CONNECTIVITY CARD
LTE + WIREPAS MESH MPCIE

Datasheet. Release 1.0

Remote monitoring of critical infrastructure with edge computing

The Combo Connectivity Cards from CTHINGS.CO® are extension cards based on the Nordic® Semiconductor nRF52840 SoC and Quectel EG25 series of LTE Cat 4 modules optimized specially for M2M and IoT applications. Adopting the 3GPP Rel-11 LTE technology, it delivers maximum data rates up to 150 Mbps downlink and 50 Mbps uplink. It's a combination of multi-protocol chips designed to empower IoT integrators to implement LTE Cat 4, UMTS/HSPA(+), Bluetooth® 5.3 including Bluetooth Low Energy, Bluetooth Mesh, Wirepas®, Thread®, Zigbee®, 802.15.4, ANT, and other 2.4 GHz protocol stacks.

The product comes with full CE class-B and RED certification and can be used to quickly and reliably add 2.4 GHz and Cellular LTE protocol stack support to any existing device with a **mini-PCIe** without worrying about certification or radio performance. A full J-Trace connector is available for convenient firmware development.

CTHINGS.CO also provides various pre-flashing options, and tested support for Wirepas Mesh 2.4 GHz profile.

SPECIFICATIONS

Hardware Features	• Mini PCI-express connector pinout compliant • Single-ended U.FL antenna connectors • Based on Nordic® Semiconductor nRF52840 • Based on Quectel® EG25-G • Ultra-low power consumption • J-Trace interface for easy debugging and FW development • RF output power up to +8 dBm • ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz • USB 2.0 full speed (12 Mbps) controller
Software Features	• Compatible with Wirepas Mesh 2.4 GHz profile firmware (including sink) • Compatible with nRF Connect SDK
Electrical Specification	• 3.3 V nominal supply voltage (electrically mini-PCIe compliant) • 3.0 V - 3.5 V supply voltage range • ESD protected • Ultra-low power consumption
Cellular Modem features	• 3GPP LTE release 11 Cat 4 compliant

RF transceiver for global coverage	• Up to 23 dBm output power in LTE
	• RX sensitivity:
	   • -100 dBm for LTE
	   • -110 dBm for WCDMA

Cellular band support in hardware:	• LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/ B19/B20/B25/B26/B28 • LTE-TDD: B38/B39/B40/B41 • WCDMA: B1/B2/B4/B5/B6/B8/B19 GSM: B2/B3/B5/B8
Embedded Security	• ARM® TrustZone® Cryptocell 310 security subsystem • Secure boot ready • Secure erase
RF transceiver for local coverage	• 2360 - 2500 MHz operating frequency • 1 MHz PLL channel spacing • ±170 kHz frequency deviation @ 1 Mbps • ±320 kHz frequency deviation @ 2 Mbps • 125 - 2000 kbps on-the-air data rate

SPECIFICATIONS

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Certifications	The CTHINGS.CO® Combo mPCIe Connectivity Card is CE Class-B, Radio Equipment Directive (RED), & EU RoHS directive compliant. US FCC and UK CA certification is planned. The device has been tested to meet the following electromagnetic compatibility standards: Electromagnetic emissions: • Conducted emission: EN 55022, EN 55014-1, EN 55011 • Radiated emission up to 6 GHz • Harmonic current emission: EN 61000-3-2 • Voltage fluctuations and flicker: EN 61000-3-3 Immunity to electromagnetic interference (EMI): • Electrostatic discharge (ESD) immunity: EN 61000-4-2 • Radiated electromagnetic field immunity: EN 61000-4-3 • Electrical fast transient / burst immunity: EN 61000-4-4 • Surge immunity: EN 61000-4-5 • Conducted disturbance immunity: EN 61000-4-6 • Power frequency magnetic field immunity: EN 61000-4-8 • Pulse magnetic field immunity: EN 61000-4-9 • Voltage dips & short interruptions: EN 61000-4-11
Use Cases	• IoT Gateways • Workstations and Laptops • Cellular backhaul systems for non-cellular Wirepas meshes • Bluetooth interface for IoT sensors

Wirepas Mesh	Plug-and-play support for Wirepas 2.4 GHz profile mesh networks	**Mini-PCIe Pinout Compliance**	Small and standardised form factor compliant with common hardware
Bluetooth® 5.3	IEEE 802.15.4-2006, 2.4 GHz transceiver	**Multiprotocol**	LTE, WCDMA, GPS, Bluetooth Low Energy, Bluetooth Mesh, Thread, Zigbee, IEEE 802.15.4, ANT, Wirepas 2.4GHz
Certified Radio Equipment	Full CE Class-B & Radio Equipment Directive (RED) certification	**In-system firmware upgrades**	Support for in-system programming (SWD)
Performant CPU	32-bit ARM Cortex-M4 CPU with floating-point unit	**Cellular Network**	LTE Cat. 4, WCDMA/HSPA(+)

External appearance
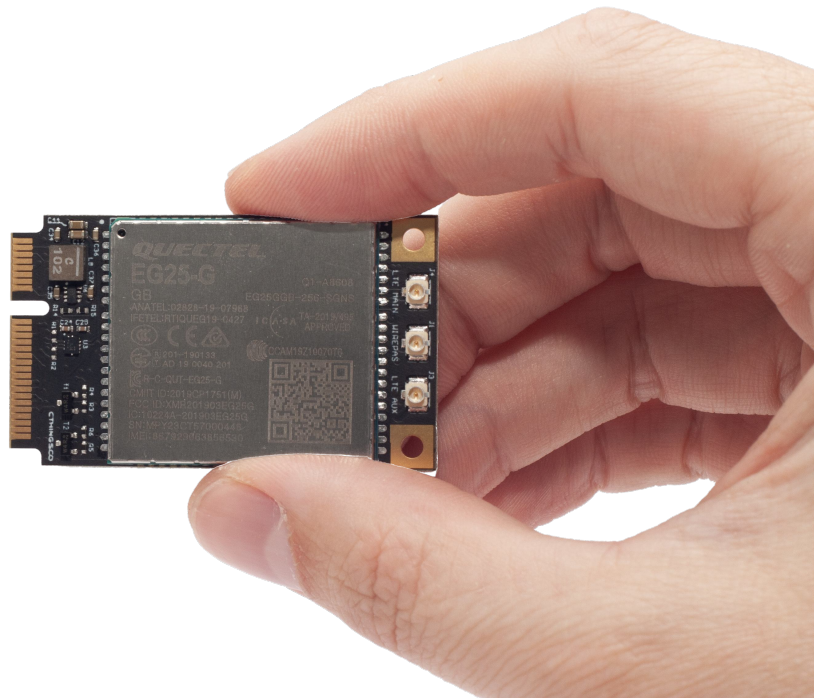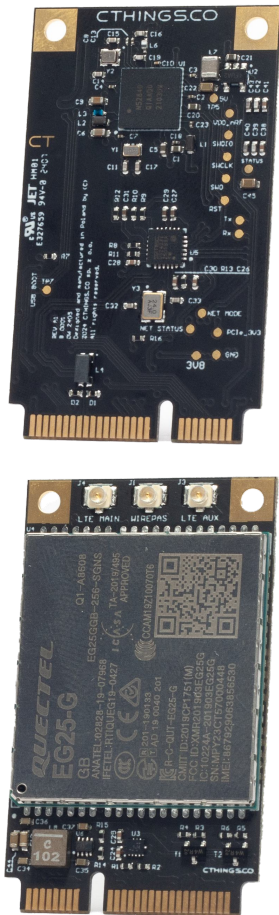
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