Introduction

Lekha offers a reference design for Category NB LTE eNodeB, now extended to support Non-Terrestrial Networks (NTN). This deployable solution allows customers to integrate their Radio Front-End and Antenna for terrestrial or satellite-based IoT deployment. The design complies with major mandatory features from 3GPP Release 14 (NB-IoT) and the evolved features for IoT-NTN in Releases 17–19.

NBIOT Specifications

- Release 13/14 InBand and Standalone
- CAT-NB1 / CAT-NB2
- FDD Support
- 200 kHz Bandwidth
- Standalone mode of operation
- 15 kHz Subcarrier Spacing
- Multi-tone UL
- DL Repetition: 2048 — UL Repetition: 128
- Paging with Repetition
- PHY abstraction layer interface: FAPI
- Encryption: AES-128
- RTOS support SMP (Symmetric Multi-Processing)

Diagnostics and Debugging:

- Remote logging with hierarchical module-level control
- Logging optimized for real-time operation in high-latency NTN links
- Interactive CLI for parameter changes and performance statistics

NTN-IoT Extensions (Rel-17 to Rel-19)

- Satellite Connectivity: Support for GEO and LEO orbits
- Timing Adjustments: Extended Timing Advance to handle long satellite RTTs
- Doppler Compensation: Uplink and downlink frequency correction for high LEO mobility
- Random Access Adaptations: Extended PRACH formats for large propagation delay
- System Information Enhancements: SIB-31/32 and related NTN parameters
- Delay-Tolerant Traffic: Optimized scheduling for IoT devices with relaxed latency
- Broadcast/Multicast Support: Optional NTN group messaging for IoT devices
- Seamless Integration: Coexistence with terrestrial NB-IoT deployments

Configuration and Monitoring:

- Interactive configuration tool for standard and NTN-specific parameters
- GUI to manage terrestrial and satellite-connected eNodeBs
- SNMPv3 support for NMS integration
- KPI monitoring including NTN link statistics (RTT, Doppler offsets)

Lekha Wireless is a technology solutions company focused on wireless communication, with a portfolio spanning 5G, LTE, WiMAX, and tactical communication waveforms. Our platforms support 5G and gigabit throughputs and are used by OEMs and operators worldwide for terrestrial and satellite communication networks.

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