

The logo for Fibocom, featuring the word "Fibocom" in a blue, sans-serif font. The letter "i" has a dot, and the "o"s are stylized. The logo is positioned in the upper left corner of the page, overlaid on a background of a world map made of small grey dots.

Fibocom

PERFECT WIRELESS EXPERIENCE

# FIBOCOM FN 189-GL Series

## Hardware Specification

V1.0.0

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# Foreword

## 1.1 Introduction

FN189 is to demonstrate the high-level feature set of the Qualcomm SC7280 core chipset when assembled into a representative form factor using standard techniques and commonly available components. Integrated baseband, PMIC, memory, Wi-Fi/BT and 5G Sub-6 supports NR/LTE/WCDMA systems and can be applied to most cellular networks of mobile carrier in the world. This module is available to customers as a fabricate yourself design.

The document describes the FN189-GL electrical characteristics and basic function.

## 1.2 Specification

### 1.2.1 RF Characteristic

FN189 RF characteristic is shown in Table 2.

Table 1. RF characteristic

| Operating Band |  |
|----------------|--|
| NR Sub-6       | n2/5/25/38/41/48/66/70/71/77           |
| FDD-LTE        | B2/4/5/12/13/14/25/26/30/66/71         |
| TDD-LTE        | B38/41/48                              |
| UMTS/HSPA+     | B2/4/5                                 |
| GNSS           | GPS/GLONASS/Galileo/BDS/QZS            |
| WLAN           | WLAN 2 × 2 802.11a/b/g/n/ac/ax MU-MIMO |
| Bluetooth      | BT 5.2                                 |

Modulation Characteristic

|            |                             |
|------------|-----------------------------|
|            | 3GPP Release 15             |
| NR Sub6    | 200MHz 2 DLCA, 256 QAM      |
| Modulation | 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       | 3GPP Release 8 |
| Modulation |                |

RF Characteristic

|      |                                      |
|------|--------------------------------------|
| HPUE | B38/41, n41/77                       |
|      | NR DL 4x4 MIMO: n2/25/38/41/48/66/77 |
| MIMO | NR UL 2x2 MIMO: n41/48/77            |
|      | LTE DL 4x4 MIMO: B2/4/25/41/48/66    |
|      | n41/77                               |
| SRS  | 1T2R/1T4R/2T4R                       |

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  |

## 1.2.2 Key Feature

Table 2. Key features

| Specification            |   |
|--------------------------|---|
| CPU                      | Qualcomm Kryo CPU built on Arm V8 Cortex 6nm process            |
| Memory                   | 8GB LPDDR4X +128GB eMMC   |
| OS                       | Chrome/Linux  |
| Power Supply             | DC 3.3V to 4.4V, typical 3.7V                                   |
| Temperature              | Normal operating temperature: -10°C to +55°C                    |
|                          | Extended operating temperature:                                 |
|                          | Storage temperature: -40°C to +85°C                             |
| Physical Characteristics | Dimension: 129 mm x 40 mm x 3.14 mm                             |
| Antenna Connector        | WWAN Antenna x 4  |
|                          | Support 4x4 MIMO  |
| Function Interface       | WLAN/BT x 2   |
|                          | Dual SIM (one embedded eSIM), 1.8V/3V                           |
|                          | One 4-lane DSI DSC1.2, D-PHY 1.2 or C-PHY 1.0.                  |
|                          | Two 4-lane CSIs, D-PHY 1.2 or C-PHY 1.2.                        |
|                          | eDP is the primary display; eDP and DSI are mutually exclusive. |
|                          | Support for SD 3.0  |
|                          | Support QSPI NOR flash  |
| Support PCIe for NVMe    |   |

Support for USB 3.1 Type-C with DisplayPort 1.4 and USB 2.0.

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|          |     |
|----------|-----|
| Firmware | USB |
| Update   |     |

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## 2. 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:ZMOFN189GL”

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 |
|---------------|-----------|------|
| WCDMA Band 2  | 2.3       | PIFA |
| WCDMA Band 4  | 2.1       |      |
| WCDMA Band 5  | 0.0       |      |
| LTE Band 2    | 2.3       |      |
| LTE Band 4    | 2.1       |      |
| LTE Band 5    | 0.0       |      |
| LTE Band 12   | -0.5      |      |
| LTE Band 13   | -0.2      |      |
| LTE Band 14   | -0.2      |      |
| LTE Band 25   | 2.3       |      |
| LTE Band 26   | 0.0       |      |
| LTE Band 30   | -1.3      |      |
| LTE Band 38   | 1.0       |      |
| LTE Band 41   | 1.0       |      |
| LTE Band 48   | -2.2      |      |
| LTE Band 66   | 2.1       |      |
| LTE Band 71   | -1.0      |      |
| 5G NR Band 2  | 2.3       |      |
| 5G NR Band 5  | 0.0       |      |
| 5G NR Band 25 | 2.3       |      |
| 5G NR Band 38 | 1.0       |      |
| 5G NR Band 41 | 1.0       |      |
| 5G NR Band 48 | -2.2      |      |
| 5G NR Band 66 | 2.1       |      |
| 5G NR Band 70 | 2.1       |      |
| 5G NR Band 71 | -1.0      |      |
| 5G NR Band 77 | 1.8       |      |
| Bluetooth     | 3.53      |      |
| 2.4GHz WLAN   | 3.53      |      |
| 5.2GHz WLAN   | 3.06      |      |
| 5.3GHz WLAN   | 3.07      |      |
| 5.6GHz WLAN   | 4.81      |      |
| 5.8GHz WLAN   | 4.2       |      |
| 5.9GHz WLAN   | 5.09      |      |
| 6.2GHz WLAN   | 5.14      |      |

|             |      |          |
|-------------|------|----------|
| 6.5GHz WLAN | 5.09 | Monopole |
| 6.7GHz WLAN | 5.16 |          |
| 7.0GHz WLAN | 5.12 |          |
| Bluetooth   | 3.22 |          |
| 2.4GHz WLAN | 3.22 |          |
| 5.2GHz WLAN | 3.35 |          |
| 5.3GHz WLAN | 3.42 |          |
| 5.6GHz WLAN | 4.77 |          |
| 5.8GHz WLAN | 4.72 |          |
| 5.9GHz WLAN | 4.71 |          |
| 6.2GHz WLAN | 4.75 |          |
| 6.5GHz WLAN | 4.29 |          |
| 6.7GHz WLAN | 4.81 |          |
| 7.0GHz WLAN | 4.74 |          |

## 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.

## WIFI 6E Warning

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.