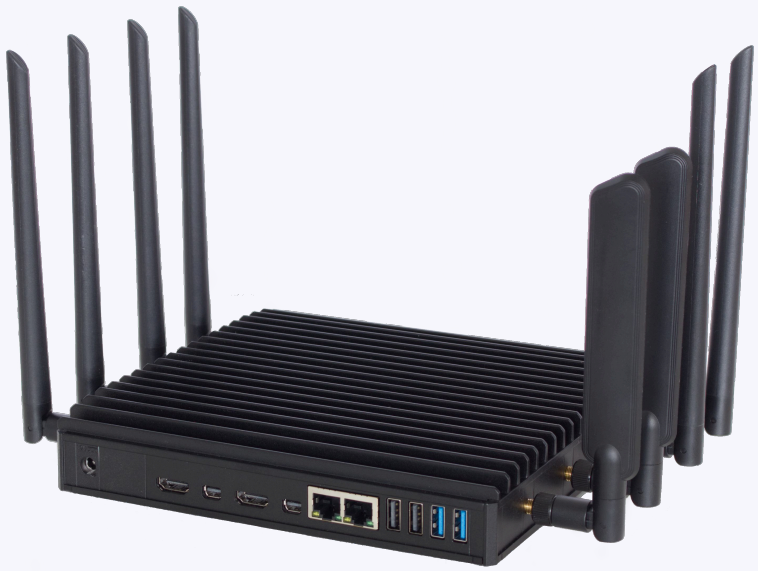
CTHINGS.CO®
EDGE IOT SOLUTIONS



EDGE IOT GATEWAY (L)

Datasheet. Release 2.2

Remote monitoring of critical infrastructure with edge computing

Pervasive computing systems are capable of collecting, processing and communicating data, they can adapt to the data's context and activity. That means, in essence, a network that can understand its surroundings and improve the human experience and quality of life.

CTHINGS.CO® Edge IoT Gateway (L) connects whatever data customer needs to process directly at the edge, reducing latency and relieving connectivity networks with full support of **Orchestra Platform.**

The gateway is based on Linux. It provides tremendous possibilities opening up the entire embedded applications ecosystem. It supports industry standard specifications like mission-critical operation in temperatures ranging between -20 °C and +60 °C.

The design provides the flexibility needed while still keeping it simple! Based on the concept of modularity, it may operate with many wireless technologies without PCB redesign requirements. As of now, support for all major cellular connectivity standards like luetooth 5.x, LTE Cat. 4, Wirepas 2.4GHz Mesh, Wirepas 5G NR+, Wi-Fi 802.11 a/b/g/n/ac is assured, as well as the very new 5G sub-6 GHz version that will open up tremendous possibilities.

The CTHINGS.CO® Edge IoT Gateway (L) also sports a large expansion system in order to enable plug-in modules for resilient industrial interfaces (digital and analog IOs, current measurement, high-current sourcing or sinking, galvanic isolation, relays, etc.).

To ease deployment of use cases and solutions, CTHINGS.CO® Edge IoT Gateway (L) is designed alongside CTHINGS.CO® Orchestra, a state-of-the-art networking solution making provisioning and maintenance of private networks as simple as a few clicks. Additionally, we open the possibility for curated backend systems including open APIs for connecting external systems, as well as data visualisation capabilities through our interfaces and supported protocols.

SPECIFICATIONS

Hardware Features	Industrially certified hardware for enhanced Edge Computing • **Quad-Core Intel® i7-1185G7E 1.8/2.8 GHz, TDP: 15/28 W, vPro** • **Memory RAM: 32GB** DDR4, • **Storage: 256GB** NVMe/ SATA, • Built-in Intel® PTT (TPM 2.0: RSA-2048, ECC-256, SHA-256, EAL4+) • Dimensions: 200mm x 200mm x 35.3mm • Operating temperature range: **-20 °C to +60 °C** • Passively cooled all-metal **aluminium construction** • **CE Class-A** certified & **RoHS compliant** device
Internal Interfaces	• 2x SO-DIMM DDR4 up to 3200MT/s • 1x M.2 Key-B up to 3060, PCIe Gen 3 x1 + USB 2.0 • 1x M.2 Key-E up to 2230, PCIe Gen 3 x1 + USB 2.0 • 1x M.2 Key-M up to 2280, PCIe Gen 3 x4 / SATA
Physical Interfaces	• 2x 1 Gbps RJ-45 Ethernet • 2x HDMI 1.4b (up to 3840 x 2160 @ 30Hz) • 2x mini-DP 1.2 (up to 4096 x 2160 @ 60Hz) Dual mode • 2x USB 3.1 on USB Type-A • 2x USB 2.0 on USB Type-B • Optional* up to 8x SMA Ports for antennas • Optional* up to 12 RS-232 / RS-485 or 40+ isolated GPIOs
Electrical Specification	• 12V, 5.5 mm power jack w/ locking, 60W universal PSU • 12-56V, 6-pin ATX power connector w/ locking, 120W universal PSU • EMI/ESD protected device • Myriad of power supply protection features: **UVLO**, **OVP**, **OCP**, **RPP, surge/transients**, **soft-start**, and more • **CE Class-A** certification

SPECIFICATIONS

Connectivity (options)	Full flexibility which allows plug and play exchange of connectivity modules to meet requirements: Bandwidth overview per connectivity technology: • Rel. 15 **5G Sub-6 GHz**: Max. 5.0 Gbps (DL); Max. 650 Mbps (UL) - NSA Max. 4.2 Gbps (DL); Max. 450 Mbps (UL) - SA • Rel. 14 **LTE Cat. 20**: LTE-FDD: Max. 2.0 Gbps (DL); Max. 200 Mbps (UL) • Rel. 7 **HSPA+**: WCDMA: Max. 42 Mbps (DL); Max. 5.76 Mbps (UL) • Rel. 14 **LTE Cat NB2**: Max. 127 Kbps (DL); Max. 158.5 Kbps (UL) • Rel. 14 **LTE Cat M1** with CE Mode B: Max. 588 Kbps (DL); Max. 1119 Kbps (UL) • **EDGE**: 296kbps (DL), Max. 236.8kbps (UL) • **GPRS**: 107kbps (DL), Max. 85.6kbps (UL) • **GPS**, GLONASS, Galileo, BeiDou/Compass, QZSS, Cell ID/Wi-Fi positioning • **Wi-Fi 6E** (a/b/g/n/ac/ax 2.4/5/**6** GHz): Max. 2.4 Gbps • **Bluetooth Low Energy (BLE) 5.3** • **Wirepas 2.4 GHz MESH** • **Wirepas 5G NR+** • **Zigbee / Thread**
Use Cases	The gateways supports vast range of usage across industries. Application examples: • Smart Retail: monitoring stock, goods rotation, sales • Smart Logistics: tracking distribution and transport • Smart Product: embedded intelligence and compute • Industry 4.0: digital retrofitting, enhanced maintenance, remote operations, automation, time-sensitive networking (TSN) • Smart Metering: remote and wireless data collection
Software Features	• **Linux® OS** • **Ubuntu® Server** • **Debian®** • Yocto • Windows 10 IoT Enterprise / Windows 10/11 Pro • OpenWRT capable • Flexible I/O operations • Upgrade Over-The-Air (FOTA) • Support for CTHINGS.CO® Orchestra

Supported Frequencies

5G NR / LTE / HSPA+ subsystem*

Band name	Transmit (MHz)	Receive (MHz)	LTE-FDD	LTE-TDD	UMTS	5GNR
IMT (2100)	1920-1980	2110-2170	B1	–	B1	n1
PCS (1900)	1850-1910	1930-1990	B2	–	B2	n2
DCS (1800)	1710-1785	1805-1880	B3	–	B3	n3
AWS	1710-1755	2110-2155	B4	–	B4	–
Cell (850)	824-849	869-894	B5	–	B5	n5
JCELL (800)	830-840	875-885	–	–	–	–
IMT-E (2600)	2500-2570	2620-2690	B7	–	–	n7
EGSM (950)	880-915	925-960	B8	–	B8	n8
J1700	1750-1785	1845-1880	–	–	–	–
700 low A-C	699-716	729-746	B12	–	–	n12
700 upper C	777-787	746-756	B13	–	–	–
700 D	788-798	758-768	B14	–	–	–
B17	704-716	734-764	B17	–	–	–
B18	815-830	860-875	B18	–	–	–
B19	830-845	875-890	B19	–	B19	–
EU800	832-862	791-821	B20	–	–	n20
PCS + G	1850-1915	1930-1995	B25	–	–	–
B26	814-849	859-894	B26	–	–	–
700 APAC	703-748	758-803	B28	–	–	n28
FLO	–	717-728	B29	–	–	–
WCS	2305-2315	2350-2360	B30	–	–	–
L-band	–	1452-1496	B32	–	–	–
B34	2010-2025	2010-2025	–	B34	–	–
B38	2570-2620	2570-2620	–	B38	–	n38
B39	1880-1920	1880-1920	–	B39	–	–
B40	2300-2400	2300-2400	–	B40	–	–
B41/B41XGP	2496-2690	2496-2690	–	B41	–	–
B42	3400-3600	3400-3600	–	B42	–	–

** depending on system configuration*

Band name	Transmit (MHz)	Receive (MHz)	LTE-FDD	LTE-TDD	UMTS	5GNR
B43	3600-3800	3600-3800	–	B43	–	–
B46	5150-5925	5150-5925	–	B46	–	–
B48	3550-3700	3550-3700	–	B48	–	n48
B66	1710-1780	2110-2200	B66	–	–	n66
B71	663-698	617-652	B71	–	–	n71
n77	3300-4200	3300-4200	–	–	–	n77
n78	3300-3800	3300-3800	–	–	–	n77
n79	4400-5000	4400-5000	–	–	–	n79

Supported modulations:

5G NR UL	π/2-BPSK, QPSK, 16QAM, 64QAM, 256QAM
5G NR DL	QPSK, 16QAM, 64QAM, 256QAM
LTE	QPSK, 16QAM, 64QAM, 256QAM
UMTS	QPSK, 16QAM, 64QAM

5G SA / NSA operation modes

NSA	n38/n41/n77/n78/n79
SA	all 5G bands
5G SA / NSA bandwidth	up to 100 MHz
SCS	15 kHz on NR FDD & 30 kHz on NR TDD

MIMO support

5G NR UL	2 x 2 MIMO (5G SA only): n41/n77/n78/n79
5G NR DL	a4 x 4 MIMO: n1/n2/n3/n7/n25/n38/n40/n41/n48* /n66/n77/n78/n79
LTE DL	4 x 4 MIMO: B1/B2/B3/B4/B7/B25/B30/B32/B34/B38/B39/B40/B41/B42/B43/B48/B66

5G NR Option	3x, 3a, 3, 2 compatible
LTE Category	DL Cat. 16; UL Cat. 18
LTE RF BW support	1.4/3/5/10/15/20 MHz

Transmit power class

WCDMA bands	Class 3 (24 dBm +1/-3 dB)
LTE bands	Class 3 (23 dBm ± 2 dB)
LTE B38/B40/B41 /B42/B43 bands HPUE single-carrier	Class 2 (26 dBm ± 2 dB)
5G NR bands	Class 3 (23 dBm ± 2 dB)
5G NR n41/n77/n78 /n79	Class 2 (26 dBm +2/-3 dB)

* 5G NR n48 support is under development

Supported Frequencies

LTE Cat. M1 / Cat. NB1 / Cat. NB2 / EGPRS subsystem*

Band name	Transmit (MHz)	Receive (MHz)	LTE-FDD	GSM
IMT (2100)	1920-1980	2110-2170	B1	–
PCS (1900)	1850-1910	1930-1990	B2	PCS1900
DCS (1800)	1710-1785	1805-1880	B3	DCS1800
AWS	1710-1755	2110-2155	B4	–
Cell (850)	824-849	869-894	B5	GSM850
EGSM (950)	880-915	925-960	B8	EGSM900
700 lower A-C	699-716	729-746	B12	–
700 upper C	777-787	746-756	B13	–
B18	815-830	860-875	B18	–
B19	830-845	875-890	B19	–
EU800	832-862	791-821	B20	–
PCS + G	1850-1915	1930-1995	B25	–
B26	814-849	859-894	B26**	–
B27	807-824	852-869	B27**	–
700 APAC	703-748	758-803	B28	–
B31	452.5-457.5	462.5-467.5	B31*	–
B66	1710-1780	2110-2180	B66	–
B71	663-698	617-652	B71***	–
B72	451-456	461-466	B72*	–
B73	450-455	460-465	B73*	–
B85	698-716	728-746	B85	–

LTE-FDD RF bandwidth

LTE Cat. M1	1.4 MHz
LTE Cat. NB2	200 kHz

Maximum throughput

LTE Cat. M1	588 kbps (DL); 1119 kbps (UL)
LTE Cat. NB2	127 kbps (DL); 158.5 kbps (UL)
EDGE	296 kbps (DL); 236.8 kbps (UL)
GPRS	107 kbps (DL); 85.6 kbps (UL)

Transmit power class:

LTE-FDD bands	Class 5 (21 dBm +1.7/-3 dB)*
GSM850	Class 4 (33 dBm ± 2 dB)
EGSM900	Class 4 (33 dBm ± 2 dB)
DCS1800	Class 1 (30 dBm ± 2 dB)
PCS1900	Class 1 (30 dBm ± 2 dB)

** depending on system configuration*
*** support for Cat. M1 only*
**** support for Cat. NB2 only*

GNSS subsystem*

Type	Frequency (MHz)
GPS	1575.42 ± 1.023 (L1)
Galileo	1575.42 ± 2.046 (E1)
QZSS	1575.42 (L1)
GLONASS	1597.5-1605.8
BeiDou / COMPASS	1561.098 ± 2.046

GNSS acquisition performance:	
Cold start (open sky)	18.9 seconds typical
Warm start (open sky)	1.5 seconds typical
Hot start (open sky)	1.1 seconds typical
CEP-50 accuracy (open sky)	1 metre typical

** depending on system configuration*

Certifications

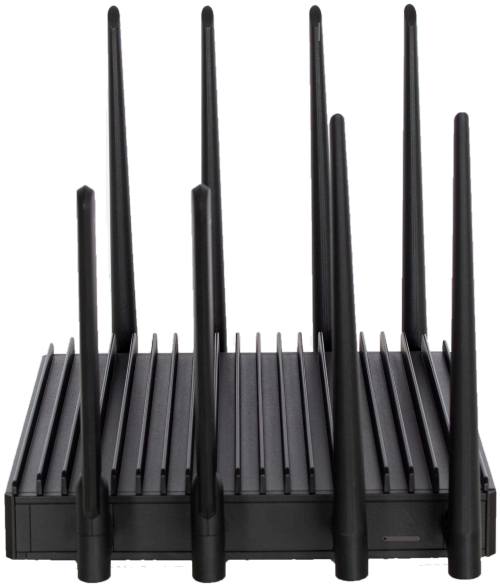
The CTHINGS.CO® Edge IoT Gateway Is CE Class-A & EU RoHS Directive Compliant. The Device Has Been Tested To Meet The Following Electromagnetic Compatibility Standards:

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

Extensive Connectivity	5G SA/NSA, LTE Cat. 20, Cat. M, NB-IoT, EGPRS, Wi-Fi 6ax, BLE 5.3, Wirepas 2.4GHz MESH, Wirepas 5G NR+
Vast IoT Protocol Suite	Native support of modern IoT Protocols: i.e. MQTT/-SN, Modbus TCP/RTU, Profinet, etc.
Localisation	GPS, GLONASS, Galileo, BeiDou, COMPASS, Cell ID/Wi-Fi positioning, Wirepas 2.4/5G
Interfaces	Expansion module system for customisation of additional industrial interfaces
Rich Software Ecosystem	Linux® OS (Yocto® and Debian®), Mainline Linux, FreeRTOS®, Ubuntu® Server, Windows
OA&M Linux OS	Remote operations, administration, and maintenance
RESTful	Support for SATA-based M.2 SSD storage cards and VPUs for AI acceleration
MPU	Multipurpose computing, hybrid data processing in edge, public or private cloud

External appearance

Edge IoT Gateway (L)



Edge IoT Gateway (L)

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

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.