TWMR-5002

EN50155 Multifunction VPN Router w/1 WiFi 11ac + 1 LTE 4G + 2 serial ports + 2 Gigabit X-coded Ethernet for Load Balancing**, TWCC**, VPN, Protocol Gateway, Storage**; WV input; IP65/54

- *Built-in 1x WiFi 11ac/a/b/g/n module + 1xLTE 4G module + 2xGigabit X-coded ports*
- *Up to 2 concurrent modem for 3G/4G LTE Link & GPS(1L-1AC model/2 SIMs)*
- *Optional TWCC**(Train Wireless Carriage Coupling))for auto wireless coupling*
- *Built-in 2 serial ports with 2.5K isolation(RS422/485) or w/o isolation(RS232)*
- *LTE 4G modem with GPS positioning & 2 SIMs fail-over*
- *WiFi radio for 802.11ac/a/b/g/n with 5GHz or 2. 4GHz; MIMO 3T3R*
- *Fast roaming**; 802.11r work with Lantech controller*
- *Supports AP/ Bridge/ Client modes*
- *VPN router for Multi-site VPN, OpenVPN, L2TP, IPSec, PPTP**, L2 over GRE*
- *Load Balancing** support 8 mechanism for WiFi client/WAN arrangement*
- *Optional EMMC Flash storage on-board**
- *Support NAT and Firewall*
- *Support Modbus or gateway on serial ports*
- *Galvanic isolation on WV model from 16.8V~137.5V input*
- *Built-in environmental monitoring for router inside info with voltage, current, temperature; WiFi & LTE graphic signal strength & TX/RX rate display*
- *Editable login page of captive portal for hot-spot application*
- *USB port for backup, restore the configuration file and upgrade firmware*; Dual image firmware**
- *IP 65 /54 Aluminum housing for best heat dissipation and preventing moist ingress*
- *EN50155/61373/45545 verification for railway application*

OVERVIEW

Lantech TWMR-5002 series is a next generation EN50155 multi-function VPN router w/1x 802.3ac WiFi + 1x LTE modem + 2x Gigabit Ethernet+ 2 serial ports that supports advanced function of VPN, Load-balancing**(Premium pack), EMMC Flash Storage**, Protocol gateway(Modbus), Storage**, WiFi roaming** and LTE dual SIM fail-over for on-board / onboard-to-ground applications. The dual core CPU with 1.6GHz + 256M flash enables the router to multi-task smoothly.

Optional TWCC** (Train Wireless Carriage Coupling) for auto coupling

TWMR-5002 series supports optional TWCC** (Train Wireless Carriage Coupling) that enables auto wireless coupling to reconnect APs.

LTE modem 4G/3G with dual SIM fail-over

Built-in one LTE modem with 2 SIM card slots, TWMR-5002 can allow failover between two operators for resilient connection. Both GPS and Russian GLONASS systems are supported (may vary in models)

IEEE 802.11ac radio up to 1.3GMbps bandwidth

With IEEE 802.11ac capability, TWMR-5002 can operate either 5GHz or 2.4GHz bands, offering the maximum speed of 1.3GMbps bandwidth. It is also compatible with 802.11g/n that can work with 2.4GHz for longer range transmission.
The WiFi 11ac supports AP/BRIDGE/AP Client modes can be diverse for most of wireless application. Client mode supports PMK** Caching and pre-authentication. Working with load-balancing** “Priority” mode, the AP client can enable router to transmit on WiFi with first priority.

Optional EMMC Flash storage*

The optional EMMC flash storage on router can offer 8G/16G/32G capacity.

MIMO technology with 3T3R and SMA/QMA** type connectors

Lantech TWMR-5002 series adapts MIMO technology with Smart antenna transmission and reception for 3T3R.With six external detachable antenna connectors (SMA/QMA**) and optional antennas, TWMR-5002 can have better Wi-Fi & LTE/GPS coverage.

Optional 802.11r fast roaming**
TWMR-5002 support fast roaming** (optional) in coordination with Lantech Wireless Controller to allow encryption keys to be stored on all of the APs in a network.
Client mode supports PMK** Caching and pre-authentication.

Wireless WMM QoS
TWMR-5002 supports 802.11e standard which defines a set of Quality of Service for wireless LAN applications as well as WMM (WiFi multimedia)

Advanced security & 16 SSIDs
The security support standards including 64/128bits WEP, WPA/WPA2 PSK (TKIP*, AES), 802.1x** ensures the best security and active defense against security treads. Lantech TWMR-5002 support up to 16 SSIDs, each SSID has its independent security and encryption.

Load Balancing** with 8 mechanism for multi-WANs (premium license)
TWMR-5002 supports Load Balancing** for LTE / WAN connections. There are eight schemes for Load Balancing** function:

Pack	Algorithm	Description
Standard	Fixed	Manually route by traffic type through fixed WAN link.
Basic Package	Failover	Routes connections through preferred WAN link while others stand-by. Sequentially activate another link if preferred link fail occurs. Once failover will not failback until link loss.
	Priority	Routes connections through preferred WAN link as primary while others follow by. Ex. WiFi client>LTE>others
	Weighted Round-Robin	Evenly distribute the traffic over all working WAN links in circular order according to the specified weights.
	Custom Route	Routing through the selected WAN for each specific traffic, ex: TCP/UDP port number and IP address.
Full Package (incl. basic package)	Sticky Session*	Binding all connections in an application session to particular WAN link to ensure all connections in the session are routed to the same WAN link , that is suitable for security services like online payment etc.
	Smallest Load*	Routes connections through the WAN link with highest free bandwidth ratio. The ratio = 1 - (traffic load / the capability of a WAN link). The traffic load could be defined by downstream, upstream or total traffic
	Fastest*	Routes connections through the WAN link with lowest latency time.

2 port serial connection, Modbus gateway

It builds in 2 port serial connection for RS232 or RS422, RS485 in which RS422/485 has 2.5KV isolation protection.

The built-in Modbus gateway can convert Modbus RTU/ASCII to Modbus TCP for device control.

VPN and firewall
Besides traditional VPN peer to peer tunneling, TWMR-5002 support latest Multi-Site VPN function that is an efficient way for mesh tunneling. The registration is under cloud service and encrypted by SSH makes the connection easy and safe.
It supports Multi-Site VPN, Open VPN, L2TP, IPsec L2 over GRE, NAT, and PPTP** for various VPN applications.

The built-in Layer-4 firewall includes DoS**, IP address filter / Mac address filter* / TCP/UDP port number.

DIDO for alarm & email** notice; Event log; Remote Web/SMS** control
2 sets of DIDO function can support additional high/low physical contact for designate applications besides Port / Power events, for example, DIDO function can trigger alarm if the router was moved or stolen. In case of events, the TWMR-5002 will immediately send email** and trap.
When the router is at remote area with limited access, Web/SMS** control can help to get router status or remotely reboot by Web/SMS**

Wide range dual isolated input voltage from 16.8-137.5V (WV model)
The TWMR-5002 is able to work from dual 16.8V ~137.5V DC isolated input (WV model) that is particular good for vehicle, rail train, depot etc applications.

Environmental monitoring for inside router info& alerting; WiFi & LTE signal strength and TX/RX rate display
The built-in environmental monitoring can detect router overall temperature, voltage, current where can send the syslog, email** and SMS** alert when abnormal.
The graphic WiFi & LTE signal strength and TX/RX rate display shows connection status at a glance.

USB port for back up, restore configuration and upgrade firmware*; Dual image firmware*
The built-in USB port can upload/download the configuration through USB dongle for router replacement

Dual image firmware*
It supports dual-image firmware* to choose which one to start.

Editable login page of captive portal
The TWMR-5002 supports editable captive portal function that allows administrator to force end-users redirect to authentication page.

Ruggedized EN50155 design and FCC/CE, E-marking** certificate
The TWMR-5002 series is verified with EN50155, IEC61373, EN45545 standard with IP65/54 housing. It passed tests under extensive Industrial EMI and environmental vibration and shocks standards. With CE & FCC radio certification for WiFi and LTE and E-marking** certificate, the TWMR-5002 is best for outdoor community, vehicle, power substation, process control automation etc. For more usage flexibilities, TWMR-5002 supports operating temperature from -20°C to 70°C or-40°C to 70°C(-E) .

FEATURES & BENEFITS

- **High Speed Air Connectivity: WLAN interface support up to 1.3GMbps link speed(1AC)**
- **Built-in two Gigabit ports X-coded ; 1LAN+1WAN or 2LAN**
- **Optional TWCC** (Train Wireless Carriage Coupling) for auto wireless coupling**
- **EMMC-FLASH storage**8/16/32G**
- **Dual band 2.4G and 5GHz with 802.11ac/a/b/g/n**
- **Support 2.4Ghz operating within the following frequency bands:**
  - ***2.412~2.472 GHz***
- **Support 5Ghz operating within the following frequency bands:**
  - ***5.180GHz~5.825GHz***
- **MIMO Smart antenna technology with 3T3R with 6 SMA/QMA** type connectors for WiFi & LTE, GPS**
- **Output power < 24dBM**
- **Transmit power adjustment**
- **VAP (virtual access point) support up to 16 SSIDs**
- **Operation modes : *AP/ Bridge/ AP Client***
- **Traffic control for each SSID****
- **Band preference for same SSID services on dual band****
- **Rate selection to disable low data rate access****
- **Highly Security Capability: WEP64/128bits/ WPA/ WPA-PSK (TKIP*,AES)/ WPA2/ WPA2-PSK (TKIP*,AES)**
- **HTTP/HTTPS/Telnet/SSH & Administration access**
- **Support IPv6** & IPv4 protocol**
- **Radius Authentication, EAP-MD5, EAP-TLS, EAP-TTLS, PEAP; SSID broadcast disable supported****
- **Multiple channel bandwidths of 20MHz and 40MHz for 2.4G.**
- **Multiple channel bandwidths of 20MHz, 40MHz and 80MHz for 5G only.**
- **Wi-Fi Multimedia (WMM) and 802.11e traffic prioritization**
- **One LTE 4G/3G w/ 2 SIM slots design for mobile redundancy**
- **GPS/ GLONASS (built-in LTE module) connection**
- **Load Balancing** supports 8 mechanism between multiple WANs**

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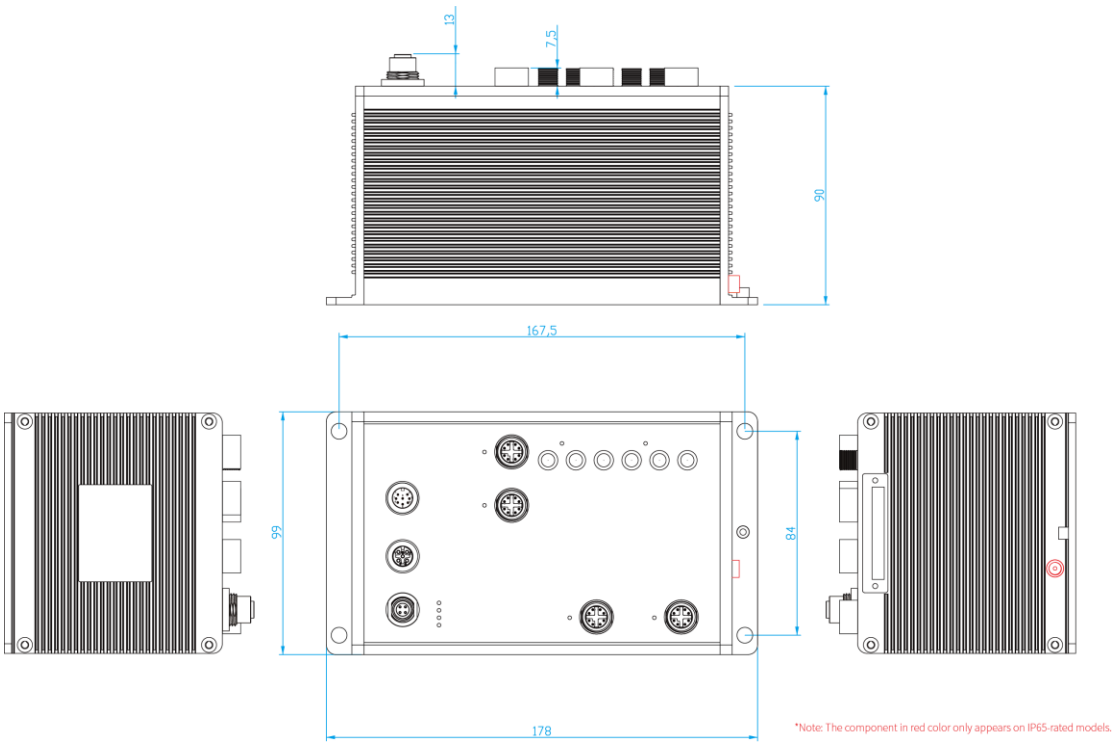
Standard	Fixed	Manually route by traffic type through fixed WAN link.
Basic Package	Failover	Routes connections through preferred WAN link while others stand-by. Sequentially activate another link if preferred link fail occurs. Once failover will not failback until link loss.
	Priority	Routes connections through preferred WAN link as primary while others follow by. Ex. WiFi client>LTE>others
	Weighted Round-Robin	Evenly distribute the traffic over all working WAN links in circular order according to the specified weights.
	Custom Route	Routing through the selected WAN for each specific traffic, ex: TCP/UDP port number and IP address.
Full Package (incl. basic package)	Sticky Session*	Binding all connections in an application session to particular WAN link to ensure all connections in the session are routed to the same WAN link , that is suitable for security services like online payment etc.
	Smallest Load*	Routes connections through the WAN link with highest free bandwidth ratio. The ratio = 1 - (traffic load / the capability of a WAN link). The traffic load could be defined by downstream, upstream or total traffic
	Fastest*	Routes connections through the WAN link with lowest latency time.

- **Built-in 2 x serial ports(RS232/RS422/485)**
- **Serial port with 2.5KV isolation on RS422/485**
- **Supports 2DI / 2DO(Digital Input / Output)**
- **Support Multi-Site VPN for mesh tunneling as well as Open VPN, L2TP, IPsec L2 over GRE, NAT, and PPTP** fro secured network connection**
- **The built-in Layer-4 firewall includes DoS**, IP address filter / Mac address filter* / TCP/UDP port number**
- **NAT/DMZ**
- **Built-in Modbus gateway converting Modbus RTU/ASCII to Modbus/TCP**
- **Event alerting by Syslog, SNMP Trap, Email**, SMS** text, Relay ; Permanent local log rotation / Maxi 1K records**
- **Remote Web/SMS** control to get status or re-boot by Web/SMS****
- **Built-in RTC to keep track of time always**
- **Support SNTP to synchronize system clock**
- **Support LLDP discovery protocol**
- **Support DHCP Server and Client**
- **Built-in environmental monitoring for system input voltage, current and ambient temperature; Able to set alert when abnormal**
- **Graphic LTE & WiFi signal strength & TX/RX rate display**
- **Firmware upgradeable through TFTP/FTP/HTTP**
- **Configuration backup and restoration**
  - *Supports editable configuration file for system quick installation*
  - *USB port to upload/download configuration by USB dongle*
- **Dual image firmware***
- **Support editable captive portal login page**

- **IP 65/54 housing for water proof environment**
- **Wall-mount installation**
- **EN45545-2 Fire & Smoke, EN50155 and EN61373 shock/vibration verification**
- **Operation temperature -20~70C or -40~70C (-E)**

DIMENSIONS (unit=mm)



SPECIFICATION

WLAN Interface	
Operating Mode	AP/BRIDGE/Client modes
Radio Frequency Type	DSSS, OFDM
Wireless Standard	IEEE 802.11ac/n/a 5GHz IEEE 802.11b/g/n 2.4GHz
Wireless bandwidth	5GHz: Up to 1300Mbps 2.4GHz: Up to 450Mbps
Modulation	**802.11b: DSSS** **802.11a/g:** OFDM (BPSK, QPSK, 16-QAM, 64-QAM) **802.11n:** OFDM (BPSK, QPSK, 16-QAM, 64-QAM) **802.11ac:** OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
Operating Frequency	IEEE 802.11 a/b/g/n ISM Band, 2.412GHz~2.472GHz, 5150MHz~5850MHz
Transmission Rate	IEEE802.11ac: up to 1300Mbps IEEE802.11b: 1 / 2 / 5.5 / 11 Mbps IEEE802.11a/g: 6 / 9 / 12 / 18 / 24 / 36 / 48 / 54 Mbps IEEE802.11n: up to 450Mbps
IEEE 802.11b/g/n(2.4Gbps)	**Output Power Tx +/- 2dB(per chain)** 18dBm @ 1~11Mbps 18dBm @ 6~54Mbps 20/20dBm @ MCS0~MCS7 (HT20/40) **Receiver Sensitivity Rx +/- 2dB** ≦-95dBm @ 1~11Mbps ≦-92dBm @ 6~18Mbps ≦-88dBm @ 24Mbps ≦-85dBm @ 36Mbps ≦-81dBm @ 48Mbps ≦-80dBm @ 54Mbps ≦-94dBm @ MCS0 (HT20/40) ≦-76dBm @ MCS7 (HT20/40)
IEEE 802.11b/g/n(2.4Gbps)	**Output Power Tx +/- 2dB(per chain)** 18dBm @ 1~11Mbps 18dBm @ 6~54Mbps 20/20dBm @ MCS0~MCS7 (HT20/40) **Receiver Sensitivity Rx +/- 2dB** ≦-95dBm @ 1~11Mbps ≦-92dBm @ 6~18Mbps ≦-88dBm @ 24Mbps ≦-85dBm @ 36Mbps ≦-81dBm @ 48Mbps ≦-80dBm @ 54Mbps ≦-94dBm @ MCS0 (HT20/40) ≦-76dBm @ MCS7 (HT20/40)
IEEE 802.11a/n/ac(5Gbps)	**Output Power Tx +/- 2dB(per chain)** 20dBm @ 6~24Mbps 16dBm @ 36~54Mbps 19/18dBm @ MCS0 (HT20/40) 16/16dBm @ MCS7 (HT20/40) 19/18/18dBm @ MCS0 (VHT20/40/80) 13/13/13dBm @ MCS8 (VHT20/40/80) 13/13dBm @ MCS9 (VHT40/80) **Receiver Sensitivity Rx +/- 2dB** ≦-92dBm @ 6~18Mbps ≦-86dBm @ 24Mbps ≦-84dBm @ 36Mbps ≦-81dBm @ 48Mbps

	≦-80dBm @ 54Mbps ≦-93dBm @ MCS0 (HT20/40) ≦-71dBm/≦-80dBm @ MCS7 (HT20/40) ≦-90dBm @ MCS0 (VHT20/40/80) ≦-69dBm @ MCS8 (VHT20/40/80) ≦-66dBm @ MCS9 (VHT40/80)
Encryption Security	WEP : (64-bit ,128-bit key supported) WPA /WPA2 : IEEE802.11i(WEP and AES encryption) WPA-PSK (256-bit key pre-shared key supported) OKC** and 802.11r** EAP,MD5,EAP,TLS,EAP,TTLS,EAP MsCHAPv3 and PEAP **
Wireless Security	SSID broadcast disable**

Cellular Interface

Antenna Connector	Detachable antenna connectors x 3; SMA/QMA** type female connector (Main, Aux, GPS)
Location Solutions	GPS, Glonass (EU/Americas) GPS, Glonass, Beidou, Galileo (APAC model only)
Band Options	**APAC & Australia (APAC model)** **LTE:** 2100/1800/850/2600/900/850/850/1500/700/2600/1900/2300/2500 MHz (B1/B3/B5/B7/B8/B18/B19/B21/B28/B38/B39/B40/B41) **EUNA & USA model** **LTE:** 2100/1800/2600/900/800 MHz (B1/B2/B3/B4/B5/B7/B12/B13/B20/B25/B26/B29/B30/B41) **WorldWide (WW model)** **LTE:** 2100/1900/1800/1700/850/2600/900/1800/700/700/8/50/850/800/850/700/2300/1500/2500/3500/3700/5200/3600/1700 (B1/B2/B3/B4/B5/B7/B8/B9/B12/B13/B18/B19/B20/B26/B28/B29/B30/B32/B41/B42/B43/B46/B48/B66)
Data Rates – LTE	**APAC & Australia (APAC model)** Downlink (Cat 6): FDD: 300 Mbps TDD: 222 Mbps Uplink (Cat 6): FDD: 50 Mbps TDD: 26 Mbps **Americas & EMEA (EUNA model)** Downlink (Cat 6): FDD: 300 Mbps TDD: 222 Mbps Uplink (Cat 6): FDD: 50 Mbps TDD: 26 Mbps **WorldWide (WW model)** Downlink: Cat 12: 600 Mbps Cat 9: 450 Mbps Uplink: Cat 13: 150 Mbps

Software

IPv6/4	Present
Login Security	Supports IEEE802.1x** Authentication/RADIUS
TWCC**	Optional Train Wireless Carriage Coupling for Auto wireless Coupling
Access Security	HTTP/HTTPS/Telnet/SSH & Administration; SNMP*v1/v2/v3 access for authentication via MD5/SHA(v3) and Encryption via DES/AES(v3)
Protocol	PPPoE Client,DHCP server/client, Adjustable MTU, Port forwarding (NAPT), DMZ; NAT, SNTP, Firewall(Firewall(DoS**; IP address filter / Mac address filter* / TCP/UDP port number), VRRP**, DDNS*
Management	SNMP*v1,v2c,v3/ Web/Telnet/CLI
Load Balancing**	8 schemes for multiple WAN
Fixed	Manually route by traffic type through fixed WAN link.

Basic Package**

Failover	Routes connections through preferred WAN link while others stand-by. Sequentially activate another link if preferred link failure occurs.
Priority	Routes connections through preferred WAN link while others stand-by. Sequentially activate other links if overflow occurs.
Weighted Round-Robin	Evenly distribute the traffic over all working WAN links in circular order according to the specified weights
Custom Route	Routing through the selected WAN for each specific traffic ex: TCP/UDP port number and IP address.

Full Package incl. basic package**

Sticky Session*	Binding all connections in an application session to particular WAN link to ensure all connections in the session are routed to the same WAN link , that is suitable for security services like online payment etc.
Smallest Load*	Routes connections through the WAN link with highest free bandwidth ratio. The ratio = 1 - (traffic load / the capability of a WAN link). The traffic load could be defined by downstream, upstream or total traffic
Fastest*	Routes connections through the WAN link with lowest latency time.
Fast Roaming**	802.11r work with Lantech controller
WMM	Wifi multimedia and 802.11e traffic prioritization
Security	WEP64/128bits/ WPA/ WPA-PSK (TKIP*,AES)/ WPA2/ WPA2-PSK (TKIP*,AES)/SSH/SSL/HTTPS
Authentication	Radius Authentication, EAP-MD5, EAP-TLS, EAP-TTLS, PEAP; SSID broadcast disable supported**
SSID	16 sets
Client mode	PMK** Caching and pre-authentication.
Timer	Built-in Real Time Clock to keep track of time always(RTC)
Discovery	IEEE 802.1ab Link Layer Discovery Protocal (LLDP)
SNMP trap	Device cold / warm start Port link up / link down DI / DO high / low
Environmental Monitoring	System status for input voltage, current , ambient temperature to be shown in GUI and sent alerting if any abnormal status
Graphic signal display	Graphic LTE & Wifi signal strength & TX / RX rate display
Remote Web/SMS** control	To reboot or get status of router by Web/SMS**
Captive portal	Editable captive portal login page
Maintenance	Firmware upgradeable through TFTP/FTP/HTTP
Configuration backup & restore	Supports text configuration file for quick system installation USB port to upload/download configuration by USB dongle

Physical Ports & System

Connectors	10/100/1000T: 2x ports M12 8-pole X-coded with Auto MDI/MDI-X function (1LAN+1WAN or 2LAN) USB/Console connector: 1 x M12 8-pole A-coded DIDO : 1 x 5-pole terminal block Power Input connector : 1 x M12 4-pole A-coded Serial connector : 2 DB9 SIM card slots : 2 SMA/QMA** connector for LTE: 3 (female) SMA/QMA** connector for Wi-Fi: 3 (male)
Serial Baud Rate	1000Kbps high data rate,250kbps normal for RS232 ; 20Mbps high data rate,250kbps normal for RS422/485
Serial Data Bits	5, 6, 7, 8
Serial Parity	odd, even, none, mark, space
Serial Stop Bits	1, 1.5, 2
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+,Tx-, Rx+, Rx-,GND
RS-485 (2-wire)	Data+, Data-,GND
Isolation protection	RS422/485 2.5KV isolation; 8KV contact & 15KV air RS232 8KV contact and 15KV air ESD DIDO 3KV isolation Input power 1.5KVA isolation
DI/DO	2 Digital Input (DI) : Level 0: -30~2V / Level 1: 10~30V Max. input current:8mA 2 Digital Output(DO): Open collector to 40 VDC, 200mA
EMMC Storage**	8/16/32 GB

LED Indicators	
Power & system indicator	Per unit: Power 1 (Green), Power 2 (Green), P-Fail (Red) , System Ready(Green), Serial1/2(Green)
10/100/1000Base-T(X) port indicator	Link/Activity (Green), Speed (Yellow)
SIM	Green for Link/Act
GPS	Green for Link/Act
WLAN LEDs	WLAN 1 ,Link /ACT : Green
Fault	Red: Ethernet link down or power down
Fault contact	
Relay	Relay output to carry capacity of 1A at 24VDC
Power	
Input power	Dual DC input, isolated 16.8VDC~137.5VDC for (WV model)
Power consumption (Typ.)	18 Watts
Physical Characteristic	
Enclosure	IP 65/54 aluminum case
Dimension	178 (W) x 99 (D) x 103 (H) mm
Weight	1000g
Environmental	
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
Operating Temperature	-20°C ~ 70°C (-4°F ~ 158°F) -40°C ~ 70°C (-40°F ~ 158°F)
Operating Humidity	5% to 95% Non-condensing
Regulatory approvals	
EMC	FCC Part 15 Class A, EN55032 , EN55024
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-6-2
Radio Frequency	EN301 489-1, EN301 489-17, EN301 489-19, EN301 489-52, EN300 440, EN301 893, EN300 328, EN301 908-1, EN303 413, EN62311
Safety	EN60950 (LVD), AS60950 (LVD)
Stability Testing	EN61373 (Shock & Vibration)
Verifications & report	EN50155, EN50121-3-2, EN50121-4 verification EN45545-2 R13/R22/R23/R24/R25 (EN ISO 4589-2, EN ISO 5659-2, NF X70-100-1 & 2) Fire & Smoke verification
MTBF	565,049 Hrs (IEC62830 standards)
Warranty	5 years

*Future Release

**Optional

RF Performance Table

	Data Rate	TX Power (per chain)	TX Power (3 chains)	Tolerance	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	20dBm	25dBm	±2dB	-95dBm	±2dB
	2Mbps	20dBm	25dBm	±2dB	-94dBm	±2dB
	5.5Mbps	20dBm	25dBm	±2dB	-92dBm	±2dB
	11Mbps	20dBm	25dBm	±2dB	-90dBm	±2dB
2.4GHz 802.11g	6Mbps	21dBm	26dBm	±2dB	-94dBm	±2dB
	9Mbps	21dBm	26dBm	±2dB	-93dBm	±2dB
	12Mbps	21dBm	26dBm	±2dB	-92dBm	±2dB
	18Mbps	21dBm	26dBm	±2dB	-90dBm	±2dB
	24Mbps	21dBm	26dBm	±2dB	-88dBm	±2dB
	36Mbps	20dBm	25dBm	±2dB	-85dBm	±2dB
	48Mbps	19dBm	24dBm	±2dB	-81dBm	±2dB
	54Mbps	18dBm	23dBm	±2dB	-80dBm	±2dB
2.4GHz 802.11n HT20	MCS 0	21dBm	26dBm	±2dB	-94dBm	±2dB
	MCS 1	21dBm	26dBm	±2dB	-91dBm	±2dB
	MCS 2	21dBm	26dBm	±2dB	-89dBm	±2dB
	MCS 3	20dBm	25dBm	±2dB	-84dBm	±2dB
	MCS 4	20dBm	25dBm	±2dB	-83dBm	±2dB
	MCS 5	20dBm	25dBm	±2dB	-78dBm	±2dB
	MCS 6	18dBm	23dBm	±2dB	-78dBm	±2dB
	MCS 7	16dBm	21dBm	±2dB	-76dBm	±2dB
2.4GHz 802.11n HT40	MCS 0	20dBm	25dBm	±2dB	-92dBm	±2dB
	MCS 1	20dBm	25dBm	±2dB	-89dBm	±2dB
	MCS 2	20dBm	25dBm	±2dB	-87dBm	±2dB
	MCS 3	19dBm	24dBm	±2dB	-82dBm	±2dB
	MCS 4	19dBm	24dBm	±2dB	-80dBm	±2dB
	MCS 5	19dBm	24dBm	±2dB	-78dBm	±2dB
	MCS 6	18dBm	23dBm	±2dB	-77dBm	±2dB
	MCS 7	16dBm	21dBm	±2dB	-73dBm	±2dB

	Data Rate	TX Power (per chain)	TX Power (3 chains)	Tolerance	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	20dBm	25dBm	±2dB	-94dBm	±2dB
	9Mbps	20dBm	25dBm	±2dB	-94dBm	±2dB
	12Mbps	20dBm	25dBm	±2dB	-92dBm	±2dB
	18Mbps	20dBm	25dBm	±2dB	-90dBm	±2dB
	24Mbps	20dBm	25dBm	±2dB	-86dBm	±2dB
	36Mbps	18dBm	23dBm	±2dB	-84dBm	±2dB
	48Mbps	16dBm	21dBm	±2dB	-81dBm	±2dB
	54Mbps	15dBm	20dBm	±2dB	-80dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	19dBm	24dBm	±2dB	-93dBm	±2dB
	MCS 1	19dBm	24dBm	±2dB	-90dBm	±2dB
	MCS 2	19dBm	24dBm	±2dB	-87dBm	±2dB
	MCS 3	18dBm	23dBm	±2dB	-83dBm	±2dB
	MCS 4	18dBm	23dBm	±2dB	-80dBm	±2dB
	MCS 5	17dBm	22dBm	±2dB	-77dBm	±2dB
	MCS 6	16dBm	21dBm	±2dB	-74dBm	±2dB
	MCS 7	14dBm	19dBm	±2dB	-73dBm	±2dB
	MCS 8	13dBm	18dBm	±2dB	-71dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	18dBm	23dBm	±2dB	-90dBm	±2dB
	MCS 1	18dBm	23dBm	±2dB	-88dBm	±2dB
	MCS 2	18dBm	23dBm	±2dB	-85dBm	±2dB
	MCS 3	17dBm	22dBm	±2dB	-82dBm	±2dB
	MCS 4	17dBm	22dBm	±2dB	-80dBm	±2dB
	MCS 5	16dBm	21dBm	±2dB	-75dBm	±2dB
	MCS 6	15dBm	20dBm	±2dB	-73dBm	±2dB
	MCS 7	14dBm	19dBm	±2dB	-73dBm	±2dB
	MCS 8	13dBm	18dBm	±2dB	-70dBm	±2dB
	MCS 9	13dBm	18dBm	±2dB	-68dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	18dBm	23dBm	±2dB	-89dBm	±2dB
	MCS 1	18dBm	23dBm	±2dB	-87dBm	±2dB
	MCS 2	18dBm	23dBm	±2dB	-85dBm	±2dB
	MCS 3	17dBm	22dBm	±2dB	-83dBm	±2dB
	MCS 4	17dBm	22dBm	±2dB	-80dBm	±2dB
	MCS 5	16dBm	21dBm	±2dB	-78dBm	±2dB
	MCS 6	15dBm	20dBm	±2dB	-75dBm	±2dB
	MCS 7	14dBm	19dBm	±2dB	-72dBm	±2dB
	MCS 8	13dBm	18dBm	±2dB	-70dBm	±2dB
	MCS 9	13dBm	18dBm	±2dB	-68dBm	±2dB

ORDERING INFORMATION

All QMA connector models are with –Q model name; -40~70C operational models are with –E model name.

- **TWMR-5002-1L-1AC-2S-WV-65-EUNA…..……..……...……...P/N: 8630-041**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; EU and US band; dual isolated 16.8V~137.5VDC; -20~70C; IP65 housing
- **TWMR-5002-1L-1AC-2S-WV-65-APAC…..…….....……P/N: 8630-042**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; APAC band; dual isolated 16.8V~137.5VDC; -20~70C; IP65 housing
- **TWMR-5002-1L-1AC-2S-WV-65-WW….……...……..P/N: 8630-043**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; Worldwide band; dual isolated 16.8V~137.5VDC; -20~70C; IP65 housing
- **TWMR-5002-1L-1AC-2SA-WV-65-EUNA…..……...……...P/N: 8630-0411**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; EU and US band; dual isolated 16.8V~137.5VDC; -20~70C; IP65 housing
- **TWMR-5002-1L-1AC-2SA-WV-65-APAC…..……...……...P/N: 8630-0421**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; APAC band; dual isolated 16.8V~137.5VDC; -

20~70C; IP65 housing

- **TWMR-5002-1L-1AC-2SA-WV-65-WW…….P/N: 8630-0431**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; Worldwide band; dual isolated 16.8V~137.5VDC; -20~70C; IP65 housing
- **TWMR-5002-1L-1AC-2S-WV-54-EUNA…….P/N: 8630-021**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; EU and US band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing
- **TWMR-5002-1L-1AC-2S-WV-54-APAC…….P/N: 8630-023**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; APAC band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing
- **TWMR-5002-1L-1AC-2S-WV-54-WW…….P/N: 8630-022**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS232 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; Worldwide band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing
- **TWMR-5002-1L-1AC-2SA-WV-54-EUNA…….P/N: 8630-0211**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; EU and US band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing
- **TWMR-5002-1L-1AC-2SA-WV-54-APAC…….P/N: 8630-0221**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; APAC band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing
- **TWMR-5002-1L-1AC-2SA-WV-54-WW…….P/N: 8630-0231**
  EN50155 Multifunction VPN Router w/1 WIFI 11ac + 1 LTE 4G SMA connectors+ 2 serial RS422/485 ports + 2 Gigabit X-coded Ethernet for load-balancing**, TWCC**, VPN, Protocol Gateway; Worldwide band; dual isolated 16.8V~137.5VDC; -20~70C; IP54 housing

EMMC Flash Storage

- **8G…….P/N: 8850-113**
- **16G…….P/N: 8850-114**
- **32G…….P/N: 8850-115**

Software License

- **LOAD BALANCING Basic Package……..P/N: 9000-101**
- **LOAD BALANCING Full Package……..P/N: 9000-102**
- **TWCC…….P/N: 9000-103**
- **WIRELESS ROAMING ……..P/N: 9000-107**

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