69T Timeline

2021												2022				
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May



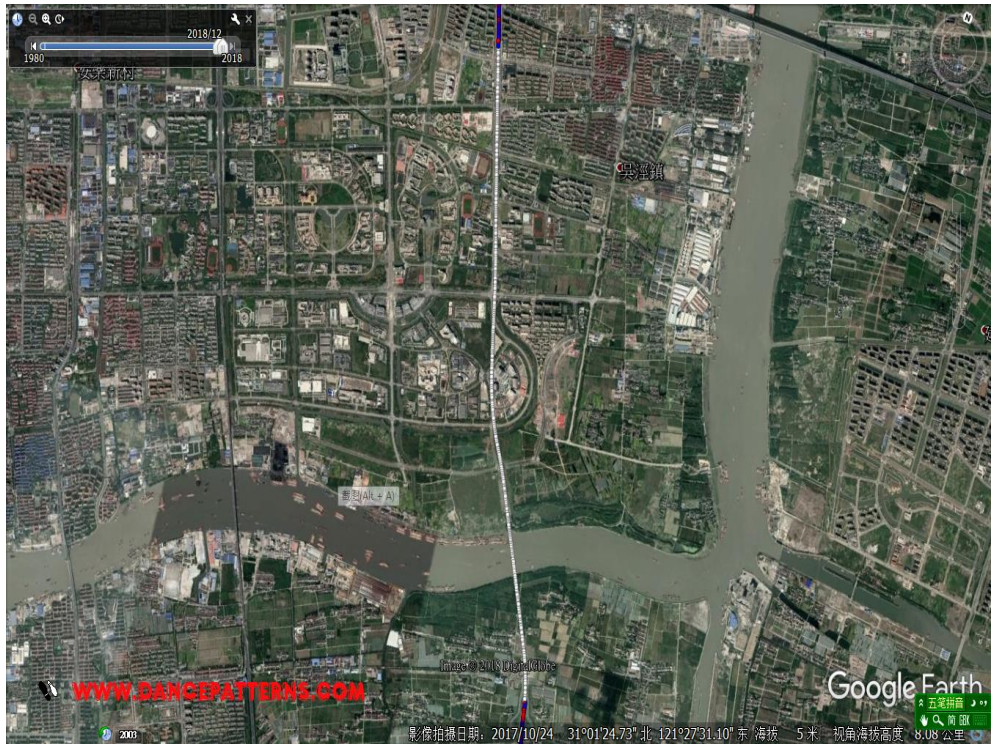
The timeline may be adjusted according to the actual development status.

LG69T Hardware Block Diagram



Full Coverage Positioning - Dead Reckoning

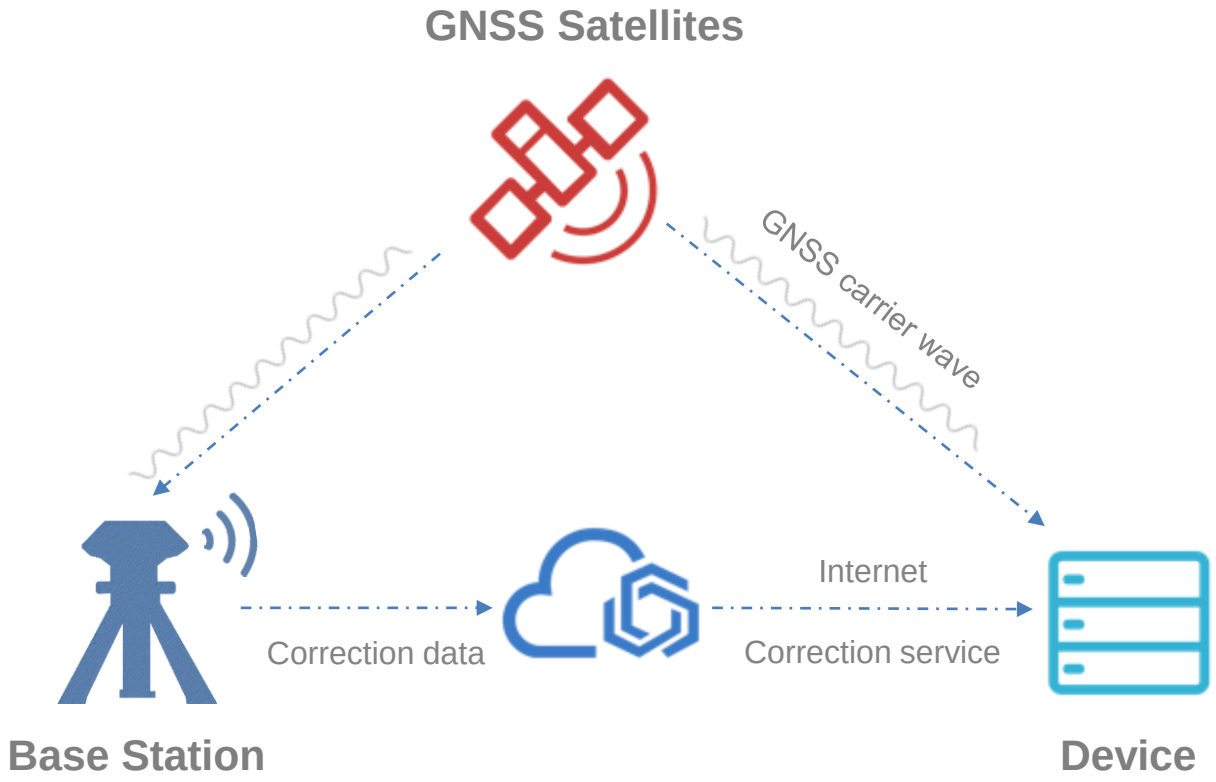
Dead Reckoning (DR) technology fuses GNSS and INS sensor together to provide a continuous high accuracy position. Using this technology, the GNSS receiver provides accurate position & time to the navigation system as long as the reception signals are good, once the reception signals are poor the INS sensor will continue to provide the information till the reception signals are improved. Based on this technology, device can get full coverage positioning or navigation even in parking garages, tunnels, and urban canyons.



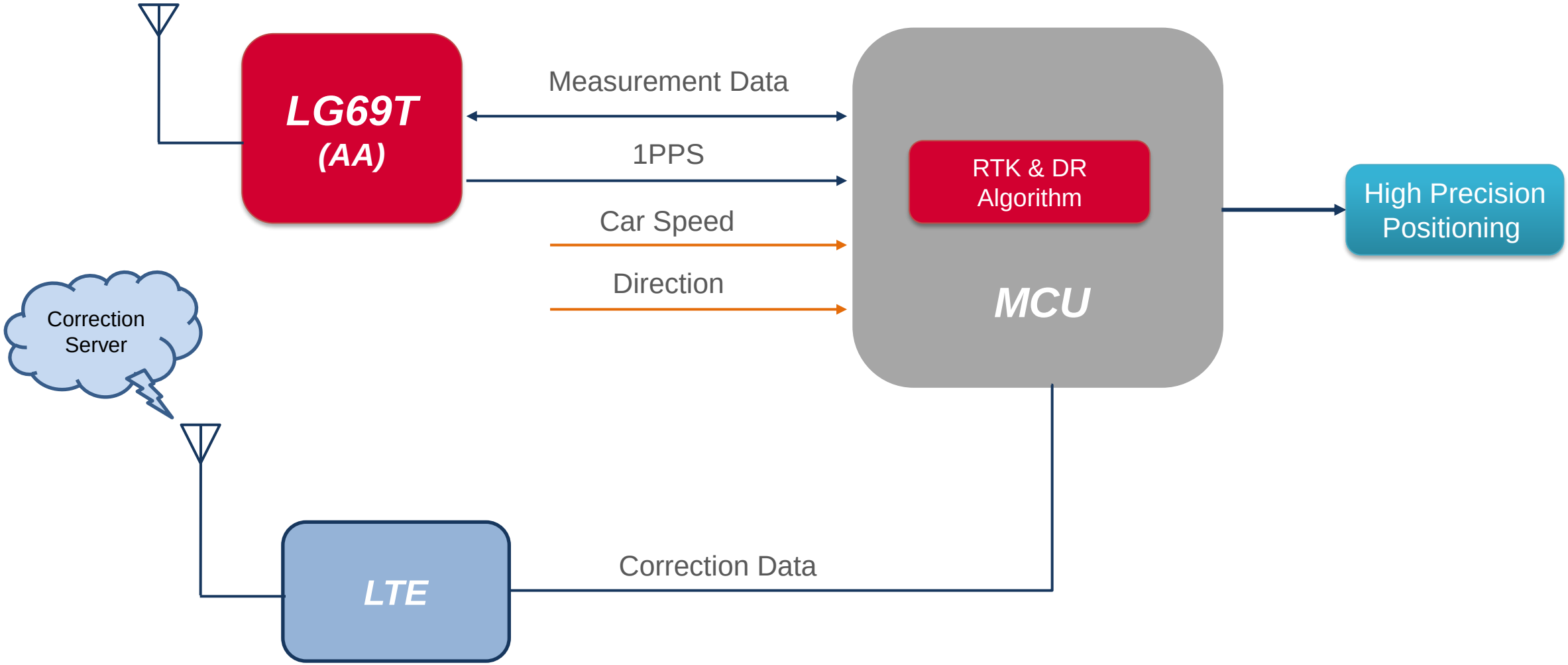
High Precision Positioning - RTK

Real-Time Kinematic (RTK) Positioning Process:

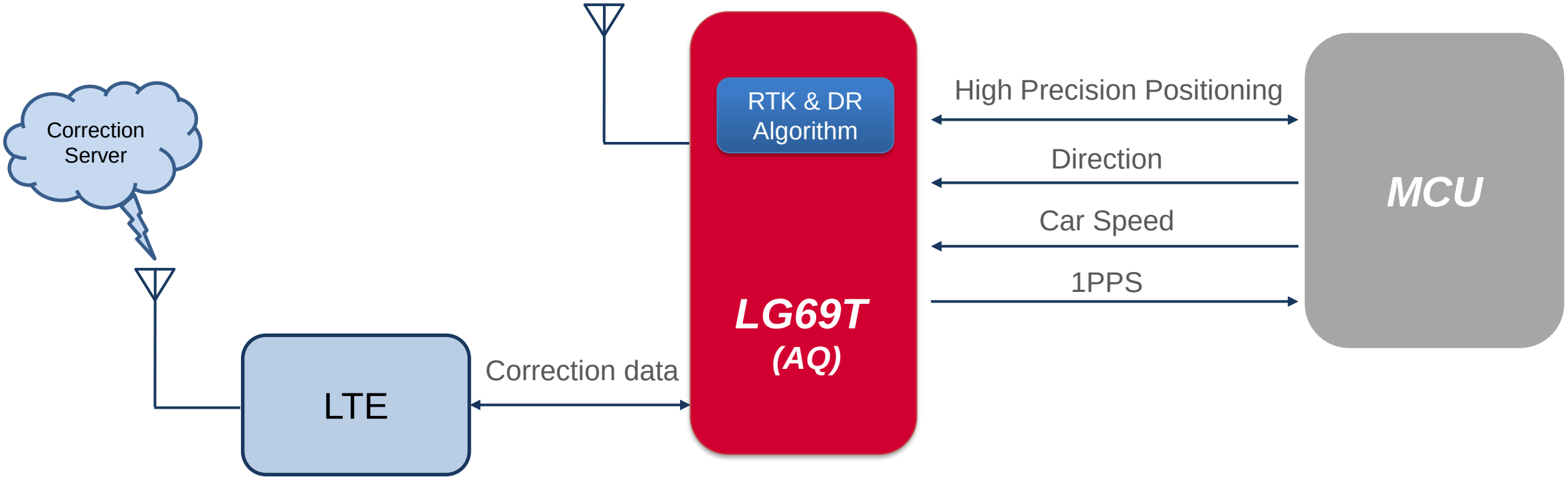
- Satellites broadcast the signal
- The base station calculates the common errors based on carrier phase, and then transfer them to the cloud server
- The device or receiver calculates a precise position with the carrier phase it received and the correction data from correction server



LG69T (AA) Application Architecture



LG69T (AQ) Application Architecture

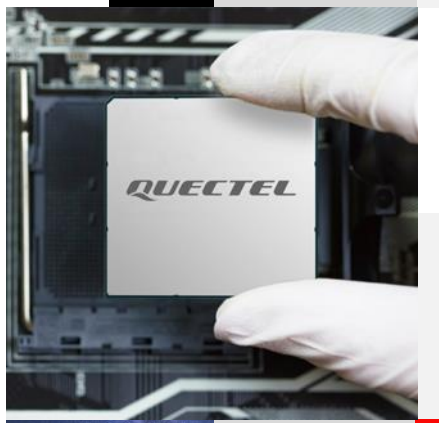


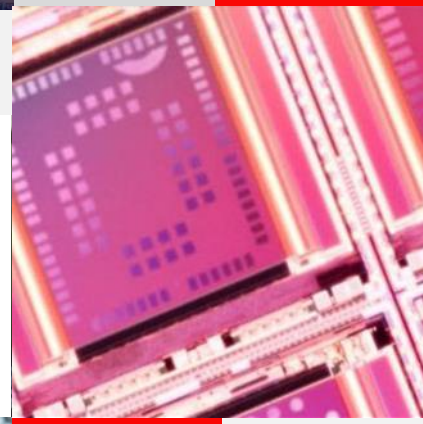
QUECTEL

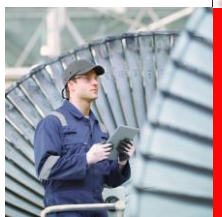
Automotive GNSS Modules

Automotive Wi-Fi&Bluetooth Modules

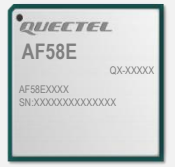
Build a Smarter World







Automotive Wi-Fi&Bluetooth Modules Roadmap

	Wi-Fi 5	Wi-Fi 6	Wi-Fi 6E
High	 AF51Y	 AF50T	 AF68E*
Medium		 AF56C*	 AF58E*
Entry	 AF20	 AF22x*	
Bluetooth	 AH20C		

** means under planning.*

Automotive Grade Wi-Fi&Bluetooth Modules Specifications

Feature	AF20	AF50T	AF51Y
Chipset	Qualcomm QCA6564A	Qualcomm QCA6696	Qualcomm QCA6595
WLAN Protocol	802.11 a/b/g/n/ac	802.11 a/b/g/n/ac/ax	802.11 a/b/g/n/ac
Wi-Fi Bands	2.4 GHz 5 GHz	2.4 GHz 5 GHz	2.4 GHz 5 GHz
Bluetooth Protocol	Bluetooth 5.0	Bluetooth 5.2	Bluetooth 5.2
Dimension (mm)	17.2 × 15.2 × 2.26	19.5 × 21.5 × 2.3	19.5 × 21.5 × 2.5
Working Mode	AP or STA	AP and STA	AP and STA
Power Supply Voltage (V)	3.14–3.46, Typ. 3.3	**VDD_CORE_VL:** 0.9–1.05, 0.95 Typ. **VDD_CORE_VM:** 1.28–1.42, 1.35 Typ. **VDD_CORE_VH:** 1.85–2.0, 1.9 Typ. **VDD_RF:** 3.3–4.25, 3.85 Typ.	**VDD_CORE:** 1.71–1.89, 1.8 Typ. **VDD_PA:** 2.09–2.31, 2.2 Typ.
I/O Pins Supply Voltage Range (V)	1.71–1.89, Typ. 1.8	1.71–1.89, Typ. 1.8	1.62–1.98, Typ. 1.8
Matched Cellular Module(s)	AG35 series	AG55xQ series/ AG52xR series	AG55xQ series/ AG52xR series

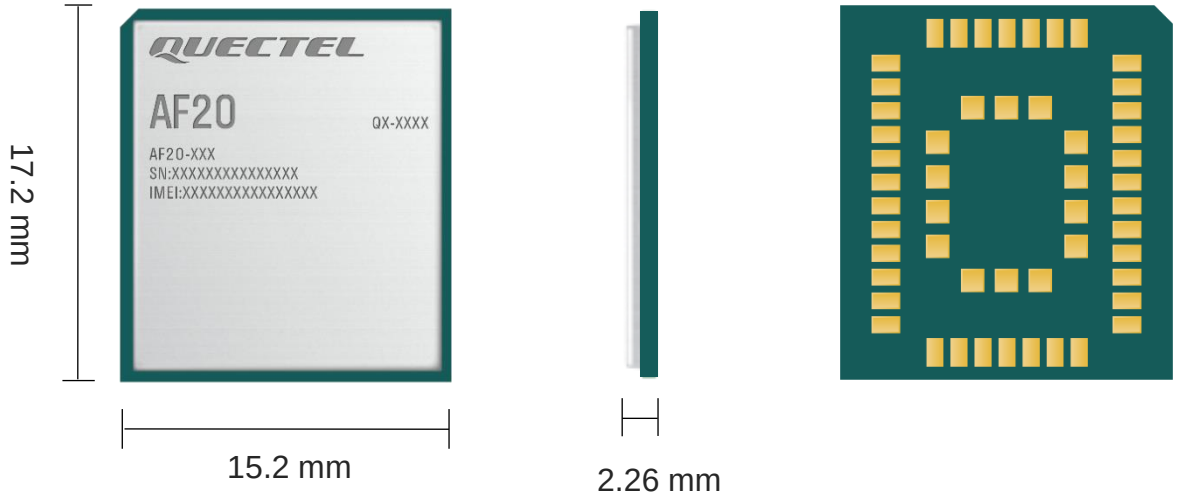
Automotive Wi-Fi&Bluetooth Modules Roadmap

	Wi-Fi 5	Wi-Fi 6	Wi-Fi 6E
High	 AF51Y	 AF50T	 AF68E*
Medium		 AF56C*	 AF58E*
Entry	 AF20	 AF22x*	
Bluetooth	 AH20C		

** means under planning.*

AF20 Highlights (Wi-Fi 5 1×1)

Automotive Grade Wi-Fi&Bluetooth Module (QCA6564A)



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

- Qualcomm QCA6564A chipset solution dedicated for automotive applications
- Work with Quectel AG35 series module and enjoy good co-existence mechanism with the automotive grade LTE module
- 1 × 1 device supporting 802.11 a/b/g/n/ac and 2.4/ 5 GHz dual-band
- Operate in soft-AP or station mode and support Bluetooth 5.0
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Operating 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 (Wi-Fi 5 1×1)

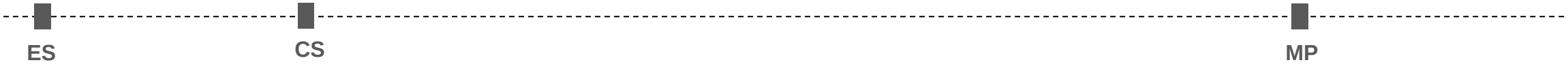
Module	AF20
Chip	QCA6564A
WLAN Protocol	802.11 a/b/g/n/ac, 1 × 1
Wi-Fi Bands (GHz)	2.4/ 5
Wi-Fi Modulation	BPSK, QPSK, CCK, 16QAM, 64QAM, 256QAM
Bluetooth Protocol	Bluetooth 5.0
Working Mode	AP/ STA
Power Supply Voltage Range (V)	3.14–3.46, Typ. 3.3
Interfaces	SDIO 3.0 × 1, BT_UART × 1, Wi-Fi/Bluetooth Antenna × 1
I/O Power Supply Voltage Range (V)	1.71–1.89, Typ.1.8
Security	WEP/ TKIP/ AES/ WPA-PSK/ WPA2-PSK
Operating Temperature Range (℃)	-40 to +85
Region	Global
Certification	**Regulatory：** CE*/ FCC*/ IC*/ Anatel*/ JATE*/ TELEC*/ RCM*

"" means under planning.*

AF20 Timeline

2020				2021							
Jan.	…	Nov.	Dec.	Jan.	…	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



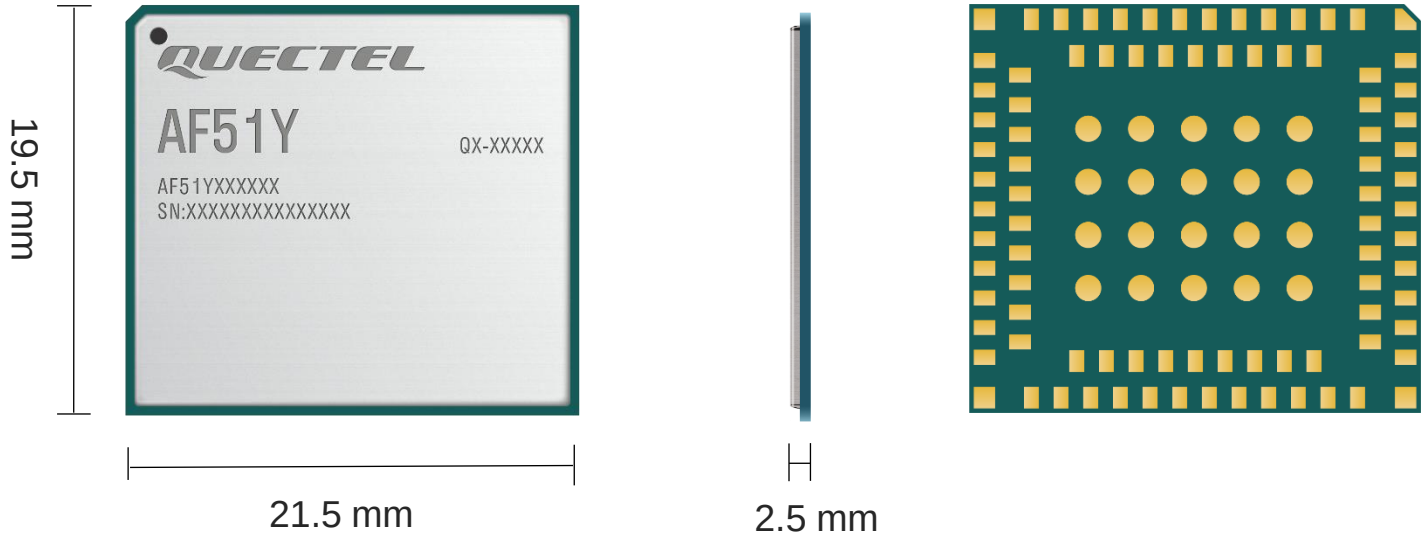
ES: Engineering samples ready. Basic functions are available for customers' simple demo purpose.
CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.
MP: Hardware and software ready for mass production. For certification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

Regulatory Certification

IC/ Anatel/ JATE/ TELEC TBD

AF51Y Highlights (Wi-Fi 5 2×2+1×1)

Automotive Grade Wi-Fi&Bluetooth Module (QCA6595)



Length: 19.5 mm (±0.20 mm)
Width: 21.5 mm (±0.20 mm)
Height: 2.5 mm (±0.20 mm)
Weight: 2.32 g

- Qualcomm QCA6595 chipset solution dedicated for automotive applications
- Work with Quectel AG55xQ/AG52xR series modules
- Support 802.11 a/b/g/n/ac Wi-Fi and Dual-Band Simultaneous (DBS) with dual-MAC
- Operate in soft-AP and station mode and support Bluetooth 5.2
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Operating 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

AF51Y Specifications (Wi-Fi 5 2×2+1×1)

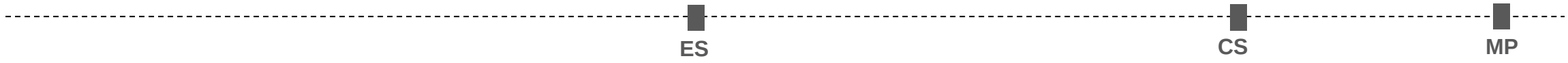
Module	AF51Y
Chip	QCA6595
WLAN Protocol	802.11 a/b/g/n/ac, 2 × 2 + 1 × 1, dual MAC
Wi-Fi Bands (GHz)	2.4/ 5
Wi-Fi Modulation	CCK, BPSK, QPSK,16QAM, 64QAM, 256QAM
Bluetooth Protocol	Bluetooth 5.2
Working Mode	AP/ STA
Power Supply	VDD_CORE_VL, VDD_CORE_VM, VDD_CORE_VH, VDD_IO
Interfaces	PCIe, WLAN_EN, UART, PCM, BT_EN, GPIOs
Security	WPA3
Operating Temperature Range (℃)	-40 to +85
Region	Global
Certification	**Regulatory:** CE*/ FCC*/ IC*/ Anatel*/ JATE*/ TELEC*

"" means under planning.*

AF51Y Timeline

2021											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

Project Schedule



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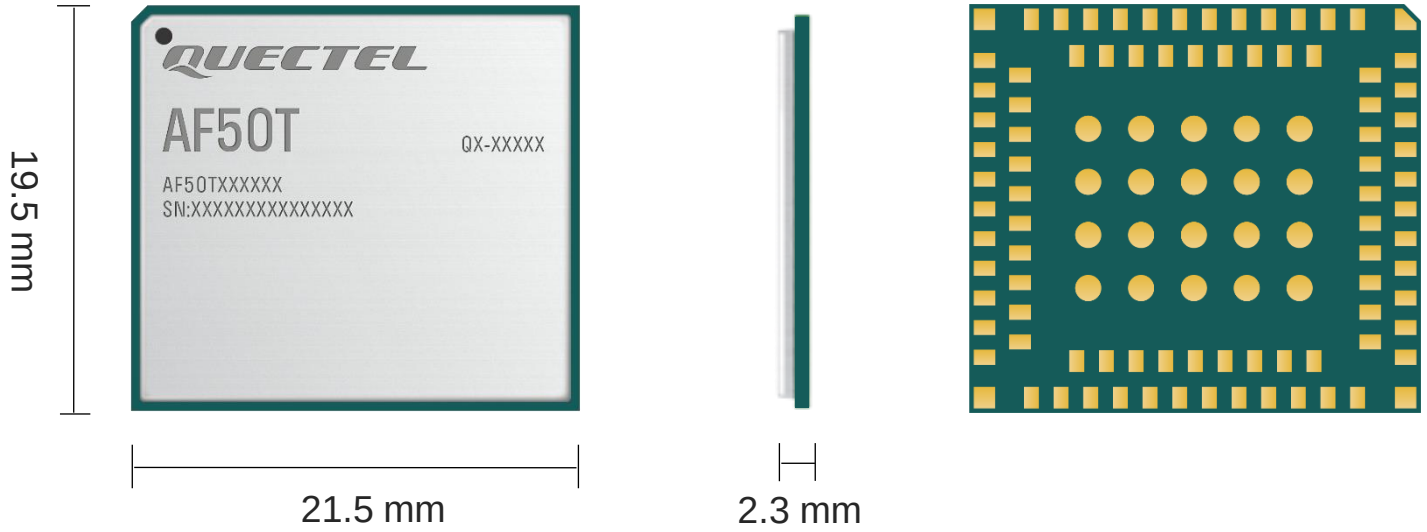
CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.
MP: Hardware and software ready for mass production. For certification status, please refer to the "certification schedule".

Regulatory Certification

CE/ FCC/ IC/ Anatel/ JATE/ TELEC	TBD

AF50T Highlights (Wi-Fi 6 2×2+2×2)

Automotive Grade Wi-Fi&Bluetooth Module (QCA6696)



Length: 19.5 mm (±0.20 mm)
Width: 21.5 mm (±0.20 mm)
Height: 2.3 mm (±0.20 mm)
Weight: Approx. 2.1 g

- Qualcomm QCA6696 chipset solution dedicated for automotive applications
- Work with Quectel AG55xQ/AG52xR series modules
- 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 Bluetooth 5.2
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Operating 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 (Wi-Fi 6 2×2+2×2)

Module	AF50T
Chip	QCA6696
WLAN Protocol	802.11 a/b/g/n/ac/ax, 2 × 2 + 2 × 2, dual MAC
Wi-Fi Bands (GHz)	2.4/ 5
Wi-Fi Modulation	DBPSK, DQPSK, CCK, BPSK, QPSK, QAM, MU-MIMO-OFDMA
Bluetooth Protocol	Bluetooth 5.2
Working 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
Operating Temperature Range (℃)	-40 to +85
Region	Global
Certification	**Regulatory:** CE/ FCC/ RCM/ IC*/ Anatel*/ SRRC*/ JATE*/ TELEC*

"" means under planning.*

AF50T Timeline

2021												2022			
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.

Project Stage

AF50T MP

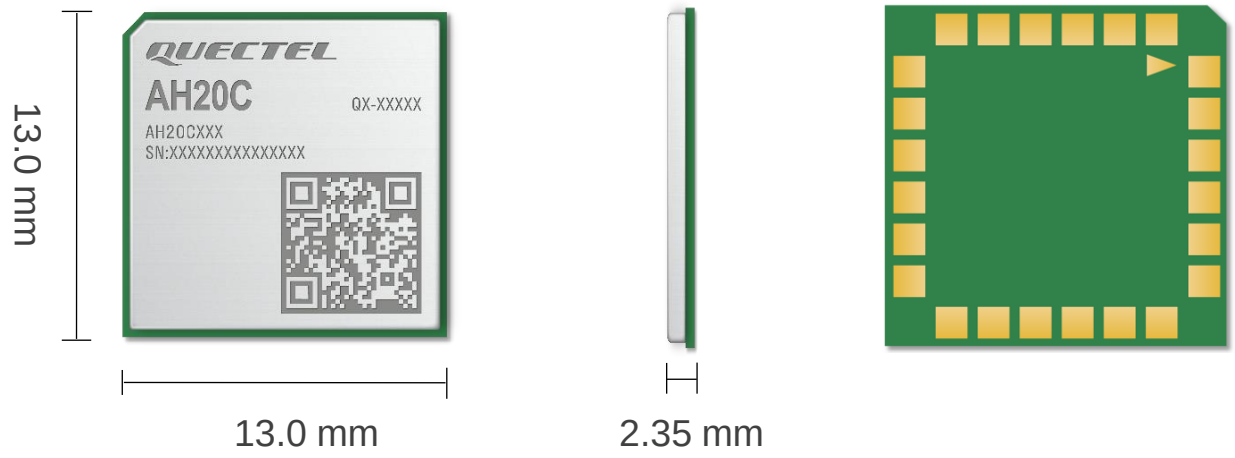
Regulatory Certification

CE/ FCC/ RCM **Completed**

IC/ Anatel/ SRRC/ JATE/ TELEC **TBD**

AH20C Highlights (Stand-alone Bluetooth)

Automotive Grade Stand-alone Bluetooth Module (CYW89072)



Length: 13.0 mm (±0.20 mm)
Width: 13.0 mm (±0.20 mm)
Height: 2.35 mm (±0.20 mm)
Weight: TBD

- CYW89072 chipset solution dedicated for automotive applications
- Work with Quectel AG55xQ/AG52xR series modules or third-party platform
- Support Bluetooth 5.0, support BLE and classic Bluetooth
- Ideal for automotive applications with IATF 16949 requirement
- Automotive quality processes (PPAP, 8D, DFMEA, PFMEA…)
- Operating 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

AH20C Specifications

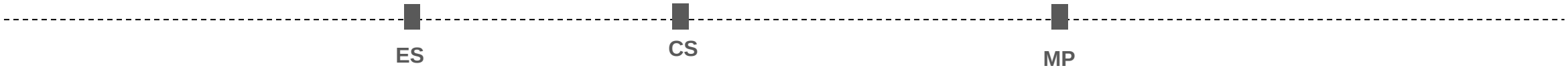
Module	AH20C
Chip	CYW89072
Bluetooth Bands (GHz)	2.4
Bluetooth Modulation	GFSK, π/4-DQPSK, 8-DPSK, Gaussian
Bluetooth Protocol	Bluetooth 5.0 (BLE + Classic Bluetooth)
Bluetooth Profile	HFP, HSP, PBAP, A2DP, AVRCP, MAP, HID, GATT, iAP2, SPP, etc.
Power Supply	VDD_BT_3V3, VDD_IO_1V8
Interfaces	UART, PCM, I2C, BT_HOST_WAKE, BT_DEV_WAKE
Operating Temperature Range (℃)	-40 to +85
Region	Global
Certification	**Regulatory:** CE*/ FCC*/ IC*

"" means under planning.*

AH20C Timeline

2021					2022					
Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.

Project Schedule



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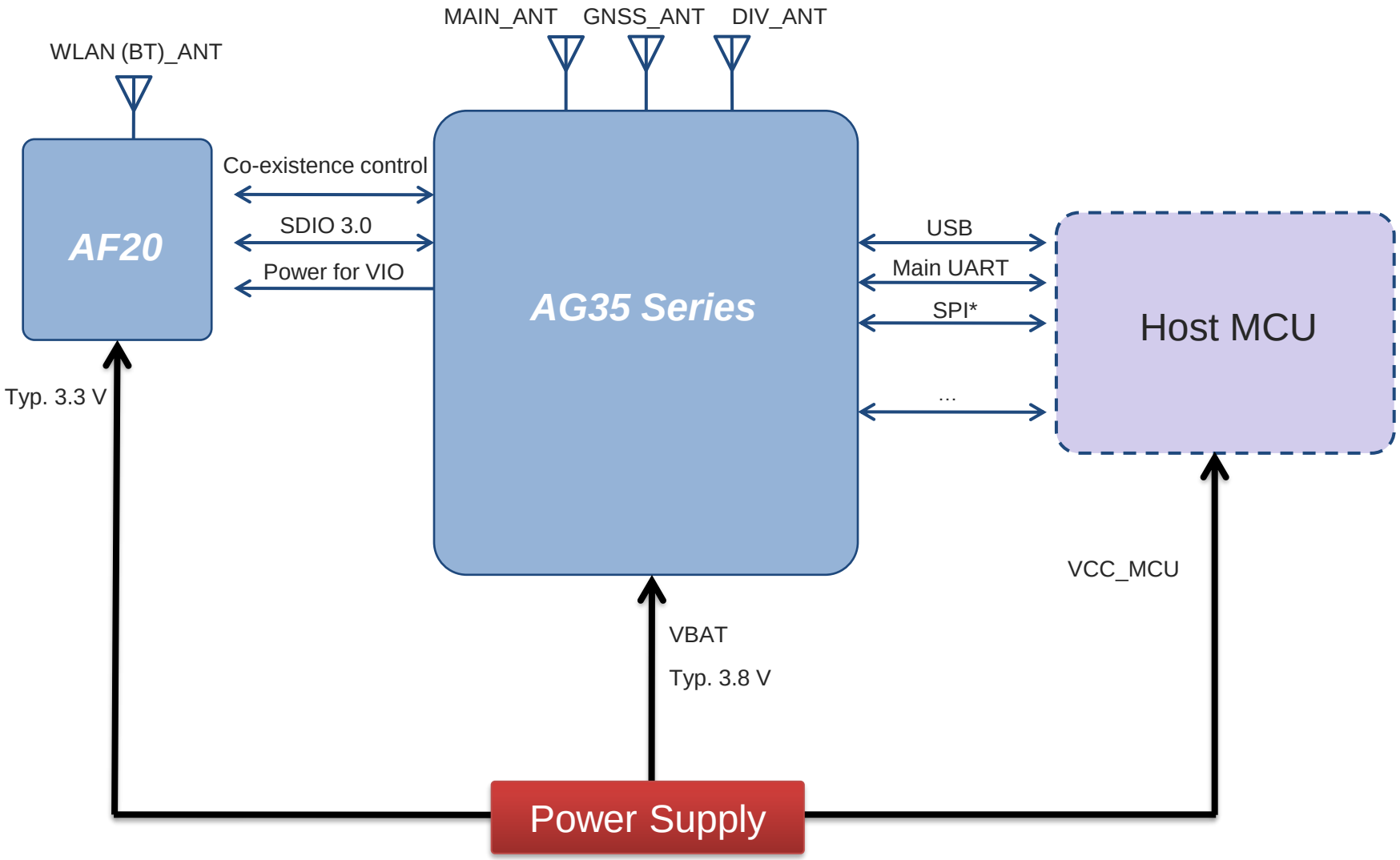
MP: Hardware and software ready for mass production. For certification status, please refer to the "certification schedule".

Regulatory Certification

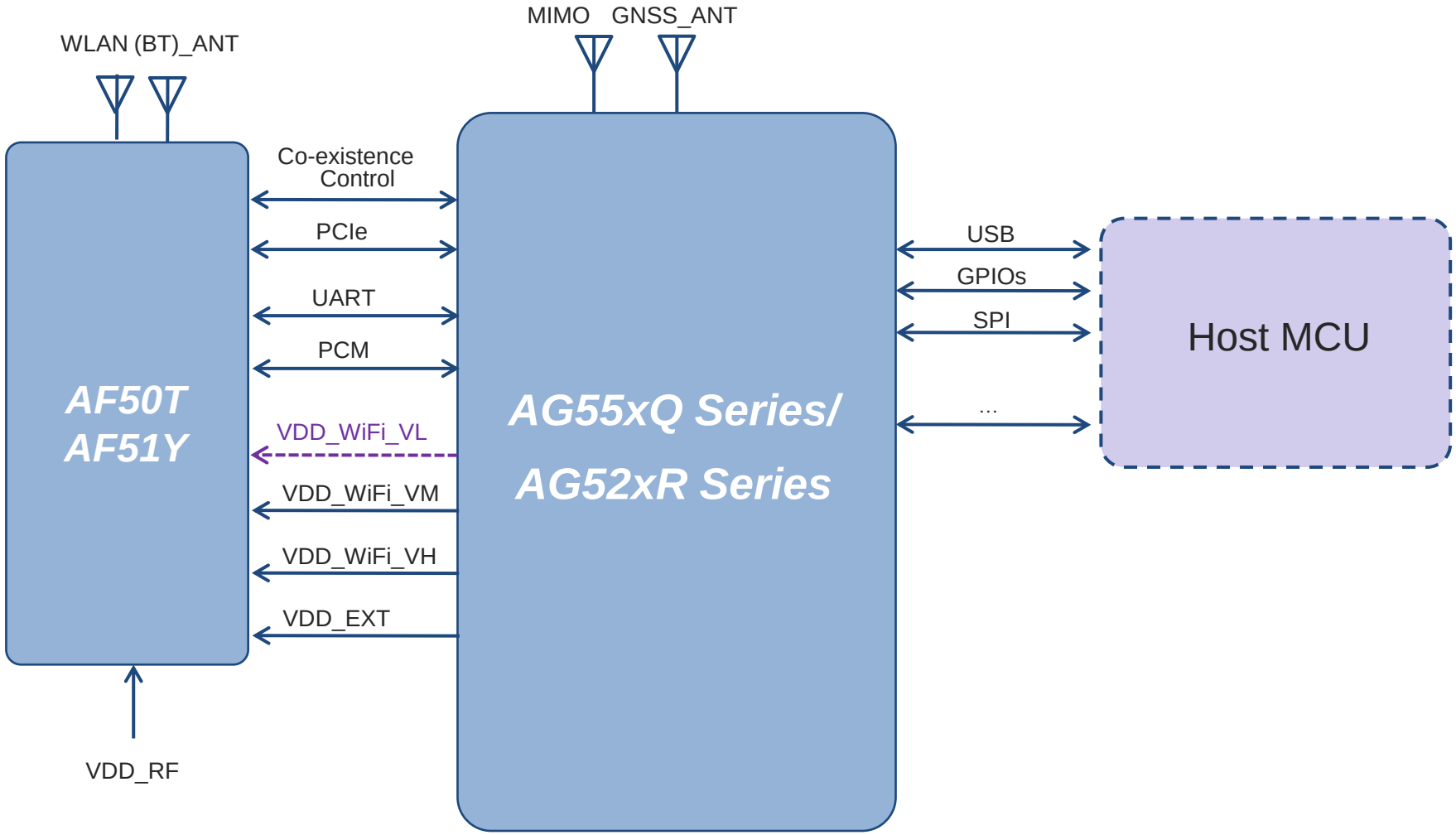
CE/ FCC/ IC	TBD

AG35 Series + AF20 Solution



"" means under development.*

AG55xQ Series/AG52xR Series + AF50T/AF51Y Solution



In AG52xR Series + AF50T/AF51Y solution, VDD_WiFi_VL is inputted by an external DC-DC converter.

Wi-Fi&Bluetooth Module Advantages

Best Co-existence

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

Quality

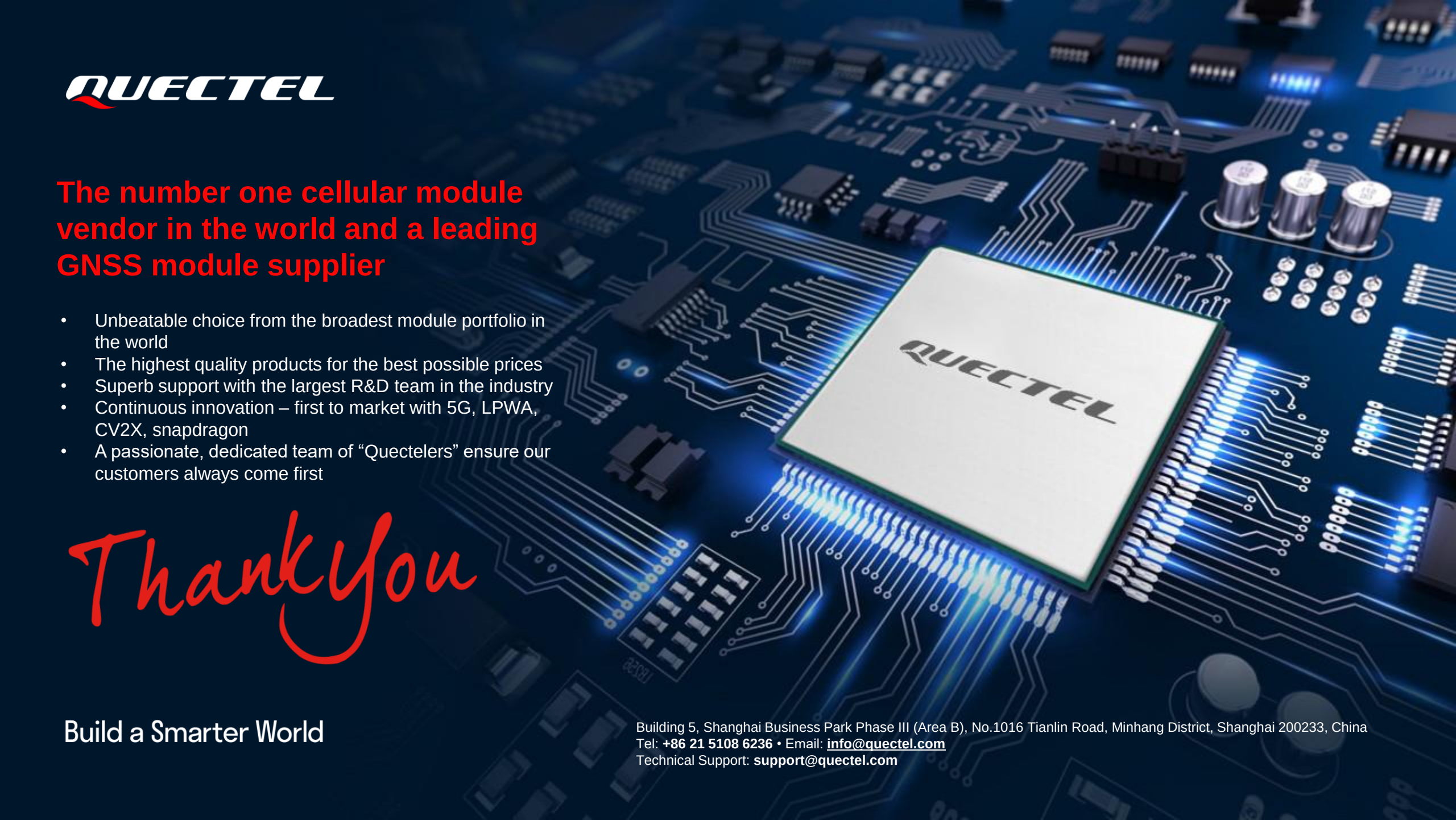
- Stable and robust network connectivity
- Wide working temperature
- Low power consumption

One-stop Solution

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

Easy Design

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



The number one cellular module vendor in the world and a leading GNSS module supplier

- Unbeatable choice from the broadest module portfolio in the world
- The highest quality products for the best possible prices
- Superb support with the largest R&D team in the industry
- Continuous innovation – first to market with 5G, LPWA, CV2X, snapdragon
- A passionate, dedicated team of “Quectelers” ensure our customers always come first

Thank You

Build a Smarter World

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Tel: **+86 21 5108 6236** • Email: **info@quectel.com**
Technical Support: **support@quectel.com**