

FalcoNet v1.1

Hardware User Guide



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Table of Contents

| | |
|---|-----------|
| INTRODUCTION | 1 |
| Safety guidelines | 1 |
| OVERVIEW..... | 2 |
| General Design concept | 2 |
| General solution specifications..... | 2 |
| Supported bands..... | 3 |
| HARDWARE CONFIGURATION | 4 |
| FALCONET UNIT INTERFACES..... | 6 |
| BU Front Panel | 6 |
| Brain unit (BU) module | 6 |
| BU front panel interface details..... | 7 |
| PA Unit (PA) Rear Panel | 9 |
| Omni Antennas RF installation..... | 10 |
| CUTTA V2 module | 11 |
| DPSU-S (AC > DC converter)..... | 12 |
| OPERATION GUIDELINES | 13 |
| Operating the FalcoNet system | 13 |
| TROUBLESHOOTING..... | 14 |
| PREVENTATIVE MAINTENANCE..... | 15 |
| TECHNICAL SPECIFICATIONS | 16 |
| RF EXPOSURE INFORMATION | 17 |
| FCC INFORMATION | 18 |
| Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information | 18 |
| FCC Compliance statement subject to Part 15.105 | 18 |

Introduction

The purpose of this document is to provide information regarding the FalcoNet including connectivity, components, and standard troubleshooting for the end user.

Safety guidelines

| | |
|---|---|
| | |
|  | The installed location of the unit must be clear and ventilated. Keep from dust, moisture etc. Do not place near heat sources or in direct sunlight |
| | Align cable connectors carefully and fasten them tightly, but do not apply excessive force. |
|  | Do not exceed temperature limit. |
| | Failure to comply with the following guidelines may cause the unit to overheat and may be dangerous: |
| | Air temperature around the unit should never exceed 45°C (113°F). |
| | The unit dissipates a lot of heat. Never block or cover the unit's ventilation slots and do not insert any objects through them. Never block or cover fans or heat sinks. |
| | Always allow at least 10 cm clearance in front of and behind the ventilation slots for free air circulation. |
| | If fans do not operate properly, immediately stop using the unit. |
| | If unit is installed in closed cabinet provide ample ventilation to ensure sufficient air flow. Test air temperature around unit after 1 hour and 10 hours of continuous operation. Verify that air temperature surrounding unit does not exceed the maximum 45°C (113°F) |
|  | The unit uses high voltage while operating. However, power input circuitry may still be at high voltage even while the unit is on stand-by. Disconnect the power cable and any batteries to completely remove dangerous voltage from the unit. |

Overview

FalcoNet is an active system that provides flexibility and operational agility as it provides simplified installation, maintainability and support.

General Design concept

NOTE: For reference the height of the drawers (modules) are referred to with the term “U” where a 1U drawer is approx. 4.5 cm in height , therefore a 2U drawer is approx. 9cm

The general design concept addresses the following points:

- + Technology agnostic: Full SDR
- + Multi-BTS: 9 BTSs in a single chassis
- + Deployment: Quick & easy removal of the BTS unit
- + Scalability: 2 systems can be managed from the same workstation

General solution specifications

As the FalcoNet system can be configured in many different combinations the below specifications are for the stated generic solutions

The general FalcoNet specifications are listed below:

- + Voltage input 36v
- + Power: Typical 800Watt - Max 1100Watt
- + Full System Dimensions: 4U x 19” x 600mm (H x W x D)
- + Brain Unit Dimensions: 153 x 386 x 267mm (H x W x D)
- + Total Weight 37Kg
- + Weight of GUL Board is 700gram
- + Weight of FalcoNet BU is 11Kg (with 9x GUL boards)
- + Weight of MPA-S is 26Kg

Supported bands

The current supported bands are listed below

| Band | Name (MHz) | Supported for FalcoNet |
|-------------|------------|------------------------|
| GSM Band 2 | 1900 PSC | Yes |
| GSM Band 5 | 850 | Yes |
| UMTS Band 2 | 1900 PSC | Yes |
| UMTS Band 4 | 2100AWS | Yes |
| UMTS Band 5 | 850 | Yes |
| LTE Band 2 | 1900 PSC | Yes |
| LTE Band 4 | 2100AWS | Yes |
| LTE Band 5 | 850 | Yes |
| LTE Band 12 | 700a | Yes |
| LTE Band 13 | 700c | Yes |
| LTE Band 14 | 700PS | Yes |
| LTE Band 17 | 700BC | Yes |
| LTE Band 25 | 1900+ | Yes |
| LTE Band 26 | 850+ | Yes |
| LTE Band 66 | 2100AWS3 | Yes |
| LTE Band 71 | 600 | Yes |
| 5G Band 71 | 600 | Yes |

Hardware configuration

This section explains the different modules used in the FalcoNet solution

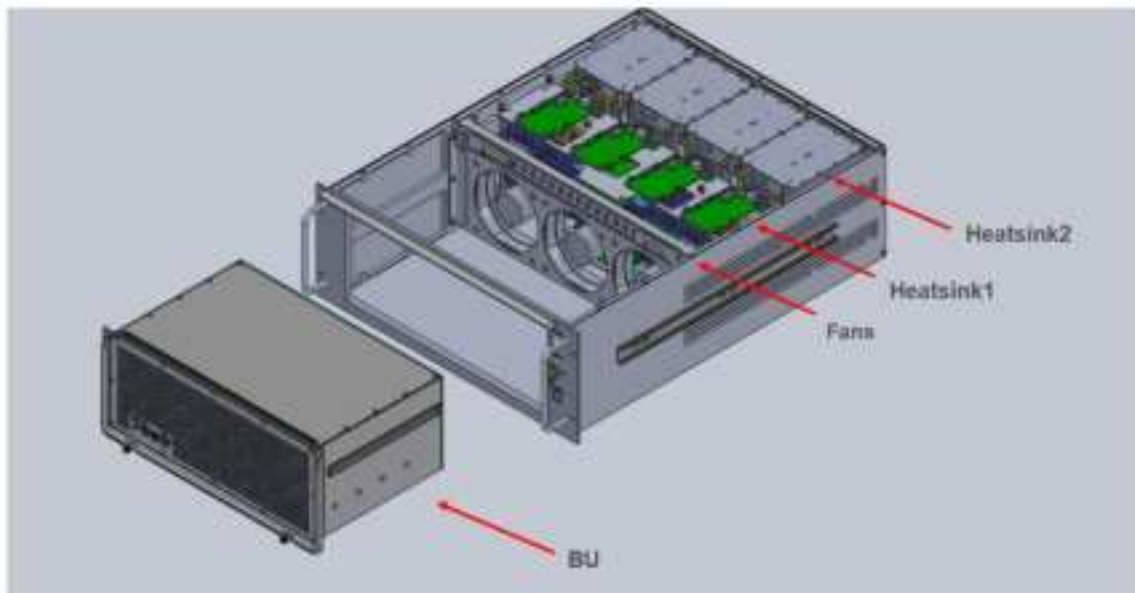


Figure 1: FalcoNet system

The FalcoNet system consists of 2 units

1. Brain unit (front panel)
2. PA unit (rear panel)

The front panel denotes the front of the system (i.e. Brain Unit) and the rear panel denotes the rear of the whole system i.e. after the PA unit.

These panels' interfaces are described later in this guide

Brain unit components

- + Power on/off switch
- + LED off switch
- + LED statuses
- + GUL (GSM, UMTS, LTE, 5G) transmission boards
- + GPS

PA unit components

- + Fans
- + MPA
- + Heatsinks

FalcoNet Unit interfaces

BU Front Panel

| Interface Function | Panel location | Connector type | Remarks |
|----------------------------|---------------------|-------------------|-----------|
| On/Off switch | Front | | |
| LED Off switch | Front | | |
| LED Status | Front | | |
| 2 x Ethernet | 1 x Front, 1 x Rear | RJ45 | |
| Main Power Input Connector | Rear | TE 4-1609075-6 | |
| Circuit Breaker | Rear | | 50A |
| 3 x TX Connectors | Rear | Quick N-Type (QN) | 9 x BTS's |
| 1 x RX | Rear | N-Type | |
| 1 x NWL | Rear | Quick SMA (QMA) | |
| GPS | Rear | D-SUB (3 PIN) | |

Brain unit (BU) module

The below picture show the BU front panel .

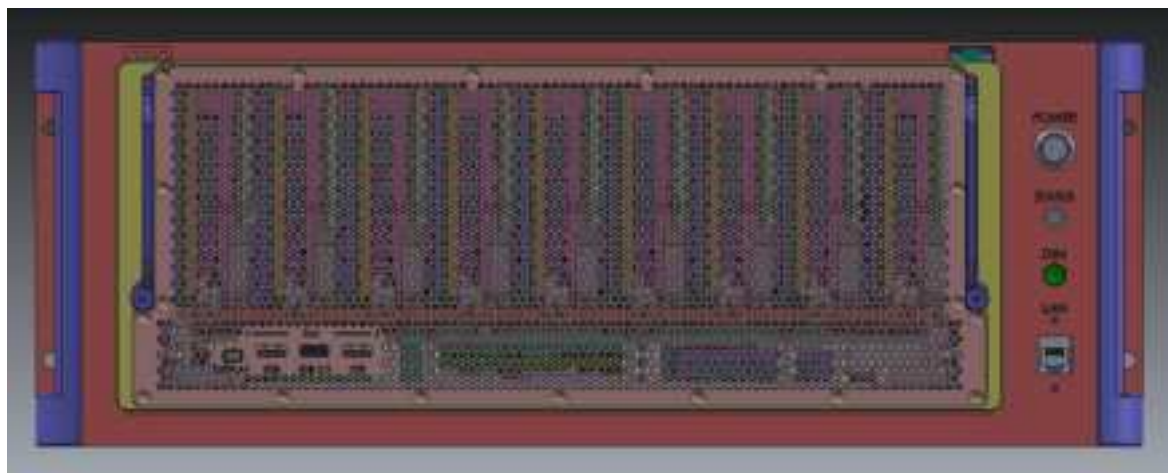


Figure 2: BU front panel

Connection table

| No. | Interface | Designation | Description |
|-----|-------------------------------|-----------------------|--------------------------|
| 1. | Power | System ON/OFF | Push button |
| 2. | Status | System status | LED |
| 3. | DIM | Dimming switch | Push Button |
| 4. | LAN | LAN connectivity | Standard RJ45 connection |
| 5. | (*) Display | | |
| 6. | (*) USB x 2 | | |
| 7. | (*) USB 3.0 | | |
| 8. | SIM x 2 | SIM card connectivity | SIM card sockets x 2 |
| | + (*) Internal PC option only | | |

BU front panel interface details

The front panel interfaces are shown below and described in the following section.

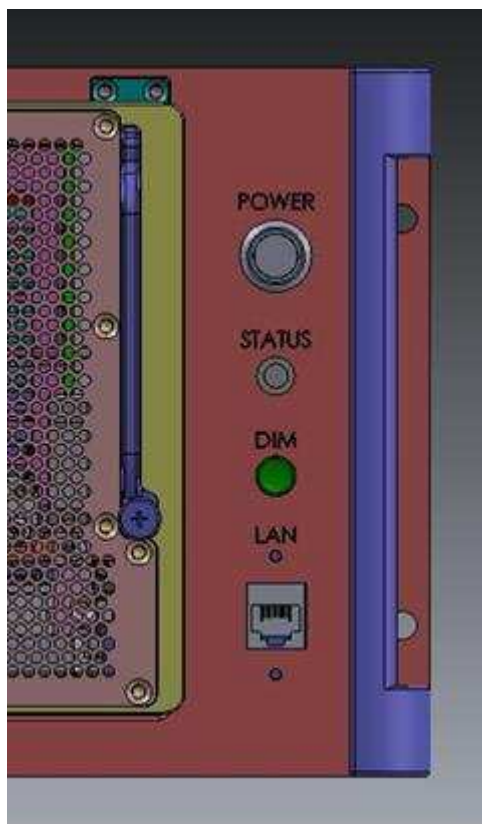


Figure 3: Front panel interface options

BU front panel system indications

| Component | Function | Action |
|---------------------|---|--------------------|
| Power Button | On/Off | Short press <1 sec |
| Power Button | Forced Off | Long press 5 sec |
| DIM | Units LEDs On/Off | Toggle |
| Status LED | <p>Normal status</p> <ul style="list-style-type: none"> Yellow Light - from Power up until the GUL cards are ready for Booting. Green Light – GUL Cards has started booting. Red Light – System is transmitting Blinking Yellow Light – system malfunction Blinking Red Light – System Shutdown | |
| Status LED Alarms | <p>Yellow light not switching to green options:</p> <ul style="list-style-type: none"> No GUL is present GUL are disabled by the CSI board CANbus between BU and MPA-S is not functional <p>Blinking Yellow light options:</p> <ul style="list-style-type: none"> Temperature Problem. Fan Alarm VSWR Problem (No Antenna) SW Issue (FalcoNet Manager) | |
| Ethernet connection | Used to connect the dedicated FalcoNet laptop | |

PA Unit (PA) Rear Panel

The below picture shows PA rear panel.

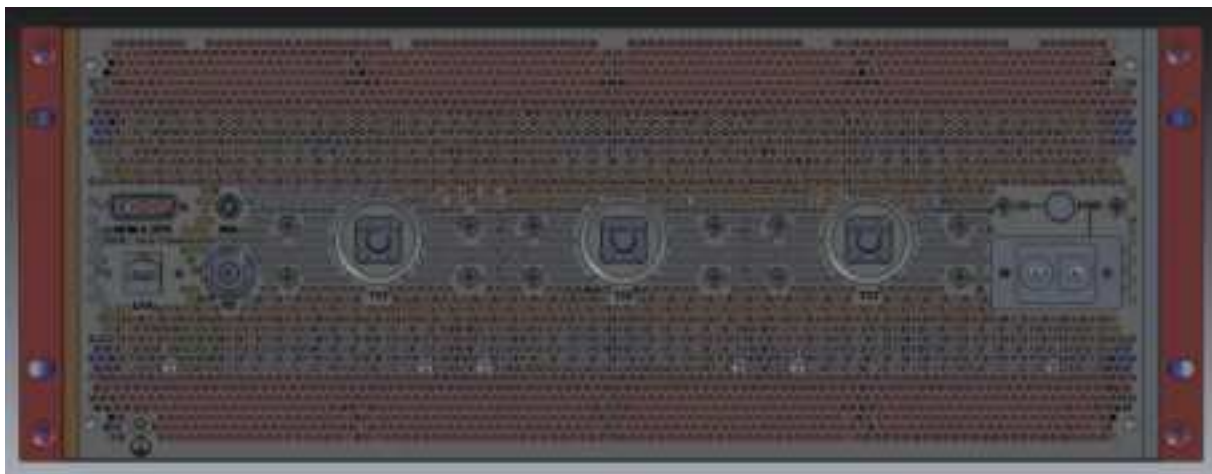


Figure 4: PA unit

Connection table

| No. | Interface | Designation | Description |
|-----|-----------|----------------------------|--------------------------|
| 1. | GPS | To external GPS antenna | SMA female |
| 2. | NWL | To external Omni antenna | QMA female |
| 3. | LAN | LAN connectivity | Standard RJ45 connection |
| 4. | RX | To external antenna | N-Type |
| 5. | TX1 | To external antenna | Quick N-Type (QN) |
| 6. | TX2 | To external antenna | Quick N-Type (QN) |
| 7. | TX3 | To external antenna | Quick N-Type (QN) |
| 8. | CB | Overcurrent protection | Circuit breaker |
| 9. | PWR | Main Power Input Connector | |

Omni Antennas RF installation and specs



Electrical Specifications

| Frequency, MHz | 617-698 | 698-960 | 1700-2200 | 2300-2700 | 3300-3800 | 3800-4000 |
|------------------------------------|----------|---------|-----------|-----------|-----------|-----------|
| VSWR ⁽¹⁾ | <2.8:1 | <2.0:1 | <1.8:1 | <1.5:1 | <2.0:1 | <2.8:1 |
| Peak Gain ^(1,2,3) , dBi | 3 | 2.5 | 4 | 3 | 1.5 | 1.5 |
| Efficiency ^(1,2) , % | 80 | 70 | 75 | 67 | 38 | 45 |
| Polarization | Vertical | | | | | |
| Nominal Impedance, Ohms | 50 | | | | | |
| Max Power, W | 100 | | | | | |

(1) Including Laird NMOHPC connector and 20 cm LMR195 cable; on a 70-cm circular ground plane

(2) Average

(3) Gain measurement uncertainty is ± 0.5 dBi

Environmental Specifications

| | |
|-------------------------------|--------------|
| Operating Environment | Outdoor |
| Operating Temperature, °C | -40 to +85°C |
| Storage Temperature, °C | -40 to +85°C |
| Material Substance Compliance | RoHS |

Mechanical Specifications

| | |
|----------------------|---------|
| Dimensions H x D, mm | 83 x 37 |
| Weight, g | 77 |
| Connector Type | NMO |

CUTTA V2 module

This module is used for improved system RX performance in all configurations. It is powered over the RF cable itself and can optionally be connected to LAN for more advanced control.



Specifications

| Parameter | Value |
|-----------------------------|--|
| Out of band rejection | >30dB (depending on band) |
| Max output level | 5dBm (depending on output routing) |
| Gain @ all bands | 10-20dB |
| Noise figure @15dB Gain | 4.5-8.5dB 5.5-15.5dB (B14 – NA variant) |
| Power consumption | 12W (Max) |
| Environmental | |
| Operating Temperature Range | -10°C to 55°C |
| Storage Temperature | -40°C to 85°C |
| Dimensions | 170mm x 130mm x 40mm (L x W x H) |
| Weight | 1.2kg |

Please refer to the CUTTA v2 product spec for more information.

DPSU-S (AC > DC converter)

The DPSU-S (Desktop Power Supply Unit) is designed to be used as a standalone unit where it can be placed next to the GIS2



Figure 5: DPSU-S unit

| No. | Interface | Designation | Description |
|-----|-----------|-------------------------------|--|
| 1. | 36VDC | To FalcoNet | Single multi-pin connector |
| 2. | 19VDC | To FalcoNet M (if applicable) | Single multi-pin connector |
| 3. | CB1 | 36V supply | 35A Resettable circuit breaker (to be used only in the event of a fault) |
| 4. | CB2 | 19V supply | 20A Resettable circuit breaker (to be used only in the event of a fault) |
| 5. | AC Power | From AC power | Standard power input connection |

Operation guidelines

Before using the units, make sure that you have read all safety guidelines.

Do not exceed temperature limit.

Failure to comply with the following guidelines may cause the units to overheat and may be dangerous:

Air temperature around the units should never exceed 45°C (113°F) or be below 0°C (32°F).

Each unit dissipates a lot of heat. Never block or cover the unit's ventilation slots and do not insert any objects through them. Never block or cover fans or heat sinks.

Always allow at least 10 cm clearance in front of and behind the ventilation slots for free air circulation.

If fans do not operate properly, immediately stop using the unit.

If the units are installed in closed space provide ample ventilation to ensure sufficient air flow. Test air temperature around the units after 1 hour and 10 hours of continuous operation. Verify that air temperature surrounding the units does not exceed the maximum 45°C (113°F).

Operating the FalcoNet system

1. Connect system as per system connection diagram.
2. Verify that the FalcoNet is switched **OFF**.
3. Turn on AC/Vehicle power supply (whichever is applicable)
4. Turn **ON** the FalcoNet system.
5. Verify that the system status LED on the front panel is **ON** and the LED is not showing any malfunction i.e. blinking yellow light).

Troubleshooting

In the event of failure, malfunction or suspicion thereof, follow the procedure below to isolate the problem.

| Problem Description | Display warning | Solution |
|--|-----------------|---|
| Unit's main On/Off switch is on. No LED lights | No LED lights | <ul style="list-style-type: none"> + Verify the unit is not in DIM mode, by pressing the DIM button for 2 seconds. + Verify the circuit breaker is engaged. + Check that the AC (or DC) power cable (whichever relevant) is not damaged, that it is connected properly on both ends and that it has the required voltage supply. + Try to operate the unit. |
| System is not performing as expected i.e. No phones are being captured. LED lights are ON | | <ul style="list-style-type: none"> + Check that external harnesses (RF, power, LAN) are plugged in all the way and are secure. + Check also the Omni scanner antennas are correctly connected. |
| If the issue persists there may be a possible malfunction that requires professional support | | Contact your support team |

Preventative maintenance

The following steps should be performed frequently to ensure the FalcoNet unit works without any problems and also performs efficiently.

- + Check all cables for signs of damage/ fatigue.
- + Check all connections are firmly secured in place.
- + Clean front panel.
- + Check there is no debris stuck in the fans and they are not making excessive noise.
- + Ensure that there is a minimum 10cm clearance from the back of the rack/ trolley and the nearest obstacle.

Technical specifications

| Feature | Specifications |
|--|---|
| Overall System Specifications | |
| Number of BTS | 9 |
| Control Device | Laptop |
| System Specifications – Power | |
| Power Consumption (Typical/Peak) | 800/1100 Watts |
| Operational Voltage | 36 v DC |
| Power Supply | DPSU-S AC/DC |
| System Specifications – Mechanical / Environmental | |
| Removable Modules/Parts | <ol style="list-style-type: none"> 1. Brain Unit 2. CSI 3. GUL BTS |
| System Dimensions Brain Unit Dimensions | 4U x 19" x 600mm H: 153mm x W: 386mm x D: 267mm |
| Overall System Weight Brain Unit Weight MPA-S Weight GUL Weight | 37Kg 11Kg 26Kg 700g |
| Operating Temperature Range | 0 ° to 45° Celsius |
| Storage Temperature Range | -40 ° to 85° Celsius |
| Vibration & Shock Standard Performed | ETSI EN 300 019-2-5 Class 5.1, 5M3 |
| FCC ID | 2A7A2-FNV1 |

RF Exposure Information

In the table below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

| Band | Mode | FCC Limit (mW/cm ²) | Output AVG Power (dBm) | Antenna Gain (dBi) | EIRP (dBm) | Duty Cycle (%) | EIRP (mW) | Separ. Distance FCC (cm) |
|----------|-------|------------------------------------|---------------------------|-----------------------|---------------|-------------------|--------------|--------------------------------|
| 850 MHz | GSM | 0.57 | 38.21 | 2.50 | 40.71 | 100.0 | 11776.06 | 40.56 |
| 1900 MHz | GSM | 1.00 | 36.58 | 4.00 | 40.58 | 100.0 | 11428.78 | 30.17 |
| 850 MHz | WCDMA | 0.57 | 34.20 | 2.50 | 36.70 | 100.0 | 4677.35 | 25.56 |
| 2100 MHz | WCDMA | 1.00 | 38.90 | 3.00 | 41.90 | 100.0 | 15488.17 | 35.12 |
| 1900 MHz | WCDMA | 1.00 | 35.89 | 4.00 | 39.89 | 100.0 | 9749.90 | 27.86 |
| LTE 2 | QPSK | 1.00 | 27.40 | 4.00 | 31.40 | 100.0 | 1380.38 | 10.48 |
| LTE 4 | QPSK | 1.00 | 30.17 | 3.00 | 33.17 | 100.0 | 2074.91 | 12.85 |
| LTE 5 | QPSK | 0.57 | 30.66 | 2.50 | 33.16 | 100.0 | 2070.14 | 17.00 |
| LTE 12 | QPSK | 0.47 | 32.82 | 2.50 | 35.32 | 100.0 | 3404.08 | 24.01 |
| LTE 13 | QPSK | 0.47 | 32.81 | 2.50 | 35.31 | 100.0 | 3396.25 | 23.99 |
| LTE 14 | QPSK | 0.47 | 28.00 | 2.50 | 30.50 | 100.0 | 1122.02 | 13.79 |
| LTE 17 | QPSK | 0.47 | 31.78 | 2.50 | 34.28 | 100.0 | 2679.17 | 21.30 |
| LTE 25 | QPSK | 1.00 | 27.44 | 4.00 | 31.44 | 100.0 | 1393.16 | 10.53 |
| LTE 26 | QPSK | 0.57 | 32.67 | 2.50 | 35.17 | 100.0 | 3288.52 | 21.43 |
| LTE 66 | QPSK | 1.00 | 24.79 | 3.00 | 27.79 | 100.0 | 601.17 | 6.92 |
| LTE 71 | QPSK | 0.40 | 31.81 | 3.00 | 34.81 | 100.0 | 3026.91 | 24.55 |
| LTE n71 | QPSK | 0.40 | 28.30 | 3.00 | 31.30 | 100.0 | 1348.96 | 16.39 |

Notes:

1. The manufacturer configures output power so that the maximum power after accounting for manufacturing tolerances, will never exceed the maximum power level measured
2. The output power in the table above is the maximum power per chain among various channels and various modes within the specific band
3. The antenna gain in the table above is the maximum antenna gain among various channels within the specified band

FCC Information

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

FCC ID: 2A7A2-FNV1

Unique identifier: FalcoNet

Responsible party – US contact information

Cognyte Software LP
35 Pinelawn Road, Suite 204, Melville,
NY, 11747
www.cognyte.com

FCC Compliance statement subject to Part 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.