

Technical Manual

Bointec WiFi Series

DGF109A

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**FRESENIUS
MEDICAL CARE**

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If the serial number and the product shipping data differ by over 30 days, the in-warranty service will be made according to the shipping date. In the serial numbers the first and second two digits give the year of manufacture, and the last first and second digit means the month (e. g., with -10 for October, -11 for November and -12 for December). For example, the serial number 070000-10 means October of year 2007.

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1 Safety and warranty

Bointec will accept no liability for injury from or damage to the WiFi module if you fail to adhere to this warning and note.



Warning

Risk of electric shock

- Always shut off the main power supply whenever you work with the hardware. Do not make connections when the power is on.
 - Only persons authorized by Fresenius Medical Care may open the device in which the WiFi module is installed.
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Note

Sensitive electronic components can be damaged by electrostatic discharge

- Always ground yourself to remove any static charge before touching the CPU carrier board.
 - Use a grounding wrist strap at all times.
 - Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the device.
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1.1 General safety instructions

Read these safety instructions carefully:

- Refer to this user manual from time to time if you need to know something more about the product. Keep this user manual document for later reference.
- Please disconnect this equipment from any power source before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
- For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
- Keep this equipment away from humidity.
- Install this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.

- All cautions and warnings on the equipment should be noted.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
- Never pour any liquid into an opening. This could cause fire or electrical shock.
- Never open the equipment. For safety reasons, only qualified service personnel should open the device.
- If any of the following situations arises, get the device checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the device.
 - The module has been exposed to moisture.
 - The module does not work well, or you cannot get it to work according to the user manual.
 - The module has been dropped and damaged.
 - The module has obvious signs of breakage.
- Generally, do not leave this equipment in an uncontrolled environment where the storage temperature is below -20° C (-4°F) or above 60° C (140° F). It may damage the equipment. Unless we describe it in the Specification, the product itself is an industrial grade product. Even if so, do not store the product that exceeds the limitation of the product endurance.

2 FCC warning

| | |
|---|---|
| Required End Product Labeling | Any device incorporating this module must include an external, visible, permanent marking or label which states: "Contains FCC ID: 2BK5J-DGF109FME" |
| Additional testing, Part 15 Subpart B disclaimer | <p>The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.</p> <p>The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.</p> |
| FCC | <p>This module has been tested and found to comply with the following requirements for Modular Approval.</p> <ul style="list-style-type: none"> – Part 15.247 – Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. – Part 15.407 – General technical requirements. |
| Test Modes | <p>This device uses various test mode programs for test set up which operate separate from production firmware. Host integrators should contact the grantee for assistance with test modes needed for module/host compliance test requirements.</p> <p>Federal Communications Commission (FCC) Statement</p> <p>15.19</p> <p>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.</p> <p>15.105(b)</p> <p>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 or more 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.</p> |

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

3 Introduction

This specification has been written as a guideline for DGF109A installation and application.

3.1 Product overview

Bointec DGF109A is a dual band 802.11ac/a/b/g/n Dual-Band WiFi + Bluetooth¹ miniPCIe adapter. It is a 2T2R (WiFi/BT co-existence supported) technology, with 20/40/80MHz and 256-QAM to maximize bandwidth. DGF109A/DGF104A lets you move at the speed of life with faster speeds (up to 867 Mbps, 1~3Mbps EDR for Bluetooth), higher capacity, broader coverage and longer battery life. Dramatically reshapes your connected experience.

Bointec DPE109A incorporated with advanced security encryption, such as WEP, WPA, WPA2, and 802.1x for secure wireless connection. Bointec DGF109A/DGF104A also supports the latest Bluetooth 4.2 specification, which includes both High Speed and Low-Energy operation to extend personal area connectivity to a variety of devices.

DGF109A also delivers superior WLAN/Bluetooth coexistence to ensure the best possible wireless experience. DGF109A/DGF104A offers advanced algorithms developed to mitigate interference and takes advantage of the physical proximity of the WLAN and Bluetooth radios to provide maximum performance.

Reference document

Bointec DPE109A product specification document.

3.2 Host device compliance

The final host device, the 5008X hemodialysis device, into which this modular approved transmitter is integrated, has to comply with the appropriate technical requirements² and apply applicable FCC Equipment Authorization Procedures (SDoC or Certification).

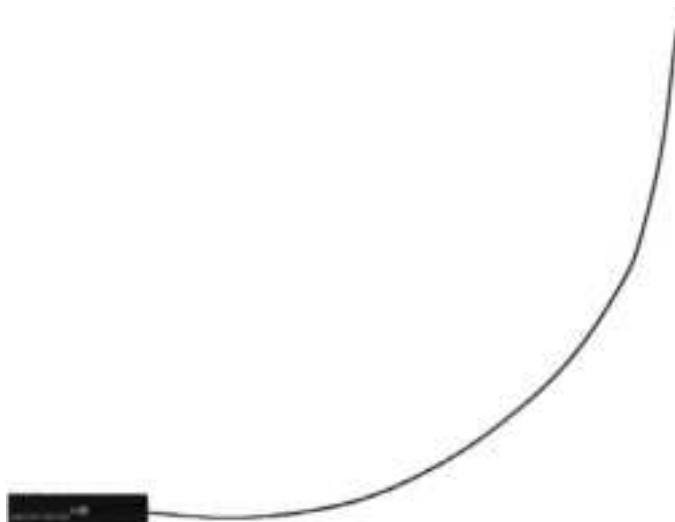
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1. Bluetooth is deactivated in the configuration for Fresenius Medical Care's medical device.
 2. Typically §15.107 AC Powerline Conducted Limits when connected to the public AC power lines and §15.109 Radiated Emission Limits for an Unintentional Radiator.

4 Views of the module and antenna

4.1 The WiFi module



4.2 The antenna



Two antennas are located within the monitor.



5 Software installation

The CDX module is delivered with an Ubuntu operating system. It is installed as such in the 5008X hemodialysis device during production. Further, no adjustments or pre-configurations are made to this operating system. To communicate with the integrated Wifi module DGF109A, the ath10k wireless driver is loaded without any special parameters.

CDX software specific to the health-care institution in which the 5008X hemodialysis device can be installed according to the instructions in the 5008X Service Manual and clinical policy.