

# CG445

## DOCSIS 3.1 Cable Modem with Voice 4 GbE and Dual Wifi

**DOCSIS/EuroDOCSIS 3.1  
Compatible DOCSIS 3.0  
32x8 channel bonding  
OFDM 2x2**



DOCSIS system include CMTS (Headend cable network ) and CM (user end). The main function of DOCSIS Cable Modem system is transparently transmitting IP packets between the front end and the user end.

The model CG445 product is designed with state-of-the-art DOCSIS/EuroDOCSIS 3.1, as well as backward compatible to all existing DOCSIS 3.0/2.0/1.1/1.0 head-end equipment under Multiple Service Operator networks. In OFDM mode, it support 2\*2 channel bonding technology, and in SC-QAM mode, it support 32\*8 channel bonding technology. DIBSYS cable modem provides a cost-effective solution which delivers high-speed and bi-directional data services.

The model CG445 product cover from low-end Four Giga Ethernet port model to high-end with integrated optional Wi-Fi feature, DIBSYS offer a one-stop solution to satisfy customers all kinds of demands. It not only play as cable modem feature, some models with built in Wi-Fi Router function are even capable to work as Residential Gateway in your home or small office and offer excellent bandwidth to all your Internet-capable devices.

### Features

- DOCSIS 3.1 Compliant; Backward compatible with DOCSIS/EuroDOCSIS 3.0
- Switchable Diplexer for upstream and downstream
- 2x 192 MHz OFDM Downstream reception capability
  - 4096 QAM support
- 32x SC-QAM (Single-Carriers QAM) Channel Downstream reception capability
  - 1024 QAM support
- 2x 96 MHz OFDMA Upstream transmission capability
  - 4096 QAM support
- 8x SC-QAM Channel upstream transmission capability
  - 256 QAM support
  - S-CDMA and A/TDMA support
- FBC (Full-Band Capture) Front End
  - 1.2 GHz Bandwidth
- 4x Gigabit Ethernet Ports
- 1x USB3.0 Host, 1.5A limitation (Typ.) (Optional)
- Wireless networking on-board:
  - IEEE 802.11n 2.4GHz (3x3)
  - IEEE 802.11ac Wave2 5GHz (4x4)
- 2x FXS Ports for Phone (Optional)
- SNMP and TR-069 remote management
- Dual stack IPv4 and IPv6

## TECHNICAL SPECIFICATIONS

### Connectivity Interface

|              |   |
|--------------|---|
| RF Interface | F type female 75ohm connector port                      |
| RJ45         | 4x RJ45 Ethernet port 10/100/1000 Mbps                  |
| Wi-Fi        | IEEE 802.11n 2.4GHz 3x3<br>IEEE 802.11ac Wave2 5GHz 4x4 |
| RJ11         | 2x FXS POTS Ports                                       |
| USB          | 1x USB 3.0 Host (Optional)                              |

### RF Downstream

|                          |                              |
|--------------------------|------------------------------|
| Frequency (edge-to-edge) | 108-1218 MHz<br>258-1218 MHz |
| Input Impedance          | 75 OHM                       |
| Total Input Power        | <40 dBmV                     |
| Input Return Loss        | > 6 dB                       |

### SC-QAM Channels

|                           |   |
|---------------------------|---|
| No. of Channels           | 32 Max.   |
| Level Range (one channel) | North Am (64 QAM, 256 QAM):<br>-15 to + 15 dBmV<br>Euro (64 QAM): -17 to + 13 dBmV<br>Euro (256 QAM): -13 to + 17dBmV |
| Modulation Type           | 64 QAM, 256 QAM   |
| Symbol Rate (nominal)     | North Am (64 QAM): 5.056941 Msym/s<br>North Am (256 QAM): 5.360537 Msym/s<br>Euro (64 QAM, 256 QAM): 6.952 Msym/s     |
| Bandwidth                 | North Am (64 QAM/256QAM with<br>$\alpha=0.18/0.12$ ): 6 MHz<br>EURO (64 QAM/256QAM with<br>$\alpha=0.15$ ): 8 MHz     |

### OFDM Channels

|  |   |
|--|---|
| Signal Type  | OFDM  |
| Max OFDM Channel Bandwidth   | 192 MHz   |
| Mini Contiguous-Modulated OFDM Bandwidth   | 24 MHz  |
| No. of OFDM Channels   | 2   |
| Frequency Boundary Assignment Granularity  | 25 KHz 8K FFT<br>50 KHz 4K FFT  |
| Subcarrier Spacing / FFT Duration  | 25 KHz / 40 us<br>50 KHz / 20 us  |
| Modulation Type  | QPSK, 16-QAM, 64-QAM, 128-QAM, 256-QAM, 512-QAM, 1024-QAM, 2048-QAM, 4096-QAM |
| Variable Bit Loading   | Support with subcarrier granularity<br>Support zero bit loaded subcarriers    |
| Level Range (24 MHz mini. Occupied BW) Equivalent Power Spectral Density to SC-QAM of -15 to + 15 dBmV per 6 MHz | -9 dBmV/24 MHz to 21 dBmV/24 MHz  |

### Upstream

|                                |                                |
|--------------------------------|--------------------------------|
| Frequency Range (edge to edge) | 5-85 MHz, 5-204 MHz            |
| Output Impedance               | 75 OHM                         |
| Maximum Transmit Level         | (Total average power) +65 dBmV |
| Output Return Loss             | >6 dB                          |

### SC-QAM Channels

|                           |  |
|---------------------------|--|
| Signal Type               | TDMA, S-CDMA   |
| No. of Channels           | 8 MAX.   |
| Modulation Type           | QPSK, 8 QAM, 16 QAM, 32 QAM, 64 QAM, and 128 QAM   |
| Modulation Rate (nominal) | TDMA: 1280, 2560, and 5120 KHz<br>S-CDMA: 1280, 2560, and 5120 KHz<br>Pre-DOCSIS3 operation: TDMA: 160, 320, and 640 KHz                         |
| Bandwidth                 | TDMA: 1600, 3200, and 6400 KHz<br>S-CDMA: 1600, 3200, and 6400 KHz<br>Pre-DOCSIS3 operation: TDMA: 200, 400, and 800 KHz                         |
| Mini Transmit Level       | Pmin = +17 dBmV at $\leq 1280$ KHz modulation rate<br>Pmin = +20 dBmV at 2560 KHz modulation rate<br>Pmin = +23 dBmV at 5120 KHz modulation rate |

### OFDMA Channels

|  |  |
|--|--|
| Signal Type                                      | OFDMA  |
| Max OFDMA Channel Bandwidth                      | 96 MHz   |
| Mini OFDMA Occupied Bandwidth                    | 6.4 MHz (for 25 KHz subcarrier spacing)<br>10 MHz (for 50 KHz subcarriers spacing)                         |
| No. of Independently Configurable OFDMA Channels | 2  |
| Subcarrier Channel Spacing                       | 25, 50 KHz   |
| FFT Size   | 50 KHz: 2048 (2K FFT); 1900 Max. active subcarriers<br>25 KHz: 4096 (4K FFT); 3800 Max. active subcarriers |
| Sampling Rate                                    | 102.4 (96 MHz Block Size)  |
| FFT Time Duration                                | 40 us (25 KHz subcarriers)<br>20 us (50 KHz subcarriers)   |
| Modulation Type                                  | BPSK, QPSK, 8-QAM, 16-QAM, 32-QAM, 64-QAM, 128-QAM, 256-QAM, 512-QAM, 1024-QAM, 2048-QAM, 4096-QAM         |

### Wi-Fi

|                                |  |
|--------------------------------|--|
| Full dual band concurrent WiFi | 2.4GHz (3x3) IEEE 802.11n AP<br>5GHz (4x4) IEEE 802.11ac Wave2 AP  |
| 2.4GHz WiFi Power              | Up to +20dBm   |
| 5GHz WiFi Power                | Up to +36dBm   |
| WPS                            | WiFi Protected Setup (WPS)   |
| WiFi Security Levers           | WPA2 Enterprise / WPA Enterprise<br>WPA2 Personal / WPA Personal<br>IEEE 802.1x port-based authentication with RADIUS client |
| SSID                           | Up to 8 SSIDs per radio interface  |
| 3x3 MIMO 2.4GHz WiFi features  | SGI<br>STBC<br>20/40MHz coexistence  |
| 4x4 MU-MIMO 5GHz WiFi features | SGI<br>STBC<br>LDPC (FEC)<br>20/40/80/160MHz mode<br>Multi-User MIMO   |
| Channel Selection              | Manual / auto radio channel selection  |

### Voice and Telephony

|                          |  |
|--------------------------|--|
| Voice Compliant          | PacketCable 2.0; EuroPacketCable 1.5   |
| Multi-line Phone Support | 2 Phone lines<br>3-Party Conference Calls<br>Support Two Complex Voice Codecs Simultaneously |
| DTMF Tone Relay          | RFC 2833   |
| Packet Tone              | DTMF Generation<br>Call Progress Generation<br>Custom Tone Generation                        |
| REN                      | 3 REN per device   |
| Pulse Dialing            | DTMF/Pulse Tones<br>Pulse/DTMF Tones Conversion  |

### Mechanical

|            |   |
|------------|---|
| LED Button | PWR/TEL/WiFi/WPS/Internet<br>WiFi on/off button<br>WPS button<br>Reset button (recessed)<br>Power on/off button |
| Dimensions | TBD   |
| Weight     | TBD   |

### Environment

|                       |                         |
|-----------------------|-------------------------|
| Operation temperature | 0 to 40°C               |
| Storage temperature   | -20~70°C                |
| Operating Humidity    | 10~90% non - condensing |
| Power Consumption     | <36W (Max.)             |
| Power input           | 12V/3A                  |

### Accessories

|  |
|--|
| 1x User Guide                                |
| 1x 1.5M Ethernet Cable                       |
| 4x Label (SN, MAC Address)                   |
| 1x Power Adapter                             |
| Input: 100-240VAC, 50/60Hz; Output: 12VDC/3A |