

## 5G WIRELESS HIGH-SPEED NETWORK INTERFACE BOARD

- 2 M.2 card slots for 5G
- 1 PCIe Mini Card slot for WLAN
- 1 high-precision GNSS receiver
- 8 micro-SIM card slots
- Software tool for switching SIM cards and remote power up/down of modems
- -40 °C to +85 °C, conformal coating



### THREE SLOTS FOR WIRELESS FUNCTIONALITY

The G239 is a rugged CompactPCI Serial carrier board providing 5G mobile communication features to 19" Systems. It offers two M.2 slots for 5G and one PCI Express Mini Card slot for WLAN. For 5G functionality, the board is equipped with eight QLS antenna connectors (four connectors for each M.2 card) as well as up to three QLS antenna connectors for WLAN functionality. A high-precision GNSS receiver is also provided.

### MADE FOR TRAIN COMMUNICATION

Together with a powerful CPU it features a lot of application possibilities, in particular for the railway market. Some of these are Internet-on-board, general backoffice communication, live CCTV to control centers or predictive maintenance. In the train communication system architecture, the G239 is typically located at the front end where it communicates directly with a cellular network. To optimize the connection and network coverage, the G239 features eight micro-SIM card slots.

### REMOTE CONTROL BY SOFTWARE

duagon provides a user-friendly software tool designed for interacting with the G239. The user is able to remotely control which micro-SIM cards are connected to the modems. Remote power reset is also possible for each modem.

### SUITED FOR MOBILITY APPLICATIONS IN HARSH ENVIRONMENTS

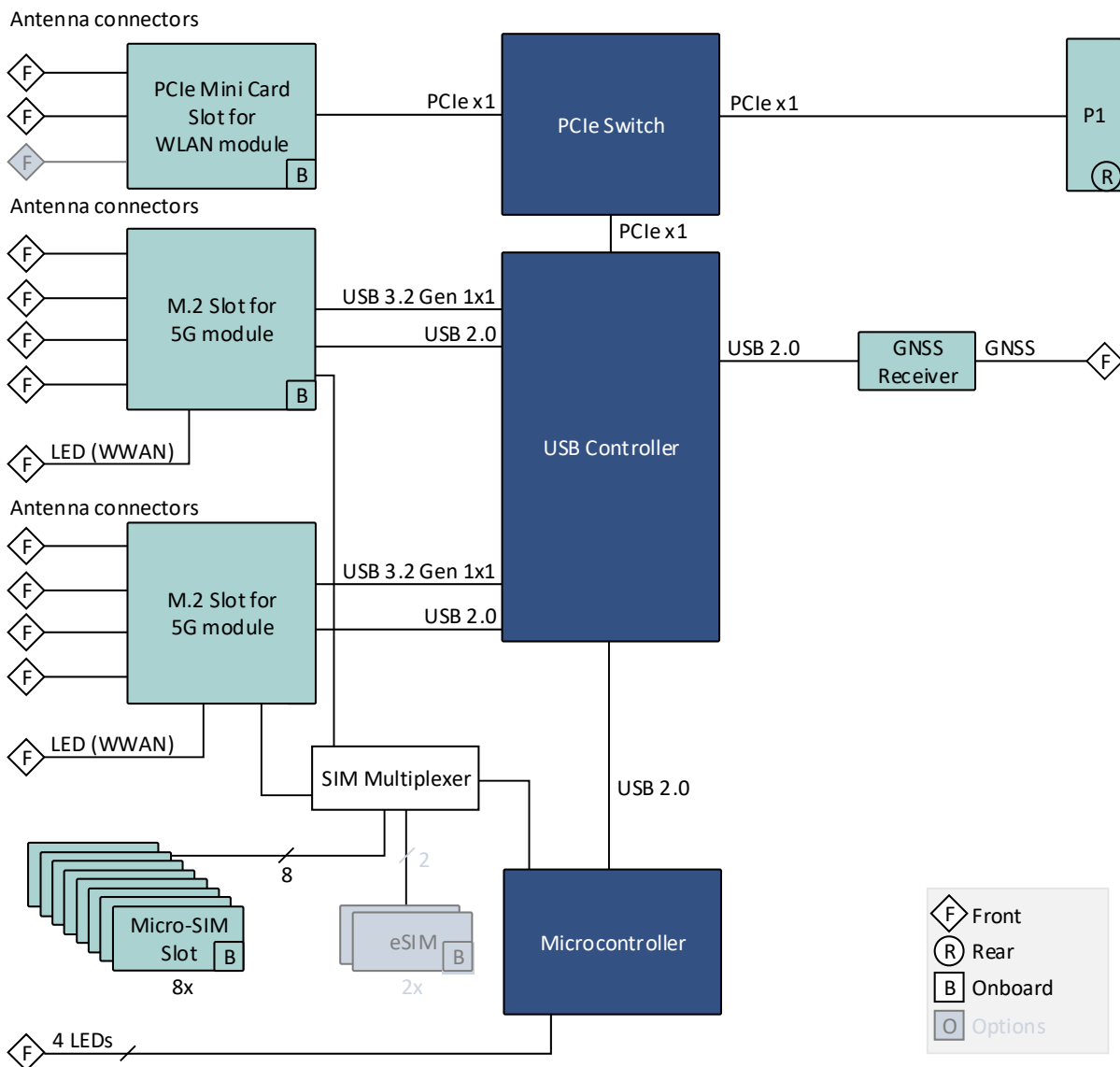
The G239 is designed for -40 °C to +85 °C operating temperature and comes with conformal coating for use also in harsh and mobile environments. The final environmental qualification depends on the respective modem cards used with the carrier. Long-term availability ensures an extended product life and future-safety.



[www.duagon.com/products/g239/](http://www.duagon.com/products/g239/)

## DATA SHEET

## G239 | DIAGRAM



## G239 | TECHNICAL DATA

## WIRELESS FUNCTIONALITY

- Possible functions:
  - 5G
  - WLAN
  - GNSS

## INTERFACES

- PCI Express
  - 1 × PCIe 2.0, x1, backplane



## ■ Wireless

- 5G (Main) antenna connector: 1 × QLS receptacle (X4)
- 5G (MIMO1) antenna connector: 1 × QLS receptacle (X3)
- 5G (MIMO2) antenna connector: 1 × QLS receptacle (X2)
- 5G (Aux) antenna connector: 1 × QLS receptacle (X1)
- 5G (Main) antenna connector: 1 × QLS receptacle (X8)
- 5G (MIMO1) antenna connector: 1 × QLS receptacle (X7)
- 5G (MIMO2) antenna connector: 1 × QLS receptacle (X6)
- 5G (Aux) antenna connector: 1 × QLS receptacle (X5)
- WLAN 1 antenna connector: 1 × QLS receptacle (X9)
- WLAN 2 antenna connector: 1 × QLS receptacle (X10)
- GNSS antenna connector: 1 × QLS receptacle (X12)

## ■ M.2 Card

- 2 × M.2 Card slot
- Slot 1: M.2 3042 (5G) socket 2 Key B, M.2 3052 (5G) socket 2 Key B; USB 3.2 Gen 1x1, USB 2.0
- Slot 2: M.2 3042 (5G) socket 2 Key B, M.2 3052 (5G) socket 2 Key B; USB 3.2 Gen 1x1, USB 2.0
- Sierra Wireless EM9191 (optional, depending on G239 model)
- Quectel RM500Q (on request)

## ■ PCI Express Mini Card

- 1 × PCI Express Mini Card slot
- PCIe Full-Mini; PCIe x1
- SparkLAN WPEQ-261ACNI(BT), WLAN PCI Express Mini Card, 802.11ac/a/b/g/n, -40 °C to +85 °C (optional, depending on G239 model)

## ■ SIM card

- 8 × micro-SIM slot, externally accessible
- 2 × eSIM (on request)

## ■ LED

- Status: power status
- User configurable: 3 ×

## ■ Cutout

- Antenna connector options: QLS receptacle, RP-SMA receptacle, SMA receptacle

## PRODUCT STANDARD

- CompactPCI Serial: CompactPCI Serial PICMG CPCI-S.0 Specification

## ELECTRICAL SPECIFICATIONS

- Supply voltage: +12 V (9.5 V to 15.5 V)
- Power consumption: 20 W with 2x 5G + 1x WLAN assembled

## MECHANICAL SPECIFICATIONS

- Dimensions: 3U, 8 HP
- Weight: 546 g approx.
- Cooling: Air cooling, forced convection, airflow 1.5 m/s
- Protection rating: IP20

## PRODUCT COMPLIANCE: RAIL - ROLLING STOCK

- Compliance level: This product is prepared for use in EN 50155 systems. Some parameters are system-dependent and are specified on system level.
- Operating temperature: -40 °C to +85 °C (EN 50155:2021, class OT6)
- Equipment location: EN 50155:2021, location 1, closed electrical operating area
- Rapid temperature variations: EN 50155:2021, class H1, no requirements
- Storage temperature: -40 °C (EN 50155:2021) to +85 °C (EN 60068-2-2, Bb)
- Altitude: +3000 m max. (EN 50125-1:2014, class AX)
- Pollution degree: EN 50124-1:2017, class PD2
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2021)
- Shock: 30 ms @ 50 m/s<sup>2</sup> (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Vibration: 10 min @ 2.02 m/s<sup>2</sup> (functional) and 5 h @ 11.44 m/s<sup>2</sup> (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B, double acceleration)
- Electrical safety
  - EN 50155:2021
  - EN 50153:2014 + A1:2017 + A2:2020
  - EN 50124-1:2017
  - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2020, EL9, HL3



- EMC emission
  - EN 50121-3-2:2016 + A1:2019
  - Regelung Nr. EMV 06 :2019-05-09 (2.0), Anhang E: Messung an Geräten, Schutzklasse S1
  - Regelwerk 50.02.01 :2021-12-01, 12.3.2. EMV - Funk, prequalified according to electronic equipment tests defined by Deutsche Bahn EMV 06 standard, class S1, for risk minimization in finished vehicle test
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings
  - EN 50155:2021, class PCX (As agreed between user and supplier)
  - G239 and SIM card carrier board are coated, modems are not coated
- Useful life: 20 years (EN 50155:2021, class L4)

## PRODUCT COMPLIANCE: RAIL - WAYSIDE NON-SAFETY RELATED

- Operating temperature: -40 °C to +70 °C (EN 50125-3:2003, class T2, cubicle, with class T2 maximum extended by 5 °C)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Altitude: +3000 m max. (EN 50125-3:2003, class AX)
- Pollution degree: EN 50124-1:2017, class PD2
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Humidity - Condensation: Non-condensing
- Shock: 11 ms @ 20 m/s<sup>2</sup> (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Vibration: 2.3 m/s<sup>2</sup> (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Electrical safety
  - EN 50124-1:2017
  - EN 62368-1:2014 + AC:2015
- EMC emission
  - EN 50121-4:2016
  - EN 61000-3-2:2014
  - EN 61000-3-3:2013
  - EN 61000-6-4:2007 + A1:2011
- EMC immunity
  - EN 50121-4:2016
  - EN 61000-6-2:2005

## PRODUCT COMPLIANCE: INFORMATION TECHNOLOGY EQUIPMENT

- Operating temperature: -40 °C (EN 60068-2-1:2007, Ae) to +85 °C (EN 60068-2-2:2007, Be)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Altitude: +3000 m max. (EN 62368-1:2014 + AC:2015)
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Humidity - Condensation: Non-condensing
- Electrical safety: EN 62368-1:2014 + AC:2015
- Flammability (PCBs): UL 94 V-0
- EMC emission: EN 55032:2015 (multimedia equipment), class A (industrial environments)
- EMC immunity: EN 55035:2017 (multimedia equipment)

## RELIABILITY

- MTBF: 149 000 h (02G239-00) / 188 000 h (02G239-01) predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

## SOFTWARE SUPPORT

- Linux
  - Tested with: Ubuntu 20.04.2 LTS
- Further Resources
  - See the product User Manual for details on software support: [www.duagon.com/products/g239/#doc](http://www.duagon.com/products/g239/#doc)
  - See section Software on the product web page for available packages: [www.duagon.com/products/g239/#downl](http://www.duagon.com/products/g239/#downl)



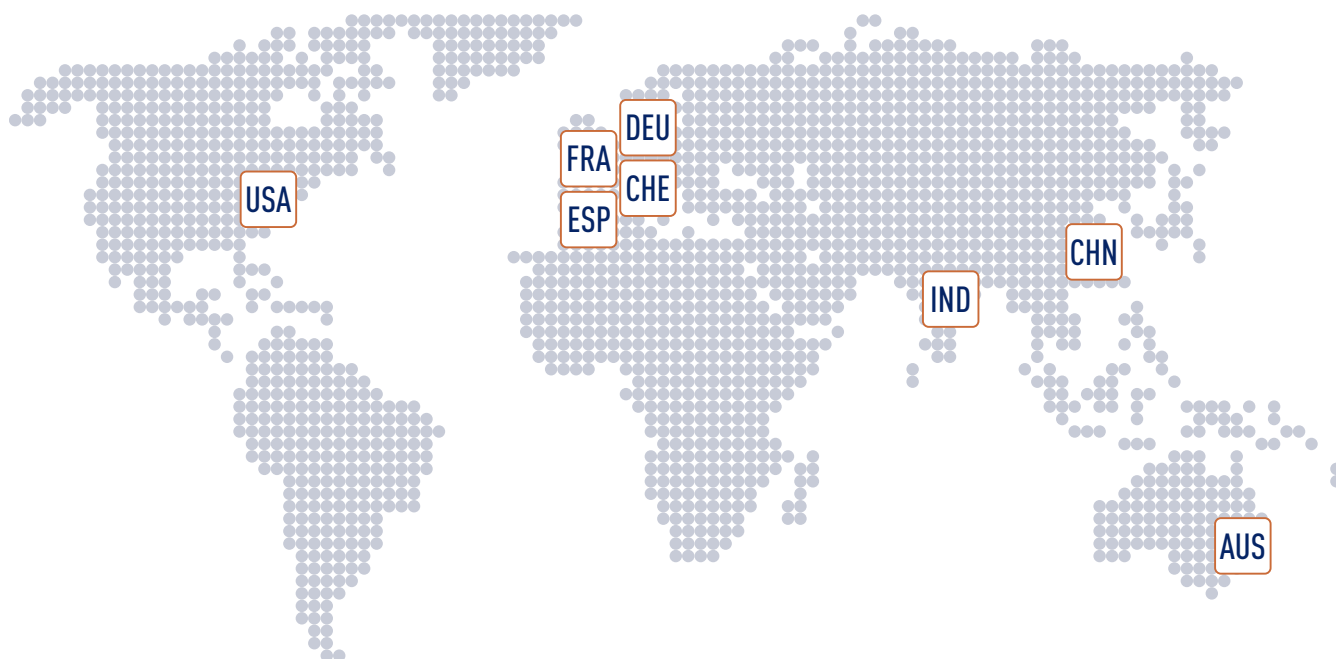
## G239 | ORDERING INFORMATION

### STANDARD MODELS

|                  |                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>02G239-00</b> | G239, 2x 5G Sierra Wireless EM9191, WLAN SparkLAN WPEQ-261ACNI(BT), GNSS, 8x SIM card slot, -40 °C to +85 °C, conformal coating |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|



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