

KaTE (Ka band Transponder Experiment)

KaTE Operational data sheet

Functionality

X band uplink frequency range 7145-7235 MHz
 X band downlink freq range 8400-8500 MHz
 Ka band downlink freq range 31900-32300 MHz

Compatibility ESA and NASA DSN

	KaTE Flight Model
Mass	4.7 kg
Dimensions	Length x Breadth x Height 185mm x 220 mm x 142 mm
Power	Rx only: 15.6 W Rx & X and Ka band Tx: 28.0 W

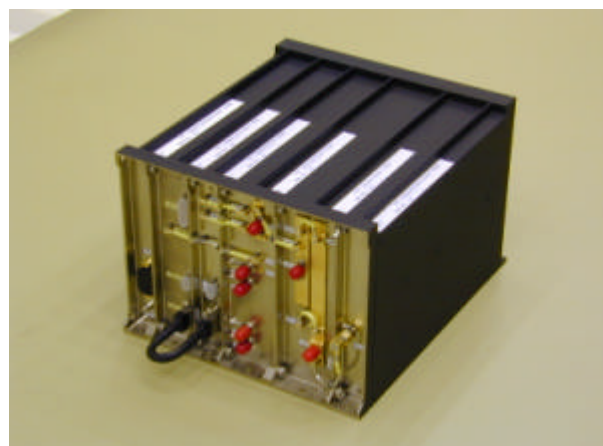
Key performance parameters

X-band Reception (Uplink)

Receiver center frequency 7194.676698 MHz (Channel 42)
 Rest Frequency Stability: $\pm 2 * 10^{-6}$ (-40°C to 85°C)
 (long term stability $\pm 1 * 10^{-6}$)
 Noise Figure < 1.4 dB (Tsystem <113 k)
 Input Signal Level Range -70 to -150 dBm
 Carrier Acquisition Level : -148 dBm
 Carrier Tracking Threshold -151 dBm for safe tracking
 Carrier tracking range +/- 500 kHz around BLF
 550 Hz/s ; max rate 16 Hz/s²
 Carrier Tracking Loop Noise BW 2 BLo = 19 Hz \pm 20 %
 Subcarrier demodulation 8 or 16 kHz
 Bit detection performance 0.6 dB for 16 kHz:
 TC data rate 7.8125 to 4000 bps



KaTE TRSP with X and Ka band antennas and interconnecting RF cables



X and Ka band Transmission (Downlink)

Output RF centre frequency : 8453.024225 MHz
 32121.49350 MHz
 RF Output Signal Level X-Band : + 9 dBm
 Ka-Band: + 20 dBm
 RF Output Level Stability $\pm 2 * 10^{-6}$ (-40°C to 85°C)
 TM format NRZ-L, NRZ-M, SP-L
 PCM/PSK/PM, PSK/PM
 TM coding RS, CE, Turbo code
 (1/2, 1/3, 1/4 and 1/6 rate)
 TM RS frame length 223, 446, 892, 1115 Octets
 TM modulation index 0.1 to 1.4 radians
 Ranging modulation index 0.01 to 0.7 radians
 TM subcarrier frequency 31.45 KHz
 DOR- Modulation
X-TX DOR:
 2 MHz MI = 0.74 rads
 16 MHz MI = 0.64 rads
Ka-TX- DOR:
 2 MHz MI = 0.78 rads
 16 MHz MI = 0.64 rads

Operating temperature range -20°C to +60°C
 Total radiation dose 12 krads