Model: EC864FPA
Wi-Fi + Bluetooth LE (WiBlue) module

Features

- Wi-Fi and Bluetooth (WiBlue) dual radio in a single integrated module
- Fully compliant to Wi-Fi Alliance and Bluetooth Smart (4.x Low Energy single mode) specifications.
- High efficiency on-module printed PCB RF antenna (EC864FPA)
- Very few external BOM-count to create a fully functional application circuit
- Texas Instrument CC2640 SimpleLink™ Wireless MCU and Espressif ESP8266 Wi-Fi Soc

CC2640

- 48MHz ARM Cortex-M3 MCU core for applications with 128K flash memory for ISP
- 8-KB SRAM for Cache and 20-KB Ultra-Low Leakage SRAM
- Dedicated ARM Cortex-M0 core, 4KB SRAM, and ROM for RF operations
- Ultra Low power consumption, 6.5mA during Active-TX at 0dBM
- TRNG and AES-128 encryption for data encryption and authentication
- 4 General-Purpose Timer Modules (8 × 16-Bit or 4 × 32-Bit Timer, PWM)
- Programmable UART, SPI, I2S, I2C, and GPIO interface
- 12-Bit ADC, 200-ksamples/s, 8-Channel Analog MUX and battery monitor
- Support for 8 Capacitive Sensing Buttons

ESP8266

- 80MHz low power 32-bit RISC MCU core
- 64-KB instruction RAM and 96-KB data RAM
- 64-KB boot ROM, and 4-MB flash for applications and data
- +20dBm output power in 802.11b mode
- Hardware accelerator engine for encryption and authentication operations
- Wake up and transmit packets in < 2ms
- UART, SPI, I2C, and GPIO interface
- 802.11 b/g/n protocol
- Wi-Fi 2.4 GHz, support WPA / WPA2
- Full Wi-Fi and TCP/IP (Ipv4) protocol stack
- Station / softAP / Station+AP mode support
- Wi-Fi Direct (P2P) support

- Integrated RF Shied can models available (EC864FPA)
- Bluetooth Certification BQB: Available upon request
- FCC Certification: Available for EC864FPA
- REACH / RoHS compliant
- Dimensions:
    - 38 x 21.5 x 2.5 mm (EC864FPA)

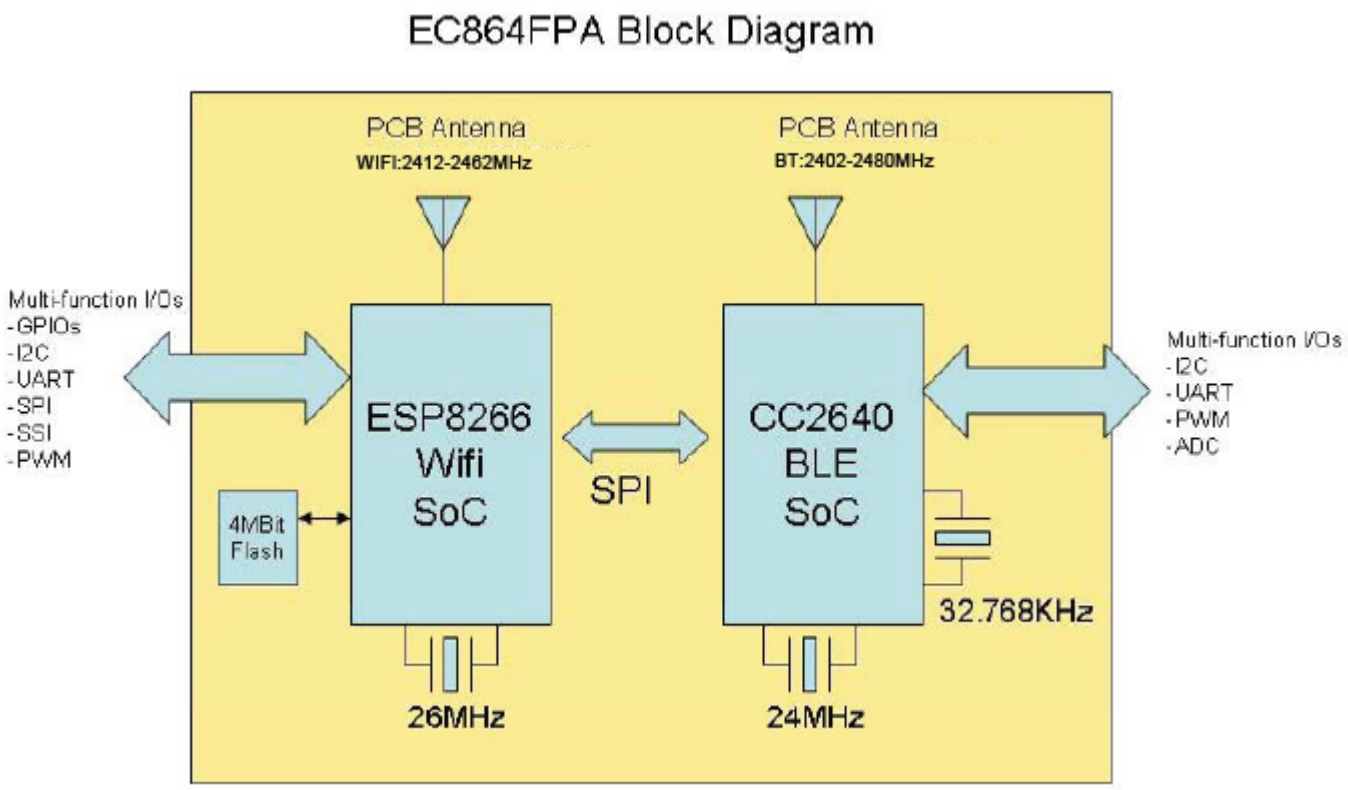
Applications

- Dual-mode Internet of Things (IoT) Device
- Wi-Fi-to-Bluetooth Gateway
- Home Automation Hub
- IoT Message Display
- RC and Interactive Toy
- Wireless Alarm and Security Controller
- Lighting and HAVC control
- Remote Control and Assisted Living

Standard Firmwares Available

- DxCloud IoT Gateway
- DataExchanger (serial data transfer)

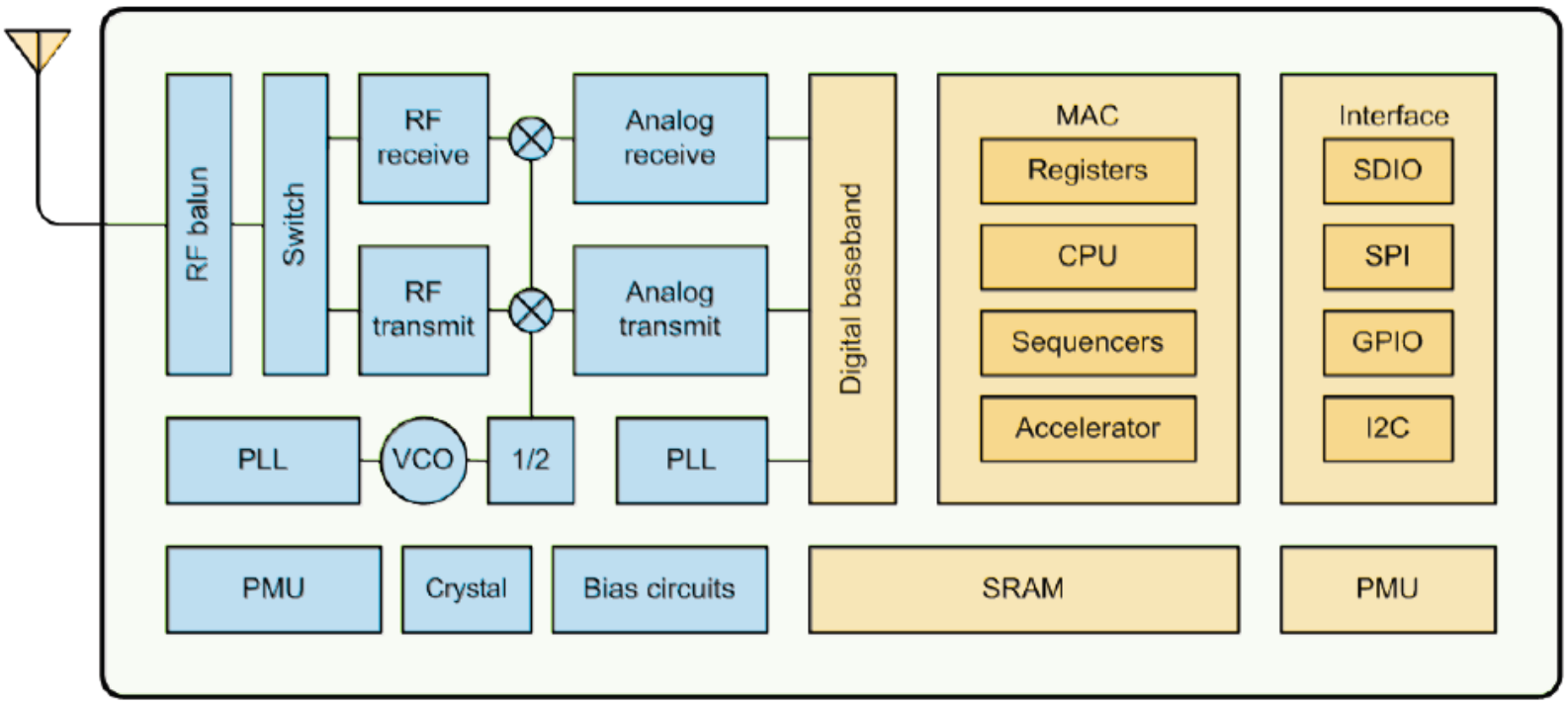
Block Diagram



Detail Descriptions

EC864FPA integrates Expressif's ESP8266 Wifi SoC and Texas Instrument's CC2640 BLE SoC to form an integrated module to provide WLAN and BLE connectivity. Four dedicated I/Os from each SoC are connected together for inter-chip communications (e.g. SPI).

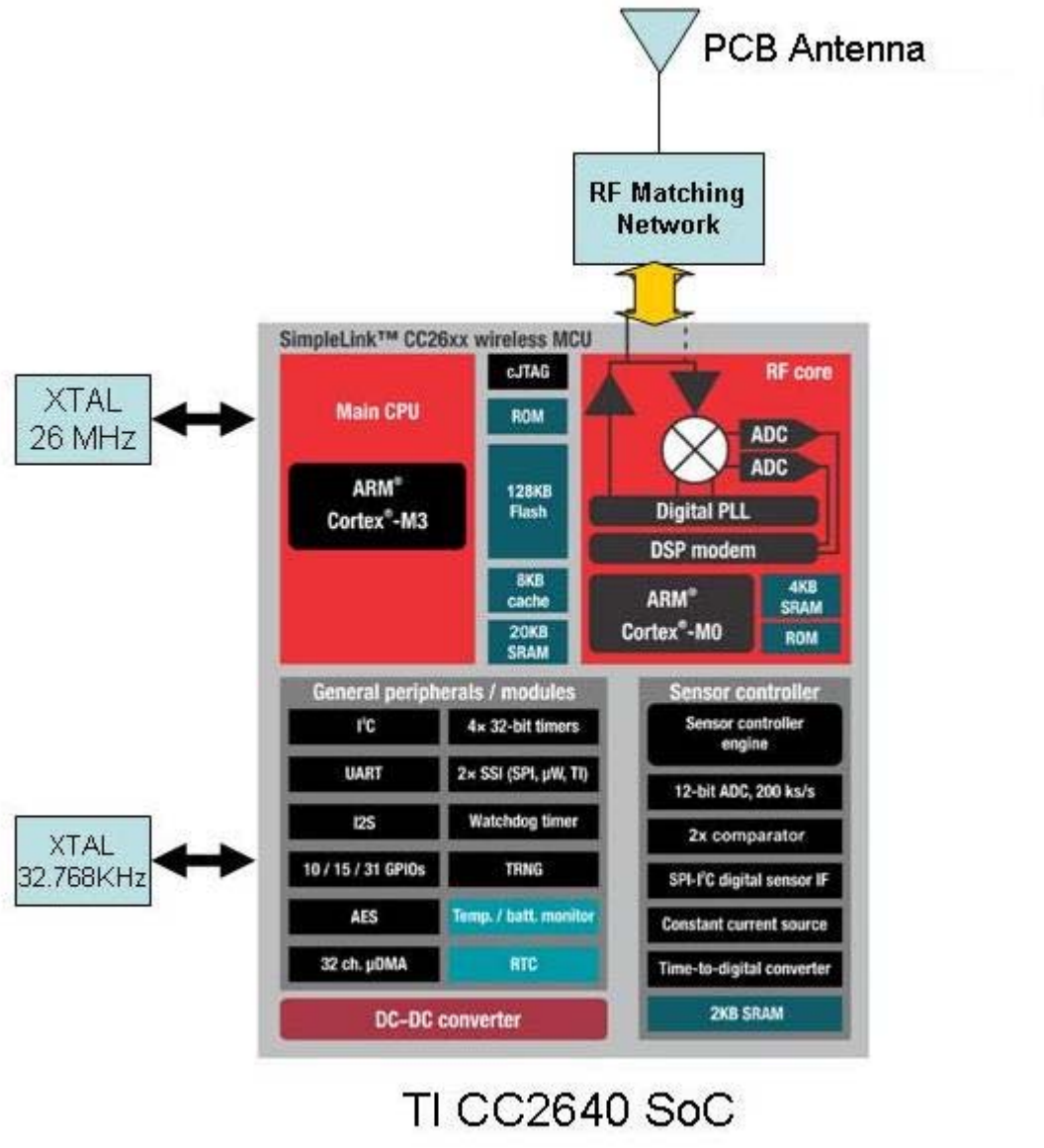
ESP8266 SoC



ESP8266EX offers a complete and self-contained Wi-Fi networking solution; it can be used to host the application or to offload Wi-Fi networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any microcontroller -based design with simple connectivity (SPI/SDIO or I2C/UART interface). ESP8266EX is among the most integrated WiFi chip in the industry; it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area. ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the Wi-Fi functionalities. ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs; codes for such applications are provided in examples in the SDK.

Sophisticated system-level features include fast sleep/wake context switching for energy-efficient VoIP, adaptive radio biasing for low-power operation, advance signal processing, and spur cancellation and radio co-existence features for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation. For more detail information on ESP8266, please refer to ESP8266EX : A Beginner's Guide.

CC2640 SoC



TI CC2640 SoC

CC2640 is a wireless MCU targeting Bluetooth Smart applications. The CC2640 device contains a 32-bit ARM Cortex-M3 processor that runs at 48 MHz as the main processor and a rich peripheral feature set that includes a unique ultralow power sensor controller. This sensor controller is ideal for interfacing external sensors and for collecting analog and digital data autonomously while the rest of the system is in sleep mode. Thus, the CC2640 device is ideal for a wide range of applications where long battery lifetime, small form factor, and ease of use is important.

The *Bluetooth* Low Energy controller is embedded into ROM and runs partly on an ARM Cortex-M0 processor.

This architecture improves overall system performance and power consumption and frees up flash memory for the application. For more detail information on CC2640, please refer to CC2640 SimpleLink Bluetooth Smart Wireless MCU (SWRS176A) from Texas Instruments.

General Electrical Specification

Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 ℃	+90 ℃
Supply Voltage VDD	-0.3 V	3.9 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range – (C-grade)	-20 ℃	+75 ℃
Supply Voltage VDD, VDDIO	3.0 V	3.8 V

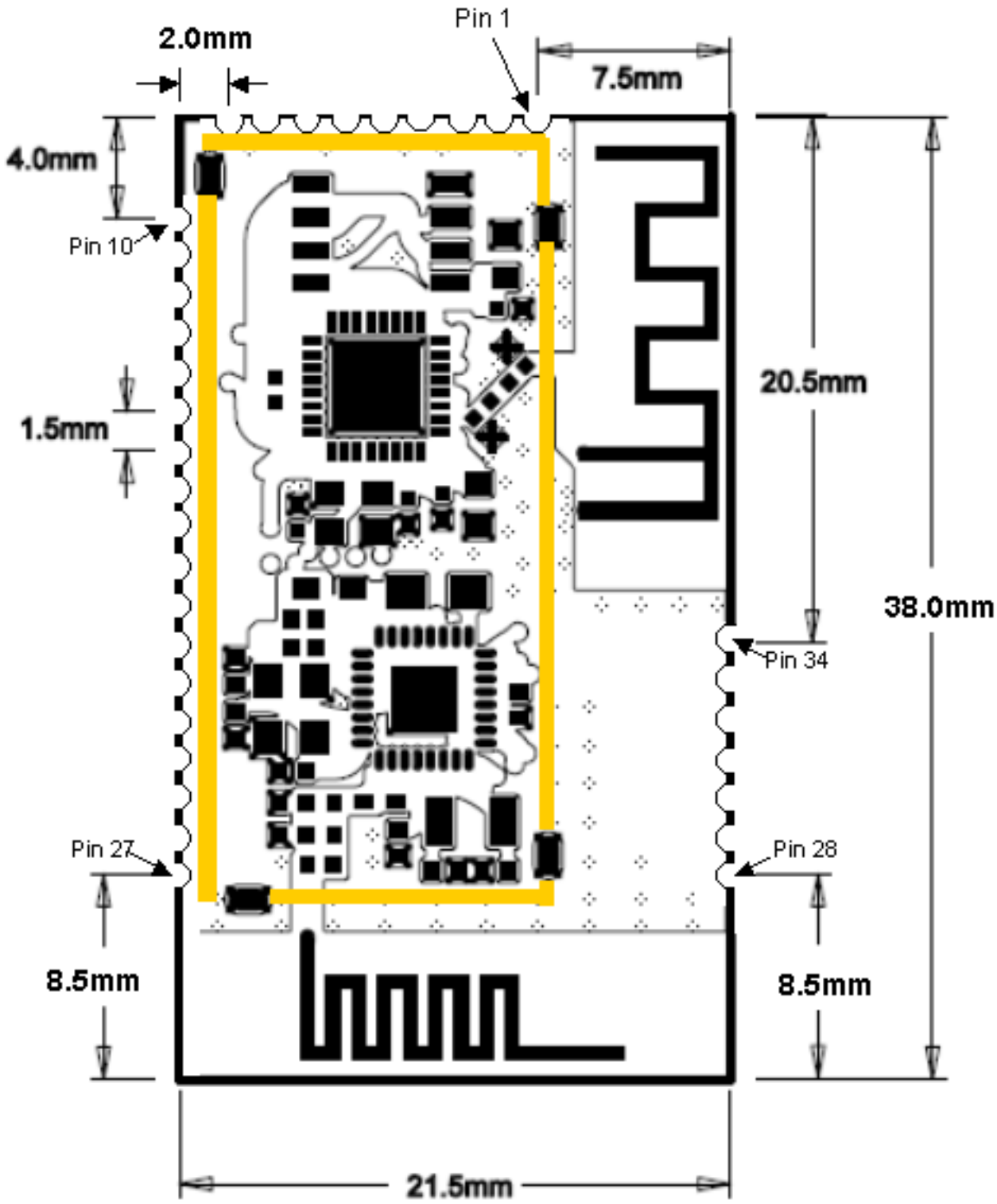
Pins Configurations

EC864FPA

pin No.	Pin Name	Pin No.	Pin Name
1	GND	21	GND
2	TOUT	22	BT_V33
3	WF_V33	23	DIO_4
4	CH_PD	24	DIO_3
5	MTMS	25	DIO_2
6	MTDI	26	DIO_0
7	MTCK	27	GND
8	MTDO	28	GND
9	GND	29	JTAG_TSMC
10	GPIO2	30	JTAG_TCKC
11	GPIO0	31	DIO_5
12	GPIO4	32	DIO_6
13	XPD_DCD	33	BT_RSTB
14	GPIO5	34	GND
15	GND		
16	WF_RSTB		
17	URXD		
18	UTXD		
19	DIO_7		
20	DIO_8		

Module Outline

EC864FPA Module Outline



Precautions

- **Storage Condition**

  This product should be stored without opening the packing, and under temperature 0-60 °C and humidity 30-70% RH. It should be used within 15 months after reception.

- **ElectroStatic Discharge (ESD)**

  This product is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices. Such precautions are described in the ANSI/ESD S20.20, IEC/ST61340-5, JESD625-A or equivalent standards.

- **Module Reflow Installation**

  For RoHS/Pb-free applications, Sn96.5/Ag3.0/Cu0.5 solder is recommended.

Profile Feature	Recommended Parameters
Ramp-up rate before liquidous	< 2°C / second
Preheat	150-200°C 60-90 seconds
Maximum time at liquidous	40 – 80 seconds
Maximum peak temperature	230° - 240°C (below 250°C)
Ramp-down rate	< 6°C / second

Ordering Information

Part Number	FW Code Available	Description
EC864FPA	Please check with your sales rep	WiBlue module with integrated PCB antenna

Revision History

Rev.	Date	Description	By
01	2015-09-02	Initial release	Paul
02	2015-09-22	Updated Module Outline	Paul
03	2016-06-29	Modified block diagram and added detail descriptions	Paul

Host Information

This module was defined to be used for specific host only. The designated host for this module was:
Company: GT-tronics HK Ltd.
Address: B210, Tonic Industrial Center, 19 Lam Hing Street, Kowloon Bay, Hong Kong
Host Model Name: WiBlue_Breakout_Board_v02
Host brand name: GT-tronics

FCC RF Exposure Requirement

1.At least 20cm separation distance between the antenna and the user's body must be maintained at all times. And must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.

2.To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the antenna gain is -0.30dBi for BLE; 2dBi for WIFI.

Please be noticed following information and instructions should be placed in the end-user's operating manual

The Module has been granted as full modular approval for mobile applications.

1. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and OEM is responsible for meeting SAR requirement of end product.

2. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

3. A label must be affixed to the outside of the end product into which the module is incorporated, with a statement similar to the following: contains FCC ID: B4OEC86XFPX .

4. The module shall be in non-detachable construction protection into the finished products, so that the end-user has to destroy the module while remove or install it.

5. A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled . The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required.
For a host using this FCC certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible.

6. Host product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. Compliance must be demonstrated to regulations for other transmitter components within the host product; to requirements for unintentional radiators (Part 15B). To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. If a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depends on the details of how the module is integrated with the host, we suggest the host device to recertify part 15B to ensure complete compliance with FCC requirement: Part 2 Subpart J Equipment Authorization Procedures , KDB784748 D01 v07, and KDB 997198 about importation of radio frequency devices into the United States.

FCC Certification Requirement:

The end product with an embedded Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

Note: This module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

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. Changes or modifications made to this equipment not expressly approved by GT-tronics HK Ltd. may void the FCC authorization to operate this equipment.