24 GHz Integrated Transceiver

- Highly integrated RF IC: digital, analogue, RF/mmW
- “Smart” components: tunable and/or programmable
- Silicon technology complements GaAs, enabling affordable complex systems
- Communication and radar applications

General approach: Focus on low power

- Highly integrated transceiver architecture. Direct conversion from baseband to mmW
  - Zero-IF
  - Low-IF
- Simplified circuitry in RF path
- Complexity pushed in baseband and LO generation
- High resolution converters with minimum baseband filtering
- Performance and power monitoring
  - Low power circuit blocks
  - Tunable circuits with digital control
  - Digital calibration (RF-BIST)

Integrated mmW Transceiver

- CMOS 130 nm
- Size 3.1 x 2.3 mm²
- Low-voltage, low-power
- Frequency of operation: 24 GHz ISM band. Capable of operating from 23.5 GHz to 25.5 GHz

TX Characteristics

- Power consumption: 315 mW
  - 200 mW for transmitter and biasing
  - 115 mW for LO path including active splitter, buffers and quadrature generation circuit
- Output power: 2 dBm with spurs < -30 dB
  - External GaAs amplifier if more power is needed
- Spurs rejection (LO, image, HD2, HD3…) >30 dB with baseband compensation
  - P_{OFDM}: -5 dBm
  - 64QAM-OQDM (54 Mb/s) with EVM < -25 dB

Output power at 24 GHz as a function of data rate of a 802.11a waveform

- EVM measurement of a down-converted 64QAM OFDM signal at 24 GHz – Prf = -67.50 dBm

RX Characteristics

- Power consumption: 168 mW
  - 108 mW for receiver and biasing
  - 60 mW for LO path including active splitter, buffers and quadrature generation circuit
- NF: 7 dB
  - NF = 4 dB in Zero-IF mode (DSB)
  - External GaAs LNA recommended for improved sensitivity
- Receiver front-end gain: 32 dB
  - External baseband/IF amplifier recommended for additional gain
- IQ balance error lower than -30 dB
  - Good for 64QAM-OFDM (54 Mb/s)

Status: Product Development
Current as of: 06/14/2012

Cobham reserves the right to make changes to the product(s) or information contained herein without notice. Cobham makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Cobham assume any liability whatsoever arising out of the use or application of any product(s) or information.

This data is controlled in accordance with Export Administration Regulations ECCN EAR99. Diversion contrary to U.S. law is prohibited. In accordance with U.S. law (Title 15 CFR Part 746 and Supplement No. 1 to Part 774; and Title 31 CFR) transfer to certain designated countries is prohibited without the prior written consent of the U.S. Department of Commerce.