Usage Instructions

This equipment (WBZ350) is a module and not a finished product. It is not directly marketed or sold to the general public through retail; it is only sold through authorized distributors or through Microchip. Using this equipment requires a significant engineering expertise towards understanding of the tools and relevant technology, which can be expected only from a person who is professionally trained in the technology. The user must comply with all the instructions provided by the Grantee, which indicate installation and/or operating conditions necessary for compliance.

WBZ350- Module description

The PIC32CX-BZ3 Family is a general purpose low-cost 32-bit Microcontroller (MCU) with BLE or Zigbee connectivity, hardware-based security accelerator, transceiver, Transmit/Receive (T/R) switch, Power Management Unit (PMU) and so on.

The WBZ350 is a fully certified module with BLE and Zigbee capabilities.

It contains the PIC32CX-BZ3 SoC and an integrated Power amplifier, Low Noise Amplifier (LNA), Transmitter/Receiver (TX/RX) switch and mixer; reference 16MHz crystal with following antenna options:

• PCB Antenna

• u.FL Connector for External Antenna

The radio architecture in PIC32CX-BZ3 is based on a direct conversion topology for Transmit employing a fully integrated synthesizer. The receiver is a low IF receiver and has an on-chip LNA, while the transmitter utilizes a high efficiency switching power amplifier with 1dB step power control from -24dBm to +11dBm.

Features and supported Modulation and data rates

Parameter	BLE	Zigbee	Proprietary
Frequency Range	2402MHz to 2480MHz	2405MHz to 2480MHz	2405MHz to 2480MHz
Number of channels	40 channels	16 channels	16 channels
Modulation	GFSK	OQPSK	OQPSK
Modes/data rates	1M, 2M 500kbps, 125kbps	250kbps	500kbps, 1M, 2M
Bandwidth	2MHz	2MHz	2MHz

The module variants integrate Trust&GO option. The Trust&GO is a pre-configured and pre-provisioned secure element of Microchip's family of security focused devices.

The PIC32CX-BZ3 Family supports rich set of standard peripherals such as BLE, Zigbee, SPI, I2C, TCC, and so on.

WBZ350 Module has 13.4x 18.7 x 2.8 mm dimension. Module operating voltage is 1.9V to 3.6V and powered by typical 3.3V Supply (VDD) with the operating temperature from -40°C to +85°C, and an optional external 32.768KHz Real time clock or crystal. VDD supplies on chip voltage regulators. VDD also powers Input and Output interface circuitries to communicate with host processor via Industry Standard Interface protocol. On chip Buck/ voltage regulator outputs 1.35V for RF transceiver and digital core circuitries.

After application of VDD and NMCLR signals, Internal SoC microprocessor executes boot-up sequence and executes the firmware stored in the memory complaining to BLE and Zigbee protocols specifications.

The SoC also supports a packet level arbitration to ensure the BLE and Zigbee MAC layers can use the common PHY layer.

Module Variant description

Model Number	Description
WBZ350PE	Module with PCB antenna
WBZ350PC	Module with PCB antenna and Trust&Go
WBZ350UE	Module with u.FL connector for external antenna
WBZ350UC	Module with u.FL connector for external antenna and Trust&Go
RNBD350PE	Same hardware as WBZ350PE with different application software
RNBD350PC	Same hardware as WBZ350PC with different application software
RNBD350UE	Same hardware as WBZ350UE with different application software
RNBD350UC	Same hardware as WBZ350UC with different application software

WBZ350

WBZ350_Regulatory Approval

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1. Appendix A: Regulatory Approval

The WBZ350 module(1) has received regulatory approval for the following countries:

- Bluetooth Special Interest Group (SIG) QDID:
  - WBZ350 with Class 1(2) : TBD
- United States/FCC ID: 2ADHKWBZ350
- Canada/ISED:
  - IC: 20266-WBZ350
  - HVIN: WBZ350PE, WBZ350UE, WBZ350PC, WBZ350UC, RNBD350PE, RNBD350UE, RNBD350PC, RNBD350UC
  - PMN: Wireless MCU module with BLE 5.2 compliant and Zigbee 3.0 Radio
- Europe/CE
- Japan/MIC: TBD
- Korea/KCC: TBD
- Taiwan/NCC: TBD
- China/SRRC: CMIIT ID: TBD

1.1 United States

The WBZ350 module has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C “Intentional Radiators” single-modular approval in accordance with Part 15.212 Modular Transmitter approval. Single-modular transmitter approval is defined as a complete RF transmission sub-assembly, designed to be incorporated into another device, that must demonstrate compliance with FCC rules and policies independent of any host. A transmitter with a modular grant can be installed in different end-use products (referred to as a host, host product or host device) by the grantee or other equipment manufacturer, then the host product may not require additional testing or equipment authorization for the transmitter function provided by that specific module or limited module device.

The user must comply with all the instructions provided by the Grantee, which indicate installation and/or operating conditions necessary for compliance.

A host product itself is required to comply with all other applicable FCC equipment authorization regulations, requirements, and equipment functions that are not associated with the transmitter module portion. For example, compliance must be demonstrated: to regulations for other transmitter components within a host product; to requirements for unintentional radiators (Part 15 Subpart B), such as digital devices, computer peripherals, radio receivers, etc.; and to additional authorization requirements for the non-transmitter functions on the transmitter module (i.e., Suppliers Declaration of Conformity (SDoC) or certification) as appropriate (e.g., Bluetooth and Wi-Fi transmitter modules may also contain digital logic functions).

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

1.1.1 Labeling and User Information Requirements

The WBZ350 module has been labeled with its own FCC ID number, and if the FCC ID is not visible when the module is installed inside another device, then the outside of the finished product into which the module is installed must display a label referring to the enclosed module. This exterior label must use the following wording:

> Contains Transmitter Module FCC ID: 2ADHKWBZ350
>
> or
>
> Contains FCC ID: 2ADHKWBZ350
>
> **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**.

The user's manual for the finished product must include the following statemen:

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

Additional information on labeling and user information requirements for Part 15 devices can be found in KDB Publication 784748, which is available at the FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB) apps.fcc.gov/oetcf/kdb/index.cfm.

1.1.2 RF Exposure

All transmitters regulated by FCC must comply with RF exposure requirements. KDB 447498 General RF Exposure Guidance provides guidance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to Radio Frequency (RF) fields adopted by the Federal Communications Commission (FCC).

From the FCC Grant: Output power listed is conducted. This grant is valid only when the module is sold to OEM integrators and must be installed by the OEM or OEM integrators. This transmitter is restricted for use with the specific antenna(s) tested in this application for Certification and must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except in accordance with FCC multi-transmitter product procedures.

WBZ350: These modules are approved for installation into mobile host platforms at least 20cm away from the human body.

1.1.3 Helpful Web Sites

- Federal Communications Commission (FCC): www.fcc.gov.
- FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB) apps.fcc.gov/oetcf/kdb/index.cfm.

1.2 Canada

The WBZ350 module has been certified for use in Canada under Innovation, Science and Economic Development Canada (ISED, formerly Industry Canada) Radio Standards Procedure (RSP) RSP-100, Radio Standards Specification (RSS) RSS-Gen and RSS-247. Modular approval permits the installation of a module in a host device without the need to recertify the device.

1.2.1 Labeling and User Information Requirements

Labeling Requirements (from RSP-100 - Issue 12, Section 5): The host product shall be properly labeled to identify the module within the host device.

The Innovation, Science and Economic Development Canada certification label of a module shall be clearly visible at all times when installed in the host device; otherwise, the host product must be labeled to display the Innovation, Science and Economic Development Canada certification number of the module, preceded by the word “Contains” or similar wording expressing the same meaning, as follows:

Contains IC: 20266-WBZ350

User Manual Notice for License-Exempt Radio Apparatus (from Section 8.4 RSS-Gen, Issue 5, February 2021): User manuals for license-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both:

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference;

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Transmitter Antenna (From Section 6.8 RSS-GEN, Issue 5, February 2021): User manuals, for transmitters shall display the following notice in a conspicuous location:

This radio transmitter [IC: 20266-WBZ350] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC: 20266-WBZ350] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés cidessous 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 pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi) and required impedance for each.

1.2.2 RF Exposure

All transmitters regulated by Innovation, Science and Economic Development Canada (ISED) must comply with RF exposure requirements listed in RSS-102 - Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).

This transmitter is restricted for use with a specific antenna tested in this application for certification, and must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except in accordance with Canada multi-transmitter product procedures.

WBZ350: The device operates at an output power level which is within the ISED SAR test exemption limits at any user distance > 20cm.

Tous les émetteurs réglementés par Innovation, Sciences et Développement économique Canada (ISDE) doivent être conformes à RF Exigences d'exposition énumérées dans RSS-102 - Conformité à l'exposition aux radiofréquences (RF) des radiocommunications Appareil (toutes les bandes de fréquences).
Cet émetteur est limité à une utilisation avec une antenne spécifique testée dans cette application pour la certification, et ne doit pas être colocalisé ou fonctionnant en conjonction avec toute autre antenne ou émetteur au sein d'un appareil hôte, sauf dans conformément aux procédures relatives aux produits multi-transmetteurs du Canada.
WBZ350 : l'appareil fonctionne à un niveau de puissance de sortie qui se situe dans les limites d'exemption des tests ISDE SAR à tout moment. distance utilisateur > 20 cm.

1.2.3 Helpful Web Sites

Innovation, Science and Economic Development Canada (ISED): www.ic.gc.ca/.

1.3 Europe

The WBZ350 module has is/are a Radio Equipment Directive (RED) assessed radio module that is CE marked and has been manufactured and tested with the intention of being integrated into a final product.

The WBZ350 module has has/have been tested to RED 2014/53/EU Essential Requirements mentioned in the following European Compliance table.

Table 1-1. European Compliance Information

Certification	Standard	Article
Safety	EN 62368	3.1a
Health	EN 62311	
EMC	EN 301 489-1	3.1b
	EN 301 489-17	
Radio	EN 300 328	3.2

The ETSI provides guidance on modular devices in the "*Guide to the application of harmonised standards covering articles 3.1b and 3.2 of the RED 2014/53/EU (RED) to multi-radio and combined radio and non- radio equipment*" document available at http://www.etsi.org/deliver/etsi_eg/203300_203399/20 3367/01.01.01_60/ eg_203367v010101p.pdf.

Note: To maintain conformance to the standards listed in the preceding European Compliance table, the module shall be installed in accordance with the installation instructions in this data sheet and shall not be modified. When integrating a radio module into a completed product, the integrator becomes the manufacturer of the final product and is therefore responsible for demonstrating compliance of the final product with the essential requirements against the RED.

1.3.1 Labeling and User Information Requirements

The label on the final product that contains the WBZ350 module has must follow CE marking requirements.

1.3.2 Conformity Assessment

From ETSI Guidance Note EG 203367, section 6.1, when non-radio products are combined with a radio product:

If the manufacturer of the combined equipment installs the radio product in a host non-radio product in equivalent assessment conditions (i.e. host equivalent to the one used for the assessment of the radio product) and according to the installation instructions for the radio product, then no additional assessment of the combined equipment against article 3.2 of the RED is required.

1.3.2.1 Simplified EU Declaration of Conformity

Hereby, Microchip Technology Inc. declares that the radio equipment type WBZ350 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity, for this product, is available at www.microchip.com/design-centers/ wireless-connectivity/.

1.3.3 Helpful Websites

A document that can be used as a starting point in understanding the use of Short Range Devices (SRD) in Europe is the European Radio Communications Committee (ERC) Recommendation 70-03 E, which can be downloaded from the European Communications Committee (ECC) at: http://www.ecodocdb.dk/.

Additional helpful web sites are:

- Radio Equipment Directive (2014/53/EU): https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/red_en
- European Conference of Postal and Telecommunications Administrations (CEPT): http://www.cept.org
- European Telecommunications Standards Institute (ETSI): http://www.etsi.org
- The Radio Equipment Directive Compliance Association (REDCA): http://www.redca.eu/

1.4 Other Regulatory Information

- For information about other countries' jurisdictions not covered here, refer to the www.microchip.com/design-centers/wireless-connectivity/certifications.
- Should other regulatory jurisdiction certification be required by the customer, or the customer needs to recertify the module for other reasons, contact Microchip for the required utilities and documentation.

1.5 List of certified antennae

Sl.No	Part Number	Vendor	Antenna type	Gain	Comment
1	W3525B039	Pulse	PCB	2dBi	Cable Length 100mm
2	RFDPA870915IMAB306	WALSIN	Dipole	1.82dBi	150mm
3	001-0016	LSR	PIFA	2.5dBi	Flex PIFA antenna
4	001-0001	LSR	Dipole	2dBi	RPSMA connector*
5	1461530100	Molex	PCB	3dBi	100mm (Dual Band)
6	ANT-2.4-LPW-125	Linx Technologies	Dipole	2.8dBi	125mm
7	RFA-02-P05-D034	Alead	PCB	2dBi	150mm
8	RFA-02-P33-D034	Alead	PCB	2dBi	150mm
9	ABAR1504-S2450	ABRACON	PCB	2.28dBi	250mm
	WBZ350	Microchip	PCB	2.9dBi	-