

Leveraging on DAS to Enable Ubiquitous Wi-Fi Coverage & Multi-Mode Wireless Access

Solving a flagship hotel's Wi-Fi coverage & capacity problems through an integrated DAS employing Indoor Integrated APs

About Comba

Comba Telecom provides the infrastructure and solutions to mobile operators and enterprises to enhance and extend their wireless communications networks.

Comba's Wi-Fi Business History:

1997: Comba Telecom founded

2002: Started development of solutions for Wi-Fi data services

2003: Comba listed on the Hong Kong Stock Exchange.

2008: Formally established the Wireless Access Business Unit incorporating Wi-Fi solutions

2009: Comba Network Solutions launched in the global market offering integrated end-to-end solutions.

Comba becomes one of the top three carrier Wi-Fi suppliers to Chinese operators.

2010: Wi-Fi solution released in international market, including South America, Middle East, and Southeast Asia

2011: Over 32 provinces in China have deployed Comba's Wi-Fi products and solutions

The Scenario

The Fairmont Peace Hotel is a classic luxury hotel located on Shanghai's iconic Bund at Nanjing Road. First opened as the Cathay Hotel in 1929, the hotel is one of the finest surviving examples of Chicago Gothic architecture in Shanghai and boasts two buildings with 273 rooms. Today the hotel is managed by Fairmont Hotels & Resorts.

After a deluge of complaints about dropped calls and poor reception from the customers, the operator, China Unicom Shanghai, decided to invest in combined 2G, 3G and Wi-Fi coverage network. They contracted Comba to assist in re-designing the existing distributed antenna system (DAS) for all 2G, 3G, and Wi-Fi systems, in order to add capacity and boost signal strength within the hotel.



The Fairmont Peace Hotel Shanghai

After investigating and assessing the network at the hotel, Comba found three key sets of issues that had to be addressed:

- **Coverage**
Smart phones had difficulty accessing network due to low network transmission power. This was exacerbated by the complicated hotel architecture and high penetration loss through thick walls
- **Capacity**
Wi-Fi capacity was insufficient when hotel rooms were fully occupied
- **Interference**
Operator-owned and personal Wi-Fi networks co-existing and sharing same wireless resource. Lack of radio resources resulted in low data rate and even connection problems.

The Solution

Working with the operator, Comba assessed different solutions to resolve the Peace Hotel's problem whilst being cognizant of operation and capital expenditure costs.

Amongst those assessed included:

- (1) **Re-designing the distributed antenna system:** this would help improve the coverage, but would not resolve the dropped call issue
- (2) **Deploying additional APs alone:** this would resolve all the issues. However, this option would face high site acquisition cost and procedural issues.

Case Study

Fairmont Peace Hotel Shanghai

Comba's Indoor Integrated AP

Deployed as part of a solution, Comba's Indoor Integrated AP allows operators to optimize their CAPEX and OPEX for new and existing distributed antenna systems by extending coverage and improving quality of service.

The Indoor Integrated AP Features:

- OFDM technology, 1x1 SISO
- Supports 2.4GHz networks
- High output power up to 500mW
- Supports Power over Ethernet (PoE)



Indoor Integrated AP

Application Scenario:

- Hotel
- Office
- Enterprise building
- Hospital
- Dormitory

- (3) **Improving radio planning:** by careful radio planning, allocate radio channel resources to different coverage areas to avoid intra-system interference inside the hotel

Finally, Comba settled on a solution that incorporated elements of all three alternatives: a redesigned DAS with added APs and improved radio planning.

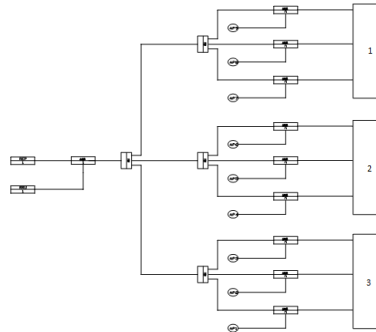


Figure of the Redesigned System

Comba's solution effectively covered not only all of the hotel rooms, but also public areas and hallways with 2G, 3G, and Wi-Fi service. Blind spots with weak signal coverage were eliminated. The Wi-Fi coverage rate rose to over 95%.

At the same time, the additional APs reduced the access conflicts between users, ensuring that guest room signal strengths exceeded -70dBm. This ensured that traffic was evenly distributed, thus addressing the network overload issue that had negatively affected call quality.

The hotel was able to meet its service target, and customer complaints about mobile coverage vanished.

Peace Hotel reported that customer complaints decreased dramatically – the final testament to the effectiveness of Comba's Indoor Integrated AP, network redesign, and technical support capabilities.

The Results

Before and after AP installation and DAS redesign, Comba monitored the signal strength and loss tolerance in some guest rooms. The rooms saw great improvement in both.

Coverage Result			
Room Number		Signal Strength (dBm)	Loss Tolerance (%)
507	Bedside	-55	0
	Desk	-65	0
	Sofa	-62	0
608	Bedside	-58	0
	Desk	-45	0
	Sofa	-68	0

Coverage Test Result for Selected Rooms

Comba Products & Services

- Indoor Integrated AP, single band, 1x1 SISO, 500mW output power
- Distributed Antenna System
- Installation & Commissioning
- Post Installation Support

For more information, contact your Comba representative, or visit: <http://www.comba-telecom.com>

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