



500W C-Band SSPA Chassis

Paradise Datacom's Indoor, Rack Mount (R) series SSPAs represent the latest in High Power Microwave Amplifier Technology. The SSPA chassis achieves the highest power density in the industry along with enhanced maintainability.

Local, front panel, control is available with a user friendly interface. Five fault condition LEDs on left side of the front panel reflect some of the SSPA major faults states, plus a summary fault indicator. The SSPA online LED turns green when the amplifier is in Online mode (1:1 Mode) or serves as an AC power indicator in standalone mode. Local/Remote and Mute/Unmute LEDs show the current control mode and mute state of the amplifier.

A full compliment of serial and parallel (contact closure) control is also available from the rear panel. Paradise Datacom's Windows™-based Universal M&C software allows monitor and control of the SSPA from a remote computer.

A state of the art thermal platform provides efficient cooling for the amplifier module and power supplies. This ensures the highest possible MTBFs for microwave power amplifiers.

Along with high reliability comes the ultimate in amplifier maintainability. Amplifier modules and power supplies are easily accessed making this one of the easiest amplifier assemblies to maintain in the field.

FEATURES

- Extremely High Power Density:
S Band to 600W ;
C Band to 600W ;
X Band to 500W ;
Ku Band to 250W
- Removable Fan Trays
- Removable M&C Card
- RF Output Sample Port (-40 dB)
- RF Gain Adjustment
55 dB - 75 dB
- Universal, Power Factor Corrected Power Supply
- Built-in 1:1 Redundancy Control

OPTIONS

- N+1 Redundant Power Supply
- Extended Frequency Bands
- L-Band Input operation
- ZBUC™
- Reflected Power Monitor
- Phase Combined Systems
- Input Sample Port
- Ethernet Port
- Exhaust Duct Adapters
- Redundant and Phase Combined System Solutions

SPECIFICATIONS

- Chassis:
19.0 X 7.0 X 28.0 in
483 X 178 X 711 mm
75 lbs. / 34 kg;
100 lbs. / 45 kg
for units > 250W
- Gray powder coat finish
- Operating temperature:
0 to +50 °C

S-Band SSPA Power Levels

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	Band A Band B	2.020 to 2.120 2.200 to 2.300	GHz GHz
Output Power @: Saturation/P _{1dB} (Typical/Guaranteed minimum)	Band A HPAS2050ARXXXXX (2.020 - 2.090 GHz) HPAS2100ARXXXXX (2.095 - 2.120 GHz) HPAS2200ARXXXXX (2.020 - 2.090 GHz) HPAS2200ARXXXXX (2.095 - 2.120 GHz) HPAS2300ARXXXXX (2.020 - 2.090 GHz) HPAS2300ARXXXXX (2.095 - 2.120 GHz) HPAS2400ARXXXXX (2.020 - 2.090 GHz) HPAS2400ARXXXXX (2.095 - 2.120 GHz) HPAS2500ARXXXXX (2.020 - 2.090 GHz) HPAS2500ARXXXXX (2.095 - 2.120 GHz) HPAS2600ARXXXXX (2.020 - 2.090 GHz) HPAS2600ARXXXXX (2.095 - 2.120 GHz) Band B HPAS2050BRXXXXX (2.200 - 2.300 GHz) HPAS2100BRXXXXX (2.200 - 2.300 GHz) HPAS2200BRXXXXX (2.200 - 2.300 GHz) HPAS2300BRXXXXX (2.200 - 2.300 GHz) HPAS2400BRXXXXX (2.200 - 2.300 GHz) HPAS2500BRXXXXX (2.200 - 2.300 GHz) HPAS2600BRXXXXX (2.200 - 2.300 GHz)	P _{sat} /P _{1dB} 47.5 / 47.0 (56/50) 50.5 / 50.0 (112/100) 53.5 / 53.0 (223/200) 53.0 / 52.5 (200/178) 55.0 / 54.5 (316/280) 54.4 / 54.0 (280/250) 56.5 / 56.0 (447/400) 56.0 / 55.5 (400/355) 57.2 / 57.0 (525/500) 56.7 / 56.5 (468/447) 58.0 / 57.5 (631/560) 57.5 / 57.0 (560/500) 47.5 / 47.0 (56/50) 50.5 / 50.0 (112/100) 53.5 / 53.0 (223/200) 55.0 / 54.5 (316/280) 56.5 / 56.0 (447/400) 57.2 / 57.0 (525/500) 58.0 / 57.5 (631/560)	dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W)
Power Requirements	power factor corrected 47 to 63 Hz HPAS2050A/BRXXXXX (90 to 265 VAC) HPAS2100A/BRXXXXX (90 to 265 VAC) HPAS2200A/BRXXXXX (180 to 265 VAC) HPAS2300A/BRXXXXX (180 to 265 VAC) HPAS2400A/BRXXXXX (180 to 265 VAC) HPAS2500ARXXXXXX (180 to 265 VAC) HPAS2600ARXXXXXX (180 to 265 VAC)	250 500 1000 1600 1800 3500 3800	W W W W W W W

Receive Band Noise and Filter Option

Receive Band Reject Filter used on sub-band A SSPAs only Filter integrated into SSPA chassis through 400W Output 500W and 600W SSPAs require external filter.	Insertion Loss Rx Reject @ 2.200 GHz	- 0.3 - 60	dB dB
Receive Band Noise Power Density For sub band A Amplifiers	Without optional filter With optional filter	-95 -155	dBw/4 KHz dBw/4 KHz



C-Band SSPA Power Levels

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	(see options for extended band)	5.850 to 6.425	GHz
Output Power @: Saturation/P _{1dB} (Typical/Guaranteed minimum)	HPAC2050ARXXXXX HPAC2075ARXXXXX HPAC2100ARXXXXX HPAC2140ARXXXXX HPAC2200ARXXXXX HPAC2250ARXXXXX HPAC2300ARXXXXX HPAC2400ARXXXXX HPAC2500ARXXXXX HPAC2600ARXXXXX	<u>Psat / P1dB</u> 47.0/46.8 (50/48) 48.8/48.5 (76/70) 50.0/49.5 (100/89) 51.5/51.0 (141/126) 53.0/52.3 (200/170) 53.9/53.0 (250/200) 54.7/54.0 (300/251) 56.0/55.0 (400/316) 57.0/56.0 (500/400) 57.8/57.0 (600/500)	dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W)
Power Requirements Line Voltage Line Frequency Line Power	power factor corrected 47 to 63 Hz HPAC2050ARXXXXX (90 to 265 VAC) HPAC2075ARXXXXX (90 to 265 VAC) HPAC2100ARXXXXX (90 to 265 VAC) HPAC2140ARXXXXX (90 to 265 VAC) HPAC2200ARXXXXX (180 to 265 VAC) HPAC2250ARXXXXX (180 to 265 VAC) HPAC2300ARXXXXX (180 to 265 VAC) HPAC2400ARXXXXX (180 to 265 VAC) HPAC2500ARXXXXX (180 to 265 VAC) HPAC2600ARXXXXX (180 to 265 VAC)	AC input 400 450 650 850 1000 1300 1700 2400 2800 3700	W W W W W W W W W W

Frequency Options

Extended Frequency Bands 5.850 to 6.725 GHz 5.75 to 6.67 GHz Insat/Palapa Band 6.425 to 7.025 GHz	De-rate output power by 1.0dB Linearly from 6.425 to 6.725 GHz De-rate output power by 1.0dB Linearly from 6.425 to 6.67 GHz Available in output power levels up to 500W
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X-Band SSPA Power Levels

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	(see options for extended band)	7.90 to 8.40	GHz
Output Power @: Saturation/P _{1dB} (Typical/Guaranteed minimum)	HPAX2060ARXXXXX HPAX2075ARXXXXX HPAX2100ARXXXXX HPAX2140ARXXXXX HPAX2200ARXXXXX HPAX2250ARXXXXX HPAX2350ARXXXXX HPAX2500ARXXXXX	Psat / P1dB 47.5/47.3 (60/54) 48.8/48.3 (76/68) 50.0/49.5 (100/89) 51.4/50.8 (140/120) 53.0/51.8 (200/170) 54.0/53.3 (250/214) 55.5/54.5 (354/282) 57.0/56.0 (500/400)	dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W)
Power Requirements Line Voltage Line Frequency Line Power	power factor corrected 47 to 63 Hz HPAX2060ARXXXXX (90 to 265 VAC) HPAX2075ARXXXXX (90 to 265 VAC) HPAX2100ARXXXXX (90 to 265 VAC) HPAX2140ARXXXXX (180 to 265 VAC) HPAX2200ARXXXXX (180 to 265 VAC) HPAX2250ARXXXXX (180 to 265 VAC) HPAX2350ARXXXXX (180 to 265 VAC) HPAX2500ARXXXXX (180 to 265 VAC)	AC input 650 700 750 1225 1370 2450 3000 3500	 W W W W W W W W

Frequency Options

Extended Frequency Band 7.70 to 8.40 GHz 7.50 to 8.50 GHz	De-rate output power by 1.0dB Linearly from 7.90 to 7.70 GHz
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Ku-Band SSPA Power Levels

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	(see options for extended band)	14.00 to 14.50	GHz
Output Power Saturation/P1dB (Typical/Guaranteed minimum)	HPAK2025ARXXXXX HPAK2035ARXXXXX HPAK2040ARXXXXX HPAK2050ARXXXXX HPAK2070ARXXXXX HPAK2100ARXXXXX HPAK2125ARXXXXX HPAK2200ARXXXXX HPAK2250ARXXXXX	Psat / P1dB 44.0/43.0 (25/20) 45.5/44.5 (35/28) 46.0/45.0 (40/31) 47.0/46.0 (50/40) 48.5/47.5 (70/56) 50.0/49.0 (100/80) 51.0/50.0 (125/100) 53.0/52.0 (200/158) 54.0/53.0 (250/200)	dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W) dBm (W)
Power Requirements Line Voltage Line Frequency Line Power	power factor corrected 47 to 63 Hz HPAK2025ARXXXXX (90 to 265 VAC) HPAK2035ARXXXXX (90 to 265 VAC) HPAK2040ARXXXXX (90 to 265 VAC) HPAK2050ARXXXXX (90 to 265 VAC) HPAK2070ARXXXXX (90 to 265 VAC) HPAK2100ARXXXXX (180 to 265 VAC) HPAK2125ARXXXXX (180 to 265 VAC) HPAK2200ARXXXXX (180 to 265 VAC) HPAK2250ARXXXXX (180 to 265 VAC)	AC input 320 350 500 500 550 1100 1200 2500 2800	VAC Hz W W W W W W W W

Frequency Options

Extended Frequency Band 13.75 to 14.50 GHz	De-rate output power by 1.0dB linearly from 14.00 to 13.75 GHz
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Common Electrical Specifications

PARAMETER	NOTES	LIMITS	UNITS
Gain	minimum	75	dB
Gain Flatness	full band	±1.0	dB
Gain Slope	per 40 MHz (C, X, Ku) Per 10 MHz (S-band)	±0.3 ±0.1	dB/40 MHz dB/10 MHz
Gain Variation vs. Temperature	0°C TO +50°C	±1.0	dB
Gain Adjustment	0.1 dB resolution	20	dB
Intermodulation Distortion	3dB back off relative to P _{1dB}	-25	dBc
AM/PM Conversion	(@ rated P _{1dB}) (@ P _{1dB} -3dB)	3.5 1.0	°/dB °/dB
Spurious Harmonics	(@ rated P _{1dB}) (@ rated P _{1dB} -3dB) (C-,X-,Ku-bands) (@ rated P _{1dB} -3dB) (S-Band)	-70 -50 -40	dBc dBc dBc
Input/Output VSWR		1.30:1	
Noise Figure	at maximum gain	12	dB
Group Delay	Linear Parabolic Ripple	0.01 0.003 1.0	ns/MHz ns/MHz ² ns p-p
Noise Output	TX Band (S, C-, X- or Ku-Band) RX Band (C- or Ku-Band) RX Band (X-Band) RX S Band see page 2	-75 -150 -100	dBW/4 KHz dBW/4 KHz dBW/4 KHz
Residual AM Noise	0 - 10 KHz 10 KHz - 500 KHz 500 KHz - 1 MHz	-45 -20 (1.25 + log F) -80	dBc dBc dBc
Residual Phase Noise	Offset frequency from carrier 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz 1 MHz	-90 -100 -110 -120 -125 -130	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
Connectors	RF Input, Input & Output Sample RF Output: HPAS2XXXXRXXXXX RF Output: HPAC2XXXXRXXXXX RF Output: HPAX2XXXXRXXXXX RF Output: HPAK2XXXXRXXXXX Line Power	Type N Type N WR137 Waveguide WR112 Waveguide WR75 Waveguide (90-265) IEC 6100-3300 (180-265) IEC 4798-9000	Female Female CPR137G Flange (PDR-70) CPR112G Flange (PDR-84) Grooved Flange (PBR-120) Plug Plug

Mechanical

Size	width X height X depth	19.0 X 7.0 X 28.0 483 X 178 X 711	inches mm
Weight	≤ 250W Chassis > 250W Chassis	75 (34) 100 (45)	lbs.(kg) lbs.(kg)
Finish		powder coat	Gray

Environmental Specifications

Operating Temperature	Ambient	0 to +50	°C
Relative Humidity	non-condensing	95	%
Cooling System	Integrated	Forced air	

Specifications are subject to change.

Redundant Power Supply Option



The combination of a separate +12 VDC output, fully redundant power supply is an excellent means of obtaining the ultimate system reliability.

The power supply is an N+1 redundant configuration meaning that there is one more power supply module available than is required to operate the SSPA. A failure of one power supply module will *not* take the amplifier off-the-air.

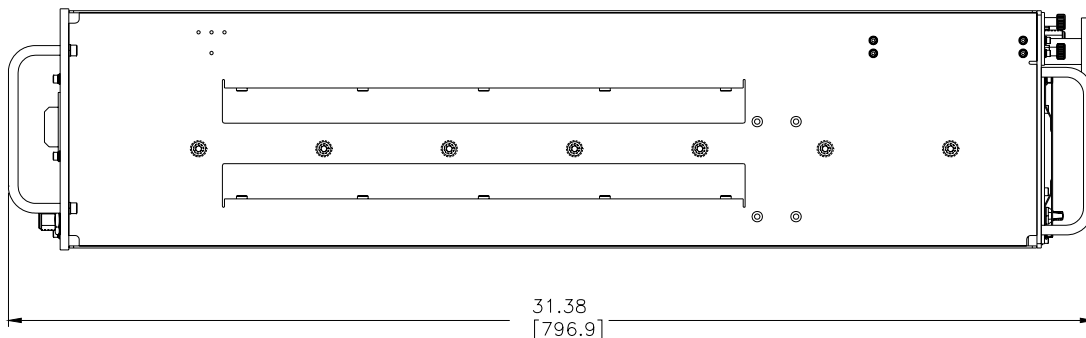
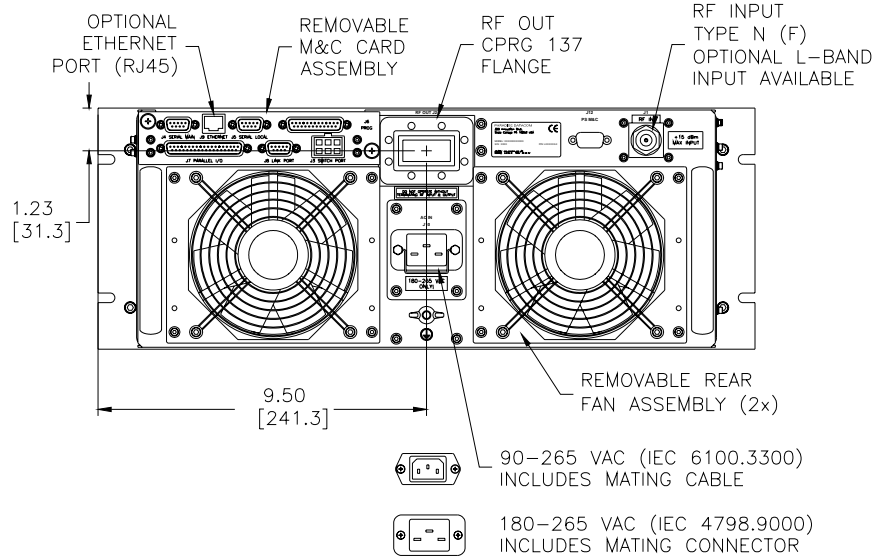
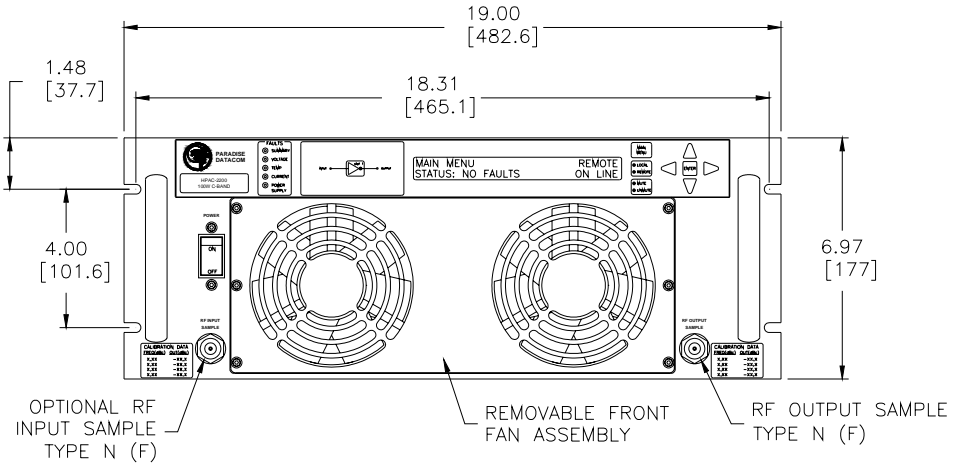
In addition the power supply modules are removable from the front panel while in operation. There is never a need to remove the power supply chassis from the equipment rack.

Weighing only 9 lbs. (4 kg) and occupying only 1 rack unit of cabinet space, the redundant power supply chassis is an excellent companion to the SSPA chassis.

The power supply has a single phase, universal AC input ranging from 90-265 VAC, 47-63 Hz. It is power factor corrected to 0.99. Depending on the power requirements of the SSPA, the power supply is configured with two, three or four 1200W hot-swappable modules, each of which weighs 5 lbs. (2.3 kg).

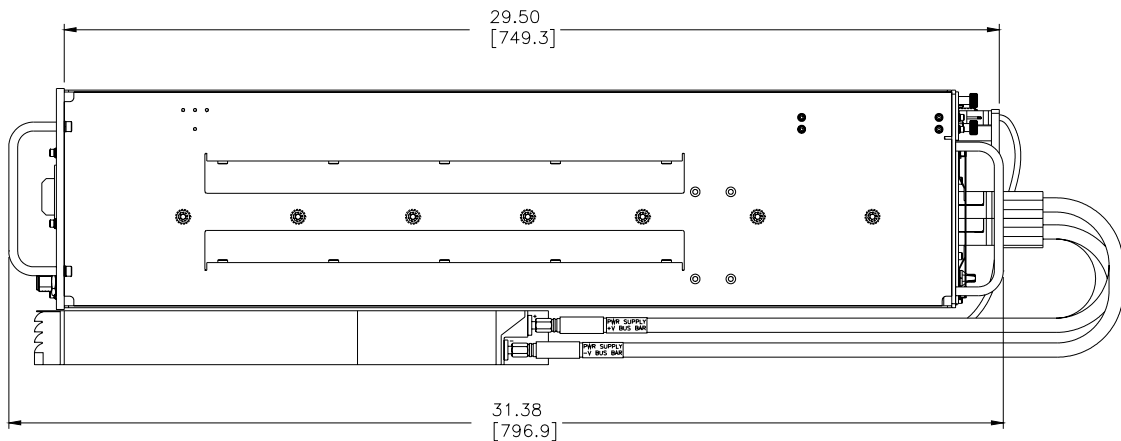
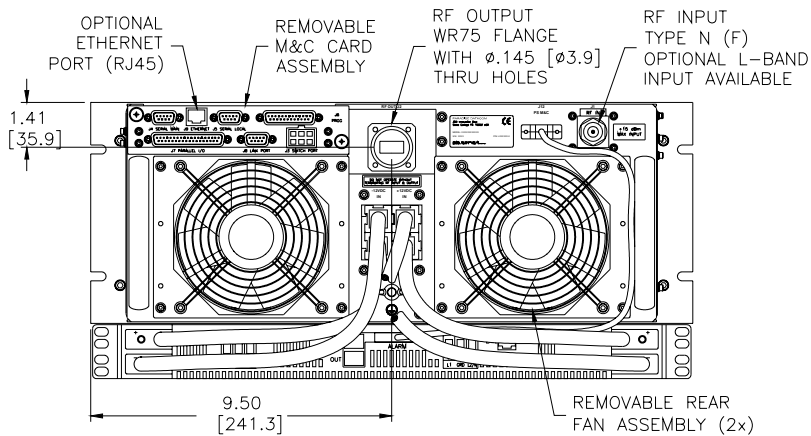
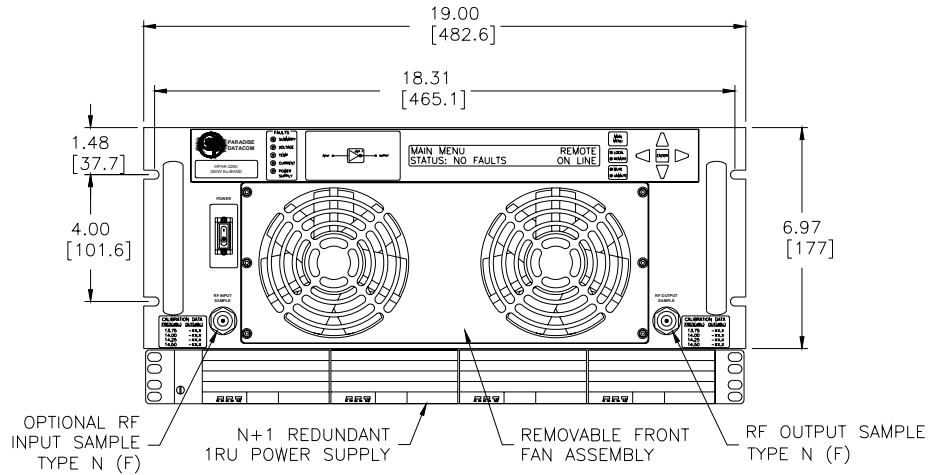


Outline Drawing, 4RU SSPA with Integral Power Supply





Outline Drawing, 4RU SSPA with N+1 Redundant Power Supply



Part Number Configuration

HPA 2 R X

Band

S - S-Band
C - C-Band
X - X-Band
K - Ku-Band

Power Level (in Watts)

S-Band

050, 100, 200, 300, 400, 500
or 600

C-Band

050, 075, 100, 140, 200, 250,
300, 400, 500 or 600

X-Band

060, 075, 100, 140, 200, 250
or 350

Ku-Band

025, 035, 040, 050, 070, 100,
125, 200 or 250

Frequency Sub Band

S-Band

A - 2.02 to 2.12 GHz
B - 2.20 to 2.30 GHz
C-Band
A* - 5.850 to 6.425 GHz
B* - 5.850 to 6.725 GHz
C** - 5.750 to 6.670 GHz
E* - 6.425 to 6.725 GHz (Palapa)
F* - 6.725 to 7.025 GHz (Insat)

X-Band

A* - 7.90 to 8.40 GHz
B - 7.50 to 8.50 GHz
C - 9.50 to 10.50 GHz
D - 7.70 to 8.40 GHz

Ku-Band

A* - 14.00 to 14.50 GHz
B* - 13.75 to 14.50 GHz

* Available with optional BUC

** Derate power by 1.0 dB from 6.425 to 6.670
GHz and by 0.5 dB from 5.85 to 5.75 GHz

Package

R = Rack Mount (Standalone)

Configuration Modifier

XXX = Standard
XXD = 48V Input
SXX = Input Sample
KXX* = 110/220 VAC Operation
XVX = Reflected Power Monitor
XXE[†] = Rear Panel Exhaust Adapters
XXP = External 1RU N+1 Power Supply
XXJ[†] = 48V Input & Rear Panel Exhaust
Adapters
XXR** = Receive Band Reject Filter
XXH** = 48V Input & Receive Band Reject
Filter
XXK**[†] = Rear Panel Exhaust Adapters &
Receive Band Reject Filter
XXL[†] = External 1RU N+1 Power Supply &
Rear Panel Exhaust Adapters
XXM** = External 1RU N+1 Power Supply &
Receive Band Reject Filter
CXX* = Input Sample & 110/220 VAC
Operation

* 100-125W Ku- & 200-300W C-Band only;
Consult factory for S- & X-Bands.

** S-Band Sub Band 'A' only; 400W max.

[†] Not available with package options Y or Z.

System Configuration

X = Standalone

See the following datasheets for system options:

- Indoor Rack Mount Redundant SSPA Systems (203583)
- Indoor Rack Mount Phase Combined SSPA Systems (203584)

Block Up Converter

B = BUC (Custom)
C = 10 MHz Ext. Ref. Std. LO
D = 50 MHz Ext. Ref. Std. LO
E = 10 MHz Int. Ref. Std. LO
F = 50 MHz Int. Ref. Std. LO
M = Internal Reference ZBUC
P = External Reference ZBUC
X = N/A

Example - A standalone 100W Extended Ku-Band Rack Mount SSPA with an optional 48 VDC input and no block up converter is part number: **HPAK2100BRXXXXD**.