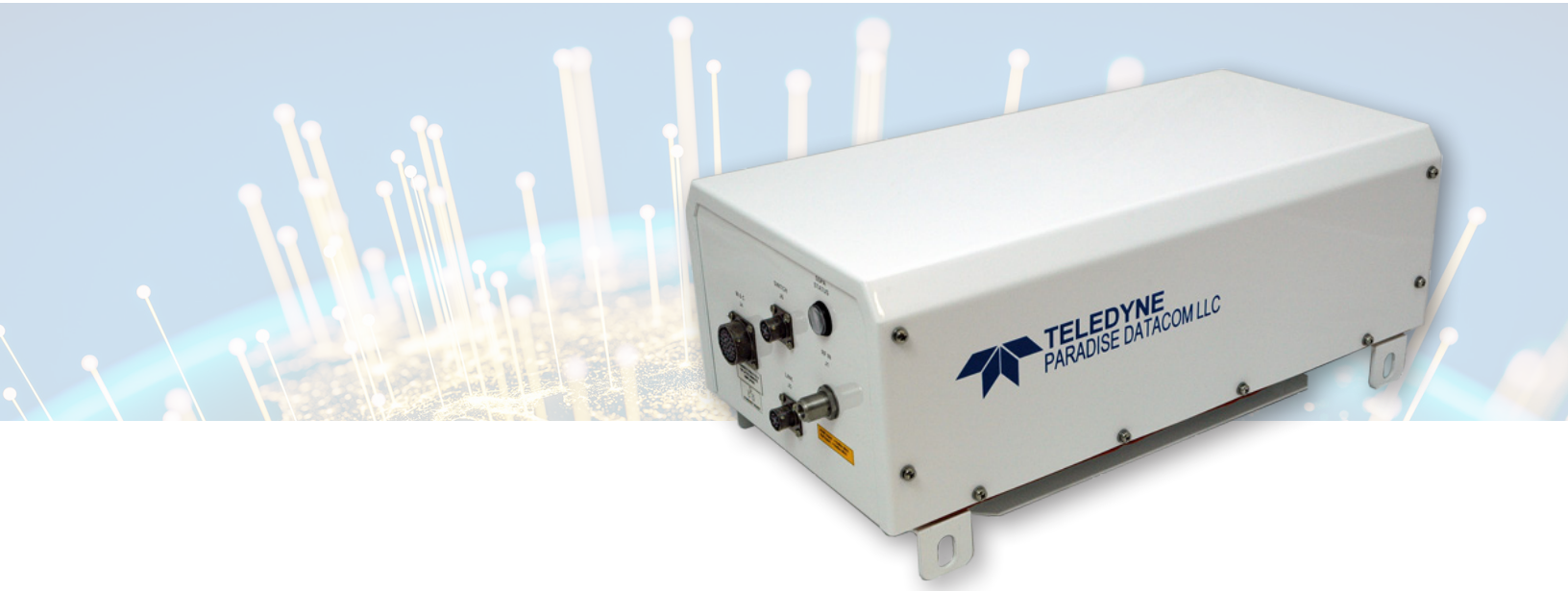
Compact Outdoor SSPA

Available in L, S, C, X and Ku Bands



Superior Power Density for Extreme Outdoor Environments

TELEDYNE
PARADISE DATACOM
Everywhereyoulook™

Field Proven in the World's Most Extreme Environments

The **Compact Outdoor** series of microwave amplifiers has been manufactured by Teledyne Paradise Datacom for more than 25 years and features a wide variety of frequency bands and output power levels, available in a common platform.

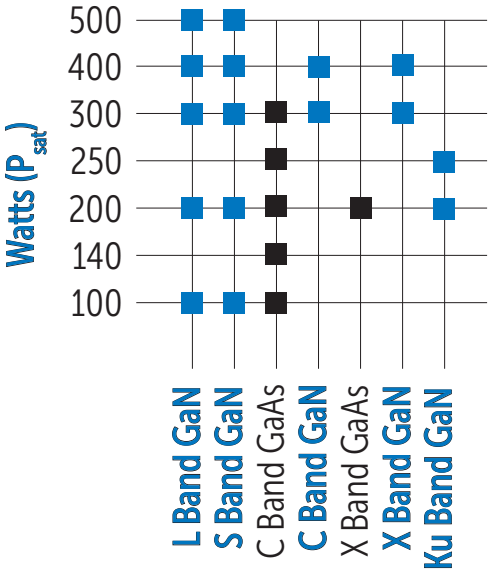
This platform has proven to be extremely robust and is fully qualified to MIL-STD- 810F environmental requirements. Each **Compact Outdoor SSPA** is factory tested over a wide temperature range, from -40 °C to +60 °C and is designed to withstand myriad issues that arise when designing equipment for hostile environments.

In 2010, Teledyne Paradise introduced GaN technology into their high power solid state amplifiers. Our engineers were at the forefront of the push to overcome the memory effect which was prevalent in the first generation of GaN devices. This coordination with the manufacturers continues, and has resulted in significant improvement in device performance industry-wide.

Hallmarks of the Compact Outdoor SSPA

- L band through Ku band
- GaAs & Gen II GaN
- Proprietary linearization techniques
- Compact size, weight, leading power density
- CE & MIL-STD-461
- Extreme Environmental Testing (MIL-STD-810F)

Available Output Powers (GaN and GaAs)



SSPA Technology Comparison

GaAs

- Lower Power Devices than GaN
- Better Linearity at low output power levels.
- Plinear = P1dB - 3 dB
- Gallium Arsenide based amplifiers are nearly Class A mode of operation

GaN

- Much higher power transistors.
- Same Linearity as GaAs at high output power levels (when linearized)
- Plinear = Psat - 3 dB {Linearized}
- Plinear = Psat - 4 dB {unLinearized}
- 2nd Generation GaN devices have solved the Memory Effect Limitation, allowing GaN amplifiers to reach their full potential as broadband multi-carrier Amplifiers for Satellite Communications
- Gallium Nitride based amplifiers are Class AB mode

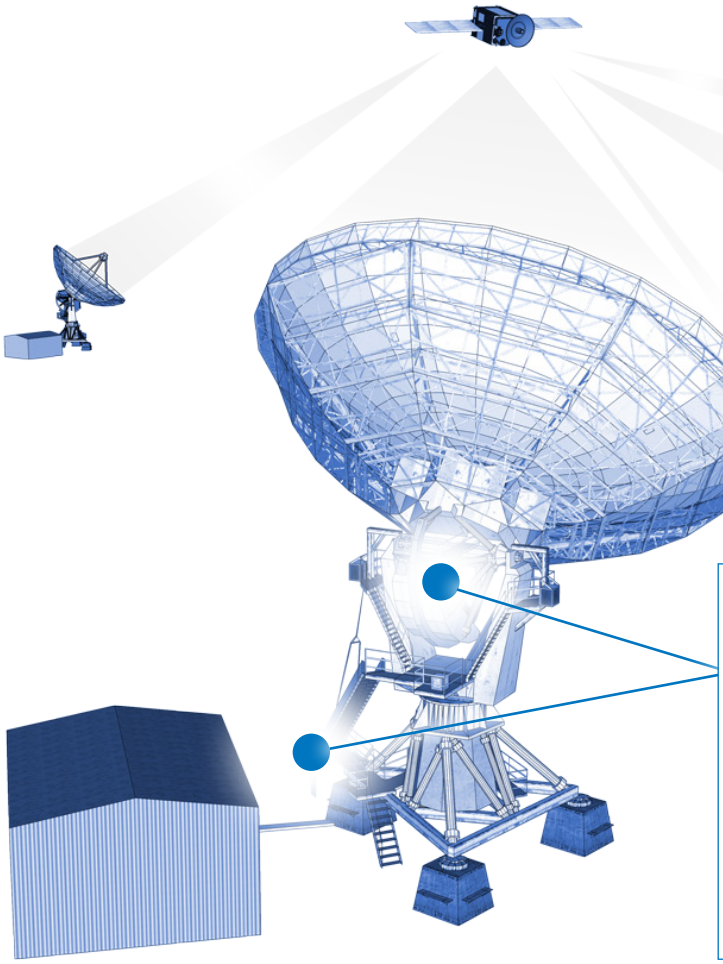
General Specifications (typical)

Gain Adjustment	20 dB, 0.1 dB steps
Gain Flatness (full band)	± 1.0 dB
Gain Slope (per 40 MHz)	± 0.3 dB/40 MHz
Gain Variation vs. Temp. (-30 to +50 °C)	± 1.5 dB
Gain Stability (at constant temp.)	± 0.25 dB/24 hours
Intermod Distortion (2-tone, 5 MHz spacing) (@ Psat - 3 dB)	-25 dBc
AM/PM Conversion	< 1.0 °/dB
Spurious	-65 dBc
Harmonics	-50 dBc
Input VSWR	1.3:1
Output VSWR	1.3:1
Noise Figure (at maximum gain)	10 dB

See complete specifications on the Outdoor SSPAs page of the web site.

Compact Outdoor SSPA Features

- Compact Size: 10.0in x 19.5in. X 6.50in.
- Very light weight: as low as 36 lb. (16.4 kg.)
- Extremely Robust Outdoor Operation
- -40 °C to +60 °C Operating Range
- Universal Input Power Supply
- 90-265 VAC input range, PFC
- Variable Gain: 55 to 75 dB typical, 0.1 dB step adjustment
- True Power Reading Power Detector
- Output Power Sample Port, 40 dBc
- Internal 1:1 Redundant Controller
- Large status LED
- Serial or Parallel Monitor and Control (RS232/485)
- Ethernet Interface Standard, UDP, SNMP, Embedded Web Browser
- FSK Monitor and Control via IFL
- Auxiliary +15VDC power port for external equipment (LNB)
- Optional L Band Input with Integrated Block Up Converter
- Optional Receive Band Reject Filter (L/S- and X-bands only)
- Optional side-mount AC Input for SNG installations



Outdoor SSPAs

Teledyne Paradise Datacom offers a wide range of Outdoor Solid State Power Amplifiers in both GaN and GaAs technologies.

High Power Outdoor (H-series)

Compact Outdoor (C-series)

Compact Outdoor I/O Connectors and Features

Switch Port (J6)
- Used for redundant systems to power and monitor switch

SSPA Status Indicator
- Omitted from X-Band units to limit RF leakage

RF In / IF In (J1)
- Type N (F)
- Maximum RF/IF Input: +15 dBm
- For units with external reference Block Up Converter, +10 dBm maximum reference input

M&C Port (J4)
- Remote control interface via Serial or Ethernet
- Variety of Remote Control options available
- Hard-wire unmute

Link Port (J5)
- Used for redundant system comms between amplifiers

Auxiliary (AUX) Power (J8)
- Provides +15VDC and up to 1 A for external equipment (LNBs,etc.)

Removable Fan Tray
- Easily removed to access heatsink for cleaning and maintenance
- Spare plug-in fan assemblies available

RF Output Sample (J3)
- Provides a -40 dBc sample of unit RF Output

RF Output (J2, obverse)
- Grooved waveguide flange for C-, X- and Ku-band units; N-type (F) for L-/S-band units
- Optional pressure window available for Ku-band units

AC In (J7)
- Optional DC Input available
- Alternate connector locations available

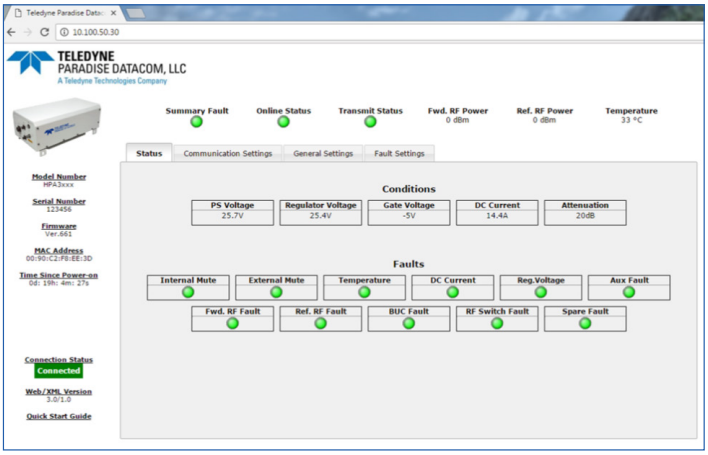
Mounting
- Mounting kit options available

Variety of Remote Control Options

Embedded Web-based Control

The Compact Outdoor SSPA's internal micro-controller contains an embedded web page from which the operator can perform all remote monitoring and control of the unit.

The multi-tab display offers status indicators, communication settings, and mute or attenuation control with a simple mouse click.

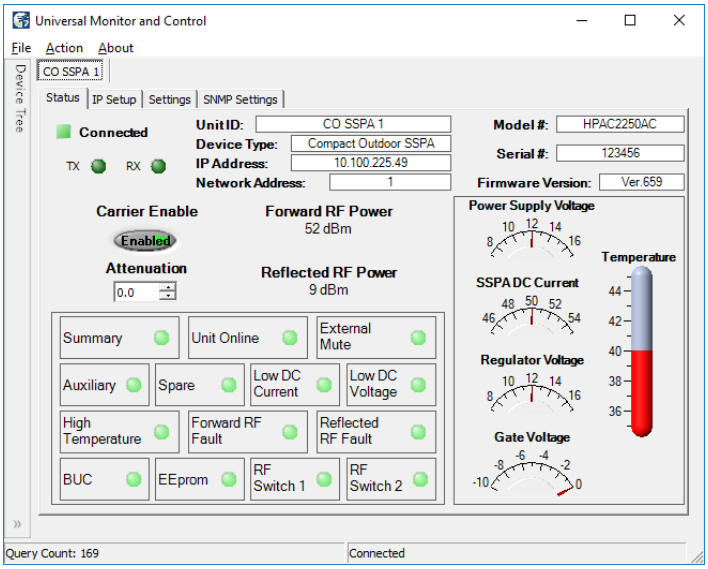


Embedded Web-based Monitor & Control: Connect to a PC running any modern web browser (Microsoft Edge, Chrome, Firefox).

Universal Monitor & Control Software

Alternately, connect the Compact Outdoor SSPA to a PC (directly or over a network) and install Teledyne Paradise Datacom's free Universal Monitor and Control software, available for download from the web site.

Both the embedded web page and the Universal Monitor and Control Sofware are configurable for comms over RS-232/RS-485, IPNet, or SNMP.



Teledyne Paradise Datacom Universal Monitor & Control Software: Download the free software from the company web site and run on any Windows-based PC.

RCH-1000 Hand-held Controller (Optional)

An optional hand-held controller is also available. The sealed enclosure provides an ingress protection level of IP65, which allows use in most outdoor environments. The rugged construction provides protection from impact and vibration.

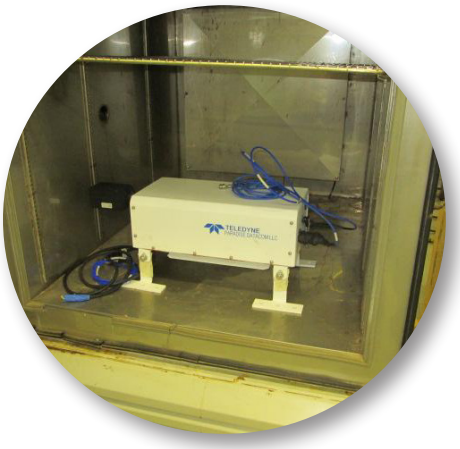
The operator may adjust the attenuation of the connected unit, control the mute/unmute selection, and monitor the status, conditions and settings of the connected unit via a serial RS-485 connection.

RCH-1000 Hand-Held Controller: Works with both Compact Outdoor and High Power Outdoor SSPAs.

Compliance to Standards

Environmental Military Specs

MIL-STD-810F, Method 501.4: High Temperature
MIL-STD-810F, Method 503.3: Temperature Shock
MIL-STD-810F, Method 505.3: Solar Radiation
MIL-STD-810F, Method 507.4: Damp Heat, Humidity
MIL-STD-810F, Method 502.4: Low Temperature
MIL-STD-810F, Method 506.4: Blowing Rain
MIL-STD-810F, Method 510.3: Blowing Dust
MIL-STD-810F, Method 510.3: Blowing Sand
MIL-STD-810F, Method 508.5: Mold Growth
MIL-STD-810F, Method 509.4: Salt Fog
MIL-STD-344A: Random Vibration, 20 50Hz: 0.02 g 2 Mz, then rolling up to 0.001g 2 /Hz at 500 Hz; Shock, 25g for 4000 bumps, 10g 6 msec, 12 bumps/s



High Temperature
60 °C to -40 °C, three cycles, 2 hour dwell at each extreme

Blowing Rain
10 mm/hr at 40 MPH

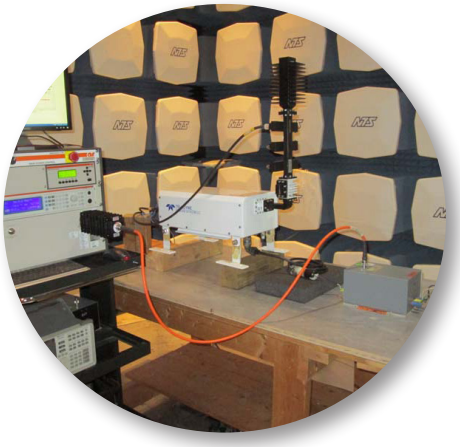
Commercial CE Compliance

EN 55022, 2007: Conducted Emissions
EN 55022: 2007: Radiated Emissions
EN 61000 3 2: 2001: Harmonic Current Emissions
EN 61000 3 3: 1995: Voltage Fluctuations & Flicker
EN 61000 4 2: 1999: Electrostatic Discharge
EN 61000 4 3: Radiated Immunity
EN 61000 4 4: 1995: Electrical Fast Transient / Burst
EN 61000 4 5: 1995: Surge
EN 61000 4 6: 2003: Conducted Immunity
EN 61000 4 8: 1994: Magnetic Field Immunity
EN 61000 4 11: 1994: Voltage Dips & Interruptions

Blowing Dust/Sand
2kg/m3 of powder

EMI/EMC Military Specs

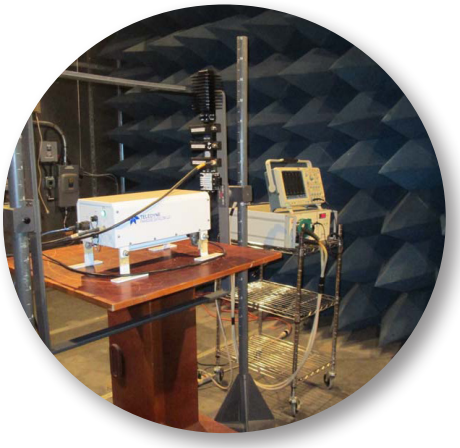
MIL-STD-461F, CE102: Conducted Emissions, Power Leads 10 kHz to 10 MHz
MIL-STD-461F, CS101: Conducted Susceptibility, Power Leads, 30 Hz to 150 kHz
MIL-STD-461F, CS114: Conducted Susceptibility, Bulk Cable Injection 10 KHz to 200 MHz
MIL-STD-461F, CS115: Conducted Susceptibility, Bulk Cable Injection Impulse Excitation
MIL-STD-461F, CS116: Conducted Susceptibility, Damped Sinusoidal Transients 10 kHz to 100 MHz
MIL-STD-461F, RE102: Radiated Emissions, Electric Field 10 kHz to 18 GHz
MIL-STD-461F, RE103: Radiated Susceptibility, Electric Field 30 MHz to 18 GHz
MIL-STD-1686C, HESD: 16 kV, HESD level 3



Conducted RF Immunity
Signal applied:
150kHz-80 MHz, 10Vrms
1 kHz AM, 80% modulation

Quality Management Standards

ISO 9001:2015



Magnetic Field Immunity
30A/m, 50/60Hz

System Configurations

Redundant Systems

Teledyne Paradise Datacom's Compact Outdoor series of redundant amplifier systems provide the highest degree of earth station redundancy and reliability. These systems can be configured in either 1:1 or 1:2 redundant configurations

The Compact Outdoor SSPA has a built-in 1:1 redundancy controller, allowing it to be used in 1:1 redundant systems without a separate external controller, although an optional controller is available. When used in a 1:2 redundant system a separate controller is required.

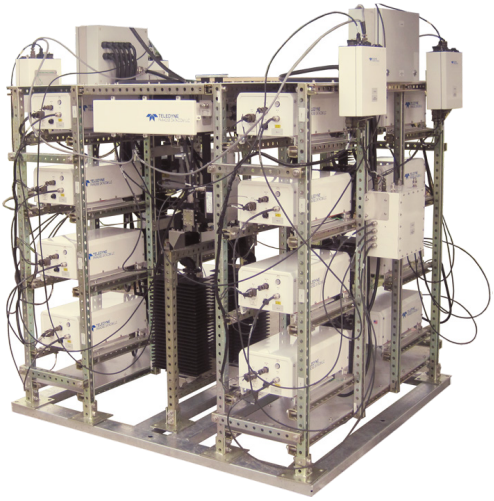
Phase Combined Systems

Phase combined systems provide a means to increase the RF output of a series of Compact Outdoor amplifiers by combining the output power with the use of a hybrid coupler or magic Tee.

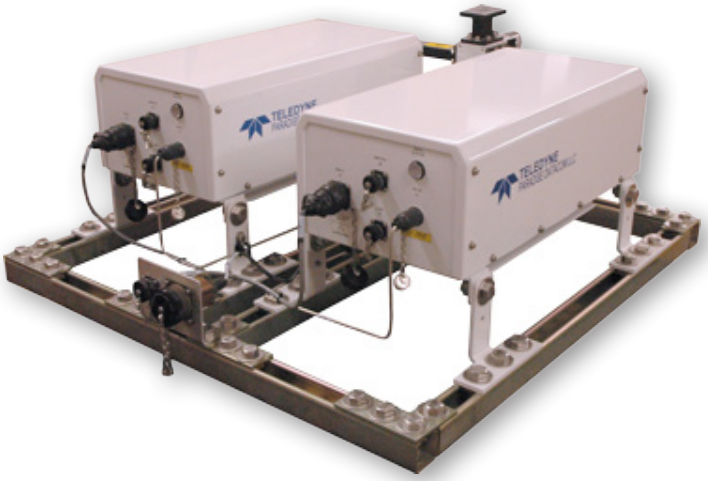
These systems can be configured in either 1:1 or 1:2 phase combined configurations. 1:2 phase combined systems provide a spare amplifier which can be switched online should an online amplifier exhibit a fault. All phase combined systems require a separate controller.

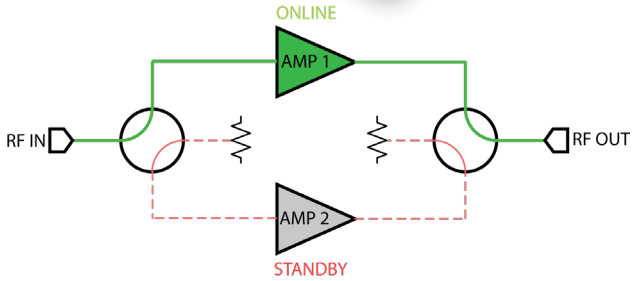
PowerMAX Systems

Several Compact Outdoor SSPAs can be configured into a modular soft-fail redundant PowerMAX system, which acts as though it were a single amplifier. The PowerMAX system provides a high level of reliability and maintainability, while offering extremely high output power levels.

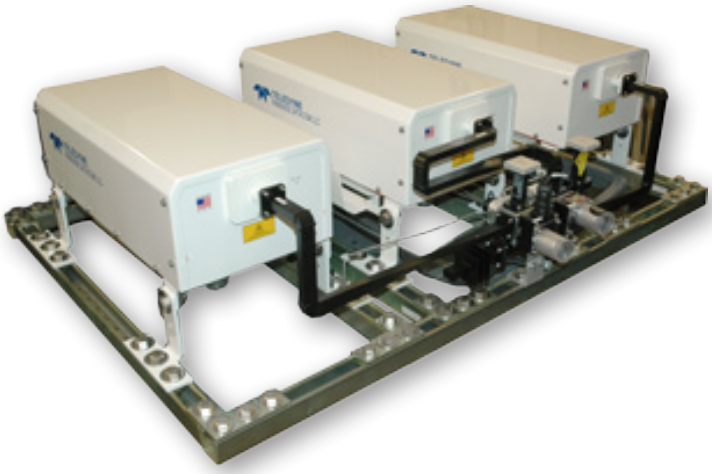


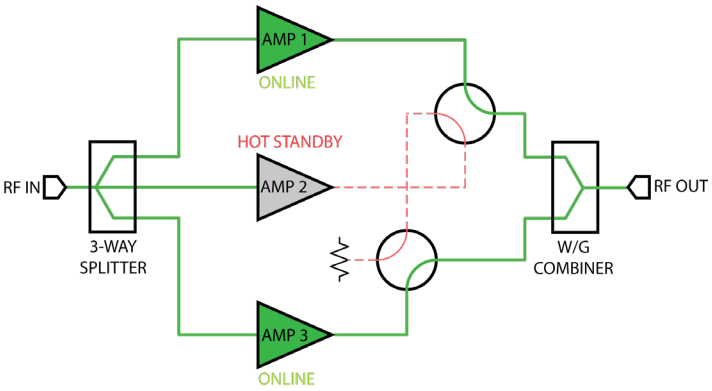
16-Module PowerMAX System with Compact Outdoor SSPAs





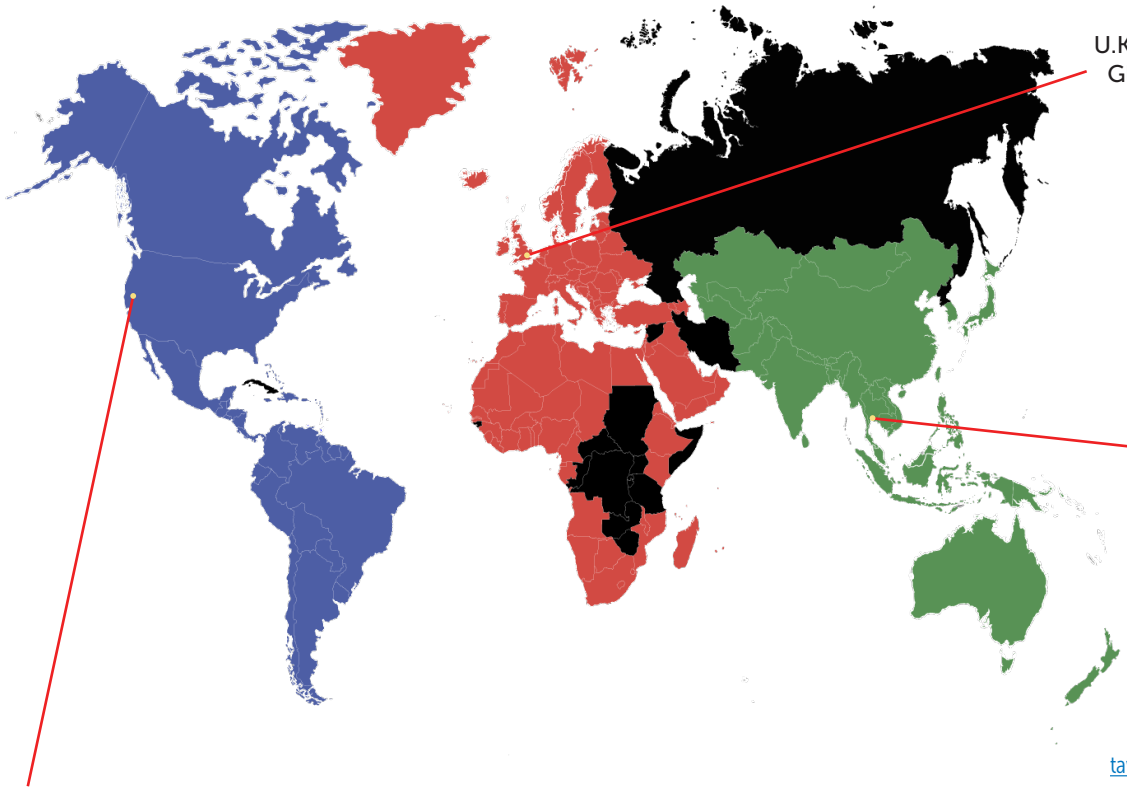
1:1 Redundant System Block Diagram with Amp 1 transmitting (online) and Amp 2 in reserve (standby).





1:2 Phase Combined System Block Diagram with Amp 1 and Amp 3 transmitting (online) to a combined output, and Amp 2 in reserve (hot standby).

Global Sales Offices



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