EM9305V01 *BLUETOOTH*® MODULE USER MANUAL

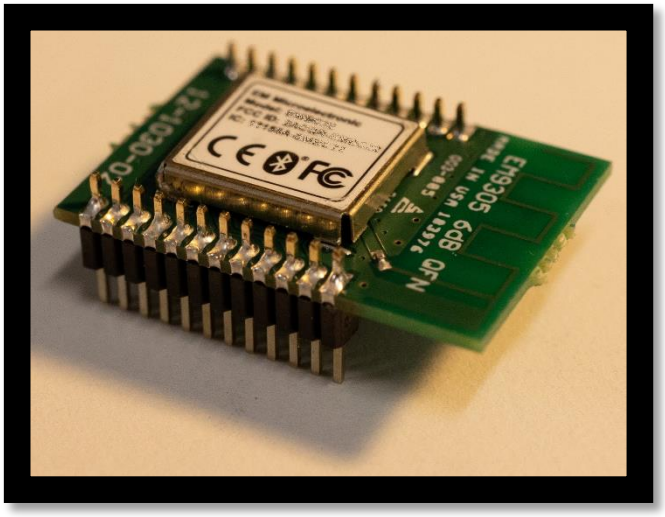
DESCRIPTION

The EMREF9305QFN EM9305 *Bluetooth*® low energy module is a small size module embedding the EM9305 *Bluetooth*® low energy chip in QFN package from EM Microelectronic. It has an efficient PCB antenna and one of the lowest power consumption available.

The EM9305 is a tiny, ultra-low power and high performance Bluetooth 5.3 low energy chip. Its highly flexible architecture allows it to act as a companion IC to any ASIC or MCU-based product, or as a complete System-on-Chip (SoC). Its flexibility also allows it to be used with other protocols such as 802.15.4 MAC (ZigBee and Thread), BLE-mesh or other compatible proprietary protocols. Custom applications can execute on an efficient 32-bit ARC processor from a 512kB flash using a cache and DMA to optimize power consumption. DSP and floating-point units can be exploited to implement advanced audio and tracking algorithms.

https://www.emmicroelectronic.com/product/standard-protocols/em9305

The *EMREF9305QFN* Module can be used with the *EMDVK9305* and the *EMDVK9305SOC* for product development



- Automated power management configuration (supply from 1.1V to 3.6V) when used with 9305 DVKs
- Small form factor: 24.127x16.5mm
- Low current consumption (3V supply)
  - 3.0mA typical receiver current
  - 3.5mA typical transmitter current @0 dBm output power
  - 370nA BLE sleep mode current (4kB retention)
  - 7nA disable mode current
- 512kB flash memory for stack and applications
- 64kB data/instruction RAM, with steps of 4kB retention for leakage current optimization
- High sensitivity : -94/-97/-103dBm RX sensitivity for 2Mbps/1Mbps/125kbps modes
- Programmable RF output power from -57dBm to +6dBm
- High Data Rate (HDR) and Long Range (LR) support
- Angle-of-Arrival and Angle-of-Departure support
- Isochronous channels for audio applications
- SPI and UART HCI Transport Layers
- USB 2.0 Full Speed interface
- Integrated PCB antenna
- FCC certified 2ACQR-EM9305V1
- IC certified 12155A-EM9305V1
- CE certified
- Based on *Bluetooth*® 5.3 chip (QDID 181688)
- Based on *Bluetooth*® 5.3 stack (QDID 84268)
- *Bluetooth*® certified module (D055174)
- The communication protocol (Bluetooth, Zigbee, …) is selected by the FW loaded to the module. Today only Bluetooth is available.

FEATURES

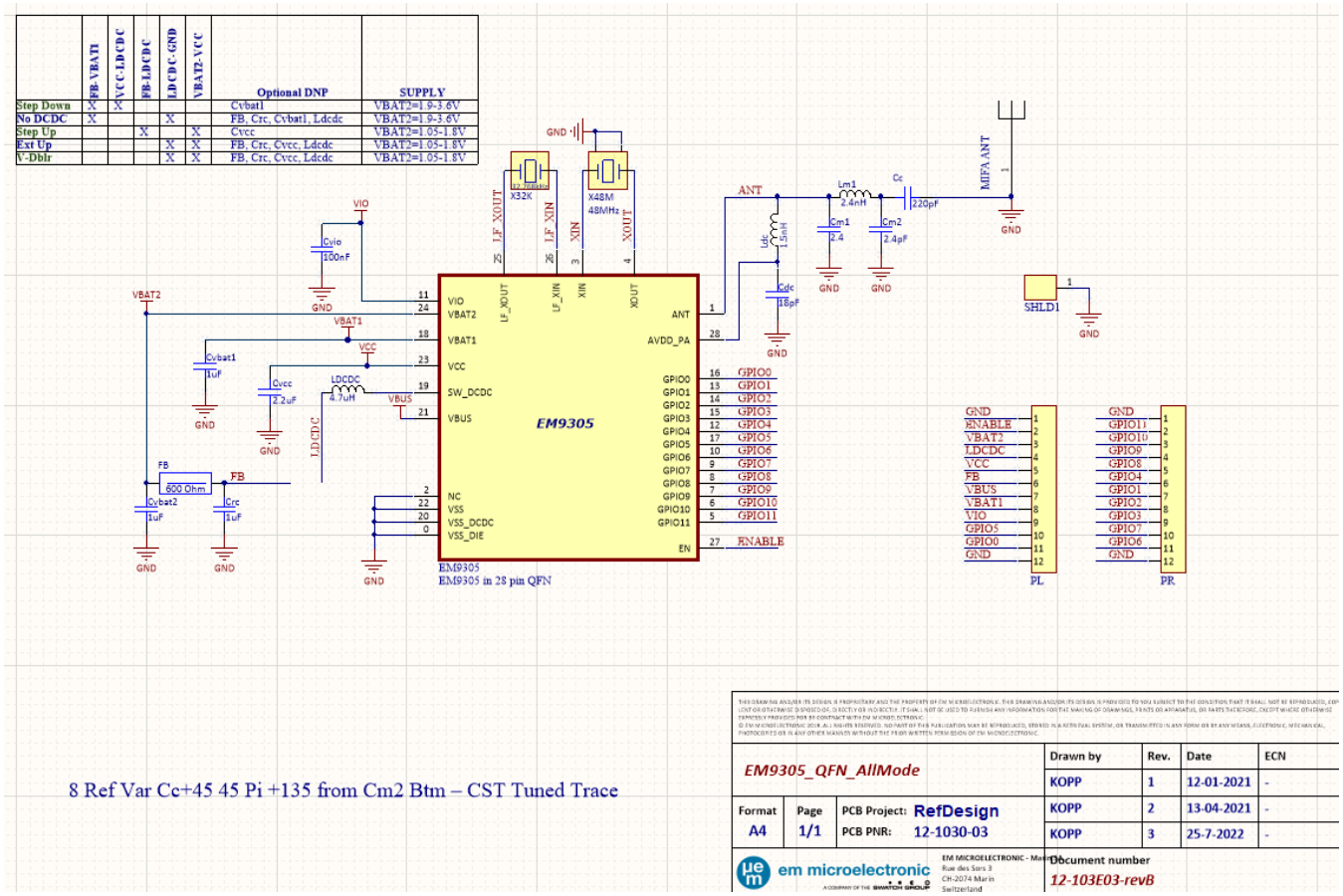
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

ORDERING INFORMATION

The following products can be ordered directly from the EM Microelectronics website:

Part Number	Description	Container	Units per Container
EMDVK9305SOC	Bluetooth Low Energy SOC Development Kit	Box	1
EMREF9305QFN	EM9305 QFN Module	-	1

1. SCHEMATIC



2. REGULATORY

EM9305V1 is modular certified and complies with the following regulatory requirements:

2.1. USA-FCC

- Single Modular Transmitter
- EMC

  FCC CFR 47, Part 15, Subpart B (10-1-17 Edition), Secs. 15.109

- RF

  FCC Part 15.247, 10-1-20 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.
  FCC Part 15.209, 10-1-20 Edition: Radiated emission limits; general requirements

2.2. CANADA-IC

- EMC

  ICES-003 Issue 7 – Update October (2020)

- RF

  RSS-247 Issue 2 (February 2017).
  RSS-Gen Issue 5 (March 2019).

2.3. CE

EM Microelectronic, as the responsible party for regulatory compliance, declares under our sole responsibility that as delivered the described product is in conformity with the RED Radio Equipment Directive 2014/53/EU, following the provisions of ERP Directive 2009/125/EC, EU RoHS Directive 2011/65/EU, including the amendment 2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, and carries the CE-marking. Refer to emmicroelectronic.com for the signed declaration.

- EMC

  ETSI EN 301 489-1 V2.2.3
  ETSI EN 301 489-17 V3.2.4

- RF

  ETSI EN 300 328 v2.2.2 (2019-07):

- Safety

  The equipment is supplied by an external power supply that complies with ES1 and PS1 requirements according to IEC 62368-1.

  The PCB and mounted components are UL-94 listed for V-0 minimum.

2.4. REGULATORY INFORMATION USA

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.
This device is only FCC authorized for the specific rule parts listed on the grant. The 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.
The host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.
The host product manufacturer needs to take into consideration simultaneously transmitting modules or other transmitters in a host product.

CLASS B DEVICE NOTICE

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.

RF EXPOSURE SAFETY

This device meets the SAR Test Exclusion threshold specified in KDB447498 and is authorized for portable and mobile operation for a usage at a distance of 1cm or greater. The host product manufacturer shall provide a minimum of 1cm to the human body.

PERMITTED ANTENNA

This radio transmitter model, FCC ID: 2ACQR-EM9305V1 has been approved by FCC to operate with the integrated PCB antenna (see below with the maximum gain indicated). It isn't possible to use any other antenna.

Type	**Max Gain**
Integrated PCB IFA	1.7 dBi

LABELLING REQUIREMENTS FOR THE HOST DEVICE

The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the IC of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains FCC ID: **2ACQR-EM9305V1**

2.5. REGULATORY INFORMATION CANADA

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorisation de l'utilisateur d'utiliser l'équipement.

This device complies with Industry Canada's license-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF EXPOSURE SAFETY

According to "RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", paragraph "2.5.1 Exemption Limits for Routine Evaluation – SAR Evaluation", the device operates below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance. The evaluation has been done at a distance of 1cm.

PERMITTED ANTENNA

This radio transmitter model, IC: 12155A-EM9305V1 has been approved by the ISED to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Type	**Max Gain**
Integrated PCB IFA	1.7 dBi

Le présent émetteur radio modèle, IC: 12155A-EM9305V1 a été approuvé par ISDE pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Type	**Max Gain**
Integrated PCB IFA	1.7 dBi

CAN ICES-3 (B)/NMB-3(B)

This Class B digital apparatus complies with Canadian ICES-003

Cet appareil numérique de clase B est conforme à la norme Canadienne ICES-003

LABELLING REQUIREMENTS FOR THE HOST DEVICE

The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the IC of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

***Contains* IC*:* 12155A-EM9305V1**

L'équipement hôte doit être correctement étiqueté pour identifier les modules dans l'équipement. L'étiquette de certification du module doit être clairement visible en tout temps lorsqu'il est installé dans l'hôte, l'équipement hôte doit être étiqueté pour afficher l'IC du module, précédé des mots "Contient le module émetteur", ou le mot "Contient", ou un libellé similaire exprimant la même signification, comme suit:

Contains IC: 12155A-EM9305V1