

## SSTRX-3000 Satellite TM/TC Unit

The **SSTRX-3000** TM/TC Unit provides the full-duplex telemetry and telecommand interface between the satellite and its ground station. The **SSTRX-3000** TM/TC Unit has been designed specifically as a compact, low cost unit for use with low-earth-orbit (LEO) satellites. It operates in S-Band, is fully redundant, and is compliant with ECSS/CCSDS Standards. The SSTRX-3000 is an ECSS Class 3 equipment.

The SSTRX-3000 TM/TC Unit comprises two Transceivers and an RFDU in a small and compact form factor. Overall weight is approx.. 7.5 kgs. The unit is finished in a flat black polyurethane coating (Aeroglaze Z306 / Z307), but can be delivered also with other finishes. RF connectors are nonmagnetic, Type SMA (MIL-C-39012), Supply, Data/Monitor and HP-Command connectors are non-magnetic, sub-miniature Type HD (NASA GSFC-S-311). The receiver and transmitter are supplied via separate DC/DC-converters, fed via EMI-Filters to reduce reflected ripple current to within the limits set by MIL-STD-461C.

**RFDU** A typical RFDU comprises two diplexing filters to enable the TM/TC Units to transmit and receive using one communications link and a 3 dB power divider to connect the diplexer to the two antennas, e.g. for omnidirectional coverage. Further configuration arrangements would be available upon request.

**RECEIVERS** The receiver accepts an up-link signal in the frequency range 2,025 to 2,110 MHz. The up-link modulation can be 2/4 kbps on a 8/16 kHz subcarrier, SP-L or BPSK (QPSK) at data rates from 2 kbps up to 256 kbps (1 Mbps). The receivers are optimized for low power consumption in the order of 4 Watts, typical.

**TRANSMITTERS** The transmitter provides a down-link carrier in the frequency band 2,200 to 2,290 MHz, phase-modulated by the telemetry data in either SP-L, BPSK or (O)QPSK. DVB-S2 over CCSDS could be made available. Data rates from 10 kHz up to 6 Mbps with output power in range +20 dBm to +33 dBm at the antenna port(s) are available.

### Transmitter

Transmit Frequency	in range 2200 - 2290 MHz
Transmit Frequency Stability	better than $\pm 10$ ppm
Spurious Emission/Harmonics	less than -60 dBc
Carrier Phase Noise (10Hz less than 1 <sup>o</sup> rms to 1MHz)	
Transmit Power at Antenna Port	100 mW to 2 W
Modulation SP-L	up to 100 kbps
Modulation BPSK	up to 2 Mbps
Modulation (O)QPSK	up to 6 Mbps

### Receiver

Receive Frequency	in range 2025 - 2110 MHz
Receive LRF Stability	better than $\pm 10$ ppm
Carrier Tracking Range	$\pm 150$ kHz
Carrier Acquisition	20 to 60 kHz/s -130 dBm
Bit Error Rate (10-5)	4 kbps -120 dBm
Bit Error Rate (10-5)	4 Mbps -106 dBm
Modulation Index	0.5 to 1.5 rads

### Power

Supply Voltage	in range +16 to +40 volts
Power Consumption (TX) at 1 W o/p-power	16 Watt
Power Consumption (RX)	4 Watt

### Environment

Temperature Range Operational	-30° to +60°C
Vibration 10 - 2000 Hz Random	18 grms