An NB-IoT technology supporting wide range of frequency bands with advanced radio frequency transceiver and Release 14 compatible baseband

**Keywords:**
- NB-IoT, wide range, radio frequency, advanced dynamic circuit, error rate, energy-efficient, chip-area, R14 baseband
- Power consumption, sensitivity, baseband algorithms, HKAI award

**Problems addressed**
NB-IoT device is needed to cover a wide range of frequency bands with a reduced chip area, lower power consumption and enhanced performance.

ASTRI’s device covers all the NB-IoT frequency ranges widely used in the world. It adopts an advanced polar transmitter architecture with on-chip power amplifier and advanced baseband algorithms for low power consumption and small chip area. It supports multiple frequency bands from various operators with single chip and enhanced sensitivity.

**Innovations**
The NB-IoT device supporting a wide range of frequency bands using highly integrated radio frequency transceiver and a R14 compatible baseband. The innovation also includes the followings:
- **Wide frequency range** cover all NB-IoT bands defined in 3GPP Release 14 specification
- **High-performance polar transmitter** offers small chip area
- **Advanced baseband algorithms** are fully compatible with 3GPP Release 14 specification
- **Enhanced sensitivity** with 1.5dB better than standard requirement

**Key impact**
- Cover wide frequency ranges
- High sensitivity with advanced baseband algorithm
- Small chip area and low cost
- Awarded the Hong Kong Awards for Industries in 2018
- Adopted by multiple chip vendors and world-leading IP vendor

**Innovation snapshot**

**Project completed**
- November 2020

**Applications**
- Chip

**Patent(s)**
- US Patent No. 10,677,664 and CN Patent No. ZL201980000874.8

**Commercialisation opportunities**
- IP licensing
- Technology co-development

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