OVERVIEW OF RADIO TECHNOLOGY

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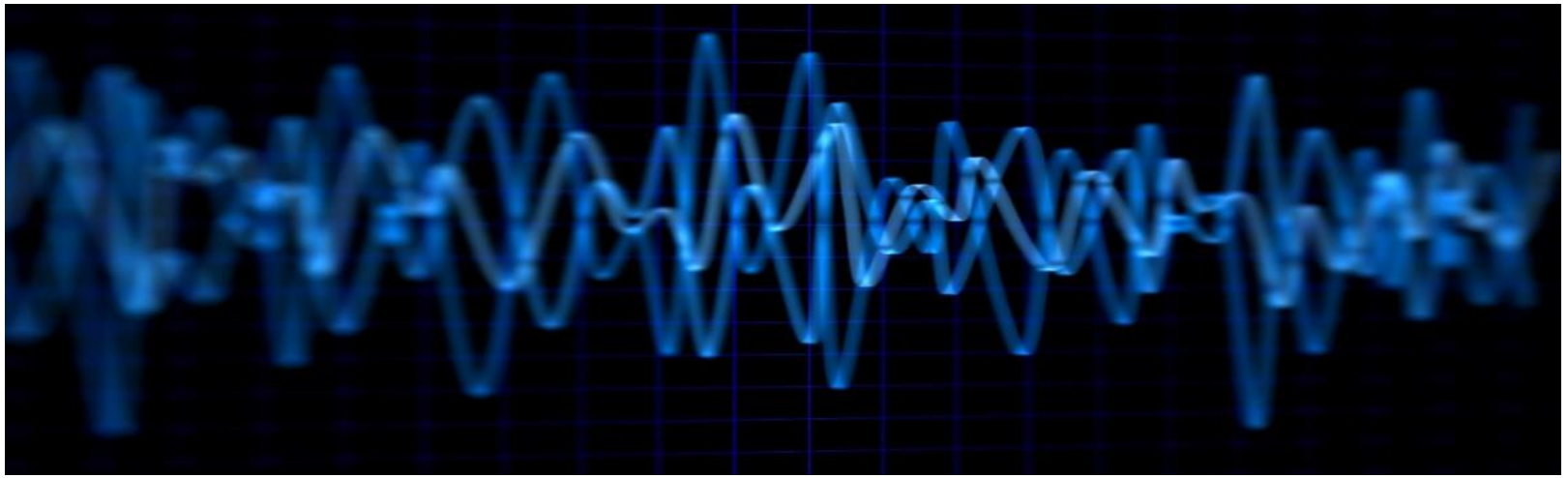
What is radio technology ?

Radio is the technology of signaling and communicating using radio waves. Radio waves are electromagnetic waves of frequency. They are generated by an electronic device called a transmitter connected to an antenna which radiates the waves, and received by another antenna connected to a radio receiver.



Types of frequency band

Licensed

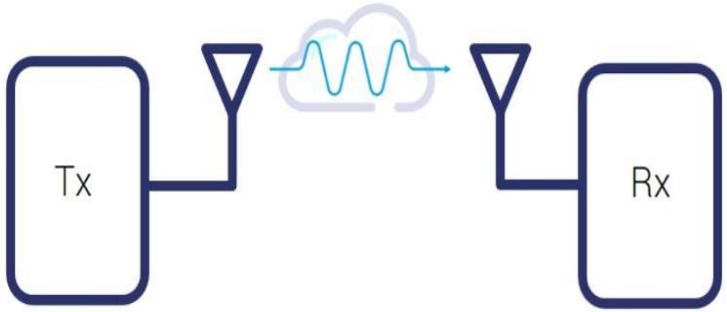
License is required to be purchased for spectrum use and it is not free
The medium can be accessed or used only by the owner of the license
Frequency: 2.3 GHz, 3.5 GHz, 900 MHz,1800 MHz

ISM

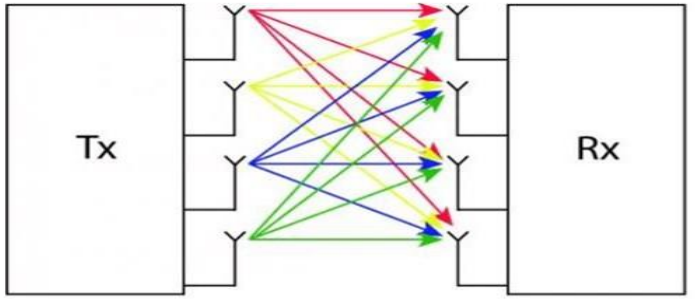
License is free
Anyone can use the unlicensed spectrum and its medium
Anyone can access the medium via listening if channel is empty
Frequency: 2.4 GHz and 5.8 GHz

Radio old and Existing technology of BRACNet

SISO refers to a wireless communications system in which one antenna is used at the source (transmitter) and one antenna is used at the destination(receiver).



MIMO is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time.



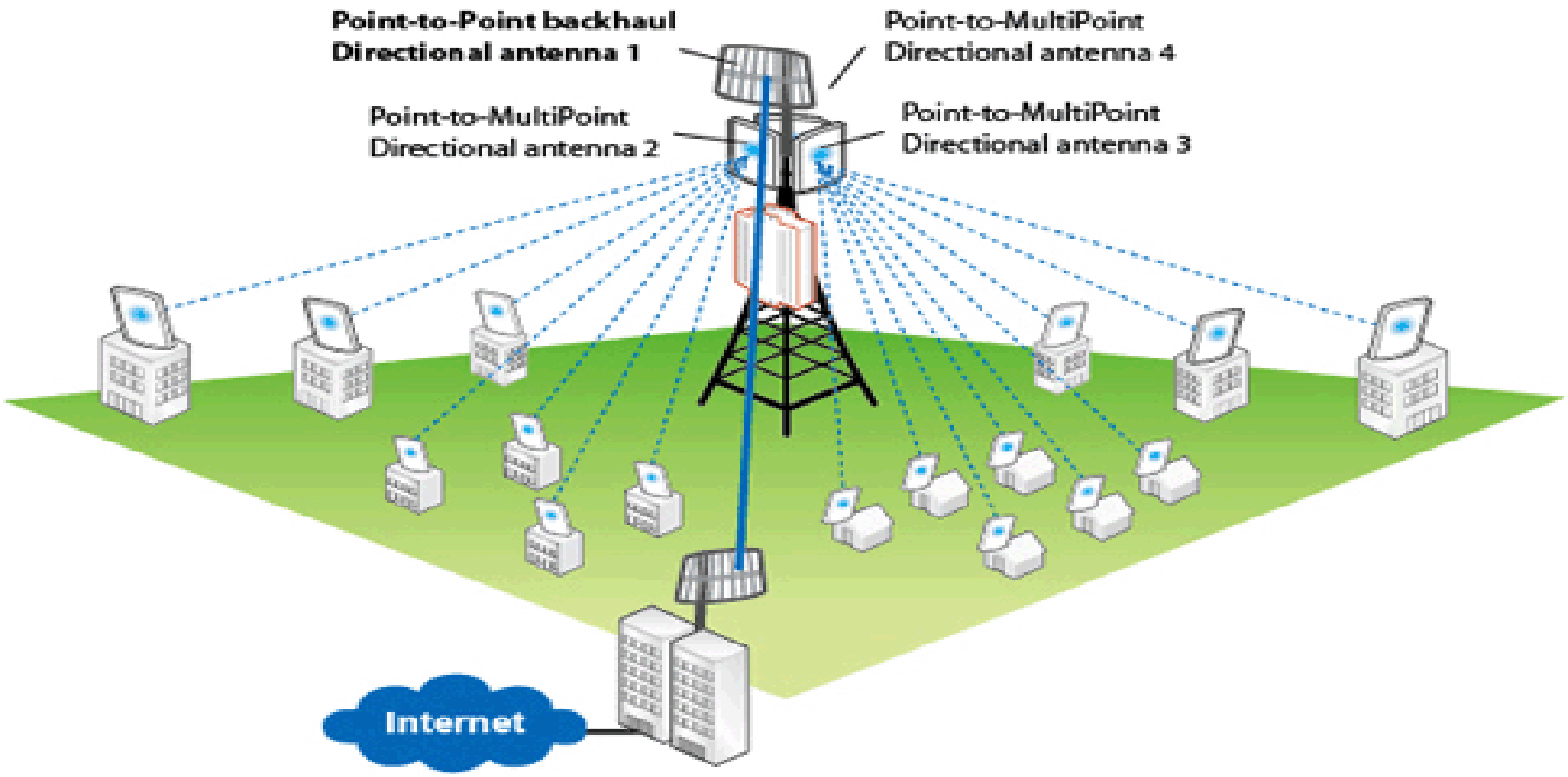
Existing Radio Brands/Model of BRACNet

Two radio brands currently BRACNet is using (Ubiquti & Cambium)

Cambium	Ubiquiti
ePMP 180	Power Beam M5 400
ePMP 190	Lite Beam M5
ePMP 200/ePMP 200L	Nano Station M5
ePMP 300-25/ePMP 300-25L	Rocket M5
ePMP 300-16	
ePMP 1000	
ePMP 2000	

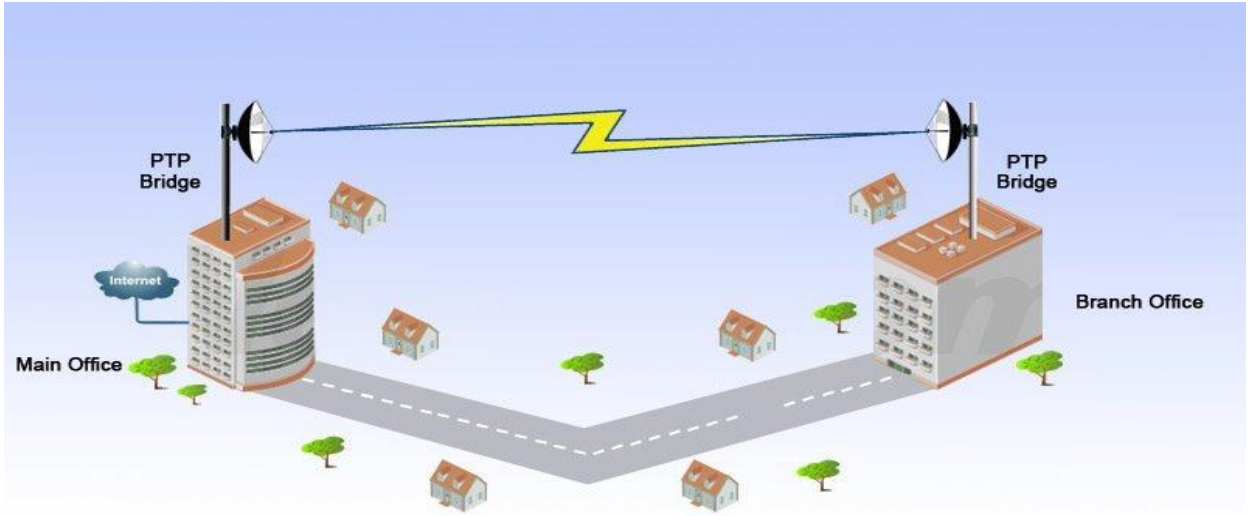
Type of **Radio** links

- **P2P (——)**
- **P2M (----------)**



P2P Radio Links

Point to Point wireless is a data connection between two points .The connection is delivered wirelessly through radio waves. For fixed links, this can involve use of high gain directional antennas which enables long distance and high capacity links.

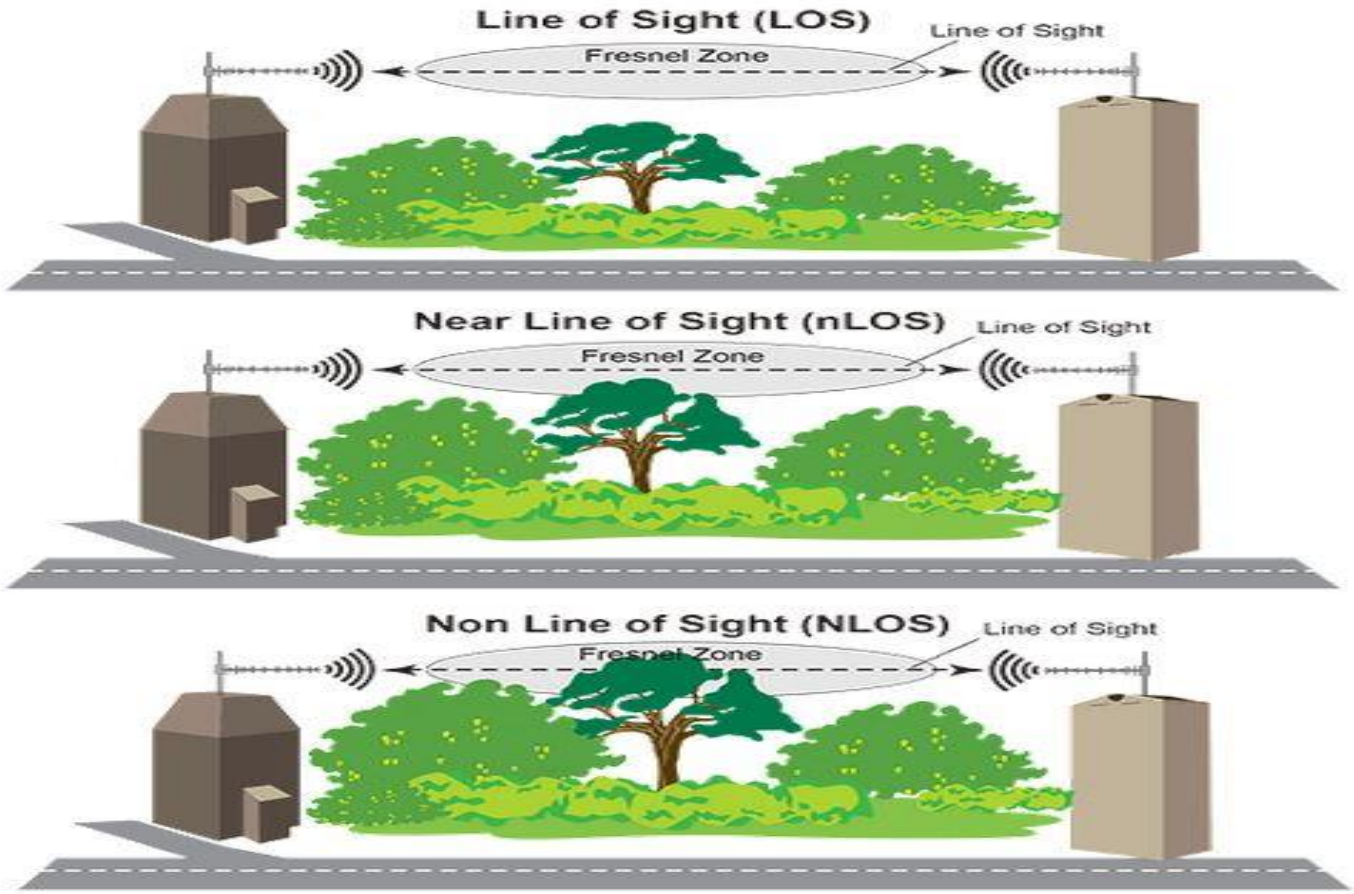


P2M Radio Links

For P2MP, a central antenna or antenna array broadcasts to several receiving antennas and the system uses either Frequency Division Multiplexing or time-division multiplexing to allow for bidirectional traffic flow.

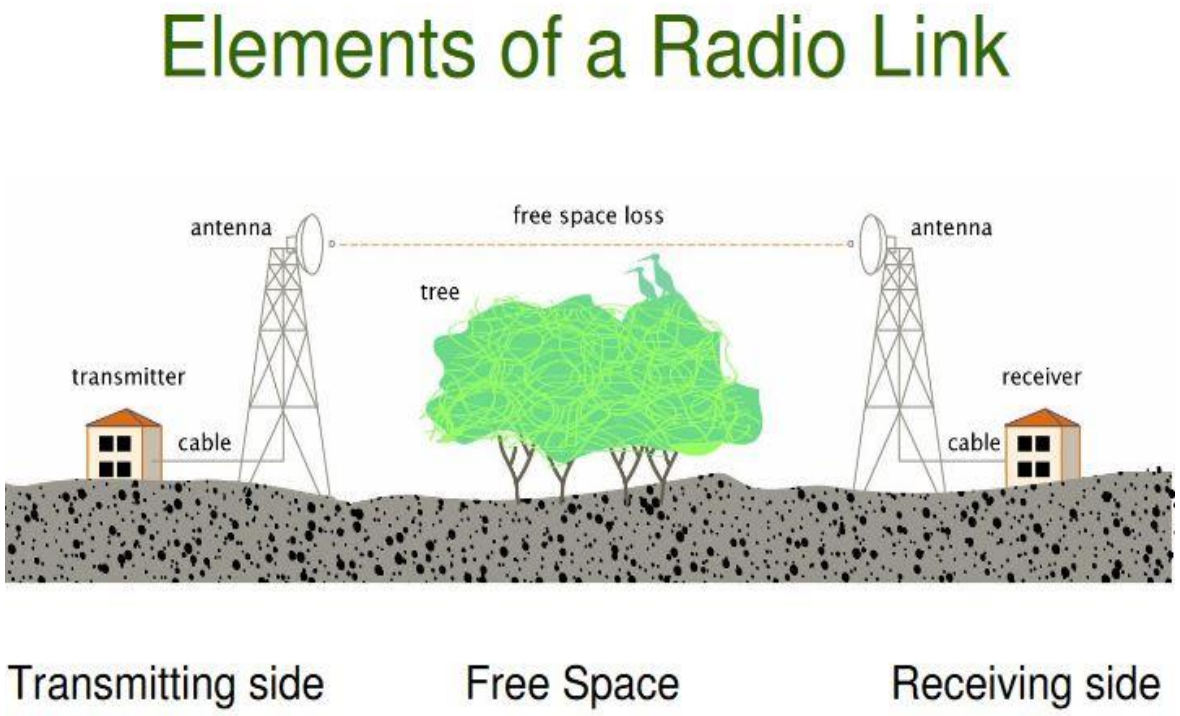
Line of sight (LoS)

Line of sight (LoS) is a type of propagation that can transmit and receive data only where transmit and receive stations are in view of each other without any sort of an obstacle between them.

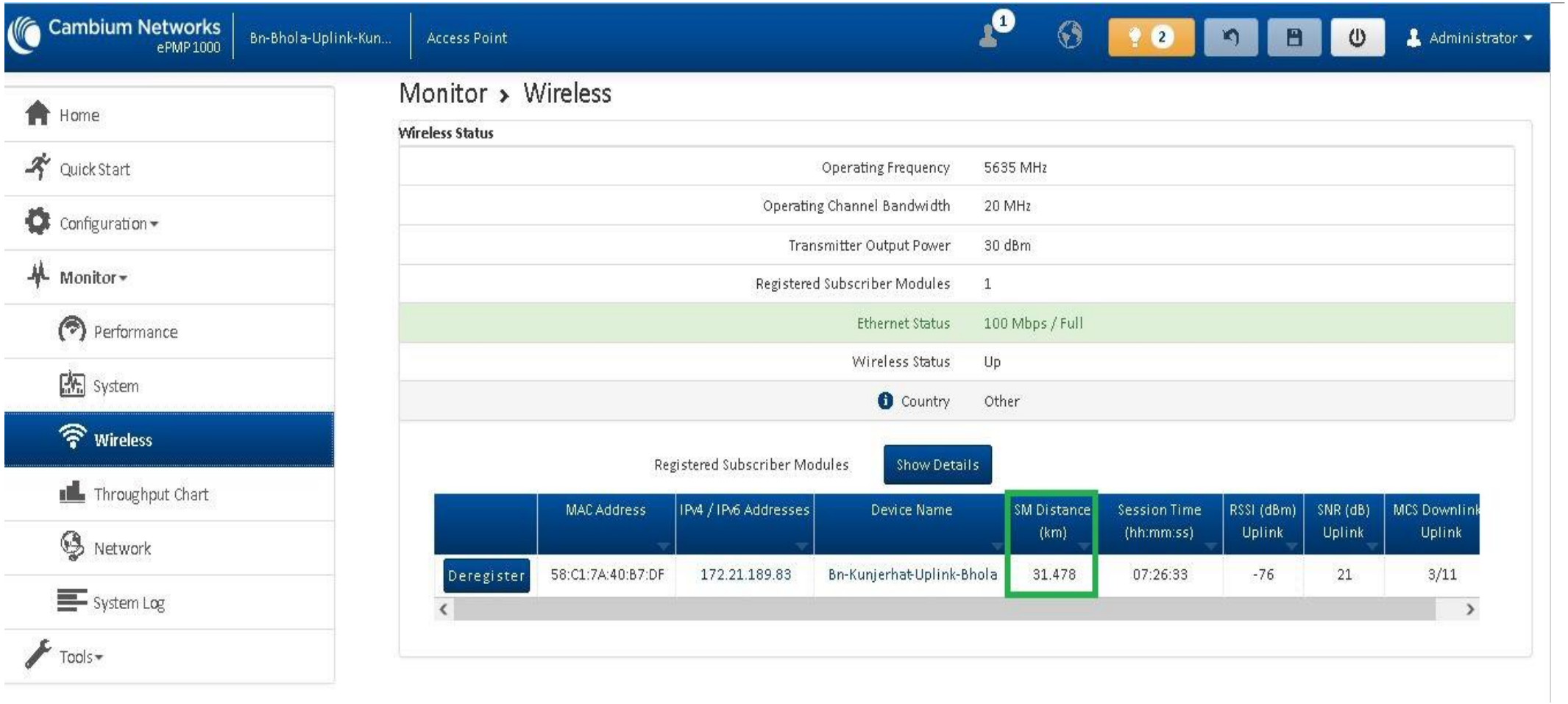


Link Budget

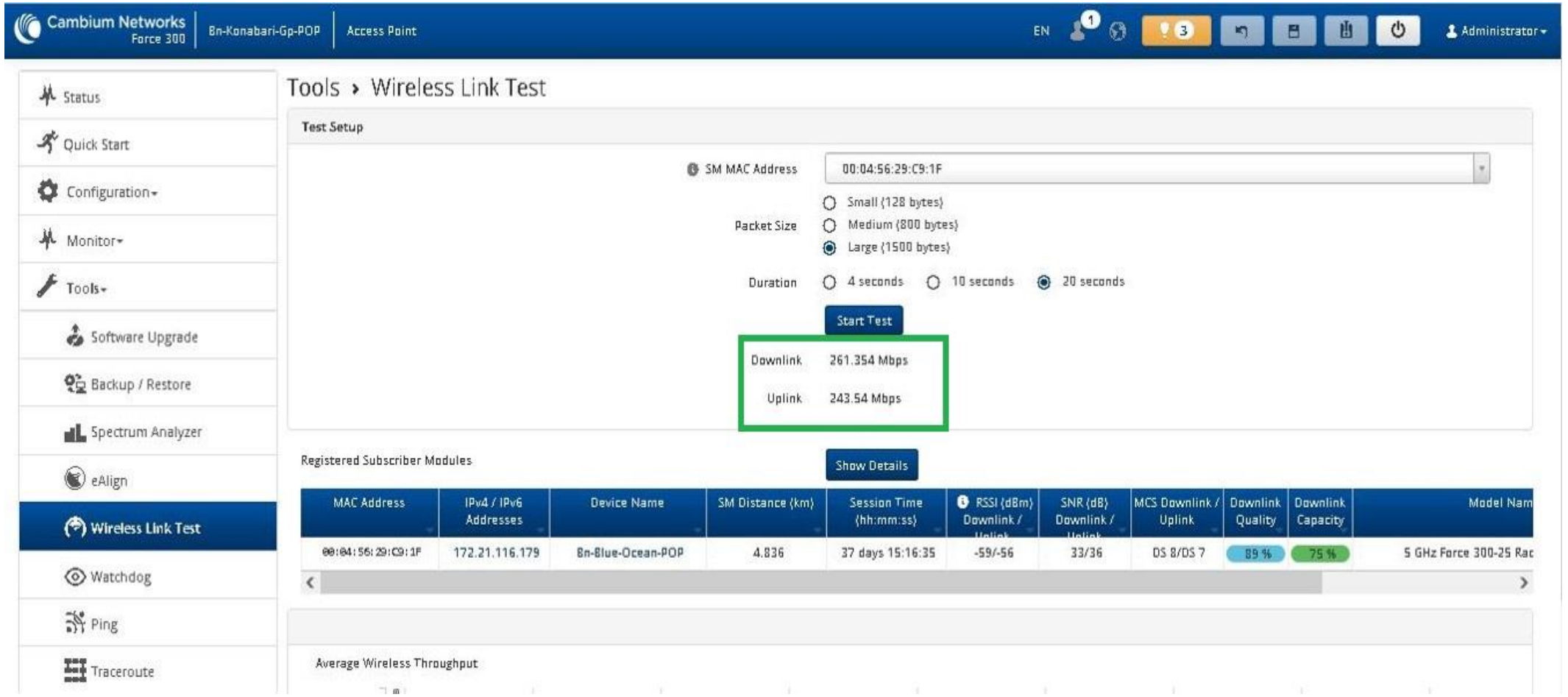
- The accounting of all of the gains and losses from transmitter to receiver.
- Estimation of losses/gains in radio link
- Suitable design Adequate choice of equipment
- Transmitting side
  - Transmitting power, cable loss, antenna gain
- Propagating side.
  - Fresnel zone
- Receiving side.
  - Antenna gain, cable loss, receiver sensibility



Example Max. Range of BRACNet Radio Links



Example of Max. Throughput of BRACNet Radio Links



Any Question ?


ThankYou!