Kathrein Signal Analyser

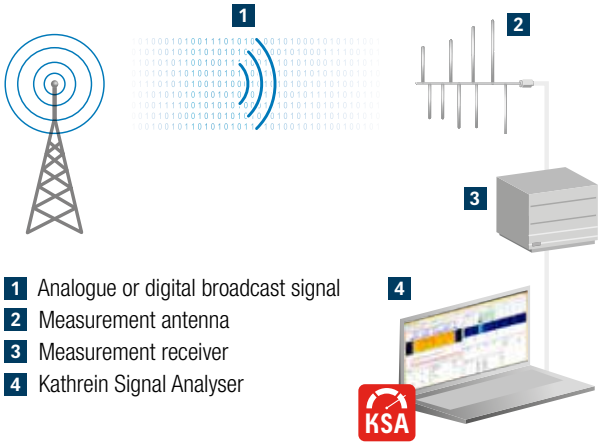
Broadcast Signal Analysis System based on SDR and digital broadband receiver

Kathrein is presenting a high-performance solution to analyse the signals of broadcasting networks. The measurement and investigation tool for analogue and digital broadcasting – Kathrein Signal Analyser KSA – is a powerful and complete system to assist through any phase of radio network planning, realisation and maintenance, as well as in the quality assurance. Radio frequency (RF) and quality of service (QoS) measurements can be done quickly and seamlessly for various broadcast technologies.

Advanced digital signal processing algorithms
Kathrein Signal Analyser strictly follows the concept of SDR (Software Defined Radio). The input with high quality I/Q-data comes from a suitable test receiver. Demodulation, channel decoding and measurement of all relevant parameters, as well as generation of statistics and graphics, are performed by the Kathrein Signal Analyser software. Advanced digital signal processing algorithms allow robust and precise measurements, both in stationary and mobile environments.

Optimized for mobile use
The concept of software-defined radio provides maximum flexibility and allows measurement of multiple technologies with one hardware setup. Together with the flexible post-processing software, user-friendly interface, and navigation functions implemented, Kathrein Signal Analyser is optimally suited for drive tests.

Functionality



1 Analogue or digital broadcast signal
2 Measurement antenna
3 Measurement receiver
4 Kathrein Signal Analyser

- RF Level and QoS
- Spectrum
- Constellation
- Channel impulse response
- Waterfall diagram
- and many more

System Setup and Hardware
The Kathrein Signal Analyser system setup requires a basic software module, the KSA Basic Module:
Order No.: 7620100008/09

Kathrein Signal Analyser is hardware independent. The following RF frontend receivers are supported:
- Precision Wave BR-VBI
- Narda Signal Shark with option Vita 49
- Rohde&Schwarz TSMW with option K1
- IZT R3000

Measure
The measurement system stores and decodes measured data of mobile, as well as stationary and long-term measurements. Powerful channel-scans give a fast overview over the band. Radiation pattern and height profile can be recorded. GPS and other external sensors to capture supplemental data are supported. Many other analysis features are included.

The following modules for broadcast technologies can be implemented:
- FM
- DAB/DAB+
- DVB-T (planned)
- DVB-T2
- LTE FeMBMS
- ATSC 3.0

Export and Review function
Various export and review functions are available for the different software modules, to visualize the measurement with all parameters individually, and to investigate parameters in detail after the measurement.

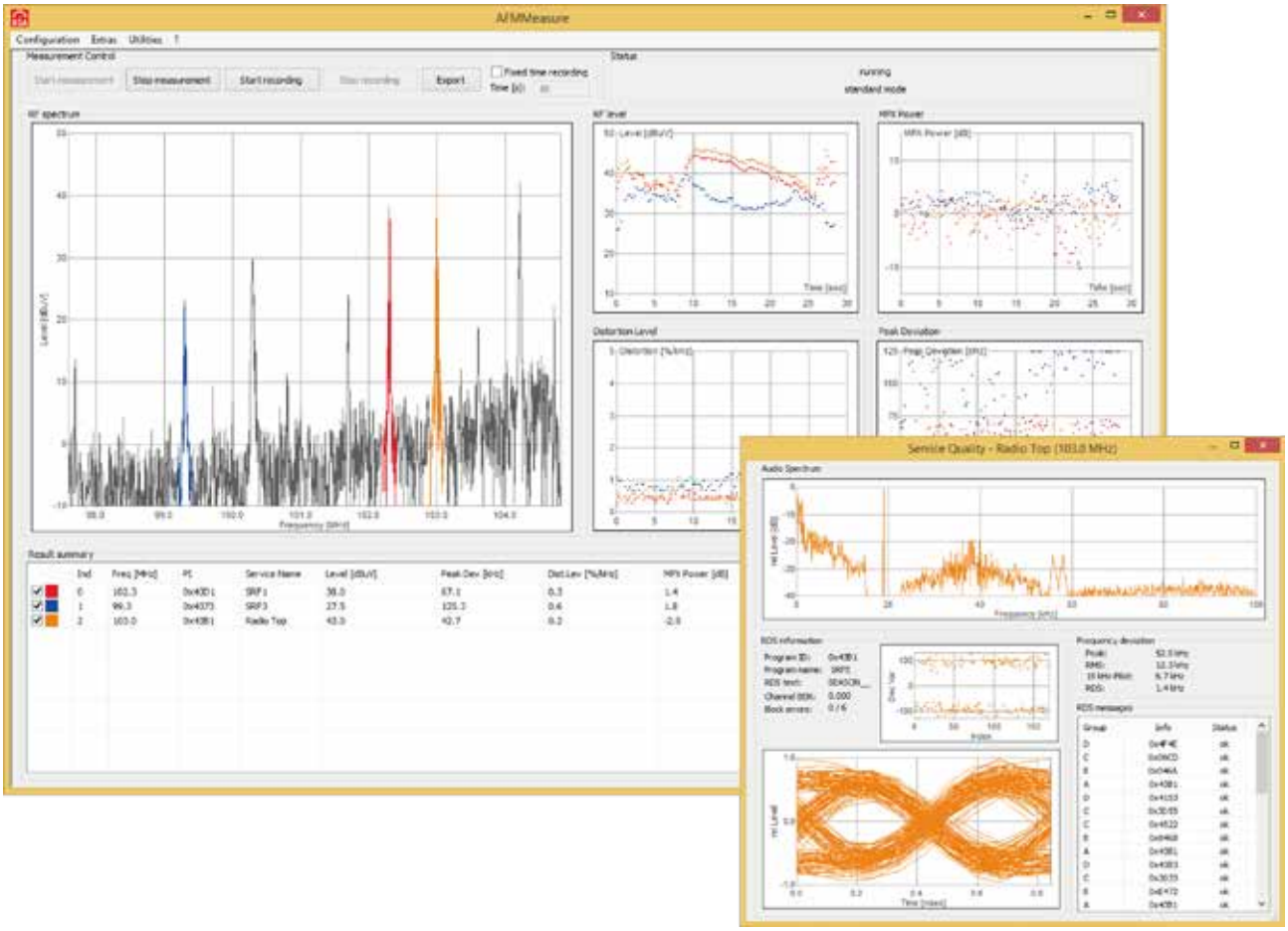
Software Support Service
Kathrein offers support contracts which may include software maintenance and updates, as well as operational support. One year of support is included when purchasing.

KATHREIN Signal Analyser Measure FM

Software for measuring and analysing FM signals.
Order No. 7620100004/05

Key Features

- FM spectrum view
- AM spectrum view of FM channel
- RDS Quality of Service parameters
- Eye pattern of RDS signal
- Channel allocation measurement mode
- Export function for txt file



RF Parameters

- FM spectrum
- Rx level in dBm, dBuV or dBuV/m

Quality

- Frequency deviation (Peak, RMS, 19 kHz Pilot, RDS)
- Distortion level
- MPX power
- AM spectrum for every FM channel

RDS Measurement and Analysis

- RDS BER
- RDS BLER
- RDS text
- RDS content
- Eye pattern of RDS signal

Special Measurement Modes

- Fixed time measurement
- Height profile measurement
- Azimuth pattern measurement
- Channel allocation measurement

KATHREIN Signal Analyser Measure DAB/DAB+

Software for measuring and analysing DAB/DAB+ signals.
Order No. 7620100006/07

Key Features
- Coverage margin calculation
- Channel scan
- Fast level measurement mode
- TII analysis
- Antenna monitor: Height profile and radiation pattern
- Export function for txt file, MapInfo, kml and CHIRplus BC
- Review function for replaying recorded measurement data, referenced to a map

Supported Standards
- DAB: EN 300 401
- DAB+: TS 102 563
- DMB: TS 102 427

RF Parameters
- Spectrum
- Channel impulse response (CIR): graphical overview, table overview, level and delay analysis
- Level
  Null symbol, sync symbol
- Frequency error
- Phase error
- Modulation error ratio (MER)
- Signal to noise ratio (SNR)
- Constellation diagrams
- Transmitter identification
- Coverage reserve
- Symbol quality

Channel BER
- VEFR FIC channel
- VEFR per subchannel
- BER of DMB streams

DAB+ streams
- Viterbi Error Flag Ratio VEFR
- Pre Reed Solomon BER
- Post Reed Solomon BER
- AU CRC failure

Ensemble
Ensemble and service labels

More Features
- Symbol quality measurement
- DMB info
- DAB+ info
- DAB packet data information
- Coverage reserve
- FIG info
- TII table
- Fast level measurement mode
- Channel scan

KATHREIN Signal Analyser Measure DVB-T

Software for measuring and analysing DVB-T signals.
Order No. 7520100002/03

Key Features

- Coverage Margin
- Channel Scan/Measure
- Sync Analysis
- Two Channel Diversity
- Antenna monitor: Height profile and radiation pattern
- Export function for txt file, MapInfo, kml and CHIRplus BC

Supported Standards

DVB-T: EN 302 744/302 304

RF Parameters

- Spectrum
- Channel impulse response (CIR): graphical overview, table overview, level and delay analysis
- Channel result
- RX level
- Symbol level
- Constellation diagrams
- Channel rise time (CRT)
- Frequency error

Quality

- BER PreViterbi
- BER PreRS
- BER PostRS
- SINR
- MER

TS Analysis

- Number of transport errors
- Number of sync byte errors
- Number of re-sync events
- Number of sync loss events
- Sync OK state length
- Sync fail state length
- PAT CRC failures
- CAT CRC failures
- PMT CRC failures
- TS error mask

Diversity Mode

- Fixed antenna 0
- Fixed antenna 1
- Maximum ratio
- Equal gain
- Subcarrier selection
- Antenna selection

More Features

- Show PAT
- Show TPS
- Show coverage margin
- Sync analysis
- Extended CIR
- Spectrum measurements
- Antenna monitor
- Channel scan

KATHREIN Signal Analyser Measure DVB-T2

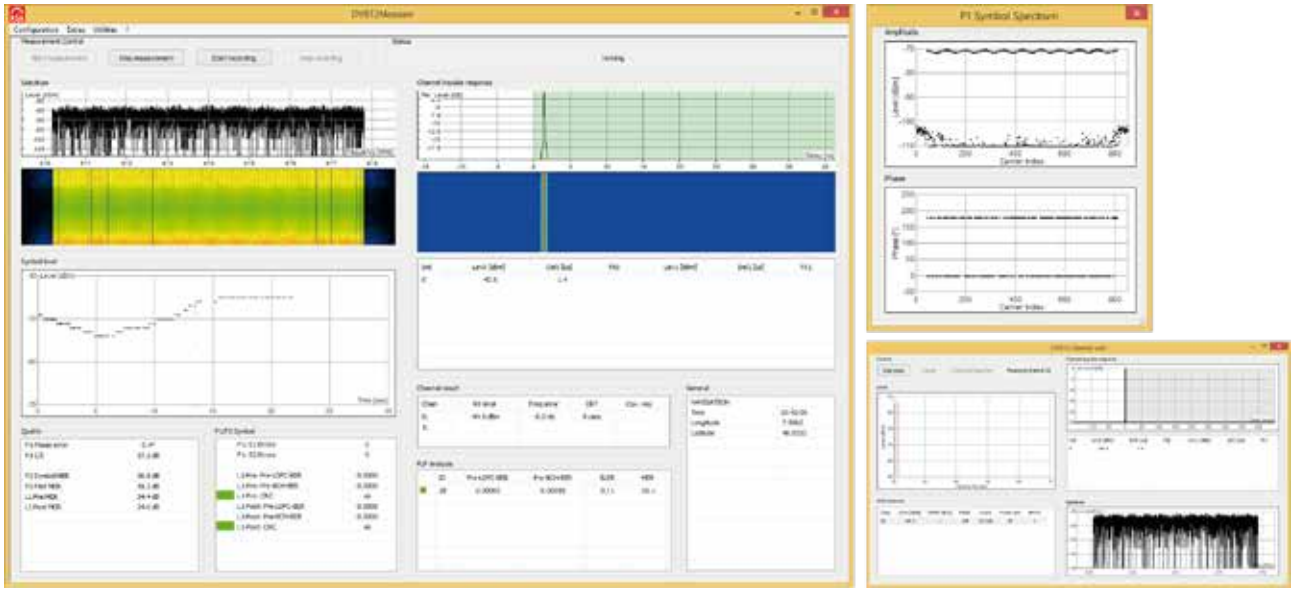
Software for measuring and analysing DVB-T2 signals.
Order No. 7620100010/11

Key Features

- Coverage margin
- Channel scan/measure
- Sync analysis
- Two channel diversity
- Antenna monitor: height profile and radiation pattern
- Export function for txt file, MapInfo, kml and CHIRplus BC

Supported Standard

DVB-T2: EN 302 755



RF Parameters

- Spectrum (all DVB-T2 bandwidths)
- Channel impulse response (CIR): graphical overview, table overview, level and delay analysis
- Channel result
- Symbol level
- Constellation diagrams: pilots-1st-P2-symbol, L1 pre signalling, L1 post signalling, per PLP
- Channel rise time (CRT)
- Frequency error

Quality

- P1 phase error
- P1 channel/interference (C/I)
- P2 symbol MER
- P2 Pilot MER
- L1 pre signalling MER
- L1 post siganlling MER

P1 Symbol

- Spectrum
- Phase
- C/I

P1/P2 Symbol

- P1: S1/S2 Errors
- L1 pre-signalling: pre LDPC-BER
- L1 pre-signalling: pre BCH-BER
- L1 pre: CRC check
- L1 post: pre LDPC-BER
- L1 post: pre BCH-BER
- L1 post: CRC check

Multiple PLP Analysis

- Pre LDPC-BER per PLP
- Pre BCH-BER per PLP
- Failed FEC blocks per PLP
- MER per PLP

Diversity Mode

- Fixed antenna 0/1
- Maximum ratio
- Equal gain
- Subcarrier selection
- Antenna selection

L1 Pre-Signalling Information

- Transmissing type
- Extended carrier mode used/not used
- S1/S2
- Guard interval
- PAPR used/not used
- L1 modulation
- L1 coding
- Pilot Pattern (PP)
- Cell/network/T2 system ID
- Number of data symbols

L1 Post-Signalling

- Frame ID
- Number of PLP
- PLP ID
- PLP type
- Payload type
- FF flag
- First RFIDX
- First frame IDX
- PLP group ID
- PLP code rate
- PLP modulation
- Constellation rotation used/not used
- PLP FEC type
- PLP number block max
- Frame interval
- Time interleaving length
- Time interleaving type
- In-band signalling flag

KATHREIN Signal Analyser LTE Scanner FeMBMS

KSA

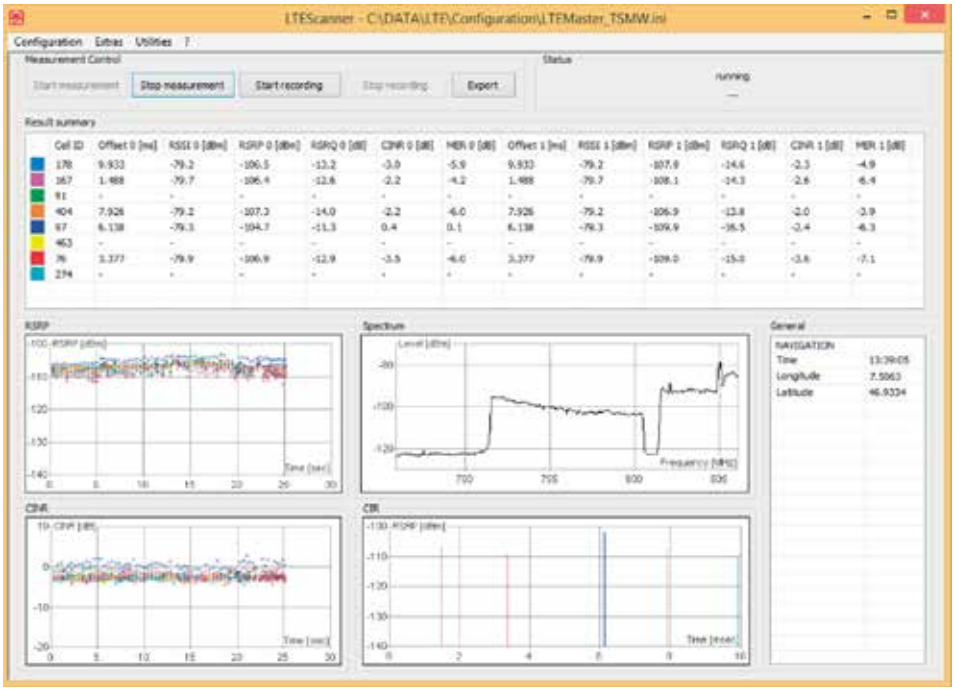
Software for measuring and analysing FeMBMS signals.
Order No. 7620100016/17

Key Features

- Export function for txt file, MapInfo, kml and CHIRplus BC
- Review function for replaying recorded measurement data, referenced to a map

Standard

- ETSI TS 136 211
- ETSI TS 136 212



LTE Parameters and Graphs

- Physical Cell Identifier PCI
- Received Signal Strength Indicator RSSI
- Reference Symbol Received Power RSRP
- RSRP port 0 and port 1
- Reference Symbol Received Quality RSRQ
- Reference symbol CINR
- Modulation error ratio MER
- Time offset
- Spectrum
- Channel impulse response
- Constellation

FeMBMS Parameters and Graphs

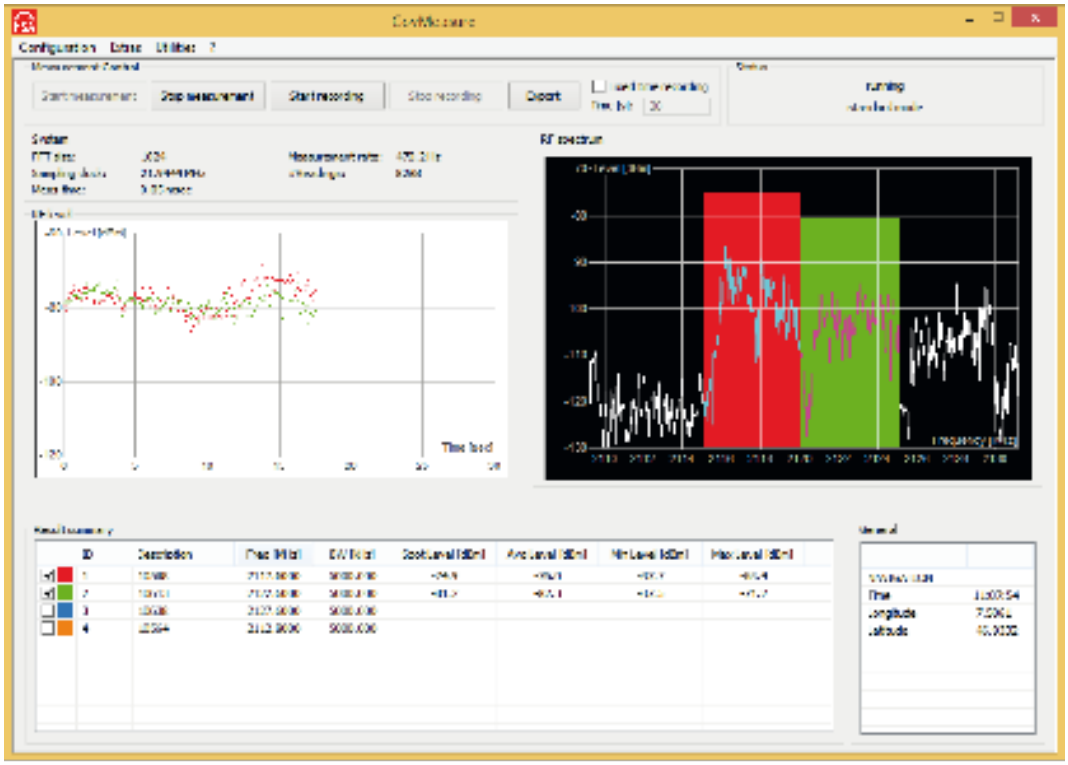
- MBSFN symbol
- MER
- Constellation
- Channel impulse response
- SFN ID
- Channel BER/BLER: PBCH, PCFICH, PDCCH, PDSCH, PMCCH, PMTCH

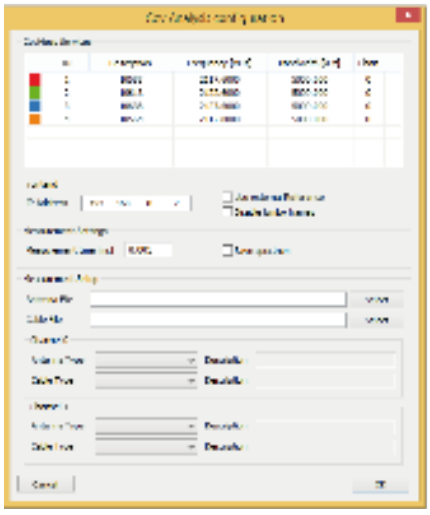
KATHREIN Signal Analyser Coverage Measure

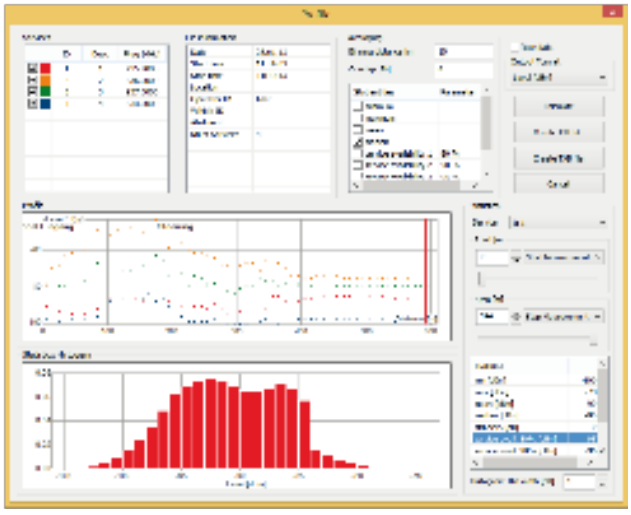
The software is able to measure a number of channels with a certain bandwith within the acquisition bandwith of the receiver (eg. 24MHz).
Order No. 7620100014/15

Key Features

- Very high speed channel measurement
- Free definable number of channels
- Free definable bandwith of a certain channel
- Export function for txt file, MapInfo







KATHREIN Signal Analyser Measure DxB Scanner

KSA

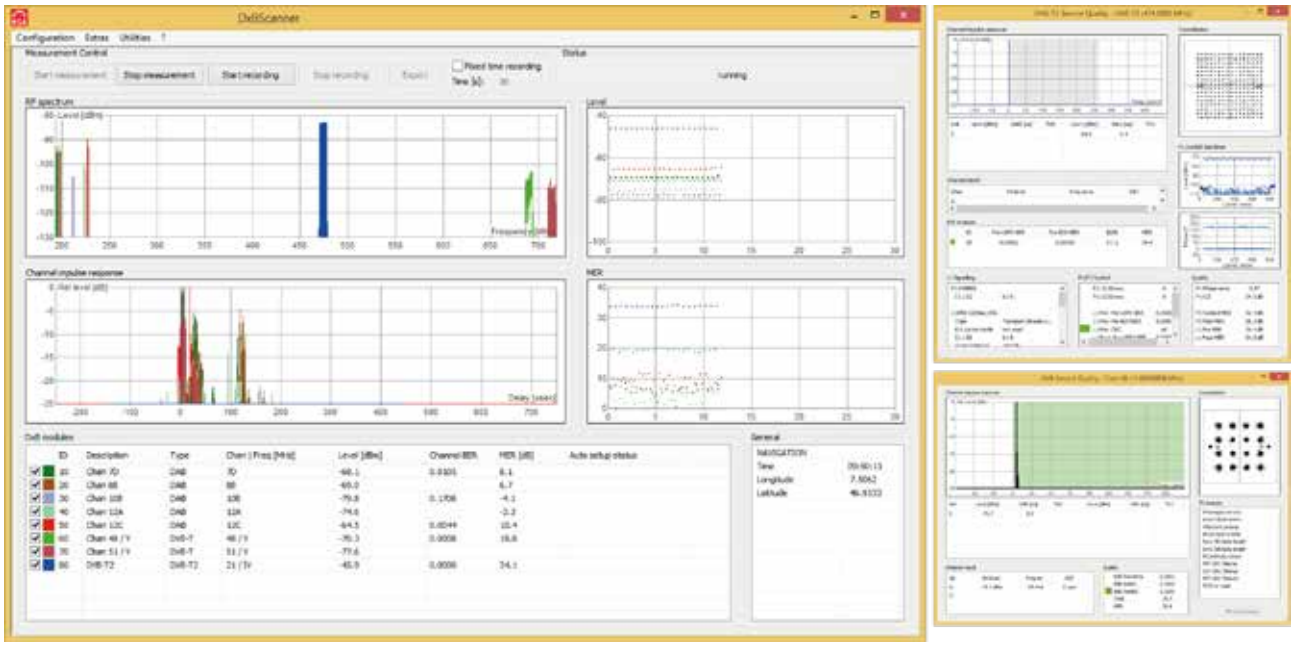
Software for measuring and analysing DxB (DVB-T, DVB-T2, DAB and DAB+) signals of multiple MUX and different technologies.
With Channel scan and Auto Setup mode, the configuration can be done easily without knowledge of detailed parameters of the DxB signal.
Order No. 7620100012/13

Key Features

- Parallel measurement of multiple MUX and different technologies with just one software
- Detail view for each channel
- Channel scan and auto setup mode
- Channel diversity for DVB-T/DVB-T2
- Antenna monitor: Height profile and radiation pattern
- Export function for txt file, MapInfo, kml and CHIRplus BC

Supported Standards

- DVB-T2: EN 302 755
- DVB-T: EN 302 744/302 304
- DAB: EN 300 401
- DAB+: TS 102 563



RF Parameters

- RF spectrum
- Channel impulse response (CIR): graphical overview, table overview, level and delay analysis
- Channel result
- Symbol level
- Constellation diagrams
- MER
- Frequency error

Special Measurement Modes

- Channel scan
- Antenna monitor for height profile

DVB-T2

- Quality:
  P1: phase error, C/I
  P2: symbol MER, Pilot MER
  L1: pre MER, post MER
- P1/P2 symbol:
  P1: S1/S2 errors
  L1 pre: pre LDPC BER, pre BCH BER
  L1 pre: CRC check
  L1 post: pre LDPC BER, pre BCH BER
  L1 post: CRC check
  Detailed L1 pre-signalling information
  Detailed L1 post-signalling information
- PLP analysis:
  Pre LDPC-BER per PLP
  Pre BCH-BER per PLP
  Failed FEC blocks per PLP
  MER per PLP

DVB-T

- Quality:
  BER PreViterbi, PreRS, PostRS, SINR, MER
- TS analysis: number of transport and sync, byte errors, number of re-sync and sync loss events, PAT/CAT/PMT CRC failures
- TPS information

DAB(+)

- Quality: level null/sync symbol, MER, SNR, transmitter identification
- BER measurements: VEFR FIC and per sub-channel, Viterbi Error Flag Ratio VEFR, pre/post Reed Solomon BER, AU CRC failure