

1 GHz Forward Path QAM Transmitters

CHP Max5000

Converged Headend Platform



- **1 GHz technology**
- **10dBm output provides transmitter reach of up to 150km**
- **Optical output available at odd ITU channels 21 through 61**
- **Dual high isolation input**
- **Low profile footprint allows 200 transmitters in a standard rack**
- **Universal local or remote management through Craft interface and SNMP with HMS**

The CHP Max5000 Advanced 1 GHz QAM Transmitters are ideally suited to transport digitally encoded video (16/64/256-QAM) and QPSK data from the headend to a hub or node. These forward path transmitters can accept narrowcast QAM signals, telephony, etc. from 550 to 1002MHz and convert the RF input to an optical output at DWDM wavelengths available at odd ITU channels 21 through 61. The optical output power of 10dBm provides a transmitter reach of up to 150km when used in conjunction with an EDFA. CHP Max5000 1GHz transmitters are dual-input, 10dBm output, hot-swappable transmitters with integrated management through the local Craft GUI and remote management via SNMP HMS-compliant interface for external connection to an element manager.

The 1GHz transmitter's dual-input capability provides isolation that is much superior to alternative offerings, enabling the possibility to use "broadcast" QAM channels on one input, while using "narrowcast" QAM channels on the other input without cross-talk impairments. The high isolation eliminates having to add external devices to achieve similar performances, thereby lowering CapEx even further and reducing system complexity.

Up to 10 CHP Max5000 transmitters can reside in the 2RU CHP Max5000 chassis, with RF input and optical bulkhead connector access on the rear panel. Thus, a standard 40RU rack holds up to 200 CHP Max5000 transmitters, providing exceptional space efficiency and reducing operational costs.

Features

- Superior performance to facilitate 256-QAM digital channel transmission capability
- 10dBm optical output DWDM wavelengths available at odd ITU channels 21 through 61
- Plug-in attenuators for RF gain control and front-panel RF testpoint for convenient monitoring
- Downloadable firmware upgrades

Specifications

Optical

Optical Wavelength	1529 nm (ITU channel 61) to 1561 nm (ITU channel 21)
Wavelength Drift	0.15 nm
Optical Output Power, min./typ./max.	9.75/10.0/10.25 dBm

RF

Bandwidth (Note 1)	550 to 1002 MHz
Response Flatness, P-V, typ./max. (Notes 2 and 3)	1.0/2.0 dB
Response tilt, max. (Note 2)	±0.5 dB
Input Return Loss, min. (Note 2)	16 dB
Unit-to-Unit Isolation, min.	>65 dB

Powering

Power Consumption, max.	17.4 W
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Performance

Channel Plan	up to 75 256-QAM channels		
Nominal Total RF Input Power	37 dBmV for 33 Digital QAM Channels		
Carrier to Intermodulation Noise, min. (Note 4)	63 dB		
Bit Error Rate (BER), min. (Note 5)	1×10^{-6}		
Link Range (up to 150 km)	30 km	90 km	145 km
CNR, typ. (Notes 5, 6, and 7)	51 dB	44 dB	41 dB
CTB, typ. (Notes 5 and 6)	-60 dBc	-50 dBc	-45 dBc
CSO, typ. (Notes 5, 6, and 8)	-55 dBc	-30 dBc	-25 dBc

Mechanical

Optical Connector	SC/APC
RF Connector	F-type
RF Input Testpoint (Note 9)	-20 ± 1.0 dB
Dimensions (W x H x D) (Note 10)	1.25 x 3.4 x 18.5 in. (3.2 x 8.7 x 47.0 cm)
Weight	2.75 lbs (1.24 kg)

Environmental

Operational Temperature (Note 11)	32 to 122°F (0 to 50°C)
Storage Temperature	-40 to 158°F (-40 to 70°C)
Humidity, noncondensing, max.	85%

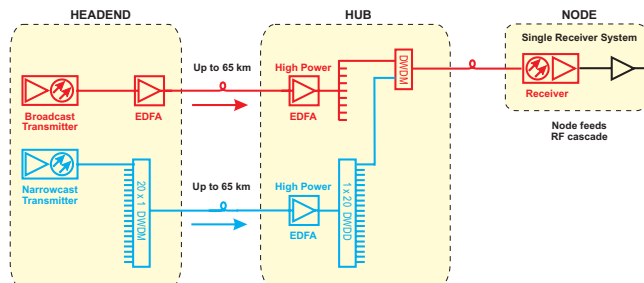
Notes:

1. Please contact your C-COR sales professional if you want to use QAM channels below 550 MHz.
2. Specifications obtained with 0 dB external PAD installed.
3. Typical specifications measured at 25°C and maximum specifications measured from 0 to 50°C.
4. CIN measurement obtained using a fiber length of 90 km and a power level of -2 dBm at the receiver input.
5. CSO, CTB, and CNR measurements obtained using an input of 22 dBmV/channel with a channel loading of 33 256-QAM signals from 550 to 750 MHz.
6. Test configuration consists of CHP-GQTX-10-S-xx → 55 km fiber → EDFA → 35 km fiber → TF520 receiver. The maximum optical power into the fiber should not exceed 8 dBm. Optical power to EDFA is -3 ± 0.5 dBm and input to receiver is -6.5 ± 0.5 dBm. An EDFA with a noise figure better than 5.5 dB must be used.
7. OMI is 4.4% at 33 QAM channel loading.
8. CSO performance for QAM channels measured from 110 to 1002 MHz.
9. Relative to main port with 0 dB pad and 0 dB EQ at a temperature from 0 to 50°C. The tolerance is ±0.75 dB at a temperature of 25°C.
10. Includes handles and connectors.
11. Temperature measured at transmitter module's air inlet.
12. Distortions are measured using only CW analog carriers per SCTE recommendation by standard RF test methods. Performance shown represents typical performance for ≥85% of production units tested over typical Corning SMF-28 fiber (or equivalent). For minimum CSO and CTB, subtract 2 dB from typical.

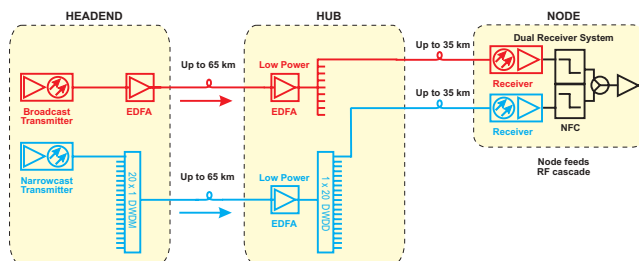
Specifications subject to change without notice

Application

In this example, narrowcast content from up to 20 QAM transmitters can be dense wave division multiplexed (DWDM) onto a single fiber in the headend and then transmitted up to 65km to a hub. An EDFA in the hub amplifies the optical signal and the wavelength of the associated narrowcast transmitter is demultiplexed by the DWDD. The output of the DWDD is multiplexed with the broadcast signal of the EDFA in the hub to combine both signals onto a single fiber going to the node.



In the dual receiver architecture, the major difference from the previous example is that the broadcast and narrowcast signals are not dense wave division multiplexed onto the same fiber in the hub. Instead, the broadcast and narrowcast signals are independently routed through the headend and hub to separate receiver in the node. The RF signals are then combined in the node.



Ordering Information

				1	2	3	4		5	6		7		8	9
C	H	P	-	G	Q	T	X	-	1	0	-	S	-	x	x

1-4 Type of Module	
GQTX	1 GHz QAM forward transmitter

5-6 Optical Output Power	
10	10dBm

7 Optical Connector	
S	SC/APC

8-9 Optical Output Wavelength	
21	ITU channel 21 (1560.6065nm)
23	ITU channel 23 (1558.9834nm)
25	ITU channel 25 (1557.3636nm)
27	ITU channel 27 (1555.7473nm)
29	ITU channel 29 (1554.1343nm)
31	ITU channel 31 (1552.5246nm)
33	ITU channel 33 (1550.9183nm)
35	ITU channel 35 (1549.3153nm)
xx	Odd ITU channels from 37 to 61
a) These ITU channels will be offered upon request	

Contact your C-COR sales professional to discuss how our exciting new 1 GHz products can add value to your network.

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