

# Product Summary

# UBX-P3

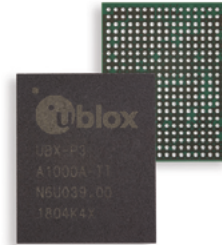


## DSRC/802.11p V2X and Wi-Fi chip



### Smallest concurrent dual-channel V2X chip

- Compact 9 x 11 x 1.04 mm V2X chip
- Co-packed power management unit
- Concurrent dual channel / diversity for robustness and full coverage around the vehicle
- Operating temperature of -40 °C to +105 °C
- Low power consumption – less than 1 W
- Supports smart antenna deployment



9.0 × 11.0 × 1.04 mm

### Product description

The UBX-P3 is a compact Wi-Fi chip that provides full 802.11p functionality for V2X applications. The chip operates on both 5.9 GHz and 760 MHz frequency bands. The UBX-P3 is fully compliant with IEEE WAVE, ETSI V2X, and ARIB T-109M requirements and enables concurrent reception on two 802.11p channels. The chip supports diversity in both transmit and receive directions, thus providing vehicles full coverage with no “dead” areas.

The UBX-P3 chip features an Ethernet host interface, which allows maximal flexibility in placing the chip in a vehicle, independent of the distance from the host processor. It also offers a solution for smart antennas and distributed systems in the vehicle.

The UBX-P3 chip has superior RF performance and a robust design, making it ideal for operation in harsh environments. The chip is fully qualified in accordance with the highly demanding AEC-Q100 grade 2 specification.

### Key features

- Supports V2X standards including:
  - IEEE 802.11-2012, IEEE/WAVE (for US)
  - ETSI ITS G5 standards EN 302 663 (for EU)
  - ARIB STD-T109 (Japan)
- Frequency bands: 760 MHz, 5 GHz, and 5.9 GHz
- Channel width: 10/20 MHz (for V2X), 20 MHz (for 802.11a)
- Tx-mask IEEE 802.11p Class C (5 GHz band)
- Operation modes:
  - 802.11p single channel with diversity
  - 802.11p dual channel without diversity
  - 802.11a (5 GHz band only) station mode
- Data rates up to 27 Mbps (10 MHz channel) and 54 Mbps (20 MHz channel)
- ECDSA verification supporting NIST/Brainpool curves, with a minimum throughput of 1000 verifications/sec
- Secure boot from a host CPU or an external flash memory
- Power management unit in the package
- PPS interface for communication with GNSS receivers

### Product selector

Model	Package	Radio	Interfaces						Power	Features	Grade								
		Frequencies	Wi-Fi 802.11	Channel width (MHz)	Rx/Tx diversity	Ethernet (RGMI / MII / Reverse MII)	SDIO	UART	SPI	Octal/Quad SPI	GPIO	I <sup>2</sup> C	PPS	Main supply (VDC)	Concurrent dual-channel operation	Security Acceleration Engine	Standard	Professional	Automotive
UBX-P3	FCBGA	5.850-5.925 GHz 5.18-5.725 GHz 755-765 MHz	p/a	10/20	•	1	1	4	1	1	20	1	•	3.3	•	•			•



## Features

Wi-Fi standards	IEEE 802.11 a/p
Frequency bands	5 GHz (Channels 36-165) 5.9 GHz (Channels 172-184) 760 MHz
Antenna	2 antenna pins (5 GHz band)
Transmitter	Single channel and diversity (Cyclic Shift Diversity) Supports configurable Root-Raised Cosine windowing for pulse shaping Tx Output power: -3 dBm
Receiver	Single channel and diversity Sensitivity (indicative): -98 dBm (MCS0 - 1 Rx Antenna) -100.2 dBm (MCS0 - 2 Rx Antennas)
Clock	TCXO 26/49.58/52 MHz
Embedded power management chip	
Security	Security acceleration for ECC implementing the ECDSA algorithm Compliant with 1609.2 IEEE/WAVE (for US) and ETSI TS-103-097 (for EU)
Auxiliary ADC	For transmit power control and antenna diagnostics

## Software features

Wi-Fi operational modes	802.11a station V2X single and dual (concurrent) channel Channel switching support (1609.4) Congestion control (DCC) metrics reporting Timing synchronization support
Host support	Linux, QNX, AUTOSAR host SDK, drivers, and libraries
Security	Secure boot

## Interfaces

Host	1 Ethernet (RGMII/MII/Reverse MII) 1 SDIO v3.0, speed up to 200 Mbps 1 SPI, speed up to 24 Mbps
Flash interface	1 Quad/Octal SPI
GNSS interface	1 I <sup>2</sup> C, normal and fast modes 4 UART, speed up to 4 Mbs 1 PPS
Other interfaces	20 GPIOs 1 RESET

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

For more product details and ordering information, see the [product data sheet](#).

## Package

Dimensions	9.0 x 11.0 x 1.04 mm
Mounting	FCBGA, 357 pins

## Environmental data, quality & reliability

Operating temperature	-40 °C to +105 °C
Storage temperature	TBD
Humidity	MSL 3 (Planned)
RoHS compliant (lead-free) and green (no halogens)	
Automotive qualification according to AEC-Q100 Grade 2	
Manufactured in ISO/TS 16494 certified production sites	

## Electrical data

Voltage supply	3.3 V
Power consumption	1 W (max)

## Certifications and approvals\*

Europe (ETSI Radio Equipment Directive (RED))
USA (FCC CFR parts 15, 90 (RSU), and 95 (OBU))
Japan (Giteki)

\* Pending approvals

## Support products

Evaluation Kit	UBX-P3031 Development Platform with Computer on Module (CoM) interfaces supporting various host CPUs
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## Product variants

UBX-P3011-BA	V2X chip, automotive grade chip with one single antenna
UBX-P3021-BA	V2X chip, automotive grade chip with dual antenna, single channel with diversity
UBX-P3031-BA	V2X chip, automotive grade chip with dual antenna, concurrent dual channel without diversity

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