# RESEARCH PRESENTATION

ON UNUSED TV SIGNALS

CABLE INTERNET

- Cable Internet is a category of broadband Internet access that uses the infrastructure of cable TV network to provide Internet services. Cable Internet provides connectivity from the Internet service provider (ISP) to the end users in a similar manner as digital subscriber line (DSL) and fiber-to-the-home (FTTH).

- It gives high speed internet .To access that we need to connect using modems.
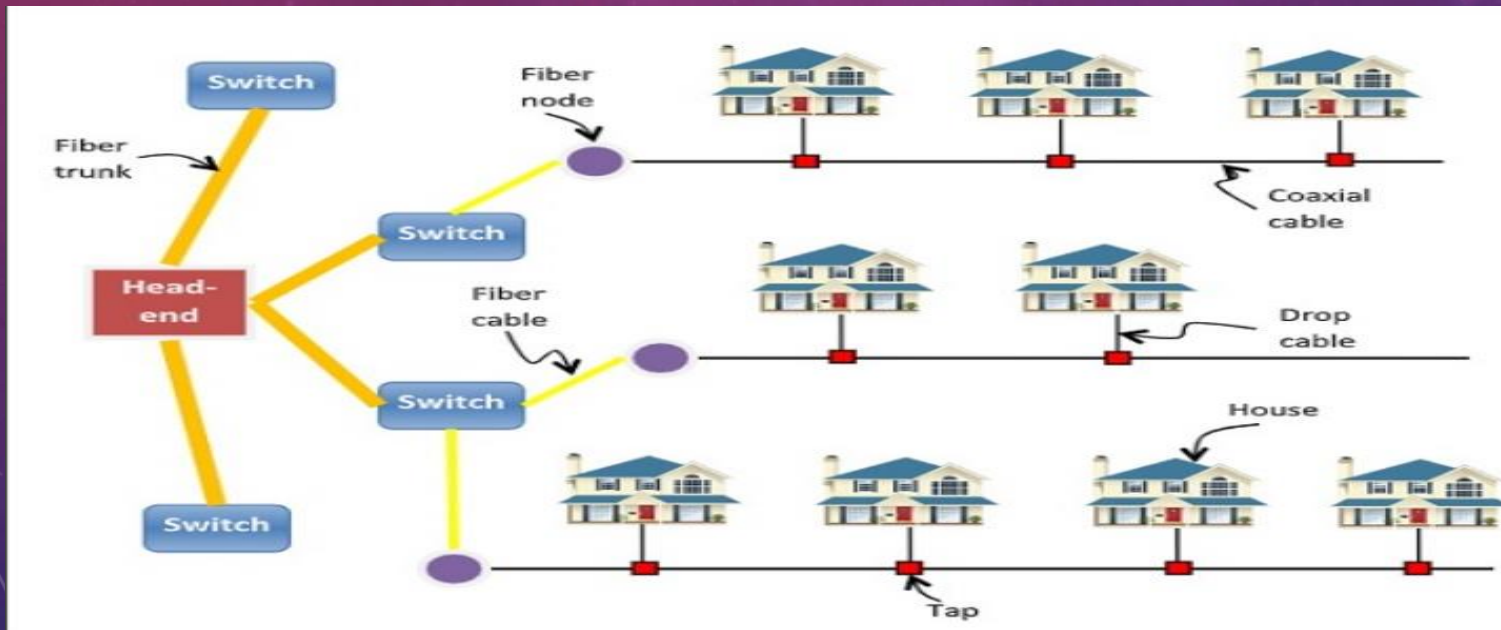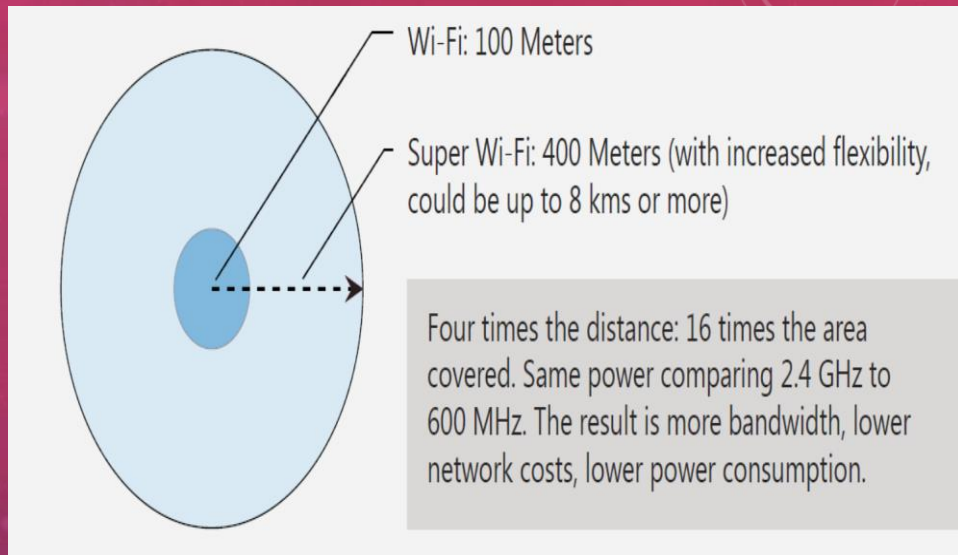
SPECTRUM TECHNOLOGY

- TV White Space refers to the unused TV channels between the active ones in the VHF and UHF spectrum. These are typically referred to as the "buffer" channels. In the past, these buffers were placed between active TV channels to protect broadcasting interference. It has since been researched and proven that this unused spectrum can be used to provide broadband Internet access while operating harmoniously with surrounding TV channels.

- TV white spaces devices and networks will work in much the same way as conventional Wi-Fi, but because the TV signals *travel over longer distances and better penetrate walls and other obstacles, they require fewer access points to cover the same area*.

- Because of the excellent range and obstacle penetration characteristics ,it referred as "Super Wi-Fi".
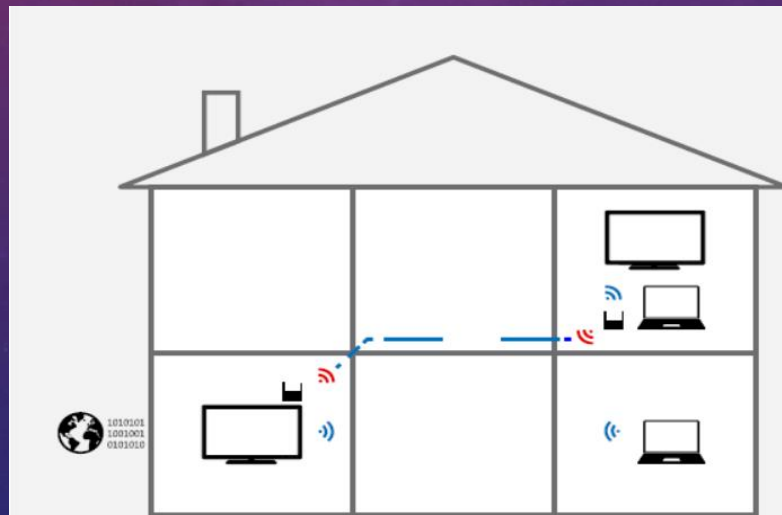

- In a typical home, a Wi-Fi signal can penetrate up to two walls. At the same time, a TV white spaces signal can penetrate through more walls and obstacles,enabling whole home media distribution.

- This will simplify and enrich in-home/in-building networking opportunities.

Wi-Fi: 100 Meters

Super Wi-Fi: 400 Meters (with increased flexibility, could be up to 8 kms or more)

Four times the distance: 16 times the area covered. Same power comparing 2.4 GHz to 600 MHz. The result is more bandwidth, lower network costs, lower power consumption.

Better throughput was achieved closer to the base station. With non-contiguous and contiguous channel bonding an expected feature of second generation TV white space devices – for example, taking advantage of the 802.11af/ac Wi-Fi standard – even better throughput can be expected.

Better Coverage than Wi-Fi
While a traditional Wi-Fi router has a relatively limited range, around 100 meters under perfect conditions, and can be blocked by walls or other environmental barriers, TV White Space technology can cover an expanse of about 10 kilometers in diameter (100 times the distance)!

Wi-Fi   TV White Space
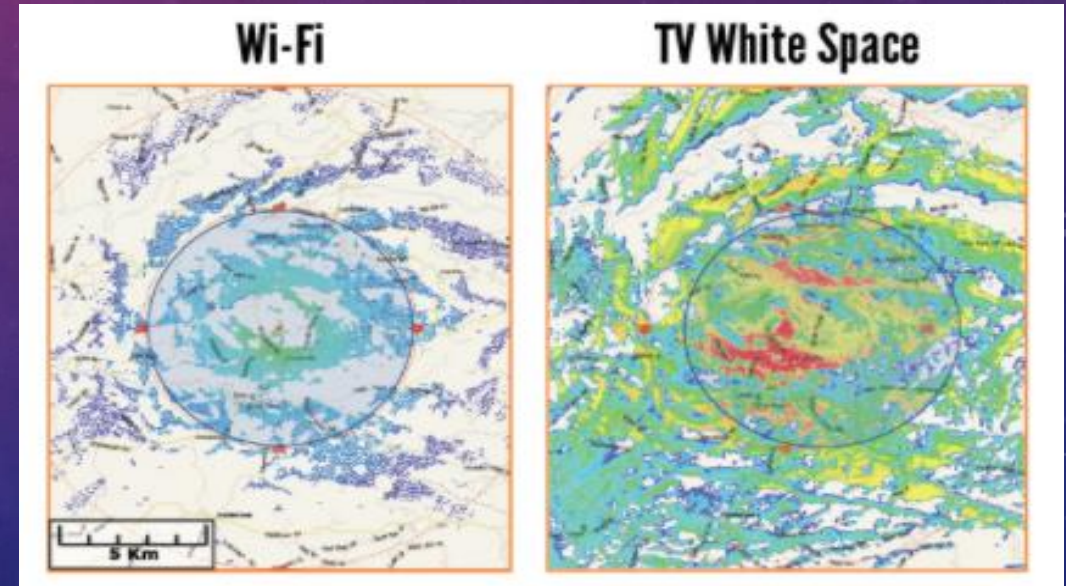
Non-Line-of-Sight (NLOS) Performance

- Microwave links require line-of-sight (LOS) between the points being connected. In areas with rugged or forested terrain, the tall towers necessary to provide this line-of-sight connection make microwave an expensive and unfeasible solution. TV White Space technology provides an effective alternative to microwave by utilizing the lower-frequency UHF signals that can penetrate obstacles and cover uneven ground without requiring additional infrastructure.

IS TV WHITE SPACE TECHNOLOGY VIABLE INTERNATIONALLY?

- While the United States and United Kingdom are the forerunners in developing this new technology, many other countries are following their lead, and TV White Space is on track for worldwide usage. For Canadian users, the UHF band includes spectrum available now for light licensed use. South Africa, Singapore, and New Zealand are not far behind in developing regulations and shaping the TV White Space landscape in their countries.

ADVANTAGES

Long distance
Propagation

Penetrates
environmental
barriers

Maximum
coverage

Strong signals
in rural areas

- It is already implemented in India by a Group students of IIIT Bengaluru and this was funded by Microsoft. They used 470-582MHz spectrum band for TV white space. As they found that the deployment of optical fibres is expensive and this also makes service providers suffer from average revenue per user, high license fees and infrastructure costs they thought that implementing this technology will be helpful.

- According to a study by IIT Bombay , India has only one terrestrial TV service provider- Doordarshan , and as a result nearly 12(80%) out of 15 channels of 8MHz in the "TV-UHF band –IV" are available as TVWS.

- Students of IIT Bombay has already implemented in a village called Khamoli , Maharastra .The testbed network provides broadband in 13 villages or hamlets, with each village typically in the range of 5 km of Khamloli. The project has been deployed over 25 sqkm, with 1 base station at Khamloli which connects to 10 client stations, which subsequently connect to WiFi hotspots to provide internet access. The project users the 470-590 MHz ultra high frequency band which can typically operate at the range of 1-5 km.

- The technology has many use cases like:
    1. Smart farming
    2. Rural Internet
    3. Port Connectivity
    4. Border Security
    5. Public Safety & security