

NuWaves

RF Solutions

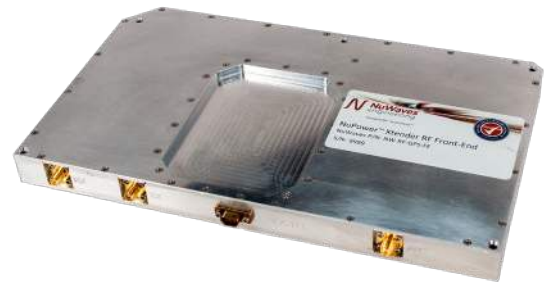
GPS RF Front End

Transmit: 1626.5 to 1675 MHz

Receive: 1518 to 1559 MHz

20 Watts CW Transmit Power

47 dB Receive Gain



P/N: NW-RF-GPS-FE

(Includes NW-PA-ACC-CB09MC interface cable)

The NuWaves Satellite Terminal RF Front End is a highly efficient, high gain RF transmit/receive module that provides 20 watts of RF power to boost performance of data links.

This high performance RF front end is a powerful combination of our NuPower 13G05A RF power amplifier, low noise figure LNAs, a high isolation diplexer between the transmit and receive paths, and band-reject filters. This module accepts a nominal 0 dBm (1 mW) RF input and provides 43 dB of gain from 1626.5 to 1675 MHz, and provides 47 dB of gain from 1518 to 1559 MHz. It supports both constant envelope and complex waveforms such as APSK, QAM, DVB-T, etc.

Extend your operational communication range with a custom RF & Microwave Solution from NuWaves RF Solutions.

Features

- 20 Watts RF Output Power
- 47 dB Receive Gain
- Transmit: 1626.5 to 1675 MHz
- Receive: 1518 to 1559 MHz
- High-Efficiency GaN Technology
- 0 dBm Nominal RF Input
- Over-Voltage Protection
- External Transmit Control

Benefits

- Extended Range
- Improved Link Margin
- Reduced Load on DC Power Budget Due to High Efficiency Operation
- Requires Less Volume on Space-Constrained Platforms

Applications

- RF Telemetry
- RF Communication Systems
- Unmanned Aircraft Systems (UAS)
- Unmanned Ground Vehicles (UGV)
- Satellite Terminals
- Software Defined Radios

GPS RF Front End

Specifications

Absolute Maximums

| Parameter | Rating | Unit |
|---------------------------------------|--------|------|
| Max Device Voltage | 32 | V |
| Max Device Current | 4.75 | A |
| Max RF Input Power, $Z_L = 50 \Omega$ | 12 | dBm |
| Max Operating Temperature (ambient) | 60 | °C |
| Max Operating Temperature (baseplate) | 85 | °C |
| Max Storage Temperature | 85 | °C |

| Export Classification |
|-----------------------|
| EAR99 |

Electrical Specifications - Operational @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|---------------------|---------------|--------|------|------|---------|---|
| Operating Frequency | BW | 1626.5 | | 1675 | MHz | |
| Switching Speed | $T_{XON/OFF}$ | | | 2 | μ S | 10% control voltage to 90% output power |
| Operating Voltage | VDC | 27 | 28 | 32 | V | |
| Operating Current | I_{DD} | | 3.25 | | A | Pin = 0 dBm |
| Module Efficiency | | | 35 | | % | CW, Pin = +5 dBm |

Electrical Specifications - Transmit @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|--|------------|-----|------|------|------|-----------------------------------|
| RF Output Power | P_{SAT} | 20 | | | W | 1626.5 to 1675 MHz Pin = 0 dBm |
| Output Power @ 1dB Compression | P1dB | | 33 | | dBm | 1626.5 MHz |
| | | | 31 | | | 1650.75 MHz |
| | | | 30 | | | 1675 MHz |
| Small Signal Gain | G | | 57 | | dB | 1626.5 MHz, Pin = -30 dBm |
| | | | 57 | | | 1650.75 MHz, Pin = -30 dBm |
| | | | 56 | | | 1675 MHz, Pin = -30 dBm |
| Small Signal Gain Flatness | ΔG | | 2 | | dB | Pin = -30 dBm |
| Input VSWR | VSWR | | 1.5 | | | |
| Nominal Input Drive Level | P_{IN} | | 0 | | dBm | |
| Quiescent Current | I_{DQ} | | 0.08 | | A | |
| Quiescent Bias Current | I_{DQ} | | 0.75 | | A | |
| Third Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 20 dBm / tone) | OIP3 | | TBR | | dBm | 1626.5 MHz |
| | | | TBR | | | 1650.75 MHz |
| | | | TBR | | | 1675 MHz |
| Harmonics | 2nd | | -70 | | dBc | |
| | 3rd | | -45 | | | |
| Output Mismatch (No Damage) | | | | 10:1 | | |

GPS RF Front End

Specifications (cont.)

Electrical Specifications - Receive @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|--------------------------|------------------|-----|-----|-----|------|------------------|
| Receive Gain | G | | 47 | | dB | 1518 to 1559 MHz |
| Receive Gain Flatness | ΔG | | TBR | | dB | Any 2 MHz |
| Receive Current | I_{RX} | | 80 | | mA | |
| Receive Noise Figure | NF | | 1.7 | | | |
| Receive P1dB | P1dB | | | | dBm | |
| Receive OIP ³ | OIP ³ | | | | dBm | |

Mechanical Specifications

| Parameter | Value | Unit | Limits |
|-----------------------------|-----------------------|------|--------|
| Dimensions | 10.25" x 6.00 x 0.80 | in | Max |
| Weight | 47 | oz | Max |
| RF Connectors, Input/Output | SMA Female | | |
| Interface Connector | Micro-D, 9-pin Socket | | |

Environmental Specifications

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|-----------|-----|-----|-----|------|
| Operating Temperature (ambient) | T_A | -40 | | +60 | °C |
| Operating Temperature (baseplate) | T_C | -40 | | +85 | °C |
| Storage Temperature | T_{STG} | -55 | | +85 | °C |
| Relative Humidity (non-condensing) | RH | | | 95 | % |
| Altitude MIL-STD-810F - Method 500.4 | | | | | |
| Vibration Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis) | | | | | |

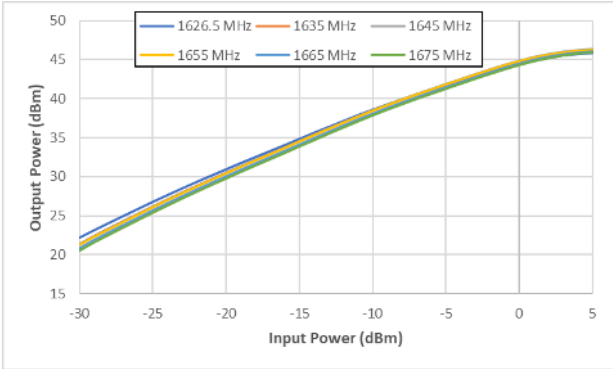
Power Spectral Density, g²/Hz

GPS RF Front End

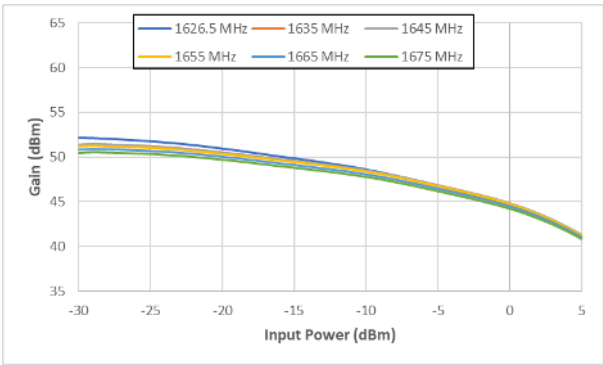
Performance Plots

Test Conditions: +28 VDC, +25 °C, $Z_s=Z_L=50 \Omega$

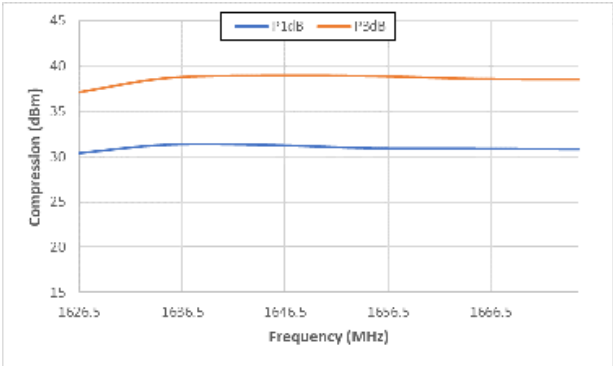
Transmit RF Output Power



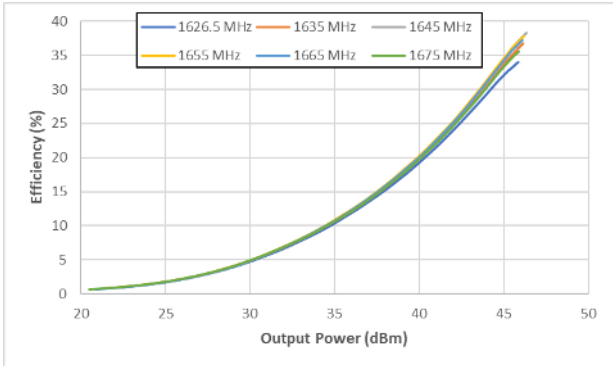
Transmit Gain



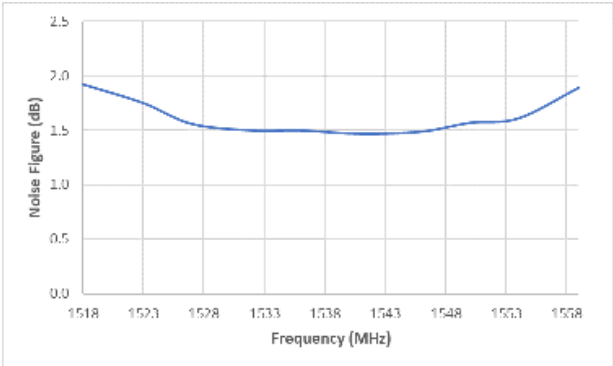
Transmit P1dB & P3dB



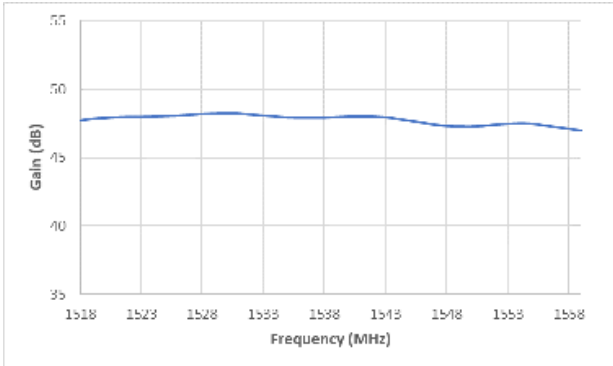
Transmit Efficiency



Receive Noise Figure

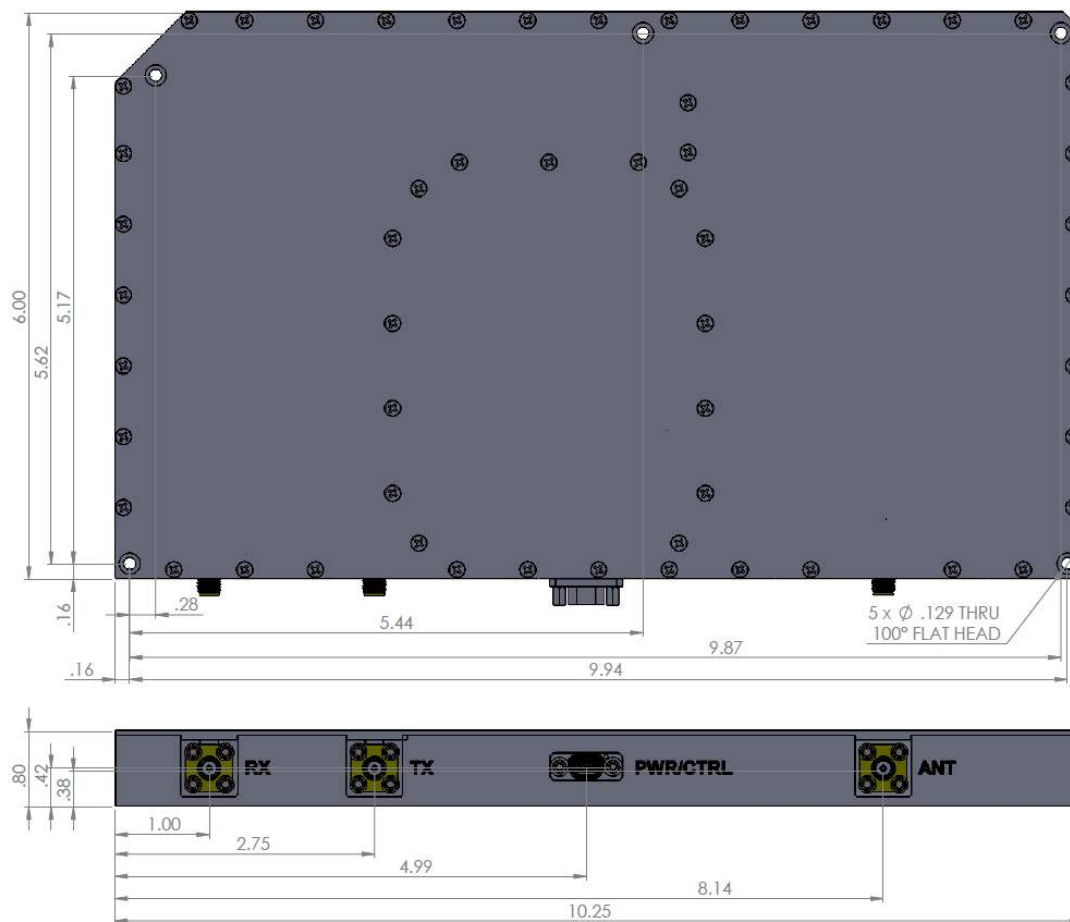


Receive Gain



GPS RF Front End

Mechanical Outline



Accessory Part Numbers

| Part Number | Description |
|------------------|---|
| NW-PA-ACC-CB09MC | Standard Interface Cable Assembly - Flying Leads (included with module) |

For information on product disposal (end-of-life), please refer to this document: <https://nuwaves.com/wp-content/uploads/Product-Disposal-End-of-Life.pdf>

Contact NuWaves



NuWaves RF Solutions
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
sales@nuwaves.com
513.360.0800

