4T2 broadcast multi probe bmp3000

Integrated portable system for all aspects of terrestrial broadcast measurement

Advanced Broadcast Components
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4T2 broadcast multi probe

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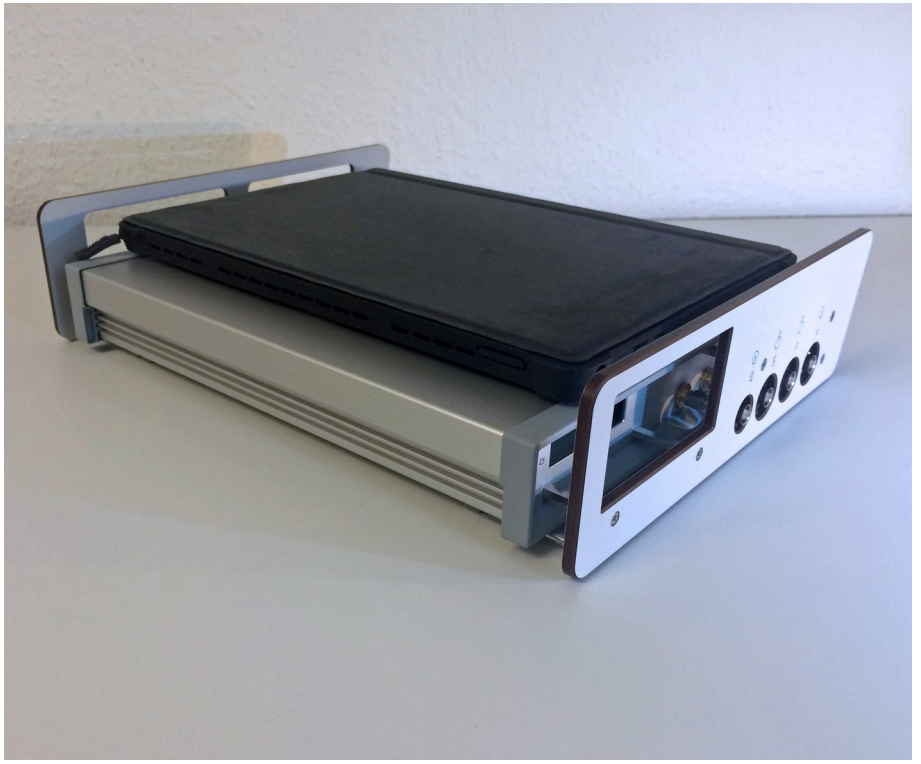

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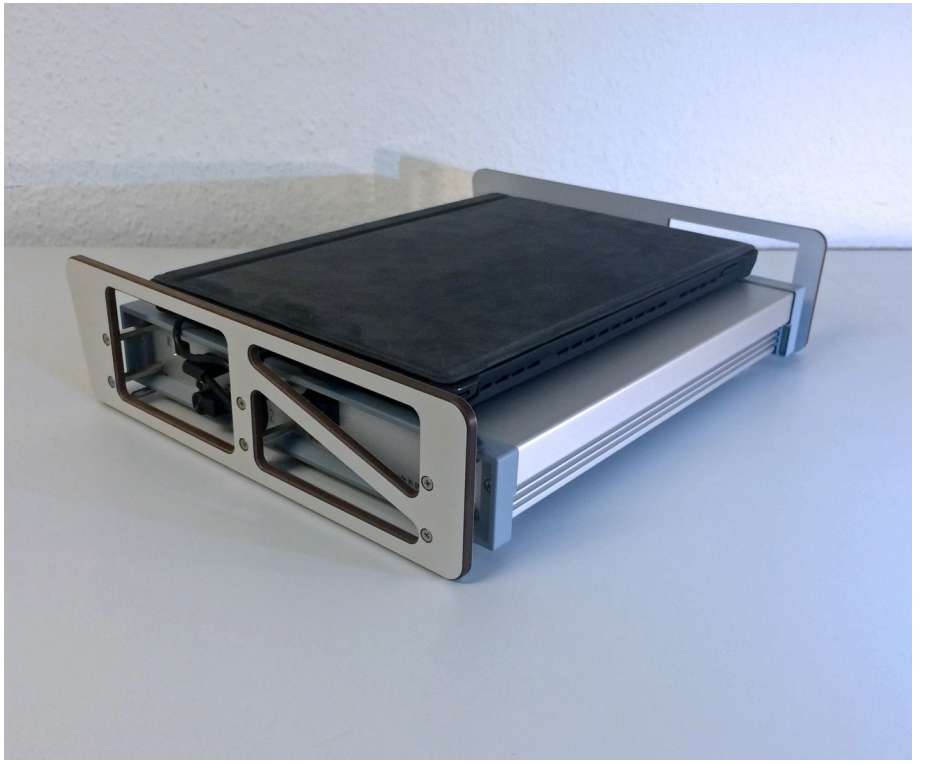


Features of the broadcast multi probe

- Portable, mains independent system at 4.5 kg
- State of the art industry standard Windows 10 operating system on latest generation tablet computer (Microsoft Surface Pro4)
- Spectrum Analyser 10 kHz to 4.4 GHz
- Scalar Network Analyser with VSWR capabilities (through synchronised tracking generator and integrated directional coupler)
- DVB-T/T2 RF-measurements, graphical Constellation, Shoulder, CCDF, Group Delay, Impulse Response, Level, MER/EVM, …
- DVB-ASI input and DVB-IP Transport Stream input/output
- Coverage expert-function: key performance parameters superimposed on map of the area, with Kml/kmz output for documentation purposes
- Multi Viewer with H.265 CODEC support

4T2 bmp and tablet computer interconnect

The 4T2-bmp connects to the tablet computer using just two cables:

1) USB 3.0 Jumper cable

2) 15 V supply and charging

4T2-bmp is agnostic to the actual tablet computer make, as long as it is windows based and powerful enough with respect to processing power, memory and storage required.

4T2 bmp design goals

Design goals accomplished with the 4T2-bmp:

1) using readily available components for interconnecting external equipment

2) using industry standard hardware and software components to perform RF measurements

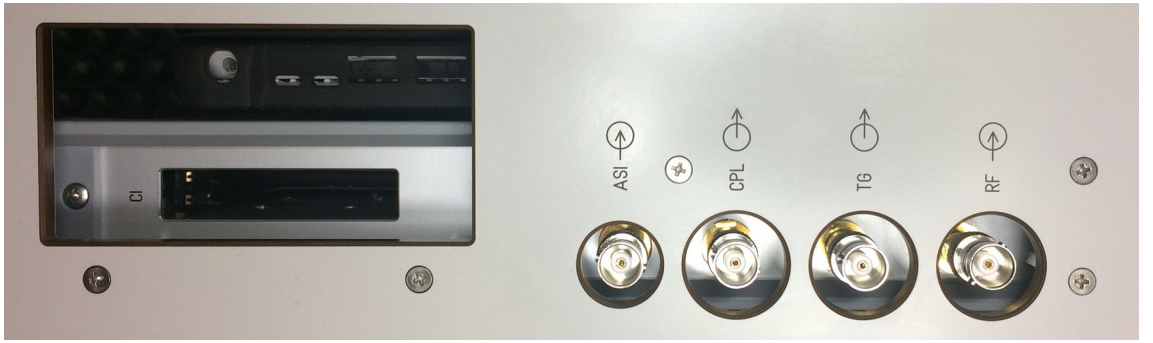
3) providing industry standard interface formats for documentation (csv, xml, kml, kmz)

4) overcoming short term availability of key components (tablet computer, Windows OS)

.. while achieving an all in one approach of versatility and accuracy expected in professional test equipment.

4T2-bmp left hand side connections

On the left hand side, you will find connectors essential for measurements:



3.5mm Jack headphone output of tablet computer

Volume up/down rocker switch

CI: Dual Common Interface slot

ASI: Asynchronous Serial Interface MPEG Transport Stream input

CPL: Coupler output from tracking generator

TG: Tracking Generator main output

RF: Radio Frequency main input

4T2-bmp right hand side connections

On the right hand side, you will find connectors essential for charging and for networking:

GbE gigabit ethernet connector for networking and transport stream input and/or output streaming

USB 3 Jumper cable between 4T2-bmp PSU and tablet computer

Charger Jumper cable between 4T2-bmp and tablet computer

Mini Display Port output for additional monitor

Main power input (12V, plus on 2.1mm center contact, reverse polarity protected)

4T2-bmp operation and control

All operation of the 4T2-bmp happens through the integrated tablet computer system

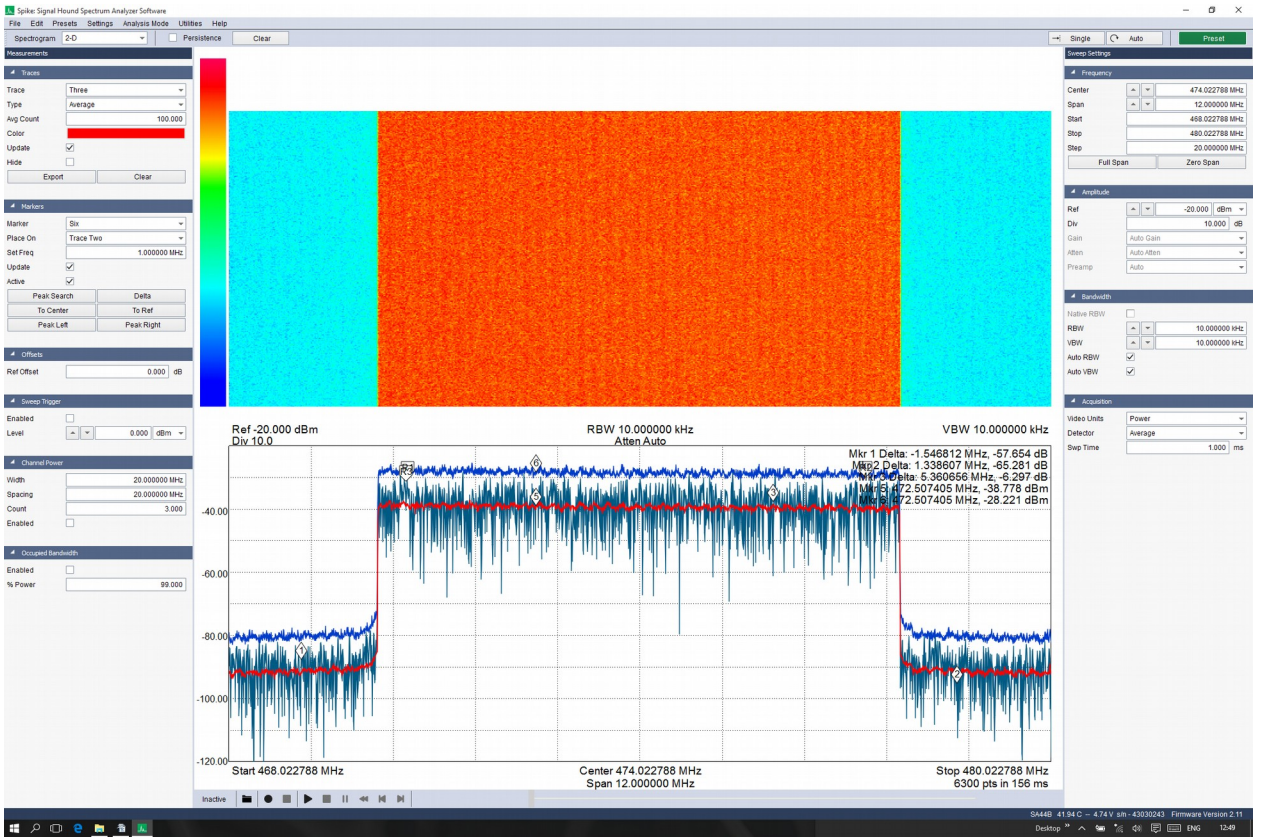
Power-on of the entire system controlled through the power switch of the tablet computer.

Main software applications:
4T2 Content Analyser,
Spike Spectrum Analyser
for measurement routines

4T2 RF-Analyser for coverage measurement tasks
ABC Map Maker for retrieving map data for coverage project visualisation of the internet
Google applications for documentation purposes.

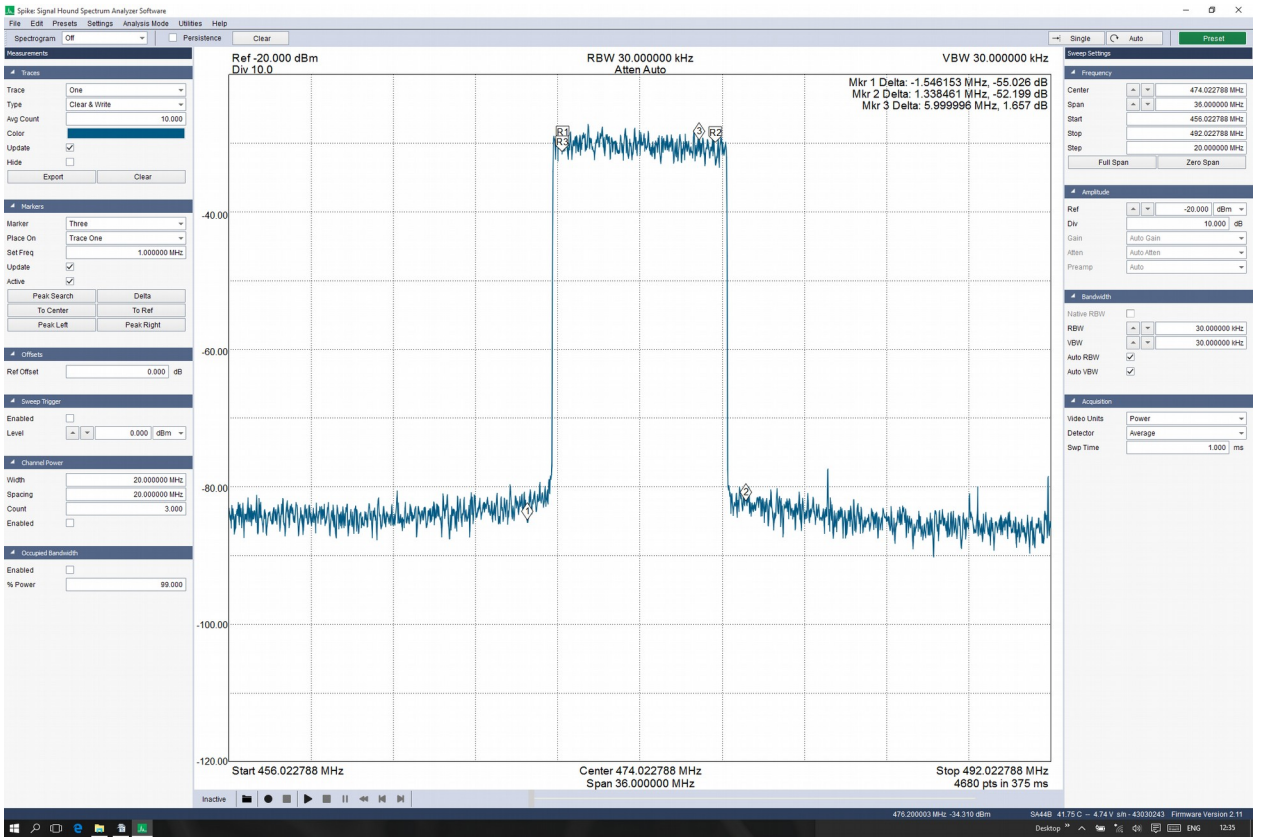
RF spectrum analyser

- 10 kHz to 4.4 Ghz Spectrum Analyser with built-in Tracking Generator for Scalar Network Analysis
- Verify filter performance
- 2D and 3D spectrum plots
- Max hold and average sweeps
- Multiple markers
- Mask import
- Sweep export



RF spectrum analyser

- Superior RF performance for noise-floor and linearity (shoulder) measurements



key functions on transport stream level

- Analysis of MPEG-TS PAT, PMT Program Association, and Map Tables
- Analysis of DVB-specific Service Information (CAT, SDT, EIT, NIT, TOT, TDT)
- Analysis of ATSC-specific Service Information (MGT, STT, TVCT, EIT, ETT)
- Visualisation of SDT Service Description Tables
- Visualisation of NIT Network Information Tables
- Visualisation of MIP Mega-frame Initialisation Packets
- Visualisation of PID Packet Identifiers and associated bit-rates
- Visualisation of bit stuffing
- Visualisation of time repetition intervals of tables defined in TR.101.290
- Analysis and visualisation of first, second, and third priority errors according to TR.101.290

enhanced functions on TS level

- Analysis of DVB T2-MI Modulator Interface
- Measurement of PCR Program Clock Reference Jitter
- Content decoding, based on Software Defined Video SDV,

  including H.262 SD/HD, H.264 SD/HD, and H.265 QRes/SD/HD/UHD material
- Monitor-wall feature with audio bar-graphs
- Detection of black and freeze conditions of services in the Transport Stream
- Detection of audio mute condition of services in the Transport Stream
- Triggered capture of Transport Stream to disk in presence of errors (pre/post trigger time adjustable)

enhanced functions on TS level (contd.)

- Measurement of multiple Transport Stream sources

  (through multiple instances of the program running at the same time)
- Remote capability with full SNMP support following the DVB MIB, including Traps
- Input support for XTASI-S2 & XTASI-RF & XTASI-ASI, or 4T2 hardware
- Input support for RTP & UDP packet protocol, or files
- Comprehensive logging features with powerful sorting capabilities
- Raw data analysis with smart packet-trigger, and bit dependencies checking
- Smart Packet trigger with expression editor
- Interface to relay alarm contacts with expression debugger
- Forwarding of transport stream to IP, File, or ASI output

Versatile input and forwarding options

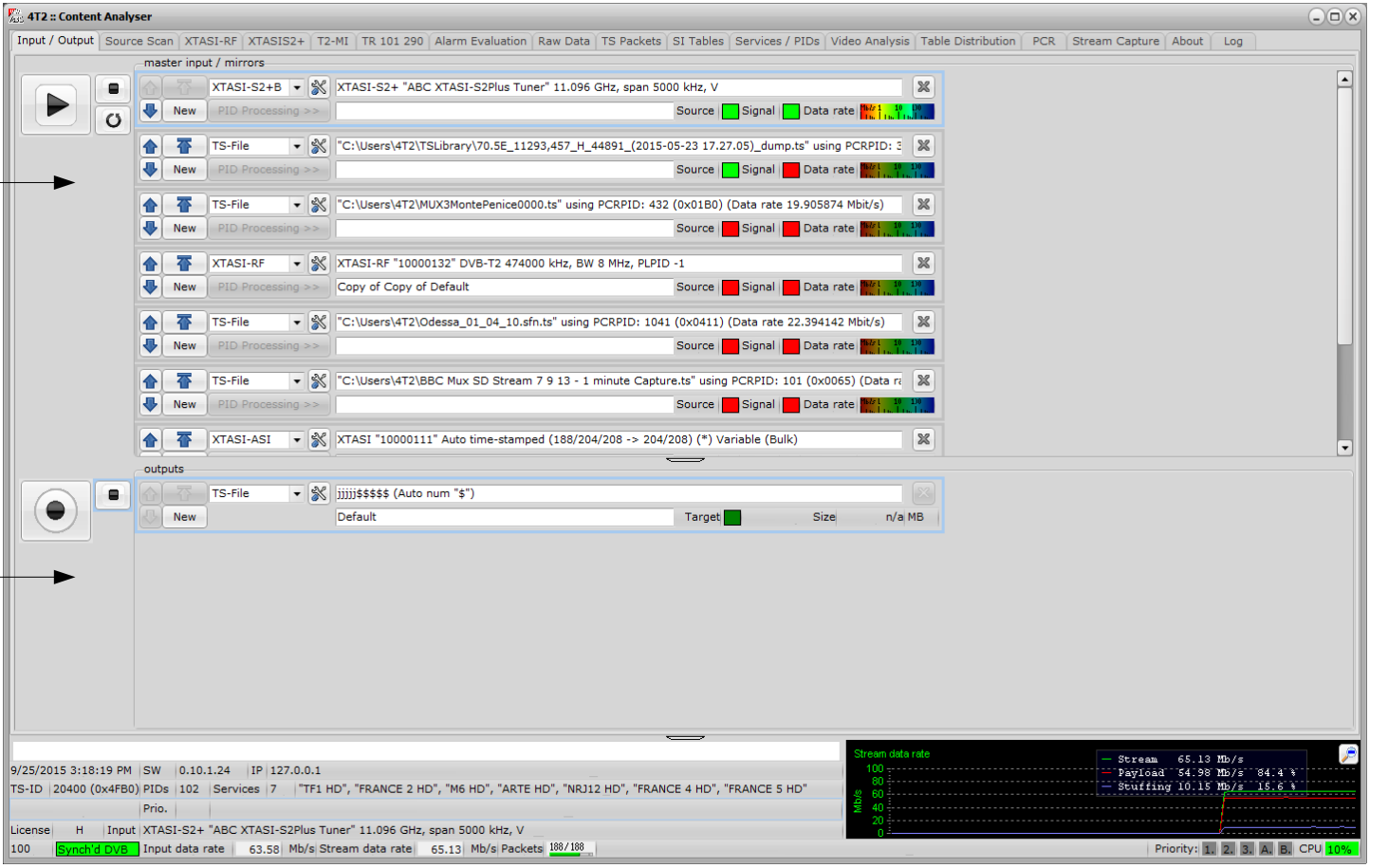
Inputs

- IP udp /rtp
- File playback
- XTASI ASI input
- XTASI DVB-T/T2 input
- XTASI DVB-S/S2 input

Outputs

- udp/rtp streaming
- File recording

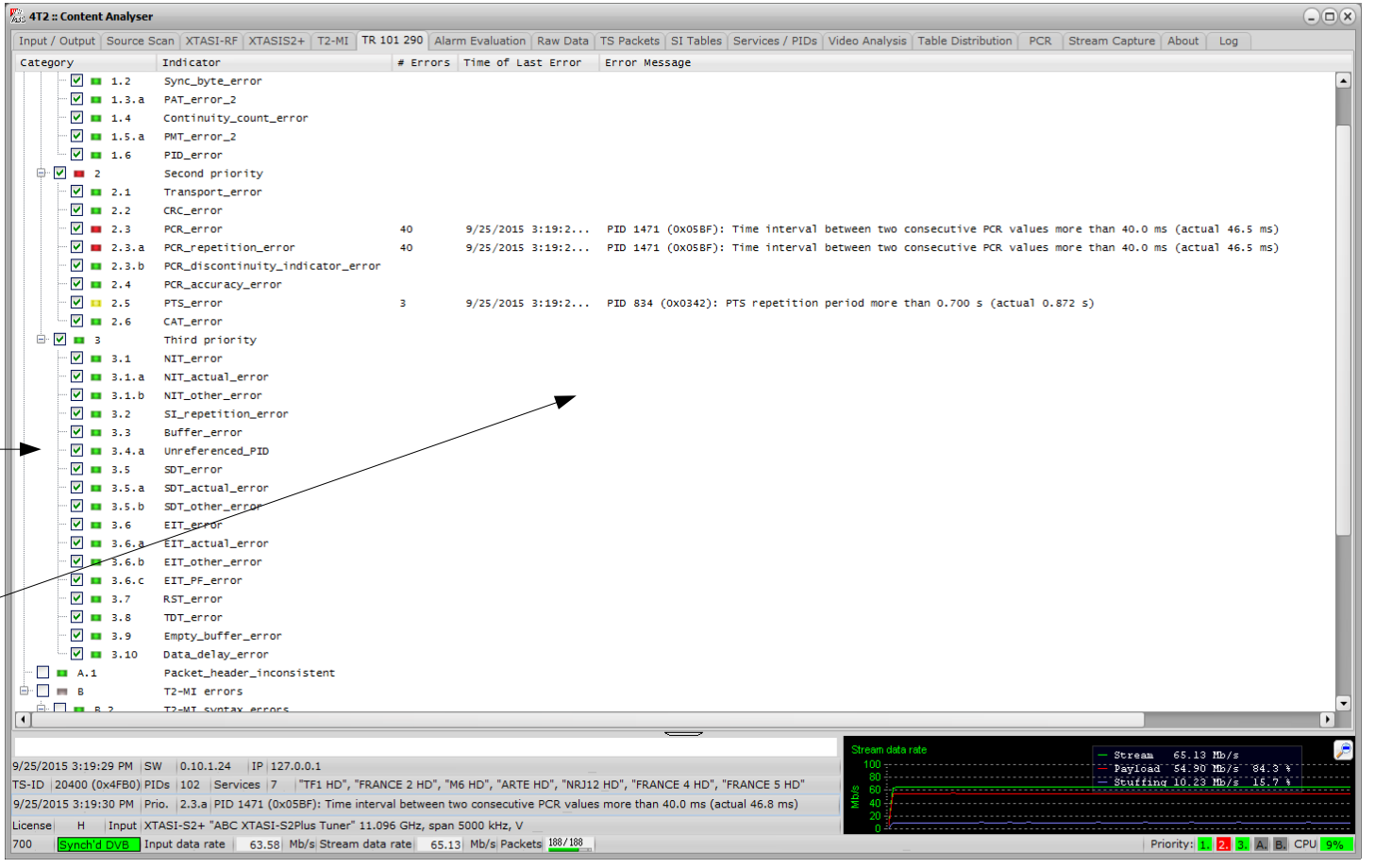
XTASI ASI output
Forwarding of decapsulated PLP from T2-MI input



TR.101.290 monitoring and StreamCapture

(all inputs)
Evaluation of TS following TR-101-290
1st, 2nd, 3rd priority

- Groups, or individual error measurements can be activated / deactivated
- All errors are logged with date and time of occurence
- Selection can be used as trigger for Stream Capture



Includes T2-MI extensions

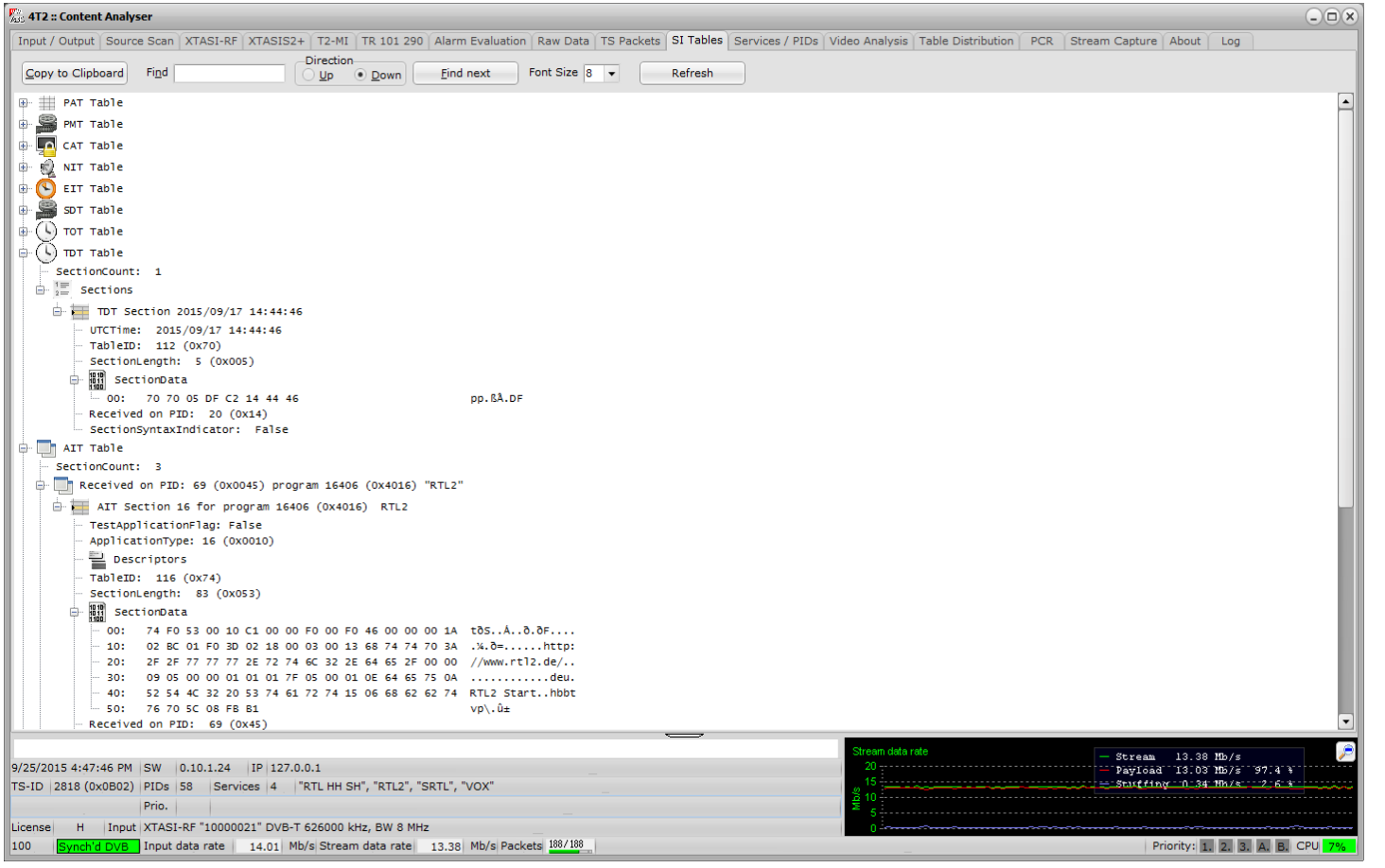
SI-Table analysis

(all inputs)

Display of the service information tables (SI) with:

- find function
- comprehensive tree exporting options
  - all SI-tree
  - sub-tree
  - individual entries

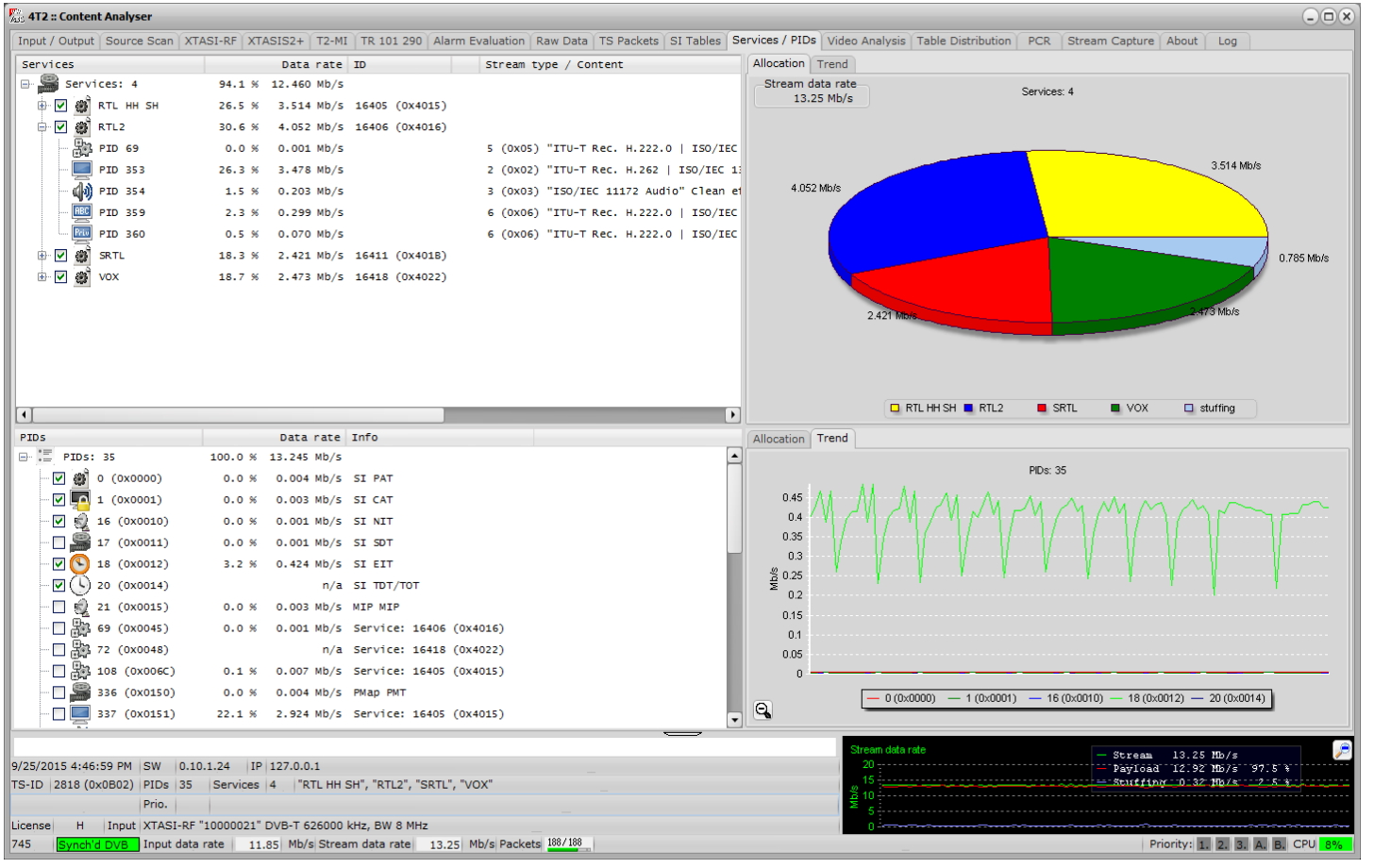
SI of DVB, ATSC, and ISDB supported



SERVICES PIDs analysis display

(all inputs)

- Data-rate displays with virtual and logical channel numbers sorted by services and PIDs
- Pie-chart allocation or trend of Services
- Service-sorted view displays all PIDs that make up a service
- PID-sorted view with corresponding data-rate display
- Services data-rate export to file for reporting purposes



MultiViewer

(all inputs)
decoding of services in transport stream

- Black/freeze detection
- Moving video or thumbnails
- Audio bar-graphs and Loudness measurements
- EPG current/next analysis

- DVB-Teletext
- DVB-Subtitling

- H.264, H.265 HD

DVB-T specific RF measurements

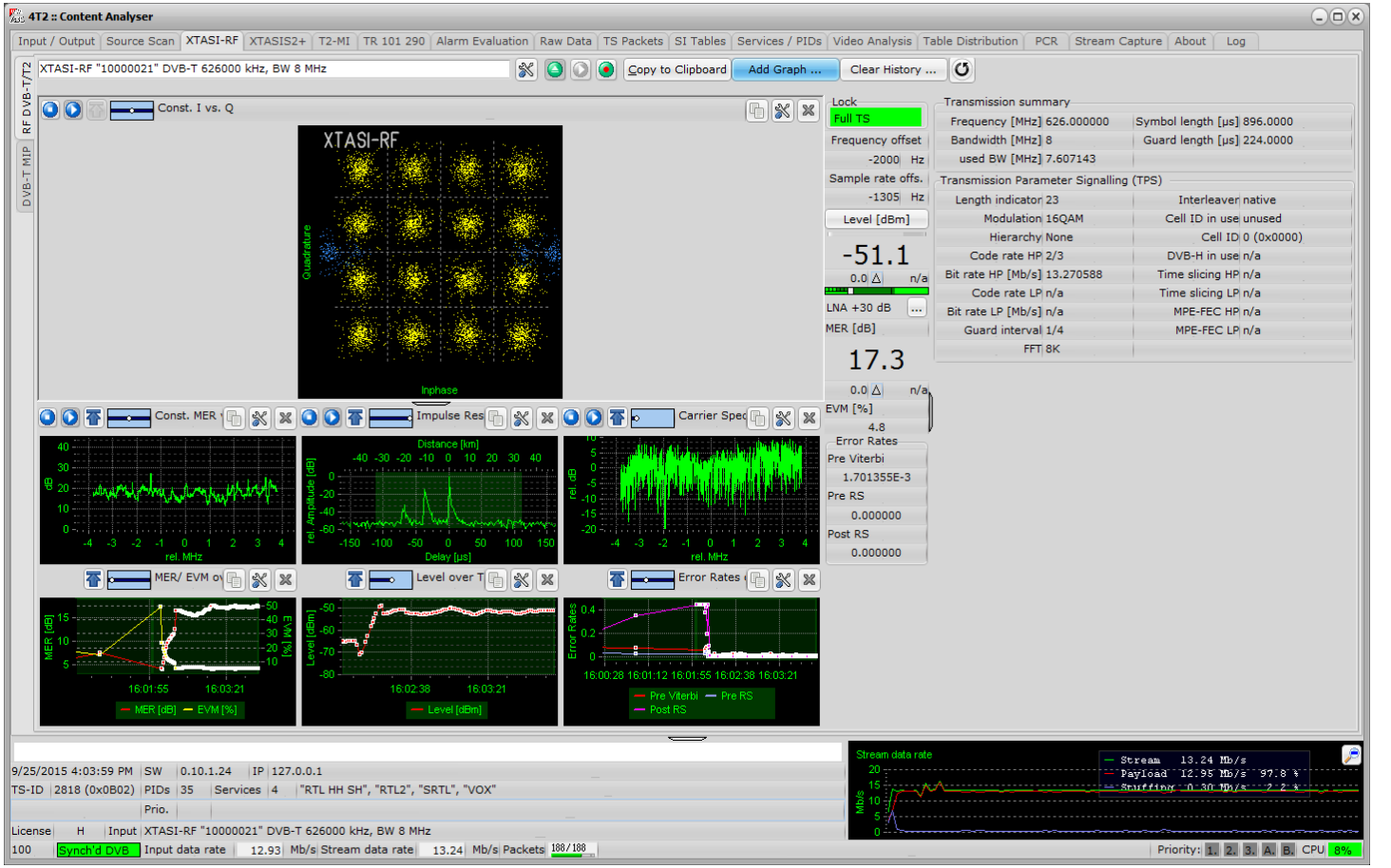
(XTASI-RF)
Constellation,
Impulse-Response,
Spectrum graphical displays

MER/EVM, BER, Level over time graphs

Calibrated level, field-strength with antenna correction factor

MER, EVM, BER before, and after Viterbi and Reed-Solomon

Decoded TPS information
>42dB MER performance



DVB-T2 specific RF measurements

(XTASI-RF)
Constellations
L1 post and
Data-PLP,
Impulse-Response,
Spectrum displays

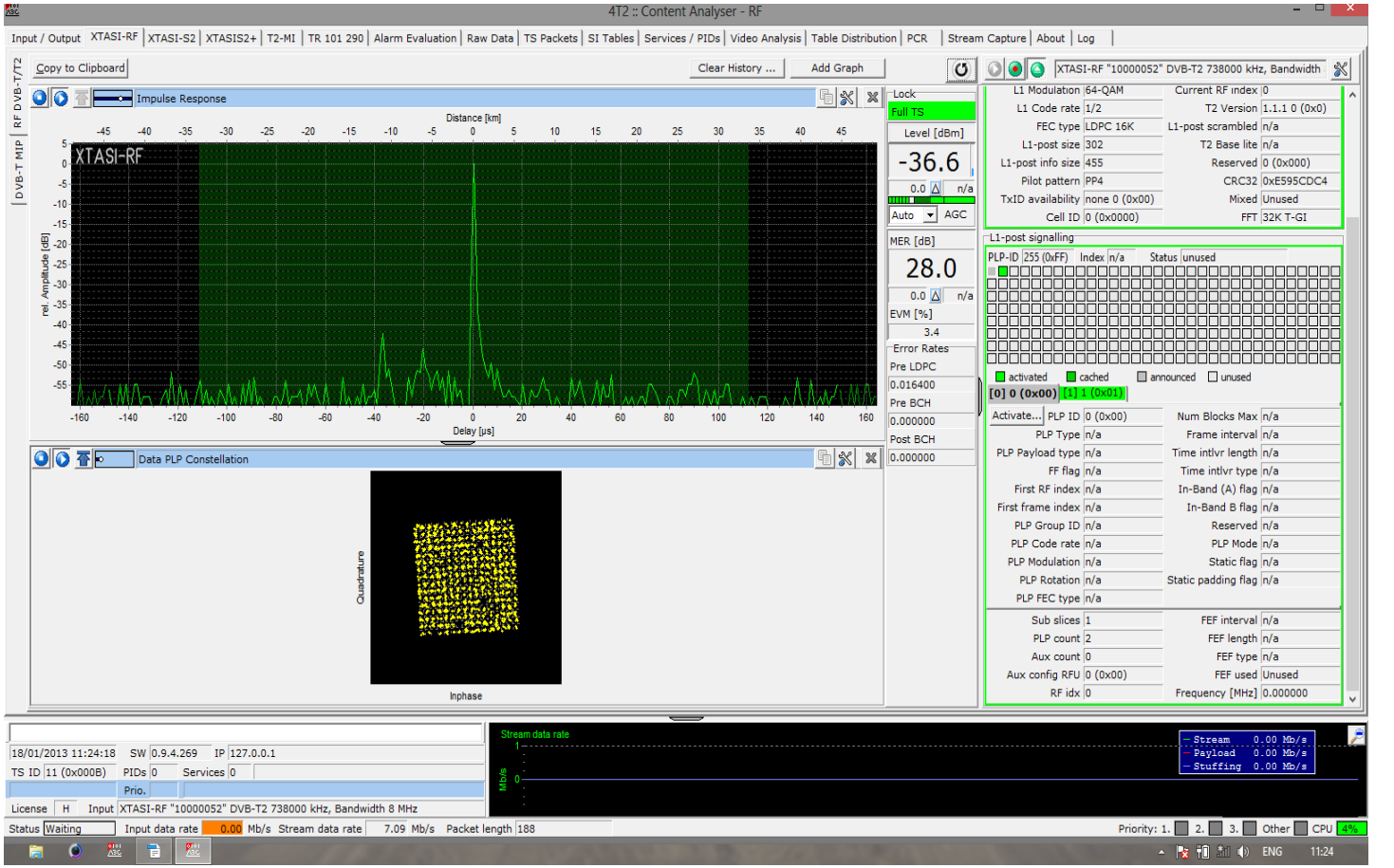
Level, MER, EVM,

BER before LDCP, and BCH

L1-pre, and L1-post
decoded information

Data logging
Data export

>42dB MER performance



DVB-S specific RF measurements

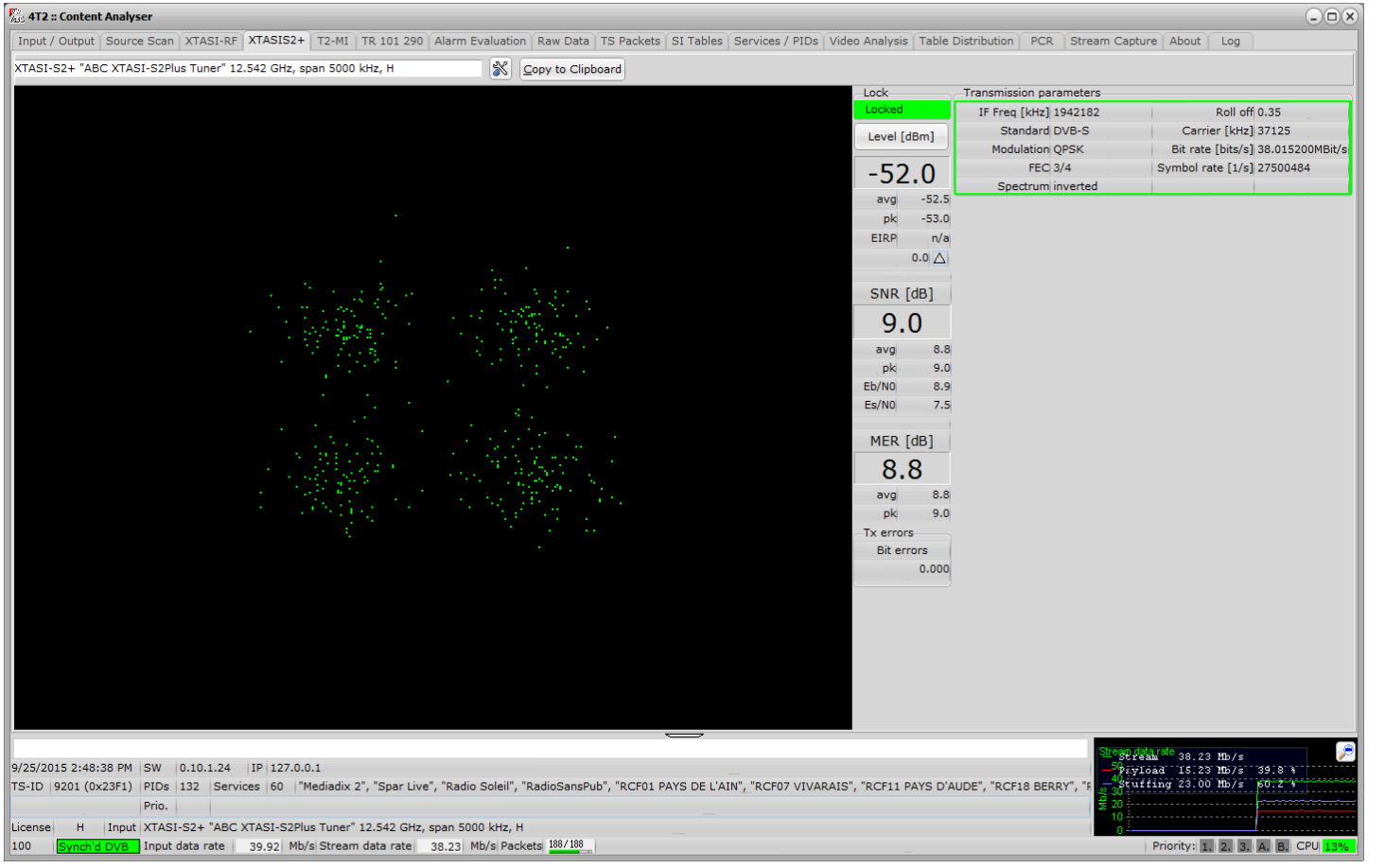
(XTASI-S/S2)
Constellation graphical display
QPSK

Viterbi and Reed-Solomon FEC

Level measurement

SNR, MER, Eb/N0, Es/N0 measurements

Bit errors



DVB-S2 specific RF measurements

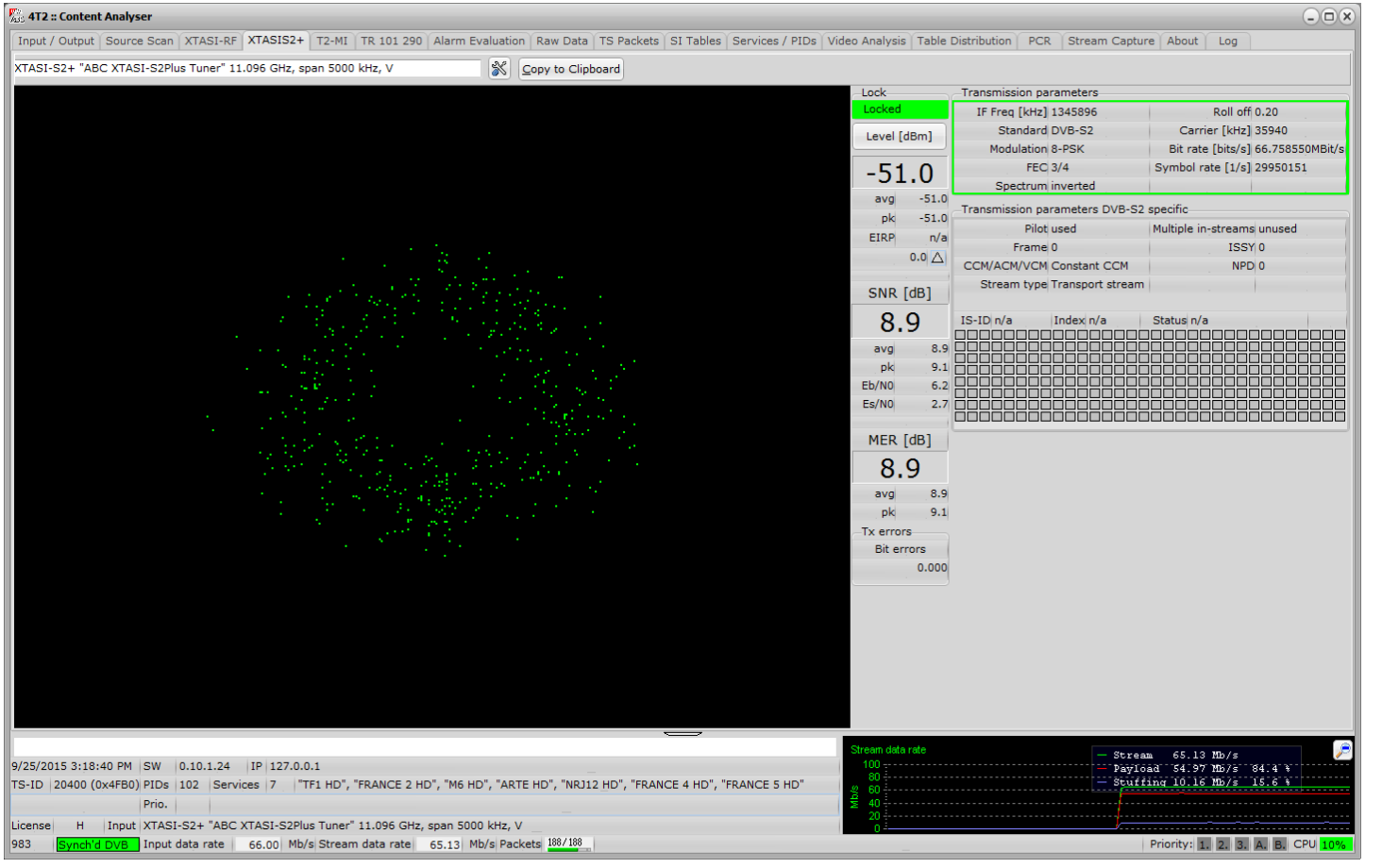
(XTASI-S/S2)
Constellation graphical display
QPSK+, 8 APSK+,
16 APSK+, 32 APSK+

CCM, ACM, and VCM
Multi-Stream

LDCP and BCH short and normal mode

0.2, 0.25, 0.35 Filter
Rolloff support
Level measurement

SNR, MER, Eb/N0, Es/N0 measurements
Bit errors

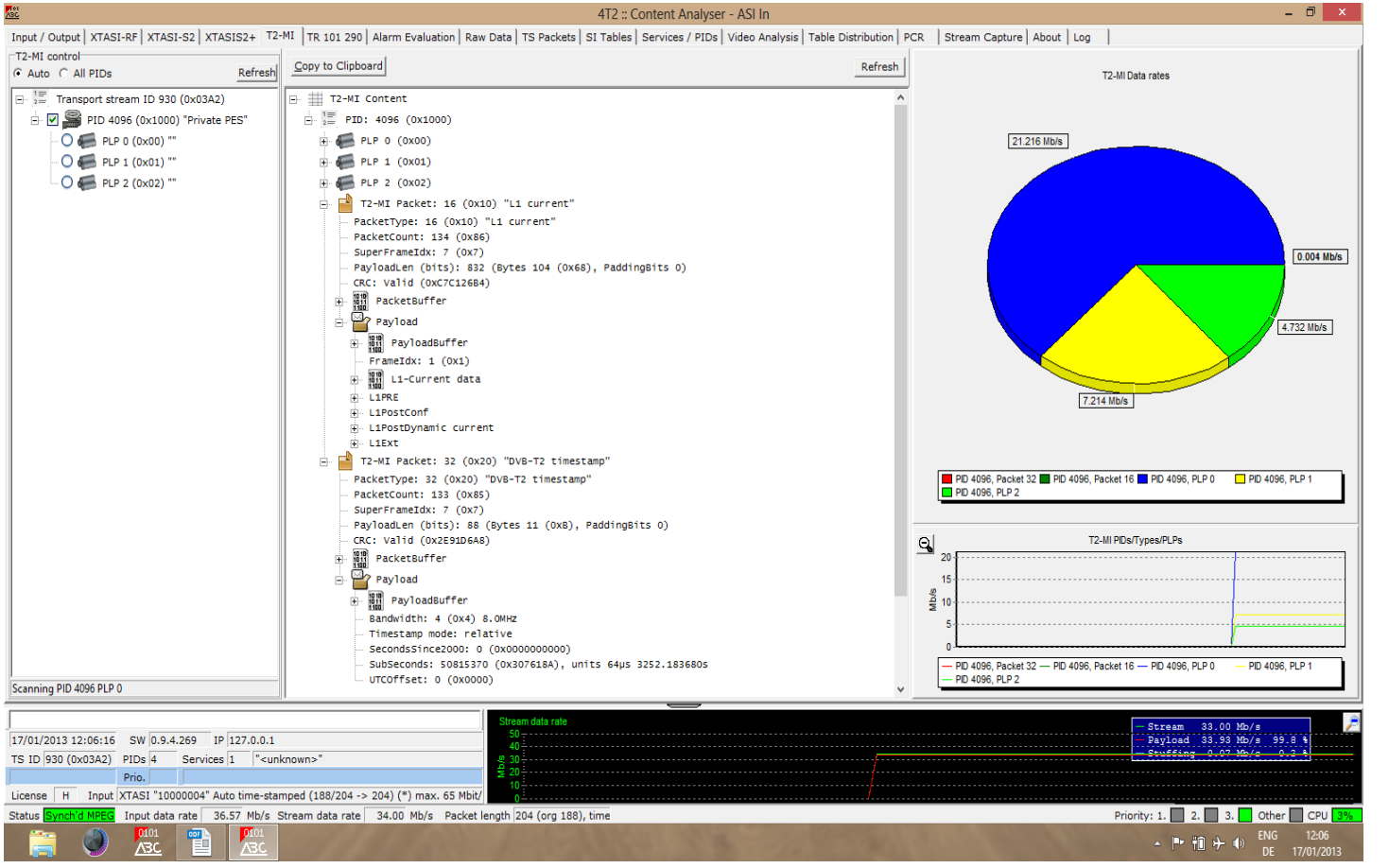


T2-MI de-capsulation and analysis

(DVB-S2, ASI, IP inputs) Modulator interface real-time analyser

De-capsulation of embedded single-, or multi-program transport streams

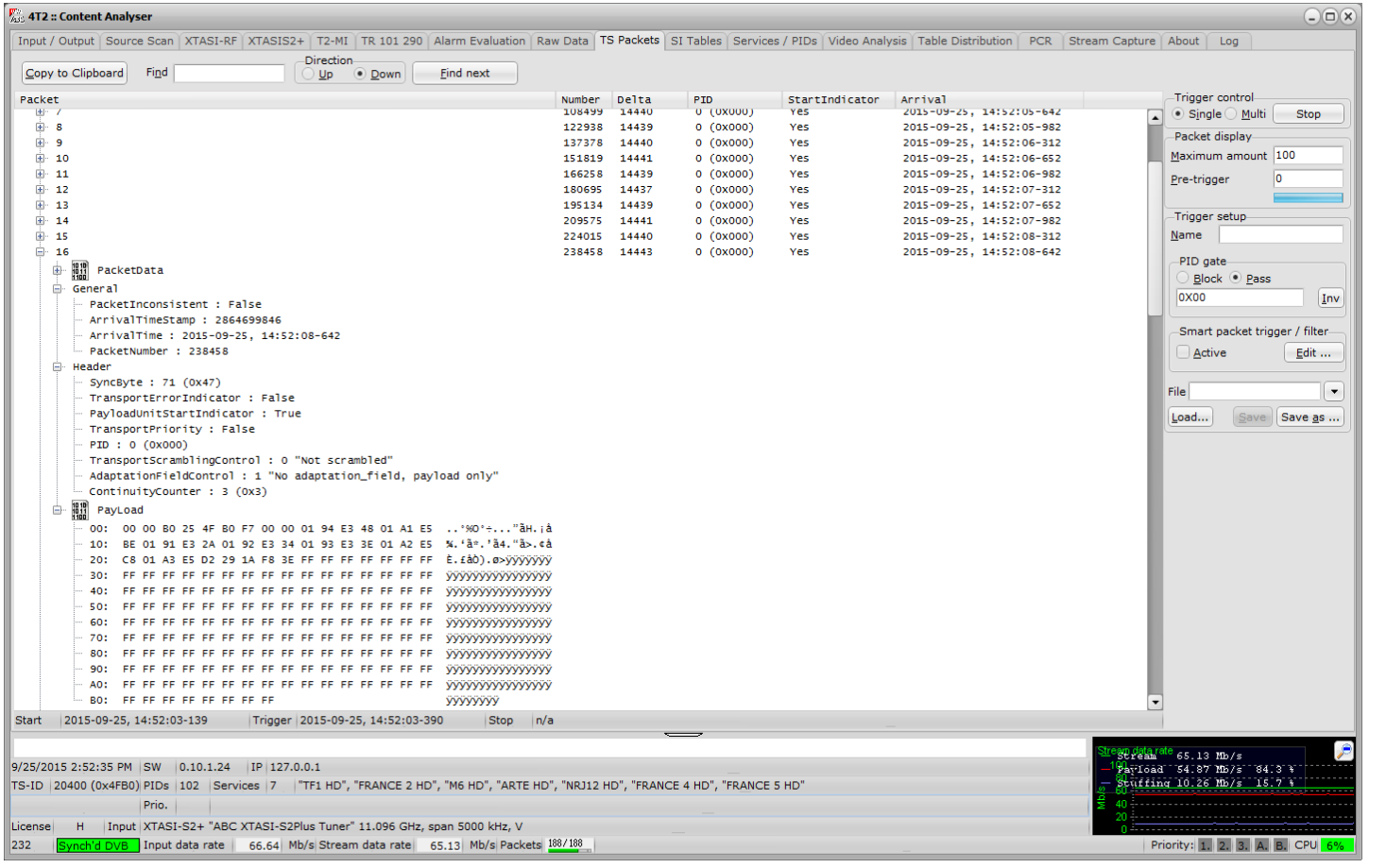
Re-routing into Content-Analyser for visualisation and analysis



TS Packets expert function

(all inputs)
Sophisticated packet filtering with multiple trigger variables and filter expression editor

Unique and powerful tool for finding problems in the transmission chain and in multiplexers



PCR

(all inputs)
Powerful menu for finding PCR related problems from Jitter, to drift, and time-stamping

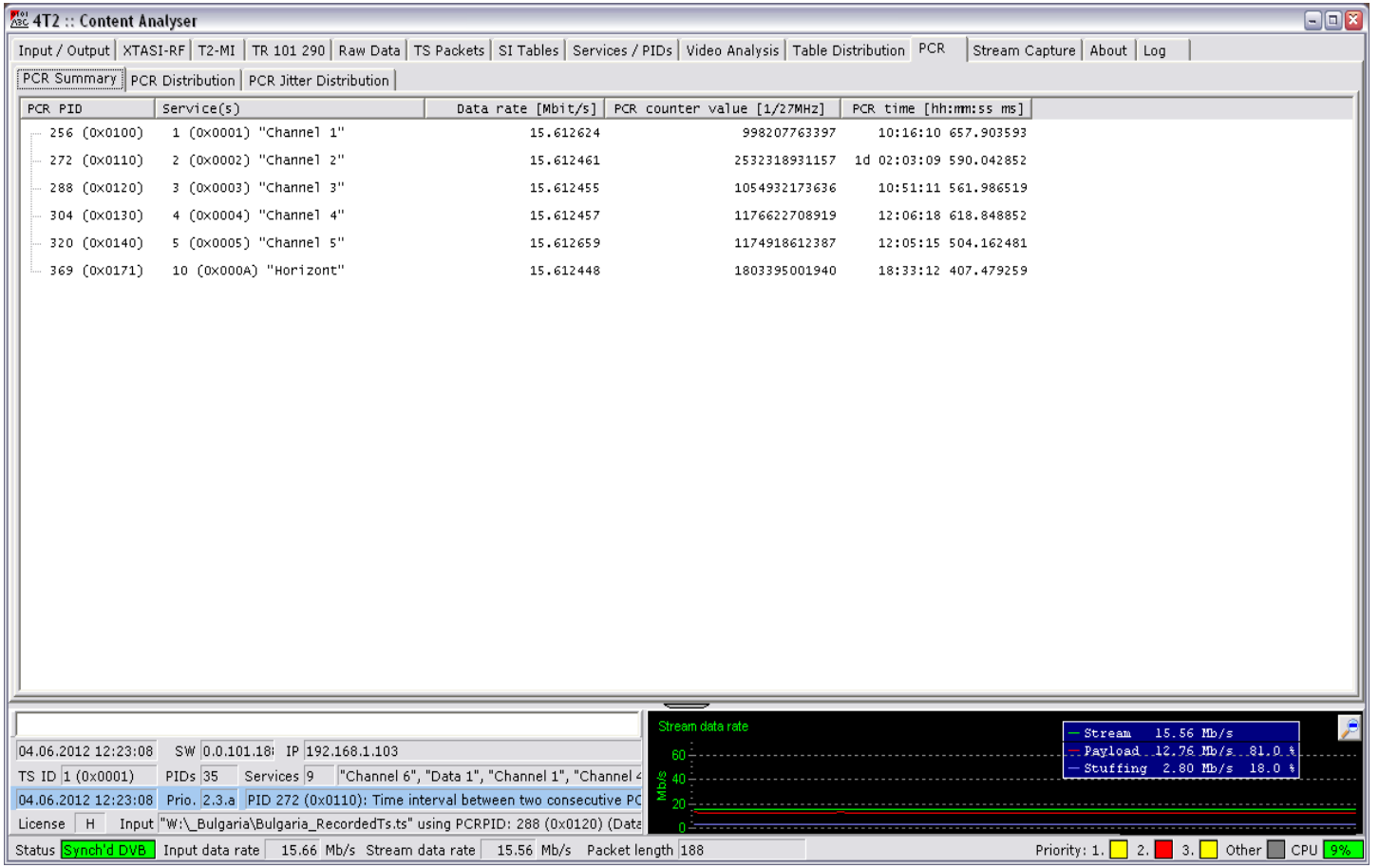


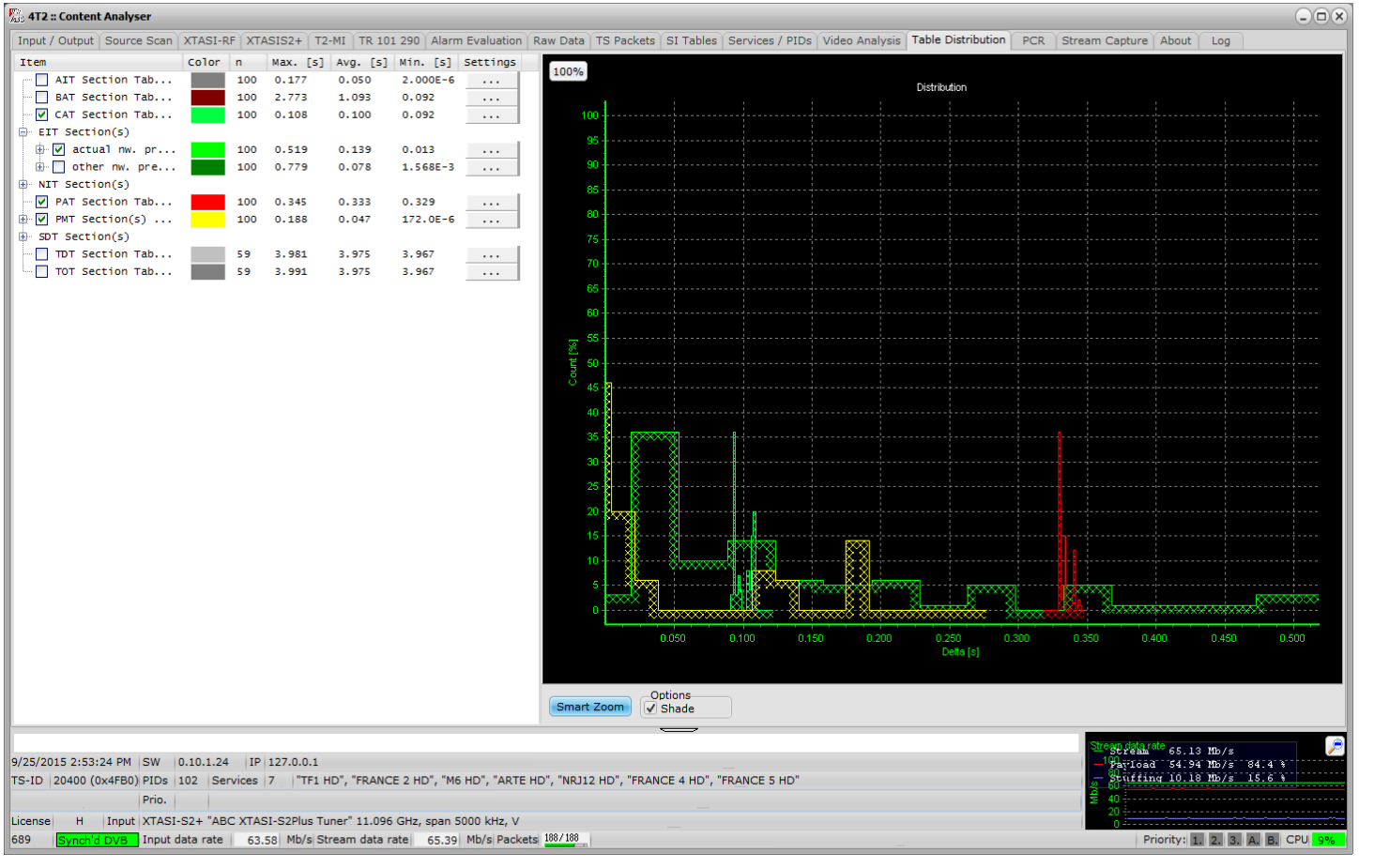
Table and PCR Distribution

(all inputs)
Distribution of SI-tables in the Transport Stream

Selection is arranged through individual services

Individual tables can be selected and the repetition rates are displayed in form of a histogram

Smart-zoom assists on positioning the histograms

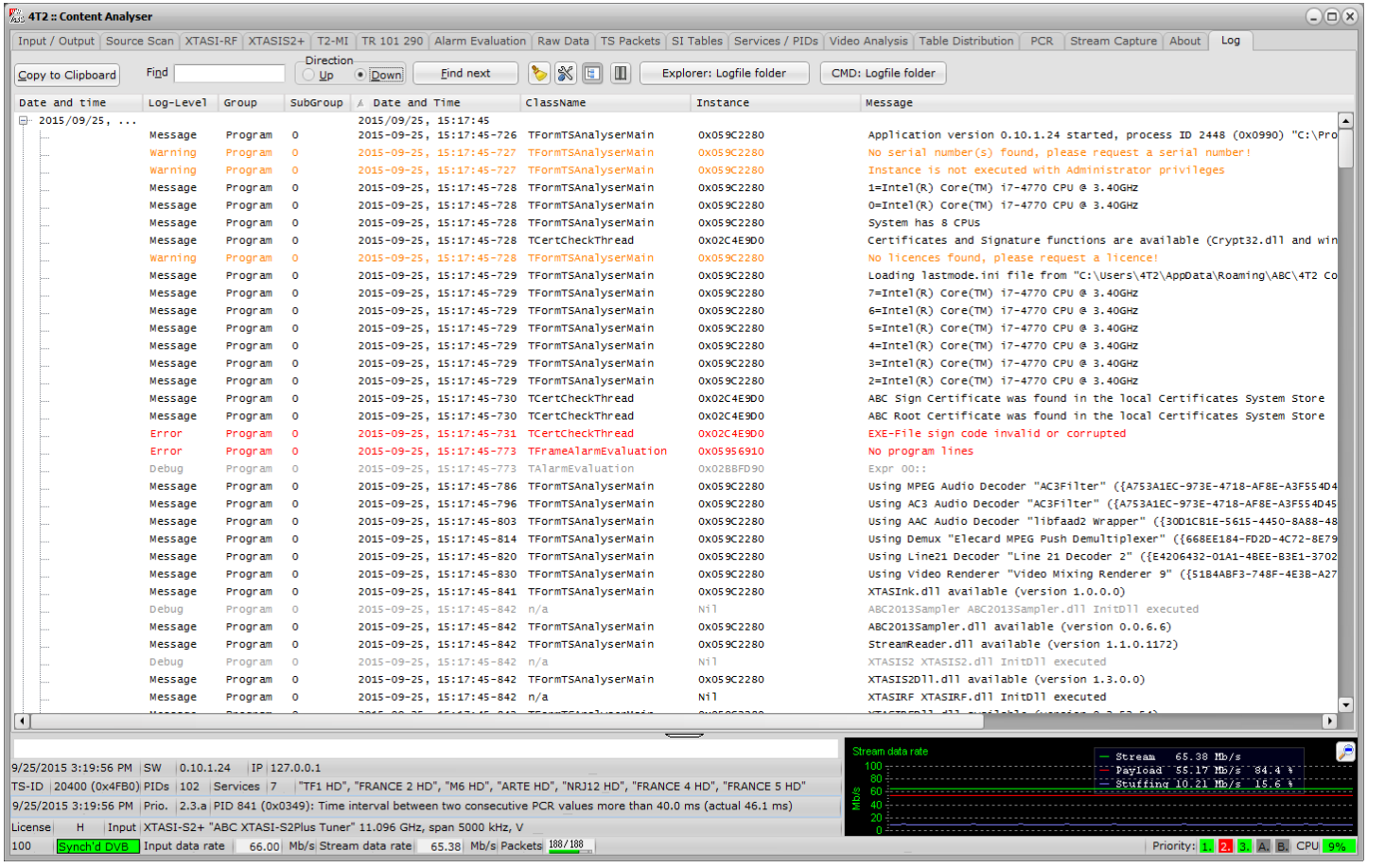


Log

(all inputs)
Most comprehensive logging system with integrated find and sorting features

Automated logfile storage with integrated garbage collection

Easy logfile post-processing available on-the-fly using Windows tools



further information available at
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