ZigBee v/s WiFi

The new Current war but for Wireless IoT

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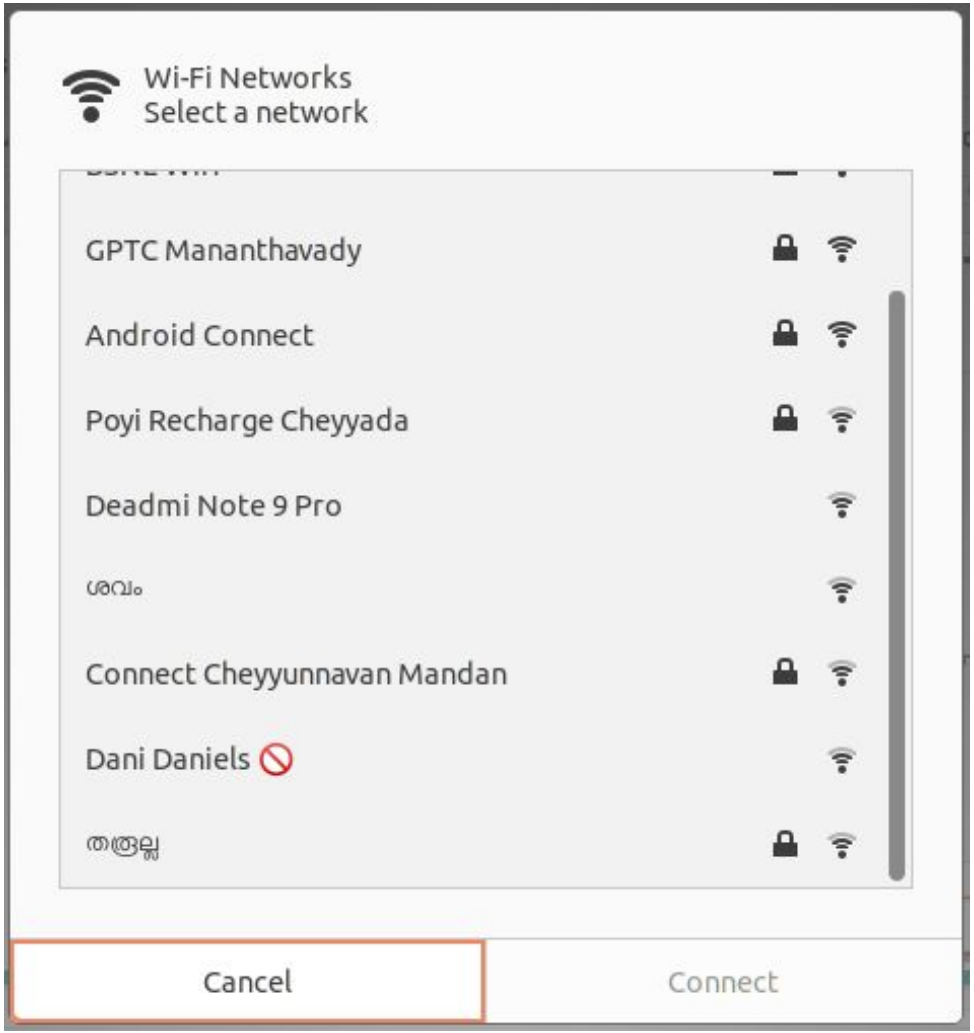
Contents

Contents

- Zigbee v/s WiFi.
  - Comparison.
- Other Alternatives.
  - Bluetooth Low Energy.
  - Z-wave.
- Latest News.

What is WiFi 😂

- You Know What it is.
- You Use it.
- Sometimes its Free.
- Sometimes You Steal it.



What is WiFi

- Wi-Fi is a family of wireless network protocols, based on the IEEE 802.11 family of standards.
- Commonly used for **local area networking** of devices and Internet access, allowing nearby digital devices to exchange data by radio waves.
- These are the most widely used computer networks in the world, used globally in home and small office networks.
- Used to link desktop and laptop computers, tablet computers, smartphones, smart TVs, printers, and smart speakers together and to a wireless router to connect them to the Internet.
- Used in wireless access points in public places like coffee shops, hotels, libraries and airports to provide the public Internet access for mobile devices.

WiFi

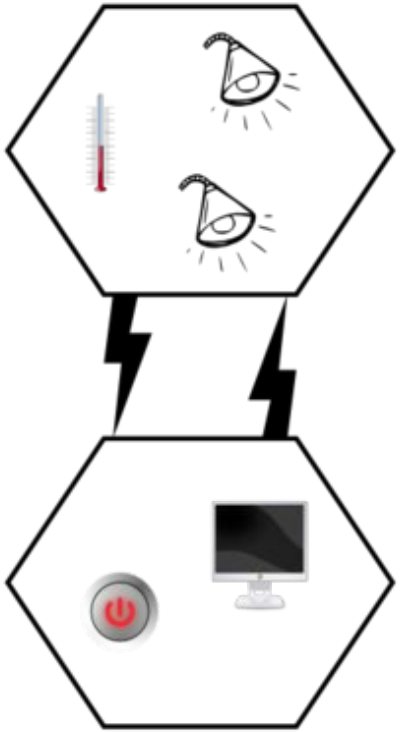
- It requires wireless adapter on all devices and wireless router for connectivity.
- Wi-Fi stands for Wireless Fidelity.
- It consumes high power.
- It provides better security.
- Wi-Fi supports large amount of users.
- The radio signal range of Wi-Fi is 100 meters.
- It requires high bandwidth.

What is ZigBee Technology?

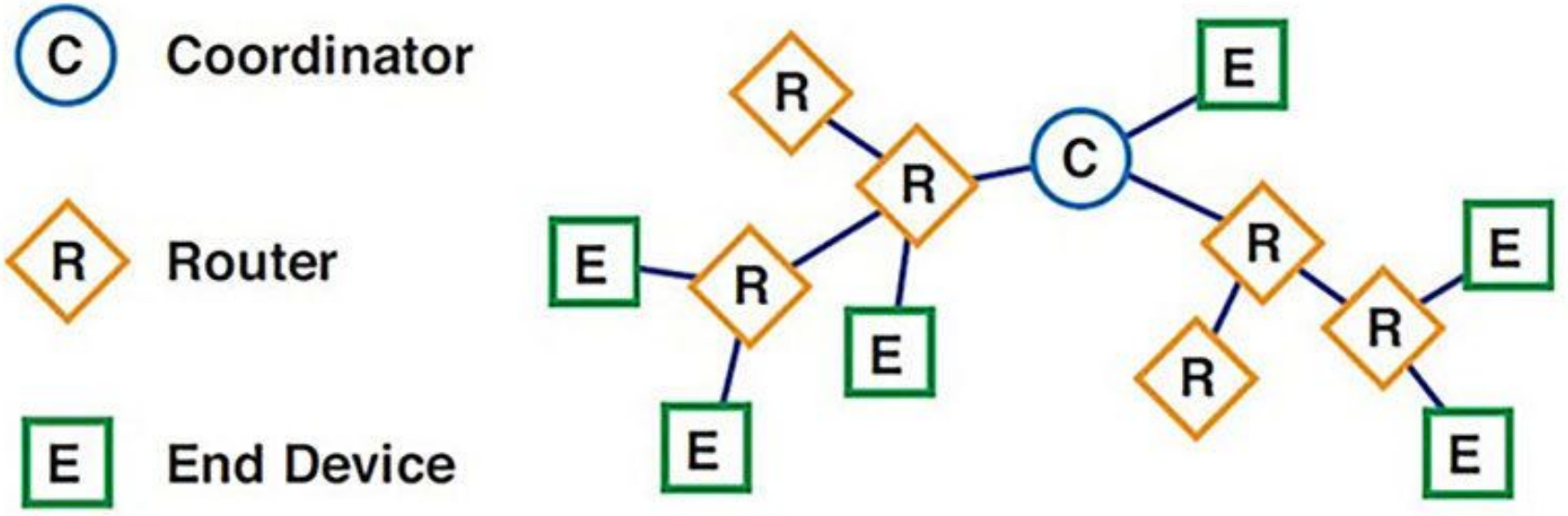
- Zigbee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless IoT networks.
- The Zigbee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz.

What is the basic principle of Zigbee ?

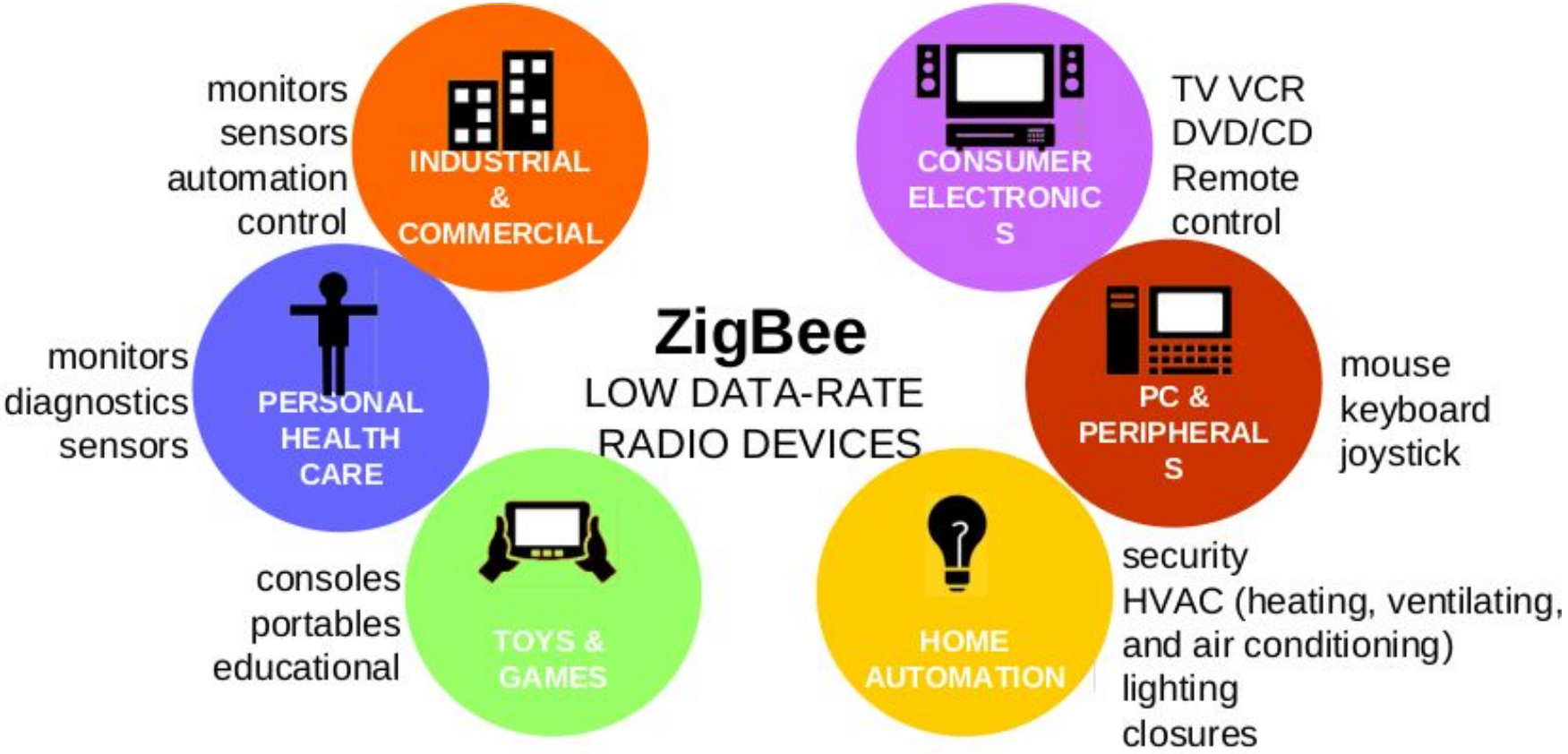
- Zigbee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones.
- Zigbee is typically used in low data rate applications that require long battery life and secure networking. (Zigbee networks are secured by 128 bit symmetric encryption keys.)



Types of ZigBee Devices



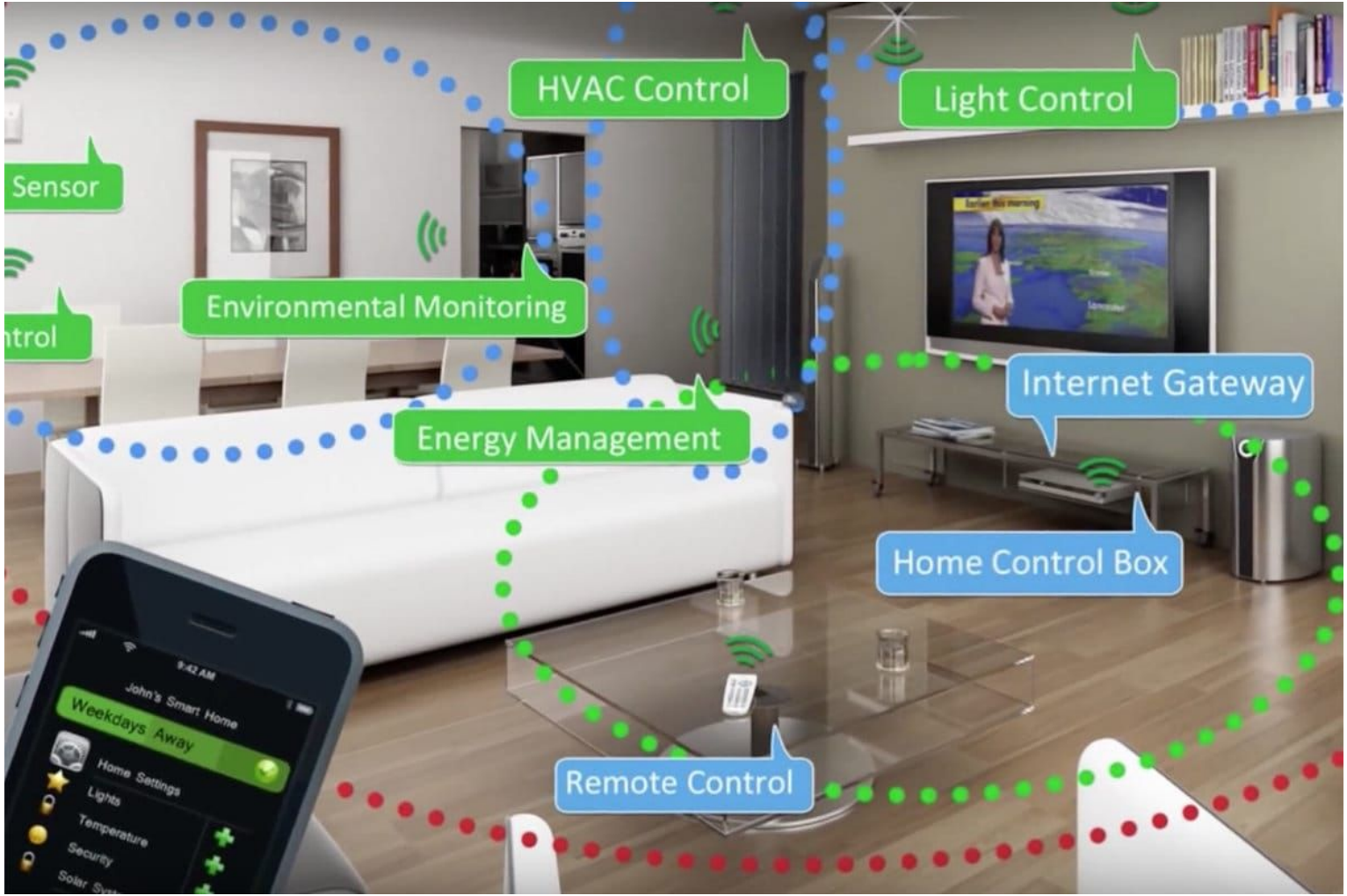
ZigBee Technology - Applications



ZigBee Technology - Applications

Typical application areas include

- Home automation
- Wireless sensor networks
- Industrial control systems
- Embedded sensing
- Medical data collection
- Smoke and intruder warning
- Building automation


HVAC Control
Light Control
Sensor
Environmental Monitoring
Internet Gateway
Energy Management
Home Control Box
Remote Control
9:42 AM
John's Smart Home
Weekdays Away
Home Settings
Lights
Temperature
Security

Example

- A typical example is when you have a Zigbee-enabled light bulb and a Zigbee-enabled light switch and you want the light switch to control the light bulb.
- With Zigbee, the two devices - even if they're from different manufacturers - speak a common language, so there's no barrier to communication

Advantages

- **Low Cost - Cost Effective.**
  - This pricing provides an economic justification for extending wireless networking to even the simplest of devices.
- **Range Obstruction Issue Avoidance.**
  - Zigbee routers double as input devices and repeaters to create a form of mesh networking.
  - If two network points are unable to communicate as intended, transmission is dynamically routed.
- **Multisource products.**
  - Zigbee alliance work in groups defines interoperability.
- **Low Power Consumption.**
  - battery life ranging from months to years.
  - also provide the sleep function.

Disadvantages

- It **requires knowledge of the system** for the owner to operate zigbee compliant devices.
- It is **not secure** like wifi based secured system.
- **Replacement cost** will be high when any problem occurs in zigbee compliant home appliances.
- Like other wireless systems, zigbee based communication is **prone to attack from unauthorized people**.
- The **coverage is limited** and hence can not be used as outdoor wireless communication system. It can be used in indoor wireless applications.

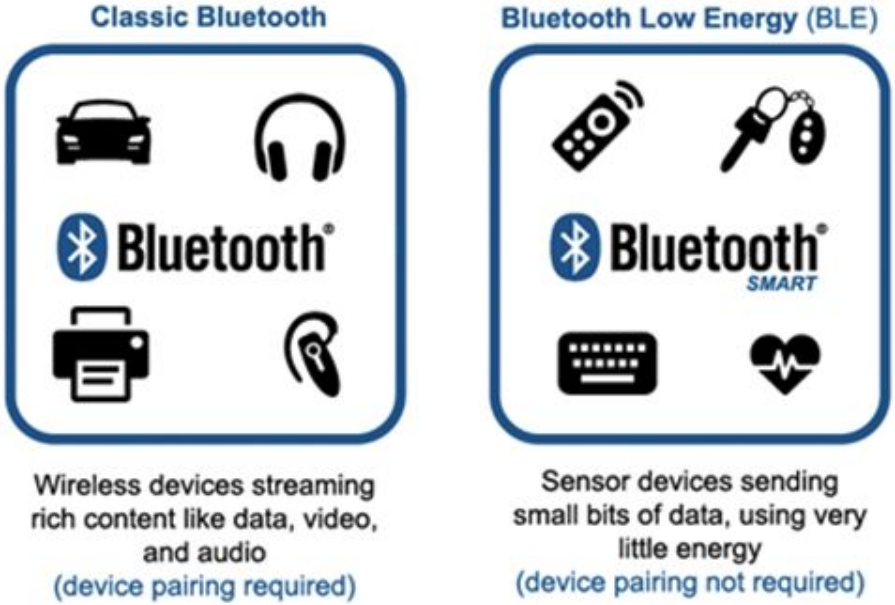
ZigBee v/s WiFi

The frequency range supported in Zigbee mostly 2.4 GHz worldwide.	Wifi transmits data at 2.4 GHz and 5 GHz radio frequencies.
It consumes less power.	It consumes high power.
It uses BPSK and QPSK modulation techniques like UWB.	It doesn't use BPSK and QPSK modulation techniques like UWB.

ZigBee v/s WiFi

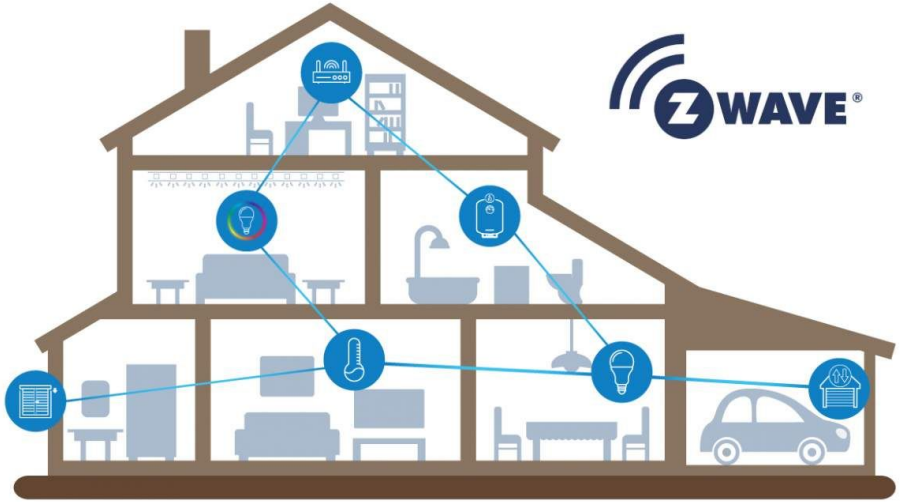
It supports less number of users.	It supports large amount of users.
The radio signal range of zigbee is ten to hundred meters.	The radio signal range of Wi-Fi is 100 meters.
Zigbee network is more reliable as compared to Wi-Fi network.	WiFi network is less reliable as compared to Zigbee network.
It requires low bandwidth but greater than Bluetooth's bandwidth most of time.	It requires high bandwidth.

Alternative - Bluetooth Low Energy



- low power requirements, operating for “months or years” on a button cell
- small size and low cost
- compatibility with a large installed base of mobile phones, tablets and computers

Alternative - Bluetooth Low Energy



- A Zigbee network, which doesn't have a maximum number of allowed hops, can support more than 65,000 devices.
- while a Z-Wave network, limited to four hops, supports a maximum of 232 devices.

5 REASONS WHY ZIGBEE OVER WIFI

More Reliable

Less Overcrowding

No Router

Expandable System

Energy Efficient

Latest ZigBee News

ZIGBEE ON MARS!

The smart home protocol arrives on the Red Planet

By Thomas Ricker | @Trixxy | May 20, 2021, 7:33am EDT

- the Ingenuity drone copter twirling about on Mars communicates with the Perseverance rover using 900MHz Zigbee radios. Not Wi-Fi, GSM, or something exotic like fission powered lasers or space algae, but the same consumer tech you use to turn on a Philips Hue lightbulb.

NEWS

ZigBee Home Automation Market to Witness Robust Expansion by 2029 | Atmel, – Texas Instruments, – GreenPeak Technologies

February 25, 2022 / researchworld703

Thanks