Virtual integrated baseband V-IBB for Satellite Tracking, Telemetry & Telecommand (TT&C)

FAST, FLEXIBLE & RELIABLE COMMUNICATION BETWEEN THE SATELLITE CONTROL CENTRE & SATELLITE

Applications

Baseband equipment for reception of housekeeping and payload telemetry from GEO and LEO satellites, and transmission of telecommands to GEO and LEO satellites

Ranging of GEO and LEO satellites

Automated satellite test, like TT&C SCOE, ATE, EGSE

Main functionality

Number of receivers / transmitters: 1 or 2

2 interface ports (Main & Alternate) per receiver / transmitter

Carrier acquisition, tracking and demodulation (up to 10 Msymb/s)

- PM/PSK/PCM, FM/PSK/PCM
- PM/PCM, FM/PCM
- BPSK, QPSK, OQPSK, GMSK, 8PSK (incl. 4D-TCM)
- Spread spectrum (chip rate <= 10 Mchips/s; data rate <= 100 ksymb/s)

Telemetry subcarrier demodulation and bit synchronization

Codecs: Convolutional, Reed Solomon, Turbo, LDPC, BCH

Processing of Telecommand data, subcarrier generation and modulation

Uplink carrier generation and modulation (up to 10 Msymb/s)

- PCM/PSK/PM, PCM/PSK/FM
- PCM/PM, PCM/FM
- BPSK, QPSK, OQPSK, GMSK, 8PSK (incl. 4D-TCM)
- Spread spectrum (chip rate <= 10 Mchips/s; data rate <= 100 ksymb/s)

Generation and reception of ranging tones and ranging code with associated delay measurement; processing of ranging data

Doppler and Doppler rate measurements

Local and remote monitoring and control

Data logging

TM simulator

Spectrum analyser for real-time analysis of the received input spectrum

Key benefits

Easy and flexible to use resulting in reduced CAPEX and OPEX

- Direct interface at 70 MHz, L-band and/or S-band (no need of extra frequency up/down converters, cost efficient)
- Easy (re)configuration due to the modular software defined radio architecture and the intuitive graphical user interface

Operational reliability resulting in improved total cost of ownership (TCO)

- Limited number of hardware elements
- Most functions are software based including modulation and demodulation
- Linux based PC platform

Extremely short acquisition time, even in challenging receiving conditions like low signal/noise, Doppler, ...

Field proven heritage (Globalstar, O3b, Proba, NAOS, MTSat, ...)

- Proven interoperability with the most common protocols for satellite control centres, which allows for smooth integration in ground stations
- RF over IP interface allowing RF sampling very close to the antenna and TT&C processing at a remote centralised location

Interfaces

Direct RF interface

Rx	Tx
70 MHz +/- 10 MHz	70 MHz +/-10 MHz
950 MHz to 2050 MHz	950 MHz - 2050 MHz
2200 MHz to 2300 MHz	2025 MHz - 2250 MHz
other frequencies on request	other frequencies on request

Exchange of TM data, TC data, RNG data and Doppler data with the Station Control Centre via an Ethernet interface using the TCP /IP protocol (SLE, MCS2BBE, Others on request).

Time (IRIG-B) & Frequency (10 MHz) external interfaces

Test Systems interfaces (RS422, EDEN, others on request)

Environmental / power

Operating temperature: +10 °C to +40 °C

Storage temperature: -20 °C to +60 °C

Relative humidity: 40 % to 90 % non-condensing

Power supply: 90 - 265 V, 47 - 63 Hz

The equipment is CE compliant

Physical dimensions

The IBB equipment consists of two components

Server

- 19" rack mountable, height 2U
- Dimensions (W x H x D): 44.54 x 8.8 x 68 cm

Front End (Sampler)

- 19" rack mountable, height 1U
- Dimensions (W x H x D): 43.7 x 4.4 x 47 cm (without handles)

Related product

LSAT-X digitizer (coming soon)

2b2 is an inverse IBB, which tests the ground segment by simulating the satellite

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