Case Study: Exploring Field Test Mode on Redmi Note 11 Pro+ 5G

Objective

The objective of this case study is to explore and analyze key networking information collected using Field Test Mode on a **Redmi Note 11 Pro+ 5G**. This data includes network performance metrics such as signal strength, network type, bandwidth, and mobile location information, which can help assess the device's connectivity and service quality.

1. Device Type Covered

Device: Redmi Note 11 Pro+ 5G (Android)

2. Key Information Collected

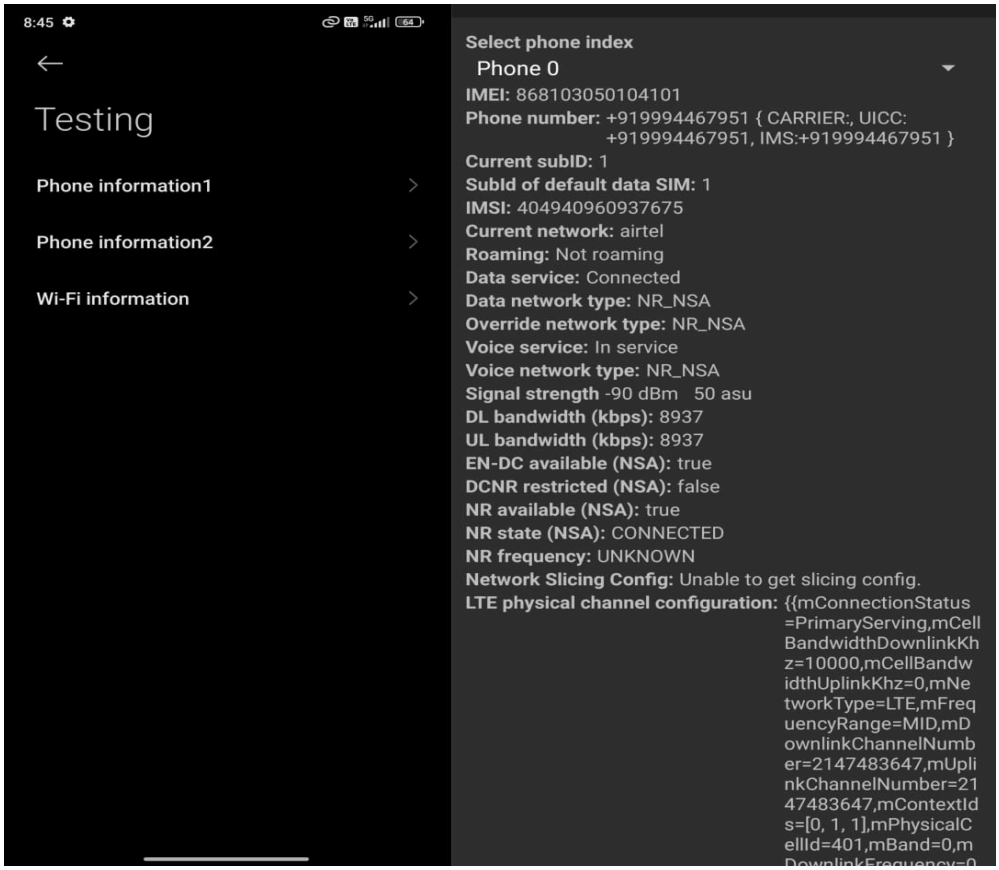
- **IMEI Number**:
  The IMEI uniquely identifies the device on the cellular network, ensuring proper device registration and functionality within the Airtel network.
- **MAC Address**:
  The default MAC address indicates that the Wi-Fi function is currently disabled, and no connection has been established.
- **IP Address**:
  No active IP assignment is present since the Wi-Fi is disabled and the device is relying on mobile data for connectivity.
- **Network Operator/Brand**: Airtel
  The device is connected to Airtel’s cellular network, providing voice, SMS, and data services.
- **Network Type**: NR_NSA (New Radio Non-Standalone)
  The device is connected to a 5G network using the NR_NSA architecture, which combines 5G speeds with the LTE infrastructure for enhanced performance.

- **Signal Strength**: -90 dBm (50 asu)
  This indicates a moderate signal strength, which could result in occasional reception issues, slower internet speeds, or dropped connections in areas with interference.
- **Download/Upload Bandwidth**: 8937 kbps (approximately 8.94 Mbps)
  The bandwidth reflects moderate performance, which is suitable for basic internet activities but might not be sufficient for data-heavy tasks like HD streaming or online gaming.
- **Mobile Location Information**:
  - **LAC (Location Area Code)**: 55357
  - **CID (Cell ID)**: 195437067
- These values identify the specific cell tower to which the device is connected, providing insight into its physical location within the Airtel network.

3. Steps to Access Field Test Mode

To gather the data, the following steps were taken:

1. **Open the phone dialer** on the Redmi Note 11 Pro+ 5G.
2. **Enter `*#*#4636#*#*`** to access the Testing Menu.
3. **Select "Phone Information"** to view details like IMEI, signal strength, network type, and more.



4. Analysis of Collected Data

From the data gathered through Field Test Mode on the Redmi Note 11 Pro+ 5G, several key insights emerged:

- **Signal Strength**: The device's signal strength at -90 dBm is classified as moderate. While the signal is generally usable, areas with interference or congestion could experience reception issues or slower data speeds.
- **Network Type**: The connection to a 5G network using the NR_NSA architecture allows for faster speeds and lower latency compared to older 4G networks. However, the observed download and upload speeds (approximately 8.94 Mbps) indicate that real-world performance may be constrained by signal strength or network congestion.
- **IMEI and MAC Addresses**:
  The IMEI is crucial for tracking and managing the device on the Airtel

network. The MAC address pertains to Wi-Fi usage, but since Wi-Fi is disabled, no connection has been established.

- **Bandwidth**:
  While the device supports 5G, the available bandwidth suggests that performance is being impacted by factors such as signal quality or network load.
- **Mobile Location Information**:
  The LAC (55357) and CID (195437067) provide information on the specific cell tower to which the device is connected. This data can help pinpoint the device's location within the network and identify possible coverage gaps or network congestion points.

5. Importance of Networking Information

The networking information obtained from Field Test Mode is essential for various reasons:

- **Signal Strength**:
  Understanding the dBm value (-90 dBm) helps users determine whether they are in an area with good network coverage. A moderate signal could lead to slower speeds, especially in high-traffic areas or buildings with poor reception.
- **Network Type**:
  Identifying the type of network the device is connected to (5G NR_NSA) provides insight into the potential speed and latency improvements over older 4G LTE networks. However, this potential may be limited by bandwidth availability.
- **Device Identifiers**:
  The IMEI and MAC addresses are vital for network providers to manage, authenticate, and troubleshoot devices on their network. These identifiers also play a role in device security and tracking.
- **Location Information**:
  The LAC and CID data help identify which cell tower the device is

connected to. This information can assist in diagnosing network performance issues, as well as understanding the coverage and connectivity in specific locations.

6. Conclusion

This case study demonstrates the usefulness of Field Test Mode for assessing network performance on the **Redmi Note 11 Pro+ 5G**. The data gathered provides a detailed look at the device's connection, including signal strength, network type, and bandwidth, which can help users understand their connectivity experience. In this case, while the device is connected to a 5G network, the moderate signal strength of -90 dBm and relatively low bandwidth suggest potential areas for improvement in coverage or network performance.

Github repository link : https://github.com/Harshini-s-u/case-study