Telecom SW-L Wi-Fi Module User Manual

Contents

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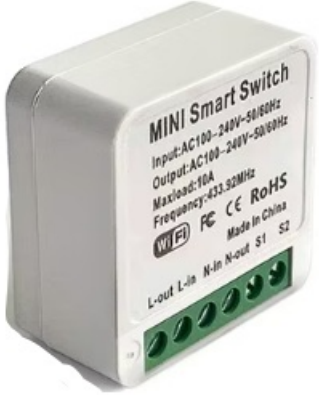
Telecom SW-L Wi-Fi Module



Product Specifications

- **Product Name:** Wi-Fi Module Series
- **Model:** FC06E_Hardware_Design
- **Wi-Fi Standards:** IEEE 802.11a/b/g/n/ac/ax 2.4 GHz and 5 GHz
- **Power Consumption:** Low power consumption

Product Usage Instructions

General Description

The Wi-Fi module is designed for seamless integration of Wi-Fi technologies. It supports various Wi-Fi standards for both 2.4 GHz and 5 GHz frequencies.

RF Performances

- **Wi-Fi RF Performance**

  The module provides specific Wi-Fi transmitting and receiving performances as detailed in the provided tables.
- **Wi-Fi Tx Power at 2.4 GHz**

  The module's Wi-Fi transmission power at 2.4 GHz varies based on the specific Wi-Fi standard and conditions. Refer to Table 25 for detailed power levels.
- **Wi-Fi Tx Power at 5 GHz**

  Similarly, the module's Wi-Fi transmission power at 5 GHz is detailed in Table 26 for different Wi-Fi standards and conditions.
- **Wi-Fi Rx Sensitivity**

  The Wi-Fi module's receiving sensitivity at both 2.4 GHz and 5 GHz frequencies is provided in Tables 27 and 28, respectively.

Warning – Antenna Installation

When installing the antenna for the Wi-Fi module, ensure that there is a minimum distance of 25 cm between the antenna and users. The transmitter module should not be placed near other transmitters or antennas. Only antennas with specified gains may be used, and the maximum allowed antenna gain is 1 dBi for external monopole antennas.

General Description

The module is a Wi-Fi module with low power consumption. It is a single-die Wi-Fi solution supporting IEEE 802.11a/b/g/n/ac/ax 2.4 GHz and 5 GHz Wi-Fi standards, which enables seamless integration of Wi-Fi technologies.

RF Performances

The following tables summarize the Wi-Fi transmitting and receiving performances of the module.

Wi-Fi RF Performances

Table 25: Wi-Fi Tx Power at 2.4 GHz (Unit: dBm)

Description VDD_FEM = 5 V	Typ.	Tolerance
802.11b @ 1 Mbps	20	±2 dB
802.11b @ 11 Mbps	20	±2 dB
802.11g @ 6 Mbps	20	±2 dB
802.11g @ 54 Mbps	19	±2 dB
802.11n, HT20 @ MCS 0	20	±2 dB
802.11n, HT20 @ MCS 7	18.5	±2 dB
802.11n, HT40 @ MCS 0	20	±2 dB
802.11n, HT40 @ MCS 7	18.5	±2 dB
802.11ax, HE20 @ MCS 0	20	±2 dB
802.11ax, HE20 @ MCS 11	17.5	±2 dB
802.11ax, HE40 @ MCS 0	20	±2 dB
802.11ax, HE40 @ MCS 11	17.5	±2 dB
Description VDD_FEM = 3.3 V	**Typ.**	**Tolerance**
802.11b @ 1 Mbps	19	±2 dB
802.11b @ 11 Mbps	19	±2 dB

	802.11g @ 6 Mbps	17	±2 dB	
	802.11g @ 54 Mbps	15	±2 dB	
	802.11n, HT20 @ MCS 0	17	±2 dB	

802.11n, HT20 @ MCS 7	15	±2 dB
802.11n, HT40 @ MCS 0	17	±2 dB
802.11n, HT40 @ MCS 7	15	±2 dB
802.11ax, HE20 @ MCS 0	17	±2 dB
802.11ax, HE20 @ MCS 11	14	±2 dB
802.11ax, HE40 @ MCS 0	17	±2 dB
802.11ax, HE40 @ MCS 11	14	±2 dB

Table 26: Wi-Fi Tx Power at 5 GHz (Unit: dBm)

Description VDD_FEM = 5 V	**Typ.**	**Tolerance**
802.11a @ 6 Mbps	20	±2 dB
802.11a @ 54 Mbps	19	±2 dB
802.11n, HT20 @ MCS 0	20	±2 dB
802.11n, HT20 @ MCS 7	18.5	±2 dB
802.11n, HT40 @ MCS 0	20	±2 dB
802.11n, HT40 @ MCS 7	18.5	±2 dB
802.11ac, VHT20 @ MCS 0	20	±2 dB
802.11ac, VHT20 @ MCS 8	17.5	±2 dB
802.11ac, VHT40 @ MCS 0	20	±2 dB
802.11ac, VHT40 @ MCS 9	17.5	±2 dB
802.11ac, VHT80 @ MCS 0	20	±2 dB
802.11ac, VHT80 @ MCS 9	17	±2 dB
802.11ax, HE20 @ MCS 0	20	±2 dB
802.11ax, HE20 @ MCS 11	17	±2 dB
802.11ax, HE40 @ MCS 0	20	±2 dB

802.11ax, HE40 @ MCS 11	17	±2 dB
802.11ax, HE80 @ MCS 0	20	±2 dB
802.11ax, HE80 @ MCS 11	16.5	±2 dB
Description VDD_FEM = 3.3 V	**Typ.**	**Tolerance**
802.11a @ 6 Mbps	18	±2 dB
802.11a @ 54 Mbps	16.5	±2 dB
802.11n, HT20 @ MCS 0	18	±2 dB
802.11n, HT20 @ MCS 7	16	±2 dB
802.11n, HT40 @ MCS 0	18	±2 dB
802.11n, HT40 @ MCS 7	16	±2 dB
802.11ac, VHT20 @ MCS 0	18	±2 dB
802.11ac, VHT20 @ MCS 8	15.5	±2 dB
802.11ac, VHT40 @ MCS 0	18	±2 dB
802.11ac, VHT40 @ MCS 9	15.5	±2 dB
802.11ac, VHT80 @ MCS 0	17.5	±2 dB
802.11ac, VHT80 @ MCS 9	15	±2 dB
802.11ax, HE20 @ MCS 0	18	±2 dB
802.11ax, HE20 @ MCS 11	15	±2 dB
802.11ax, HE40 @ MCS 0	18	±2 dB
802.11ax, HE40 @ MCS 11	15	±2 dB
802.11ax, HE80 @ MCS 0	17.5	±2 dB
802.11ax, HE80 @ MCS 11	14	±2 dB

Table 27: Wi-Fi Rx Sensitivity at 2.4 GHz (Unit: dBm)

Description VDD_FEM = 5 V or 3.3V Typ. Tolerance

802.11b @ 1 Mbps	-95	±2 dB
802.11b @ 11 Mbps	-89	±2 dB
802.11g @ 6 Mbps	-93	±2 dB
802.11g @ 54 Mbps	-75	±2 dB
802.11n, HT20 @ MCS 0	-91	±2 dB
802.11n, HT20 @ MCS 7	-72	±2 dB
802.11n, HT40 @ MCS 0	-89	±2 dB
802.11n, HT40 @ MCS 7	-70	±2 dB
802.11ax, HE20 @ MCS 0	-91	±2 dB
802.11ax, HE20 @ MCS 11	-63	±2 dB
802.11ax, HE40 @ MCS 0	-90	±2 dB
802.11ax, HE40 @ MCS 11	-61	±2 dB

Table 28: Wi-Fi Rx Sensitivity at 5 GHz (Unit: dBm)

Description VDD_FEM = 5 V or 3.3V	**Typ.**	**Tolerance**
802.11a @ 6 Mbps	-92	±2 dB
802.11a @ 54 Mbps	-74	±2 dB
802.11n, HT20 @ MCS 0	-91	±2 dB
802.11n, HT20 @ MCS 7	-72	±2 dB
802.11n, HT40 @ MCS 0	-88	±2 dB
802.11n, HT40 @ MCS 7	-70	±2 dB
802.11ac, VHT20 @ MCS 0	-91	±2 dB
802.11ac, VHT20 @ MCS 8	-70	±2 dB
802.11ac, VHT40 @ MCS 0	-90	±2 dB
802.11ac, VHT40 @ MCS 9	-65	±2 dB

802.11ac, VHT80 @ MCS 0	-86	±2 dB
802.11ac, VHT80 @ MCS 9	-61	±2 dB
802.11ax, HE20 @ MCS 0	-91	±2 dB
802.11ax, HE20 @ MCS 11	-63	±2 dB
802.11ax, HE40 @ MCS 0	-90	±2 dB
802.11ax, HE40 @ MCS 11	-60	±2 dB
802.11ax, HE80 @ MCS 0	-86	±2 dB
802.11ax, HE80 @ MCS 11	-58	±2 dB

Warning

1. This module is limited to installation in fixed applications, according to Part 2.1091(b).
2. Separate approval is required for all other operating configurations, including portable configurations concerning Part 2.1093 and different antenna configurations.

For FCC Part 15.31 (h) and (k):
The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out-of-band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or that emissions are compliant with the transmitter(s) rule(s). The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Antenna Installation

1. The antenna must be installed such that 25 cm is maintained between the antenna and users,
2. The transmitter module may not be co-located with any other transmitter or antenna. (3)Only antennas of the same type and with equal or less gains as shown below may be used with this module. Other types of antennas and/or higher gain antennas may require additional authorization for operation.
3. The max allowed antenna gain is 1 dBi for the external monopole antenna.

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/IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC/IC authorization.

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.

3. 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.
4. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used by 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.
5. 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.
6. The antenna must be installed such that 25 cm is maintained between the antenna and users, and
7. The transmitter module may not be co-located with any other transmitter or antenna.

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 a minimum distance of 25 cm between the radiator & your body.

Frequently Asked Questions

- **Q: What are the supported Wi-Fi standards for the Wi-Fi Module Series?**
  A: The Wi-Fi Module Series supports IEEE 802.11a/b/g/n/ac/ax standards for both 2.4 GHz and 5 GHz frequencies.
- **Q: What is the maximum allowed antenna gain for external antennas?**
  A: The maximum allowed antenna gain for external monopole antennas used with this module is 1 dBi.

Documents / Resources

	Telecom SW-L Wi-Fi Module [pdf] User Manual PX8-SW-LWIFI, PX8SWLWIFI, SW-L Wi-Fi Module, SW-L, Wi-Fi Module, Module

References

- User Manual