

IoT/M2M devices  
Levanto series



# Levanto 520 series

LTE routers  
for energy and industrial scenarios



Fast Ethernet



Cellular



Mono & Dual SIM

Datasheet

## Models

# Levanto 520

# Levanto 520-D



## LTE router with cellular connectivity for energy and industrial scenarios

**Levanto** is a product series that provides connectivity between remote devices and centralized control systems, via a LTE radio network, ensuring continuity of the service and links. They are compact, robust and designed for industrial use.

LEVANTO 520 is available in different variants to cover the frequency band of different regions and countries.

**Levanto 520** and **520-D series** is particularly suitable for business applications in the industrial and energy sectors, where safety and continuity of service are of primary importance, as well as reliability and durability for installations in harsh environments.

### ALWAYS-ON

Levanto 520 and 520-D series, through the WAN connection on the GSM / GPRS / EDGE / HSPA / LTE networks, guarantees reachability and data exchange between peripheral assets and central control and monitoring platforms.

The numerous mechanisms present on the Levanto maintain **always-on connections**, eliminating the need for interventions in peripheral offices by operators.

It is backward compatible with existing GSM, GPRS and EDGE networks.

### KEY BENEFITS

- ⇒ Continuity of service
- ⇒ Always-on connections
- ⇒ Industrial class with long component life cycle and high reliability
- ⇒ Security by design
- ⇒ Compact and small size housing and DIN-Rail mountable for easy integration in cabinet with limited space
- ⇒ Low power consumption
- ⇒ Factory pre-configurations
- ⇒ SIM are installed and tested in factory for each single device
- ⇒ Remote management and provisioning

### APPLICATIONS

Levanto 520 and 520-D are designed to meet the requirements and needs for the following applications:

- ⇒ Smart Metering
- ⇒ Remote assets monitoring and management
- ⇒ Remote telereading and telecontrol
- ⇒ Suitable to host user application
- ⇒ Environmental monitoring
- ⇒ Smart City
- ⇒ Industry 4.0
- ⇒ Totem, vending machines, ATMs



## Wherever the installation is...

### Robust

Robust industrial grade design. Designed to operate under extreme conditions and temperature, even on harsh environment with high level of electromagnetic disturbances.

### Access

Wherever installed, **Levanto** accesses public network (Internet) with the proper security level. Connections can be activated using call over TCP-IP / GPRS / EDGE / HSPA / LTE.

### Maintenance and Configuration

- Both local or remote configuration are easy and fast (available via radio mobile SMS on specific models)
- Factory configured or later via remote download from a remote control center
- Risk free system for avoiding wrong configuration in effecting reachability of remote networks

## MODELS



Levanto 520 series include some commercial variants that differ in the number of SIM cards that can be used while all other features remain the same.

This means that the two models share the same hardware and always mount 2 SIM slots, but only the LEVANTO 520-D is enabled to use two SIMs, while the LEVANTO 520 can only be used with one SIM, although

there are physically 2 slots.

there are physically 2 slots.

The functionality that allows the use of two SIMs is activated via the firmware and therefore can not be changed runtime or via CLI.

Summing up, the Levanto 520 and 520-D models differ by:

**LEVANTO 520:** 2 SIM slots mounted, only 1 SIM slot enabled

**LEVANTO 520-D:** 2 SIM slots mounted, 2 SIM slot enabled

Moreover LEVANTO is available in different variants to cover the frequency band of different regions and countries.

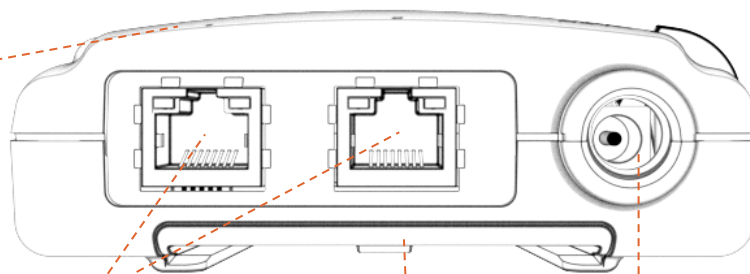
## Automatic management of the network operator

Both the Levanto 520 model and the 520-D recognize and automatically set the configuration of the APN, userid and password of the main network operators by drawing data from an internal configuration table.

In addition, mobile network access credentials can be unique to each device.

## HARDWARE INTERFACES

1 x Cellular  
4G/3G/2G



2 x LAN ports  
ETH 10/100

SIM holder

1 x power port

Port	Description	Details
LAN	FE	– 2 Ethernet ports, 10/100 Mbps, RJ45 connectors
Radio cellular		– Up to LTE cat. 4, see next page for the details about frequency bands and throughput
SIM Slots		– 2 slots pedal-lift type - Note: the number of enabled slots depends on the model – Levanto 520: 1 slot enabled – Levanto 520-D: 2 slot enabled



## APPLICATION SCENARIOS

A typical LEVANTO 520 usage scenario is within the secondary energy substations of DSOs (*Distribution System Operators*).

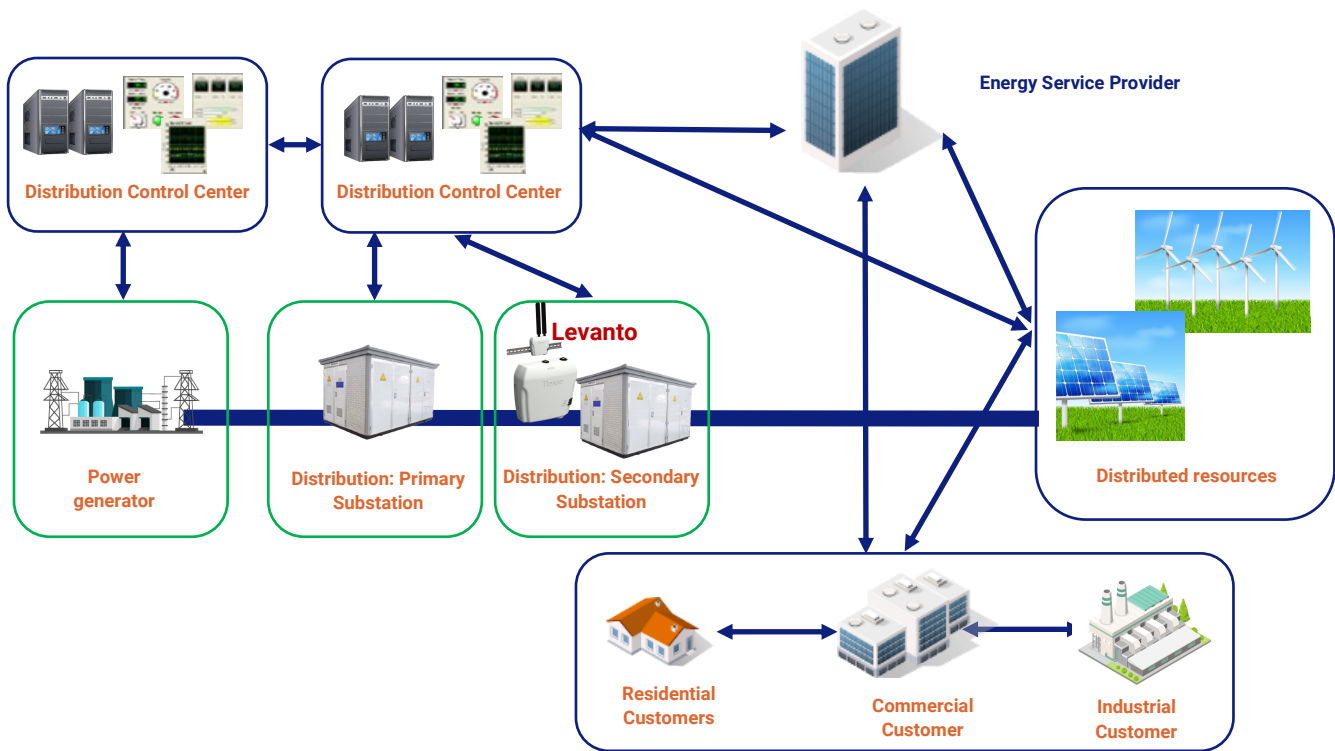
In the field of electrical metering, the significant deployment of electronic remote metering systems began in the early 2000s.

Italy, in 2001, was the first European country to deploy electronic telemanagement systems, with the introduction of the first generation of 1G smart meter.

Upon reaching the end of the useful life of the first 1G electronic meters installed, in compliance with industry regulations and legislation, a new plan is being implemented

for the massive replacement of the meter fleet installed at customers' and manufacturers' premises with innovative second-generation meters known as 2G.

In this scenario **Levanto 520** is installed in the secondary substations and is in charge of connecting the Low Voltage Manager to the communication network and to its Central Center to deploy the remote management system.



In the secondary substations are present one or more Low Voltage Manager relating to the remote meter management system of residential customers.

At application level different protocol could be used (Meters and More, DLMS/Cosem, Sitred, ELPE, G3, DLMS/Cosem) but at the transport layer all of them use TCP/IP.



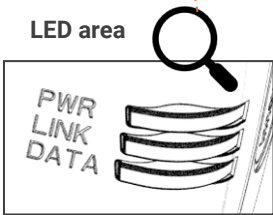
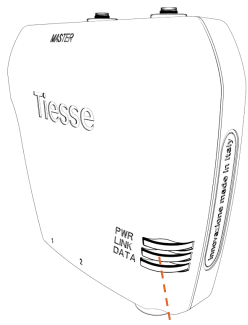
## RADIO CELLULAR INTERFACE

Description	EU REGION	LATAM REGION
<b>Frequency bands</b>	<ul style="list-style-type: none"> <li>– <b>LTE FDD:</b> B1/B3/B7/B8/B20/B28</li> <li>– <b>WCDMA:</b> B1/B8</li> <li>– <b>GSM:</b> B3/B8</li> </ul>	<ul style="list-style-type: none"> <li>– <b>LTE FDD:</b> B1/B2/B3/B4/B5/B7/B8/B28/B66</li> <li>– <b>LTE TDD:</b> B40</li> <li>– <b>WCDMA:</b> B1/B2/B4/B5/B8</li> <li>– <b>GSM:</b> B2/B3/B5/B8</li> </ul>
<b>LTE</b>	<ul style="list-style-type: none"> <li>– Support up to Cat. 4</li> <li>– <b>LTE FDD:</b> 150 Mbps (DL) - max 50 Mbps (UL)</li> </ul>	<ul style="list-style-type: none"> <li>– Support up to Cat. 4</li> <li>– <b>LTE FDD:</b> 150 Mbps (DL) - max 50 Mbps (UL)</li> </ul>
<b>UMTS</b>	<ul style="list-style-type: none"> <li>– <b>DC-HSDPA:</b> max 42 Mbps (DL)</li> <li>– <b>HSUPA:</b> max 5.76 Mbps (UL)</li> <li>– <b>WCDMA:</b> max 384 Kbps (DL) - max 384 Kbps (UL)</li> </ul>	<ul style="list-style-type: none"> <li>– <b>DC-HSDPA+:</b> max 21.1 Mbps (DL) - max 5.76 (UL)</li> <li>– <b>WCDMA:</b> max 384 Kbps (DL) - max 384 Kbps (UL)</li> </ul>
<b>GSM/EDGE</b>	<ul style="list-style-type: none"> <li>– <b>EDGE:</b> max 296 Kbps (DL) - max 236.8 Kbps (UL)</li> <li>– <b>GPRS:</b> max 107 Kbps (DL) - max 85.6 Kbps (UL)</li> </ul>	<ul style="list-style-type: none"> <li>– <b>EDGE</b> Support of multi slot class 12, GMSK and 8-PSK for different modulation and coding scheme. Support of uplink coding scheme MCS 1-9. Max 296 Kbps (DL) - max 236.8 Kbps (UL)</li> <li>– <b>GPRS:</b> Support of multi slot class 12 coding scheme: CS 1-4 Max 85.6 Kbps (DL) - max 85.6 Kbps (UL)</li> </ul>
<b>Transmitting power</b>	<ul style="list-style-type: none"> <li>– Class 4 (33 dBm ±2 dB) for GSM850</li> <li>– Class 4 (33 dBm ±2 dB) for EGSM900</li> <li>– Class 1 (30 dBm ±2 dB) for DCS1800</li> <li>– Class 1 (30 dBm ±2 dB) for PCS1900</li> <li>– Class E2 (27 dBm ±3 dB) for GSM850 8-PSK</li> <li>– Class E2 (27 dBm ±3 dB) for EGSM900 8-PSK</li> <li>– Class E2 (26 dBm ±3 dB) for DCS1800 8-PSK</li> <li>– Class E2 (26 dBm ±3 dB) for PCS1900 8-PSK</li> <li>– Class 3 (24 dBm +1/-3 dB) for WCDMA bands</li> <li>– Class 3 (23 dBm ±2 dB) for LTE-FDD bands</li> </ul>	<ul style="list-style-type: none"> <li>– Class 4 (33 dBm ±2 dB) for GSM850</li> <li>– Class 4 (33 dBm ±2 dB) for EGSM900</li> <li>– Class 1 (30 dBm ±2 dB) for DCS1800</li> <li>– Class 1 (30 dBm ±2 dB) for PCS1900</li> <li>– Class E2 (27 dBm ±3 dB) for GSM850 8-PSK</li> <li>– Class E2 (27 dBm ±3 dB) for EGSM900 8-PSK</li> <li>– Class E2 (26 dBm ±3 dB) for DCS1800 8-PSK</li> <li>– Class E2 (26 dBm ±3 dB) for PCS1900 8-PSK</li> <li>– Class 3 (24 dBm +1/-3 dB) for WCDMA bands</li> <li>– Class 3 (23 dBm ±2 dB) for LTE-FDD bands</li> <li>– Class 3 (23 dBm ±2 dB) for LTE-TDD bands</li> </ul>
<b>Receiving sensitivity</b>	<ul style="list-style-type: none"> <li>– EGSM900 -109.8 dBm</li> <li>– DCS1800 -109.8 dBm</li> <li>– WCDMA B1: -112.5 dBm</li> <li>– WCDMA B8: -112.5 dBm</li> <li>– LTE-FDD B1: -102.4 dBm</li> <li>– LTE-FDD B3: -102.5 dBm</li> <li>– LTE-FDD B7: -100.3 dBm</li> <li>– LTE-FDD B8: -102.2 dBm</li> <li>– LTE-FDD B20: -102.2 dBm</li> <li>– LTE-FDD B28: -102 dBm</li> </ul>	<ul style="list-style-type: none"> <li>– EGSM900 -108.2 dBm</li> <li>– DCS1800 -106.8 dBm</li> <li>– WCDMA B1: -109.2 dBm</li> <li>– WCDMA B2: -107.7 dBm</li> <li>– WCDMA B4: -109.2 dBm</li> <li>– WCDMA B5: -110.7 dBm</li> <li>– WCDMA B8: -110.2 dBm</li> <li>– LTE-FDD B1: -101 dBm</li> <li>– LTE-FDD B2: -100.2 dBm</li> <li>– LTE-FDD B3: -100.9 dBm</li> <li>– LTE-FDD B4: -101.1 dBm</li> <li>– LTE-FDD B5: -101.7 dBm</li> <li>– LTE-FDD B7: -99.9 dBm</li> <li>– LTE-FDD B8: -100.2 dBm</li> <li>– LTE-FDD B28: -102.4 dBm</li> <li>– LTE-FDD B66: -100 dBm</li> </ul>





## LED DESCRIPTION



Models LEVANTO 520 are equipped with 2 LEDs for each Ethernet port to signal the operating status plus three LEDs that are located frontally:

- ⇒ 1 x power supply/ operating status (PWR LEDs)
- ⇒ 1 x connection status on cellular radio connection (LED LINK)
- ⇒ 1 x data activity on cellular radio connection (LED DATA)

The following table summarizes the operation at the first lighting (the colors with which the states are indicated are the color that assumes the LED at different stages).

LED	Behaviour	Meaning
PWR	Blinking (500ms ON/ 500 ms OFF)	Booting
	Fast blinking (100ms ON/ 100 ms OFF)	Self-test
	ON	Booting completed
Data	ON	PDP active
	Blinking	Data exchange active
	Spento	Modem not registered
Link	Blinking 2 times / 1 sec OFF (100ms ON/ 100 ms OFF)	Modem registered over 2G network
	Blinking 3 times / 1 sec OFF (100ms ON/ 100 ms OFF)	Modem registered over 3G network
	Blinking 4 times / 1 sec OFF (100ms ON/ 100 ms OFF)	Modem registered over 4G network
	Red	Signal quality: poor
	Yellow	Signal quality: average
	Green	Signal quality: good

## SOFTWARE

Note: the list below is indicative; the features depend on the NoS version and update.

Area	Main features	Area	Main features
NETWORKING	<ul style="list-style-type: none"> <li>- IPv4 (RFC 791), IPv6</li> <li>- TCP (RFC 793)</li> <li>- UDP (RFC 768)</li> <li>- ICMP</li> <li>- ARP</li> <li>- 801.q (VLAN)</li> </ul>	SERVICES	<ul style="list-style-type: none"> <li>- DHCP client, DHCP server</li> <li>- HTTPS</li> <li>- Ping, Traceroute</li> <li>- NTP Client and Server support</li> <li>- DNS</li> <li>- Possibility to disable network services when not in use</li> <li>- Timestamp service</li> </ul>
	ROUTING & MULTICAST		<ul style="list-style-type: none"> <li>- Static routing</li> <li>- Dynamic routing protocols RIPv1, RIPv2, BGPv4</li> </ul>
SECURITY	<ul style="list-style-type: none"> <li>- Non-interruptible boot</li> <li>- NAT/PAT</li> <li>- PAP, CHAP</li> <li>- IPSEC, GRE</li> <li>- ACLs, Stateful Firewall</li> <li>- Port forwarding</li> <li>- Services enable / disable</li> <li>- Multilevel security access</li> <li>- Password encryption</li> </ul>	MANAGEMENT AND CONFIGURATION	<ul style="list-style-type: none"> <li>- Different levels of logging</li> <li>- Radius Support</li> <li>- TACACS local authentication</li> <li>- Configuration via command Line Interface (CLI)</li> <li>- Possibility to implement custom commands</li> <li>- Remote scripting for firmware upgrade</li> </ul>



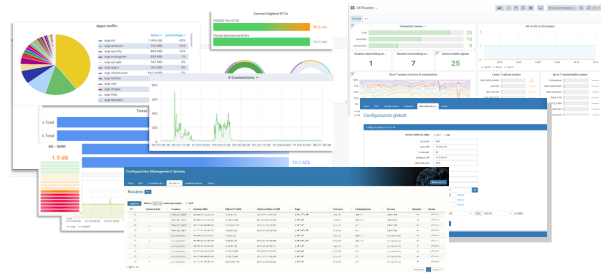
## SD-WAN with TNA software suite

The routers are integrated into the **TNA (Tiesse Network Architecture)** suite, the SD-WAN solution developed by Tiesse in order to provide a dynamic, secure, reliable, high-performance and scalable solution. The TNA solution is based on the usability of the product and focuses on the effectiveness and easy feasibility of an SD-WAN solution without having to implement complex and expensive architectures and therefore adopted by a few structured end customers.

Thanks to highly consolidated and robust use cases, the TNA suite has integrated, with a modular architecture, innovative features to realize a concrete SD-WAN solution that can meet the needs of the market.

TNA is a **modular solution** composed of distinct entities: **COS**, **MOS** and **NAD** which collaborate organically to manage all aspects of management of a network both IP and **Overlay** architectures. In this case the suite is completed by an additional module called **OVN**.

The heart of the Tiesse SD-WAN solution is the **Intelligent Routing** that allows the network, whether in overlay or not, to react to changes in status, managing to operate independently even in the presence of congestion, saturation or abnormal traffic.



### TNA suite DASHBOARD

Thanks to a flexible dashboard, which can also be customized, you can administer and manage the SD-WAN.

Panel	Description	Parameters
<b>ROUTER</b>	<b>Monitoring and visualization of the main resources for each apparatus (Router, CPE, IoT)</b>	<ul style="list-style-type: none"> <li>– Reachability and connectivity towards a target network/internet (primary/backup or other)</li> <li>– Uptime time and reboot number</li> <li>– Round Time Trip last mile or to Internet target</li> <li>– CPU usage, memory, router load based on current and queued tasks</li> <li>– Number of active connections</li> <li>– Input/output throughput and traffic generated/received per single interface</li> <li>– Traffic classification by type of application for specific equipment</li> <li>– Number of devices connected to active Wi-Fi networks</li> <li>– <b>GPON optical connections</b>: Uptime, optical input/output power, SFP temperature</li> <li>– <b>Cellular network connections</b>: signal strength for each connection type (5G/4G/3G/2G and SINR, RSRP, RSSI, RSCP, EC/IO), SIM in use</li> <li>– <b>xDSL connection</b>: Uptime, Signal state and attenuation, Noise margin (SNR), Redundancy errors (CRC)</li> </ul>
<b>GENERAL</b>	<b>Monitoring and visualizations in aggregate form</b>	<ul style="list-style-type: none"> <li>– Total number of apparatus:                             <ul style="list-style-type: none"> <li>– connected, reachable and not as a function of uptime</li> <li>– transmitting on a specific interface</li> <li>– with active mobile connection</li> <li>– active grouped by connection type (primary, backup, other)</li> <li>– connected over 5G, 4G, 3G and 2G networks</li> </ul> </li> <li>– Reachable and unreachable devices, for uptime, in a specified time range</li> <li>– Classification /sorting equipment:                             <ul style="list-style-type: none"> <li>– first 5 (active) by number of connections</li> <li>– time order of the last routers connected and those no longer reachable</li> <li>– for response time (major and minor RTT) to a given destination</li> </ul> </li> </ul>
<b>OVN</b>	<b>Monitoring and visualization of Overlay Network data</b>	<ul style="list-style-type: none"> <li>– Total number of apparatus:                             <ul style="list-style-type: none"> <li>– connected, reachable and not as a function of uptime</li> <li>– with active mobile connection</li> <li>– transmitting on a specific interface</li> <li>– active grouped by connection type (primary, backup, other)</li> </ul> </li> <li>– Reachable and unreachable devices, for uptime, in a specified time range</li> <li>– Classification /sorting equipment:                             <ul style="list-style-type: none"> <li>– first 5 (active) by number of connections</li> <li>– time order of the last routers connected and those no longer reachable</li> <li>– for response time (major and minor RTT) to a given destination</li> </ul> </li> </ul>



## CERTIFICATIONS

<b>Health and Safety</b> <b>Art. Directive 3.1(a)</b>	– EN 62368-1:2014	EN 62311:2020
<b>EMC</b> <b>Art. Directive 3.1(b)</b>	– ETSI EN 301 489-1 V2.2.3 – ETSI EN 301 489-7 V1.3.1 – ETSI EN 301 489-17 V.3.2.4	– EN 55032:2015 / AC:2016 / A11:2020 / A1:2020 – EN 55035:2017 / A11:2020
Ato ANATEL nç 1120/2018, Itens 4.1.5, 4.1.6, 6.1.1.1 CISPR 22 (2005)		
<b>Radio</b> <b>Art. Directive 3.2</b>	– ETSI EN 301 511 V12.5.1 – ETSI EN 301 908-1 V13.1.1	– ETSI EN 301 908-2 V13.1.1 – ETSI EN 301 908-13 V13.1.1
<b>EN 60529</b>	– Degree of protection (IP grade) – IP51 - with regard to the whole house and with the following specificities – IP54 - SIM slot to protect the SIM CARD – IP22 - LAN connectors and antennas	
<b>ROHS</b>	– Directive 2015/863/EU (RoHS III) Annex II EN50581:2012	
<b>CE</b>	– Compliant with the essential requirements of the Directive 2014/53/UE	
<b>ANATEL</b>	– Anatel certified	
<b>CRC</b>	– CRC certified	

## RELIABILITY

FIT / (10 <sup>9</sup> hours)	MTBF (hours)	MTBF (years)
925.7	1080263.5	123.31





## SYSTEM FEATURES

<b>POWER</b>	<ul style="list-style-type: none"> <li>– 9–30 Vcc</li> <li>– Or AC/DC 12V power adapter version is also available</li> </ul>
<b>CONSUMPTION</b>	– < 3 W
<b>ENVIRONMENT</b>	<ul style="list-style-type: none"> <li>– <b>Operating temperature:</b> -25° C / +55° C with Operating range limit: -40° C / +70° C</li> <li>– <b>Storage temperature:</b> -40° C / +70° C</li> <li>– <b>Max operating humidity:</b> 93% (non condensing)</li> </ul>
<b>PROCESSOR</b>	– ARM up to 400 MHz
<b>MEMORY</b>	– DRAM 128 MB
<b>FLASH MEMORY</b>	– 256 MB

### EXTERNAL FEATURES

<b>Material</b>	– Chassis in self-extinguishing polycarbonate V0
<b>Color</b>	– Papyr white
<b>Form factor</b>	– Wall mounting or DIN rail with specific kit add-ons
<b>Standard weight</b>	<ul style="list-style-type: none"> <li>– 240 gr ±10% (without antennas)</li> <li>– 293 gr ±10% (with antennas)</li> </ul>

### ANTENNAS

<b>Quantity</b>	– 2 x external removable antennas SMA male connector
<b>Frequency</b>	– 700-960 / 1710-2700
<b>Features</b>	<ul style="list-style-type: none"> <li>– VSWR less than 2.2</li> <li>– Impedence 50 ohms</li> <li>– Vertical polarization</li> <li>– Gain 2.14 dBi</li> </ul>

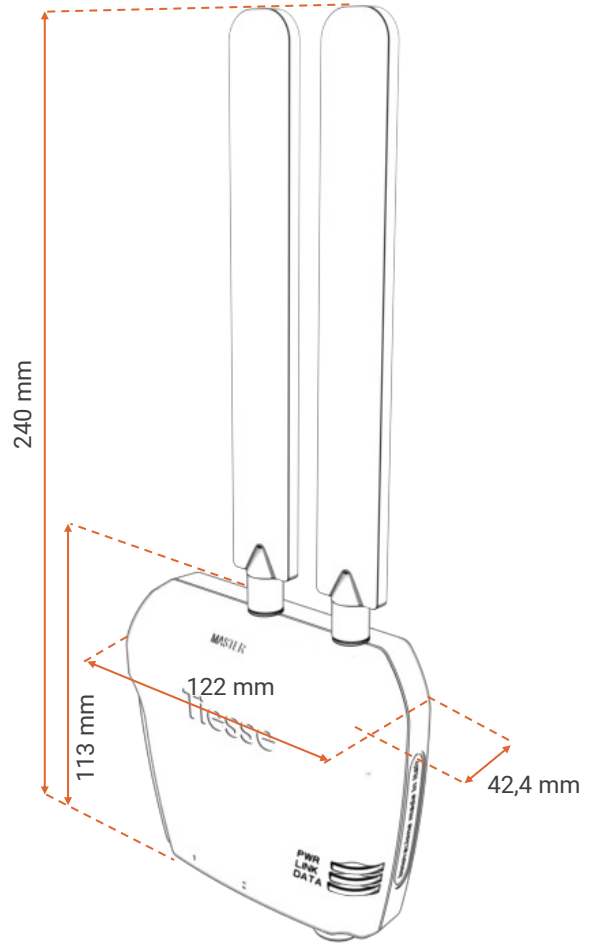
### TECHNICAL SUPPORT

Tiesse provides the user with two sites that are constantly updated:

**Supporto.tiesse.com:** the site with technical documentation, assembly instructions, software updates, and how to request technical support.

**Wiki.tiesse.com:** the site with manuals, instructions for installation, case studies, scenarios, FAQs, etc.

### SIZE



### OPTIONAL ADD-ONS

The Levanto series is equipped with optional accessories such as omnidirectional and directional antennas for outdoor installations and brackets for wall installations. Refer to the specific documentation for all additional product accessories, available on [www.tiesse.com](http://www.tiesse.com).



**MEC204-01**

Plastic bracket for mounting on DIN rail



**MEC015-I**

Plastic bracket for wall mounting



**ANT-OMNI / LTE2**

LTE/HSDPA/HSUPA outdoor and indoor omnidirectional antenna, including Rg58 cable low loss type, 10 m. long, equipped with SMA male connector.

# Tiesse

Innovation made in Italy®

Tiesse is a totally Italian company with more than 25 years of experience in the design, development and production of network equipment and IoT devices, suitable for use in mission-critical and industrial scenarios. Tiesse's most successful series, Imola, Lipari and Levanto, are innovative, competitive and certified, and are present in the networks of the major telecommunications operators, in the energy sector, large-scale distribution and vertical sectors, both in the Italian and foreign markets.

Further information on Tiesse solutions can be found on the company website [www.tiesse.com](http://www.tiesse.com).



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