

NewSpace S-Band Transceivers [PRELIMINARY]

Rakon's NewSpace S-Band Transceiver is low SWaP (Size, Weight and Power) full-duplex piece of equipment. It is designed for TT&C¹ and high data rate communications between satellites (inter-satellite links) or between satellites and ground stations.

The NewSpace S-Band Transceiver operates over commercial frequency ranges and only needs passive external antennas to be fully operational. The equipment is highly configurable and provides flexibility around changing data rates and frequencies on-orbit.

Rakon provides two NewSpace Transceivers products, >1-year equipment for short missions and >5-year equipment for long missions.

Key Features

- Full duplex communication
- In-flight re-configurable frequency range (Tx/Rx)
- In-flight re-configurable data rate
- Triple safety watchdog
- Low power consumption (<12 W on Tx)
- Max. Tx & Rx baud rate: 5 Mbps
- CAN-bus and RS-422 interfaces to onboard systems
- RF output power of up to 33 dBm (2 W)
- Supply voltage range: 5 – 28 VDC

Configuration

- Short or long missions
- Receiver/Transmitter operating frequency
- Downlink data rate
- Transmitter power, modulation
- RF connector type, position and orientation

95 x 95 x 50 mm



RF Specifications

Parameter	Condition / Remarks	Short missions	Long missions
Transmission frequency range		2.2 to 2.29 GHz	
Reception frequency range		2 to 2.1 GHz	
Maximum output power		2 W (33 dBm)	
Frequency stability		0.5ppm / 1 st year	2ppm / 12 years
Supported modulations		BPSK / QPSK / GMSK	

Electrical Specifications

Parameter	Condition / Remarks	Short missions	Long missions
Supply voltage			
Supply voltage		6 V	Isolated DC-DC converter with a 22/37V input range
Power amplifier		5 V	
Current consumption	@25°C		
Receiving mode		200 mA @6V, 10 mA @5V	TBD
Transmitting mode (CW)		200 mA @6V, 2000 mA @5V	TBD

Environmental Conditions

Parameter	Condition / Remarks	Short missions	Long missions
Operating temperature		-20°C to +60°C	-20°C to +60°C
Non-operating temperature	Qualification	-30°C to +70°C	-30°C to +70°C
Total Ionizing Doze (TID)		> 1 year	50kRad
SEE		> 1 year	No SEL up to LET = 43 MeV/mg/cm ²
Lifetime		> 1 year	12 years

¹ TT&C: Telemetry, Tracking, and Control.

Interface specifications

Parameter	Condition / Remarks	Short missions	Long missions
CAN			
Maximum data rate		1 Mbps	
Protocol		CSP	
Connectors		CSP	TBD
RS 485			
Maximum data rate		5 Mbps	
Connectors		Molex or Harwin	TBD
RF			
Maximum Tx data rate	Transfer frame level	5 Mbps	
Maximum Rx data rate	Transfer frame level	5 Mbps	
Supported protocols		CSP + Sync. word CCSDS USLP AX. 25	
Channel encoding options		RS + Convolutional LDPC	
Connectors		SMA or MMCX	TBD

Mechanical specifications

Parameter	Condition / Remarks	Short missions	Long missions
Mass		250 g	300 g
Dimensions		95 x 95 x 50 mm	95 x 95 x 60 mm

Qualification and Acceptance testing for Short & Long mission variants

Test	Condition / Remarks	Qualification testing	Acceptance testing
Functional		✓	✓
Vibration		✓	-
Mechanical shocks		✓	-
Thermal cycling		✓	✓
Thermal vacuum		✓	-

Documentation package

Document	Condition / Remarks	Short missions	Long missions
Test report	One report per batch of equipment	✓	✓
Radiation test report	Shared during Part Control Board	-	✓