Outdoor Backhaul MIMO Antenna Array

Overview

The Wireless Local Area Network (WLAN), Wireless Fidelity (WiFi), and Worldwide Interoperability for Microwave Access (WiMAX) are very popular wireless systems in data communications. WLAN mainly provides wireless access and connection within a region of tens of meters, especially for computers in a small geographic area, like a home, office, or group of buildings. WiFi is the embedded technology of WLAN and has now been increasingly used for services, including Internet and VoIP phone access, gaming, and basic connectivity of consumer electronics such as televisions, DVD players, and digital cameras. WiMAX is an emerging wireless connection technology and aims to provide wireless data over long distances in a variety of different ways—from point to point links to full mobile cellular type access. The market of such systems is growing fast in developed areas and penetrating into developing regions.

Technology

The key challenge of antenna design in the WLAN / WiFi / WiMAX systems is to achieve high performance and low cost. We have developed the technologies to enhance the impedance and radiation performance of suspended plate antennas to meet specific requirements in a variety of systems. Besides achieving the high performance of the antennas, we have also addressed the critical engineering issues related to cost. The cost effectiveness is the key factor for industry to adopt our technologies and enhance their competencies in the market. Moreover, our innovations have significantly enhanced the robustness of the structure by co-designing and optimizing the electrical and mechanical parameters.

The sectored MIMO antenna arrays have promising application in outdoor backhaul applications of WiFi and WiMAX. We have designed and implemented a 16-sector antenna array based on our innovative technologies. The challenge of this design is to achieve high gain with compact size. The size was reduced by using single column series-fed arrays. The array features a well-matched impedance response, consistent high gain of 16 dBi as well as stable radiation performance across the WiFi band of 5.15–5.35 GHz / 5.47–5.875 GHz and WiMAX at 5.725–5.875 GHz. The mutual coupling between the adjacent elements was effectively suppressed to < -23 dB. With the MIMO array, superior data rate and long range performance can be delivered.

Key Features

- Broadband: 4.9–5.35 GHz / 5.47–5.875 GHz
- High Gain
- Stable gain response
- Stable radiation patterns
- Low mutual coupling between antenna elements
- Low cost
- Mechanically robust
- 16 sectors

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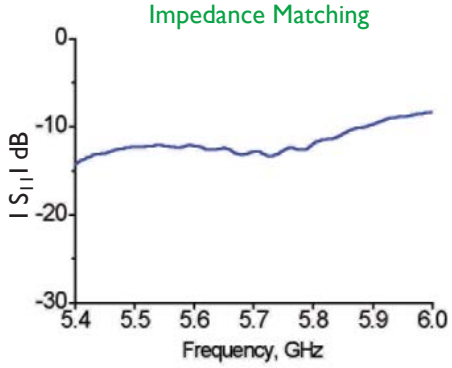
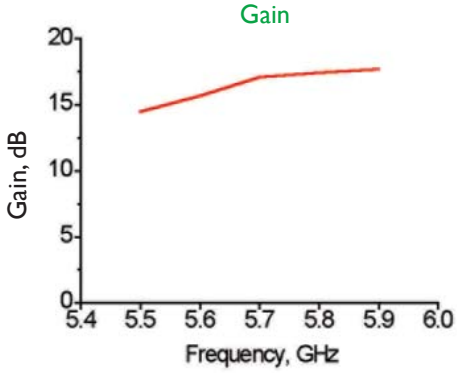
Antenna Specifications

Electrical Specifications	
Frequency	4.9–5.35 GHz / 5.47–5.875 GHz
Gain	≥16. 5 dBi
Beam Width	7° (Vertical) / 50° (Horizontal)
Return Loss	≤ -12 dB
Isolation	≥ 23 dB
Impedance	50 Ω
Maximum RF Power	200 W
Other Parameters	
Size/ Weight	40 cm x 40 cm x 130 cm / ~5 kg
Operating Temperature	-40°C – 80°C
Humidity	0–100 %
Connector	N type

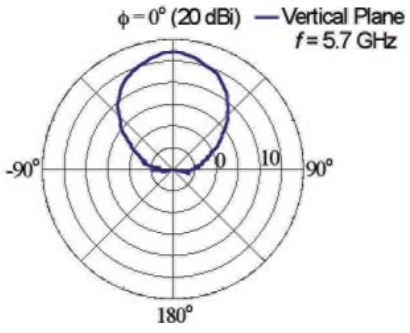
Impedance Matching

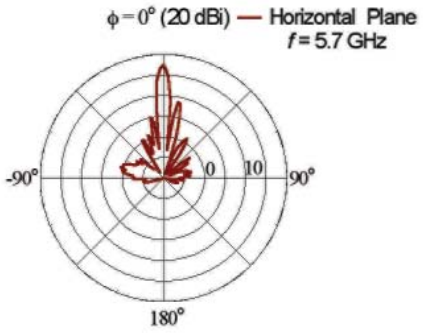


Gain



Radiation Pattern





Potenial Industries

Communications

- Healthcare
- Education
- Logistic

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