Fibocom
PERFECT WIRELESS EXPERIENCE

FG190W-NA Hardware Guide

V1.0

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Applicable Models

No.	Applicable Model	Description
1	FG190W-NA	4/6/8+1 ANT, 1GB LPDDR4x+4GB eMMC, LTE: B2/4/5/7/12/13/14/17/25/26/29/30/38/41/42/43/48/66/71 SA: n2/5/7/12/13/14/25/26/29/30/38/41/48/66/70/71/77/78 NSA: n2/5/7/12/25/30/38/41/66/71/77/78

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Change History

V1.0 (2024-06-20)	Initial version.

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1 Foreword

1.1 Introduction

The document describes the electrical characteristics, RF performance, dimensions and application environment, etc. of FG190W-NA (hereinafter referred to as FG190W). With the assistance of the document and other instructions, the developers can quickly understand the hardware functions of FG190W modules and develop products.

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2 Overview

2.1 Introduction

The FG190W series module is a 5G module which supports NSA and SA network architectures. The FG190W integrates core devices such as Baseband, Memory, PMU, Transceiver, and PA. It supports 5G NR Sub6, FDD-LTE and TDD-LTE long-distance communication modes. Supports uplink 2×2 MIMO and downlink 4×4 MIMO multi-antenna configuration in SA mode. It also supports GNSS wireless positioning technology. The FG190W is designed in an LGA package and is suitable for a variety of eMBB scenarios, such as CPE, VR/AR, gateway, TV box, and intelligent monitoring.

2.2 Antenna Band Introduction

Table 1. Band Introduction

No	Project Description	Band Configuration
1	FG190W-NA 4/6/8+1 ANT SA: 2T4R NSA: 1T4R 1T2R	FDD-LTE: Band 2/4/5/7/12/13/14/17/25/26/29/ 30/66/71 TDD-LTE: Band 38/41/42/43/48 FDD-NR: n2/5/7/12/13/14/25/26/29/30/66/70/71 TDD-NR: n38/41/48/77/78 4x4 MIMO: n2/5/7/12/13/14/25/26/30/38/41/48/66/ 70/71/77/78 GNSS: GPS/GLONASS/BeiDou/Galileo/QZSS

2.3 Key Feature Introduction

Table 2. Key features

Type	Description	Project
Power Supply	DC: 3.3-4.4V, typical voltage: 3.8V	FG190W-NA
CPU	Qualcomm SDX75, 4nm process, Quad core Arm Corte A55 processor, up to 2.2 GHz	FG190W-NA
Firmware update	USB	FG190W-NA
Operating System	Linux	FG190W-NA
Memory	1GB LPDDR4x + 4GB eMMC	FG190W-NA
USB Interface	USB2.0 high speed (HS) interface, data transmission rate up to 480Mbps USB3.1 Gen2 Super-speed (SS) interface, data transmission rate up to 10Gbps	FG190W-NA
PCIe Interface	Three PCIe interfaces (All three support RC mode,	FG190W-NA

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	and only PCIE A supports EP mode): PCIe A: one lane PCIe Gen 4 or two lanes PCIe Gen 3 PCIe B: two lanes PCIe Gen 3 PCIe C: one lane PCIe Gen 3	
USXGMII Interface	Two 10 Gbps USXGMII interfaces for Ethernet	FG190W-NA
SIM Interface	Dual SIM: SIM1: 1.8/3V USIM SIM2: 1.8V USIM	FG190W-NA
I2Cs	I2C interface x2	FG190W-NA
PWM	PWM interface x4	FG190W-NA
ADCs	One A/D conversion channel	FG190W-NA
LTE	Support max DL 6CA Support max UL 2CA Support 3GPP R17 Support DL 256-QAM, UL 256-QAM Support RF bandwidth 1.4MHz–20MHz DL peak rate 2.0 Gbps (CAT20) UL peak rate 211Mbps (CAT18) DL 4×4 MIMO (Support Band B2/4/5/7/12/13/14/17/25/26/30/38/41/42/43/48/66/71)	FG190W-NA
SA	Support max DL 4CA Support max UL 2CA Support DL 256QAM, UL 256QAM Support RF bandwidth 5MHz–300MHz Support carrier spacing 15KHz (FDD) and 30KHz (TDD) FR1 DL peak rate 6.18Gbps FR1 UL peak rate 900Mbps FR1+FR2 DL peak rate 10Gbps FR1+FR2 DUL peak rate 3.38Gbps DL 4×4 MIMO (Support Band n2/5/7/12/13/14/25/26/30/38/41/48/66/70/71/77/78) UL 2×2 MIMO (n2/n25/41/48/66/70/71/77/78)	FG190W-NA
NSA	Support max DL LTE 5CA + NR 2CA	FG190W-NA

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	Support max UL LTE 1CA + NR 1CA LTE Modulation: DL 256QAM, UL 256QAM NR Modulation: DL 256QAM, UL 256QAM DL peak rate 5.95Gbps UL peak rate 555Mbps DL 4×4 MIMO LTE (Support Band B2/4/5/7/12/13/14/17/25/26/30/38/41/42/43 /48/66/71) DL 4×4 MIMO NR (Support Band n2/5/7/12/13/14/25/26/30/38/41/48/66/70/71/ 77/78)	
GNSS	GPS/GLONASS/BeiDou/Galileo/QZSS	FG190W-NA
Physical Characteristics	Dimension: 45 × 52 × 2.75 mm Package: 507 pin LGA Weight: 12g	FG190W-NA
Temperature	Normal operating temperature: -30 to 75℃[1] Extended operating temperature: -40 to 85℃[2] Storage temperature: -40 to 85℃	FG190W-NA

1. When temperature keeps in the range of –30 to 75°C, module can work normally. Module performance meets the 3GPP specifications.
2. When temperature keeps in the range of –40 to 85°C, module performance may be slightly out of 3GPP specifications.

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2.4.1 Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in fixed 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).

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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 ID 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: ZMOFG190WNA”
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.
(4)The max allowed antenna gain is **2.19 dB**i for external Dipole antenna.

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 Type	Bands	Peak Gain
Dipole	LTE B2	-1.85
	LTE B4	-2.98
	LTE B5	1.32
	LTE B7	-1.21
	LTE B12	1.61
	LTE 13	1.83
	LTE 14	2.19
	LTE 17	1.61
	LTE B25	-1.85
	LTE B26	1.32
	LTE B30	0.22
	LTE B66	-2.98
	LTE B71	1.61
	LTE B38	-1.21
	LTE B41	-1.21

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	LTE B42	-6.13
	LTE B43	-6.13
	LTE B48	-6.13
	5G NR n2	-1.85
	5G NR n5	1.32
	5G NR n7	-1.21
	5G NR n12	1.61
	5G NR n13	1.83
	5G NR n14	2.19
	5G NR n25	-1.85
	5G NR n26	1.32
	5G NR n30	0.22
	5G NR n66	-2.98
	5G NR n70	-2.86
	5G NR n71	1.61
	5G NR n38	-1.21
	5G NR n41	-1.21
	5G NR n48	-6.13
	5G NR n77	-6.13
	5G NR n78	-6.13

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.

2.4.2 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, 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.

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.

2.5 Antenna trace design

The trace reference design is as follows