MERiDIAN5G

PRODUCTS AND SPECIFICATIONS

Maritime-specific 5G equipment
for superyachts, cruise ships and
other maritime applications.

Table of contents

Modem specifications

Model: Qualcomm Snapdragon (SD) x55 modem, Cat. 20
Coverage: Worldwide 5G coverage with 3G/4G fallback
Power Class 2, max. TX power 400mW

MAXIMUM SPEED per modem:

Download: 2.0 Gbit/s per modem, 7xCA, max. Modulation 256QAM
Upload: 211 Mbit/s per modem, 2xCA, max. Modulation 256QAM

SUPPORTED RF BANDS (Worldwide Coverage)

Technology	Bands	Diversity Connection
3G	B1, B2, B4, B5, B6, B8, B9, B19	YES
4G LTE-A-PRO	B1-B5, B7, B8, B12-B14, B17-B20, B25, B26, B28-B30, B32, B34, B38-B43, B46, B48, B66, B71	YES (4x4 MIMO)
5G	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79	YES (4x4 MIMO)

ALL SYSTEMS

MERiDIAN5G

User interface

DASHBOARD:

Modem Status	System Status	System Control
• SIM card inserted • Connection status • Aggregation status • Temperature • Error indication	• Aggregator status • Current network load (down/up) • Temperature • Error indication	• Power down • Reset

FURTHER CONTROL:

Modem Status	System Status	System Control
• Reset • Set offline • Roaming on/off • Modem Status information (IMEI, Signal level..)	• PIN/PUK • C/E Description • Roaming on/off • Contract or pay as you go data package	• Limit for signal Level • Limit for network technology • Limit for BER (bit error rate) • Limit for latency

5G Bonding and Leo integration

Meridian 5G pioneered connection bonding for superyacht LTE connectivity in 2013 and hosts professional dedicated Data Centers in various worldwide locations to provide a desired static dedicated IP address. Besides other benefits that allows streaming of country-specific content such as Netflix US or UK, etc.

When done right, bonding adds a substantial level of reliability and stability of the connection. That is especially helpful in locations where cellular networks are overloaded like busy ports or areas with spotty coverage.

LEO integration

With an addition of LEO satellite connectivity Meridian 5G integrated an option to bond LEO (e.g. Starlink) connection with 4G/5G. You have an option to bond multiple 4G/5G connections only, or bond one or multiple 4G/5G connections and LEO connection(s).

Meridian routers can also be used to connect multiple LEO dishes / panels (e.g. Starlink Maritime edition) as those come without a way to combine them.

Load Balancing vs Bonding

Unlike load balancing mode, bonding ensures no connection interruption if one internet uplink drops out.

Dedicated Data Centers

In order to use bonding a dedicated data center counterpart is required. You have a choice of Data center in the following countries (more available on demand):

- USA
- UK
- Italy
- Spain
- Switzerland
- Australia
- Hong Kong
- Russia

Installation options

There are two installation options for the 5G DOME Router system:

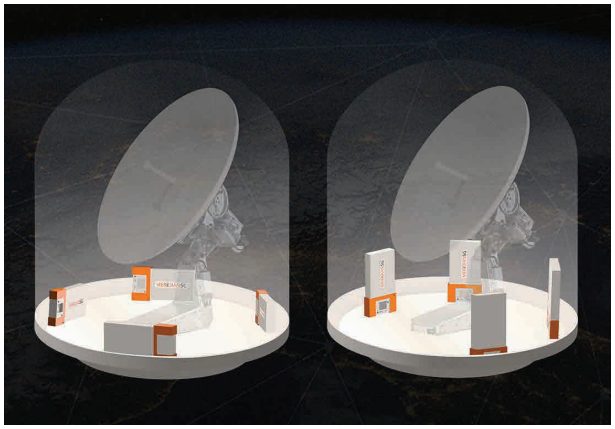
- **Standalone DOME**
- **Panel Version** retrofitted inside a vessel's existing and operational VSAT or TVRO dome.

The only **cables you need** to install the DOME system are:

- 1 Ethernet cable – to connect the system to your vessel's network. Same cable is used for the SIM extender
- Power supply (AC or DC)

Each version can be installed with a **SIM extender.**

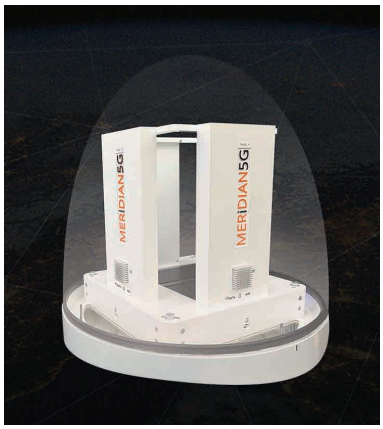
Panel Version



This version is built for installations inside the ship's existing and operational VSAT or TVRO domes. Such installations do not create any interference with the dish inside, as long as there is at least 10cm clearance between the dish and the dome cover.

Existing domes usually have power available and only require an ethernet cable run to the ship's network (if there is no spare one there yet).

Standalone DOME



Our Standalone DOME is identical in performance to the Panel Version and is built for ships that prefer or require a separate dome installation.

We can provide smaller domes for installations onboard yachts, as well as larger domes for installations onboard bigger ships.

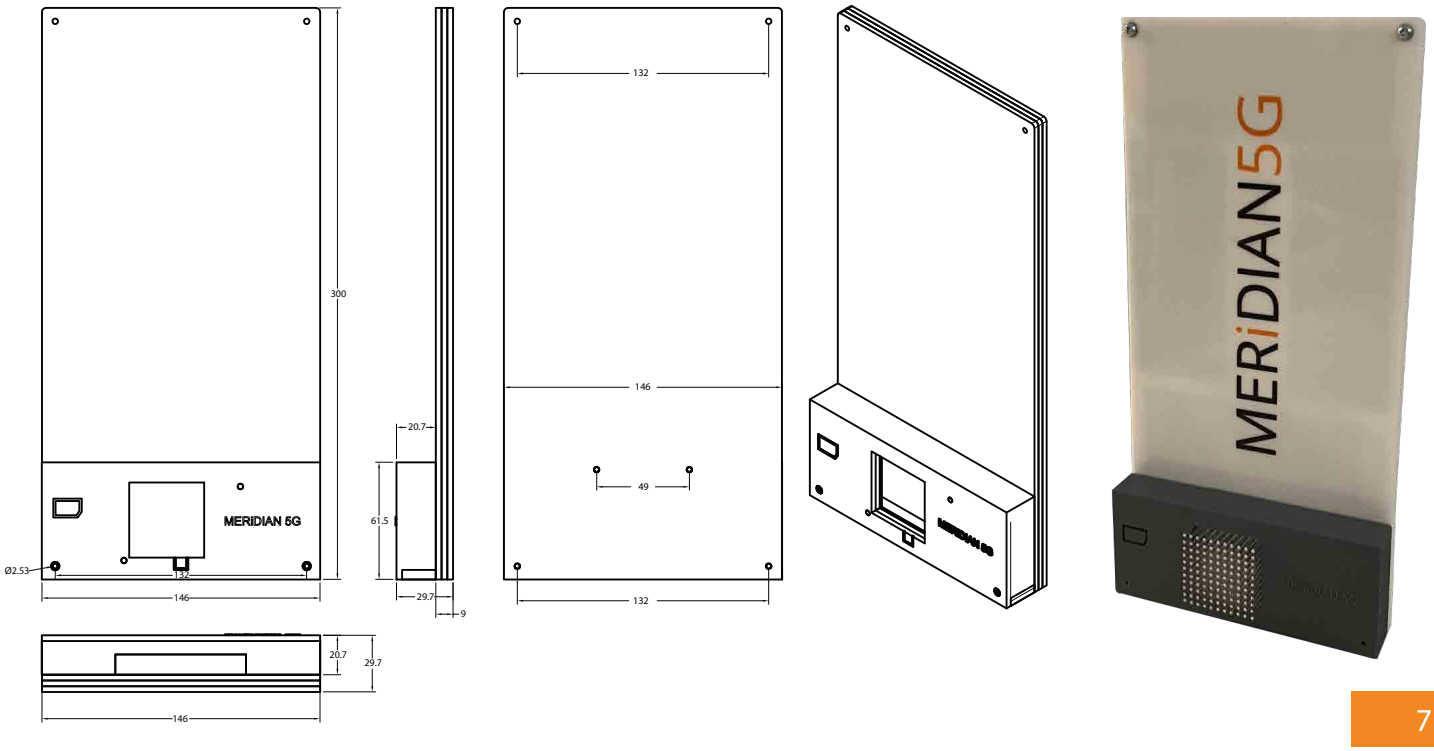
DOME SYSTEM

Panel

Panel is a part, not a complete system. A control router is required to operate the panels.

Panels are the main parts in the DOME systems. A panel can also be used to upgrade either a DOME system to include more modems/antennas, or to upgrade M1 or M2 rugged (more on that on page 16).

- **Modem:** One 5G modem with 1 push-pull SIM slot (Nano, 4FF)
- **Antennas:** 4 omnidirectional wide band antenna modules (600MHz-6Ghz, peak gain 5dBi), arranged orthogonally in pairs to achieve 4x4 MiMo
- **Antenna layout:** Slim design on the antenna section to fit tight VSAT domes as well, e.g. Intellian V60
- **Dimensions in mm:** 300 x 146 x 29.7
- **Weight:** 800g
- **Material:** Polyester resin and ABS plastic
- **Operating temperature:** Heatsink to allow for up to 75°C operations
- **Connectors:** USB-C connector for USB-3.2 data bus and auxiliary power
- **Power:** DC 5V/3A (provided over USB-C from the control router)
- **Mounting:** vertical or horizontal, but not flat



DOME SYSTEM- X4 Standalone

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Inner core

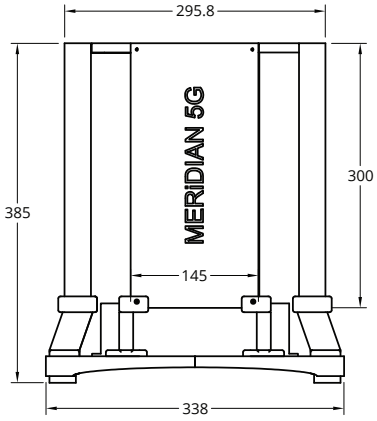
TECHNICAL SPECIFICATIONS

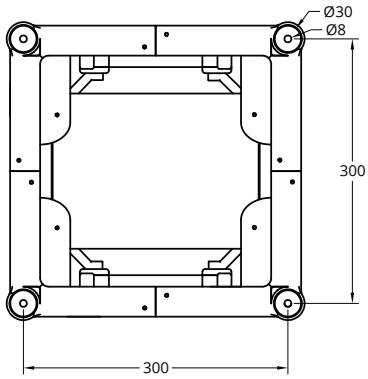
System contains 4 panels with a control router arranged into an inner core to be installed inside a small (~50cm) empty dome.

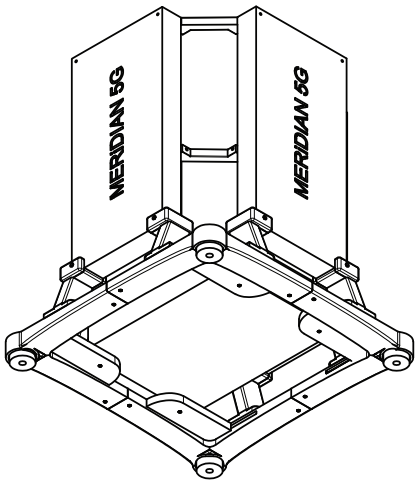
- 4 panels (four 5G modems and 16 omnidirectional antennas in total, see “Panel” spec page 7 for more info)
- Connection bonding or load balancing modes, optional LEO integration
- **Weight:** 12kg
- **Mounting:** 4x M8 Bolt
- **Power:** 160W peak load. DC 12V, 12A (3x4sqmm) or AC 100V..240V (3x1.5sqmm)
- **Operating temperature:** -40° to +75°C
- **Cabling required:** Ethernet to the ship’s firewall: Cat6A or Cat7 S/FTP (shielded).
- **Connectors:** RJ45 connector (to border router)
- **Dome cover:** recommended model Intellian i4

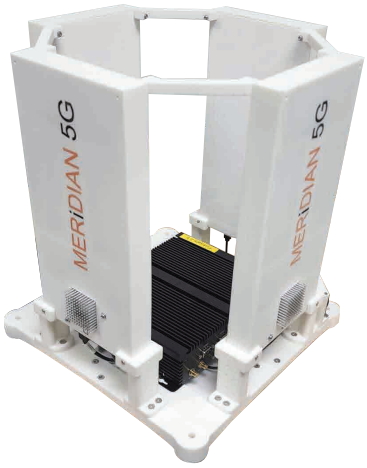
Remarks: 360° non-blocked horizontal line of sight recommended.

Optional SIM extender is available so SIM cards can be conveniently changed below deck. It does not require any extra cables (uses the same ethernet cable as for the user data).









DOME SYSTEM - X2 Standalone

MERiDIAN5G

Inner core

TECHNICAL SPECIFICATIONS

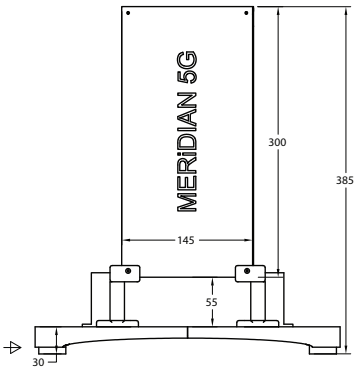
System contains 2 panels with a control router arranged into an inner core to be installed inside a small (~50cm) empty dome.

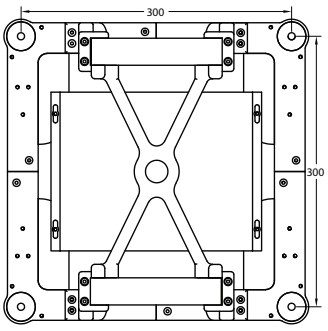
- 2 panels (two 5G modems and 8 omnidirectional antennas in total, see “Panel” spec page 7 for more info)
- Connection bonding or load balancing modes, optional LEO integration
- **Weight:** 10.5kg
- **Mounting:** 4x M8 Bolt
- **Power:** 160W peak load. DC 12V, 12A (3x4sqmm) or AC 100V..240V (3x1.5sqmm)
- **Operating temperature:** -40° to +75°C
- **Cabling required:** Ethernet to the ship’s firewall: Cat6A or Cat7 S/FTP (shielded)
- **Dome cover:** recommended model Intellian i4

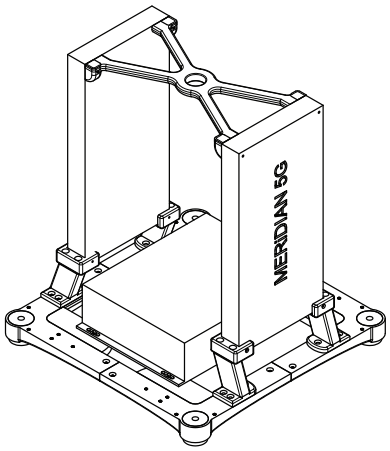
Remarks: 360° non-blocked horizontal line of sight recommended.

X2 model has spare compartments for 2 additional panels and can be upgraded at a later time by purchasing additional panel(s).

Optional SIM extender is available so SIM cards can be conveniently changed below deck. It does not require any extra cables (uses the same ethernet cable as for the user data).







DOME SYSTEM - X4 PV

Panel version

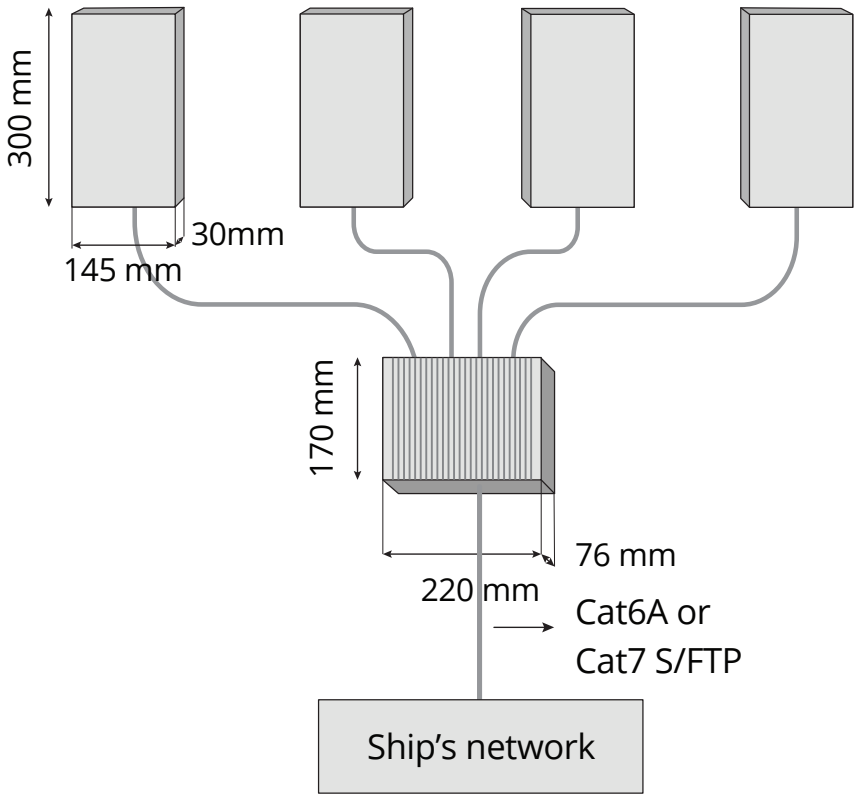
System contains 4 panels with a control router. It is meant for installations inside existing and operational VSAT or TVRO domes.

For installation of our Panel Version there should be at least 10cm clearance between the dish and the dome cover, to keep the dish fully operational.

- 4 panels (four 5G modems and 16 omnidirectional antennas in total, see “Panel” spec page 7 for more info)
- Dual-LEO (e.g. Starlink Maritime) connectivity
- **Panel Mounting:** panels can be mounted either vertically or horizontally (but not flat) near the dome’s base. Thus, they will not interfere with the satellite dish system
- **Mounting brackets:** will be provided to fit the diameter of the dome (spec on page 12)
- **Control Router:** mounted flat in the dome’s base.
- **Power:** 160W peak load. DC 12V, 12A (3x4sqmm) or AC 100V..240V (3x1.5sqmm)
- **Operating temperature:** -40° to +75°C
- **Cabling required:** Ethernet to the ship’s firewall: Cat6A or Cat7 S/FTP (shielded)

Remarks: 360° non-blocked horizontal line of sight recommended
The systems comes with all parts/cables required, except the ethernet cable connecting the dome to the ship’s network.

Optional SIM extender is available so SIM cards can be conveniently changed below deck. It does not require any extra cables (uses the same ethernet cable as for the user data).



DOME SYSTEM - X2 PV

Panel version

System contains 2 panels with a control router. It is meant for installations inside existing and operational VSAT or TVRO domes.

For installation of our Panel Version there should be at least 10cm clearance between the dish and the dome cover, to keep the dish fully operational.

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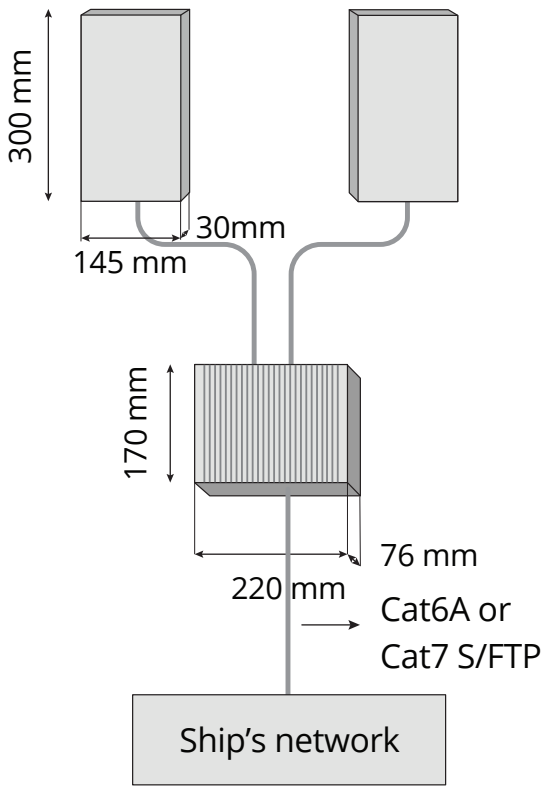
- **Operating temperature:** -40° to +75°C
- **Cabling required:** Ethernet to the ship’s firewall: Cat6A or Cat7 S/FTP (shielded)

Remarks: 360° non-blocked horizontal line of sight recommended

The systems comes with all parts/cables required, except the ethernet cable connecting the dome to the ship’s network.

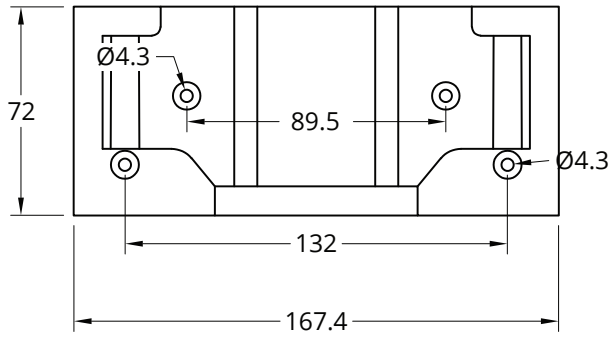
X2 model of the panel version can be upgraded at a later time by purchasing additional panel(s) (up to 2 more). Such upgrade is very easily done. Optional SIM extender is available so SIM cards can be conveniently changed below deck. It does not require any extra cables (uses the same ethernet cable as for the user data).

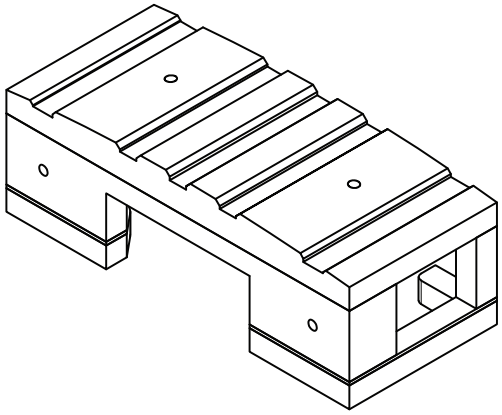


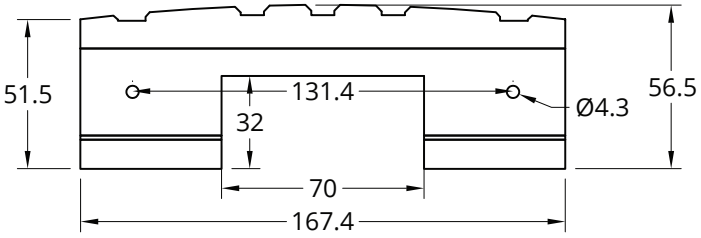
Panel bracket

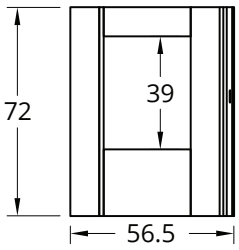
The bracket is used for the installations of the panels inside existing domes (for example, “Panel versions” of our DOME system or Panel upgrades). The bracket is 3D printed to match the diameter of the dome where the panel will be installed. It is then glued to the inner wall of such dome at the base. The panel can then be easily inserted (and if needed easily changed).

- **Weight:** 200g
- **Material:** Polyester resin
- Curve matching the dome’s diameter (the one on the rear facing the dome cover)





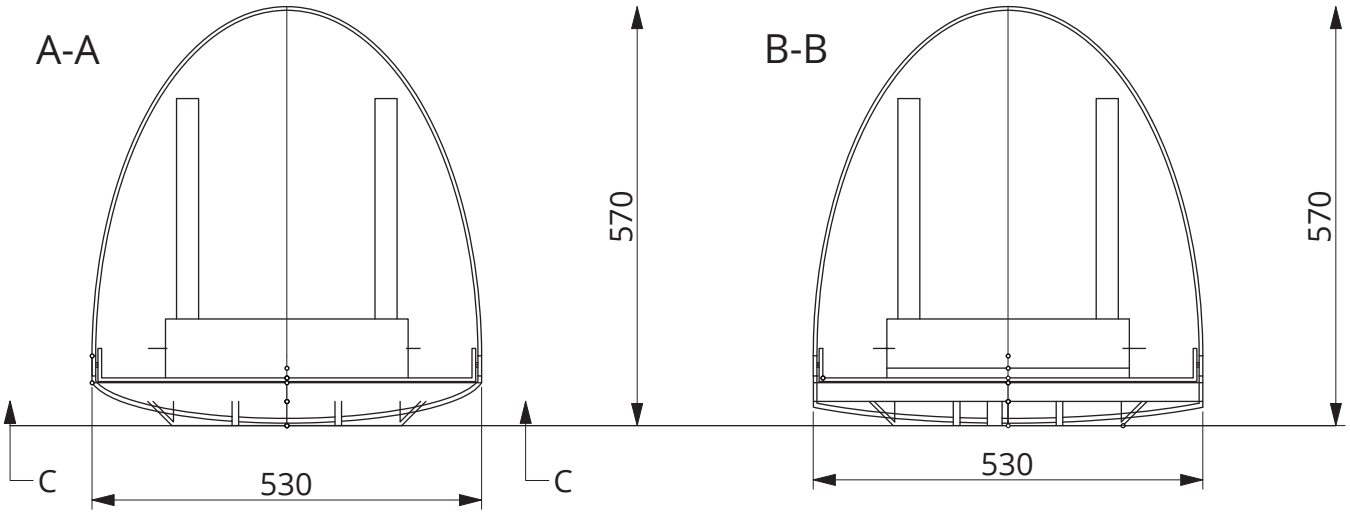


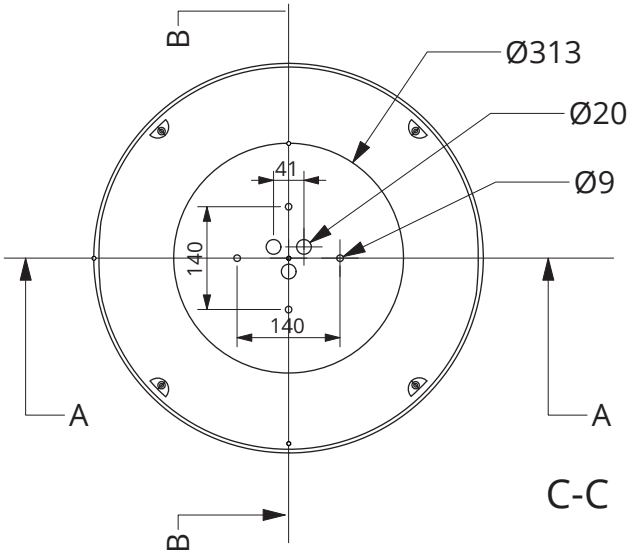


Dome cover

- **Weight:** 6kg
- **Mounting:** 4x M8 Bolt
- **Material:** Fiberglass (GRP)
- **Operating temperature:** -40° to +75°C
- **Windspeed:** max. 195 km/h

Remarks: 360° non-blocked horizontal line of sight recommended

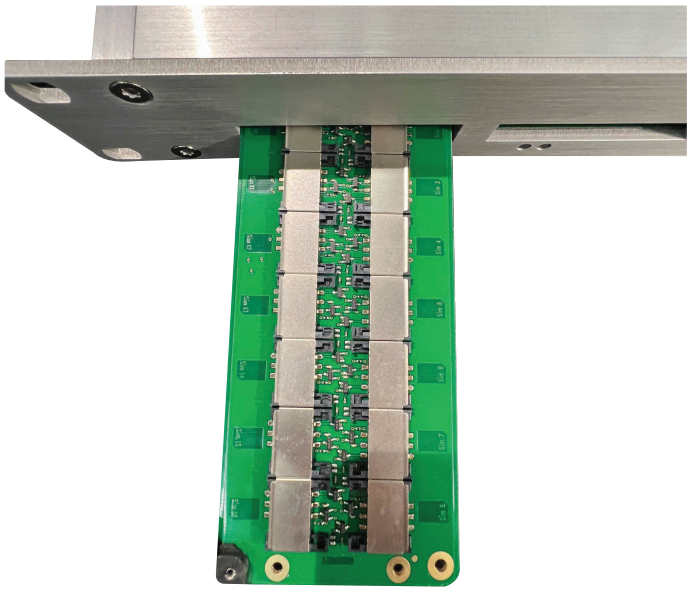




SIM extender

Optional SIM extender is available for the DOME systems (or Panel upgraded systems) so SIM cards can be conveniently changed below deck. It does not require any extra cables (uses the same ethernet cable as for the user data).

- **Dimensions:** Height 1U, Width 19", Depth 30cm
- **Weight:** 6kg
- **Material:** Aluminium
- **Mounting:** Rack mount
- **Power:** 100 to 240VAC
- **Operating temperature:** 10°-40°C, non condensing
- **Cabling required:** connected to the dome system via the same ethernet cable as for the user data (edited)
- **Options available:** 16 SIM slot, 64 SIM slot



M routers overview

All M routers have the following features:

Meant for installation with an existing antenna set up, do not include antennas.

Overview:

- 5G modem(s) with 2 push-pull SIM slots (Nano, 4FF); 4x SMA(f) connectors per modem
- WiFi 6 bridge and access-point mode; 2x RP-SMA(f) connectors; MU-MiMo
- Dual-LEO (e.g. Starlink Maritime) connectivity
- Mounting: wall, ceiling or DIN rail
- Power: 120W peak load. DC 8..35V (24V recommended) - terminal block
- Network: 3x RJ45 2.5Gbps (100/1000Mbps compatible), thereof 2x PoE+ 30W

M1-R (rugged):

- Meant for installations above deck like inside existing domes at the base etc
- One 5G modem
- Operating temperature: -40° to +85°C

M1-NR (non-rugged):

- Meant for installation inside a 19" rack or alike in an air conditioned environment
- One 5G modem
- Operating temperature: 10°-40°C, non condensing

M2-R:

- same as M1-R (rugged) but with 2 modems

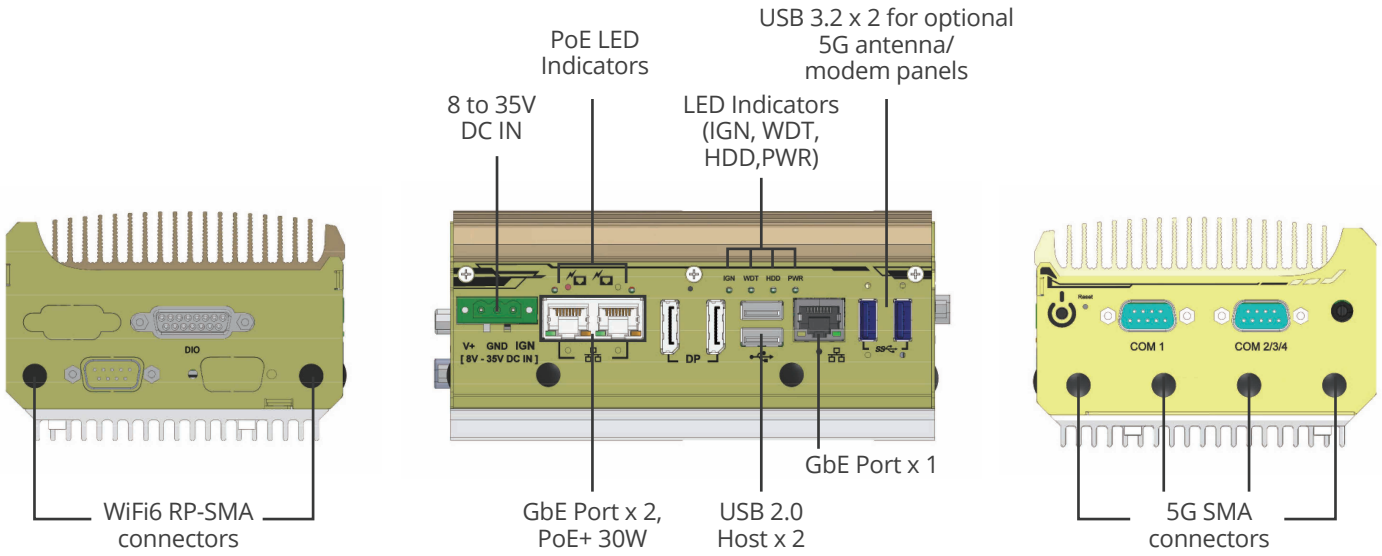
M2-NR:

- same as M1-NR non-rugged but with 2 modems

M1-R (rugged)

TECHNICAL SPECIFICATIONS

- 5G modem with 2 push-pull SIM slots (Nano, 4FF); 4x SMA(f) connectors
- WiFi 6 bridge and access-point mode; 2x RP-SMA(f) connectors; MU-MiMo
- Connection bonding or load balancing modes
- Can be used to connect multiple LEO dishes/panels (e.g. Starlink Maritime) and bond with 5G
- Dual-LEO (e.g. Starlink Maritime) connectivity



- **Dimensions:** 153mm (width), 108mm (depth), 72mm (height)
- **Weight:** 2kg
- **Mounting:** wall, ceiling or DIN rail
- **Operating temperature:** -40° to +85°C
- **Power:** 120W peak load. DC 8..35V (24V recommended) - terminal block
- **Network:** 3x RJ45 2.5Gbps (100/1000Mbps compatible), thereof 2x PoE+ 30W

Upgrade options

For cases when a more affordable version is needed you can opt for an M router and later upgrade it with a panel or two, when the budget allows. You can also do an initial installation of an M router with one or two panels included so you can take advantage of both - the existing antenna set up and the unique features of the Meridian panels. Panels are $3000 each.

Rugged versions of our M routers are usually installed above deck. Such installations can be upgraded with a panel (up to 2 panels possible), typically installed inside an existing VSAT or TVRO dome.

The following criteria has to be met for the upgrade to be possible:

- **Distance:** a panel has to be installed within 2 meter distance from the M router
- **Panel Mounting:** panels can be mounted either vertically or horizontally, but not flat
- **Mounting bracket:** will be provided (spec on page X)
- **Cabling required:** cable to connect the panel is a USB 3.2 cable with USB-C connector
- **Operating temperature:** -40° to +75°C
- **Optional:** SIM extender can be added

Remarks: 360° non-blocked horizontal line of sight recommended