

Solid State Broadband High Power Amplifier

2215
1900 - 6000 MHz / 200 Watts

The 2215 is suitable for octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power GaN devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The amplifier is constructed within a single 5RU drawer including the forced air-cooling. Available operating voltage configurations are single-phase 220 VAC up to 400 Hz and 28 VDC.



REAR CONNECTORS

The amplifier includes a built in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit's Ethernet port to a LAN. Using a web browser and the unit's IP address (IPv4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.

Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state Class AB, compact modular design (Class "A" consult factory)
- Suitable for CW, AM, FM, Pulse and some linear applications (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the need for external component
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +40°C)

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|---------------------|------|------|-----------|------|
| Operating Frequency | BW | 1900 | | 6000 | MHz |
| Power Output CW <i>(Note 1)</i> | P _{SAT} | 200 | | | Watt |
| Power Output at 1dB Gain Compression <i>(Note 2)</i> | P _{1dB} | 100 | | | Watt |
| Power Gain | G _P | 53 | | | dB |
| Input Power for Rated P _{SAT} | P _{IN} | | 0 | | dBm |
| Input Power Range | P _{IN} | -5.0 | | +5.0 | dBm |
| Small Signal Gain Flatness / Leveled ALC | ΔG | | | ±3.5/±1.0 | dB |
| Gain Adjustment Range | VVA | 20 | | | dB |
| Input Return Loss | S ₁₁ | | | -10 | dB |
| Noise Figure @ maximum gain | NF | | | 20 | dB |
| Third Order Intermodulation Distortion 2-Tone @ 47dBm/Tone, 1MHz Spacing | IM3 | | -23 | -20 | dBc |
| Harmonics @ P _{OUT} = 200W | 2 ND | | -30 | -25 | dBc |
| | 3 RD | | -40 | -35 | |
| Spurious Signals | Spur | | -70 | -60 | dBc |
| Operating Voltage (1-phase) | V _{AC} | 180 | 220 | 260 | Volt |
| Power Consumption @ 200W CW | P _D | | 1500 | 2300 | VA |
| Switching Speed | T _{ON/OFF} | | 1 | 2 | μSec |

Notes: 1. CW measurement performed in MGC Mode (Manual Gain Control)
 2. P_{1dB} measurements performed with AM 80% depth of modulation, 1 kHz modulation signal.

MECHANICAL SPECIFICATIONS

| Parameter | Value | Unit |
|---|------------------------------------|-------|
| Dimensions W x H x D (no Handles and brackets) | 17.5 x 8.75 x 22 | Inch |
| Weight | 105 | Pound |
| RF Connectors Input/Output | Type-N, Female | - |
| RF Sample | Type-SMA, Female | - |
| Blanking Input | Type-BNC, Female | - |
| Cooling | Built-in forced air cooling system | - |

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ENVIRONMENTAL CHARACTERISTICS

| Parameter | Symbol | Min | Typ | Max | Unit |
|--|------------------|-----|-----|-----|------|
| Operating Ambient Temperature | T _A | -10 | | +40 | °C |
| Non-operating Temperature | T _{STG} | -40 | | +85 | °C |
| Relative Humidity (non-condensing) | RH | | | 95 | % |
| Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5 | SH / VI | | | | - |

PROTECTIONS

| Parameter | Specification | Unit |
|--------------------------------|---|------|
| Input Overdrive | +10 dBm | Max |
| VSWR protection | At 3:1 – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized | - |
| Thermal – Graceful Degradation | Ambient 40°C | Min |
| Default Data Recovery | Factory Default Calibration Recovery | |

COMMUNICATION INTERFACES

| Function | Utility | Connector |
|---------------------------|---|------------------------|
| Ethernet | Network management of device / web interface | RJ45 |
| USB | Mass storage / Expansion Bus | USB 1.x/2.0 compatible |
| RS-232, RS-422 (optional) | Serial management of device / local operator access | D-Sub 9-position Male |

SYSTEM I/O CONNECTOR – 14-Position

| Pin # | Description | Specification |
|-------|----------------------------|---|
| 1 | FWD Test Point | Forward detected power (analog voltage: 0-5 Volt) |
| 2 | REV Test Point | Reverse detected power (analog voltage: 0-5 Volt) |
| 3 | Summary Fault | Summary Fault: Active TTL Logic Low ($\leq 0.7V$) (Internally Pulled-High) |
| 4 | N/C | No Connection |
| 5 | Shutdown | Amplifier Disable: TTL Logic Low ($\leq 0.7V$) (Internally Pulled-High) |
| 6 | Aux P/S Test Point | +12.0V _{DC} $\pm 2.0V$ (resettable 0.5amp fuse) |
| 7 | Main P/S Test Point | +44.0V _{DC} $\pm 4.8V$ (resettable 0.5amp fuse) |
| 8 | GND | Ground |
| 9-11 | Open drain control | Site management utility (reserved) |
| 12&13 | Digital I/O (configurable) | Site management utility (reserved) |
| 14 | GND | Ground |

Available Options

2215-xxx

-001 100-240VAC 1-phase, 47-63 Hz, Rear RF Connectors

-00X TBD

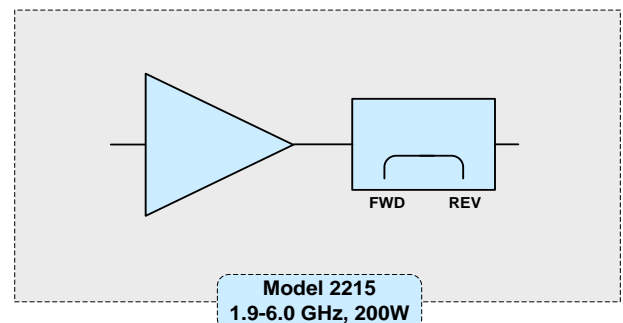
-00X TBD

-00X TBD

Standard Feature:

- LCD Control, Ethernet & Serial Comm
- Main RF Connectors: Type-N, F
- Sample Port: SMA-F [Forward & Reverse]
- Blanking/Gating Port: BNC-F
- Rack Slides, Handles and Rackmount Bracket

NOTIONAL BLOCK DIAGRAM

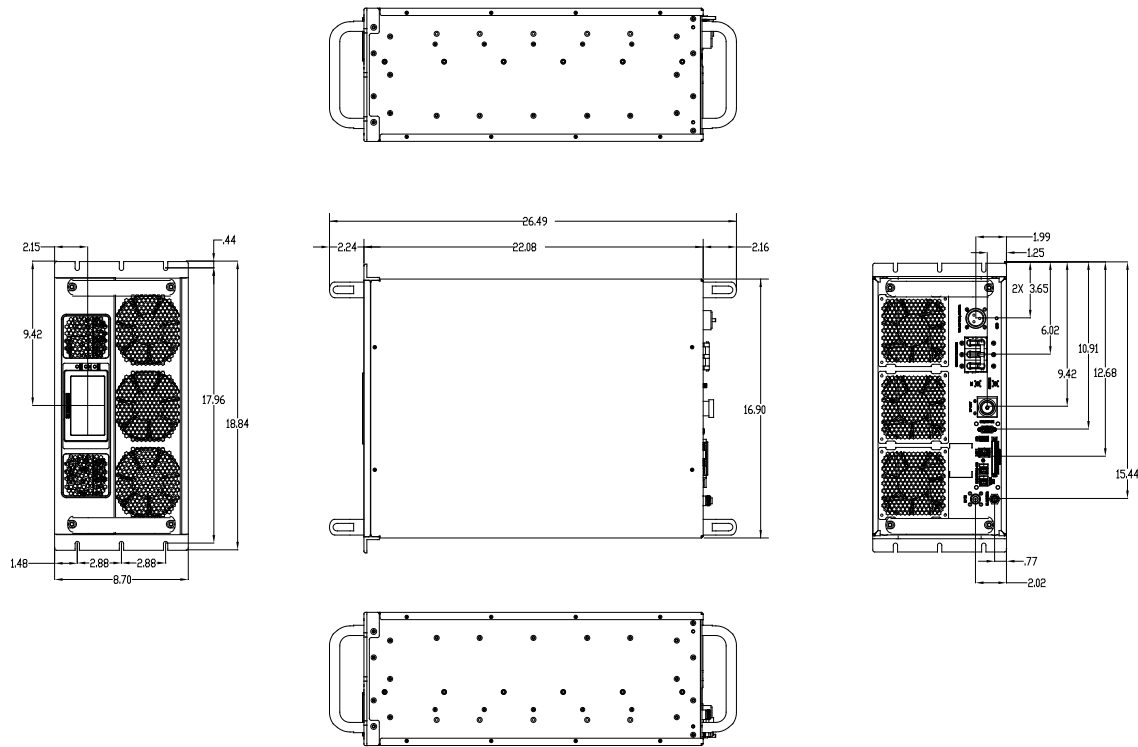


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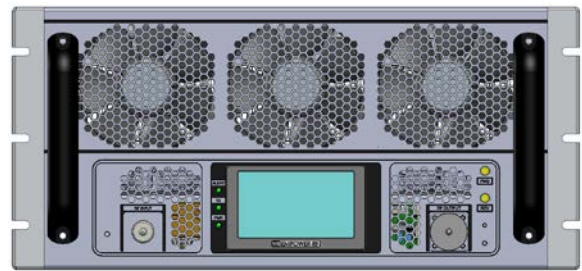
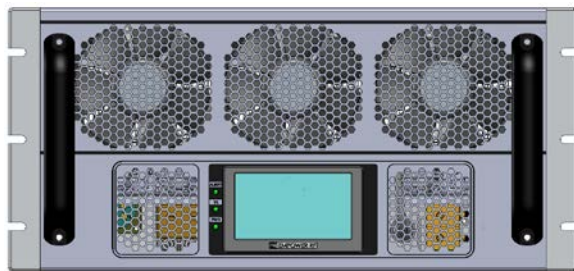
1900 - 6000 MHz / 200 Watts

OUTLINE DRAWING (Option: 2215-001)

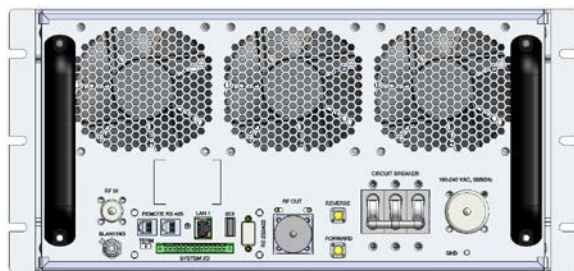


2215-001 – Front and Rear View

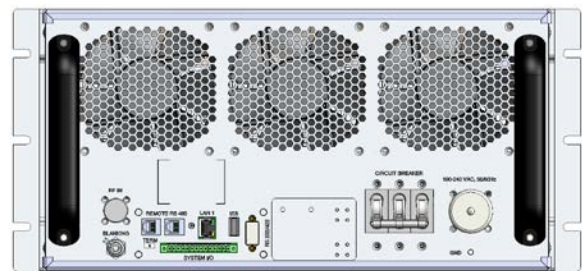
2215-00X Front and Rear View



With Front RF Connectors



With Rear RF Connectors



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TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain @ $P_{IN} = -30\text{dBm}$

Reference: 65dB, 2dB/div.



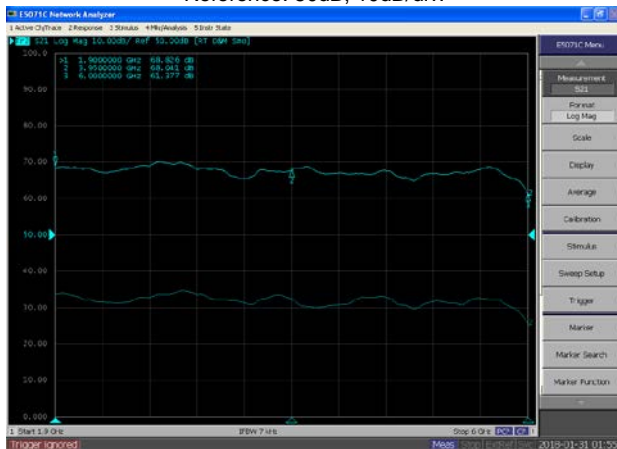
Plot 2 – Leveled ALC Flatness @ 200 watts (53dBm)

Reference: 53dB, 1dB/div.



Plot 3 – Gain Adjustment Range @ $P_{IN} = -30\text{dBm}$

Top Curve: Maximum Gain
 Bottom Curve: Minimum Gain
 Reference: 50dB, 10dB/div.



Plot 4 – Input Return Loss

Reference: -10dB, 10dB/div.

