

# UM2455COB-1

## Low Power 2.4GHz Transceiver Module

### Application Note

### AN-2455-04

**Version: 0.0**

**Released Date: 2008/7/17**

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## *UM2455COB-1*

### Low Power 2.4GHz Transceiver Module

## 1. Introduction

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The UM2455COB-1 is a low cost, highly integrated 2.4GHz transceiver module designed for low power wireless applications. This module is intended for short-range communications and control operating at the ISM band (2.405 – 2.483.5GHz). The module integrates UM2455 with necessary components and a PCB antenna. The UM2455COB-1 features extensive hardware support of TX/RX FIFO, CSMA-CA, Security engine, MAC functions, clear channel assessment, link quality indication, and wake up trigger by an MCU or a register.

The main operating parameters and the 128 bytes transmit/receive FIFOs of the UM2455 can be controlled via the SPI interface. In typical applications, the UM2455 will be used together with a microcontroller and few external passive components.

## 2. Applications

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- Baby Finder and Tracker
- Home Automation Control
- Interactive Toy
- Wireless Sensor Network
- PC Peripherals
- Medical Equipment
- Remote Controller

## 3. Features

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### *RF/Analog*

- ISM band 2.405~2.480 GHz operation
- 92 dBm sensitivity and 3 dBm maximum input level
- 0 dBm typical output power and 36 dB TX power control range
- Integrated 100 kHz internal oscillator circuit
- High receiver and RSSI dynamic range
- Support power saving modes
- Low current consumption: 20 mA in RX and 23 mA in TX mode
- 2 uA deep sleep mode
- Data rates of 250 and 625kbps respectively

### *MAC/Baseband*

- O-QPSK modulation (DSSS baseband)
- Hardware CSMA-CA, automatic ACK response and FCS check
- Up to 8 nodes supported
- Four low power operation modes
- Support all CCA modes and RSSI/LQI
- Simple four-wire SPI interface

## 4. Pin Configuration

### 4.1. Device Pin Assignments

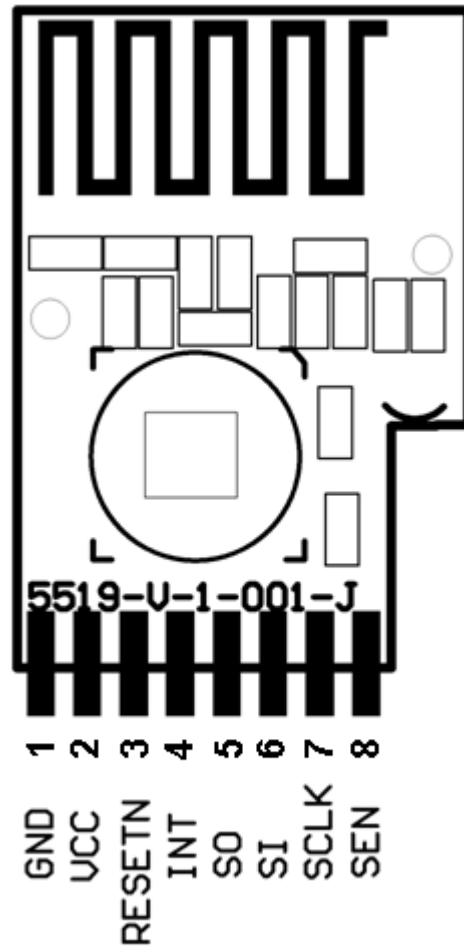


Figure 1. Pin Assignments (top view)

## 4.2. Device Pin Descriptions

Pin type abbreviation: D = Digital, I = Input, O = Output

Table 1. Pin Descriptions

Pin	Symbol	Type	Description
1	GND	Ground	Ground.
2	VCC	Power	The RF power supply. Bypass with a capacitor as close to the pin as possible.
3	RESETn	DI	Reset
4	INT	DO	The interrupt pin to the micro-processor.
5	SO	DIO	The serial interface data output from the module
6	SI	DIO	The serial interface data input to the module
7	SCLK	DI	The clock of a serial interface.
8	SEN	DI	The enabled pin of a serial interface.

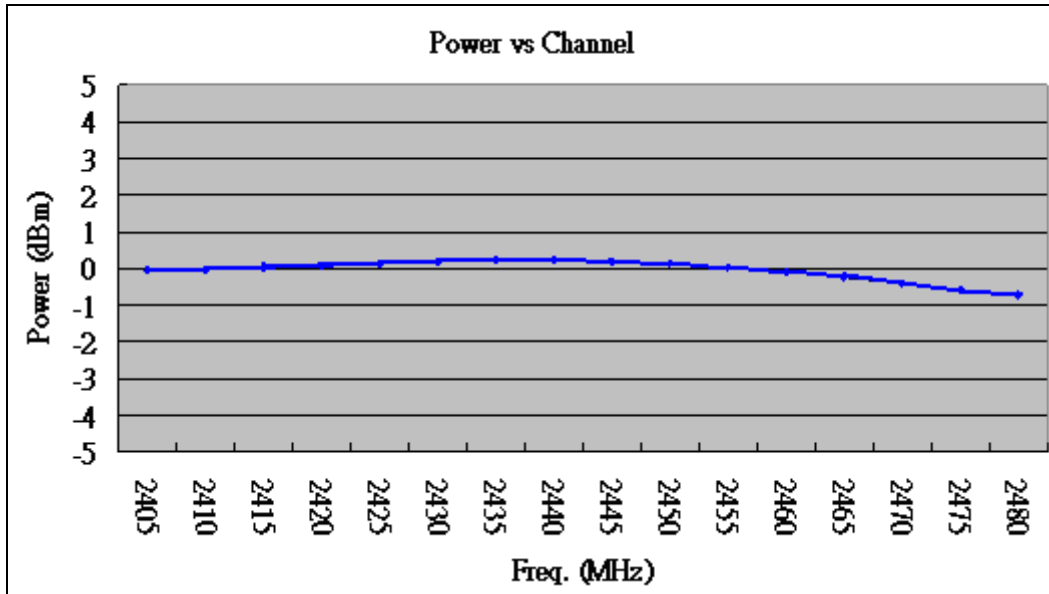


\* **Caution:** ESD sensitive. Please refer to Section 2.5 for more information.

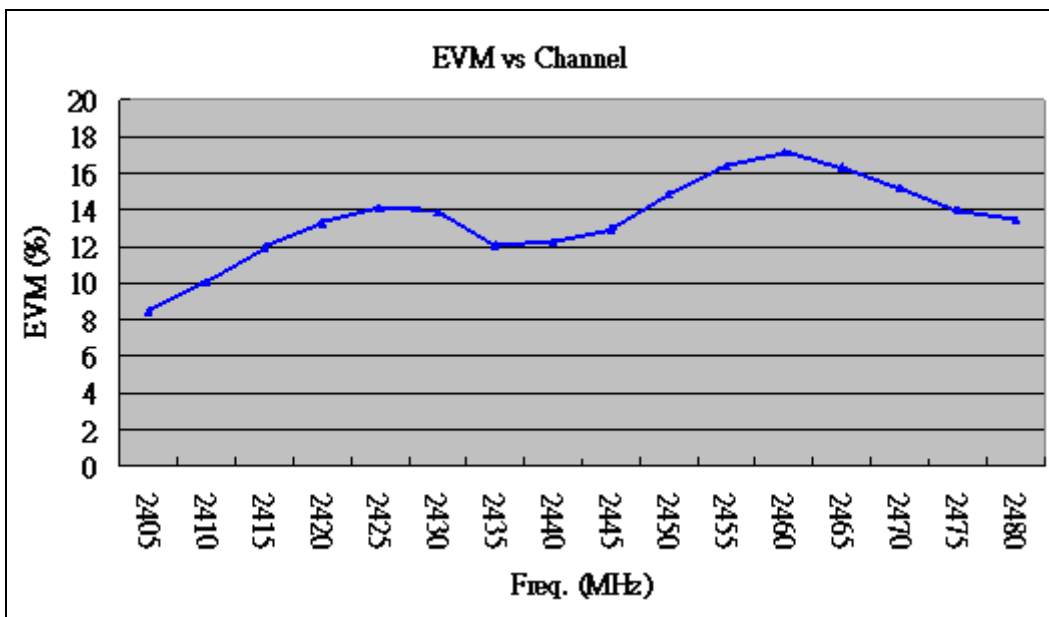


## 5. Electrical Characteristics

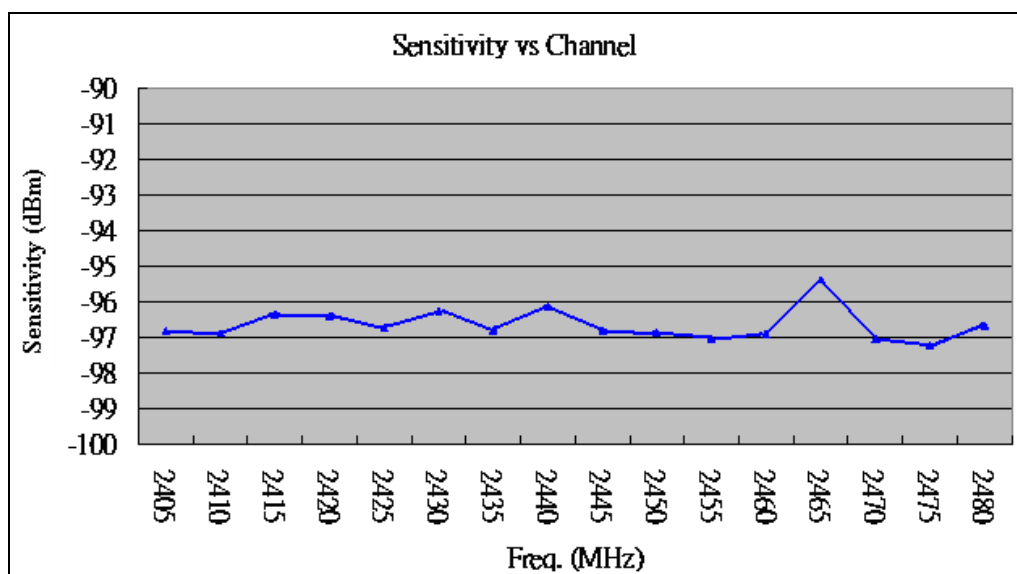
### 5.1. Tx Output Power



### 5.2. TX EVM



### 5.3. RX Sensitivity



### 5.4. Radio Frequency DC Characteristics

Test conditions:  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 3\text{ V}$

Table 2. DC Electrical Characteristics

Chip Mode	Condition	Min	Typ	Max	Unit
IDLE	RF in reset mode. Regulator, Oscillator, and digital circuits are on.		7.6		mA
STANDBY	All circuits are powered off; only the 100 kHz oscillator is still on.		3.5		uA
DEEP SLEEP	All circuits are powered off.		2		uA
ACTIVE: TX	At 0 dBm, the output power		23		mA
ACTIVE: RX			20		mA

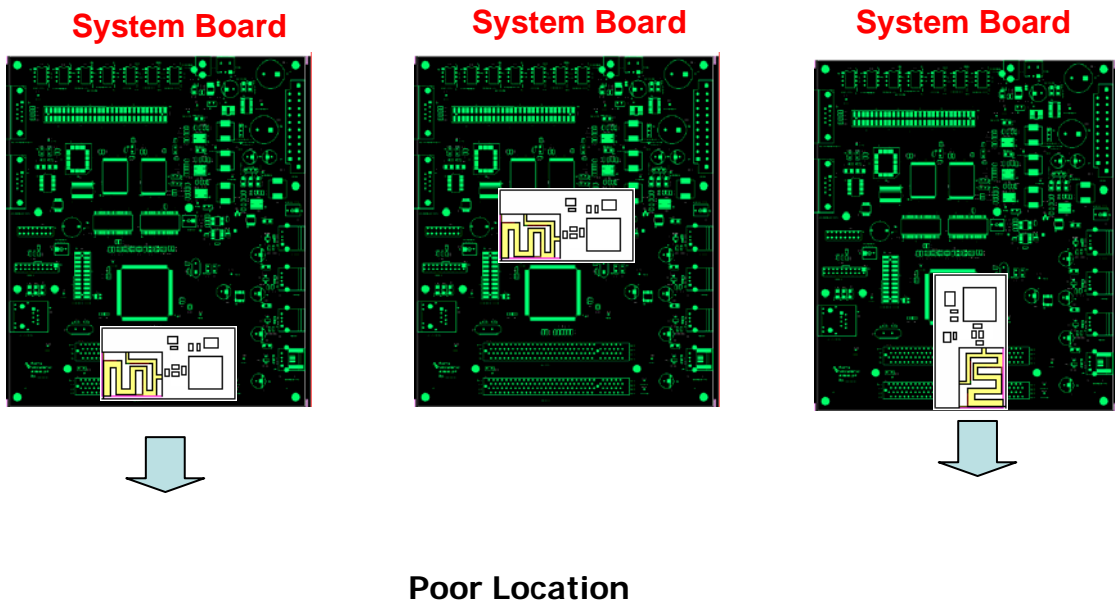
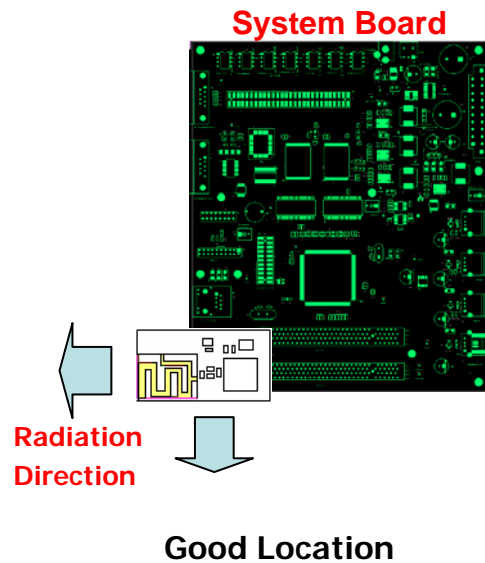
### 5.5. Peripheral Characteristics

The UM2455COB-1 has the slave mode SPI interface. They can be used by MCU host to access the UM2455 registers and FIFOs. The 4-wire SPI (SEN, SCLK, SI, SO) provides a high speed interface up to 8 MHz on the SCLK pin.

**Caution! Hot air gun should not be used after finishing the COB.**

## 6. Antenna Topology

- (1) Antenna should be placed on the edge of the system.
- (2) Be sure that there is no obstacle (component or ground ) present in the radiation direction
- (3) No ground plane or circuit should be put beneath the antenna region of the system boards.





## Revision History

Revision	Date	Description of Change
0.0	2008/7/17	Version 0.0 released.

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