

User manual of CCAT710R

1. Introduction

CCAT710R is a Wi-Fi/BLE combo module compliant with IEEE802.11 b.g.n.ac.ax MAC (2.4/5GHz) and Bluetooth 5.2 optimized for low-power applications.

The core chipset is from Realtek, part number SDA8702E.

2. Hardware Architecture:

2.1 Main Chipset Information

Item	Vendor	Part Number
IEEE802.11 b.g.n.ac.ax(2.4/5GHz) BT5.2	Realtek	SDA8702E

2.2 Circuit Block Diagram

The major internal and external block diagram of CCAT710R is illustrated in Figure 1-1.

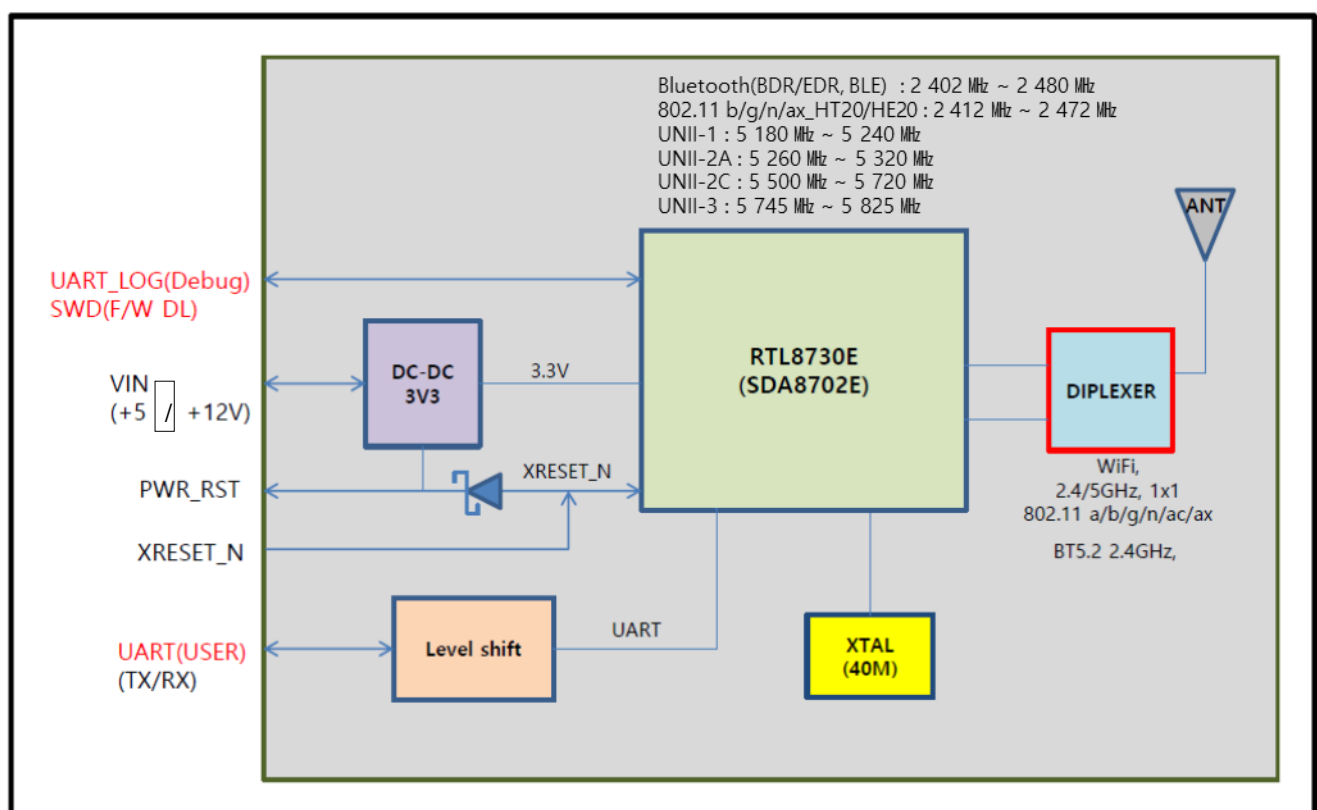


Figure 1-1 CCAT710R block diagram and System Interface

3. Operational Description

CCAT710R is the 802.11b/g/n/ac/ax MAC Wi-Fi and Bluetooth 5.2 combo Module that acts as a communication controller for users of a wireless device to connect to SMART DEVICE

- Features

- >IEEE 802.11 b/g/n/ac/ax (2.4/5GHz, 1x1)
- >20MHz up to MCS9(HE20) supported
- >Low power Tx/Rx for short range application supported
- >Adjustable transmitting power
- >BT 5.2
- >High-speed UART interface
- >Internal co-existence mechanism between Wi-Fi and BT to share the same antenna

- Time base of the RF frequency

For IF and RF frequency, a crystal(40MHz) is a clock reference.

- WIFI Transmitter

The data signal in the digital band is modulated into an analog signal through the DAC. The baseband signal is upconverted to the 2.4/5GHz ISM band while meeting the IEEE 802.11 b/g/n/ac/ax specification and transmitted as an RF signal. It is output as an aerial line through the antenna at the final stage.

- WIFI Receiver

Reverse direction isolation of LNA inside Transceiver IC suppresses unwanted radiation. Then RF signal will be directly down to IF signal (RX IQ) and high frequency spurious emissions are suppressed by LPF. At last RX IQ signal will be demodulated digital data.

- BLE Transmitter

The baseband signal is converted into an RF signal and output through the antenna at the final stage as an antenna.

- BLE Receiver

The received signal is converted into an IF signal through the mixer and passed along the IF path to the demodulator for interpretation.



- Product Details

- WIFI

> Data Modulation

DSSS:CCK,BPSK,QPSK for 802.11b

OFDM:BPSK,QPSK,16QAM,64QAM,256QAM for 802.11g,n,ac,ax

> Frequency Range 2400-2483.5MHz, 5180-5885MHz

- BT

> Data Modulation GFSK

> Frequency Range 2400-2483.5MHz

- Operating Temperature

> -20 ~ +85 °C



4. RF Exposure Statement

FCC Radiation Exposure Statement:

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

Industry Canada Radiation Exposure Statement (Déclaration d'exposition aux radiations):

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC tabliées pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

<Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual v01>

List of applicable FCC rules

This module has been granted modular approval as below listed FCC rule parts.

-FCC Rule parts 15C (15.247, 15.407)

Summarize the specific operational use conditions

-The OEM integrator should use equivalent antennas which is the same type and equal or less gain than an antenna listed in 2.7 in this instruction manual.

RF exposure considerations

The module has been certified for integration into products only by OEM integrators under the following condition:

-The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

-The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

-Mobile use

As long as the three conditions above are met, further transmitter testing will not be required.

OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

Antennas list

This module is certified with the following integrated antenna.

-Type: Metal antenna (Internal Antenna)

- Max. peak Antenna gain

Frequency	Efficiency	Max Gain		
		Ver	Hor	Total
2400.000000 MHz	31.8 %	-6.9 dBi	-2.6 dBi	-2.2 dBi
2410.000000 MHz	38.7 %	-6.4 dBi	-2.0 dBi	-1.4 dBi
2420.000000 MHz	39.7 %	-6.2 dBi	-1.9 dBi	-1.2 dBi
2430.000000 MHz	38.8 %	-6.4 dBi	-1.9 dBi	-1.1 dBi
2440.000000 MHz	38.3 %	-6.5 dBi	-1.8 dBi	-1.1 dBi
2450.000000 MHz	39.2 %	-6.4 dBi	-1.8 dBi	-0.9 dBi
2460.000000 MHz	39.0 %	-6.3 dBi	-1.8 dBi	-0.8 dBi
2470.000000 MHz	39.1 %	-6.1 dBi	-1.8 dBi	-0.8 dBi
2480.000000 MHz	49.5 %	-5.2 dBi	-1.1 dBi	-0.1 dBi
5180.000000 MHz	62.6 %	-1.5 dBi	-0.9 dBi	0.9 dBi
5260.000000 MHz	53.6 %	-2.1 dBi	-1.9 dBi	0.2 dBi
5320.000000 MHz	53.5 %	-2.4 dBi	-1.9 dBi	0.0 dBi
5400.000000 MHz	55.2 %	-2.3 dBi	-1.6 dBi	0.0 dBi
5500.000000 MHz	41.6 %	-2.9 dBi	-2.2 dBi	-0.8 dBi
5600.000000 MHz	45.0 %	-2.4 dBi	-2.0 dBi	-0.4 dBi
5785.000000 MHz	43.1 %	-2.7 dBi	-2.4 dBi	-0.7 dBi
5825.000000 MHz	36.9 %	-3.2 dBi	-2.8 dBi	-1.2 dBi



Any new antenna type, higher gain than listed antenna should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure.

Label and compliance information

End Product Labeling

The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and IC Certification Number are 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. In that case, the final end product must be labeled in a visible area with the following:

“Contains FCC ID: A3LCCAT710R”

“Contains IC: 649E-CCAT710R”

Information on test modes and additional testing requirements

-OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

Additional testing, Part 15 Subpart B disclaimer

-The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.

5. Notice

FCC Statement

Approval Statement

CE Statement

Hereby, we declare that this device is in compliance with the essential requirements and other relevant provisions of directive 1999/5/EC.

FCC approval

This device complies with Part 15 of the FCC's 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 undesirable operation.

To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

Contains Transmitter module FCC ID: A3LCCAT710R

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 OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.
- The module is limited to installation in mobile or fixed applications.

IC approval

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). L'opération est soumise aux deux conditions suivantes:

- (1) cet appareil ne peut causer d'interférences, et*
- (2) cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.*

The host device must be labeled to display the Industry Canada certification number of the module.

Contains transmitter module IC:649E-CCAT710R

Le dispositif d'accueil doivent être étiquetés pour afficher le numéro de certification d'Industrie Canada du module.

Contient module émetteur IC :649E-CCAT710R

IMPORTANT NOTE

This device complies with FCC & IC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

- 1) This module may not be co-located with any other transmitters or antennas.
- 2) The antenna must be installed such that 20cm is maintained between the antenna and users.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements with this module installed. In the event that these conditions cannot be met, then the FCC & IC authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product including this module and obtaining separate FCC & IC authorizations.

Cet appareil est conforme aux limites de la FCC et IC exposition aux radiations dans un environnement non contrôlé. Cet appareil doit être installé et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou un autre émetteur.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes :

- 1) L' antenne doit être installée de telle sorte que 20 cm est maintenue entre l'antenne et les utilisateurs .*
- 2) Ce module ne peut pas être co-localisé avec d'autres émetteurs ou des antennes .*

Aussi longtemps que deux conditions précitées sont remplies, le test du transmetteur supplémentaires ne seront pas tenus. Toutefois, l'intégrateur OEM est toujours responsable de tester leurs produits finis pour toutes les exigences de conformité supplémentaires avec ce module installé.

Dans le cas où ces conditions ne peuvent pas être remplies, alors la FCC et IC autorisations ne sont plus considérés comme valides et l'ID de la FCC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera responsable de réévaluer le produit final, y compris l'obtention de ce module et séparée de la FCC et IC Autorisations

User Information

Caution: Any changed or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Attention: Toute changé ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'utilisateur `autorité de faire fonctionner cet équipement.