



PRODUCT GUIDE

ALL THE POWER YOU NEED

SSPAs & BUCs

SATCOM Broadcast · Government & Defence

SCIENCE Industrial · Scientific · Medical

SPACEBORNE



A L L T H E P O W E R Y O U N E E D





A B O U T U S

A **European technology leader** in different domains of the satellite communication value chain, from ground stations to aircraft and spacecraft communications systems. We specialise in radiofrequency, antennas and turnkey ground station solutions.

Ours is a business based on technologies developed over many years to meet customer needs. Excellent quality standards and product reliability are part of the company's identity. We invest a significant part of our turnover in R&D activities. We also work closely with the most important research centres across Europe including the **European Space Agency** and many others around the world.

We have a unique product line-up of **high-power amplifiers in solid state (SSPAs)** based on GaN technology, from tens of watts up to kW, covering very low frequency bands up to Q band for aerospace, broadcast, radar, science and 5G.

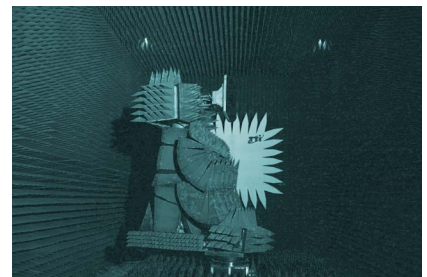
Hundreds of **GaN SSPAs** are already deployed in the field in very demanding environments. **Proprietary and unique technologies** provide high efficiency power combination techniques and multicarrier operation solutions, maximising linear power and efficiency.

We also offer a range of **Low Noise Amplifiers (LNAs)** for satcom reception links, from S to Q band.

F A C I L I T I E S

Our headquarters in Santander in Spain is **over 4000m²** in size and has a **dedicated mass production area**. We have **state-of-the-art equipment and facilities** that allow us to undertake any technological challenge.

CLEAN ROOM BONDING ROOM RF & MICROWAVE LABORATORY ANECHOIC CHAMBER PRODUCTION AREA CRYOGENIC LABORATORY CLIMATIC CHAMBER



C U S T O M E R B A S E

We work with a wide range of customers worldwide, market leaders in AEROSPACE, SATCOM & SCIENCE.



THALES



overon



indra



Q U A L I T Y & I N N O V A T I O N

ISO 9001:2015 - Certified for the DESIGN, DEVELOPMENT, PRODUCTION & INTEGRATION OF TELECOMMUNICATIONS EQUIPMENT, with a multi-site certification covering all locations.



INNOVATIVE SME STAMP - Awarded the Innovative SME stamp from the Spanish Ministry of Science & Innovation for activity in R+D+i.



I N D E X

- SATCOM -

BROADCAST - GaN based SSPAs/BUCs

	TYPE	P _{sat}	FREQUENCY	CONFIGURATION	PAGE
DBS band					
Outdoor					
SSPA/BUC	550 W	173-18.4 GHz	Standalone	11	
	300 W		2:1 redundancy system	12	
	 200 W		1:1 redundancy system	13	
SSPA	3.5 kW		Phase combined	14	
	2 kW				
	1 kW				
Indoor					
SSPA/BUC	550 W	173-18.4 GHz	Standalone	15	
	300 W		2:1 redundancy system	16	
	200 W		1:1 redundancy system	17	
SSPA	3.5 kW		Phase combined	14	
	2 kW				
	1 kW				
Ku band					
Outdoor					
SSPA/BUC	600 W	13.75-14.50 GHz	Standalone	19	
	325 W	or	2:1 redundancy system	20	
	150 W	12.75-13.25 GHz	1:1 redundancy system	21	
SSPA	600 W	12.75-14.5 GHz (Super extended)	Standalone	22	
			2:1 redundancy system	20	
			1:1 redundancy system	21	
	3.5 kW	13.75-14.50 GHz	Phase combined	23	
					2 kW
1.1 kW	12.75-13.25 GHz				
Indoor					
SSPA/BUC	600 W	13.75-14.50 GHz	Standalone	24	
	325 W	or	2:1 redundancy system	25	
	150 W	12.75-13.25 GHz	1:1 redundancy system	26	
SSPA	3.5 kW	13.75-14.50 GHz	Phase combined	23	
	2 kW	or			
	1.5 kW	12.75-13.25 GHz			
C band					
Outdoor					
SSPA/BUC	800 W	5.850- 6.425 GHz	Standalone	29	
			2:1 redundancy system	30	
			1:1 redundancy system	31	
SSPA	4.8 kW		Phase combined	32	
	2.7 kW				
	1.1 kW				
Indoor					
SSPA/BUC	800 W	5.850- 6.425 GHz	Standalone	33	
			2:1 redundancy system	34	
			1:1 redundancy system	35	
SSPA	4.8 kW		Phase combined	32	
	2.7 kW				
	1.5 kW				

I N D E X

COMMERCIAL, GOVERNMENT & DEFENCE - GaN based SSPAs/BUCs

	TYPE	Psat	FREQUENCY	CONFIGURATION	PAGE
Ka band	Outdoor				
	SSPA/BUC	40 W	29-31 GHz (Dual band)	Standalone	39

X band	Indoor				
	SSPA	300 W	79-84 GHz	Standalone	41

Q band - SSPAs/BUCs

	TYPE	Psat	FREQUENCY	CONFIGURATION	PAGE
Q band	Outdoor				
	SSPA	25 W	45-46.5 GHz	Standalone	45
	BUC		43-43.5 GHz	Standalone	46

RCU - Remote Control Unit for SSPAs/BUCs/UCs

	MODEL	OPERATION	INTERFACES	CONFIGURATION	PAGE
RCU	Outdoor				
	RCU	Up to 8 SSPAs/BUCs/UCs	RS485 / USB / RJ45	Redundant config. & Phase combined systems	49
	Indoor				
	RCU	Up to 8 SSPAs/BUCs/UCs	RS485 / USB / RJ45	Redundant config. & Phase combined systems	50

- SCIENCE -

LDMOS based SSPAs

	TYPE	Psat	FREQUENCY	OPERATING MODE	PAGE
S band	Indoor				
	SSPA	350 W	3 GHz	Pulsed wave	55
UHF band	Outdoor				
	SSPA	1.25 kW	200 MHz	Continuous wave	56
		500 W	500 MHz	Continuous wave	57

- SPACEBORNE -

GaN based SSPAs

	TYPE	Psat	FREQUENCY	APPLICATIONS	PAGE
UHF band	Spaceborne				
	SSPA	150 W	240-270 MHz	GEO	61

SATCOM



NEW GENERATION OF GaN BASED SSPAs/BUCs FOR BROADCAST SATCOM

Using cutting-edge **GaN technology**, the new SSPA/BUC family offers outstanding performance in outdoor/indoor operations

MULTICARRIER OPERATION

No memory effects and limited back off guaranteeing **unlimited carriers**.

MODULARITY

A combination in phase of SSPAs delivers **output powers up to a few kW**s on a built-in redundancy and hot swappable amplification modules.

EFFICIENCY & RELIABILITY

Super linearity for maximum useable output power to provide customised linearisation independent of the modulation method used.

Robust performance guaranteed through individual unit testing over temperature at factory. Built-in output isolator for protection against reflected power.

Advanced packaging and cooling techniques enable the equipment to be operated in the toughest environments.

Built-in up converter plus **high stability internal reference** for BUC.

MONITORING & CONTROL

Full M&C capability through RS-485/USB (ASCII commands) or with the option of an Ethernet port (Telnet, HTTP with embedded user-friendly web page or SNMP).

Discrete lines for mute and turn on/off functions and a summary alarm (Form C relay and discrete) for speedy operation.



KEY FEATURES

- * Highly efficient
- * Super high linear power
- * Multicarrier operation
- * Superior lifetime based on GaN-tech
- * High MTBF
- * Detachable power supply module
- * Redundant configurations (1:1, 2:1, N:1)
- * OPEX savings
- * Weatherproof (outdoor version)
- * Compact design
- * Simple operation & maintenance

DBS BAND

SATCOM: BROADCAST

OUTDOOR —————

GaN SSPA/BUC
300 W / 550 W

PAGE 11



OUTDOOR —————

NEW !

GaN SSPA/BUC
200 W

PAGE 11



INDOOR —————

GaN SSPA/BUC
200 W / 300 W / 550 W

PAGE 15



OUTDOOR / INDOOR —————

High power GaN SSPA
1 kW / 2 kW / 3.5 kW

PAGE 14





OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Extended temperature range: -40 °C, +55 °C
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference

ACCESSORIES & SPARES

- * Set of fans
- * Detachable power supply (300 W / 550 W)

CONTACT

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NOTICE

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ELECTRICAL

Input frequency range	950-2050 MHz (BUC)
Operating frequency range	17.3-18.4 GHz
Output power ($P_{SAT (typical)}$)	
200 W / 300 W / 550 W	53 dBm / 54.8 dBm / 57.4 dBm
Linear output power ($P_{LINEAR*}$)	
200 W / 300 W / 550 W	52 dBm / 53.8 dBm / 56.4 dBm
Gain	>75 dB
Gain flatness	4 dB p-p max over full band; 1 dB p-p max over any 40 MHz
Gain variation over temperature	±1.5 dB over full operating range
Attenuation adjustment range	20 dB in 0.25 dB step (BUC) 15 dB in 0.50 dB step (SSPA)
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Phase noise (BUC)	-65 dBc/Hz at 100Hz, -75 dBc/Hz at 1k Hz, -85 dBc at 10 kHz, -95 dBc at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, -135 dBc/Hz at 100Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz, 0 dBm ±3 dB supplied via input L-band cable
Spectral regrowth	-25 dBc @ $P_{LINEAR*}$
Spurious	-60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4 Mbaud, Roll-off: 0.25 / ModCod QPSK-3/4, Occupied Bandwidth 5 MHz, Measured @1.0 x symbol rate

POWER SUPPLY

Input voltage	90 - 264 VAC, 50 - 60 Hz
Power consumption @ Psat	
200 W / 300 W / 550 W	850 W / 1700 W / 2700 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	
200 W / 300 W / 550 W	400 x 274 x 220 mm / 550 x 450 x 278 mm / 550 x 450 x 278 mm
Weight	
200 W / 300 W / 550 W	<34 kg / 45 Kg / 60 Kg
Interfaces	RF input (L-Band + Ref. signal): N-type (f) (BUC) / SMA (f) (SSPA) RF output: WR62 grooved RF sample: SMA AC line: 3-pin MIL circular M&C: 19-pin MIL circular

MONITOR & CONTROL

Remote control	RS-485 / USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing

PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC DBS 300/550W (Qty. 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG load & coaxial load Dual WG switches (Qty. 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (Qty. 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (Qty. 1)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 3) M&C connector (SSPAs/BUCs) (Qty. 3) M&C connector (switches) (Qty. 2)
Standard outdoor frame	Mechanical horizontal frame Lateral and top covers

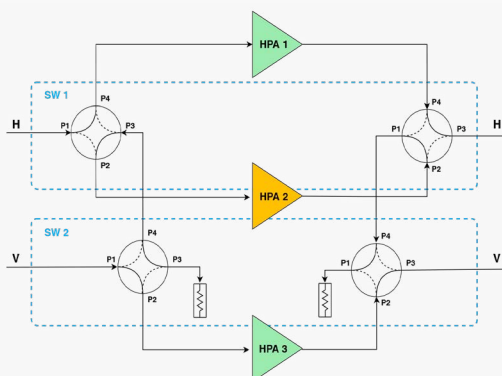
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Simple hardware installation
- * Weatherproof

OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables

SYSTEM CONFIGURATION



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PARTS INCLUDED

GaN High power transmitter	GaN SSPA/BUC DBS 200/300/550W (Qty. 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 2) M&C connector (SSPAs/BUCs) (Qty. 2) M&C connector (switch) (Qty. 1)
Standard outdoor frame	Mechanical horizontal frame Lateral and top covers



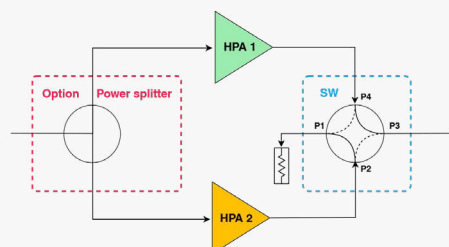
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * Simple configuration/operation
- * Simple hardware installation
- * Weatherproof

OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

SYSTEM CONFIGURATION



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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Extended temperature range: -40 °C, +55 °C
- * Receive reject filter (external)
- * Harmonic filter (external)
- * L to DBS band up-converters in 1:1 redundancy configuration (external)
- * SNMP
- * AC breaker box

ELECTRICAL

Operating frequency range	17.30 - 18.40 GHz
Output power (P_{SAT} (typical))	
1 kW / 2 kW / 3.5 kW	60 dBm / 63 dBm / 65.4 dBm
Linear output power (P_{LINEAR})	
1 kW / 2 kW / 3.5 kW	59 dBm / 62 dBm / 64.4 dBm
Gain	>70 dB
Gain flatness	<4d B p-p over full band; <1 dB p-p over any 40 MHz
Gain variation over temperature	<± 1.5 dB over full operating range
Attenuation adjustment range	30 dB in 0.25 dB step
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Spectral regrowth	-25 dBc @ P_{LINEAR} *
Spurious	-60 dBc max @ P_{LINEAR} *

* For single carrier with modulation DVB-S, 4Mbaud, roll-off: 0.25, ModCod QPSK-3/4, occupied bandwidth 5MHz, measured @1.0x symbol rate

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	
1 kW / 2 kW / 3.5 kW	<5 kW / <10 kW / <20 kW

INTERFACES & PHYSICAL

Dimensions (L x W x H)	
Outdoor	1370 x 1070 x 1000 mm (1 kW / 2 kW) / 1370 x 2000 x 1000 mm (3.5 kW)
Indoor	19" Rack cabinet 44 U (H), 1 m (D) Qty x1 (1 kW / 2 kW) Qty x2 (3.5 kW)
Interfaces	RF Input: N (f) RF Output: WR62 grooved / RF sample: SMA M&C: Ethernet or 19-pin MIL circular (outdoor) Ethernet or 15-pin D-Sub (indoor)

MONITOR & CONTROL

Remote control	RS-485 / Ethernet / Dry-Contacts / Web user interfaces
Monitor parameters	Forward & Reverse output power / Input power / Individual SSPAs output power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C (outdoor) / 0 °C to +50 °C (indoor)
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing (outdoor)

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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference
- * Air exhaust MEC interface
- * Breaker panel

ACCESSORIES & SPARES

- * Set of fans
- * Power supply module

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ELECTRICAL

Input frequency range	950 MHz - 2050 MHz (BUC) / 173 - 18.4 GHz (SSPA)
Operating frequency range	173 - 18.4 GHz
Output power ($P_{SAT (typical)}$)	
200 W / 300 W / 550 W	53 dBm / 54.8 dBm / 57.4 dBm
Linear output power ($P_{LINEAR*}$)	
200 W / 300 W / 550 W	52 dBm / 53.8 dBm / 56.4 dBm
Gain	>75 dB
Gain flatness	4 dB p-p max over full band; 1 dB p-p max over any 40 MHz
Gain variation over temperature	± 1 dB over full operating range
Attenuation adjustment range	20 dB in 0.25 dB step (BUC) 15 dB in 0.50 dB step (SSPA)
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Phase noise (BUC)	-65 dBc/Hz at 100 Hz, -75 dBc/Hz at 1 kHz -85 dBc at 10 kHz, -95 dBc at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz, 0 dBm ± 3 dB supplied via input L-band cable

Spectral regrowth -25 dBc @ $P_{LINEAR*}$

Spurious -60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied Bandwidth 5MHz, Measured @1.0x symbol rate

POWER SUPPLY

Power supply module	1RU 19" subrack: AC/DC converters (Qty. 2) hot-swappable working in redundancy
Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	
300 W / 550 W	<1700W / 2700W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 266 x 560 mm RF unit 6RU panel height. Power supply 1RU panel height
Weight	48 Kg
Interfaces	RF Input: N-type (f) (BUC) / SMA (f) (SSPA) RF Output: WR62 grooved RF Sample: SMA AC Line: IEC320 M&C: DB15 (m) Inhibit switch signal: DB9 (f)

MONITOR & CONTROL

Remote control	RS-485 / USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	0 °C to +50 °C
Storage temperature	-40 °C to +85 °C

PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC DBS 200/300/550 W (qty 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG load & coaxial load Dual WG switches (qty 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (qty 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (qty 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (qty 1)
Mating connectors	AC connector (SSPAs/BUCs) (qty 3) MS3106E20-19S M&C connector (SSPAs/BUCs) (qty 3) MS3116F14-19P M&C connector (switches) (qty 2) MS3116F14-19S
Standard outdoor frame	Mechanical frame

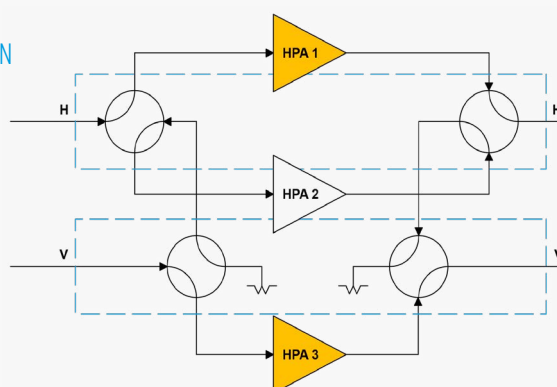
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Rack mounting

OPTIONS

- * Rack cabinet
- * Antenna switch with dummy load

SYSTEM CONFIGURATION



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PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC DBS 200/300/550 W (qty 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (qty 2)
System cabling	AC cables (SSPAs/BUCs) (qty 2) M&C cables (SSPAs/BUCs) (qty 2) M&C cable (switch) (qty 1)
Others	Breaker panel
Dimensions	19" Rack 42 U (H) x 1 m (D)

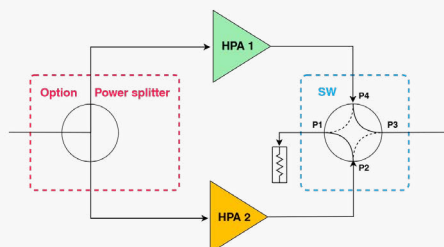
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Rack mounting

OPTIONS

- * Rack cabinet
- * Antenna switch with dummy load
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

SYSTEM CONFIGURATION



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Ku BAND

SATCOM: BROADCAST

GaN SSPA/BUC

325 W / 600 W

PAGE 19

OUTDOOR

Super extended GaN SSPA

600 W

PAGE 22



GaN SSPA/BUC

150 W

PAGE 19

OUTDOOR



GaN SSPA/BUC

150 W / 325 W / 600 W

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INDOOR



High power GaN SSPA

1 kW / 2 kW / 3.5 kW

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OUTDOOR / INDOOR





OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Extended temperature range: -40 °C, +55 °C
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference

ACCESSORIES & SPARES

- * Set of fans
- * Detachable power supply

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ELECTRICAL

Input frequency range	BUC (1) 950-1700 MHz (2) 950-1450 MHz
Operating frequency range	(1) 13.75-14.50 GHz, LO 12.80 GHz (2) 12.75-13.25 GHz, LO 11.80 GHz
Output power (P_{SAT} (typical))	
150 W / 325 W / 600 W	51.8 dBm / 55 dBm / 57.8 dBm
Linear output power ($P_{LINEAR*}$)	
150 W / 325 W / 600 W	50.8 dBm / 54 dBm / 56.8 dBm
Gain	>65 dB (SSPA) / >70 dB (BUC)
Gain flatness	3 dB p-p max over full band; 1 dB p-p max over any 40 MHz
Gain variation over temperature	±1.5 dB over full operating range
Attenuation adjustment range	25 dB in 0.25 dB step (BUC) 25 dB in 0.10 dB step (SSPA)
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Phase noise (BUC)	-65 dBc/Hz at 100Hz, -85 dBc/Hz at 1 kHz, -90 dBc/Hz at 10Hz, -95 dBc/Hz at 100 kHz,
External ref. freq. & phase noise (BUC)	10 MHz, 0 dBm ±5 dB (TX IF port multiplexed) -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz
Spectral regrowth	-25 dBc @ $P_{LINEAR*}$
Spurious	-60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied Bandwidth 5MHz, Measured @1.0x symbol rate

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	
150 W / 325 W / 600 W	680 W / 1400 W / 2600 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	
150 W / 325 W / 600 W	400 x 248 x 268 mm / 550 x 360 x 289 mm / 550 x 360 x 289 mm
Weight	
150 W / 325 W / 600 W	<28 Kg / 68.5 Kg / 68.5 Kg
Interfaces	RF Input (L-Band + Ref. signal): N (f) (BUC) / SMA (f) (SSPA) RF Output: WR75 grooved / RF sample: SMA AC Line: 3-pin MIL circular M&C: 19-pin MIL circular

MONITOR & CONTROL

Remote control	RS-485/USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing



KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Simple hardware installation
- * Weatherproof

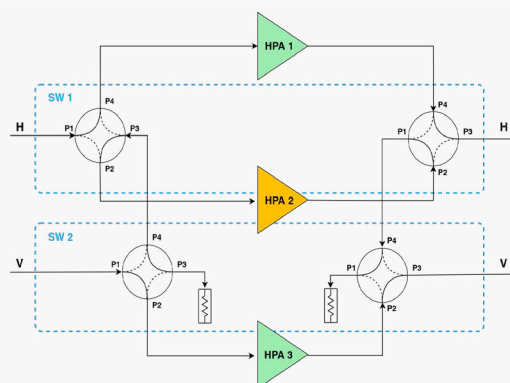
OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables

PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC Ku 325/600W (Qty. 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG load & coaxial load Dual WG switches (Qty. 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (qty 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (qty 1)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 3) M&C connector (SSPAs/BUCs) (Qty. 3) M&C connector (switches) (Qty. 2)
Standard outdoor frame	Mechanical horizontal frame Lateral and top covers

SYSTEM CONFIGURATION



CONTACT

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PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC Ku 325/600W (Qty. 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 2) M&C connector (SSPAs/BUCs) (Qty. 2) M&C connector (switch) (Qty. 1)
Standard outdoor frame	Mechanical horizontal frame Lateral and top covers

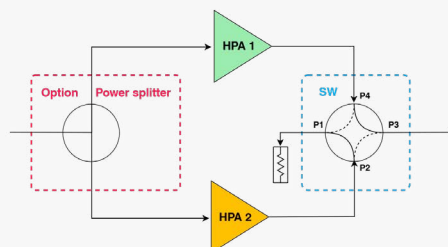
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * Simple configuration/operation
- * Simple hardware installation
- * Weatherproof

OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

SYSTEM CONFIGURATION



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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Extended temperature range: -40 °C, +55 °C
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference

ACCESSORIES & SPARES

- * Set of fans
- * Detachable power supply

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ELECTRICAL

Operating frequency range	12.75-13.25 GHz & 13.75-14.50 GHz (simultaneously)
Output power ($P_{SAT (typical)}$)	57.8 dBm
Linear output power ($P_{LINEAR*}$)	56.8 dBm
Gain	>65 dB
Gain flatness	<3 dB p-p @12.75-13.25 GHz & @13.75-14.5 GHz, <1 dB peak to peak any 40 MHz
Gain variation over temperature	± 1.5 dB over full operating range
Attenuation adjustment range	25 dB in 0.10 dB step
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Spectral regrowth	-25 dBc @ $P_{LINEAR*}$
Spurious	-60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4Mbaud, roll-off: 0.25, ModCod QPSK-3/4, occupied bandwidth 5MHz, measured @10x symbol rate

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	2600 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	550 x 360 x 280 mm
Weight	68 Kg
Interfaces	RF Input: SMA (f) RF Output: WR75 grooved / RF sample: SMA (f) AC Line: 3-pin MIL circular (RT00144PNH) M&C: 19-pin MIL circular (UT0016-19SH)

MONITOR & CONTROL

Remote control	RS-485
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing



OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Extended temperature range: -40 °C, +55 °C
- * Receive reject filter (external)
- * Harmonic filter (external)
- * L to Ku band up-converters in 1:1 redundancy configuration (external)
- * SNMP
- * AC breaker box

ELECTRICAL

Operating frequency range	13.75 - 14.50 GHz / 12.75-13.25 GHz
Output power ($P_{SAT (typical)}$)	
1.1 kW / 2 kW / 3.5 kW	60.4 dBm / 63 dBm / 65.4 dBm
Linear output power (P_{LINEAR})	
1.1 kW / 2 kW / 3.5 kW	59.4 dBm / 62 dBm / 64.4 dBm
Gain	>70 dB
Gain flatness	<4 dB p-p over full band; <1 dB p-p over any 40 MHz
Gain variation over temperature	<± 1.5 dB over full operating range
Attenuation adjustment range	30 dB in 0.25 dB step
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Spectral regrowth	-25 dBc @ P_{LINEAR} *
Spurious	-60 dBc max @ P_{LINEAR} *

** For single carrier with modulation DVB-S, 4Mbaud, roll-off: 0.25, ModCod QPSK-3/4, occupied bandwidth 5MHz, measured @1.0x symbol rate*

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	
1.1 kW / 2 kW / 3.5 kW	<5 kW / <10 kW / <20 kW

INTERFACES & PHYSICAL

Dimensions (L x W x H)	
Outdoor	1370 x 1070 x 1000 mm (1.1 kW / 2 kW) / 1370 x 2000 x 1000 mm (3.5 kW)
Indoor	19" Rack cabinet 44 U (H), 1 m (D) Qty. x1 (1.1 kW / 2 kW) Qty. x2 (3.5 kW)
Interfaces	RF Input: N (f) RF Output: WR75 grooved / RF sample: SMA M&C: Ethernet or 19-pin MIL circular (outdoor) M&C: Ethernet or 15-pin D-Sub (indoor)

MONITOR & CONTROL

Remote control	RS-485 / Ethernet / Dry-Contacts / Web user interfaces
Monitor parameters	Forward & Reverse output power / Input power / Individual SSPAs output power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C (outdoor) / 0 °C to +50 °C (indoor)
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing (outdoor)

CONTACT

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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference
- * Air exhaust MEC interface
- * Breaker panel

ACCESSORIES & SPARES

- * Set of fans
- * Power supply module

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ELECTRICAL

Input frequency range	BUC (1) 950-1700 MHz (2) 950-1450 MHz
Operating frequency range	(1) 13.75-14.50 GHz, LO 12.80 GHz (2) 12.75-13.25 GHz, LO 11.80 GHz
Output power ($P_{SAT (typical)}$)	
150 W / 325 W / 600 W	51.8 dBm / 55 dBm / 57.8 dBm
Linear output power ($P_{LINEAR*}$)	
150 W / 325 W / 600 W	50.8 dBm / 54 dBm / 56.8 dBm
Gain	>65 dB (SSPA); >70 dB (BUC)
Gain flatness	3 dB p-p max over full band; 1 dB p-p max over any 40 MHz
Gain variation over temperature	± 1 dB over full operating range
Attenuation adjustment range	25 dB 0.25 dB step (BUC) 25 dB 0.10 dB step (SSPA)
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Phase noise (BUC)	-65 dBc/Hz at 100 Hz, -85 dBc/Hz at 1 kHz, -90 dBc/Hz at 10 kHz, -95 dBc/Hz at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, 0 dBm ±5 dB (TX IF port multiplexed), -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz
Spectral regrowth	-25 dBc @ $P_{LINEAR*}$
Spurious	-60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied Bandwidth 5MHz, Measured @1.0x symbol rate

POWER SUPPLY

Power supply module	1RU 19" subrack: AC/DC converters (Qty. 1 for 150 W / Qty. 2 for 325 W/600 W) hot-swappable working in redundancy
Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	
150 W / 325 W / 600 W	680 W / 1400 W / 2600 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 266 x 601 mm (including handles) - RF unit 6RU panel height 483 x 266 x 561 mm (without handles) - RF unit 6RU panel height Power supply 1RU panel height
Weight	45 Kg
Interfaces	RF Input: N-type (f) (BUC) / SMA (f) (SSPA) RF Output: WR75 grooved RF Sample: SMA AC Line: IEC320 M&C: DB15 (m) Inhibit switch signal: DB9 (f)

MONITOR & CONTROL

Remote control	RS-485 / USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	0 °C to +50 °C
Storage temperature	-40 °C to +85 °C

PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC Ku 150/325/600W (Qty. 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG load & coaxial load Dual WG switches (Qty. 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (Qty. 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (Qty. 1)
System cabling	AC cables (SSPAs/BUCs) (Qty. 3) M&C cables (SSPAs/BUCs) (Qty. 3) M&C cables (switches) (Qty. 2)
Others	Breaker panel
Dimensions	19" Rack 42 U (H) x 1 m (D)

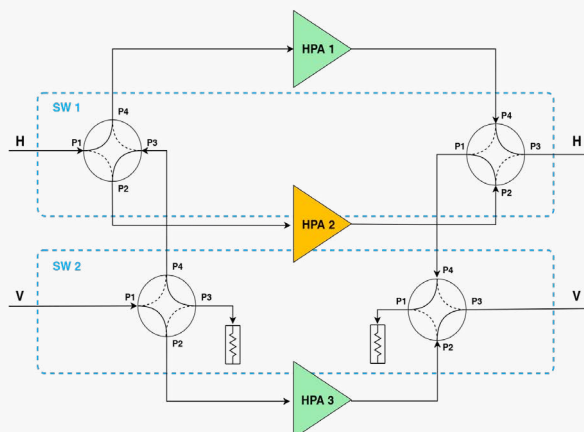
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Rack mounting

OPTIONS

- * Rack cabinet
- * Antenna switch with dummy load

SYSTEM CONFIGURATION



CONTACT

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KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Rack mounting

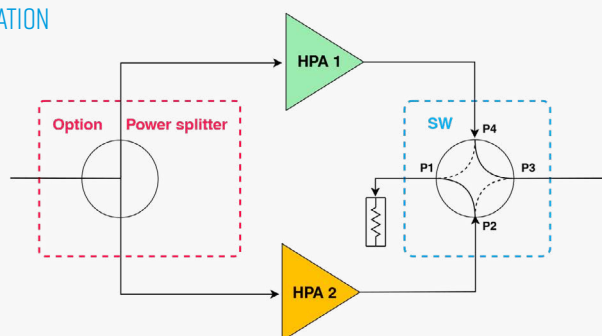
OPTIONS

- * Rack cabinet
- * Antenna switch with dummy load
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

PARTS INCLUDED

GaN High power transmitter	GaN SSPA/BUC Ku 150/325/600W (Qty. 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
System cabling	AC cables (SSPAs/BUCs) (Qty. 2) M&C cables (SSPAs/BUCs) (Qty. 2) M&C cable (switch) (Qty. 1)
Others	Breaker panel
Dimensions	19" Rack 42 U (H) x 1 m (D)

SYSTEM CONFIGURATION



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A L L T H E P O W E R Y O U N E E D

C BAND

SATCOM: BROADCAST

GaN SSPA/BUC

800 W

OUTDOOR

PAGE 29



GaN SSPA/BUC

800 W

INDOOR

PAGE 33



High power GaN SSPA

1.5 kW / 2.7 kW / 4.8 kW

OUTDOOR / INDOOR

PAGE 32





OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Ethernet port
- * Extended temperature range: -40 °C, +55 °C
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference

ACCESSORIES & SPARES

- * Set of fans
- * Detachable power supply

ELECTRICAL

Input frequency range	BUC 950-1525 MHz
Operating frequency range	5.85 - 6.425 GHz, LO 4.9 GHz
Output power ($P_{SAT (typical)}$)	59 dBm
Linear output power (P_{LINEAR})	58 dBm
Gain	>70 dB
Gain flatness	3 dB p-p max 1 dB p-p max over any 40 MHz
Gain variation over temperature	± 1.5 dB over full operating range
Attenuation adjustment range	25 dB in 0.1 dB step
Input VSWR	$\leq 1.5:1$
Output VSWR	$\leq 1.3:1$
Phase noise (BUC)	-75 dBc/Hz at 100 Hz, -90 dBc/Hz at 1 kHz, -100 dBc/Hz at 10 kHz, -100 dBc/Hz at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, 0 dBm ± 5 dB (TX IF port multiplexed) -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz
Spectral regrowth	-25 dBc @ P_{LINEAR} *
Spurious	-60 dBc max @ P_{LINEAR} *

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied Bandwidth 5MHz, Measured @1.0x symbol rate

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	3000 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	442 x 424 x 302 mm
Weight	45 Kg
Interfaces	RF Input (C-Band + Ref Signal): N (f) RF Output: CPR-137-G Grooved / RF Sample: SMA AC Line: 3-pin MIL circular (RT00144PNH) M&C: 19-pin MIL circular (UT0016-19SH)

MONITOR & CONTROL

Remote control	RS-485/USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing

CONTACT

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KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual & automatic mode
- * User-friendly configuration/operation
- * Simple hardware installation
- * Weatherproof

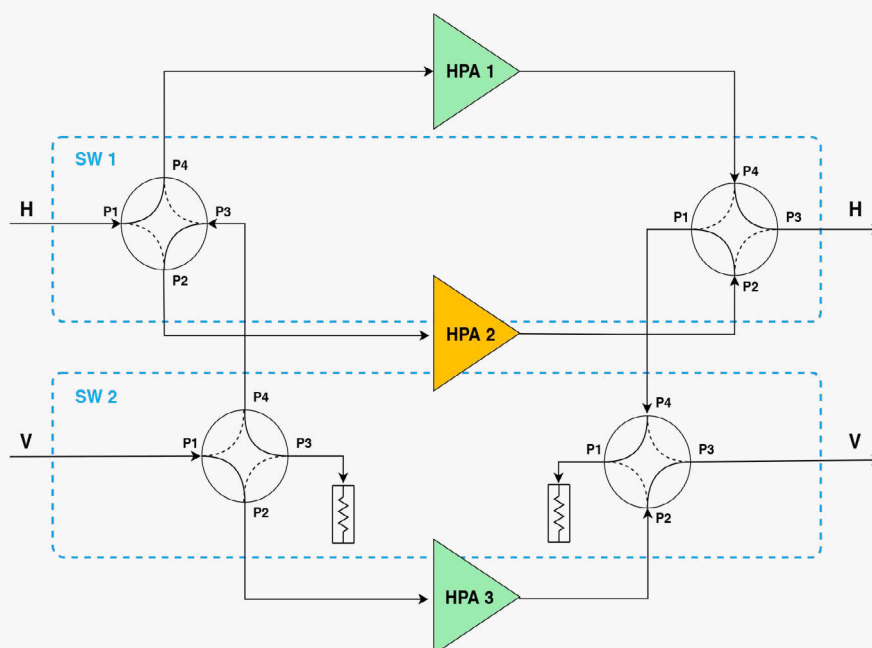
OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables

PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC Ku 800 W (Qty. 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG load & coaxial load Dual WG switches (Qty. 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (Qty. 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (Qty. 1)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 3) M&C connector (SSPAs/BUCs) (Qty. 3) M&C connector (switches) (Qty. 2)
Standard outdoor frame	Mechanical horizontal frame Lateral and top covers

SYSTEM CONFIGURATION



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PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC C 800 W (Qty. 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (Qty. 2)
Mating connectors	AC connector (SSPAs/BUCs) (Qty. 2) M&C connector (SSPAs/BUCs) (Qty. 2) M&C connector (switch) (Qty. 1)
Standard outdoor frame	Mechanical horizontal frame

KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual and automatic mode
- * Simple configuration/operation
- * Simple hardware installation
- * Weatherproof

OPTIONS

- * Vertical frame
- * Custom frame
- * Antenna switch with dummy load
- * Outdoor redundancy system controller
- * System cables
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

CONTACT

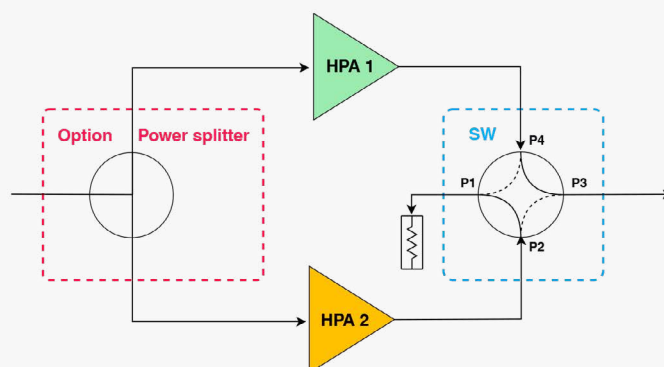
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SYSTEM CONFIGURATION





OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port

OPTIONS

- * Extended temperature range: -40 °C, +55 °C
- * Receive reject filter (external)
- * Harmonic filter (external)
- * L to C band up-converter (external)
- * SNMP
- * AC breaker box

ELECTRICAL

Operating frequency range	5.85 - 6.425 GHz
Output power (P_{SAT} (typical))	61.2 dBm
1.5 kW / 2.7 kW / 4.8 kW	61.8 dBm / 64.3 dBm / 66.8 dBm
Linear output power (P_{LINEAR})	59 dBm
1.5 kW / 2.7 kW / 4.8 kW	60.8 dBm / 63.3 dBm / 65.8 dBm
Gain	>70 dB
Gain flatness	<3 dB p-p over full band; <1 dB p-p over any 40 MHz
Gain variation over temperature	<± 1.5 dB over full operating range
Attenuation adjustment range	20 dB in 0.25 dB step
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Spectral regrowth	-30 dBc @ P_{LINEAR} *
Spurious	-60 dBc max @ P_{LINEAR} *

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, occupied bandwidth 5 MHz, measured @1.0x symbol rate

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	<4600 W
1.5 kW / 2.7 kW / 4.8 kW	<5 kW / <10 kW / <20 kW

INTERFACES & PHYSICAL

Dimensions (L x W x H)	
Outdoor	1370 x 1070 x 1000 mm (1.1 kW / 2.7 kW) / 1370 x 2000 x 1000 mm (4.8 kW)
Indoor	19" Rack cabinet 44 U (H), 1 m (D)
	Qty x1 (1.5 kW / 2.7 kW)
	Qty x2 (4.8 kW)
Interfaces	RF Input: N (f)
	RF Output: CPR-137 Grooved / RF sample: SMA
	M&C: Ethernet or 19-pin MIL circular (outdoor)
	Ethernet or 15-pin D-Sub (indoor)

MONITOR & CONTROL

Remote control	RS-485 / Ethernet / Dry-Contacts / Web user interfaces
Monitor parameters	Forward & Reverse output power / Input power / Individual SSPAs output power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C (outdoor) / 0 °C to +50 °C (indoor)
Storage temperature	-40 °C to +85 °C
Humidity	100 % condensing (outdoor)

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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port
- * Input RF calibrated sample port

OPTIONS

- * Ethernet port
- * Redundant systems 1:1, 2:1, N:1
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * SNMP
- * High stability internal reference
- * Air exhaust MEC interface
- * Breaker panel

ACCESSORIES & SPARES

- * Set of fans
- * Power supply module

ELECTRICAL

Input frequency range	BUC 950-1525 MHz
Operating frequency range	5.85 - 6.425 GHz, LO 4.9 GHz
Output power ($P_{SAT (typical)}$)	59 dBm
Linear output power ($P_{LINEAR*}$)	58 dBm
Gain	>70 dB
Gain flatness	3 dB p-p max over full band; 1 dB p-p max over any 40 MHz
Gain variation over temperature	± 1.5 dB over full operating range
Attenuation adjustment range	20 dB 0.1 dB step
Input VSWR	≤1.5:1
Output VSWR	≤1.3:1
Phase noise (BUC)	-75 dBc/Hz at 100Hz, -90 dBc/Hz at 1 kHz, -100 dBc/Hz at 10Hz, -100 dBc/Hz at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, 0 dBm ±5 dB (TX IF port multiplexed), -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz
Spectral regrowth	-25 dBc @ $P_{LINEAR*}$
Spurious	-60 dBc max @ $P_{LINEAR*}$

* For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied Bandwidth 5MHz, Measured @1.0x symbol rate

POWER SUPPLY

Power supply module	1RU 19" subrack: AC/DC converters (qty 2) hot-swappable working in redundancy
Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	<3000 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 266 x 518 mm - RF unit 6RU panel height Power Supply 1RU panel height
Weight	35 Kg
Interfaces	RF Input: N-type (f) (BUC) / SMA (f) (SSPA) RF Output: CPR-137-G Grooved RF Samples: N-type (f) AC Line: IEC320 M&C: DB15 (m) / DB9 (f) for inhibit switch signal

MONITOR & CONTROL

Remote control	RS-485 / USB
Monitor parameters	Forward & Reverse output power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input-output power

ENVIRONMENTAL

Operating temperature	0 °C to +50 °C
Storage temperature	-40 °C to +85 °C

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PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC C 800 W (Qty 3)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switches WG loads Dual WG switches (Qty 2): system output port at WG switch
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (qty 2)
RF cabling	Coaxial SMA-SMA/SMA-N cables from switches to SSPAs/BUCs (qty 3) Coaxial SMA-SMA cable from switch 1 to switch 2 (qty 1)
System cabling	AC cables (SSPAs/BUCs) (qty 3) M&C cables (SSPAs/BUCs) (qty 3) M&C cables (switches) (qty 2)
Others	Breaker panel
Dimensions	19" Rack 42 U (H) x 1 m (D)

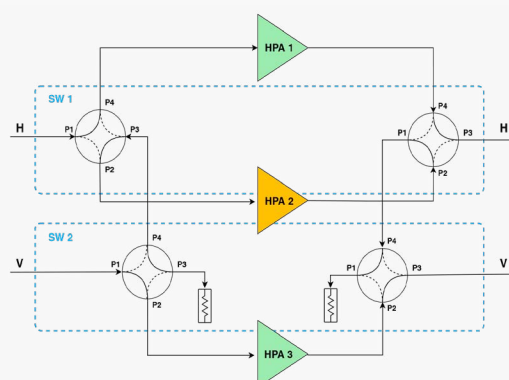
KEY FEATURES

- Based on GaN high power transmitter
- Robust redundancy performance
- Web interface for remote control
- Manual and automatic mode
- User-friendly configuration/operation
- Rack mounting

OPTIONS

- Rack cabinet
- Antenna switch with dummy load

SYSTEM CONFIGURATION



CONTACT

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www.ttinorte.com

NOTICE

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PARTS INCLUDED

GaN high power transmitter	GaN SSPA/BUC C 800 W (Qty 2)
Redundancy WG assembly outdoor kit	WG sections from SSPA/BUC outputs to WG switch WG load WG switch (system output port at WG switch)
Redundancy system controller	Standard controller (indoor) 2U-high 19" sub rack (indoor) Ethernet port USB local port Dual internal power supply Cabling: AC cables (1.5 m long) (qty 2)
System cabling	AC cables (SSPAs/BUCs) (qty 2) M&C cables (SSPAs/BUCs) (qty 2) M&C cable (switch) (qty 1)
Others	Breaker panel
Dimensions	19" Rack 42 U (H) x 1 m (D)

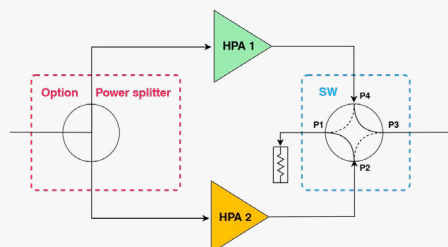
KEY FEATURES

- * Based on GaN high power transmitter
- * Robust redundancy performance
- * Web interface for remote control
- * Manual and automatic mode
- * User-friendly configuration/operation
- * Rack mounting

OPTIONS

- * Rack cabinet
- * Antenna switch with dummy load
- * Coaxial power splitter
- * Coaxial cables from power splitter to SSPAs/BUCs

SYSTEM CONFIGURATION



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A L L T H E P O W E R Y O U N E E D

NEW GENERATION OF GaN BASED SSPAs/BUCs FOR COMMERCIAL, GOVERNMENT & DEFENCE SATCOM

Using cutting-edge **GaN technology**, the new Ka/X SSPA/BUC family offers outstanding performance in outdoor/indoor operations

INNOVATIVE TECHNOLOGY

State-of-the-art technology offering outstanding performance in a compact packaging. **High reliability** solutions for harsh environmental and operational conditions.

Options to increase the number of power stages and achieve **higher output powers**.

EFFICIENCY & RELIABILITY

Super linearity for maximum useable output power to provide customised linearisation independent of the modulation method used.

Robust performance guaranteed through individual unit testing over temperature at factory. Built-in output isolator for protection against reflected power.

Advanced packaging and cooling techniques enable the equipment to be operated in the toughest environments.

MONITORING & CONTROL

Full M&C capability through RS-485/USB (ASCII commands) and an Ethernet port (Telnet, HTTP with embedded user-friendly web page or SNMP).

Discrete lines for mute and turn on/off functions and a summary alarm (Form C relay and discrete) for speedy operation.



KEY FEATURES

- * Highly efficient
- * Super high linear power
- * Multicarrier operation
- * Superior lifetime based on GaN-tech
- * High MTBF
- * Redundant configurations (1:1, 2:1, N:1)
- * Simple operation & maintenance

Ka BAND

SATCOM: COMMERCIAL,
GOVERNMENT & DEFENCE

GaN SSPA/BUC

40 W

OUTDOOR

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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Pressure window
- * Output RF calibrated sample port
- * Ethernet port

OPTIONS

- * High stability internal reference
- * Extended temperature range: -40 °C to +60 °C
- * Redundant systems
- * Remote M&C Panel
- * SNMP

ACCESSORIES & SPARES

- * Set of fans

ELECTRICAL

Input frequency range	1-2 GHz
Operating frequency range	29-30 GHz / 30-31 GHz (electronically switchable)
Output power ($P_{SAT (typical)}$)	46 dBm @ 29-30 GHz / 45 dBm @ 30-31 GHz
Linear output power (P_{LINEAR})	43 dBm @ 29-30 GHz / 42 dBm @ 30-31 GHz
Gain	>70 dB
Gain flatness	4 dB p-p max over full band, 1 dB p-p max over any 40 MHz
Gain stability over 24 hours	± 0.25 dB @ constant temperature
Gain variation over temperature	± 1.5 dB over full operating range
Attenuation adjustment range	20 dB in 0.1 dB step
Input VSWR	$\leq 1.5:1$
Output VSWR	$\leq 1.3:1$
Phase noise (BUC)	-63 dBc/Hz at 100 Hz (BUC), -73 dBc/Hz at 1 kHz, -83 dBc/Hz at 10 kHz (BUC), -93 dBc/Hz at 100 kHz
External ref. freq. & phase noise (BUC)	10 MHz, 0 dBm ± 5 dB (TX IF port multiplexed), -135 dBc/Hz at 100 Hz, -155 dBc/Hz at 1 kHz, -160 dBc/Hz at 10 kHz
Spectral regrowth	-30 dBc @ $P_{LINEAR} *$
Spurious	-60 dBc max @ P_{LINEAR}

** For single carrier with modulation DVB-S, 4Mbaud, Roll-off: 0.25, ModCod QPSK-3/4, Occupied bandwidth 5 MHz, Measured @1.0x symbol rate*

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	350 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	340 x 210 x 170 mm
Weight	<15 kg
Interfaces	RF Input (L-Band + Ref Signal): N-type (f) RF Output: WR28 AC Line: 3-pin MIL Circular (MS3102R10SL-3P) M&C: RS-485: 19-pin (MS3112E14-19S) Ethernet (17-150214) USB (17-200781)

MONITOR & CONTROL

Remote control	RS-485 / USB / Ethernet
Monitor parameters	Forward & Reverse output power / Reflected power / Input power / Temperature / Summary alarms
Internal self protection	Temperature (>75 °C) / Input level / Reflected power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C

CONTACT

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X BAND

SATCOM: COMMERCIAL,
GOVERNMENT & DEFENCE

INDOOR

GaN SSPA

300 W

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OTHER FEATURES

- * Automatic Control Mode: AGC, ALC
- * Monitoring: input, forward & reverse output power
- * Ethernet

OPTIONS

- * Redundant systems 1:1, 2:1, N:1
- * SNMP
- * Indoor controller
- * Receive reject filter (external)
- * Harmonic filter (external)
- * Air exhaust MEC interface (air cooling)
- * Breaker panel

CONTACT

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ELECTRICAL

Operating frequency range	7.9 - 8.4 GHz
Output power ($P_{SAT (typical)}$)	55 dBm
Output power ($P_{LINEAR (typical)}$)	52 dBm
3 rd order IMD (2 tones 5 MHz apart*)	-25 dBc @ P_{LINEAR}
Gain @ P_{SAT}	>60 dB
Gain flatness	±1.0 dB p-p max
Gain stability over 24 hours	±0.25 dB @ constant temperature and drive level
Gain variation over temperature	±1.5 dB over the whole range
Attenuation adjustment range	20 dB whit in 0.1 dB steps
Input VSWR	<1.3:1
Output VSWR	<1.3:1
Mute	>45 dB
Noise power density	-75 dBm/Hz between 7.9 – 8.4 GHz -140 dBm/Hz between 7.25 – 7.75 GHz (with external RX rejected filter)
Spurious @ P_{LINEAR}	-65 dBc
Harmonics @ P_{LINEAR}	-60 dBc
AM/PM conversion	<2 °/dB up to P_{LINEAR}

* As for MIL-STD-188-164B: the max. combined transmit power of 2 equal amplitude CW carriers when any individual intermodulation product power is -25 dB relative to the combined power of the 2 CW carriers

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	800 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 266 x 560 mm - RF unit 6RU panel height (air cooling) 343 x 120 x 508 mm - 343 x 120 x 684 mm with pipes (water cooling)
Weight	<23 kg
Interfaces	RF Input: N (f) RF Output: WR112 (CPR-112) RF Forward output sample: N (f) M&C: RJ45 (f) & DB15 (f) AC Input: 3-pin C14 (m), 90-260 VAC, 6A, 50/60 Hz Water cooling interface: quick connect coupling connectors System status: tricolour status LED
Coolant (liquid)	Fluid: inhibited glycol / distilled water mixture Inlet temperature: 20 °C to 30 °C Inlet pressure: < 5 bar

MONITOR & CONTROL

Remote control	RS-232 / RS-485 / Ethernet
Monitor parameters	Input power / Output forward & reverse power / Temperature / Summary alarms
Internal self protection	Temperature (>85 °C) / Reflected power / High input or output power

ENVIRONMENTAL

Operating temperature	0 °C to +50 °C
Storage temperature	-40 °C to +85 °C

A L L T H E P O W E R Y O U N E E D

NEW GENERATION OF SSPAs/BUCs FOR LOAD PULL & SATELLITE COMMUNICATIONS

Using **cutting-edge technology**, the new Q SSPA/BUC family offers outstanding performance in outdoor operation

INNOVATIVE TECHNOLOGY

State-of-the-art technology offering outstanding performance in a compact packaging. **High reliability** solutions for harsh environmental and operational conditions.

EFFICIENCY & RELIABILITY

Robust performance guaranteed through individual unit testing over temperature at factory. Built-in output isolator for protection against reflected power.

Advanced packaging and cooling techniques enable the equipment to be operated in the toughest environments.

MONITORING & CONTROL

Full M&C capability through RS-485/USB (ASCII commands) and an Ethernet port (Telnet, HTTP with embedded user-friendly web page or SNMP).

Discrete lines for mute and turn on/off functions and a summary alarm (form C relay and discrete) for speedy operation.



KEY FEATURES

- * Satcom & load pull applications
- * Highly efficient
- * High MTBF
- * Redundant configurations (1:1, 2:1, N:1)
- * Weatherproof
- * Compact design
- * Simple operation & maintenance

Q BAND

SATCOM & LOAD PULL

OUTDOOR

SSPA

25 W

PAGE 45

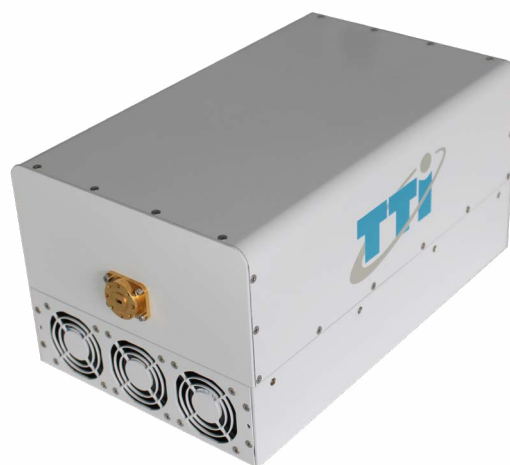


OUTDOOR

BUC

25 W

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OPTIONS

- * Ethernet port
- * Extended temperature range:
-40 °C to +60 °C
- * Monitoring: forward & reverse
output power
- * Redundant systems
- * Remote M&C Panel
- * Automatic Control Mode:
AGC, ALC
- * Output RF calibrated sample port
- * SNMP

ACCESSORIES & SPARES

- * Set of fans

ELECTRICAL

Operating frequency range	45 - 46.5 GHz (other sub-bands upon request)
Output power (P_{SAT} (typical))	44 dBm (45-46.5 GHz)
Gain	>70 dB
Gain flatness	± 1.5 dB p-p max over any 40 MHz
Gain stability over 24 hours	± 0.25 dB @constant temperature
Gain variation over temperature	± 1.5 dB over the whole range
Attenuation adjustment range	25 dB in 0.1 dB steps
Input VSWR	<1.5:1
Output VSWR	<1.3:1
Mute	>45 dB
Spurious	<-60 dBc

POWER SUPPLY

Input voltage	90-264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	495 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	340 x 210 x 170 mm
Weight	12.6 kg
Interfaces	Input: WR22 (UG599/U or UG-383/U) Output: WR22 (UG599/U or UG-383/U) AC Line: 3-pin MIL circular M&C: RS 4885, Ethernet upon request

MONITOR & CONTROL

Remote control	RS-485/USB
Monitor parameters	Input power / Temperature / Summary alarms
Internal self protection	Temperature (>75 °C) / Input level / Reflected power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40°C to +85°C

CONTACT

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OPTIONS

- * Ethernet port
- * Extended temperature range: -40 °C to +60 °C
- * Monitoring: forward & reverse output power
- * Redundant systems
- * Remote M&C Panel
- * Automatic Control Mode: AGC, ALC
- * Output RF calibrated sample port
- * SNMP

ACCESSORIES & SPARES

- * Set of fans

ELECTRICAL

Input frequency range	950-1450 MHz
Operating frequency range	43-43.5 GHz
Output power ($P_{SAT (typical)}$)	44 dBm
Gain	>60 dB
Gain flatness	± 1.5 dB p-p max (SSPA) / ± 0.5 dB p-p max over any 40 MHz
Gain stability over 24 hours	± 0.25 dB @ constant temperature
Gain variation over temperature	± 2 dB over the whole range
Attenuation adjustment range	30 dB in 0.25 dB steps
Input VSWR	<1.5:1
Output VSWR	<1.3:1
Mute	>60 dB
Phase noise	As per IESS-308/309
External ref. freq. & phase noise	10 MHz / 0 dBm ± 5 dB. Multiplexed on L-band input SMA (F) 50 Ω upon request
Spurious	<-60 dBc

POWER SUPPLY

Input voltage	264 VAC, 50-60 Hz
Power consumption @ P_{SAT}	495 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	340 x 210 x 170 mm
Weight	12.3 kg
Interfaces	Input (L-band + external reference): N-type (f) Output: WR22 UG-383/U or UG599/U AC Line: 3-pin MIL circular M&C: RS-485, Ethernet upon request

MONITOR & CONTROL

Remote control	RS-485/USB
Monitor parameters	Input power / Temperature / Summary alarms
Internal self protection	Temperature (>75 °C) / Input level / Reflected power

ENVIRONMENTAL

Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C

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REMOTE MONITORING & CONTROL UNIT FOR THE NEW GENERATION OF GaN BUCs/SSPAs/UCs

Using universal protocols, the unit **remotely monitors and controls redundant and phased combine SSPAs/BUCs/UCs configurations** for outdoor/indoor operation

CONFIGURABILITY

Field configurable for managing and controlling a **variety of redundancy applications: 2:1, 1:1 & 1:0 and 1+1 phase combination.**

OPERATIVITY

Full remote M&C capability of BUCs/SSPAs/UCs and switches configured in the system through **TCP/IP web interface embedded in the RCU.**

COMMUNICATION PROTOCOL

Communication with the system by **USB (local interface)**, RS485 (4 wire or 2 wire) serial ports or Ethernet sockets with two ports, by default 7001 and 8001.

REDUNDANT SUPPLY

Dual internal power supply working in redundancy maintain RCU performance when one power supply fails.



KEY FEATURES

- * Management of redundant configurations (1:1, 2:1)
- * Management of phased combination (1+1) (outdoor version)
- * Management of standalone units
- * RS485, USB & Ethernet interfaces
- * Embedded secure web interface
- * Fault & alarms interfaces
- * Redundant power supply
- * Compact design
- * Weatherproof (outdoor version)
- * Outdoor/indoor operation

RCU

M&C SSPA/BUC/UC SYSTEMS

Remote Control Unit

Redundant systems · Phase combined

OUTDOOR

PAGE 49



Remote Control Unit

Redundant systems

INDOOR

PAGE 50



LOCAL INTERFACES

Controls

Local / Remote
Manual / Automatic
Channel selection
Waveguide switches
RF Inhibit Enable / Disable
User attenuation
SSPA external On / Off
Mute TX On / Off
Set alarm thresholds
Fault reset

Status LED

Manual
Auto
Alarm
Fault

Local / Remote monitoring
Presence
Fault State
Mute TX On / Off
Forward State

REMOTE INTERFACES

Communication

RS485 ASCII Command under proprietary packet format
USB (type A) ASCII Command under proprietary packet format
ETH (RJ45) ASCII Command under proprietary packet format
Web interface
SNMP interface (optional)

M&C

Form-C contacts (RCU) Summary Fault
Summary Alarm
Global On / Off
Global mute

Supply

AC line (2 inputs) 3-pin MIL Circular

RF*

RF input SMA (f)
RF output SMA (f) (qty 2)
RF input user sample SMA (f)
RF output user samples (FWD, REV) - SMA (f) (qty 2)
RF DIFF user sample SMA (f)

**Only for 1+1 phase combined*

OPERATING CONFIGURATIONS

1:1 systems 1:1 redundant SSPAs/BUCs/UCs
2:1 systems 2:1 redundant SSPAs/BUCs/UCs
1+1 systems 1+1 phase combined
Standalone unit SSPA/BUC/UC (up to 3 standalone units)

ENVIRONMENTAL

Dimensions (L x W x H) 404 x 220 x 151 mm
Weight 11.5 kg
Supply 180-305 VAC, 47-63 Hz
Operating temperature -30 °C to +55 °C
Storage temperature -40 °C to +85 °C

OTHER FEATURES

- Simple operation & maintenance
- Periodic firmware upgrades

OPTIONS

- UPC-Uplink power control
- SNMP protocol
- Slave control unit (indoor)

CONTACT

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NOTICE

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LOCAL INTERFACES

Controls	Status LED
Local / Remote	Manual
Manual / Automatic	Auto
Channel selection	Alarm
Waveguide switches	Fault
RF Inhibit Enable / Disable	Local / Remote monitoring
User attenuation	
SSPA external On / Off	
Mute TX On / Off	
Set alarm thresholds	
Fault reset	
	Presence
	Fault State
	Mute TX On / Off
	Forward State

REMOTE INTERFACES

Communication

RS485	ASCII Command under proprietary packet format
USB (type A)	ASCII Command under proprietary packet format
ETH (RJ45)	ASCII Command under proprietary packet format
	Web interface
	SNMP interface (optional)

M&C

Form-C contacts (RCU)	Summary Fault
	Summary Alarm
	Global On / Off
	Global mute

Supply

AC line (2 inputs)	3-pin MIL Circular
--------------------	--------------------

RF*

RF input	SMA (f)
RF output	SMA (f) (qty 2)
RF input user sample	SMA (f)
RF output user samples	(FWD, REV) - SMA (f) (qty 2)
RF DIFF user sample	SMA (f)

**Only for 1+1 phase combined*

OPERATING CONFIGURATIONS

1:1 systems	1:1 redundant SSPAs/BUCs/UCs
2:1 systems	2:1 redundant SSPAs/BUCs/UCs
1+1 systems	1+1 phase combined
Standalone unit	SSPA/BUC/UC (up to 3 standalone units)

ENVIRONMENTAL

Dimensions (L x W x H)	404 x 220 x 151 mm
Weight	11.5 kg
Supply	180-305 VAC, 47-63 Hz
Operating temperature	-30 °C to +55 °C
Storage temperature	-40 °C to +85 °C

OTHER FEATURES

- * Simple operation & maintenance
- * Periodic firmware upgrades

OPTIONS

- * UPC-Uplink power control
- * SNMP protocol
- * Slave control unit (indoor)

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A L L T H E P O W E R Y O U N E E D



SCIENCE

NEW GENERATION OF LDMOS BASED SSPAS FOR INDUSTRIAL, SCIENTIFIC & MEDICAL APPLICATIONS

Using ruggedized **LDMOS technology**, the new CW / PW SSPA family offers outstanding performance in indoor operations

COOLING FLEXIBILITY

Air and liquid cooling solutions available.

MODULARITY

Combination in phase of SSPAs delivers **output powers up to a few kW**s on amplification modules.

EFFICIENCY & RELIABILITY

Super linearity for maximum useable output power to provide customised linearity characteristics.

Robust performance guaranteed through individual unit testing over temperature at factory.

Built-in output isolator for protection against full reflected power.

MONITORING & CONTROL

Discrete digital and analog signal interfaces for telemetries, commands and alarms.



KEY FEATURES

- * Highly efficient
- * Super high linear power
- * Superior lifetime based on LDMOS-tech
- * High MTBF
- * Compact design
- * Simple operation & maintenance
- * User friendly LED indicators/display for local control
- * Fault & alarm interfaces
- * Standard 19" rack mounting
- * ISM uses: industrial, scientific & medical

S BAND SCIENCE

INDOOR

PW LDMOS SSPA

350 W

PAGE 55



UHF BAND SCIENCE

INDOOR

CW/PW LDMOS SSPA

1.25 kW

PAGE 56



INDOOR

CW LDMOS SSPA

500 W

PAGE 57



ELECTRICAL

Input frequency range	3 GHz $\pm$ 5 MHz
Operating mode	Pulsed wave
Output power ($P_{1\text{ dB (typical)}}$)	55.44 dBm
Gain	> 57 dB
Gain flatness	< 1 dB
Input level (nominal)	-2 dBm to 4 dBm
Attenuation adjustment range	6 dB
Input VSWR	<1.4:1
Output VSWR	Full reflection all phases
Pulse characteristics	Pulse width: 100 ms max. Duty cycle: 10 % max. Rise/fall time: <50 ns

POWER SUPPLY

Input voltage	AC 100-264 VAC 50/60 Hz
Power consumption @ P_{SAT}	<1200 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 88 x 322 mm / 19" Standard, 2U height
Weight	11 kg
Interfaces	RF input: N-type (f), 50 Ω RF output: N-type (f), 50 Ω RF sample: SMA-type (f), 50 Ω AC line: IEC C14 w/ filter, fused Trigger: BNC-type (f), 50 Ω M&C: Dsub-25 (f)

MONITOR & CONTROL

Remote control	Discrete analog / Digital signals
Monitor parameters	Output power / Alarms: current, power supply, temperature & overduty
Internal self protection	Temperature / Fan failure / Overduty / PS failure

ENVIRONMENTAL

Operating temperature	10 $^{\circ}$ C to 40 $^{\circ}$ C
Storage temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Humidity	90 % non-condensing

OTHER FEATURES

- * Air cooled
- * Standard 19" rack mounting

OPTIONS

- * Customizable input level range
- * Customizable attenuation adjustment range

CONTACT

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OTHER FEATURES

- * Liquid cooled
- * Standard 19" rack mounting

ELECTRICAL

Input frequency range	200 MHz $\pm$ 5 MHz
Operating mode	Continuous / Pulsed wave
Output power ($P_{1\text{dB (typical)}}$)	61 dBm peak, 58.45 dBm average
Gain	71 dB
Gain flatness	<1 dB
Non-linear phase distortion	<5°
Input level (nominal)	-10 dBm
Output VSWR	Full reflection all phases
Pulse characteristics	Duty cycle: any, respecting maximum average output power Repetition rate: from CW to 1 MHz Rise/fall time: <100 ns

POWER SUPPLY

Input voltage	400 V AC $\pm$ 10 %, 50/60 Hz, 3P + N + E
Wall plug efficiency @ P_{SAT}	>50%
Power consumption @ P_{SAT}	<2500 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 176 x 557 mm / 19" Standard, 4U height
Weight	25 kg
Interfaces	RF input: N-type (f), 50 Ω RF output: 7/16"-type (f), 50 Ω RF samples: N-type (f), 50 Ω AC line: IEC 309 (m), 3P + N + E M&C: 2 x circular industrial (f)
Coolant	Fluid: DI water Inlet temperature: 15 °C to 30 °C Flow: >4 l/min Inlet pressure: <5 bar Pressure drop: <1 bar

MONITOR & CONTROL

Remote control	Discrete analog / Digital signals
Monitor parameters	Input, output, direct, reverse power / Alarms: current, power supply & overdrive
Internal self-protection	Current/ Power supply / Temperature/ Overdrive

ENVIRONMENTAL

Operating temperature	10 °C to 45 °C
Storage temperature	-40 °C to +85 °C
Humidity	90 % non-condensing

CONTACT

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OTHER FEATURES

- * Liquid cooled
- * Standard 19" rack mounting

OPTIONS

- * Customizable input level range
- * Customizable attenuation adjustment range

ELECTRICAL

Input frequency range	500 MHz $\pm$ 5 MHz
Operating mode	Continuous wave
Output power ($P_{1\text{ dB (typical)}}$)	57 dBm
Gain	57 dB
Gain flatness	< 1 dB
Input level (nominal)	0 dBm
Attenuation adjustment range	1 dB (manual)
Input VSWR	<1.3:1
Output VSWR	Full reflection all phases
Spurious	<-60 dBc
Harmonics	2fo $\leq$ -40 dBc / 3fo $\leq$ -60 dBc

POWER SUPPLY

Input voltage	AC 100-264 VAC 50/60 Hz
Power consumption @ P_{SAT}	<1800 W

INTERFACES & PHYSICAL

Dimensions (W x H x D)	483 x 133 x 492 mm / 19" Standard, 3U height
Weight	15.5 kg
Interfaces	RF input: N-type (f), 50 Ω RF output: N-type (f), 50 Ω AC line: IEC C14 w/ filter, fused M&C: Dsub-25 (f), Dsub-15 (m)
Coolant	Fluid: DI Water Inlet temperature: 15 $^{\circ}$ C to 30 $^{\circ}$ C Flow: > 3.5 l/min Inlet pressure: < 5 bar Pressure drop: < 1 bar

MONITOR & CONTROL

Remote control	Discrete analog / Digital signals
Monitor parameters	Output power / Current / Alarms: current, power supply & temperature

ENVIRONMENTAL

Operating temperature	10 $^{\circ}$ C to 40 $^{\circ}$ C
Storage temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Humidity	90 % non-condensing

CONTACT

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NOTICE

Information contained in this document is subject to change without notice.
Unless otherwise specified, tests have been done at 23 $^{\circ}$ C.

SPACEBORNE

NEW GENERATION OF GaN BASED SSPAs FOR SPACE MISSIONS

Using cutting-edge **GaN technology**, the new UHF SSPA offers outstanding performance with space qualification

EFFICIENCY & RELIABILITY

Based on **GaN technology** the equipment is capable to deliver **150 W** with high DC to RF conversion efficiency.

High linearity for maximum useable output power to provide customised linearisation independent of the modulation method used.

Robust performance guaranteed through individual fully space qualification.

HIGH FUNCTIONALITY & COMPACT PACKAGING

Supplied with a dedicated DC-DC converter with integrated EMI filter and **highly efficient** and **low spurious operation**. The system includes galvanic isolation and several protections against under-voltage, RF overdrive and output load mismatch (built-in isolator).

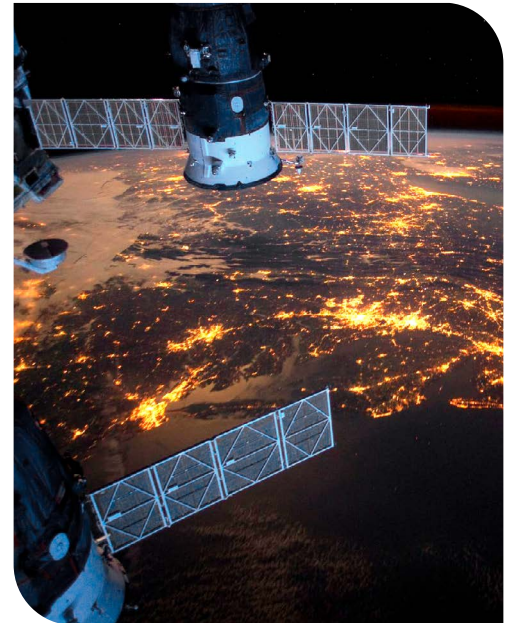
Availability of fully automatic operating modes as closed loop fixed gain mode operation (FGM) and overdrive limiting control (OLC).

MONITORING & CONTROL

Commanded by high level pulsed signals in which several analog telemetry signals are implemented in a **compact** and **low weight design** for this band.

HERITAGE

Commissioned as a payload equipment in several **commercial** and **military** programs.



KEY FEATURES

- * Fully space qualified
- * Highly efficient
- * Improved linearity
- * High MTTF
- * Compact design
- * Flexible output power & fixed gain mode
- * Overdrive protection
- * Built-in DC-DC converter & regulator
- * Analog telemetry signals
- * Radiation tolerance
- * EMC performance qualified

UHF BAND

SPACEBORNE

GaN SSPA

150 W

SPACEBORNE

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COMPETITIVE ADVANTAGES

- * Cost effective solution
- * Space qualified HiRel-tech with flight heritage
- * High power SSPA with 100 W power
- * Compatible with all types of orbits: LEO, MEO, GEO & Near Earth

OPTIONS

- * UHF filter/duplexer
- * Several interface options
- * ALC mode
- * Flexible output power by command
- * Compatible with most the main satellite platforms: available in 22-50 V and 70-100 V versions

CONTACT

sales@ttinorte.es
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ELECTRICAL

Operating frequency range	240 MHz - 270 MHz
Output power ($P_{SAT (typical)}$)	>52 dBm
Linear output power (P_{LINEAR})	49,5 dBm
Gain flatness	0,5 dB p-p max over full band; 0,1 dB p-p max over any 25 kHz
Gain variation over temperature	$\pm 0,2$ dB over full operating range
Input VSWR	$\leq 1,22:1$
Output VSWR	$\leq 1,25:1$
NPR	>15 dB @ P_{LINEAR}
Spurious	-75 dBc max @ P_{SAT}
Harmonic generation	-55 dBc max

POWER SUPPLY

Input voltage	100 VDC compatible with other buses
Power consumption @ P_{SAT}	225 W

INTERFACES & PHYSICAL

Dimensions (L x W x H)	245 x 325 x 57 mm
Weight	4,2 kg
Interfaces	RF Input: SMA (f) RF Output: TNC (f) DC Bus & TM/TC: 26-pin sub-D

MONITOR & CONTROL

Remote control	ON/OFF command with high level pulse signal
Monitor parameters	Analog 5V telemetry (input current, primary and secondary voltage, RF output power)
Other monitoring	Independent temperature sensing

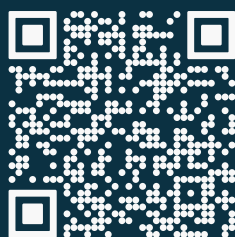
ENVIRONMENTAL

Flight temperature	-30 °C to +60 °C
1st natural frequency	>500 Hz
Vibration	9,5 gRMS (X,Y) / 18 gRMS (Z)
Shock response spectra	Up to 10000 Hz and 1300 g

A L L T H E P O W E R Y O U N E E D







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