*Low C-Band*

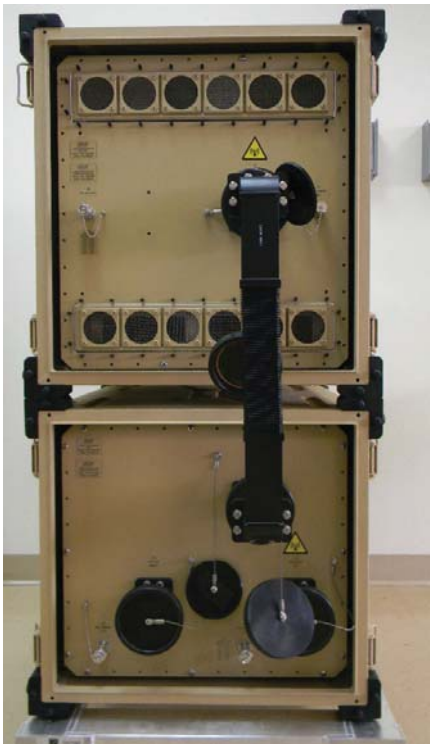
# 1000 W GaN Transceiver

## Overview

The CPI Model TR511 Troposcatter Transceiver System operates in the 4.4 to 5.0 GHz frequency band. The full system comprises two transit cases. The amplifier case houses a 1000 W peak/500 W P(lin) GaN solid-state power amplifier and optional block up converter.

The RFIO transit case houses separate tunable transmit and receive waveguide filters, a block down converter and an LNA. An auxiliary input to the receive path is provided to accommodate diversity installations. All RFIO filters are tuned electronically via the integrated Ethernet controller, eliminating manual adjustments.

A full suite of Ethernet-based monitor and control functions are available giving the operator complete control over the Troposcatter system.



**Model TR511**

1000 W peak power RF transceiver for troposcatter applications

## Features

- GaN solid state circuitry
- High linear power and efficiency
- Modular architecture
- Integrated BUC
- Frequency agile with integrated Tx and Rx filters
- Electronically tuned Tx and Rx filters
- Automatic self-protection circuitry prevents overdrive damage
- Temperature compensated gain
- Quick disconnect waveguide connectors
- Remote M&C over Ethernet
- Operating temperature range -40°C to +60°C; -40°C to +71°C non-operating

## Worldwide Support

Backed by over 35 years of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes more than 20 regional factory service centers.


Communications & Power Industries
satcom products

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
website: www.cpii.com/satcom

# 1000 W GaN Transceiver

| Transmitter | |
|---|---|
| Input Frequency | 950 to 1550 MHz |
| Output Frequency | 4.4 to 5.0 GHz (non-inverting) |
| Input Impedence | 50 ohms |
| Input RF Power | +20 dBm max. (no damage) |
| Input Connector | Type N (male) |
| RF Monitor Connector (s) | Type N (female) |
| L.O. Frequency | 3450 MHz (10 MHz reference) |
| Rated Peak Power | 1000 W (60 dBm) |
| Output Power at $P_{LINEAR}$ | 500 W (57 dBm) |
| Spectral Regrowth | -30 dBc OQPSK at $P_{LINEAR}$ 1 symbol rate offset from carrier |
| Harmonic Output | -60 dBc with RFIO, at $P_{SAT}$, with single carrier CW signal |
| Spurious Output | -60 dBc at $P_{LINEAR}$ |
| AM/PM Conversion | 2°/dB at $P_{LINEAR}$ |
| Noise Power Spectral Density | -72 dBm/Hz within output bandwidth |
| Output VSWR | 1.25:1 |
| Output Connector | CPR187G quick disconnect |
| Gain | 75 dB (min) / 82 dB (max), at $P_{LINEAR}$ |
| Small Signal Gain Variation | ±0.3 dB with RFIO, Fo ±8 MHz |
| Gain Stability vs. Temperature | ±1.5 dB, full operating temperature range; ±0.5 dB over any ΔT = ±10° |
| Gain Stability vs. Time | ±0.3 dB / 24 hrs, after reaching thermal stability |
| Gain Control Range | 31.5 dB in 0.5 dB steps |
| Group Delay | 9.0 ns per ±8 MHz |
| Phase Noise (SSB) | -65 dBc/Hz max. @ 100 Hz<br>-75 dBc/Hz max. @ 1 kHz<br>-85 dBc/Hz max. @ 10 kHz<br>-95 dBc/Hz max. @ 100 kHz<br>-105 dBc/Hz max. @ 1 MHz<br>-115 dBc/Hz max. @ ≥10 MHz |
| Tx Insertion Loss through RFIO | 0.80 dB |
| TX Filter Passband* | Fo±8 MHz |
| Prime Power Requirements | 180 to 240 VAC, 47 – 63 Hz; 2.7 kVA (typ) @ $P_{LINEAR}$ for 1000 W System |
| SSPA Case Weight | 174 lbs (78.9 kg) |
| **Receiver** | |
| Input Frequency | 4.4 to 5.0 GHz |
| Maximum Input Power | 0 dBm (no damage) |
| Input VSWR | 1.25:1 typ, 1.50:1 max. |
| Input Bandwidth | Fo ± 8 MHz, ±0.3 dB |
| Receiver Noise Figure | 1.65 dB (max) at +23°C; 1.75 dB (max) at max operating temp, measured at waveguide input and at max. gain |
| Input Connector | CPR187G |
| Output Frequency | 950 to 1550 MHz (inverting) |
| LO Frequency | 5950 MHz; 10 MHz external reference |
| Output P1dB | +18 dBm min. |
| OIP3 | +30 dBm with 2 equal carriers ΔF = 2.5 MHz |
| Spurious Outputs, Signal Related | -60 dBc, 950 ≤ f ≤ 1550 MHz @ POUT=-10 dBm CW |
| Spurious Outputs, Non-Signal Related | -70 dBm, 950 ≤ f ≤ 1550 MHz @ POUT=-10 dBm CW |

*Consult CPI for Tx and Rx filter shape factors





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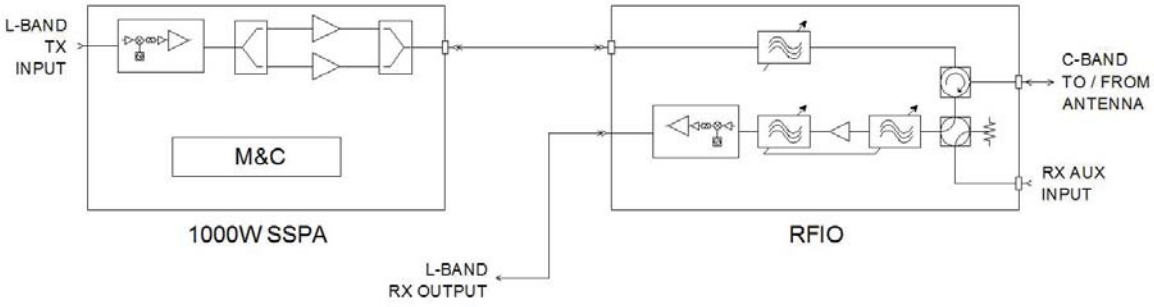
## 1000 W GaN Transceiver

| Receiver, continued | |
|---|---|
| Output Impedence | 50 ohms |
| Output VSWR | 1.5:1 max. |
| Output Connector | Type N female |
| Gain | 66 dB min; 71 dB max. |
| Gain Flatness | ±0.3 dB over Fo ±8 MHz |
| Gain Stability vs. Temperature | ±1.5 dB over full operating temperature range; ±0.5 dB over any ΔT = ±10° |
| Gain Stability vs. Time | ±0.5 dB/24 hrs after reaching thermal stability |
| Gain Control | 31.5 dB in 0.5 dB steps at C-band and L-Band |
| Group Delay | 12.0 ns pk-pk per ±8 MHz |
| LO Phase Noise (SSB) | -65 dBc/Hz max. @ 100 Hz<br>-75 dBc/Hz max. @ 1 kHz<br>-85 dBc/Hz max. @ 10 kHz<br>-95 dBc/Hz max. @ 100 kHz<br>-105 dBc/Hz max. @ 1 MHz<br>-115 dBc/Hz max. @ ≥10 MHz |
| Rx Filter Passband* | Fo ±9 MHz |
| RFIO Case Weight | 146 lbs (66.2 kg) |




**RF Block Diagram**





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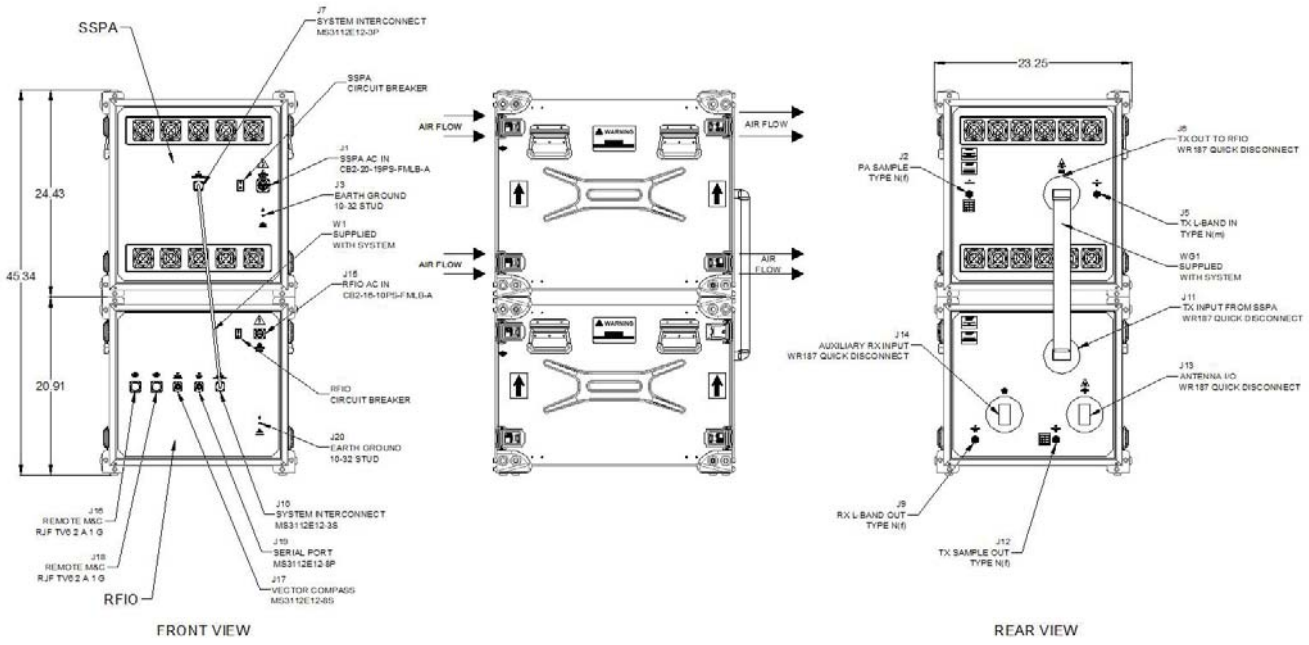


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Quality Management System - ISO 9001:2008

For more detailed information, please contact CPI. 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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