

CPI 2.25 kW SuperLinear® TWT Amplifier for Satellite Communications

C-Band

The TL22CI

2.25 kW (1000 W operating) TWT Compact High Power Amplifier, features high efficiency, small size and integral computer interface.



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 band. Designed to operate at 1000 watts flange linear power 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.

Efficient and Reliable

Employs an ultra-high efficiency dual-depressed collector helix traveling wave tube backed by many years of field-proven experience in airborne and military applications. The collector design is optimized for super-cool operation.

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 C-band modems.

Global Applications

Meets International Safety Standard EN-60215 and EMC Standard 2004/108/EC to satisfy worldwide requirements.

Easy to Maintain

Modular design and built-in fault diagnostic capability with convenient and clearly visible indicators for easy maintainability in the field.

Worldwide Support

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

satcom  **division**

811 Hansen Way
P.O. Box 51625, Palo Alto, CA 94303

tel: +1 (650) 846-3803
fax: +1 (650) 424-1744

e-mail: satcommarketing@cpil.com
www.cpil.com/satcom

C-Band

2.25 kW SuperLinear® Compact TWT A

OPTIONS & COMPANION PRODUCTS:

- *Integral Linearizer*
- *Remote Control Panel*
- *Redundant and Power Combined Subsystems*
- *Extended Frequency (5.850 - 6.725 GHz or 5.725 - 6.525 GHz)*
- *External Receive Band Reject Filter*
- *Integral L-Band Block Upconverter (BUC)*

Note: This data sheet does not provide specifications for when the BUC option is included. Please see TD-140 for details

SPECIFICATIONS, TL22CI

Electrical

Frequency	5.85 - 6.65 GHz
Output Power	
TWT peak power	2250 W min. (63.54 dBm)
Flange peak power	2000 W min. (63.00 dBm)
Flange CW power	1000 W min. (60.00 dBm)
Flange CW power	1120 W max. (60.50 dBm)
Note: This TWTA does NOT provide 2000 watts of output power at the flange. The flange peak power specification is provided so that user can more easily calculate desired backoff level.	
Bandwidth	800 MHz (1225 MHz optional)
Gain	75 dB min. at rated power output 78 dB min. at small signal
RF Level Adjust	0 to 30 dB continuous
Output Power Adjustability	±0.1 dB
Gain Stability	±0.25 dB/24 hr max. (at constant drive and temp.)
Small Signal Gain Slope	0.02 dB/MHz max.
Small Signal Gain Variation	0.5 dB pk-pk max. over any 40 MHz; 1.0 dB pk-pk max. over any 40MHz with linearizer option; 3.0 dB pk-pk max. across 800 MHz; 4.0 dB pk-pk max. across 800 MHz with linearizer option
Input/Output VSWR	1.25:1 max.
Load VSWR	2.0:1 max. for full spec compliance; any value without damage
Residual AM, max. ¹	-50 dBc below 10 kHz, -20 (1.5 + log F kHz) dBc, 10 kHz to 500 kHz (F in kHz) -85 dBc above 500 kHz
Phase Noise ¹	
IESS-308/309	
phase noise continuous	10 dB below mask at -10 dB backoff
AC fundamentals related	-50 dBc
Sum of spurs	-47 dBc
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)
Noise Density	-150 dBW/4 kHz from 3.4 to 4.2 GHz -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 -110 dBW/4 kHz from 12.0 to 40.0 GHz
Intermodulation ²	
with two equal carriers	-23.5 dBc max, 5.850 - 6.425 GHz at 400 W without linearizer (-25 dBc max. at 890 W with linearizer); -22 dBc max. 6.425 - 6.650 GHz at 400 W without linearizer (-24 dBc max. at 890 W with linearizer)

Electrical (continued)

Group Delay	0.01 ns/MHz linear (in any 40 MHz band) 0.001 ns/MHz ² parabolic 0.5 ns pk-pk ripple max.
Primary Power ³	All ratings are ±10%, 47-63 Hz, 5-wire, 3-phase with neutral and ground 200 to 240 VAC (with or w/o neutral) 380 to 415 VAC
Power Factor	0.95 min.
Power Consumption	5.5 kW max.; 4.5 kW typ. @ 1000 W linear RF output power; 3.8 kW typ. @ 800 W; 3.5 kW typ. @ 600 W; 3.3 kW typ. @ 400 W; 2.9 kW typ. @ 200 W; 2.5 kW typ. @ 100 W

Environmental

Ambient Temperature	-10° to +50°C operating -20° to +70°C non-operating
Relative Humidity	95% non-condensing
Altitude	Up to 10,000 ft (3000 m) with standard adiabatic derating of 2°/1000 ft.; 50,000 feet 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

Mechanical

Cooling(TWT)	Forced air with integral blower and power supply fan. Maximum external pressure loss allowable: 0.25 inch water gauge.
RF Input Connection	Type N female
RF Output Connection	CPR 137 F waveguide flange, grooved, threaded UNF 2B 10-32
RF Power Monitors	Type N female
Dimensions (W x H x D)	19 x 15.75 x 24 in. (483 x 400 x 610 mm)
Weight	155 lbs. (70.5 kg) max.

¹Prime power AC line unbalance not to exceed 3%. Excess imbalance may cause an increase in residual RF noise (AM, FM and PM). Phase noise increase is typically 2.5 dB / % imbalance.

²For wideband HPA (to 6.725 GHz), intermods at 400 W are -23.5 dBc below 6.425 GHz and -20 dBc above 6.425 GHz, and at 890 W with linearizer are -25 dBc below 6.425 GHz and -23 dBc above 6.425 GHz.

³AC current harmonic content: less than 20%, primarily fifth and seventh harmonics. Harmonics must be considered when choosing UPS sources.



Communications & Power Industries

satcom division

For more detailed information, please refer to the corresponding CPI Technical Description.

Note: Specifications may change without notice as a result of additional data or product refinement.

Please contact CPI before using this information for system design.