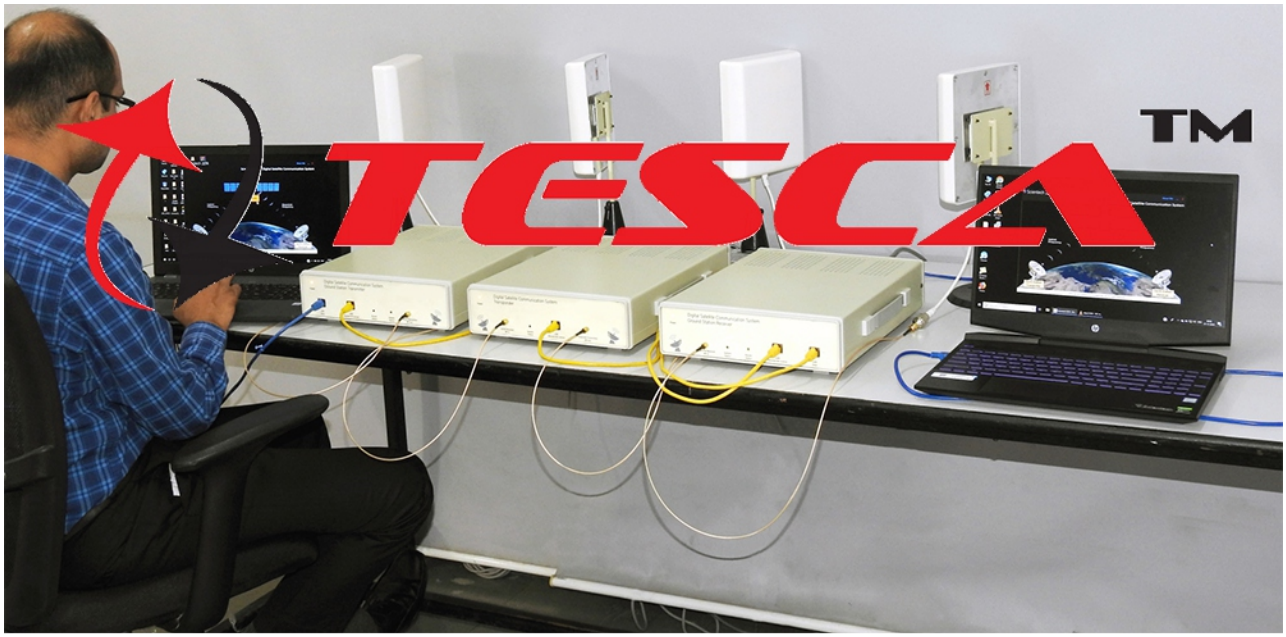

Satellite communication uses artificial satellites to provide communication links between single or various points on earth. It plays a vital role in the global telecommunication system. Digital satellite communication can be defined as a system through which data transmission and television services are delivered using the Internet protocol suite over a packet-switched network instead of being delivered through traditional terrestrial, satellite signal, and cable television formats.

10203C is a experimental platform with unique features, which provide a practical approach to understand the concepts of digital satellite communication system. It offers opportunity for in depth practical learning of digital satellite communication system blocks like, digital video transmission, forward error correction encoder and decoder, baseband modulator and demodulator, RF up convertor and RF down convertor, transponder, antenna directivity, etc.

10203C is designed to learn modern telecommunications technologies using a fully operational digital satellite communication training system link.

Features

01. Transmitting & receiving digital audio/video signals via IP router using UDP streaming
02. Ethernet port for PC communication
03. Supports direct & satellite link
04. Built in real time software
05. Baseband signal analysis of I & Q channel
06. Dual 500 MSPS 16-bit D/A converters for I channel and Q channel
07. Control setting for individual blocks
08. Built-in RF-up & RF down converters
09. Built-in low-noise frequency synthesizer
10. Detachable directive dish antenna at each station
11. Internal test data mode for BER concept
12. Portable design
13. User configurable RF frequency range, from 400 MHz – 3 GHz

Object

01. Complete practical understanding of end to end video transmission link between transmitter and receiver.
    Learning : Understand the complete flow of line of sight video transmission.
02. Complete practical understanding of end to end audio transmission link between transmitter and receiver.
    Learning : Understand the complete flow of line of sight audio transmission.
03. Practical realization of base-band modulation & demodulation.
    Learning : Study
    - Types of digital base-band modulation like BPSK and QPSK.
    - Data rate during internal data mode.
    - I-Q modulated signal in time and frequency domain.
04. To perform the bit error rate measurement using Internal test data mode.
    Learning : Observe
    - I-Q digital symbols.
    - Synchronization and BER measurement at the receiver end.
05. Understanding carrier to noise ratio (C/N).
    Learning : Measure the C/N using spectrum

Note: Specifications are subject to change.

26.02.2024
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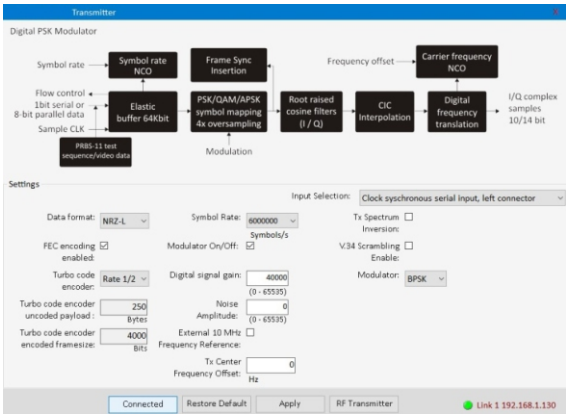
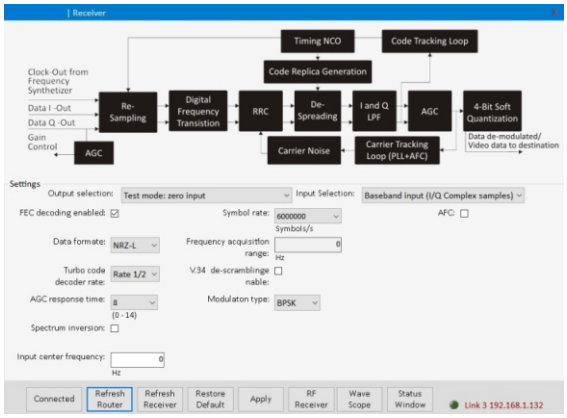
analyzer.

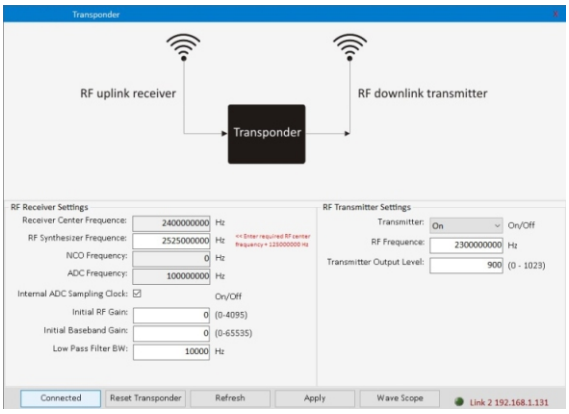
06. Study of complete system using Software controlled switch faults.
    Learning : Add various switch fault effects like I-Q signal gain up-link and down-link frequency setting between transmitter, transponder and receiver. Impairments such as noise and doppler effect (carrier NCO frequency offset).
07. Study of directivity of an antenna in satellite communication system.
    Learning : Move the antenna on the go and will be able to see its effect on the recovered video at the receiver end.



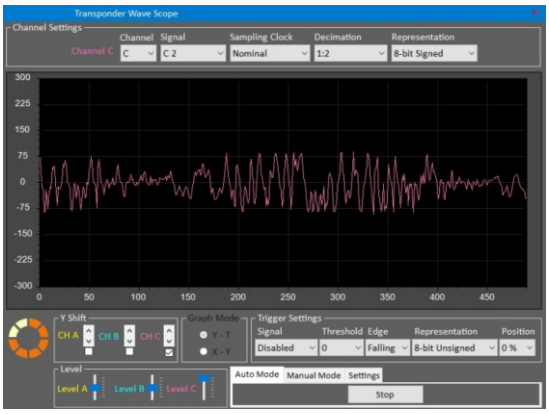
Ground station transmitter graphical user interface



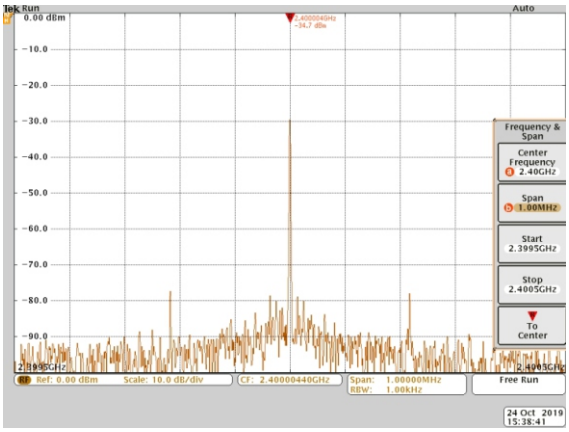
Ground station receiver graphical user interface



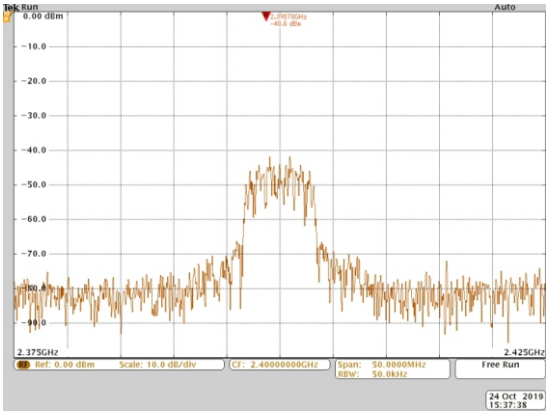
Transponder graphical user interface



Built in Wave Scope to observe baseband signal



Unmodulated carrier observed on Spectrum Analyzer



Modulated carrier observed on Spectrum Analyzer

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Technical Specifications

Ground station transmitter

Connectivity

- IP router (10/100Mbps)

Protocol

- UDP streaming
- A CRC is attached to each transmitted IP packet for error detection at the receiving end. 1-bit
- serial streams are HDLC encoded and scrambled.
- Supports audio and video standards format Forward error correction with variable rate and data scrambling

Baseband modulation

- PSK

I & Q channel DAC & analog filter

Resolution

- 16-bit per channel

Sampling frequency

- 500 Msamples/s

Analog LPF 3dB bandwidth

- +/- 13MHz

RF frequency band

- 400MHz –3 GHz

Transponder

RF Frequency band

- 400 MHz - 3 GHz RF up converter
- 400 MHz - 3 Ghz RF down converter

Ground station receiver

Connectivity

- IP router (10/100Mbps)

Protocol

- UDP streaming supports audio and video standards format
- Forward error correction with variable rate and data scrambling

Baseband de-modulation

- PSK

RF frequency band

- 400 MHz - 3 GHz RF receiver

Software

- To control and monitor ground station transmitter, transponder and ground station receiver.
- Wave Scope utility for baseband signal analysis
- System requirement: Windows7 or later (English Version)

Note: Specifications are subject to change.

Package contains

- Ground station transmitter ----------1no
- Ground station receiver ----------1no
- Transponder ----------1no
- 8 Port ethernet switch ----------1no
- Patch panel directional antenna ---------4nos
- LAN cable ----------5nos
- SMA-SMA cable ----------4nos
- Mains cord ----------3nos

Spectrum Analyzer (optional)

Benchtop (1.5GHz) - **SA-1015-TG**

Handheld (3.3GHz)

+

Computer/Laptop (optional)-2nos

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