

# Anaren Integrated Radio (AIR)

Low-power RF modules, firmware & development tools that make it easy to 'go wireless'

# 2541 System on Chip Series

The A2541R24C is a surface-mount radio module featuring *Bluetooth*<sup>®</sup> SMART technology that incorporates the Texas Instruments ultra-low-power CC2541 SoC, crystals, a U.FL connector and a DC/DC converter, all in one of the industry's smallest packages: 11x19x2.5mm. The module is pre-loaded with either TI's BLE-Stack or Em-Ware software from Emmoco and is certified with the Bluetooth SIG, US (FCC), Canada (IC), and compliant with European (ETSI) and other global standards.



A2541R24C

# **Features**

### General:

- 2.4-GHz RF transceiver incorporating Bluetooth SMART technology
- Excellent receiver sensitivity and robustness to interference (-89/-94dBm typical in BLE LGM/HGM mode with <0.1% BER)
- Programmable output power up to +1dBm .
- Supports data rates up to 2 Mbps •
- Wide input voltage range (2.0V 3.6V)
- Industry-standard U.FL connector .
- Available in tape & reel and matrix tray
- Module weight approximately 0.7 grams
- Certified/compliant for use in USA, Canada, Europe, and many other global locations
- <u>Current Consumption</u>:  $(Typ @ TC = 25^{\circ}C, VDD = 3.0V)$
- Active mode RX (CPU Idle): 14 mA
- Active mode TX (CPU Idle): 13 mA @0dBm, with 3 low power/sleep modes from 0.5uA to 270 uA
- Features TI TPS62730 step-down converter for optimal power usage (approximately a reduction of 30% when radio operating at 3.0V and 40% at 3.6V) Microcontroller:
- High-performance and low-power 8051 Microcontroller core with code prefetch
- 256KB in-system programmable flash and 8KB RAM with retention in all power modes

### Firmware:

- Available with Emmoco firmware, designed for easy implementation of embedded-mobile-connectivity Development:
- Evaluation Module (EM) available for guickconnection to the TI Development Kit (CC2540DK)
- B-SMART<sup>™</sup> BoosterPack kit available for use with TI LaunchPad and other development kits
- Emmoco software and tools enable easy communication between an embedded device and Bluetooth SMART Ready phones and tablets
- Emmoco's Em-Builder tools and Schema concept generate code that makes sharing data between embedded and mobile devices easy





- Minimal RF engineering experience necessary
- Minimal *Bluetooth*<sup>®</sup> experience necessary
- Easy to implement, short design cycle
- No additional "Intentional Radiator" certification required (FCC 15.247, IC RSS-210, EN 300 328) FCC ID: X7J-A12062101 // IC: 8975A-A12062101
- Minimal real estate required
- Easily implemented on a two layer PCB
- No additional harmonic filtering required
- 100% RF-tested in production
- Common footprint for similar products in family
- No additional DC decoupling required
- Accurate Digital RSSI support
- Operating temperature -40 to +85°C

### PLEASE NOTE:

- Additional information on the Texas Instruments CC2541 device can be found in the company's latest datasheet release at http://www.ti.com
- Additional information on Emmoco's development environment and tools can be found at http://www.emmoco.com

# Applications

Industrial controls and monitoring, remote controls, home/building automation, lighting systems, low power wireless sensor networks, and consumer electronics, sports monitoring, health & wellness

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# **Benefits**



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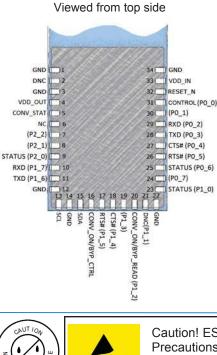
### **Product overview**

The A2541R24C is a high-performance, FCC & IC certified and ETSI-compliant SOC module featuring *Bluetooth*<sup>®</sup> SMART technology that incorporates the Texas Instruments CC2541 transceiver chip in one of the industry's smallest package (11 x 19 x 2.5 mm). The module incorporates two crystals, TPS62730 step-down converter and the required RF matching and filtering for regulatory compliance. The modules operate in the global unlicensed 2.4GHz ISM/SRD frequency band. These radio modules are ideal for achieving low power wireless connectivity without having to deal with extensive Protocol, RF design and regulatory compliance, allowing quick time to market. The modules are 100% RF-tested to provide consistent performance.

The A2541R24C has an RoHS-compliant ENIG finish and is packaged in 27-piece matrix trays or on 500-piece tape & reel for high-volume automated manufacturing.

## **Pin diagram**

Pin-out shown is for operation using the Emmoco firmware featuring *Bluetooth*<sup>®</sup> SMART technology. See TI CC2541 datasheet and A2541 User's Manual for detailed pin descriptions.



Where applicable:

NC = "NO Connection" Pin is NOT connected internally.

**DNC = "Do Not Connect"** Pin reserved for internal use, ensure mating footprint pads are isolated.

**GND = "Ground"** Connect the maximum number possible (minimum one for proper operation).

References in (parentheses) show native CC2541 pin function.

ANT ION RE SENS MSL 3

ask us!

The item described in this

product brief is part of our total

AIR Support solution. To learn

more, visit our website or just

Caution! ESD sensitive device. Precautions should be used when handling the device in order to prevent permanent damage.

For more information

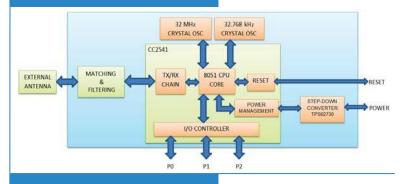
see product User's

Manual, available

online.

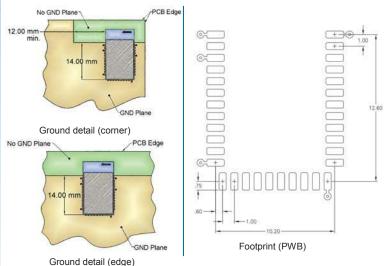


# **Block diagram**



# **Layout information**

Optional "No GND Plane" area shown for compatibility with PCB antenna model. See product User's Manual for detailed information.



Nomenclature

# A2541R24C10GR

(Anaren)

(x 100MHz)

Α

6

7

- 1 Chip series
- 2 Function
- 3 Frequency band
- 4 Form factor

Application

Packaging

- 5 Design ID
- (10 = TI's BLE-Stack, 20 = Emmoco Em-Ware software stack)
- (G = General)
  - (R = Reel, M = Matrix Tray)



(CC1101, CC2500, CC2530, CC8520)

(R = radio only, E = Range Extender)

(A = Internal Antenna, C = Connector)

What'll we think of next?®

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