CPI 2.25 and 2.50 kW *SuperLinear*™ TWT Amplifiers

for Satellite Communications

X-Band

The TL22XI and TL25XI TWTAs

Up to 2.5 kW (1110 W operating) TWT Compact High Power Amplifiers, featuring high efficiency, small size and integral computer interface.

Compact

Provides 2250 or 2500 watts of equivalent linear power (1000 or 1110 watts operating) in a compact nine rack-unit package, digital ready, for wideband, single- and multi-carrier satellite service in the 7.9 – 8.4 GHz frequency band. Designed to operate at up to 1260 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 L-band modems.

Global Applications

Meets International Safety Standard EN-60215 and EMC Standard EEC 89/336 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.

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OPTIONS & COMPANION PRODUCTS:

- *Integral Linearizer*
- *Remote Control Panel*
- *Redundant and Power Combined Subsystems*
- *External Receive Band Reject Filter*
- *Integral L-Band Block Upconverter (BUC)*

SPECIFICATIONS, TL22XI and TL25XI

Electrical

Frequency	7.9 - 8.4 GHz
Output Power	
TWT - TL22XI	2250 W min. (63.54 dBm)
TWT - TL25XI	2500 W min. (63.98 dBm)
Flange - TL22XI	1000 W max. operating (60.00 dBm)
Flange - TL25XI	1110 W max. operating (60.45 dBm)
Linear Power	
TL22XI	1000 W with linearizer option
TL25XI	1110 W with linearizer option[3]
Bandwidth	500 MHz
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; 3.0 dB pk-pk max. across the 500 MHz band; 4.0 dB pk-pk w/linearizer; 5.0 dB pk-pk w/ BUC; 6.0 dB pk-pk w/linearizer and BUC
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 backof
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.
Harmonic Output	-80 dBc
Noise and Spurious	-130 dBW/4 kHz from 3.4 to 4.2 GHz -65 dBW/4 kHz from 4.2 to 12.0 GHz -110 dBW/4 kHz from 12.0 to 40.0 GHz
Intermodulation	-23.5 dBc max, 7.9 - 8.4 GHz
with two equal carriers, total output power level at 56 dBm	(-25 dBc max. at 4 dB backoff with linearizer);

Electrical (continued)

Group Delay (in any 40 MHz band)	0.02 ns/MHz linear 0.002 ns/MHz^2 parabolic 0.5 ns pk-pk ripple max.
Primary Power[2]	All ratings are ±10%, 47-63 Hz, 5-wire, 3-phase with neutral and ground 208 VAC (with or w/o neutral) 380 to 415 VAC
Power Factor	0.95 min.
Power Consumption	5.5 kW max.; 4.9 kW typ. @ 1000 W linear RF output power; 4.2 kW typ. @ 800 W; 3.9 kW typ. @ 600 W; 3.6 kW typ. @ 400 W; 3.3 kW typ. @ 200 W; 2.8 kW typ. @ 100 W (Power consumption 10% less for 2.25 kW HPA, typ.)

Environmental

Ambient Temperature	-10° to +50°C operating -40° to +71°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 112 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.

[1]Prime 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.

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

[3]Up to 1250 watts linear power available through optimization of linearizer settings.

ISO 9001 Certificate Number: 30515

NASDAQ GLOBAL SELECT

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.

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