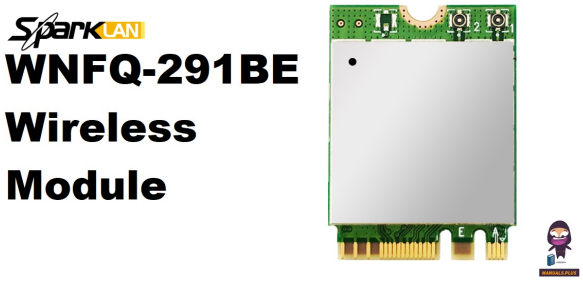
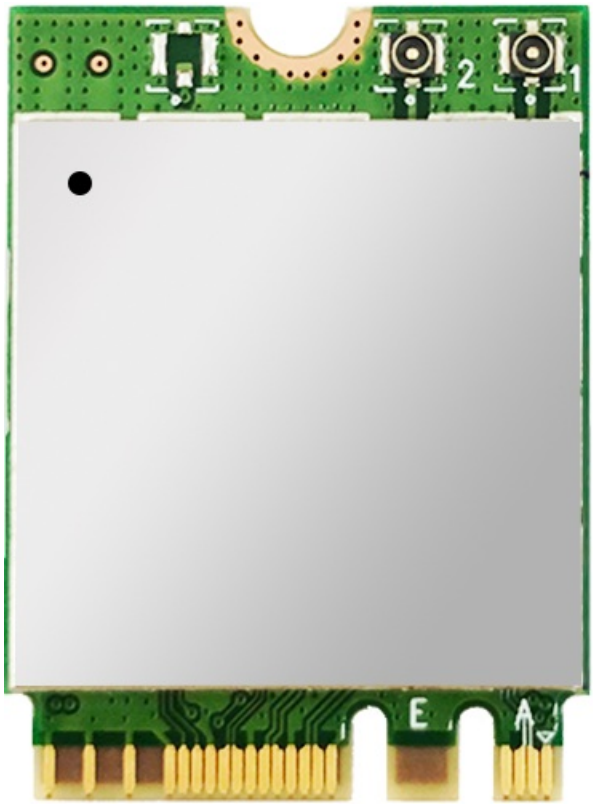


SparkLAN WNFQ-291BE Wireless Module Owner's Manual

Contents

SparkLAN WNFQ-291BE Wireless Module



Specification

Standards	IEEE 802.11be/ax/ac/a/b/g/n (2T2R) Bluetooth V5.4,V5.3,V5.2, V5.1, V5.0, V4.2, V4.1, V4.0LE, V3.0, V2.1+EDR
Chipset	Qualcomm WCN7851
Data Rate	802.11b: 11Mbps 802.11a/g: 54Mbps 802.11n: MCS0~15 802.11ac: MCS0~9 802.11ax: MCS0~13 802.11be: MCS0~13 Bluetooth: 1 Mbps, 2Mbps and Up to 3Mbps
Operating Frequency	IEEE 802.11 be/ax/ac/a/b/g/n ISM Band, 2.412GHz~2.483GHz, 5.150GHz~5.850GHz ,5.925~7.125GHz *Subject to local regulations
Interface	WLAN: PCIe Bluetooth: USB
Form Factor	M.2 2230 E Key
Antenna	2 x IPEX MHF4 connectors Ant 1: WiFi/BT Ant 2: WiFi/BT
Modulation	Wi-Fi: 802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM) 802.11be: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM,

	4096-QAM) BT: Header: GFSK Payload 2M: π/4-DQPSK Payload 3M: 8-DPSK
Power Consumption	11be TX mode: 1250 mA (MAX) RX mode: 1200 mA (MAX)
Operating Voltage	DC 3.3V
Operating Temperature Range	-10°~70°C (Operating)
Storage Temperature Range	-10°~70°C
Humidity **(Non-Condensing)**	5%~90% (Operating) 5%~90% (Storing)
Dimension L x W x H (in mm)	30mm(± 0.15mm) x 22mm(± 0.15mm) x 2.5mm(± 0.3mm)
Weight (g)	3.42g
Driver Support	Win11/Linux (Open Source) (TBD)
Security	WPS2.0, WAPI, WPA, WPA2, WPA3

Installation

- Connect the Module to the PCIe slot of the computer.
- Install Wi-Fi driver driver.
- After the Wi-Fi Driver is installed, click the Network icon on the Windows, then search the network, and connect to the Wireless Network you want.

FCC STATEMENT

Federal Communication Commission Interference 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, under 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 under 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to 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.

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

- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
- This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

FOR PORTABLE DEVICE USAGE (<20m from body/SAR needed)
Radiation Exposure Statement
The product complies with the FCC portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. Further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such a function is available.

Body-worn Operation

- This device was tested for typical body-worn operations.
- To comply with RF exposure requirements, a minimum separation distance of 5 mm must be maintained between the user's body and the handset, including the antenna.
- Third-party belt clips, holsters, and similar accessories used by this device should not contain any metallic components.
- Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided.

The product complies with the FCC portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. To comply with RF exposure requirements, a minimum separation distance of 5 mm must be maintained between the user's body including the antenna.

6e indoor device

- For 6CD (Dual Client)
- Statement in manual
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

KDB 996369 D03 OEM Manual v01 rule sections:

- List of applicable FCC rules
- This module has been tested for compliance to FCC Part 15.247, 15.407

Summarize the specific operational use conditions

- The module is tested for standalone mobile RF exposure use conditions.
- Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

NII-4 Client

- This module is authorized for client device applications under the control of an indoor access point or subordinate.
- The final host product must comply with the following operational restrictions:
- Cannot have a direct connection to the internet to source the internet to other clients, access points, subordinates or clients from a wired or direct connection.

6CD

- This module is authorized for Dual Client (6CD) device applications.
- The final host product must comply with the following operational restrictions:
- Cannot connect directly to any other client device;
- Cannot source internet/network (obtained via wired connection or other means such as cellular) to other clients, access points, and subordinate devices or provide any direct peer-to-peer connections to other clients or subordinates;
- Is prohibited to control of or communicate with unmanned aircraft systems.

Limited module procedures

- Not applicable.

Trace antenna designs

- Not applicable.

RF exposure considerations

- This equipment complies with FCC mobile 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 & your body.
- If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

Antennas

- The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module, except as described below.
- The antenna must be installed such that 20 cm can be maintained between the antenna and users.

For 6CD:

- Demonstration of compliance to Contention-Based Protocol requirements across UNII- 5/6/7/8 bands has been determined using the lowest antenna gain of 5.16dBi.
- The use of antennas with a gain lower than this will require a separate Class II permissive change re-evaluation or new certification.

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain0/1	Hong-Bo	260-25094	3.53 3.06 3.07 4.81 4.2	2.4~2.4835GHz 5.15~5.25GHz 5.25~5.35GHz 5.47~5.725GHz 5.725~5.850GHz	0.74 1.16 1.18 1.26 1.28	PIFA	MHF 4L	300mm
2	Chain0/1	Hong-Bo	260-25083	5.09 5.14 5.09 5.16 5.12	5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	1.29 1.35 1.38 1.45 1.50	PIFA	MHF 4L	300mm
3	Chain0/1	Hong-Bo	260-25084	3.22 3.35 3.42 4.77 4.72 4.71 4.75 4.29 4.81 4.74	2.4~2.4835 GHz 5.150~5.250 GHz 5.250~5.350 GHz 5.470~5.725 GHz 5.725~5.850 GHz 5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	0.49 0.76 0.77 0.80 0.84 0.84 0.86 0.91 0.96 0.98	Monopole	MHF 4L	200mm

Label and compliance information

- The final end product must be labeled in a visible area with the following: “Contains FCC ID: RYK-WNFQ291BEBT”. The grantee’s FCC ID can be used only when all FCC compliance requirements are met.
- The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product that integrates this module.
- The end product user manual shall include all required regulatory information/warnings as shown in this manual.

Information on test modes and additional testing requirements

- This transmitter is tested in a standalone mobile RF exposure condition and any colocated or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-

evaluation or new certification.

Additional testing, Part 15 Subpart B disclaimer

- This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.
- OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.
- As long as all conditions above are met, further transmitter tests will not be required.
- However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed.

Note EMI Considerations

- Please follow the guidance provided for host manufacturers in KDB publications 996369 D02 and D04.

How to make changes

- Only Grantees are permitted to make permissive changes. Please contact us should the host integrator expect the module to be used differently than as granted:
- Grady Lin / CTO

IMPORTANT NOTE: If these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is 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 reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

CONTACT

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Documents / Resources

	**SparkLAN WNFQ-291BE Wireless Module** [pdf] Owner's Manual WNFQ291BEBT, RYK-WNFQ291BEBT, RYKWNFQ291BEBT, WNFQ-291BE Wireless Module, WNFQ-291BE, Wireless Module, Module

References

- **User Manual**