# DOCSIS 3.1 Modem / Voice Equipment

## Product Specifications

### Interfaces & Standards

- Cable: F-Connector, female
- Models: E31N2V1, E31T2V1, E31U2V1
  - LAN: One 10/100/1000 Mbps RJ-45 port
- Models: EN2251, ET2251, EU2251
  - LAN: One 10/100/1000/2500 Gbps RJ-45 port
- Telephony: 2 RJ-11 ports
- PacketCable 1.5 (NCS) or 2.0 (IMS/SIP) ccompatible
- DOCSIS 3.1 certified

### Downstream*

- Frequency Range: 258MHz-1218MHz
- Capture Bandwidth: 1.218GHz
- Modulation: 64 or 256 QAM and OFDM: up to 4096 QAM
- Maximum DOCSIS 3.1 Data Rate: 2 x 192MHz OFDM channels provide capacity up to 5Gbps
- Maximum DOCSIS 3.0 Data Rate: 32 downstream channels provide speeds up to 1372Mbps
- Symbol Rate: 5361 Ksps
- RF (cable) Input Power:
  - -15 to +15dBmV (64/256 QAM)
  - -6 to +15dBmV (4096 QAM)
- Input Impedance: 75 Ω

### Upstream*

- Frequency Range: 5MHz ~ 42MHz/85MHz switchable
- Modulation: QPSK or 8/16/32/64/128 QAM and OFDMA: up to 4096 QAM
- Maximum DOCSIS 3.1 Data Rate: 2 x 96MHz OFDMA channels provide capacity up to 2Gbps
- Maximum DOCSIS 3.0 Data Rate: 8 upstream channels provide speeds up to 246Mbps
- Symbol Rate: 160, 320, 640, 1280, 2560, 5120 Ksps
- RF (cable) Output Power:
  - A-TDMA/S-CDMA (one channel): +65dBmV
  - OFDMA: +65dBmV

### Security

- DOS (denial of service) attack protection

### Regulatory

- UL/FCC Class B, Energy Star Certified

### Voice

- PacketCable 1.5 (NCS) or 2.0 (IMS/SIP) compatible
- Line Voltage On-hook: -48 Volts, Loop Current: 20mA/41mA, Ring Capability: 2K ft., 5REN, Hook State: Signaling Loop Start
- DTMF Tone Detection, T.38 Fax Relay (G.711), Echo Cancellation (G.168) / Silence Suppression, Voice Active Detection and Comfort Noise Generation
- G.722 codec, WB SLIC

### Physical and Environmental

- Dimensions: 70.8mm, 2.8 inches (W), 215mm, 8.46 inches (H), 170mm, 6.7 inches (D)
- Weight: 632.6g (1.4 lbs.), unit only
- Power: 12V 1.5A (output), 100-240VAC, 50-60Hz, 1A Max (input), external PSU
- Operating Temperature: 0°C ~ 40°C (32°F ~ 104°F)
- Humidity: 5 ~ 95% (non-condensing)
- Optional External Battery


* Actual speeds may vary based on factors including network configuration, and connected devices.

## LED Indicators

| LED | | COLOR | DESCRIPTION |
|---|---|---|---|
| **Power** | Status Light | **BLUE** | • Powering Up: **Flashing** between **On Blue** and **Off**<br>• Normal Operation: **On Blue** |
| | Illuminated Text | **WHITE** | • Powering Up and Fully Powered: **On White** |
| **Online** | Status Light | **BLUE / WHITE** | • Determining Connection: **Easing** between **On Blue** and **On White**<br>• Device has entered DOCSIS 3.0 Bonded State: **On White**<br>• Device has entered DOCSIS 3.1 Bonded State: **On Blue**<br>• Network Access Denied: **Off** |
| | Illuminated Text | **WHITE** | • Determining Connection: **On White**<br>• Connected: **On White**<br>• Network Access Denied: **Off** |
| **Voice** | Status Light | **BLUE** | • Voice Service Not Provisioned: **Off**<br>• Voice Service Active: **On Blue**<br>• Phone Cable Connected to Voice Port: **On Blue**<br>• Phone Cable Not Connected to Voice Port: **On Blue**<br>• Phone Off-Hook: **Easing** between **On Blue** and **Off**<br>• Phone Off-Hook and the modem is connected to an optional external battery: **Flashing** between **On Blue** and **Off**<br>• Unable to Establish Phone Connection: **Off** |
| | Illuminated Text | **WHITE** | • Voice Service Active: **On White** |

## LED Indicators Cont.

| LED | | COLOR | DESCRIPTION |
|---|---|---|---|
| Battery *(NOTE: external battery is optional)* | Status Light | BLUE/ RED | • Battery at 21% (of usable charge) or Higher: On Blue<br>• Battery at 20% (of usable charge) or Lower: On Red<br>• Battery at 10% (of usable charge) or Lower: Flashing between On Red and Off • No Battery Installed: Off<br>• Battery Charging: Easing between On Blue and Off |
| | Illuminated Text | **WHITE** | • Battery Installed: **On White** |
| **Reset** | Button Icon Light | **WHITE** | • Device is in a State that Suggests a Power Cycle: **On White**<br>• Device is NOT in a State that Suggests a Power Cycle: **Off** |
| | Ring | **RED** | • Device is waiting to be Power Cycled: **Easing** between **On Red** and **Off**<br>• Device is NOT in a State that Suggests a Power Cycle: **Off** |
| | Illuminated Text | **WHITE** | • Device is in a State that Suggests a Power Cycle, or is waiting to be Power Cycled: **On White** |
| | Note: When the device is in a state that suggests a power cycle (the button icon and the surrounding ring are lit), a factory reset cannot be performed. The user must power cycle the device, then perform a factory reset. | | |
| **Ethernet (Internet)** | Left Status Light | **GREEN/ AMBER** | • **On Green** - An Ethernet Device is Connected at 1000 Mbps<br>• **On Amber** - An Ethernet Device is Connected at 2500 Mbps (2.5G)<br>• **Off** - An Ethernet Device is Connected at 100 Mbps |
| | Right Status Light | **AMBER** | • **On Amber** - Data is Being Passed Between the modem and the Connected Device<br>• **Off** - No link is established |

## Safety Information

### SAFETY NOTICE

WARNING: Read all safety instructions in this guide before attempting to unpack, install, operate, or connect power to this product.

- Follow basic safety precautions to reduce the risk of fire, electrical shock, and injury. To prevent fire or shock hazard, do not expose the unit to rain and moisture or install this product near water. Never spill any form of liquid on or into this product.
- Do not use liquid cleaners or aerosol cleaners on or close to this product. Clean with a soft dry cloth.
- Do not insert sharp objects into the product's module openings or empty slots. Doing so can accidentally damage its parts and/or cause electric shock.
- Electrostatic discharge (ESD) can permanently damage semiconductor devices. Always follow ESD-prevention guidelines for equipment handling and storage.
- Use only the power supply included with the device. Do not attach the power supply cable to building surfaces or floorings.
- Rest the power cable freely without any obstacles. Do not place heavy items on top of the power cable. Do not abuse, step, or walk on the cable.
- Do not place heavy objects on top of the device. Do not place the device on an unstable stand or table; the device can fall and become damaged.
- Do not block the slots and openings in the module housing that provide ventilation to prevent overheating the device.
- Do not expose this device to direct sunlight and do not place hot devices close to the EMTA; it may degrade it or cause damage.

### FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENTS

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.