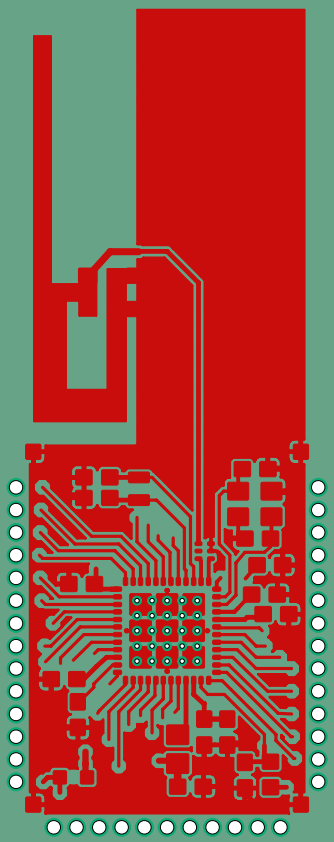
muonio

FRESH & INTELIGENT

CC2538

RADIO MODULE



The CC2538 is the ideal SoC for high-performance ZigBee applications. It combines a powerful ARM Cortex®-M3-based MCU system with up to 32K on-chip RAM and up to 512 K on-chip flash with a robust IEEE 802.15.4 radio.

This enables it to handle complex network stacks with security, demanding applications, and over-the-air download. Thirty-two GPIOs and serial peripherals enable simple connections to the rest of the board. The powerful security accelerators enable quick and efficient authentication and encryption while leaving the CPU free to handle application tasks.

The low-power modes with retention enable quick startup from sleep and minimum energy spent to perform periodic tasks. For a smooth development, the CC2538xFnn includes a powerful debugging system and a comprehensive driver library. To reduce the application flash footprint, CC2538xFnn ROM includes a utility function library and a serial boot loader.

FCC ID: 2AZ89C2538

USER MANUAL

Features & Applications

Built in CC2538 SoC
512KB, 256KB or 128KB of In-SystemProgrammable Flash
Size: 55 mm x 20 mm
Powerful ARM® Cortex®-M3 With Code Prefetch
Up to 32-MHz Clock Speed
512KB, 256KB or 128KB of In-SystemProgrammable Flash
Supports On-Chip Over-the-Air Upgrade (OTA)
Supports Dual ZigBee Application Profiles
Up to 32KB of RAM (16KB With Retention in All Power Modes)
cJTAG and JTAG Debugging
RF 2.4-GHz IEEE 802.15.4 Compliant RF Transceiver
Excellent Receiver Sensitivity of –97 dBm
Robustness to Interference With ACR of 44 dB
Programmable Output Power up to 7 dB
Worldwide Acceptance

Applicatons

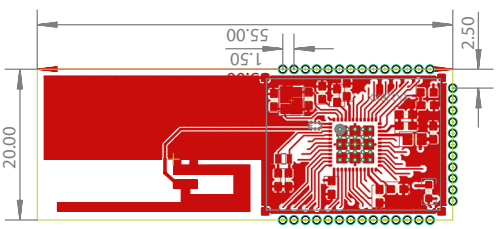
Consumer electronics
Mobile phone accessories
Sports & Fitness equipment
HID applications
Home and Building Automation, Lighting Control, Alarm and Security
Electronic Shelf Labeling, Proximity Tags
And many more...

Electrical Characteristics

ITEM TEST REQUIREMENT REMARKS
Active-Mode RX (CPU Idle): 20 mA
Active-Mode TX at 0 dBm (CPU Idle): 24 mA
Power Mode 1 (4-µs Wake-Up, 32-KB RAM Retention, Full Register Retention): 0.6 mA
Power Mode 2 (Sleep Timer Running, 16-KB RAM Retention, Configuration Register Retention): 1.3 µA
Power Mode 3 (External Interrupts, 16-KB RAM Retention, Configuration Register Retention): 0.4 µA
Wide Supply-Voltage Range (2 V to 3.6 V)
Module size 55 mm*20 mm

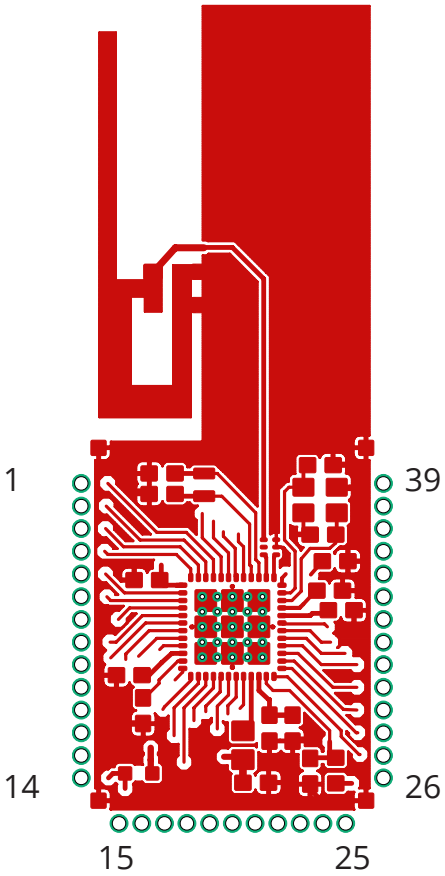
RECOMMENDED OPERATING CONDITIONS
Operating ambient temperature range, TA -30 85 °C

CAUTION:
ESD sensitive device. Precautions should be used when handing the device in order to prevent permanent damage.



Pin assignemet

NAME	Pin	PIN TYPE
VDD	14,15	
GND	10	
DVDD_USB	13	Power (USB pads)
JTAG_TCK	2	Digital I/O
JTAG_TMS	1	Digital I/O
PA0	24	Digital/analog I/O
PA1	25	Digital/analog I/O
PA2	26	Digital/analog I/O
PA3	27	Digital/analog I/O
PA4	29	Digital/analog I/O
PA5	30	Digital/analog I/O
PA6	31	Digital/analog I/O
PA7	32	Digital/analog I/O
PB0	13	Digital I/O
PB1	9	Digital I/O
PB2	8	Digital I/O
PB3	7	Digital I/O
PB4	6	Digital I/O
PB5	5	Digital I/O
PB6	4	Digital I/O
PB7	3	Digital I/O
PC0	23	Digital I/O
PC1	22	Digital I/O
PC2	21	Digital I/O
PC3	20	Digital I/O
PC4	19	Digital I/O
PC5	18	Digital I/O
PC6	17	Digital I/O
PC7	16	Digital I/O
PD0	33	Digital I/O
PD1	34	Digital I/O
PD2	35	Digital I/O
PD3	37	Digital I/O
PD4	38	Digital I/O
PD5	39	Digital I/O
RESET_N	36	Digital input
USB_P	11	USB I/O
USB_N	12	USB I/O



Pin countig starts top left.

FCC regulatory compliance statement

§15.19 Statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§15.21 Information to user
Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

List of applicable FCC rules:
47 CFR Part 15, Subpart C 15.203
47 CFR Part 15, Subpart C 15.205
47 CFR Part 15, Subpart C 15.207
47 CFR Part 15, Subpart C 15.209
47 CFR Part 15, Subpart C 15.247
47 CFR Part 2 2.1091

Summarize the specific operational use conditions
This module can be used in IOT devices, the input voltage to the module is nominally 5V. Only the embedded integral antenna is allowed. Any other external antenna is prohibited.

Limited module procedures
This module is not a limited module.

Trace antenna designs
The antenna is not a trace antenna.

RF exposure considerations
This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Antennas
If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

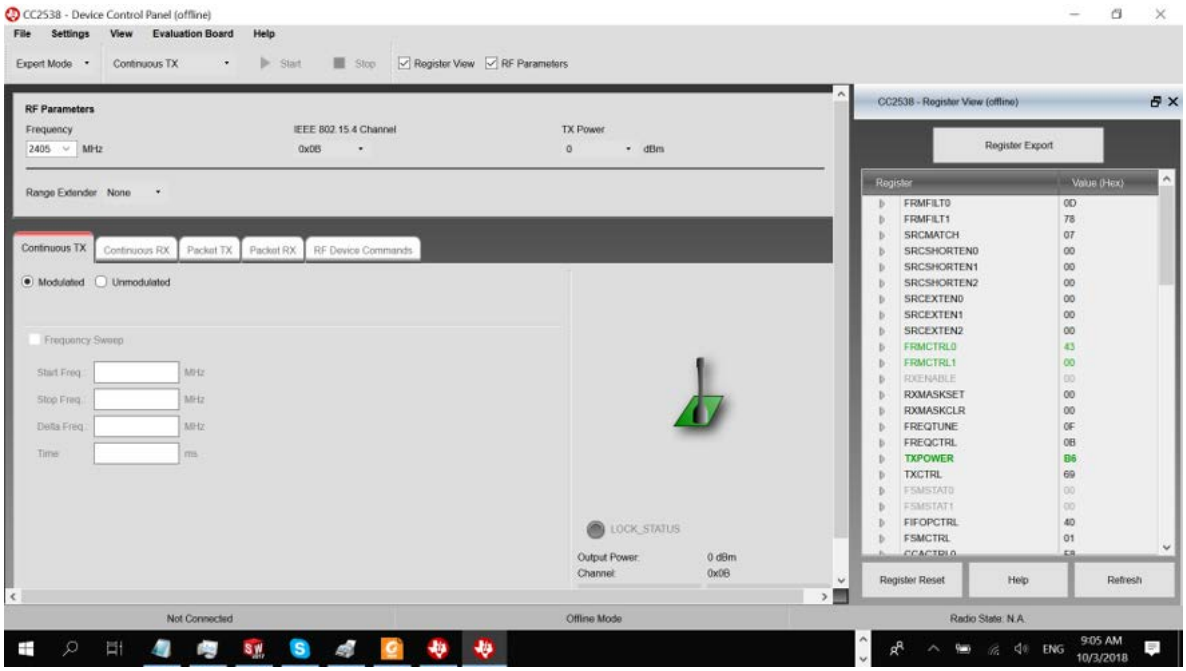
FCC regulatory compliance statement

Label and compliance information
Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains FCC ID: _2AZ89C2538_” any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.
Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

Information on test modes and additional testing requirements
The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

Test software: SmartRF Studio 7 2.10.0



Additional testing, Part 15 Subpart B disclaimer
This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

Sample Operation Description Sample Operation Description

For Class B
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

The 32MHZ Hz crystal oscillator drives the base of Q1.
The modulation provided by IC FA128-32F20X-K3128. The output of has the matching network consisting of balun 2450BM14G0011 that limit the harmonic content and effect the proper coupling of the antenna to the output stage.

Antenna, Ground and Power Source
The antenna consists of a 2.4GHz Meander line SWRU120C antenna.
Antenna gain: 1.1 to 3.3 dBi.

There is no external ground connection. The ground is only that of the printed circuit board.
Electric current is supplied by Input VCC;
Output: 3.3 Vd.c..

Operation Descriptions
The transmitter is a Portable Wireless Music System operating at 2400-2483.5MHz band. The transmitter is powered by 3.3 Vd.c and the transmitting frequency is crystal controlled. The operation is achieved by different combinations of form pulse modulating signal on the 2400MHz carrier frequency.
When the NTAG is positioned in the RF field, the high speed RF communication interface allows the transmission of the data and enable the Bluetooth pairing