

# A Novel Architecture and Regulatory Measures for Broadband through Integrated Femto-WiFi based Systems

High-speed Internet connectivity still is an indefinable issue for most of the rural areas with over 131.49 million broadband subscribers. But WiFi through hotspots would be the solution for unlicensed users. In recent advancements, the Wi-Fi hotspots are integrated with femto-based systems. With the help of the above systems, it is possible to reduce transmit power and cost parameters. The above standardization was introduced by Small Cell Forum and integrated femto-WiFi small cell (IFW) which accesses both licensed and unlicensed bands simultaneously.

## SUMMARY OF FINDINGS/RECOMMENDATIONS

### 1. Present the recommendations or findings as a list:

- Formation of centralized entity
- Inclusion of femtocells
- Integration of femto-WiFi
- Regulation and Licensing measures
- Effective cost management

2. Small cells known as “femto cells” have been considered as an efficient technique to improve capacity and better capacity. There are two types of small cells [2]. Former one is femtocell that shares the cellular licensed bands to the unlicensed band and the latter one is WiFi hotspot which is built by cellular network operators to offload traffic from their licensed bands to the unlicensed bands. In this policy brief, integration of femto-WiFi

and its methodology is considered [2].

3. To improve the data rate of smart devices, small cell forum proposed integrated femto-WiFi system for communicating both licensed and unlicensed band. Femtocell based systems can communicate with WiFi hotspots and internet can be accessed with good reliability with reduced power.

## THE RESEARCH

### I INTEGRATED FEMTO-WIFI SYSTEM

In integrated femto-WiFi case, consider femtocell base stations and mobile base stations, in which femtocell is connected to macrocell base stations to retrieve signals and to forward the same to end users within small area [1]-[3]. In order to replace more number of base stations, femto-based cells and relays have been considered. Relays are cheaper than macrocell base stations and are otherwise referred to as low-powered base stations. WiFi hotspots are connected to femtocells through relaying. With the help of above methodology, one can get better signal coverage to access internet and also to occupy more number of users within that area.

Figure 1 shows a basic structure of cooperative relaying which consists of source, relays and destination. The proposed model can transfers information from source to the destination through multiple relays. If signal strength is very poor from macrocell base station to an end user, then the signal can be improved with the help of relays. This methodology greatly reduces the amount of cost with minimized power. Therefore, effective radiation can

also minimized with the help of recent techniques [4], [8].

### II REGULATORY AND LICENSING MEASURES

Wireless Planning and Coordination (WPC) is the national radio regulatory authority responsible for spectrum management to cater the needs across the country. It issues and regulates the measures of spectrum related parameters [6]-[10]. WPC allocates and issue spectrum license to services. With respect to the rules and regulations, service providers display tariff to the end users.

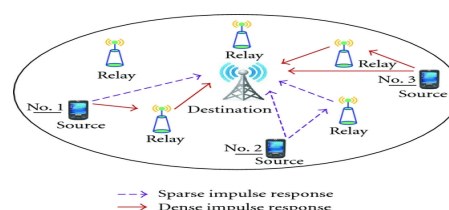


Figure 1. Cooperative Relaying

Table 1. Capacity and Coverage related parameters

Parameters	Description	Value
Transmit Power	Macro base station	40 dBm[2]
Transmit Power	Femtocell	15 dBm [2]
Coverage	WiFi	100-300 m
Coverage	Femtocell	5-20 m

### III PARAMETERS

In Table 1, the basic parameters are mentioned. Femto-based cell has the transmit power of 15 dBm which is lesser than macrocell base station. By using the above value, the power consumption can be minimized.

### CONCLUSION

Femtocell based systems have been considered as an effective technique to boost capacity as well as coverage within small area. The above system can be integrated with WiFi networks to enhance connectivity and also to access internet in a better way. By using this technique, wastage of power can be controlled and this would be a solution to incorporate in cellular networks as well as in broadband scenarios.

### SOURCES

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