# AT3535G

# Analog DWDM Narrowcast Transmitter with Selectable RF Gain (1 GHz Passband)



## Features

- DWDM transmitter (40 wavelengths on ITU grid)
- Optimized for 16, 32, 48, or 80 256-QAM channels
- Selectable RF gain allows lower RF input levels
- Industry's highest rack density (14 transmitters per 3RU chassis)
- Front access –20dB input test point
- Front panel laser On/Off interlock switch
- Hot plug-in/out
- Local and remote status monitoring features
- Occupies one full-depth slot


The AT3535G series high performance Analog Narrowcast Transmitters are a key element of Aurora Network's Passive HFC architecture and are designed for Dense Wave Division Multiplexing (DWDM) applications for forward path transmission of narrowcast digital services. Each transmitter's wavelength is specified at one of 40 wavelengths on the 100 GHz DWDM ITU grid (ITU-T G.694.1). AT3535G transmitters incorporate advanced predistortion circuitry to enable transmission of up to 80 QAM modulated channels per wavelength. Transmitter output power is 10 dBm for maximum network performance and application flexibility.

These transmitters incorporate a user-selective (enable/disable) RF input gain stage to permit its use with lower RF input levels. As network segmentation increases, each source QAM signal must feed a larger number of QAM transmitters, with resulting RF losses due to the required splitting. Moreover, as each transmitter is able to handle greater numbers of QAM channels (up to 80), the required combining of the (previously split) individual source QAM signals will also result in higher RF losses. The user-selectable RF input gain stage provides compensation for these losses.

The unique mid-plane packaging of the AT3535G features both a compact one-module-width design and an integrated "back plate" multiplexer which eliminates the need for a separate platform or shelf for a typically packaged multiplexer.

This high density packaging enables network operators to install up to 14 transmitters per 3RU chassis, all of which can be monitored remotely or locally from the power supply module. The compact design minimizes rack space requirements in headends or hubs and enhances deployment of traditional HFC, passive HFC and fiber to the home (FTTH) networks.

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# Product Specifications

# AT3535G

## Physical

Dimensions: 13.0” D x 4.3” H x 1.0” W (3RU)
(33 cm x 11 cm x 2.5 cm)

Weight: 1.7 lbs (0.77 kg)

## Environmental

Operating temperature range: –20º to +65ºC (–4º to 149ºF)

Storage temperature range: –40º to +85ºC (–40º to 185ºF)

Humidity: 5% to 95% non-condensing

## RF and Optical Interface

RF input: F-type male (mates to BP-A4 or BP35M4*x*)

Input RF test point: G-type male (located at front panel, –20 dB)

Optical connector: SC/APC (mates to BP-A4 or BP35M4*x*)

## Power Requirements

Input voltage: 12 $V_{DC}$

Power consumption: 12 W

## General

Hot plug-in/out

Manual gain alignment

Channel loading (for 6 MHz, 256-QAM modulation): 16, 32, 48, 80 channels

## Optical

Optical output power: 10 ±0.25 dBm

Fiber length: 60 km max (user settable in 5-km steps)

Wavelength: *See DWDM ITU Channel Plans description, below*

## Electrical

Pass band: 46–1002 MHz

Frequency response (including slope):
- ±0.75 dB (46–1002 MHz)
- ±0.50 dB (550–1002 MHz)

Nominal RF input level (with input attenuator = 0 dB):

- Normal Gain Setting
  22.0 dBmV for 16 QAM
  19.0 dBmV for 32 QAM
  17.2 dBmV for 48 QAM
  15.0 dBmV for 80 QAM
- High Gain Setting
  7.0 dBmV for 16 QAM
  4.0 dBmV for 32 QAM
  2.2 dBmV for 48 QAM
  0.0 dBmV for 80 QAM

RF input impedance: 75 Ω, nom

RF input return loss: 18 dB, min

RF input attenuator range: 0 to –6 dB, minimum

RF input attenuator step size: 0.5 dB

Level stability: ±0.6 dB (over operating temperature range)

Link performance with CW loading *:

| | 16[1] | 32[2] | 48[3] | 80[4] |
|---|---|---|---|---|
| • CNR ** (dB): | 51 | 50 | 48 | 46.5 |
| • CSO (dB): | 58 | 58 | 58 | 54 |
| • CTB (dB): | 57 | 57 | 57 | 56 |

(** CNR values are 0.5 dB lower for High Gain Setting.)

[1] –8.0 dBm at the receiver input
[2] –6.5 dBm at the receiver input
[3] –5.5 dBm at the receiver input
[4] –4.5 dBm at the receiver input

256-QAM BER: $<10^{-5}$ (pre-FEC, ITU-C)

* For information about BC/NC overlay system performance with actual 256-QAM loading of up to 80 QAM channels on this Narrowcast Transmitter (with additional Analog/QAM loading on an Aurora model AT3553 series Broadcast Transmitter), please contact your Aurora representative.

## DWDM ITU Channel Plans

For more complete description of DWDM ITU Grid channels, please refer to the Aurora Networks DWDM ITU Grid Channel Plan data sheet.

When ordering AT3535G transmitters on the ITU grid please note, for network planning purposes, that Aurora’s selection of AT3550 series broadcast transmitters operate at either 1545.3 nm ± 0.9 nm (occupying the approximate region of ITU channels 39 through 41) or 1563.0 nm ± 0.9 nm (occupying the approximate region of ITU channels 15 through 17).

NOTE

As a general rule the QAM channel loading must occupy less than one octave of RF bandwidth and be placed in the frequency band above half the highest operational frequency of the system. For example, in a system designed for a highest operational frequency of 870 MHz, the QAM channels must be placed in the 435-870 MHz frequency band, and no channels below 435 MHz should be used on this transmitter.

# Ordering Information

**AT3535G – ** – 1 – AS**

**Analog DWDM Narrowcast Transmitter (1 GHz)**

**** = ITU Channel Number *(20 thru 59; reference Aurora Networks DWDM ITU Grid Channel Plan Data Sheet)***

**Channel Types and Connector**
**1 = Up to 80 QAM Channels**
**AS = SC/APC Connector**

**Module Back Plates**

AT3535G series transmitters may be connected to one of two different styles of chassis back plates, which must be ordered separately depending on the application. One style provides connections for a single transmitter. This single-width back plate may be ordered as:

**BP – A4**

The second style provides connections for a group of four transmitters installed in adjacent chassis slots. These 4-channel mux back plates (for which outputs can be cascaded from one back plate to another) may be ordered for various channel groups. Please refer to the DWDM ITU Grid Channel Plan data sheet for channel groups and designators.

**BP – 35M4 * – * – 00 – AS**



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