

# 2.25 kW SuperLinear® TWT Amplifier

## Compact

Provides 2250 watts of peak power (1000 watts operating) in a compact nine rack-unit package, digital ready, for wideband, single- and multi-carrier satellite service in the 5.85 - 6.65 GHz frequency range (extended bands available). Designed for linear output up to 890 watts at the flange, with respect to each of two equal carriers, for multi-carrier uplinks. Ideal for transportable and fixed earth station applications where space and prime power are at a premium. 30% smaller than traditional HPAs and 50% more efficient than GaN SSPAs.

## Efficient and Reliable

CPI SuperLinear® TWTAs are among the most power efficient in the industry. This amplifier is optimized for maximum efficiency at linear output operating levels.

## Simple to Operate

User-friendly microprocessor-controlled logic with integrated computer interface, digital metering, pin diode attenuation, optional integrated linearizer for improved intermodulation performance, and BUC option for use with L-band modems.

## Easy to Maintain

Modular design and built-in fault diagnostic capability via remote monitor and control.

## Meets Global Requirements

Meets International Safety Standard EN-60215 and Electromagnetic Compatibility 2014/30/EU to satisfy worldwide requirements. CE certified.

## Worldwide Support

Backed by over three decades of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes more than 20 regional factory service centers.



**Model TL22CI**

2250 watt C-band SuperLinear® TWTA for **satellite uplink** applications

### OPTIONS

- Remote control panel
- Redundant and power combined sub-systems
- Integrated 1:1 switch control and drive
- L-band block upconverter (BUC) or dual-band BUC - contact CPI for specifications
- Integral linearizer
- External receive band reject filter
- Ethernet interface
- Extended frequency ranges
- TWT LifeExtender™/LifePredictor™



811 Hansen Way, PO Box 51625  
Palo Alto, CA 94303 USA  
tel: +1 (650) 846-3803  
fax: +1 (650) 424-1744  
e-mail: [satcommarketing@cpii.com](mailto:satcommarketing@cpii.com)  
website: [www.cpii.com/satcom](http://www.cpii.com/satcom)

## 2.25 kW C-Band SuperLinear® TWT Amplifier

| Specification   | Model TL22CI  |  |
|---|---|--|
| Output Frequency  | 5.85 to 6.65 GHz or 5.85 to 6.725 GHz   | 5.85 to 7.075 GHz  |
| Output Power (min.)<br>TWT Peak Power<br>Flange Peak Power<br>Guaranteed CW Power at Flange<br>Maximum CW Power at Flange | 2250 W (63.54 dBm) min.<br>2000 W (63.00 dBm) min.<br>1000 W (60.00 dBm) min.<br>1120 W (60.50 dBm) max.  |  |
| Note on Output Power  | This amplifier guarantees 1000 W of CW power at the flange. The peak power specifications are provided so that desired backoff may be more easily calculated.   |  |
| Gain  | 75 dB at rated power, 78 dB at small signal   |  |
| RF Level Adjust Range   | 0 to 30 dB (via PIN diode attenuator) typ, 0.1 dB steps   |  |
| Gain Stability<br>Over temp, constant drive   | ±0.25 dB/24 hour max,max. at constant drive and temperature, after 30 minute warmup<br>±1.0 dB typ. over operating temperature range  |  |
| Small Signal Gain Slope   | ±0.02 dB/MHz max.   |  |
| Small Signal Gain Variation   | 0.5 dB pk-pk max. over any 40 MHz<br>(1.0 dB pk-pk max. with linearizer);<br>3.0 dB pk-pk max. across 800 MHz<br>(4.0 dB pk-pk max. with linearizer)  | 0.5 dB pk-pk max. over any 40 MHz<br>(1.0 dB pk-pk max. with linearizer);<br>4.0 dB pk-pk max. across 1225 MHz<br>(5.0 dB pk-pk max. with linearizer)  |
| Input/Output VSWR   | 1.25:1 max.   |  |
| Load VSWR   | 2.0:1 continuous operation; 1.5:1 for full spec. compliance; any value operation without damage   |  |
| Phase Noise   | 10 dB below IESS-308/309 phase noise profile; -50 dBc AC fundamentals related; -47 dBc sum of spurs;<br>Prime power AC line unbalance not to exceed 3%. Excess imbalance may cause an increase in residual RF noise<br>(AM, FM and PM). Phase noise increase is typically 2.5 dB/% imbalance. |  |
| AM/PM Conversion  | 6°/dB max. With optional linearizer, can be tuned to 2°/dB max. (2.5°/dB max. for 5.850 to 6.725 GHz HPA with lin)  |  |
| Harmonic Output   | -60 dBc max.  |  |
| Noise Density   | -150 dBW/4 kHz from 3.7 to 4.2 GHz;<br>-65 dBW/4 kHz from 4.2 to 12.0 GHz (-60 dBW/4 kHz from 4.2 to 12.0 GHz with linearizer option)<br>-110 dBW/MHz from 12.0 to 40.0 GHz   |  |
| Intermodulation - with respect to each of 2 equal carriers 5 MHz apart  | -23.5 dBc max, 5.850 – 6.425 GHz at 400 W output power without linearizer (-25 dBc max. @ 890 W w/linearizer);<br>-22 dBc max., 6.425 – 6.650 GHz (or 6.725 GHz) at 400 W output power without linearizer<br>(-24 dBc max. at 890 W w/linearizer)   | -23.5 dBc max, 5.850 – 6.425 GHz at 400 W output power without linearizer (-25 dBc max. @ 890 W w/linearizer);<br>-20 dBc max., 6.425 – 7.075 GHz at 400 W output power without linearizer (-23 dBc max. 890 W w/linearizer) |
| Group Delay   | 0.01 ns/MHz linear max; 0.001 ns/MHz <sup>2</sup> parabolic max; 0.5 ns pk-pk ripple max.   |  |
| Primary Power   | All ratings are ±10%, 47-63 Hz, 5-wire, 3-phase with neutral and ground:<br>200 to 240 VAC (with or w/o neutral);<br>380 to 415 VAC<br>AC current harmonic content: less than 20%, primarily fifth and seventh harmonics.<br>Harmonics must be considered when choosing UPS sources.          |  |
| Power Consumption   | 5.5 kVA max; 4.5 kVA typ. at 1000 W output power; 2.5 kVA typ. at 100 W output power  |  |
| Power Factor  | 0.90 min; 0.95 typ.   |  |
| Ambient Temperature   | -10°C to +50°C operating; -54°C to +71°C non-operating  |  |
| Relative Humidity   | 95% non-condensing  |  |
| Altitude  | 10,000 ft. with standard adiabatic derating of 2°C/1000 ft. operating; 50,000 ft. non-operating   |  |
| Shock and Vibration   | Designed for normal transportation environment per Section 514.4 MIL-STD-810E. Designed to withstand 20g at 11 ms (1/2 sine pulse) in non-operating condition   |  |
| Cooling   | Forced air with integral blower. Maximum external pressure loss allowable: 0.25 inch water gauge.   |  |
| Connections   | RF Input: Type N Female; RF output: CPR-137 waveguide flange, grooved, threaded, UNF 2B 10-32;<br>RF output monitor: Type N Female  |  |
| M&C Interface   | RS-232 and RS-422/485 (4-wire) (Ethernet optional)  |  |
| Weight and Dimensions   | 155 lbs (70.5 kg) max. / 19 W x 15.75 H x 24 D inches (483 W x 400 H x 610 D mm)  |  |