

## WLAN ACCESS POINTS



WLAN Access Point for applications in rolling stocks

### **bintec W2002T-n**

- WLAN access for passengers and staff
- Secure wireless wagon-to-wagon communication
- Fulfilled the strong railway standards according EN50155-T3
- Extended temperature range -25 °C to +70 °C
- Robust railway proven M12 connectors



# bintec W2002T-n

## WLAN Access Point for applications in rolling stocks

The W2002T-n is designed for WLAN applications in rolling stocks, like trains and other vehicles. The device complies with railway standards including EN 50155 and works at rough conditions and at extend temperatures.

### Features

Operation Modes	
WLAN operation mode	Transparent WLAN client to connect directly ethernet devices
WLAN operation mode	WLAN Access Point (Managed Access Point; Master Access Point for 6 Aps; Standalone Access Point; Standalone Access Point + Bridgelink Master)
WLAN operation mode	Bridgelink (Point-to-multipoint) with up 8 links
WLAN disabled	Off
WLAN access point	WLAN access point for stand-alone operation, WLAN controller based operation or as Master AP to controll up to 6 AP
WLAN client	Transparent client for direct connection of Ethernet devices (Remark: Feature is currently under development)

Security	
Performance Monitoring	Tracks performance values for complete WLAN Controller, for the Access Point, the SSID anf for the dedicated, connected WLAN clients. This feature helps to analyze performance or to figure out bottlenecks. This feature requires a WLAN Controller.
Encryption WPA/WEP	WPA personal, WPA enterprise, WPA2 personal, WPA2 enterprise, WEP64 (40 Bit key), WEP128 (104 Bit key)
IEEE802.11i authentication and encryption	802.1x/EAP-MD5, 802.1x/EAP-TLS, 802.1x/EAP-TTLS, 802.1x/EAP-PEAP, key management, PSK/TKIP encryption, AES encryption, 802.1x/EAP
Access control list (ACL)	MAC address filter for WLAN clients
VLAN	Network segments on layer2 possible. Per SSID one VLAN ID available. Static VLAN configuration according IEEE 802.1q; up to 32 VLANs supported.
Inter cell repeating	Inter traffic blocking for public hot spot (PHS) applications for preventing of communication radio client to radio client in a single radio cell.

Versions	
W2002T-n	One unit with two radios, include 110V power supply for usage in rolling stocks

Wireless LAN (Radio 1/2)	
WLAN standards	802.11n (Mimo 2x2); 802.11b; 802.11g; 802.11a; 802.11h

## Wireless LAN (Radio 1/2)

Frequency bands 2.4 GHz indoor/outdoor (EU)	2.4 GHz Indoor/Outdoor (2412-2484 MHz) max. 100 mW EIRP.
Frequency bands 5 GHz indoor (EU)	5 GHz indoor (5150-5350 MHz) max. 200 mW EIRP allowed.
Frequency bands 5 GHz outdoor (EU)	5 GHz outdoor (5470-5725 MHz)
WLAN modes	2,4 GHz Operation: 802.11b only; 802.11g only, 802.11b/g/n mixed; 802.11b/g/n mixed long; 802.11b/g/b mixed short; 802.11b/g/n ; 802.11g/n; 802.11n only 5 GHz Operation: 821.1a only; 802.11a/n; 802.11n only
Automatic Rate Selection (ARS)	Available
Transmission rate	Automatic
Data rates for 802.11b,g (2.4 GHz)	11, 5.5, 2 und 1 Mbps (DSSS modulation); 54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation)
Data rates for 802.11a,h (5 GHz)	54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation)
Data rates for 802.11n, Long Guard (800ns), 20 MHz	MSC0 6,5 Mbps; MSC1 13 Mbps; MCS2 19,5 Mbps; MCS3 26 Mbps; MCS4 39 Mbps; MSC5 52 Mbps; MCS6 58,5 Mbps; MCS7 65 Mbps; MCS8 13 Mbps; MCS9 26 Mbps; MCS10 39 Mbps; MCS11 52 Mbps; MCS12 78 Mbps; MCS13 104 Mbps; MCS14 117 Mbps; MCS15 130 Mbps
Data rates for 802.11n, Short Guard (400ns), 20 MHz	MSC0 7,2 Mbps; MSC1 14,4 Mbps; MCS2 21,7 Mbps; MCS3 28,9 Mbps; MCS4 43,3 Mbps; MSC5 57,8 Mbps; MCS6 65 Mbps; MCS7 72,2 Mbps; MCS8 14,4 Mbps; MCS9 28,9 Mbps; MCS10 43,3 Mbps; MCS11 57,8 Mbps; MCS12 86,7 Mbps; MCS13 115,6 Mbps; MCS14 130 Mbps; MCS15 144,4 Mbps
Data rates for 802.11n, Long Guard (800ns), 40 MHz	MSC0 13,5 Mbps; MSC1 27 Mbps; MCS2 40,5 Mbps; MCS3 54 Mbps; MCS4 81 Mbps; MSC5 108 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps
Data rates for 802.11n, Short Guard (400ns), 40 MHz	MSC0 15 Mbps; MSC1 30 Mbps; MCS2 45 Mbps; MCS3 60 Mbps; MCS4 90 Mbps; MSC5 120 Mbps; MCS6 135 Mbps; MCS7 150 Mbps; MCS8 30 Mbps; MCS9 60 Mbps; MCS10 90 Mbps; MCS11 120 Mbps; MCS12 180 Mbps; MCS13 240 Mbps; MCS14 270 Mbps; MCS15 300 Mbps
Receiver Sensitivity @ 2.4 GHz 802.11b/g	-95 dBm @ 11 Mbps -79 dBm @ 54 Mbps
Receiver Sensitivity @ 2.4 GHz 802.11n 20 MHz	-76 dBm @ MCS7
Receiver Sensitivity @ 2.4 GHz 802.11n 40 MHz	-74 dBm @ MCS7
Receiver Sensitivity @ 5 GHz 802.11a/h	-78 dBm @ 54 Mbps
Receiver Sensitivity @ 5 GHz 802.11n 20 MHz	-75 dBm @ MCS7
Receiver Sensitivity @ 5 GHz 802.11n 40 MHz	-72 dBm @ MCS7
Output power limitation ( without antenna gain)	Adjustable in following steps: 5, 8,11,14,16 dBm and maximum. Maximal power varies depending on data rate, frequency band and country setting.
Tx Power @ 2.4 GHz 802.11b/g	19 dBm @ 11 Mbps 16 dBm @ 54 Mbps

## Wireless LAN (Radio 1/2)

Tx Power @ 2.4 GHz 802.11n 20 MHz	15 dBm @ MCS7
Tx Power @ 2.4 GHz 802.11n 40 MHz	15 dBm @ MCS7
Tx Power @ 5 GHz 802.11a/h	11 dBm @ MCS7
Tx Power @ 5 GHz 802.11n 20 MHz	11 dBm @ MCS7
Tx Power @ 5 GHz 802.11n 40 MHz	11 dBm @ MCS7
Number of spatial streams (802.11n)	1 or 2
Bandwidth (802.11n)	20/40 MHz (bundling of two adjoining 20 MHz channels to one 40 MHz channel)
Short guard interval (802.11n)	On/off switchable; increase of throughput by reduction of the guard intervals from 800ns to 400ns
DTIM Period	Adjustable
Multi SSID	Depending on the complexity of configuration up to 16 service sets per radio module, with virtual access points and own MAC address per SSID.
Broadcast SSID	On/off switchable
Power management for clients	Registering of up to 250 clients per radio module simultaneously in access point mode. Default is 32 clients.
Country-specific settings	Channel settings according regulatory domain (802.11d) permitted.
TPC	TPC (transmission power control): For 5 GHz, automatic reduction of transmission power according EN301893
DFS	DFS (dynamic frequency selection) implemented
RTS/CTS	RTS/CTS threshold adjustable

## Software

Roaming (access point mode)	Seamless roaming with IAPP (Inter Access Point Protocol), support according 802.11f
Fast roaming 802.1x (access point mode)	Pre authentication and PMK caching allows fast roaming by 802.1x encryption
Roaming behaviour (client mode)	Adjustable (no, slow, normal, fast, customized roaming). Adaptable for fast movable client (i.e. vehicle), to guarantee a roaming without interruption. This is achieved by scanning of the relevant channels in the background.
Client mode	Routing or bridge mode possible. In bridge mode multiple IP based end devices can be operated simultaneously and additionally one non-IP-based end device
Buffer pool	For cushioning of peaks
WMM 802.11e QoS	Data prioritization for TOS data, 802.11e/WMM
WMM 802.11e power save	Support of active WLAN clients, which support 802.11e power save
U-APSD	Supported

<b>Software</b>	
Internet dialup	PPPoE, PPTP
Load balancing	Session-round-robin, load-dependent bandwidth
BLD	Broken Link Detection (BLD) per SSID possible.
NTP	NTP client, NTP server, manually
DNS	DNS client, DNS server, DNS relay
DHCP	DHCP client, DHCP server, DHCP relay
Roaming at Client Mode	No roaming, normal roaming, slow roaming, fast roaming, user defined roaming

<b>Maintenance</b>	
Configuration a. maintenance: Device configuration via	Telnet, SSH, HTTP, HTTPS, SNMP
Configuration a. maintenance: SNMP	SNMP (v1, v2, v3), USM model, VACM views, SNMP traps (v1, v2, v3) configurable, SNMP IP access list configurable
Configuration a. maintenance: SNMP configuration	Complete management with MIB-II, MIB 802.11, enterprise MIB
Configuration a. maintenance: SSH Login	Supports SSH V1.5 and SSH V2.0, for secure connections of terminal applications
Configuration a. maintenance: HTTP/HTTPS	Web-based configuration (FCI). The user interface is identical with almost all bintec elmeg products.
Configuration a. maintenance: Secure configuration	SSH available, HTTPS, Telnet protected against 'bruce force attacks'
Configuration a. maintenance: Configuration export and import	Load and save of configurations; save configuration optionally encrypted; optional, automatic controlled via scheduler
Configuration a. maintenance: On the fly configuration	No restart is required after the configuration has been changed.
Configuration a. maintenance: Software update	Software updates free of charge; loadable via file, HTTP or via direct access to the bintec elmeg upload server; optional, automatic controlled via scheduler
External reporting: Syslog	Syslog client, with different levels of messaging.
External reporting: eMail alert	Automatic eMail alert by definable events
External reporting: SNMP traps	Supported
External reporting: Activity monitor	Sending of information to a PC on which the DIME Manager is installed
Monitoring: Internal Log	Output via web-based configuration interface (http/https), filter: subsystem, level, message
Monitoring: Interfaces	Statistic information of all physical and logical interfaces
Monitoring: WLAN	Detailed displays for radio, VSS, WDS link, bridge links, client links. Displayed are per link: MAC address, IP address, TX packets, RX packets, signal strength for every receiving aerial, signal-to-noise ratio, data rate

## Maintenance

Monitoring: Configurable scheduler	Following events can be scheduled: Reboot device, activate/deactivate interface, activate/deactivate WLAN, initiate 5 GHz band scan, trigger SW update, trigger configuration backup
Management: Supported management systems	WLAN Controller, DIME manager, Xadmin
Management: Discovery Protocol	CAPWAP DHCP option according RFC1517
Management: WLAN Controller functionality	Can act as stand-alone AP without WLAN controller; can act for small installation with up to 6 AP as WTP-AC (Master AP); can act as WTP (Managed by a WLAN controller)
Documentation	English documentation on the Internet for download
Guarantee	1-year manufacturer's guarantee, Online RMA handling

## Hardware

LAN / WAN	2 x 10/100/1000 Mbps Ethernet twisted pair, autosensing, auto MDI/MDI-X
Ethernet connectors	Two 8-pole M12 connectors
WLAN	IEEE 802.11a/b/g/n; 2 radio module, 2.4 und 5 GHz band
Antenna sockets	Four antenna sockets, two N-female-sockets for each radio
Integrated Power supply	110 VDC / 0,18 A according EN50155 (except for 10ms power interruption at full operation); Galvanic isolated; 4-pole M12 connector
Status LEDs	Power, Status, Activity for WLAN1, Activity for WLAN2, LEDs defeatable
Dimensions	Approx. 21 cm x 21 cm x 4 cm (width x depth x height)
Weight	2.2 kg
Environment	Temperature operating: -25 °C to +70 °C; rel. humidity up to 95%
Standards and certifications: CE approval	EN 60950; EN 300328; EN 301489-1; EN 301489-17; EN 301893; EN 62311
Standards and certifications: Railway approvals	EN 50155; EN 50121-3-2; EN 60068-2-1; EN 60068-2-2; EN 60068-2-27; EN 60068-2-30; EN 60068-2-47; EN 60068-2-64; EN 60068-3-1; EN 61373