IEEE 802.11ah RF/Baseband/CPU 40nm LP-CMOS SoC

The NRC7191 is a powerful SoC solution for IEEE 802.11ah. It has fully integrated radio transceiver and baseband processor, which can also be used as an application processor. The IP contains sub-1GHz modem that is the industry’s first solution to support the IEEE 802.11ah standard’s mandatory features and dual embedded ARM Cortex-M0 and Cortex-M3 processors. With these processors, the modem firmware, software, and the customer application software can run simultaneously. It includes significantly large memory for various operations. Low-leakage retention RAM and registers are used to store modem states while in deep sleep modes. Additionally, it supports several communication interfaces such as I2C, UART, SPI, and GPIOs.

Not only does the NRC7191 baseband support all mandatory IEEE 802/11ah features, but also several optional features such as Target Wake Time (TWT), and Restricted Access Window (RAW). It provides up to about 2Mbit/s data rate, and supports key security features like AES-CCMP and IEEE 802.11w.

The RF transceiver is a complete radio front-end optimized for sub-1GHz band IEEE 802.11ah SoC implementation that is based on the industry’s proven direct conversion transceiver architecture. The transceiver has fully integrated power amplifiers as well as the capability to support various commercial external FEM support. RF IO ports are single-ended and a fractional-N synthesizer while the power amplifiers and LDOs are fully integrated for minimum BOM and PIN counts. A special LPO for the high Sleep Clock Accuracy(SCA) is also integrated for the low power applications.

For smart electric meters and IoT wireless networks, the NRC7191 is a complete SoC solution that is compliant to the IEEE 802.11ah standard.
**KEY IP FEATURES**

- Complies with IEEE 802.11ah draft 5.0
- Prepared for upcoming WFA ERah certification
- Modem:
  - Supports 1/2MHz bandwidth
  - MCS 0, 1, 2, and 10
  - Power Saving: Target Wake Time (TWT)
  - Security: AES-CCMP
- CPU:
  - Dual Processor ARM Cortex-M0/M3
- Memory:
  - 704KB System SRAM
  - External Flash interfaces
- System peripherals:
  - 4 ch. 32-bits timers
  - 3 ch. 32-bits Watchdog timers
- Communication peripherals:
  - GPIO: 4 ch., 8 bits
  - Serial Interface: 2 SPI, 3 UART
  - I2C: 1ch.

**KEY SPECIFICATIONS**

- 1/2MHz Bandwidth
- Data rate: 150 to 1950 kbps
- Modulation: BPSK, QPSK
- Frequency band: 750 to 950MHz
- Single-ended RF ports
- Linear TX output power: 0dBm
- TX gain range: 30dB
- RX noise figure: < 3dB
- Max. input level: -10dBm
- 8bits ADC and DAC
- LPO accuracy: 500ppm
- Security: AES-CCMP, IEEE 802.11w
- Support station scheduling:
  - TWT
  - Restricted Access Window (RAW)

**IP DELIVERABLES**

- Datasheets
- Hard macro containing IEEE 802.11ah radio, baseband and others
- Test vectors and simulation model
- Integration support

**Other IPs**

Our library of silicon verified IPs include:

- Sub 1GHz 40nm LP-CMOS RF Transceiver
- 2.4/5GHz Dual Band 40nm LP-CMOS RF Transceiver
- 2.4GHz 40nm LP-COMS RF Transceiver
- 2.4GHz 40nm LP-COMS RF Transceiver for Bluetooth
- IEEE 802.11a/b/g/n/ac Baseband/MAC IP
- 433Mbps IEEE 802.11ac RF/Baseband/MAC 40nm CMOS SoC
- IEEE 802.11b/g/n Baseband/MAC IP
- IEEE 802.11n RF/Baseband/MAC 40nm CMOS SoC
- IEEE 802.11ah AP Baseband/MAC IP
- IEEE 802.11ac/BT 4.2 Combo 40nm LP-CMOS SoC
- Bluetooth Smart Ready 4.2 Baseband IP

**NEWRACOM/US Headquarter**

- 9008 Research Drive
- Irvine, CA, USA 92618

**NEWRATEK/Korea**

- F433 KAIST Moonji Campus,
  193 Moonji-ro, Yuseong-gu,
  Daejeon, South Korea 34051

For further information:

http://www.newracom.com

(Email) sales@newracom.com

(Tel) 949-390-7111 (USA)/042-716-7373 (KOR)