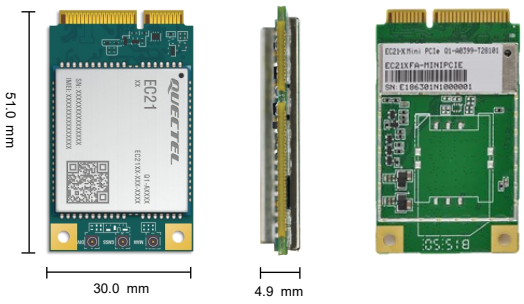
Quectel

EC21 Series Mini PCIe

IoT/M2M-optimized

LTE Cat 1 Module



Quectel EC21 Mini PCIe is a series of LTE Cat 1 module adopting standard PCI Express® Mini Card form factor (Mini PCIe). Specially optimized for M2M and IoT applications, it features cost-effective, low-power LTE connectivity, and delivers M2M-optimized speeds of 10 Mbps downlink and 5 Mbps uplink. These make it ideal for numerous IoT applications that are not reliant on high speed connectivity but still require the longevity and reliability of LTE networks.

EC21 series Mini PCIe contains 10 variants: EC21-A Mini PCIe, EC21-V Mini PCIe, EC21-AUT Mini PCIe, EC21-AU Mini PCIe, EC21-AUX Mini PCIe, EC21-E Mini PCIe, EC21-EU Mini PCIe, EC21-EUX Mini PCIe, EC21-KL Mini PCIe and EC21-J Mini PCIe. This makes it backward-compatible with existing EDGE and GSM/GPRS networks, ensuring that it can easily migrate from LTE to 2G or 3G network.

EC21 series Mini PCIe supports Qualcomm® IZat™ location technology Gen8C Lite (GPS, GLONASS, BDS, Galileo and QZSS). The integrated GNSS greatly simplifies product design, and provides quicker, more accurate and more dependable positioning.

A rich set of Internet protocols, industry-standard interfaces and abundant functionalities (USB serial drivers for Windows 7/8/8.1/10/11, Linux, Android/eCall*) extend the applicability of the module to a wide range of M2M applications such as smart metering, tracking and tracing, fleet management, wearable devices, smart home gateways, digital signs, and even drones.

Key Features

- Cost-effective, lower-power LTE connectivity optimized for broadband IoT applications
- Worldwide LTE, UMTS/HSPA(+) and GSM/GPRS/EDGE coverage
- Standard PCI Express® Mini Card form factor (Mini PCIe) ideal for manufacturers to easily integrate wireless connectivity into their devices
- MIMO technology meets demands for data rate and link reliability in modem wireless communication systems
- Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment

LTE
LTE Cat 1
Max. 10 Mbps (DL)
Max. 5 Mbps (UL)

HSPA+
Max. 42Mbps (DL)
Max. 5.76Mbps (UL)

Mini PCIe
Mini PCIe Package

Embedded Abundant Protocols

Multi-constellation GNSS

USB 2.0 High Speed Interface

USB Drivers

AT
Quectel Enhanced AT Commands

Version: 1.7 | Status: Released

Quectel EC21 Series Mini PCIe

LTE Cat 1	EC21-A Mini PCIe	EC21-V Mini PCIe	EC21-AUT Mini PCIe	EC21-AU Mini PCIe	EC21-AUX Mini PCIe
Region/Operator	North America	Verizon	Australia	Latin America/Australia/ New Zealand	Latin America/Australia/ New Zealand
Dimensions (mm)	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9
Temperature Range					
Operation Temperature	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C
Extended Temperature	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
Frequency Bands					
LTE-FDD	B2/4/12	B4/13	B1/3/5/7/28	B1/2①/3/4/5/7/8/28	B1/2①/3/4/5/7/8/28
LTE-TDD	-	-	-	B40	B40
WCDMA	B2/4/5	-	B1/5	B1/2/5/8	B1/2/4/5/8
GSM/EDGE	-	-	-	B2/3/5/8	B2/3/5/8
GNSS (Optional)	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS
Certifications					
Carrier	**America:** AT&T/T-Mobile/U.S. Cellular **Canada:** Rogers/Telus	**America:** Verizon	**Australia:** Telstra	**Australia:** Telstra	-
Regulatory	**America:** FCC **North America:** PTCRB **Canada:** IC	**Global:** GCF **America:** FCC	**Global:** GCF **Australia/New Zealand:** RCM	**America:** FCC **Canada:** IC **Brazil:** Anatel **Taiwan, China:** NCC **Japan:** JATE/TELEC **Australia/New Zealand:** RCM	**Europe:** CE **America:** FCC **Brazil:** Anatel **Taiwan, China:** NCC **Australia/New Zealand:** RCM
Others	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL
Max. Data Transmission Rates					
LTE-FDD (Mbps)	10 (DL)/5 (UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)
LTE-TDD (Mbps)	-	-	-	8.96 (DL)/3.1 (UL)	8.96 (DL)/3.1 (UL)
DC-HSPA+ (Mbps)	42 (DL)/5.76 (UL)	-	42 (DL)/5.76 (UL)	42 (DL)/5.76 (UL)	42 (DL)/5.76 (UL)
WCDMA (kbps)	384 (DL)/384 (UL)	-	384 (DL)/384 (UL)	384 (DL)/384 (UL)	384 (DL)/384 (UL)
EDGE (kbps)	-	-	-	296 (DL)/236.8 (UL)	296 (DL)/236.8 (UL)
GPRS (kbps)	-	-	-	107 (DL)/85.6 (UL)	107 (DL)/85.6 (UL)
Interfaces					
(U)SIM	× 1	× 1	× 1	× 1	× 1
UART	× 1	× 1	× 1	× 1	× 1
USB 2.0	× 1	× 1	× 1	× 1	× 1
Audio Digital (PCM)	× 1	× 1	× 1	× 1	× 1
I2C (for Wi-Fi and SD Card)	× 1	× 1	× 1	× 1	× 1
LED_WWAN#	× 1	× 1	× 1	× 1	× 1
W_DISABLE#	× 1	× 1	× 1	× 1	× 1
PERST#	× 1	× 1	× 1	× 1	× 1
Voice					
Speech Codec Modes	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB
Echo Arithmetic	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression
VoLTE (Optional)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)
Enhanced Features					
eCall *	●	●	●	●	●
DTMF	●	●	●	●	●
DFOTA	●	●	●	●	●
QMI/RmNet	●	●	●	●	●
Audio Playback*/ Audio Recording*	Optional	Optional	Optional	Optional	Optional
QuecLocator®	●	●	●	●	●
QuecFile®	●	●	●	●	●
(U)SIM Card Detection	●	●	●	●	●
Drivers					
USB Serial Driver	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x
GNSS Driver	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x
RIL Driver	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x
USB NDIS Driver	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11
USB MBIM Driver	Windows 8/8.1/10/11, Linux 3.18–5.18	Windows 8/8.1/10/11, Linux 3.18–5.18	Windows 8/8.1/10/11, Linux 3.18–5.18	Windows 8/8.1/10/11, Linux 3.18–5.18	-
USB GobiNet Driver	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18
USB QMI_WWAN Driver	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18
Electrical Features					
Supply Voltage Range	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.
Power Consumption	3.5 mA @ Sleep, Typ. 32 mA @ Idle	3.8 mA @ Sleep, Typ. 30 mA @ Idle	3.2 mA @ Sleep, Typ. 22 mA @ Idle	2.8 mA @ Sleep, Typ. 24 mA @ Idle	1.8 mA @ Sleep, Typ. 22 mA @ Idle

NOTE:
1. ①: LTE-FDD B2 of EC21-AU Mini PCIe and EC21-AUX Mini PCIe does not support Rx-diversity.
2. ●: Supported.
3. *: Under development.

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Quectel EC21 Series Mini PCIe

LTE Cat 1	EC21-E Mini PCIe	EC21-EU Mini PCIe	EC21-EUX Mini PCIe	EC21-KL Mini PCIe	EC21-J Mini PCIe
Region/Operator	EMEA/Thailand/India	EMEA/Thailand	EMEA/Thailand	South Korea	Japan
Dimensions (mm)	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9	30.0 × 51.0 × 4.9
Temperature Range					
Operation Temperature	-35 °C to +75 °C	-35 °C to +75 °C	-35 °C to +75 °C	-35°C to +75 °C	-35°C to +75 °C
Extended Temperature	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40°C to +80 °C	-40°C to +80 °C
Frequency Bands					
LTE-FDD	B1/3/5/7/8/20	B1/3/7/8/20/28A	B1/3/7/8/20/28A	B1/3/5/7/8	B1/3/8/18/19/26
LTE-TDD	-	-	-	-	-
WCDMA	B1/5/8	B1/8	B1/8	-	-
GSM/EDGE	B3/8	B3/8	B3/8	-	-
GNSS (Optional)	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS	GPS/GLONASS/BDS/Galileo/QZSS	-	GPS/GLONASS/BDS/Galileo/QZSS
Certifications					
Carrier	**Europe:** Vodafone/Deutsche Telekom	**Europe:** Deutsche Telekom	-	**South Korea:** KT/SKT	**Japan:** NTT DOCOMO/KDDI
Regulatory	**Global:** GCF **Europe:** CE **Australia/New Zealand:** RCM	**Global:** GCF **Europe:** CE **Taiwan, China:** NCC **Australia/New Zealand:** RCM	**Global:** GCF **Europe:** CE **Australia/New Zealand:** RCM	**South Korea:** KC	**Japan:** JATE/TELEC
Others	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL	RoHS/WHQL
Max. Data Transmission Rates					
LTE-FDD (Mbps)	10 (DL)/ 5(UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)	10 (DL)/5 (UL)
LTE-TDD (Mbps)	-	-	-	-	-
DC-HSPA+ (Mbps)	42 (DL)/5.76 (UL)	42 (DL)/5.76 (UL)	42 (DL)/5.76 (UL)	-	-
WCDMA (kbps)	384 (DL)/384 (UL)	384 (DL)/384 (UL)	384 (DL)/384 (UL)	-	-
EDGE (kbps)	296 (DL)/236.8 (UL)	296 (DL)/236.8 (UL)	296 (DL)/236.8 (UL)	-	-
GPRS (kbps)	107 (DL)/85.6 (UL)	107 (DL)/85.6 (UL)	107 (DL)/85.6 (UL)	-	-
Interfaces					
(U)SIM	× 1	× 1	× 1	× 1	× 1
UART	× 1	× 1	× 1	× 1	× 1
USB 2.0	× 1	× 1	× 1	× 1	× 1
Audio Digital (PCM)	× 1	× 1	× 1	× 1	× 1
I2C (for Wi-Fi and SD Card)	× 1	× 1	× 1	× 1	× 1
LED_WWAN#	× 1	× 1	× 1	× 1	× 1
W_DISABLE#	× 1	× 1	× 1	× 1	× 1
PERST#	× 1	× 1	× 1	× 1	× 1
Voice					
Speech Codec Modes	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB	HR/FR/EFR/AMR/AMR-WB
Echo Arithmetic	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression	Echo Cancellation/ Noise Suppression
VoLTE (Optional)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)	Digital Audio and VoLTE (Voice over LTE)
Enhanced Features					
eCall *	●	●	●	●	●
DTMF	●	●	●	●	●
DFOTA	●	●	●	●	●
QMI/RmNet	●	●	●	●	●
Audio Playback*/ Audio Recording*	Optional	Optional	Optional	Optional	Optional
QuecLocator®	●	●	●	●	●
QuecFile®	●	●	●	●	●
(U)SIM Detection	●	●	●	●	●
Drivers					
USB Serial Driver	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x	Windows 7/8/8.1/10/11, Linux 2.6–5.18, Android 4.x–12.x
GNSS Driver	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	-	Android 4.x–12.x
RIL Driver	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x	Android 4.x–12.x
USB NDIS Driver	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11	Windows 7/8/8.1/10/11
USB MBIM Driver	Windows 8/8.1/10/11, Linux 3.18–5.18	Windows 8/8.1/10/11, Linux 3.18–5.18	-	Windows 8/8.1/10/11, Linux 3.18–5.18	Windows 8/8.1/10/11, Linux 3.18–5.18
USB GobiNet Driver	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18	Linux 2.6–5.18
USB QMI_WWAN Driver	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18	Linux 3.4–5.18
Electrical Features					
Supply Voltage Range	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.	3.0–3.6 V, 3.3 V Typ.
Power Consumption	3.9 mA @ Sleep, Typ. 30 mA @ Idle	3.4 mA @ Sleep, Typ. 23 mA @ Idle	3.2 mA @ Sleep, Typ. 22 mA @ Idle	3.2 mA @ Sleep, Typ. 22 mA @ Idle	3.2 mA @ Sleep, Typ. 32 mA @ Idle

NOTE:
1. * : Under development.
2. ● : Supported.

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