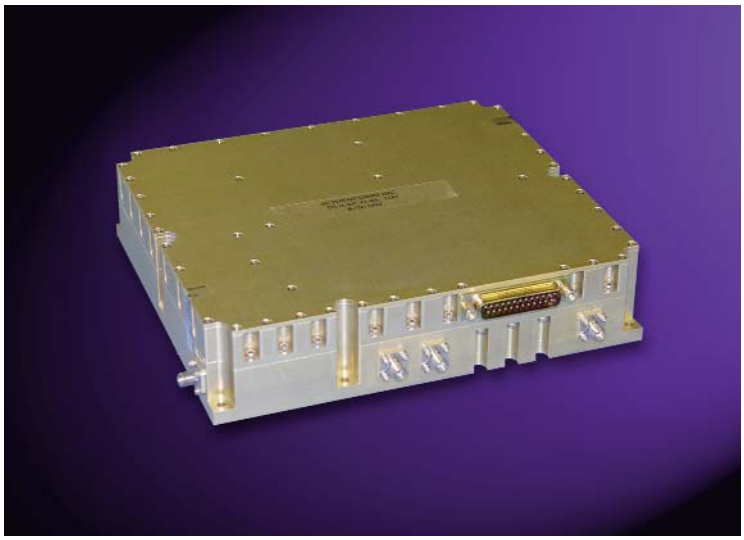
High Power Gallium Nitride T/R Module

Broadband Power Amplifier

Aethercomm Model Number TR 0.42-0.45-100 is a high power, gallium nitide (GaN), transmit/receive module employed to transmit high power pulsed or CW waveforms from 420 to 450 MHz. This transceiver is ideal for UHF radar applications. The transmit section of this module consists of GaN devices used for RF amplification. The transmitter delivers a nominal value of 49dBm if both antenna outputs were combined. There are two antenna ports for orthogonal polarization. An internal transfer switch is utilized to switch antennas with an integral 90 degree phase shift between these two ports. The Tx section offers 46.5dB minimum of small signal gain with a 10dB maximum noise figure. Transmit harmonics are -60dBc maximum. The small signal gain flatness is ±0.75dB typical. Transmit and receive data are on page two of this data sheet.

The internal receive path consists of a circulator and a 100 watt CW limiter. The Rx path loss is 1.5dB maximum. All port VSWR's are 1.5:1 maximum. This T/R module operates from three applied DC voltages: 50Vdc, +12.7Vdc and -12.7Vdc. This unit operates in harsh environments with a base plate temperature of -40C to +85C. It is employed on aircraft platforms and operates up to 50K feet. This module is packaged in a modular housing with SMA RF connectors on all ports. DC command and control voltages are applied via a DSUB connector. The housing size is 7.00" width, 8.00" length and 1.75" height. More specific information should be obtained by contacting the factory.

- **Gallium Nitride Broadband Power Amplifier Section**
- **Operation from 420 MHz to 450 MHz min**
- **Small Signal Gain 46.5 dB min**
- **10 uSec Rx to Tx and Tx to Rx Switching Time**
- **Internal Transfer Switch**



This is an example of an Aethercomm standard product. Aethercomm designs and manufactures high performance, high power CW or pulsed SSPA's for commercial, military and satellite communications customer.

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TR 0.42-0.45-100 Operational Data @ 25°C from 420 MHz to 450 MHz

Freq (MHz)	Pout @ P1dB TS #1 (dBm)	Pout @ P1dB TS #2 (dBm)	Gain @ P1dB (dB)	50 Volt Current @ P1dB (Amps)	12.7 Volt Current (mA)	-12.7 Volt Currentt (mA)	2nd Harm @ P1dB (dBc)	3rd Harm @ P1dB (dBc)	Pout @ Psat (dBm)	50 Volt Current @ Psat (Amps)	Noise Figure (dB)	Spurious Emissions (dBc)	TX Turn On Time (uSec)	TX Turn Off Time (uSec)
420	49.2	49.4	43.0	3.9	400	20	-66	<-75	50.8	6.5	5.2	<-70	N/A	N/A
430	49.4	49.6	42.5	4.0	400	20	-64	<-75	50.7	6.3	5.2	<-70	0.5	2.0
440	49.1	49.3	42.5	3.9	400	20	-64	<-75	50.8	6.1	5.0	<-70	N/A	N/A
450	49.0	49.2	44.0	3.9	400	20	-64	<-75	50.8	5.8	4.9	<-70	N/A	N/A

Measured Parameters	SS Gain Variation with Frequency (dB)	SS Gain TS #1 (dB)	SS Gain TS #2 (dB)	TX Gain w TX Disabled (Isolation) (dB)	TX to TX Leakage (Isolation) (dB)	DC Power Consumption @ Psat (Watts)	DC Blanking Command Logic "0" & OC = PA Off, Rx ON	DC Blanking Command Logic "1" = PA On, RX Off	Maximum Input Power No Damage Piin = +15 dBm	With Nominal Pin No Damage with Tx Output Open/Short (5 Minutes)
Measured Value:	+/-0.75	46.5	46.5	<-75	<-80	330	Pass	Pass	Pass	Pass

Measured Parameters	VSWR Shutdown& BIT Status	Thermal Shutdown & BIT Status	Supply Fault & BIT Status	TX Input VSWR	RX Output VSWR	Antenna Port 1 VSWR	Antenna Port 2 VSWR (uSec)	RX Path Loss (dB) (uSec)	RX Limiter Flat Leakage	Rx Video Leakage	Rx Limiter Recovery Time	Antenna Switching & Timing
Measured Value:	Pass	Pass	Pass	1.3:1	1.4:1	1.15:1	1.26:1	1.5	14.5	0.2	0.3	5.0