



CONNECTIVITY CARD NRF9151 M.2

Datasheet. Release 1.2

Remote monitoring of critical infrastructure with edge computing

The nRF91 Connectivity Cards from CTHINGS.CO® are extension cards based on the Nordic® Semiconductor nRF9151 SoC. They are multi-protocol chips designed to empower IoT integrators to implement DECT NR+, LTE Cat-M1/NB1/NB2 protocol stacks, and will support NTN (Non-Terrestrial Network) in future modem firmware releases.

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 nRF9151 supports Power Class 3 (23 dBm) and Power Class 5 (20 dBm), with Power Class 5 significantly reducing power consumption.

The product comes with full CE class-B and RED certification and can be used to quickly and reliably add LTE -M or DECT NR+ protocol stack support to any existing device with an **M.2** 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

| | |
|---|---|
| Hardware Features | <ul style="list-style-type: none"> • M.2 connector pinout compliant • Single-ended U.FL antenna connector • Based on Nordic® Semiconductor nRF9151 • 64 Mbit flash memory • Ultra-low power consumption • Arm® Cortex®-M33 processor with FPU, 64 MHz • Communicating with host device via USB interface • Compatible with CTHINGS.CO Programming Jig |
| Software Features | <ul style="list-style-type: none"> • Compatible with Wirepas Mesh 5G NR+ profile firmware (including sink) • Compatible with nRF Connect SDK |
| Electrical Specification | <ul style="list-style-type: none"> • 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 |
| Modem features | <ul style="list-style-type: none"> • 3GPP LTE release 14 Cat-M1 compliant • 3GPP LTE release 14 Cat-NB1 and Cat-NB2 compliant • Power Saving Modes: DRX, eDRX, PSM • DECT NR+ band: 1, 2, 9, 22 |
| RF transceiver for global coverage | <ul style="list-style-type: none"> • Up to 23dBm output for Power Class 3 configuration • Up to 20dBm output for Power Class 5 configuration • RX sensitivity: <ul style="list-style-type: none"> • -108 dBm (Cat-M1) for low band • -107 dBm for mid band • Supports LTE bands from 700 MHz to 2.2 GHz through a single 50 Ω antenna pin |
| LTE band support in hardware: | <ul style="list-style-type: none"> • Cat-M1: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B85 • Cat-NB1/NB2: B1, B2, B3, B4, B5, B8, B12, B13, B17, B19, B20, B25, B26, B28, B65, B66, B85 |
| Embedded Security | <ul style="list-style-type: none"> • ARM® TrustZone® Cryptocell 310 security subsystem • Secure boot ready • Secure erase |

SPECIFICATIONS

Certifications

The CTHINGS.CO® nRF91 M.2 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:

- EN 55032:2015+A1:2020
 - test method according to EN 55016-2-3:2017+A1:2019

Immunity to electromagnetic interference (EMI):

- Electrostatic discharge immunity test (ESD) according to EN61000-4-2:2009
- Radiated, electromagnetic field immunity test according to EN61000-4-3:2020

Use Cases

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

| | | | |
|----------------------------------|--|------------------------------|---|
| Wirepas 5G Mesh | Plug-and-play support for Wirepas 5G / NR+ profile mesh networks | M.2 Pinout Compliance | Small and standardised form factor compliant with common hardware |
| Cellular LTE Network | Cat. M1, NB-IoT (Cat. NB1/NB2) | Multiprotocol | LTE-M/NB-IoT, DECT NR+, Wirepas 5G Mesh |
| Certified Radio Equipment | Full CE Class-B & Radio Equipment Directive (RED) certification | Performant CPU | 32-bit ARM Cortex-M33 CPU with floating-point unit |

External appearance



Start your digital transformation journey

Order now

Confidentiality



This document is based on information provided by CTHINGS.CO Sp. z o.o. (the "Company"). It is being communicated on behalf of the Company to you solely for information and for the exclusive use of the selected persons to whom it is addressed for the purpose of their considering whether to proceed with a further analysis of a potential transaction (the "Transaction") involving the Company. This document should not be used for any other purpose. This document is strictly confidential and cannot be disclosed, revealed, reproduced or redistributed, in whole or in part, by or to any other person without the prior written consent of the Company.

All rights reserved



No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, including brief quotations embodied in critical reviews and other non-commercial uses permitted by copyright law. The publisher makes no representations or warranties with respect to the accuracy or completeness of the contents of this document. The publisher does not make any commitment to update the information contained herein. The publisher's products are not intended, authorised, or warranted for use as components in applications intended to support or sustain life. The publisher's products are not designed for and will not be used in connection with any applications where the failure of such products would reasonably be expected to result in significant personal injury or death.

Disclaimer



The information herein is believed to be correct as of the date issued. The Company will not be responsible for damages of any nature resulting from the use or reliance upon the information contained herein. The Company makes no warranties, expressed or implied, of merchantability or fitness for a particular purpose or course of performance or usage of trade. Therefore, it is the user's responsibility to thoroughly test the product in their particular application to determine its performance, efficacy, and safety. Users should obtain the latest relevant information before placing orders.

Unless The Company has explicitly designated an individual product as meeting the requirement of a particular industry standard, The Company is not responsible for any failure to meet such industry standard requirements.

Unless explicitly stated herein this document, The Company has not performed any regulatory conformity test. It is the user's responsibility to assure that necessary regulatory conditions are met and approvals have been obtained when using the product. Regardless of whether the product has passed any conformity test, this document does not constitute any regulatory approval of the user's product or application using the product.

Nothing contained herein is to be considered as permission or a recommendation to infringe any patent or any other intellectual property right. No license, expressed or implied, to any intellectual property right is granted by The Company herein.

The Company reserves the right to at any time correct, change, amend, enhance, modify, and improve this document and/or products without notice. This document supersedes and replaces all information supplied prior to the publication hereof.