ZCOM

"軌道交通解決方案"
RAILWAY WIRELESS SOLUTION

AIoT 閘道器擔任數據的收發樞紐和運算平台
AIoT Gateway as the Data Transmitting/Receiving Hub &
Computing Platform

BROCHURE

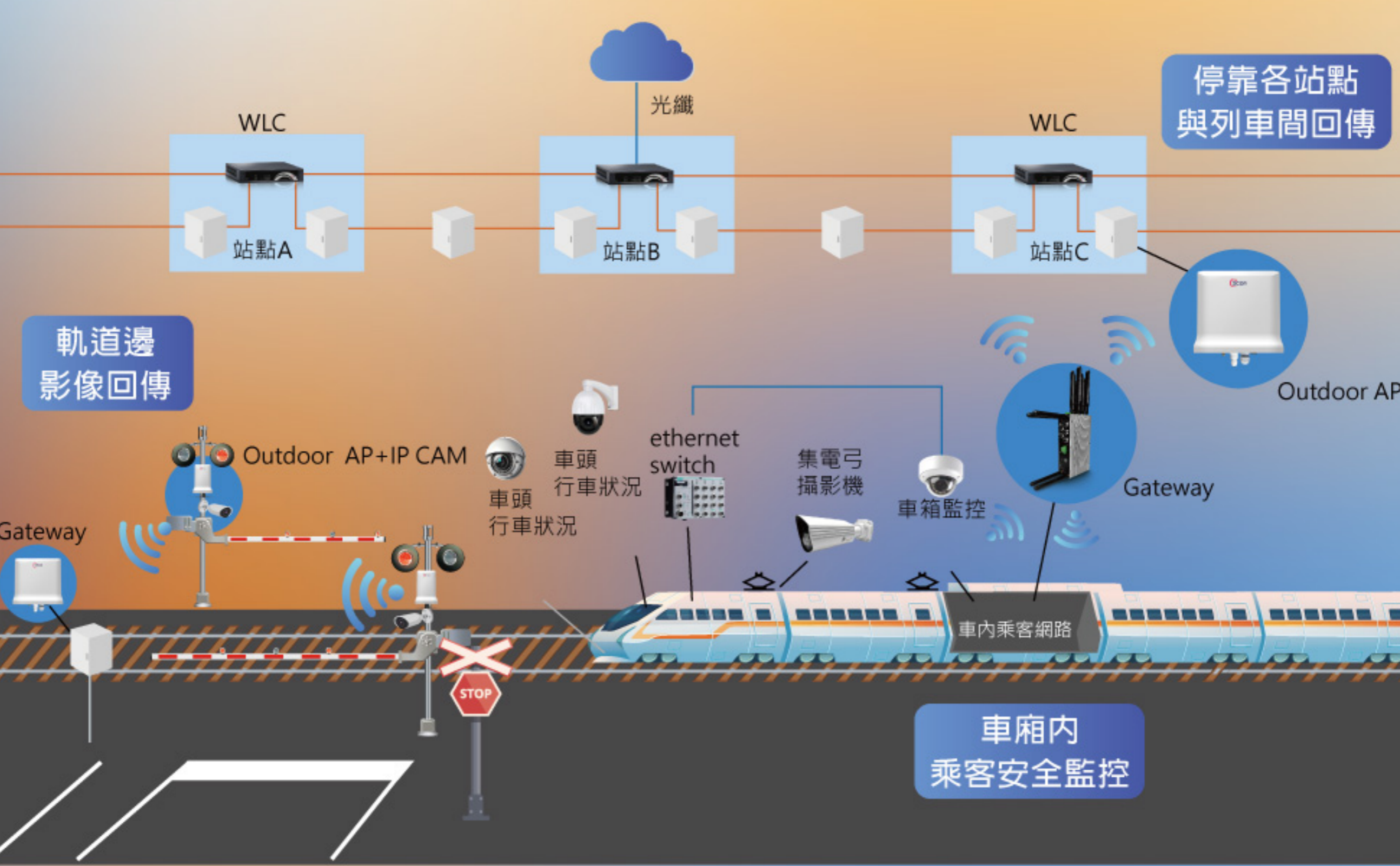**Z-COM, Smart and Fast Network Communication**

軌道交通解決方案

隨著數位化程度升高，軌道運輸業者如何串接車體和車站內各種數位系統，以即時收集關鍵數據，
改善運營效率，進而提升民眾搭乘軌道運輸的比例，是近年來軌道運輸業者急欲突破的瓶頸。智捷科技軌道
交通無線解決方案包含各式AIoT無線閘道器、無線控制器以及室內外無線存取點…等產品組合，可整合4G/5G，
Wi-Fi，GPS/GNSS…等無線通訊技術，以全方位連接能力、穩定的無線訊號傳輸，提供軌道運輸業者一個可依據車站
規模、規格，且包含車體、站體內外的完整無線產品組合。

In this highly digital era, transportation operators are constantly challenged in data collection, analysis and management in real time from various existed and new digital systems. Providing modern services improved by digital in transportation not only improves operation efficiency, but also attracts people to take more public transportation.
Z-COM In-vehicle Wireless Solution is integrated with different wireless AIoT gateways , controllers together with indoor and outdoor Access Points to offer data access from 4G/5G, Wi-Fi,GPS/GNSS, etc.. The products offer a
wide range of interfaces, with robust wireless connectivity and reliability, for operators to create a complete wireless service and management portfolio from vehicle cabins inside, the platforms, to the entire railway station.

車載/軌道網路架構

集電弓系統中繼站
Relay for pantograph monitoring system

Wired & Wireless Management	管理 Management	多網融合 heterogeneous network(5G、Wi-Fi 6) Middlebox
Load Balance	資安 Cybersecuirty	通訊框架 communication framing：MQTT/OPC-UA/RESTful 通訊資安 communications security：Firewall /IDS / IPS
Low Latency	效能 Efficiency	AI 總線匯算-影像分析 AI Edge computing, image analysis
Container-Based Microservices Platform		Nvidia GPU

zMEC Platform 5G 多網融合軌道通訊平台
5G heterogeneous network management platform for rail

5G基站 5G gNB
專網基站 private NB
5G基站 5G gNB

集電弓攝影機 monitor the pantograph

車頭 行車狀況 monitor the track & trackside

車箱監控 monitor the car interior

軌道周圍 IPCAM & IOT sensors around the tracks

車頭 行車狀況 monitor the track & trackside

公網 Public network
4G LTE
5G NR
GPS

NAS+NVR
PoE Switch
Gateway AG260
Edge AI

地震偵測 Earthquake detection
工地巡查 Construction site inspection
無人機場勘 Site survey by drone

異動偵測 Object detection
雨量偵測 Rainfall detection
邊坡偵測 Slope monitoring

Tunnel

WLC
光纖
WLC

站點A
站點B
站點C

停靠各站點 與列車間回傳

Outdoor AP

軌道邊 影像回傳

Gateway
Outdoor AP+IP CAM
車頭 行車狀況
車頭 行車狀況
ethernet switch
集電弓 攝影機
車箱監控
Gateway

STOP

車內乘客網路

車廂內 乘客安全監控

Solution Features

01 AIoT Gateway as the Data Transmitting/Receiving Hub and Computing Platform

1. Collect data from RS232/RS485, GPS, RJ45 etc., and transfer data onwards for big data analysis via 4G/5G, Wi-Fi or Ethernet landline transmission.

2. AIoT Gateway acts as data integration and platform for edge computing, to avoid the latency and high cost by centralized cloud computing.

3. Comply with EU standard EN 50155, hardware designed to resist vibration, shock and abrupt current pulse.

4. Deploy a wide range of access points widely deployed for vehicle cabins, platforms and stations can offer full coverage with robust wireless signals.

02 Centralizes the Management of all Wireless Access Points

1. Optimize the management efficiency by remotely monitor and manage the wireless access points, AIoT Gateways deployed in stations and moving vehicles via Z-COM centralized management platform.

2. Easy deployment and management to reduce capital investment and operation cost.

3. Support N+1 Backup system to prevent service interruption caused by controller malfunction.

03 Latest Wireless Network Management Tools for Better User Experience

1. Support smart Auto Channel Selection for signal interference mitigation.

2. Support smart Bandwidth Control to well allocate bandwidth for better connectivity quality.

3. Support 5GHz Priority to avoid the overloaded 2.4GHz band for less interference and better channel quality.

4. Support Load Balance to evenly distribute traffic and clients among the access points for better user access experience.

5. Support Auto Power Adjustment to adjust the radio power of access points for optimizing the coverage area when signal interference is presented.

6. Supports Fast Roaming for users to roam between access points seamlessly.

方案產品

AG260
行動通訊閘道器

- 802.11ax 2X2 雙頻雙流 1774Mbps
- 5G NR的等效全向輻射功率達到23dBm
- 符合EN 50155,通過EN 50121
- 內建GPS/GLONASS定位功能
- 可靠的確保通訊順暢,耐熱、耐濕並防振動

zMEC
邊緣運算平台

- 以Kubernetes架構為主,可依不同應用自動調配所需要的網路傳輸量
- 內嵌Z-COM無線網路管理系統
- 可搭載第三方應用如:影像管理、辨識等需求
- 敏捷打造新型態AIoT智慧物聯網

SP230-S5
室外無線存取點

TAIWAN
EXCELLENCE
2023

- 802.11ac Wave 2 2X2 雙頻 PTP點對點
- 1167Mbps 38dBm高功率 內建高增益天線
- 傳輸距離達6公里,高品質影像傳輸
- 高密度應用–開發中國家、偏鄉地區及無線網路監控需求

SP250-A04
戶外型閘道器

- 802.11ax 2X2 雙頻雙流 1774Mbps
- 4G LTE和2.5GbE WAN有線網路埠,可在有線與行動通訊間靈活的切換
- 戶外專業定向–風力/太陽能發電廠、工廠石油天然氣、交通路況監控無線傳輸

WS5G2/7G2/10G2
企業級無線控制器

- 內建集中管理平台,可遠端監控、排障,優化效能,實現集中管理和本地資料轉發
- 批量的下發配置,加速完成網路設定變更
- 中密度應用–中小型企業用戶、醫院、校園、行政機關

WLC Deploy a manageable, Intelligent, Easy Network

Cutting-Edge Technologies

無縫漫遊
Seamless roaming

自動頻道
Auto channel

頻寬控制
Bandwidth control

5GHz 優先
Auto channel
(5GHz priorization)

負載平衡
Load balance

Auto
自動功率調整
Auto power

Key Features

SDN架構
SDN架構

集中管理
Centralized

即時監控
Real-time monitoring

遠程故障排除
Remote Troubleshooting

N+1 Backup

集中轉發
Central forwarding

zMEC Edge Computing Platform

Core   **Edge**   **Access**

Portal Server

AAA Server

Radius

NMS

SNMP

Database   RESTful Server

NAS

| WLC | ZOAM | 3rd-party APPs... |

NFV / Docker Container

SDN / OVS OpenFlow

Linux OS

IPC

Kubernetes(K8S)

PoE Out

PoE Out

Managed AP
· 802.11ac Wave2
· 802.11ax
· Optional Radios

WiFi
Ethernet

LoRa

RS485

RS232

ZigBee

| Network Slicing | | URLLC | | Superior Scalability | | Load Balance |

高擴充性
Scalability

降低佈建成本
Low deployment cost

快速反應時間
Low-latency connectivity

高可用性/高彈性
High Flexibility

自動調配資源
Resource Allocation

資料安全性
Security

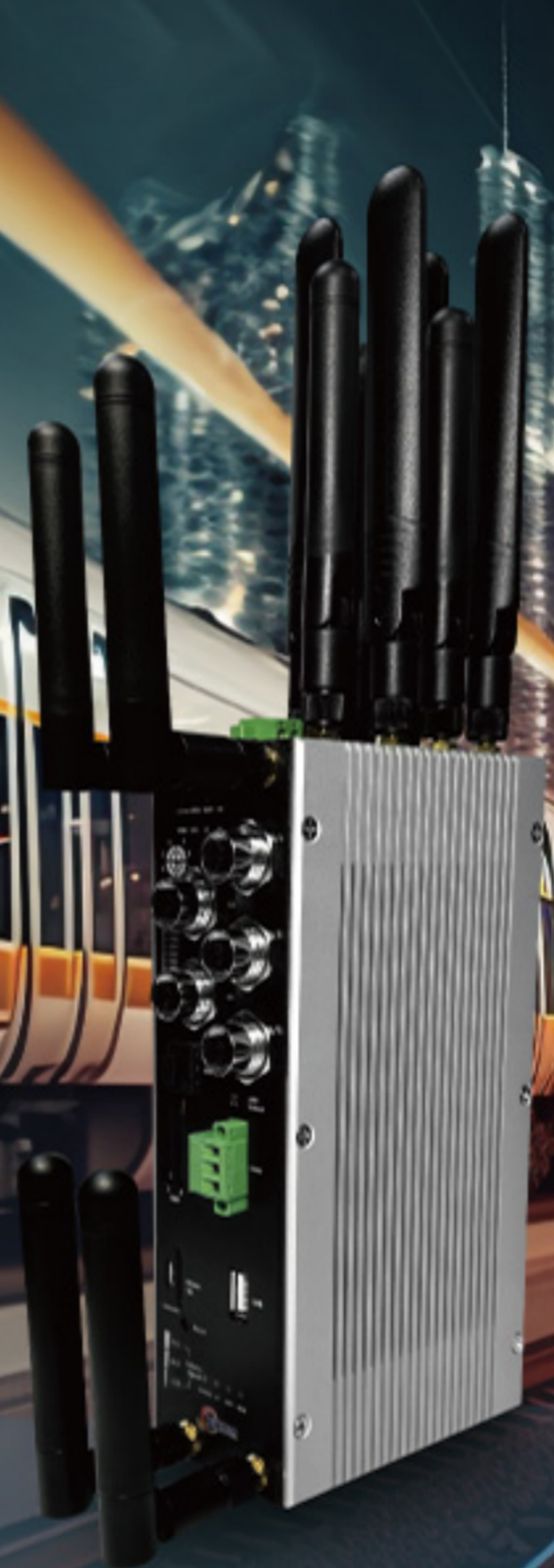# 5G TECHNOLOGY

低延遲 穩定
Low-latency Stable performance

高效 安全守護
Safety Guardianship High-performance

Zero Trust 零信任
◆ VPN Security
◆ M12 X-Coded
◆ EN50121-4
◆ EN50155
◆ Wi-Fi 6 +5G NR

AG260
行動通訊閘道器
Industrial Cellular Gateway

無線控制器
Wireless LAN Controllers

zMEC 邊緣運算平台
zMEC Edge Computing

室內無線存取點
點對點
AP Point to Point

台灣精品 2023
TAIWAN EXCELLENCE

4G戶外型閘道器
4G Gateway

About Z-COM

成立於1995年,智捷科技專注於無線
通訊研發與製造。憑藉近30年技術實力,成功推動大規
模Wi-Fi Offload和智慧城市項目,全球部署數百萬運營商級Wi-Fi基地台,
連接超過五億使用者。近年來更多次與中國、印度電信商合作佈建智慧城市,積極與IoT世代網路應用
接軌。

作為無線網路和混合組網的專業網路系統供應商,智捷科技整合5G、Wi-Fi/AIoT技術,積極佈局專用
網路系統和邊緣運算的AIoT應用,打造新一代的移動寬頻應用。

Since 1995, Z-COM pioneers wireless communication R&D, boasting nearly 30 years of expertise. We've successfully led global Wi-Fi Offload and smart city projects, connecting 500+ million users with millions of carrier-grade Wi-Fi stations. Collaborating with telecom giants in China and India, we actively embrace IoT-era network applications.

As a top-tier provider in wireless and hybrid networking, Z-COM integrates 5G, Wi-Fi, and AIoT technologies. Our strategic deployment includes dedicated networks and edge computing for AIoT, shaping the next-gen mobile broadband solutions.

1995	員工數:500+	產品市場	核心技術	大型活動 Wi-Fi 供應商	榮獲最有前景之電信商級
成立於新竹科學園區	專利數:160+	電信運營商	無線寬頻網路整合	2008 北京奧運	Wi-Fi公司印度
Wi-Fi Alliance		工業級	軟體開發	2010 上海世博會	DigiAnalysis頒發
全球聯網企業聯盟的會員	Employee: 500+	Wi-Fi 產品	設計至成品一條龍	2012 南京青年奧運會	
	Patents	日本.歐洲		2019 印度行動大會	產品SP230-S5
	granted: 160+	亞洲 (中國/印度)		2023數位轉型楷模獎	榮獲台灣精品獎
Established in			Radio Frequency (RF)	2023運動企業認證	獲選台灣優良中小企業
Hsinchu Science Park			Software development	Wi-Fi equipment supplier	
2013 Listed on Taiwan		Products and markets	for wireless bandwidth	for big events	Win Award for
OTC Exchange (TWO)		Telecom carriers	integration	2008 Beijing Olympics	Most Promising Carrier
Wi-Fi Alliance		Industrial grade	One-step service from	2010 Shanghai World Expo	Grade Wi-Fi Company
Membership		Wi-Fi Product	design to manufacturing	2012 Nanjing Youth	by DigiAnalysis India
		Japan. Europe	Own-brand	Olympics	
		Asia (China/India)		2019 India Mobile Congress	

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