# Amplifiers

## Model 457

Features:

- 100 kW Pulse, 1.2 – 1.4 GHz
- Class AB design
- 100% mismatch tolerant up to 25 kW
- Built-in fault monitoring and protection
- Touch screen display
- Soft-fail system
- Forward and reverse power monitoring
- Remote control: Ethernet, USB, GPIB, fiber-optic serial, RS-232
- Modular design for easy maintenance and service

Applications:

- EMC Test applications
- EW Communication/Test/Jamming
- RADAR
- Science

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ISO 17025 :2017 Accredited

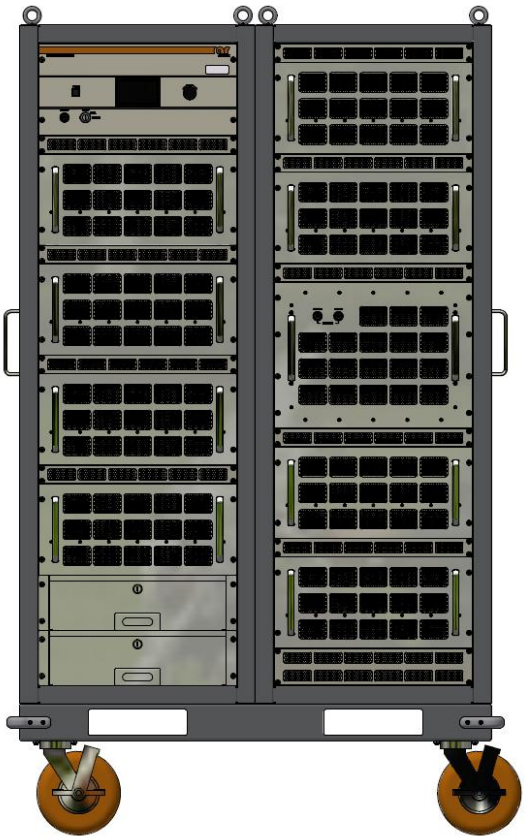
Model 457 is a solid-state, Class AB design, self-contained, air-cooled, broadband power amplifier designed for pulse applications at low duty factors where instantaneous bandwidth and high gain are required. It will provide a minimum of 100 kilowatts minimum across its operating bandwidth.

Protection from input overdrive beyond 0 dBm is provided as well as protection from various failure conditions including over-temperature and power supply faults.

A front panel display indicates the operational status and fault conditions. All amplifier control functions, and status indications are available remotely using GPIB/IEEE-488, RS-232, fiber-optic serial, USB, or Ethernet. Interface connectors are located on the back panel. Local and remote operation is managed by a switch on the front panel.

Model 457 is comprised of two (2) rack enclosures which are attached to a single common trolley base allowing the complete amplifier to be fork-lifted from either the front or the rear. Additionally, each of the two rack enclosures are fork-liftable from either side for removal from the common trolley base. The trolley has four, 8-inch omnidirectional casters with flexible elastomer tread and brake.

The export classification for this equipment is 3A999.d. These commodities, technology or software are controlled for export in accordance with the U.S. Export Administration Regulations. Diversion contrary to U.S. law is prohibited.



| Electrical Specifications | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Minimum** | **Typical** | **Maximum** | **Unit** |
| **Operating Frequency** | BW | 1.2 | | 1.4 | GHz |
| **Rated Power Output (for PW≤ 5 us)** | PSAT | 100 | 115 | 135 | kW |
| **Rated Power Output (for PW≤ 25 us)** | PSAT | 80 | 90 | 100 | kW |
| **Rated Power Output (for PW≤ 50 us)** | PSAT | 40 | 55 | 75 | kW |
| **Rated Power Output (for PW≤ 150 us)** | PSAT | 20 | 35 | 45 | kW |
| **Pulse Droop – 150 µs pulse @ 100 kW** | | | | <-0.8 | dB |
| **Input for Rated Output** | Pin | | | 1 | mW |
| | | | | 0 | dBm |
| **Gain (Small Signal, for PW≤ 5 us, @25°C)** | | 83 | 85 | 87 | dB |
| **Gain Reduction Adjustment** (when below compression) | | 20 | | | dB |
| **Flatness** | ΔG | | ±1.5 | ±2.0 | dB |
| **Input Impedance** | Z in | | 50 | | Ohm |
| | | | | ≤2.0:1 | VSWR |
| **Output Impedance** | Z out | | 50 | | Ohm |
| **Noise Figure** | NF | 8 | 10 | ≤12 | dB |
| **Harmonic Distortion @ rated power** | H2, H3 | - | - 30 | ≤-20 | dBc |
| **Spurious** | | | ≤-60 | | dBc |
| **Power Consumption for maximum duty-cycle** | PD | | 12 | 15 | kVA |

| Absolute Maximum Rating<br>**Exceeding any of the limits listed here may result in permanent damage to the device.** | | | | |
|---|---|---|---|---|
| **Parameter** | **Minimum** | **Typical** | **Maximum** | **Unit** |
| **RF Drive** | | | +13 | dBm |
| **RF Load** | | 1:1 | 3:1 @ rated power | VSWR |
| **RF Load Reflected**<br>Will operate without damage or oscillation when connected to any load impedance. Alarm and protection above 30 kW reflected power | | | 25 | % |
| **AC Power (3-Phase, High Voltage, Wye 5-wire)** | 380 | | 415 | VAC |
| **AC Power** | 47 | | 63 | Hz |
| **Ambient Temperature** | -10 | +25 | +50 | °C |
| **Storage Temperature** | -20 | | +50 | °C |
| **Altitude** | | | 1000 | m |
| **Shock/Vibration** | MIL-STD-810G | | | |

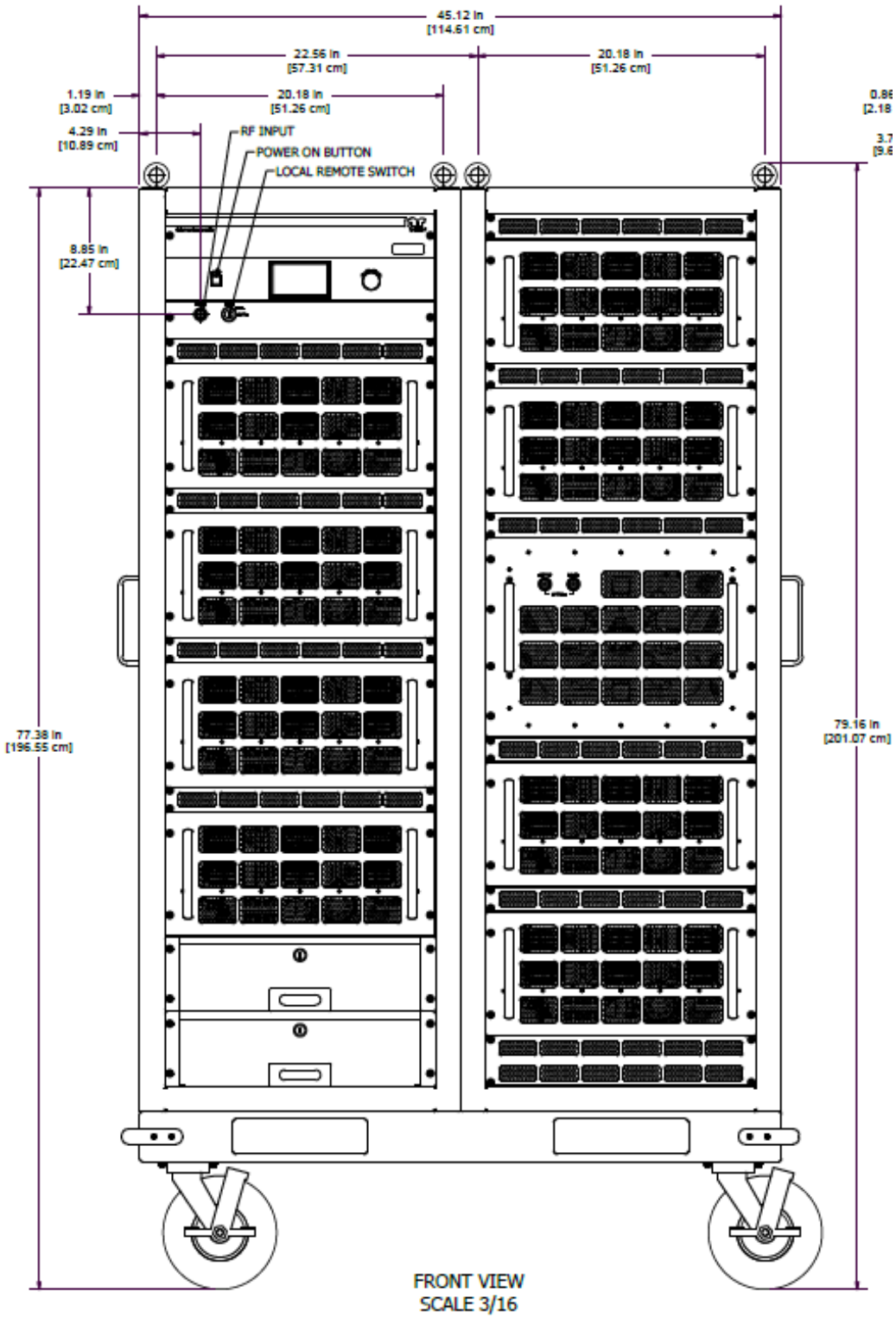
| Pulse Capability | |
|---|---|
| **Parameter** | **Value** |
| **Pulse Width** | 150 µs maximum |
| **Pulse Rate (PRF)** | 10 kHz maximum |
| **Duty Cycle (for PW≤ 5 us)** | 1% maximum |
| **Duty Cycle (for PW≤ 25 us)** | 4% maximum |
| **Duty Cycle (for PW≤ 50 us)** | 8% maximum |
| **Duty Cycle (for PW≤ 150 us)** | 10% maximum |
| **RF Rise and Fall** | 30 ns maximum (10 - 90 %) |
| **Delay** | 2.5 µs min. from pulse input to RF 90% |
| **Pulse Width Distortion** | ±25 ns maximum (difference between Pulse input gate and RF pulse) |
| **Pulse Off Isolation** | 70 dB minimum |
| **Pulse Input** | +5 V nominal / +3 to 6 V |

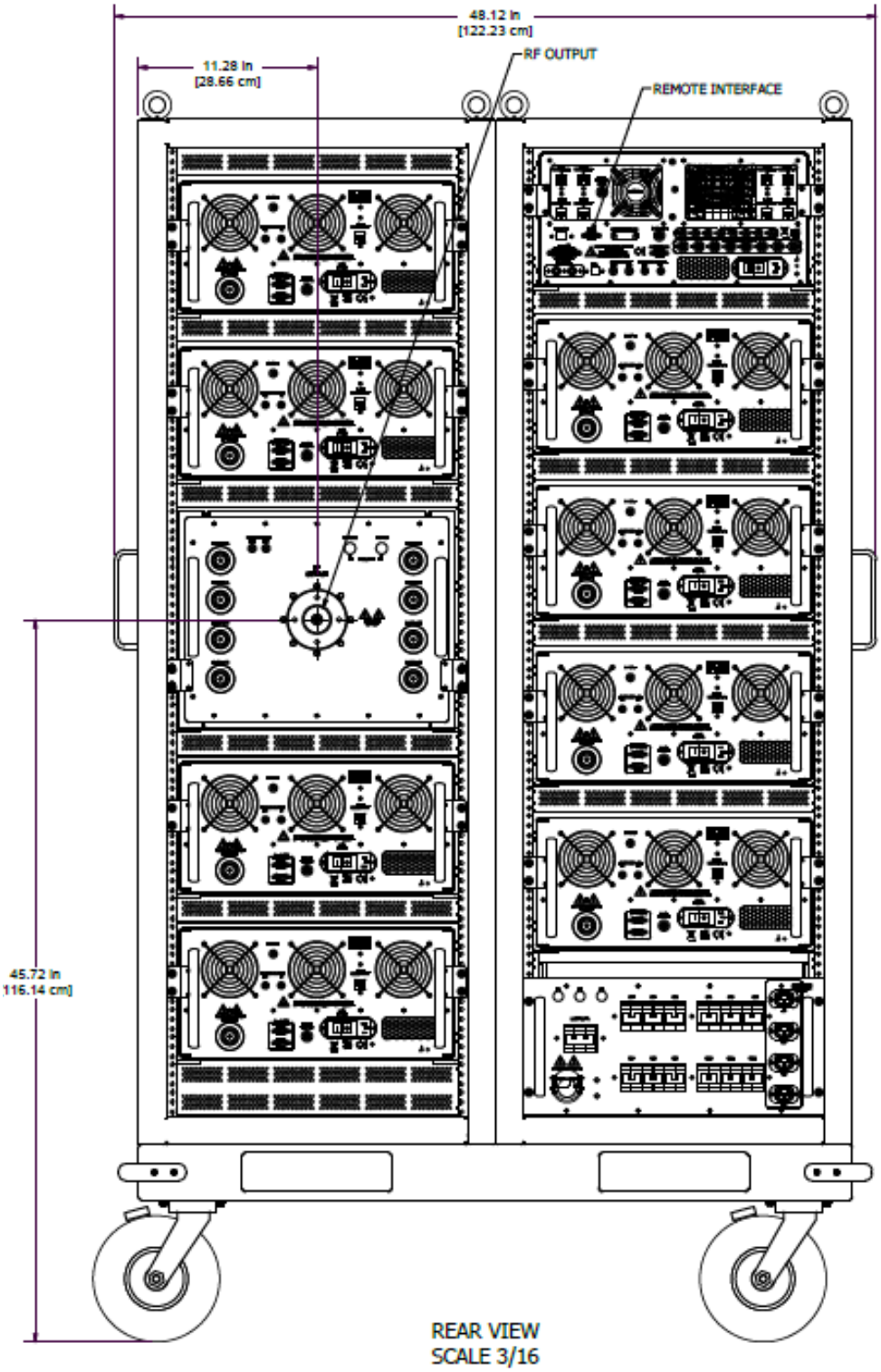
| Mechanical Specifications | | |
|---|---|---|
| **Parameters** | **Typical** | **Unit** |
| **System Amplifier Dimensions (W x H x D)** | 119.4 x 197.4 x 115.8 | cm |
| | 47 x 77.7 x 45.6 | in |
| **System Amplifier Weight** | 1019 | kg |
| | 2246 | lb |
| **Individual Rack Dimensions (33 U Rack) (W x H x D)** ***Racks leveling feet, casters, and a fork liftable base.** | 57.3 x 174.1 x 103.1 | cm |
| | 22.6 x 68.55 x 40.6 | in |
| **Individual Rack Weight** | 412 | kg |
| | 907 | lb |
| **Trolley Weight** ***Quantity 1** | 196 | kg |
| | 432 | lb |
| **Cooling** | Forced air (self-contained fans)<br>Side inlets / rear outlet Δt = +7°C (typical) | |
| **Acoustical Noise (Measured @ 1 meter from the front)** | 72 (typical) | dBA |

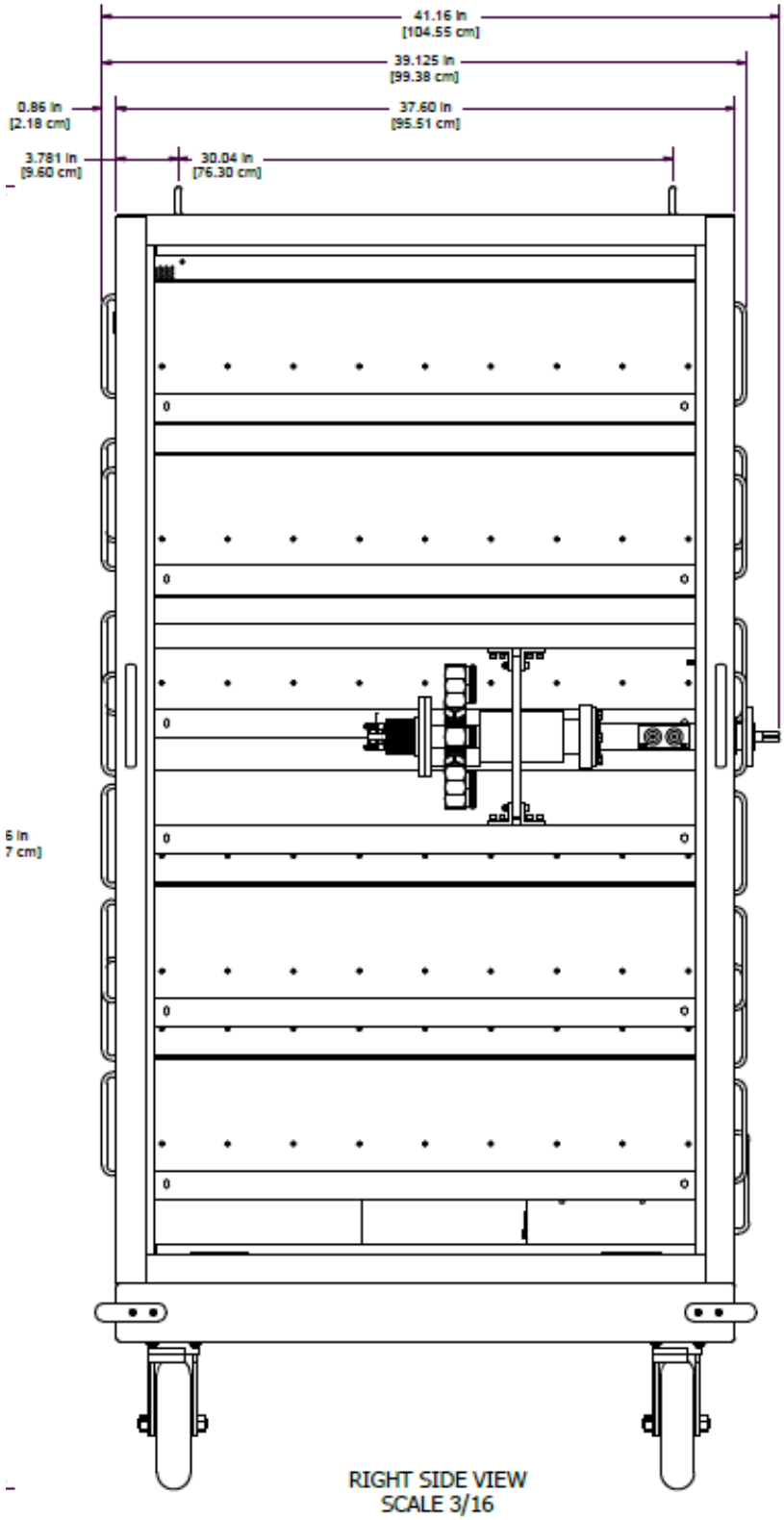
| Regulatory Compliance | |
|---|---|
| **Type** | **Standard** |
| **EMC** | EN 61326-1 |
| **Safety** | UL 61010-1 |
| | CAN/CSA C22.2 #61010-1 |
| | CENELEC EN 61010-1 |
| **RoHS** | Directive 2011/65/EU |
| **Export** | 3A999.d |

| Connector interfaces | |
|---|---|
| **Function** | **Type** |
| **RF input** | N female (50 Ω), front |
| **RF output** | 1-5/8 EIA, rear |
| **RF sample** | N female (50 Ω), front (80 dB typical) |
| **IEEE-488** | 24-pin, front |
| **RS-232** | 9-pin subminiature D female, front |
| **RS-232 (fiber optic)** | ST, front |
| **USB 2.0** | Type B, front |
| **Ethernet** | RJ-45, front |
| **Interlock** | 15-pin subminiature D female, front |
| **AC Input** | 10-meter harmonized power cord supplied for complete amplifier. |

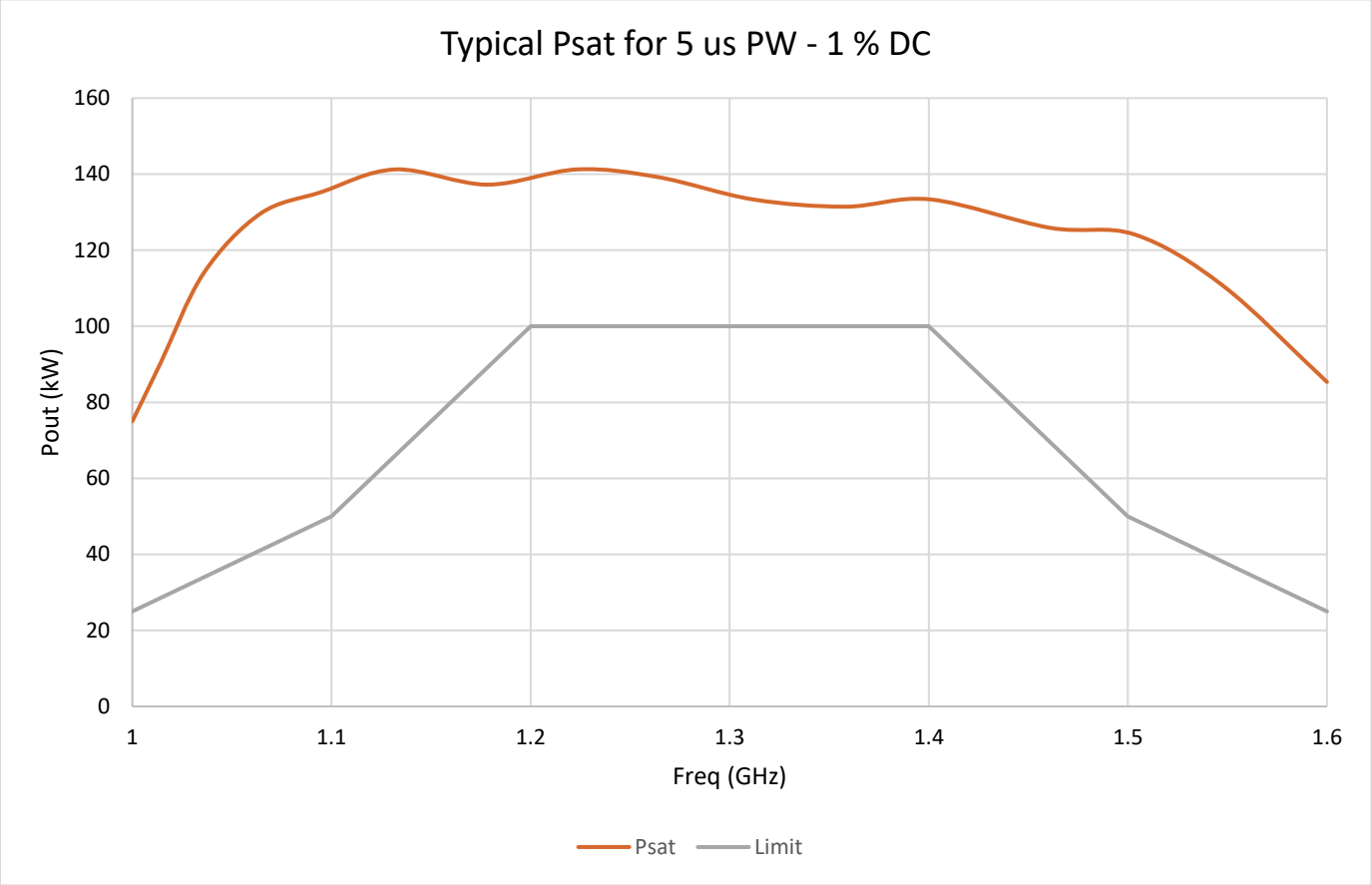
## Envelope Drawing

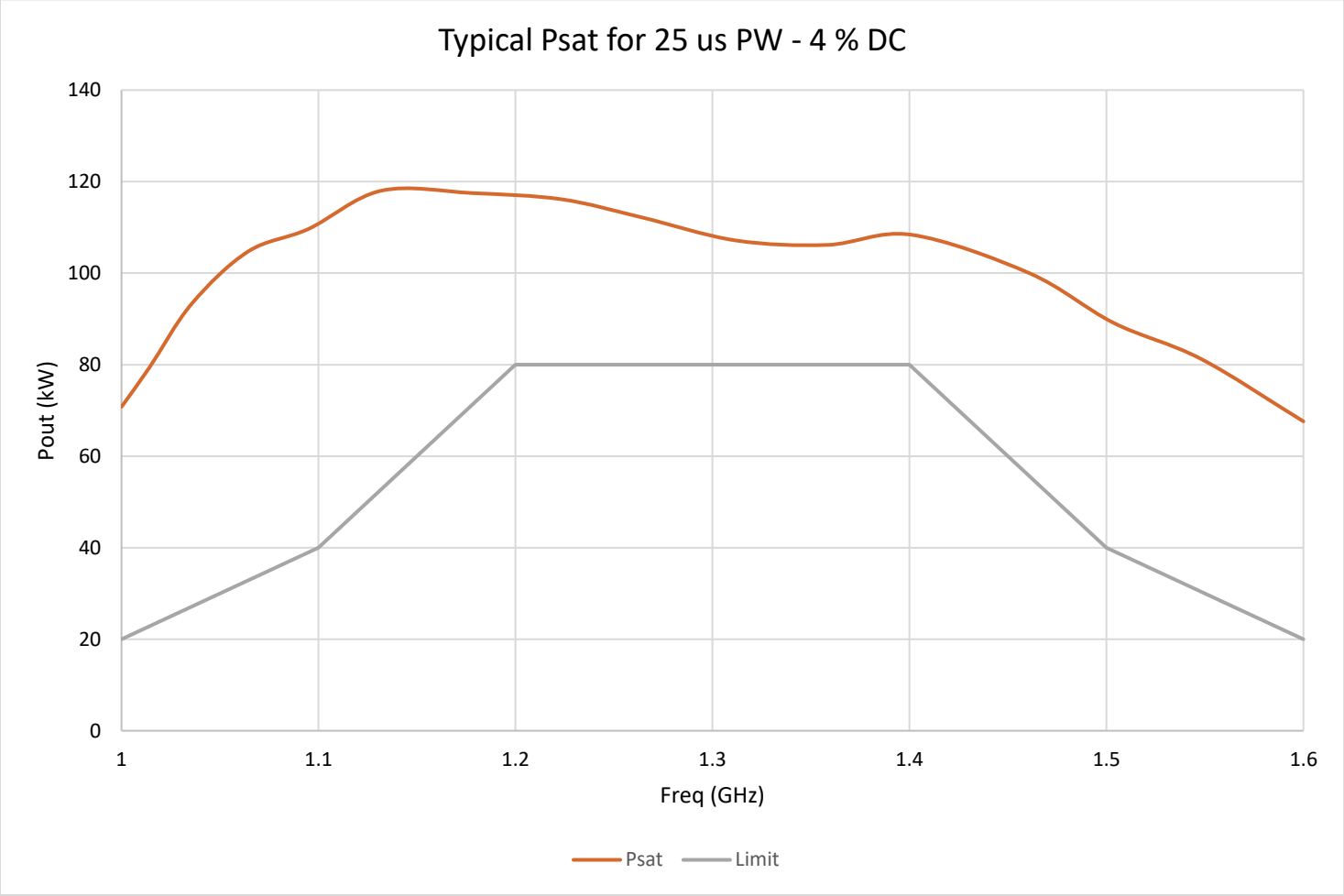


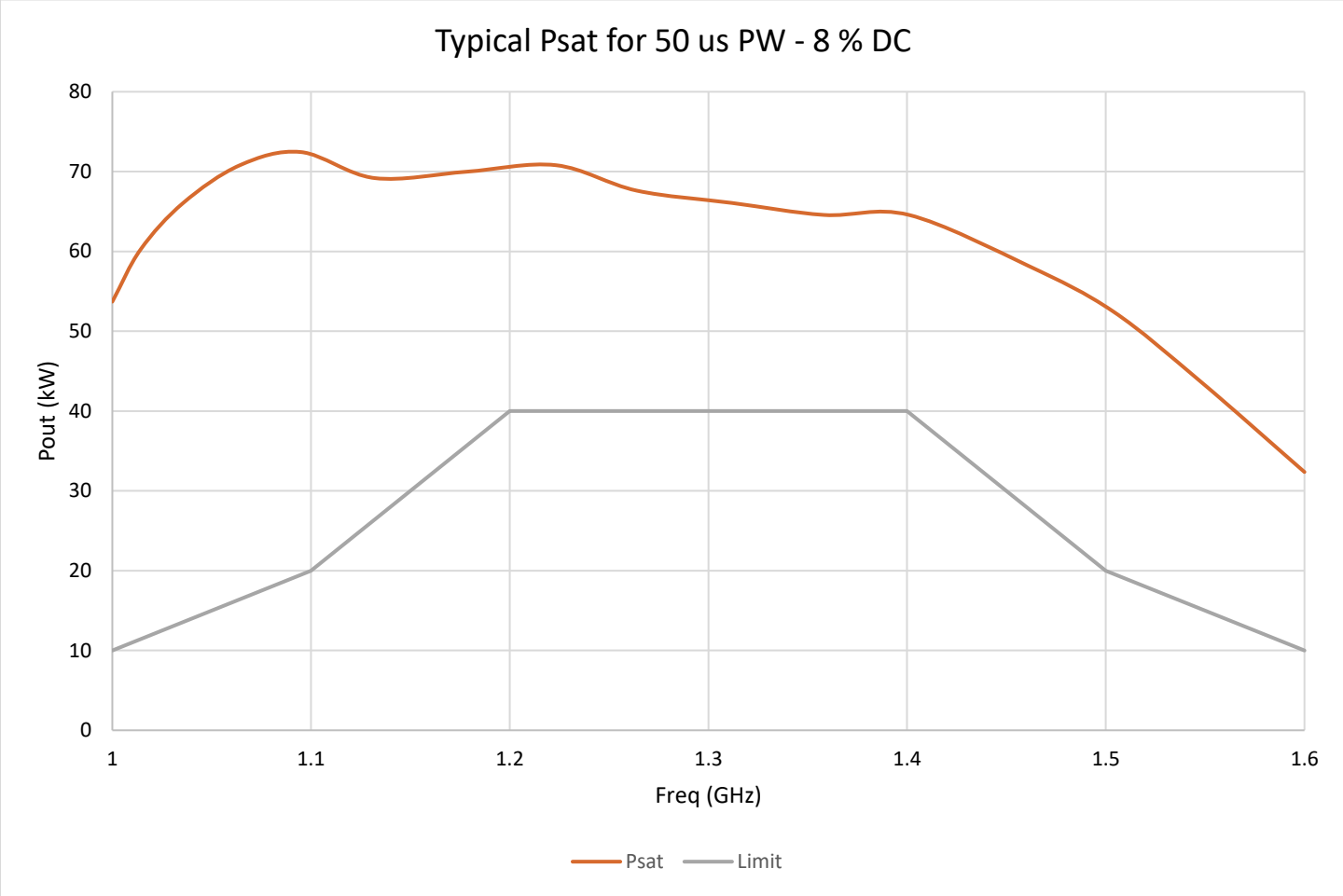

48.12 in
[122.23 cm]
11.28 in
[28.66 cm]
RF OUTPUT
REMOTE INTERFACE
45.72 in
116.14 cm]
REAR VIEW
SCALE 3/16

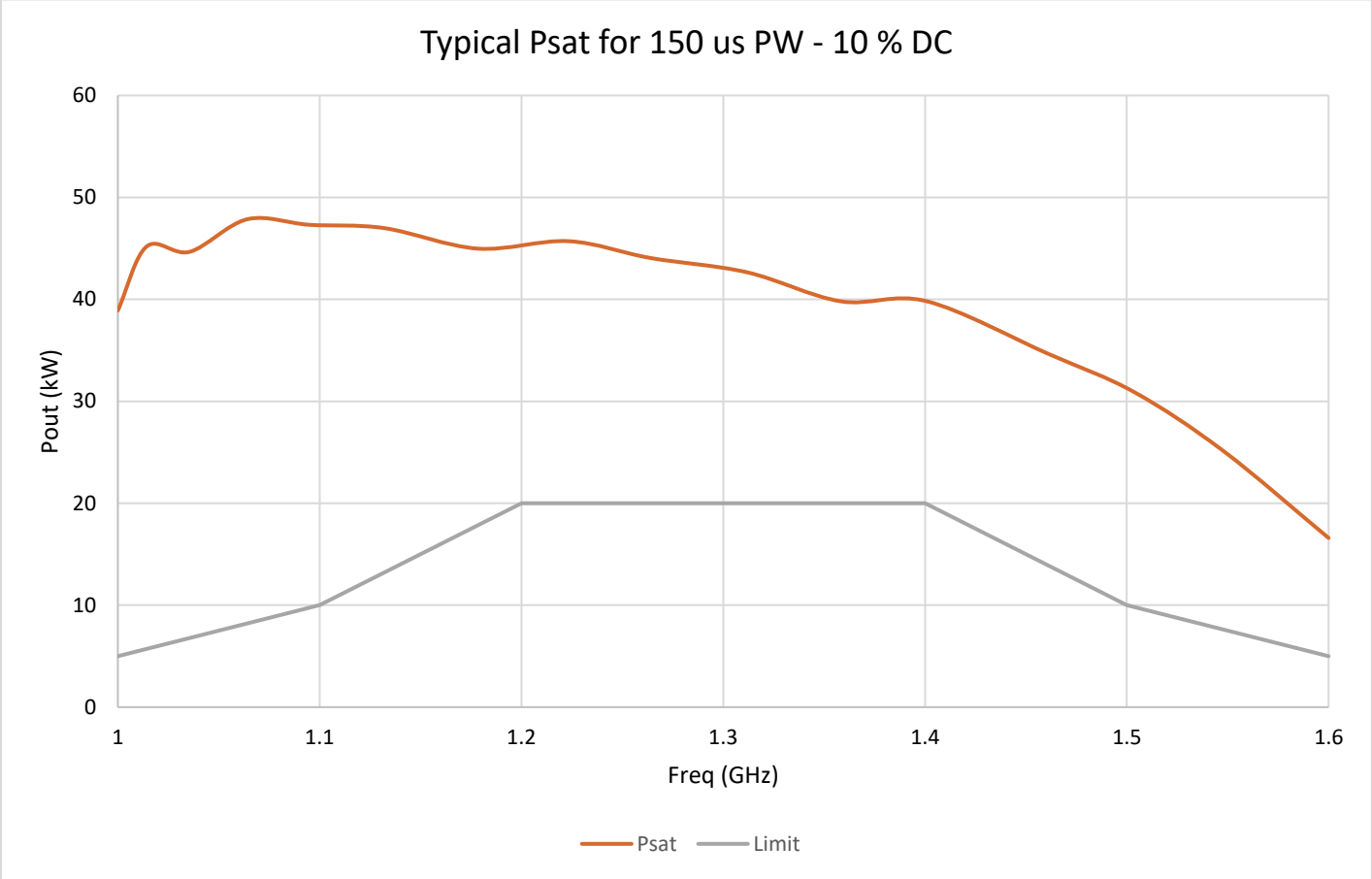



RIGHT SIDE VIEW
SCALE 3/16


Typical Psat for 5 us PW - 1 % DC
160
140
120
100
80
60
40
20
0
Pout (kW)
1
1.1
1.2
1.3
1.4
1.5
1.6
Freq (GHz)
Psat
Limit


Typical Psat for 25 us PW - 4 % DC
140
120
100
80
60
40
20
0
Pout (kW)
1
1.1
1.2
1.3
1.4
1.5
1.6
Freq (GHz)
Psat
Limit


Typical Psat for 50 us PW - 8 % DC
Pout (kW)
80
70
60
50
40
30
20
10
0
1
1.1
1.2
1.3
1.4
1.5
1.6
Freq (GHz)
Psat
Limit


Typical Psat for 150 us PW - 10 % DC
60
50
40
30
20
10
0
Pout (kW)
1
1.1
1.2
1.3
1.4
1.5
1.6
Freq (GHz)
Psat
Limit