

Chapter - XII

ETHERNET RADIO

- 12.1 Point-to-point wireless digital links should be used between two locations when it is difficult to use OFC/CAT cable between the locations or the sites are to be connected in an expeditious manner or other administrative reasons like backup purpose, solving the miscreant activities etc. To maximize the performance of the wireless link, line of sight is required between the two locations and hence the antennas may have to be provided at a certain height. At 2.4 GHz, line of sight (LOS) operations provide a much more reliable wireless link. Point to point wireless link at frequencies around 900 MHz or in the UHF band (400 MHz) can work reliably in near line of sight (NLOS) or in non-line of sight conditions (NLOS point to point wireless links).
- 12.2 Point to Point Ethernet radio equipment normally operates in 2.4 or 5.8 GHz License Free Frequency Band. They must comply with standards and regulations issued by WPC (Wireless Planning & Coordination Wing of Ministry of Communication & Information Technology). The transmitted power of the system should not exceed the maximum permitted power level specified by WPC at the frequency on which the system works. These radios typically deliver a throughput from 25 Mbps to 750 Mbps. They can work as short range as well as long range links which can go up to 50 Kms or even more in some cases.
- 12.3 The payload can be voice, data or video signals and can carry any type of signaling as per the requirements. The output signal can be framed or unframed, synchronous or asynchronous.
- 12.4 Each side of the link comprises an Indoor Unit (IDU), an Outdoor Unit (ODU), an External Antenna, a CAT-5e UV Protected Outdoor Cable from Indoor Unit to Outdoor Unit (which provides both Data and Power). In some models, the outdoor unit and antenna are integrated. Besides, an Application Software for configuring and managing the link is also a key component.
- 12.5 The Ethernet Radios can meet a variety of communication needs of Indian Railways including Building-to-building and campus connectivity, High-speed Internet access, T1/E1 leased-line replacement, traffic backhaul, Video surveillance connectivity, Voice-over-IP and multimedia communications as required.
- 12.6 The Ethernet Radio (Wireless Tx and Rx Unit) can be Point to Point (PtP) or Point to Multi Point (PtMP) type.

- 12.7 When Ethernet links are provided, some of the security measures that may be taken are as under:
- 12.7.1 If possible, Link Lock a pair of Outdoor Units of Point to Point Wireless Link to each other so that these Outdoor Units will get synchronized / connected to each other only. This shall prevent the situation where an Outdoor Unit is stolen and used as a pirate link to steal services or information.
- 12.7.2 It is preferred that the link lock is based on MAC Authentication and is activated on site.
- 12.7.3 It is preferable to use two way locking. For example, if you lock the Outdoor Unit A to the Outdoor Unit B, you must still lock the Outdoor Unit B to the Outdoor Unit A unit to ensure complete two way locking.
- 12.7.4 Point to Point Wireless Link may be encrypted using suitable encryption to ensure Data Security and shall comply with IEEE 802.11i / FIPS-197 security recommendations.

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