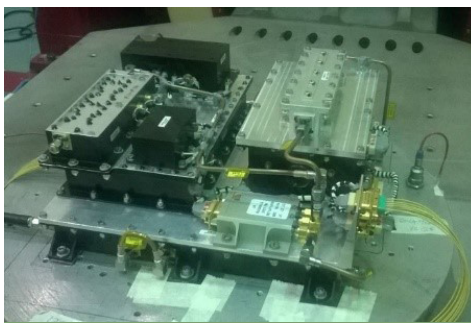


## Frequency Programmable C-Band and Ku-Band TT&C Transmitters

U R Rao Satellite Centre (URSC) of Indian Space Research Organisation (ISRO) has developed a Frequency Programmable C-Band and Ku-Band TT&C Transmitters with flexibility of programming the onboard frequency through commands from Ground station. This feature makes management of telemetry downlink frequencies easy in case of orbit relocation. It also enables production of transmitters in advance for missions where frequency coordination may be finalized just before launch.



Frequency Programmable  
C-Band TT&C Transmitter

### Salient Features

- ✦ Frequency Programmable with a resolution of 610 Hz in the range of 4185 – 4200 MHz.
  - ✦ Fixed (Predefined) and Onboard programmable frequency Options.
  - ✦ Compatible with CCSDS Standards.
- 
- ✦ Phase locked loop based carrier generation and Phase modulation.
  - ✦ 16 bit command for frequency.
  - ✦ Low power mode for On orbit.
  - ✦ High power mode for Transfer orbit.

## Major Specifications

- ✦ Carrier Frequency : 4,185 – 4,200 MHz
- ✦ Frequency Stability :  $\pm 2$  ppm (Over temperature)
- ✦ Output Power :  $\geq +25$  dBm [Low power],  $\geq +34$  dBm High power]
- ✦ Phase Noise : Better than -75 dBc/Hz @ 10 KHz offset
- ✦ Modulation Scheme : Phase Modulation
- ✦ Subcarrier Frequency : 4 KHz – 150 KHz
- ✦ Modulation Index : 0.9 rad  $\pm$  20%
- ✦ Harmonics & Spurious :  $< -50$  dBc
- ✦ DC Power Consumption : Raw bus voltage of 70V,  $< 11$  W [low power mode],  $< 30$  W [high power mode]; Raw bus voltage of 42V,  $< 5$  W [low power mode],  $< 22$  W [high power mode];
- ✦ Operating Temperature :  $-25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$

## Technology Transfer

URSC/ISRO offers to transfer this technology of Frequency Programmable C-Band and Ku-Band TT&C Transmitters to industries in India with adequate experience and facilities. Industries interested in obtaining knowhow may write giving details of their present activities, infrastructure and facilities.

Technology Transfer & Industry Coordination Division (TTID),  
Programme Planning and Evaluation Group (PPEG),

📍 U R Rao Satellite Centre (URSC), ISRO, HAL Airport Road,  
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