AKRS - Radiosignal Analysis and Classification

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Overview

- ☑ System for technical analysis of digitized radio signals
- ☑ Signal measurement, processing, analysis and classification
- ☑ On-line monitoring and recording of digital IF receiver signal
- ☑ Off-line processing of signal recordings
- ☑ Real time analysis of known-types of radio signals
- ☑ Device and signal pattern database for analysis support
- ☑ Modular system with chain-ordered analyzation tools

On-line channel monitoring and measurement

- ☑ Setting of channel monitoring and recording parameters (frequency, bandwidth for IF panorama, I record and receiver audio output, input
- ☑ sensitivity, squelch level, length of measured signal, etc.)
- ☑ Tuning of the receiver
- ☑ Real-time spectral analysis with adjustable parameters (IF panorama)
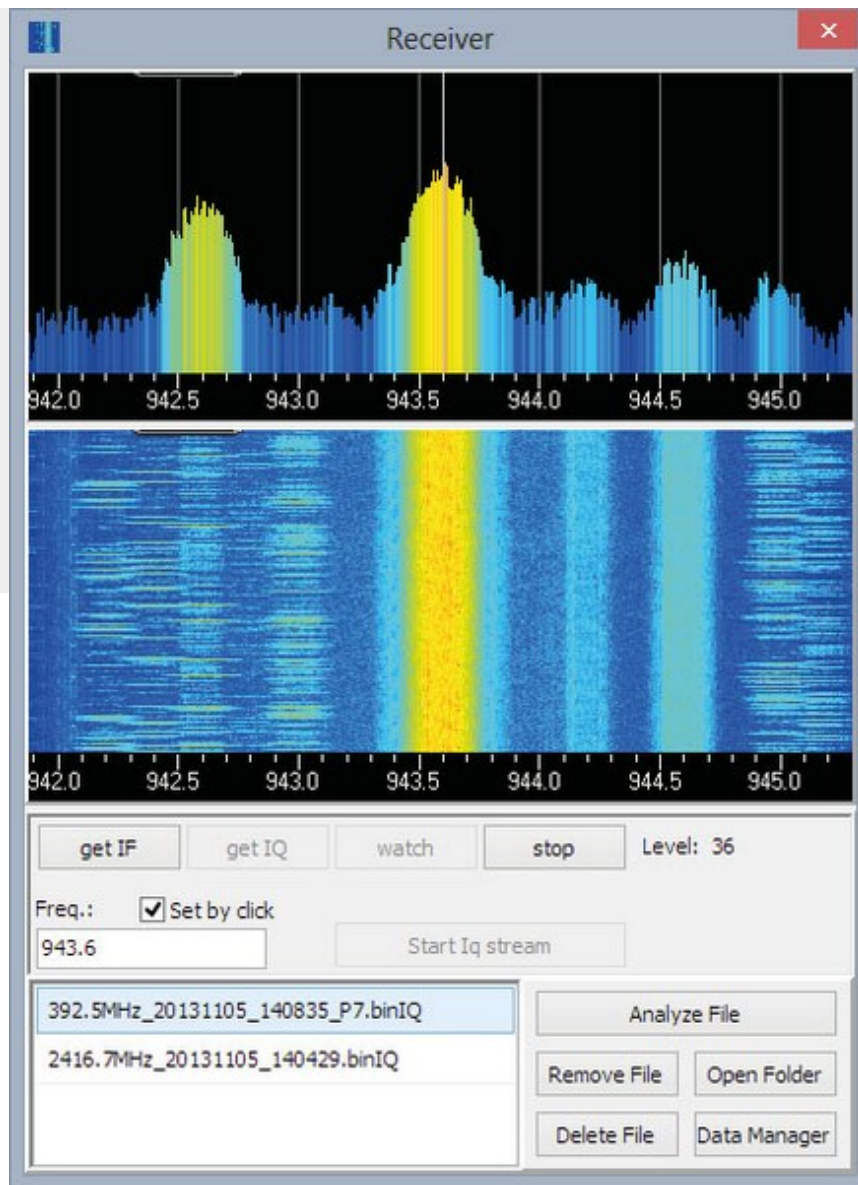
Receiver manager module window

Off-line analysis and classification

☑ Loading and importing of measured files (from on-line window of digital IF receivers or import of common wav files)

☑ Selecting the area of interest (frequency vs. time)

☑ Selected signal demodulation (amplitude, frequency, phase or quadrature demodulators)

☑ Extracting of signal characteristics (carrier frequency, bandwith, symbolrate, histogram, eye pattern, IQ diagram, etc.)

☑ Radio system classification based on pattern signal database

Spectral analysis and signal selection

☑ Loading files with file info and measurement options

☑ Automatic spectrogram or spectrum preview with adjustable parameters

☑ Spectrum max-hold and average

☑ Accumulated spectrum image

- [x] Markers for selection of interest signal
- [x] Manual or automatic input gain
- [x] Signal selection based on software defined receiver technology
- [x] Adjustable carrier frequency
- [x] Adjustable output bandwidth
- [x] Selectable resampling of output signal
- [x] Spectrogram and spectrum of output signal region
- [x] Full automatic or manual mode

Signal demodulation

- [x] Normalized amplitude envelope (in log scale) with lower and upper squelch levels
- [x] Time scope of demodulated signal
- [x] Time cursors for time interval or period measurement
- [x] Level cursors for modulating states deviation measurement
- [x] Filtering option for demodulated signal or amplitude envelope
- [x] Automatic burst detector and deburster
- [x] Data exporter for selected IF region output or demodulation output in standard wav format
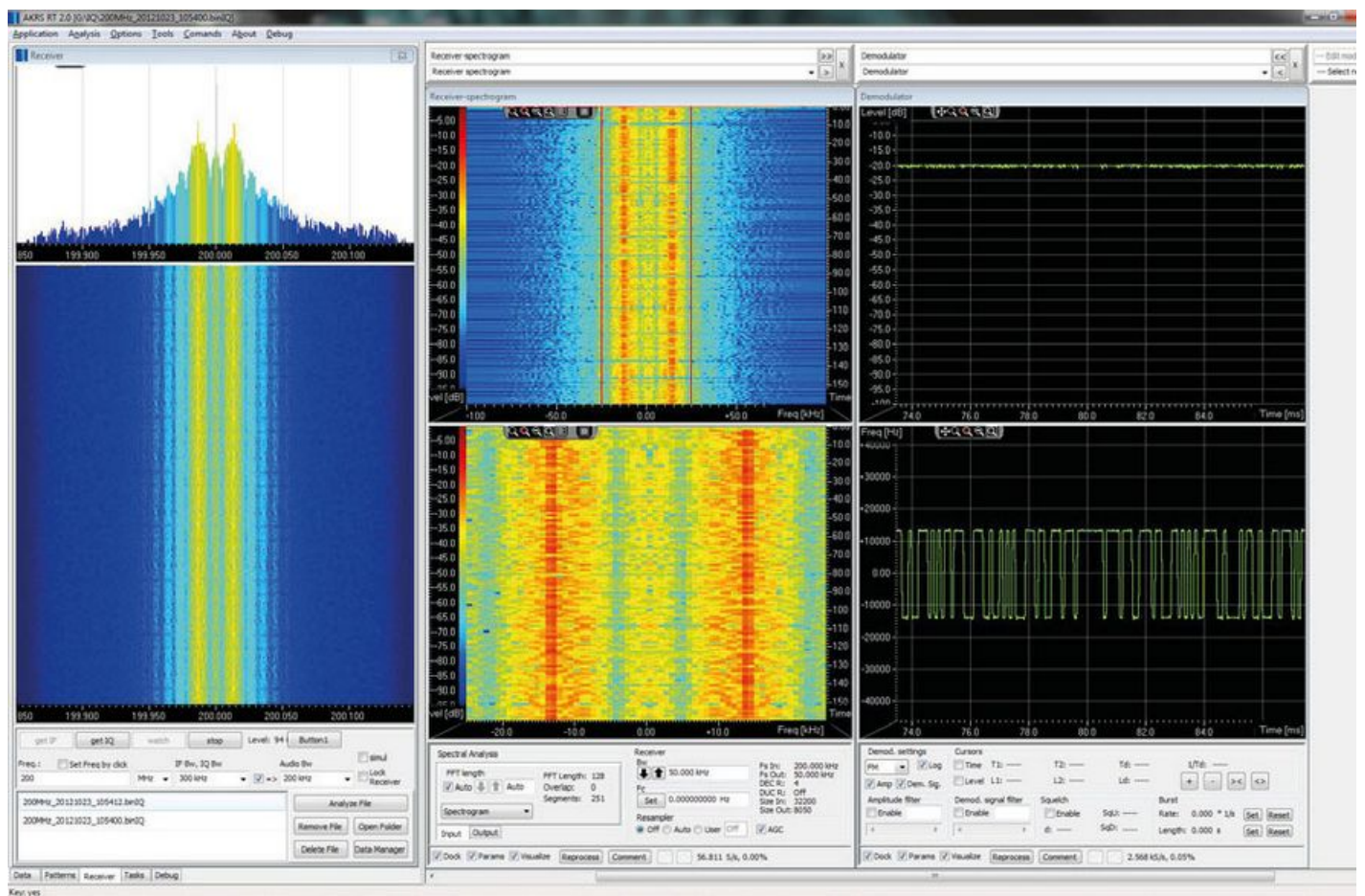
Analysis tools

- [x] Automatic symbol rate detection (independent on modulation type, manual settings option for very noisy signals)
- [x] Symbol matrix: visualization of segmented demodulated signal in 2D matrix (i.e. visualize timeslot with synchronization or training sequences, visualize analog picture systems)
- [x] Histogram of demodulated signal (full time or short-time histogram waterfall)
- [x] Carrier frequency detection for PSK and QAM modulations (selectable frequency range and frequency/angle step, fully-automatic method independent on modulation type)
- [x] IQ diagram (phase and amplitude constellation scheme) for PSK and QAM modulations with adjustable carrier frequency and phase offset Eye-pattern diagram with adjustable symbol period and segment length
- [x] Export possibility for all graphic outputs of all analyzation tools
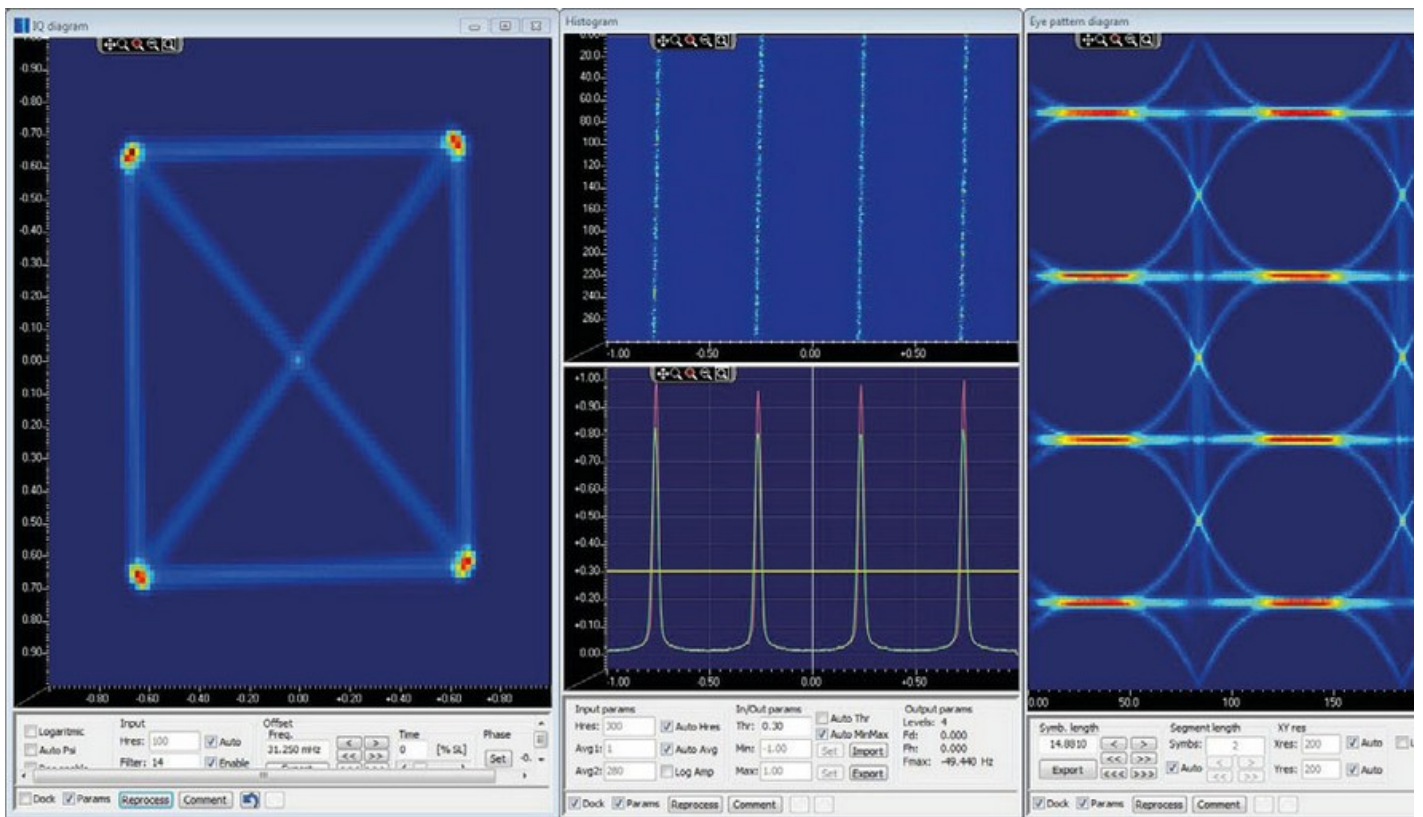
IQ diagram, Histogram and Eye-pattern diagram

Device and pattern database

☑ Pattern creator tool for editing device and signal pattern parameters (i.e. frequency band, modulation type, modulation parameters etc.)

☑ Signal pattern saved with analyzation tool chain and all setting parameters

☑ Dual mode screen with actual and pattern analyzation chains

☑ Pattern manager for viewing, using and editing database items (devices and patterns)

☑ Database search according to parameters filter

☑ Two database support: server and local database with synchronizer tool

☑ Local patterns – save analyzation tool chain to local store (without db server)

Incoming signal real-time analysis

Real-time analysis

☑ Real-time processing of selected analyzation tools

☑ Sw receiver for modifying signal carrier and bandwidth with real-time input/output spectrograms

☑ Real-time demodulation with live amplitude envelope and demodulated signal graphs with selectable time basis and synchronization

☑ Real-time audio output

☑ Real-time symbol matrix, histogram, IQ diagram and Eye-pattern diagram

Off-line analysis with signal pattern database

Other tools and possibilities

Data manager to administrate IF records in directory tree
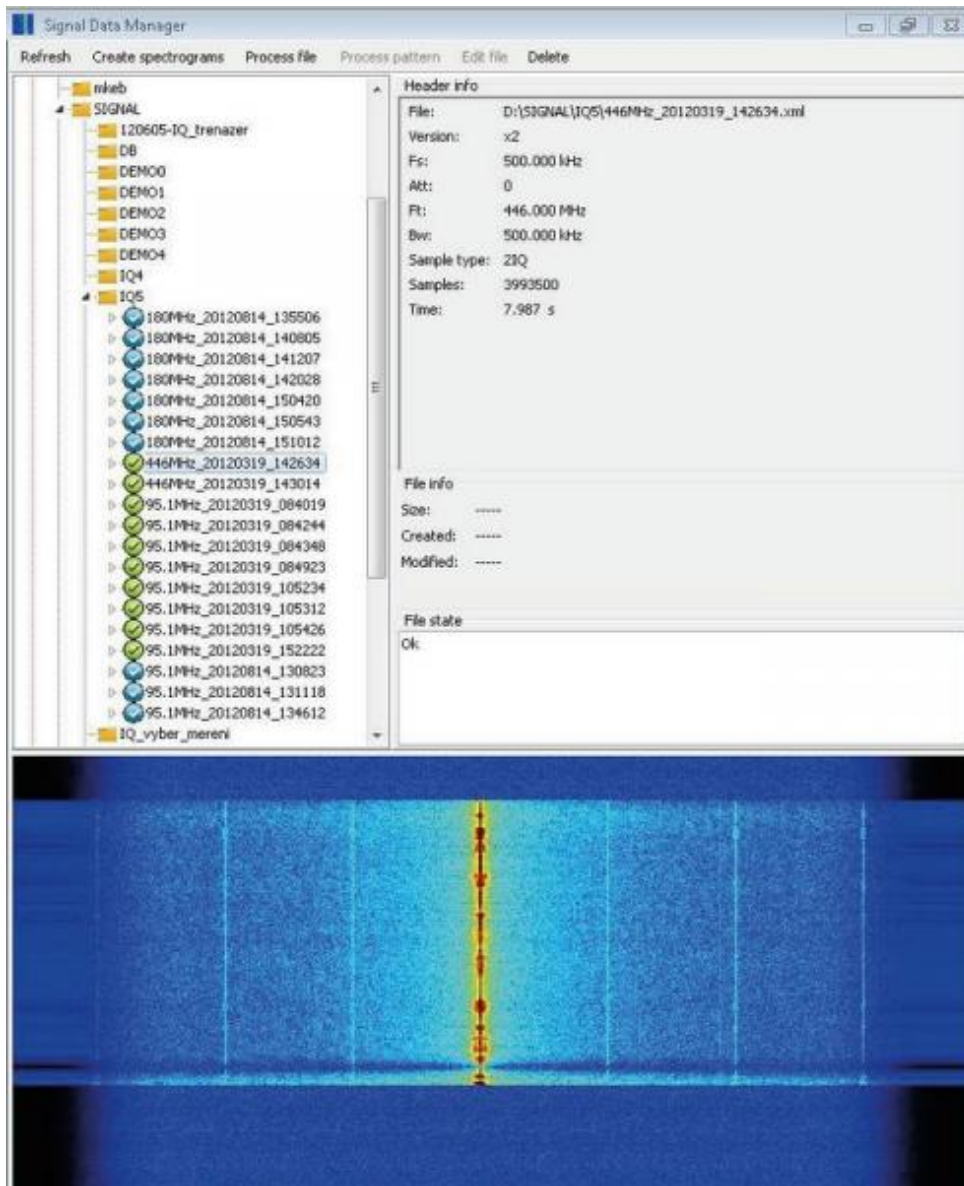
Data manager window

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