



# CONNECTIVITY CARD NRF9161 MPCIE

Datasheet. Release 1.4

## Remote monitoring of critical infrastructure with edge computing

The nRF91 Connectivity Cards from CTHINGS.CO® are extension cards based on the Nordic® Semiconductor nRF9161 SoC. They are multi-protocol chips designed to empower IoT integrators to implement DECT NR+, LTE Cat-M1/NB1/NB2 protocol stacks.

The extension card allows for full-fledged utilisation of the on-board Arm® Cortex®-M33 CPU with FPU. In addition, the ARM TrustZone® CryptoCell 310 cryptographic unit brings an extensive range of cryptography options.

The product comes with full CE class-B and RED certification and can be used to quickly and reliably add LTE or DECT NR+ 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 on a programming jig for convenient firmware development.

CTHINGS.CO also provides various pre-flashing options, and tested support for Wirepas 5G Mesh firmware profile.

## SPECIFICATIONS

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<b>Hardware Features</b>	<ul style="list-style-type: none"> <li>• Mini PCI-express connector pinout compliant</li> <li>• Single-ended U.FL antenna connector</li> <li>• Based on Nordic® Semiconductor nRF9161</li> <li>• 64 Mbit flash memory</li> <li>• Ultra-low power consumption</li> <li>• Arm® Cortex®-M33 processor with FPU, 64 MHz</li> <li>• Communicating with host device via USB interface</li> <li>• Compatible with CTHINGS.CO Programming Jig</li> </ul>
<b>Software Features</b>	<ul style="list-style-type: none"> <li>• Compatible with Wirepas Mesh 5G NR+ profile firmware (including sink)</li> <li>• Compatible with nRF Connect SDK</li> </ul>
<b>Electrical Specification</b>	<ul style="list-style-type: none"> <li>• 3.3 V nominal supply voltage (electrically mini-PCIe compliant)</li> <li>• 3.0 V – 3.5 V supply voltage range</li> <li>• ESD protected</li> <li>• Ultra-low power consumption</li> </ul>
<b>Modem features</b>	<ul style="list-style-type: none"> <li>• 3GPP LTE release 14 Cat-M1 compliant</li> <li>• 3GPP LTE release 14 Cat-NB1 and Cat-NB2 compliant</li> <li>• Power Saving Modes: DRX, eDRX, PSM</li> <li>• <b>DECT NR+</b> band: 1, 2, 9</li> </ul>
<b>RF transceiver for global coverage</b>	<ul style="list-style-type: none"> <li>• Up to 23 dBm output power</li> <li>• RX sensitivity: <ul style="list-style-type: none"> <li>• -108 dBm sensitivity (Cat-M1) for low band</li> <li>• -107 dBm for mid band</li> </ul> </li> <li>• Supports LTE bands from 700 MHz to 2.2 GHz through a single 50 Ω antenna pin</li> </ul>
<b>LTE band support in hardware:</b>	<ul style="list-style-type: none"> <li>• Cat-M1: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B85</li> <li>• Cat-NB1/NB2: B1, B2, B3, B4, B5, B8, B12, B13, B17, B19, B20, B25, B26, B28, B65, B66, B85</li> </ul>
<b>Embedded Security</b>	<ul style="list-style-type: none"> <li>• ARM® TrustZone® Cryptocell 310 security subsystem</li> <li>• Secure boot ready</li> <li>• Secure erase</li> </ul>

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## SPECIFICATIONS

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### Certifications

The CTHINGS.CO® nRF91 mPCIe Edge IoT 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):

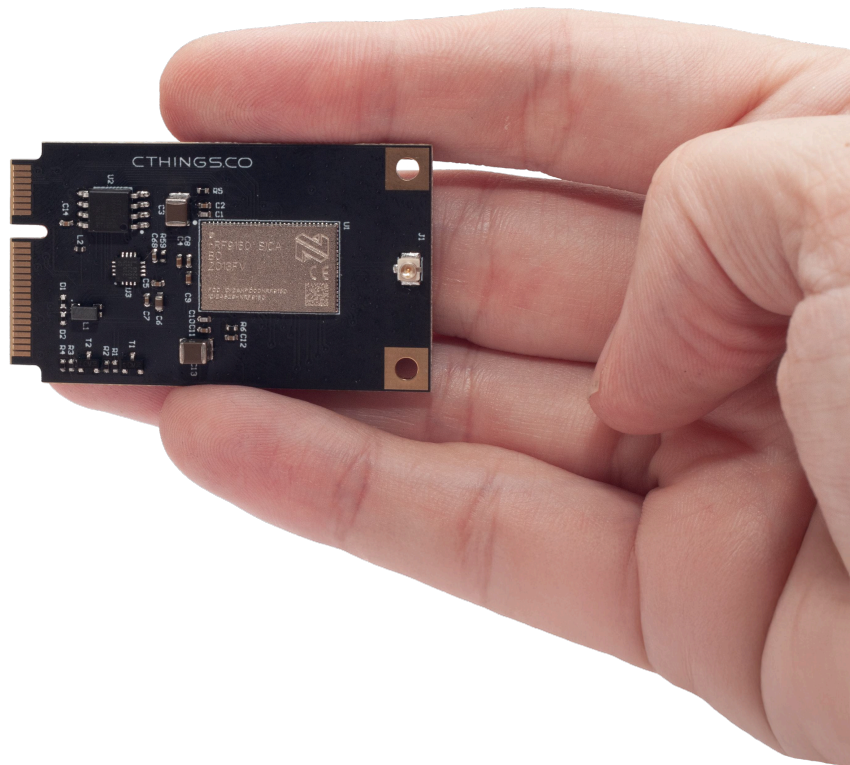
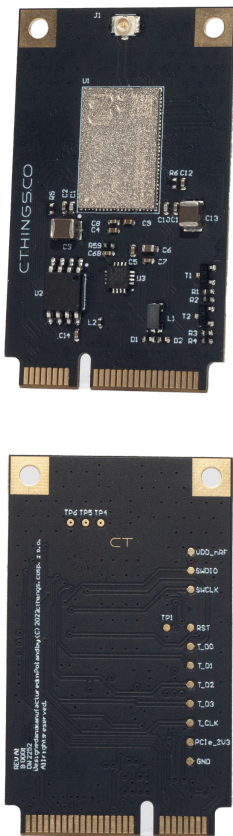
- Electrostatic discharge (ESD) immunity: EN 61000-4-2
- Radiated electromagnetic field immunity: EN 61000-4-3

### Use Cases

- IoT Gateways
- Workstations and Laptops
- Cellular backhaul systems for non-cellular Wirepas meshes
- Gateways for Nordic® Semiconductor nRF91 based IoT systems

<b>Wirepas 5G Mesh</b>	Plug-and-play support for Wirepas 5G / NR+ profile mesh networks	<b>Mini-PCIe Pinout Compliance</b>	Small and standardised form factor compliant with common hardware
<b>Cellular LTE Network</b>	Cat. M1, NB-IoT (Cat. NB1/NB2)	<b>Multiprotocol</b>	LTE-M/NB-IoT, DECT NR+, Wirepas 5G Mesh
<b>Certified Radio Equipment</b>	Full CE Class-B & Radio Equipment Directive (RED) certification	<b>Performant CPU</b>	32-bit ARM Cortex-M33 CPU with floating-point unit
<b>Zephyr support</b>	Out-of-the-box support for Zephyr RTOS		

## External appearance



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