

## PRODUCT SUMMARY

# SKY68001-21: LTE Universal Multi-Band Front-End Module for IoT

## Applications

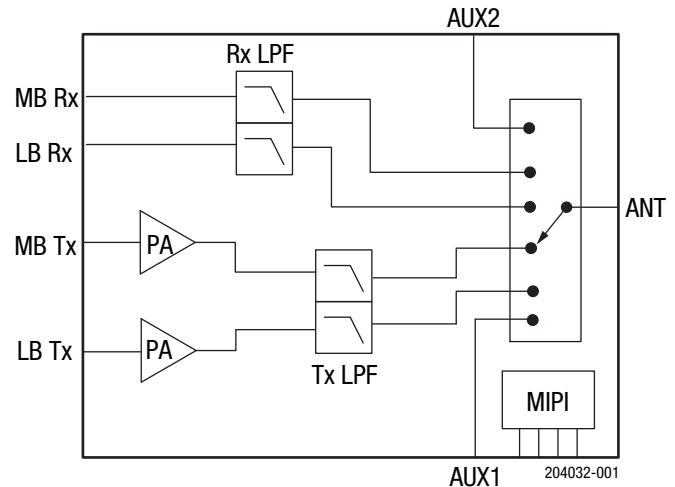
- Cellular IoT modem devices targeting low-power wide area network (LPWAN):
  - 4G LTE technology capability
  - Dedicated LTE half-duplex operation (HD-FDD) for Cat0/CatM1/CATNB1
  - Designed to meet 3GPP Rel-12 and Rel-13 specifications (with compatible cellular transceiver)
- LTE universal modem products (low-band and mid-band):
  - Low-band B5/B8/B12/B13/B17/B18/B19/B20/B28
  - Mid-band B1/B2/B3/B4/B25/B66 (AWS)
- PAE optimized for Class 3 LTE output power (+23 dBm)

## Features

- Cost-optimized front end for low-data-rate applications
- Low-loss post-PA transmit front end for enhanced transmitter efficiency (compared to LTE-FDD radio front ends)
- Broadband PA supporting APT mode of operation or Vcc fixed supply ( $\geq 2.85$  V)
- Integrated low-pass filters for harmonic rejection to comply with spurious emission requirements
- Integrated SP6T antenna Tx/Rx switch
- Integrated Rx low-pass filters for out-of-band rejection
- Optimized to support LTE for 1 to 36 RB
- MIPI RFFE control interface, 2.0 compliant
- Lead (Pb)-free and RoHS-compliant
- Pin-to-pin compatible with the SKY68000-21 and the SKY68011-21
- Two additional Aux ports offer greater flexibility for more bands on the Tx or Rx path
- Adaptive biasing scheme for maximum PA efficiencies
- Small, low profile package (4 mm x 5 mm x 0.9 mm) (MSL3 @ 260 °C per JEDEC J-STD-020)



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**SKY68001-21 Functional Block Diagram**

## Description

The SKY68001-21 is a hybrid, multi-band multi-chip RF front-end (RFFE) module supporting cellular LTE Cat0/CatM1/CATNB1 (half-duplex system) transceiver platforms. The module integrates the entire RF front end necessary for an LTE multi-band radio operating in low-band (B5/B8/B12/B13/B17/B18/B19/B20/B28) and mid-band (B1/B2/B3/B4/B25/B66 [AWS]) frequencies, including Rx low-pass filters, broadband PA with bias controller, Tx low-pass harmonic filter, antenna switch, and MIPI RFFE controller.

## Tx Section

The PA load-line is optimized for high efficiency while simultaneously meeting 3GPP ACLR and emissions mask specifications with LTE up to 36 RB. An integrated LPF is implemented to reject the PA and transceiver harmonics while at the same time minimizing any post PA loss for an optimized transmit current consumption. The broadband PA covers the frequency range 699 MHz to 915 MHz for low-band, and 1710 MHz to 1980 MHz for mid-band.

## Rx Section

Receive low-pass filters are integrated into the module along with the necessary matching to yield a 50  $\Omega$  single-ended impedance for the antenna and Rx ports. The SAW filters provide a high level of rejection to out-of-band interferers, protecting the transceiver from high blocking signal levels and guaranteeing 3GPP LTE blocking test conformance. The Rx low-pass filters are cascaded with the low throw count switch to establish a lower insertion loss and noise figure than conventional LTE receivers.

## Auxiliary Path

The AUX pin is an additional broadband port that can be used for either the Tx or Rx path (including high-band).

## MIPI RFFE Controller Interface

The SKY68001-21 functional operation is fully controllable by a single MIPI interface that is used to drive the PA in various optimized bias modes, to provide band selection, and to control the antenna switch Tx, Rx, and band selection.

## Ordering Information

Model Name	Manufacturing Part Number	Evaluation Board Part Number
SKY68001-21: LTE Multi-Band Front-End Module for IoT	SKY68001-21	SKY68001-21-EVB

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