Fibocom FM350R-GL Sub 6GHz M.2 Module User Guide

Contents

Fibocom FM350R-GL Sub 6GHz M.2 Module

Specifications

- **Model:** FM350R-GL
- **Version:** V1.0
- **Form Factor:** M.2
- **Supported Systems:** NR/LTE/WCDMA
- **Supported OS:** Windows 11/Chrome/Linux
- **Power Supply:** DC 3.135V to 4.4V, typical 3.3V

Product Usage Instructions

Installation

Follow these steps to install the FM350R module:

1. Ensure your system is powered off and disconnected from any power source.
2. Locate the M.2 slot on your device.
3. Gently insert the FM350R module into the M.2 slot, ensuring proper alignment.
4. Secure the module in place using the provided screws.
5. Power on your system and proceed with the software installation.

Software Setup

To configure the FM350R module, you need to install the necessary drivers and software. Follow these steps:

1. Download the latest drivers from the manufacturer’s website.
2. Install the drivers on your system according to the provided instructions.
3. Reboot your system to apply the changes.
4. Verify the module is recognized by checking the device manager.

Troubleshooting

If you encounter any issues with the FM350R module, refer to the troubleshooting section of the user manual or contact customer support for assistance.

Notice

The document is subject to update from time to time owing to the product version upgrade or other reasons. Unless otherwise specified, the document only serves as the user guide. All the statements, information and suggestions contained in the document do not constitute any explicit or implicit guarantee.

Contact

Website: **https://www.fibocom.com/en/**
Address: Floor 10, Building A, Shenzhen International Innovation Valley, First Stone Road, Xili Community, Xili Street, Nanshan District, Shenzhen
Tel: +86 755-26733555

Foreword

Introduction

FM350R-GL (hereinafter referred to as FM350R) is a highly integrated 5G Sub-6 WWAN module which uses M.2 form factor interface. It supports GNSS and NR/LTE/WCDMA systems which can be applied to most cellular networks of mobile carrier in the world. When the host is in above OS mode, the module works in MBB mode. When the host is in below OS mode, the module can work in IOT mode.
This document describes the FM350R electrical characteristics and basic function.

Specification

RF Characteristics

FM350R RF characteristic is shown in Table 1.

Table 1. RF characteristics

Operating Band	
NR Sub-6	n1/2/3/5/7/8/12/14/20/25/26/28/30/38/40/41/48/66/71/771)/782)/79
FDD-LTE	B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/29/30/32/66/71
TDD-LTE	B34/38/39/40/41/42/43/48
UMTS/HSPA+	B1/2/4/5/8
GNSS	GPS/GLONASS/Galileo/BDS/QZSS
Data Throughput	
Sub-6 SA Peak	DL 4.67Gbps/UL 1.25Gbps
Sub-6 NSA Peak	DL 3.74Gbps/UL 835Mbps
LTE Peak	DL 1.6Gbps (CAT19)/UL 211Mbps (CAT18)
UMTS/HSPA+ Peak	DL UMTS: 384 kbps/UL 384 kbps
	DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7)

Modulation Characteristic	
	3GPP Release 15
NR Sub6 Modulation	200MHz 2 DLCA, 256 QAM
	200MHz 2 ULCA, 256 QAM
	15KHz/30KHz SCS for FDD/TDD
	3GPP Release 15
LTE Modulation	100MHz 5 DLCA, 256 QAM
	40MHz 2 ULCA, 256 QAM
UMTS Modulation	3GPP Release 8
RF Characteristic	
HPUE4)	n41/77/78/79
MIMO	NR DL 4×4 MIMO: n1/2/3/7/25/30/38/40/41/48/66/77/78/79
	LTE DL 4×4 MIMO: B1/2/3/4/7/25/30/38/40/41/42/43/48/66
SRS	n41/77/78/79
	1T2R/1T4R
Carrier Aggregation	
Sub-6 SA	DL 2CA, UL 2CA
Sub-6 NSA	DL LTE 5CA+ NR 1CA, LTE 3CA+ NR 2CA, UL LTE 2CA+ NR 1CA
LTE	DL 5CA, UL 2CA

1. Only enable 3450-3550MHz and 3700-3980MHz for FCC.
2. Only enable 3450-3550MHz and 3700-3800MHz for FCC.

Key Features

Table 2. Key features

Specification

CPU	MTK T700, 7nm process, ARM Cortex-A55, up to 1.5 GHz
Memory	4Gb LPDDR4X+4Gb NAND Flash
Supported OS	Windows 11/Chrome/Linux
Power Supply	DC 3.135V to 4.4V, typical 3.3V
	Normal operating temperature: –10°C to +55°C

Temperature	Extended operating temperature: –30°C to +75°C1)
	Storage temperature: –40°C to +85°C
Humidity	Operating relative humidity: <=95%
	Interface: M.2 Key-B
Physical Characteristics	Dimension: 30 mm x 52 mm x 2.3 mm
	Weight: TBD
Interface	
Antenna Connector	WWAN Antenna x 4
	Support 4×4 MIMO
	Dual SIM (one embedded eSIM), 1.8V/3V
	PCIe Gen3 x1
	USB 2.0
	USB 3.1 Gen1
Function Interface	W_Disable#
	SAR trigger
	LED
	MIPI/GPO for Tunable antenna
	I2C
Software	
Protocol Stack	IPV4/IPV6
AT Commands	3GPP TS 27.007
Firmware Update	PCIe or USB 2.0
Other Feature	Multiple carrier
	Windows update

3. When temperature goes beyond normal operating temperature range of- 10°C to +55°C, RF performance of module may be slightly off 3GPP specifications.

FCC Conformance information

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, 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 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.

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.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test 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.

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile applications, according to Part 2.1091(b).
3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations
4. 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 emissions are complaint with the transmitter(s) rule(s).

The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Important Note notice that any deviation(s) from the defined parameters of the antenna trace, as described by

the instructions, require that the host product manufacturer must notify to Fibocom Wireless Inc. that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

End Product Labeling

When the module is installed in the host device, the FCC label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: ZMOFM350RGL”

The FCC ID can be used only when all FCC compliance requirements are met.

Antenna Installation

1. The antenna must be installed such that 20 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.

In the event that 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 re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Antenna information

Band	Gain(dBi)	Type	Band	Gain(dBi)	Type
WCDMA Band 2	4	PIFA/Molopole	LTE Band 48	1	PIFA/Molopole
WCDMA Band 4	3		LTE Band 66	3	
WCDMA Band 5	3		LTE Band 71	3	
LTE Band 2	4		5G NR Band 2	4	
LTE Band 4	3		5G NR Band 5	3	
LTE Band 5	3		5G NR Band 7	3	
LTE Band 7	3		5G NR Band 12	3	
LTE Band 12	3		5G NR Band 14	3	
LTE Band 13	3		5G NR Band 25	4	
LTE Band 14	3		5G NR Band 26	3	
LTE Band 17	3		5G NR Band 30	1	
LTE Band 25	4		5G NR Band 38	3	
LTE Band 26	3		5G NR Band 41	3	
LTE Band 30	1		5G NR Band 48	1	
LTE Band 38	3		5G NR Band 66	3	
LTE Band 41	3		5G NR Band 71	3	
LTE Band 42	3		5G NR Band 77	3	
LTE Band 43	3		5G NR Band 78	3	

Manual Information to the End User
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 which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

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 minimum distance 20 cm between the radiator & your body.

IC Conformance information

Industry Canada Statement
This device complies with Industry Canada's licence-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.

Radiation Exposure Statement
This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This

equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test 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.

IMPORTANT NOTE:
In the event that these conditions cannot be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the 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 Canada authorization.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC:21374-FM350RGL”.

Manual Information To the End User
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 which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

CE Conformance information

The device could be used with a separation distance of 20cm to the human body.
Hereby, [Fibocom Wireless Inc.] declares that the radio equipment type [FM350R-GL] is in compliance with Directive 2014/53/EU.

Transmitting Power of EU bands
The transmitting power for each band of the RW350R module is shown in the following table:

RAT	Band	3GPP Requirement (dBm)	Tx Power (dBm)
	Band 1	24+1.7/-3.7	23.5±1
WCDMA			
	Band 8	24+1.7/-3.7	23.5±1
	Band 1	23±2.7	23±1
	Band 3	23±2.7	23±1
	Band 7	23±2.7	23±1
	Band 8	23±2.7	23±1
	Band 20	23±2.7	23±1
LTE	Band 28	23+2.7/-3.2	23±1
	Band 34	23±2.7	23±1
	Band 38	23±2.7	23±1
	Band 40	23±2.7	23±1
	Band 41	23±2.7	23±1
	Band 42	23+3/-4	23±1
	Band 43	23+3/-4	23±1
	n1	23±2.7	23±1
NR	n3	23±2.7	23±1
	n7	23±2.7	23±1

	n8	23±2.7	23±1
	n20	23±2.7	23±1
	n28	23+2.7/-3.2	23±1
	n38	23±2.7	23±1
	n40	23±2.7	23±1
	n41 (HPUE)	26+3/-4	26±1
	n41	23+3/-3	23±1
	n77 (HPUE)	26+3/-4	26±1
	n77	23+3/-4	23±1
	n78 (HPUE)	26+3/-4	26±1
	n78	23+3/-4	23±1

The max TX power is in primary RF path at ambient temperature 25°C.

NCC Conformance information

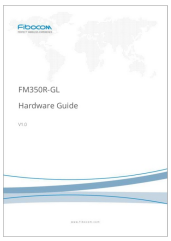
NCC Statement
Support WCDMA B1,B8/LTE B1,B3,B7,B8,B28,B38,B41/5G NR n1,n3.n7.n8.n28.n38,n41,n78,n79

Frequently Asked Questions

Q: What should I do if the module is not recognized by my system?
A: If the FM350R module is not recognized, first ensure it is properly installed in the M.2 slot and that the drivers are correctly installed. You can also try reseating the module and rebooting your system.

Q: Can the FM350R module be used with macOS?
A: No, the FM350R module is designed to work with Windows 11,Chrome, and Linux operating systems only.

Documents / Resources

	Fibocom FM350R-GL Sub 6GHz M.2 Module [pdf] User Guide FM350R-GL, FM350R-GL Sub 6GHz M.2 Module, Sub 6GHz M.2 Module, Module

References

- Global Leading Wireless Modules & IoT Solutions - Fibocom
- User Manual