**COMPANY PRESENTATION**

**DIGITAL TV & RADIO MONITORING**

**GlobalViewer**

**IPTV & OTT Service Platforms**

High-density and scalable solution for QoS & QoE monitoring of hundreds of streams in parallel: ETR 101 290, audio levels, video freeze/black screen, live thumbnail mosaic view and service streaming.

- StreamProbe IPTV & OTT

**Digital TV Broadcast Networks**

Cost-effective and high quality monitoring probes for Head-End, Transmission and Reception sites – RF & SFN signal quality, Transport Stream QoS: ETR 101 290, DVB-T2-MI, OneBeam/Single Illumination (DVB-S/S2), BTS.

- EdgeProbe Advanced
- EdgeProbe Advanced module for High Density chassis
- EdgeProbe RF & Nano
- TRANSBOX confidence monitoring

**ATSC 3.0 Broadcast Networks**

Reliable end-to-end SFN solution provided by ENENSYS TestTree.

- EdgeProbe Advanced

**Digital Radio Broadcast Networks**

Cost-effective and high quality monitoring probes: RF & SFN signal quality.

- EdgeProbe Advanced

**TEST TOOLS FOR LAB & FIELD**

**RF Capture/Playback & Generate**

70 MHz – 6 GHz frequency range, with down conversion for Ku/C band

- RF-Catcher Starter Kit
- Application Suite for RF-Catcher
- ATSC 3.0 LabMod
- RF-LiveSim

**Analyze RF & Baseband**

Multi-standard (ATSC 3.0/1.0, DVB-T/T2, DVB-C/C2, DVB-S/S2, ISDB-T/Tb) professional measurement receivers and pocket-size analyzers, recorders and players; connected via USB to a Windows PC running the DiviSuite analysis software

- ReFeree 3
- DiviSuite
  - DiviSuite Base
  - DiviSuite options: RF Scope, TS Analyzer, T2-MI Analyzer, Drive Test Coverage
- Hardware products used with the DiviSuite
  - ReFeree II
  - DiviCatch RF Series
  - DiviDual ASI + SPI (LVDS or TTL)
  - DiviDual ETI
- Pure software application using the DiviSuite
  - DiviSuite-IP

**About TestTree**

TestTree provides innovative and easy-to-use end-to-end Test and Monitoring solutions for Network operators, TV Content Providers, IPTV & OTT Platform Operators, Regulators, Chipset & TV/STB Manufacturers, R&D Labs, Automotive.

TestTree is a proud member of the ENENSYS Technologies group. ENENSYS designs and manufactures innovative professional equipment and software enabling Efficient Video Delivery over Terrestrial (ATSC 3.0, DVB-T/T2, ISDB-T/Tb, HbbTV...), Satellite (DVB-S/S2/S2X) & Telecom Networks (4G/5G, IPTV, OTT).

TestTree culture is based on innovation. ENENSYS has a strong IPR portfolio, with more than 60 patents, all dedicated to the Video Delivery sector. Linked to this innovation work, TestTree is proud to be the first to introduce new test devices to support customers in their network improvements and deployments.

All products are fully developed and produced in France by TestTree: hardware, firmware, software... providing the complete knowledge and flexibility to our team to deliver new features according to customer requests and to imagine new solutions.

**Our Customers**

**R&D Labs**

- Chipset and Receivers manufacturers / Digital TV R&D centers / Broadcast equipment manufacturers / Network & Service Platform Operators / Automotive, Telecom, Defense
- Factory testing
- End of production equipment test and validation
- Demos
- Receivers Promotion, Trade Show...

**FM & Digital Radio & Info Traffic**

- Field testing & recording / R&D Lab investigation
- Video Content Providers
- System Design and Operational teams / Network Monitoring
- Broadcast regulators
- Field testing & recording / Network compliance monitoring

www.test-tree.com
In a modern broadcast and broadband video delivery environment, video streams originate from a variety of sources.

Ensuring the availability and quality of both live and file-based content is a critical challenge for video content owners and distributors moving to Adaptive Bit Rate (ABR) and Over-The-Top (OTT) delivery models.

TestTree monitors the whole video delivery chain and thus optimizes the overall service quality and customer experience.
DIGITAL TV & RADIO MONITORING

GLOBALVIEWER
Centralized Service Availability & Network Quality views

IPTV & OTT SERVICE PLATFORMS
High-density and scalable solution for QoS & QoE monitoring of hundreds of streams in parallel: ETR 101 290, audio levels, video freeze/black screen, live thumbnail mosaic view and service streaming.

StreamProbe IPTV & OTT

DIGITAL TV BROADCAST NETWORKS
Cost-effective and high quality monitoring probes for Head-End, Transmission and Reception sites – RF & SFN signal quality, Transport Stream QoS: ETR 101 290, DVB-T2-Mi, OneBeam/Single Illumination (DVB-SIS), BTS.

EdgeProbe Advanced
EdgeProbe Advanced for High Density chassis
EdgeProbe Nano & RF
TRANSBOX confidence monitoring

ATSC 3.0 BROADCAST NETWORKS
Reliable end-to-end SFN solution provided by ENENSYS TestTree.

EdgeProbe Advanced

DIGITAL RADIO BROADCAST NETWORKS
Cost-effective and high quality monitoring probes: RF & SFN signal quality.

EdgeProbe Advanced

6000+ PROBES DEPLOYED
STREAMPROBE IPTV
STREAMPROBE OTT

SOFTWARE SOLUTION:
- Linux OS, VM for hypervisor type 1 (ESXi >.8.0)
- off the shelf server, 1RU or 2RU (for large number of RF receivers)
- CPU, RAM, HDD depending on number of streams to monitor
- Server Application for a Centralized Network Quality & Service Availability view

GLOBALVIEWER
- Server Application for a Centralized Network Quality & Service Availability view
- Analytics measurement data storage for customizable dashboard and automatic reports

EDGEPROBE ADVANCED
STANDALONE UNIT:
1 RU 19" format: multi-standard support in 1 RU
Up to 4x ASI in/out
Up to 4x IP Data In/out (VLAN support)
Up to 2x IP Control
Up to 4x 32 GB internal storage
1x TPDS, 1x 10MHz inputs
1x GPS input (GPS, GLONASS)
Eth in/out (alarm dry contact)*
2x DVB-CI+ slots (decrypt up to two CA systems in parallel)*
Up to 4x HDMI outputs*
Dual Power Supply

TSolIP OTT-ABR
- TS Monitor:
  - ETSI TR 101 290 Priority 1, 2, 3
  - MDI: Delay Factor, Media Loss Rate
- OTT-ABR Monitor:
  - HLS, MPEGS-DASH
  - Playlist integrity & network performance
- QoE Monitor:
  - Audio levels, silence detection
  - Video freeze, black screen, missing Intra detection
  - MPEG-2, H264, 4K, HEVC
  - Live Thumbnails/Mosaic
  - Audio levels, subtitles, penalty box
- CA processing:
  - EMM/ECM presence & repetition
- Video processing:
  - Live streaming over low bandwidth links
  - TS recording on error or manual/scheduled

EDGEPROBE NANO
STANDALONE UNIT:
1 RU 19" format: EdgeProbe RF Compact 144x137x30 mm format: EdgeProbe Nano
1x RF input N-type 50 Q (RF) / F-type 75 Q (Nano)
1x IP Control & Data In/out (VLAN support)
1x ASI output
1x 32 GB internal storage

TRANSBOX
- RF Monitor:
  - Signal Quality, Channel Impulse Response (Echoes)
- TS Monitor:
  - ETSI, BTS
  - ETSI TR 101 290 Priority 1, 2 & 3 and QoS SAE/SDE
- Multiplex Service Plan description
- Extended Storage:
  - Logs & Trends up to 3 months, TS recording
  - Easy integration for NMS supervision:
    - Low bitrate Web GUI (GPRS/3G/5G/4G)
    - SNMPv2 Support + v2c INFORM (no trap loss)

- HW/SW* Option for EdgeProbe Confidence Monitoring
- Streaming of multiplex services(s) over low bandwidth network links (compression down to 500 Kbps)

STANDALONE UNIT:
1 RU 19" format: EdgeProbe RF Compact 144x137x30 mm format: EdgeProbe Nano
1x RF input N-type 50 Q (RF) / F-type 75 Q (Nano)
1x IP Control & Data In/out (VLAN support)
1x ASI output
1x 32 GB internal storage
DIGITAL TV & RADIO MONITORING

GLOBALVIEWER

Centralize your Service Availability & Network Quality views!

APPLICATIONS
- Live Supervision of your Network’s QoS
- Centralized monitoring data with a real-time Dashboard
- Report generation for SLA commitments
- SMS/Email alerting

BENEFITS
- Centralized management of your deployed EdgeProbe & StreamProbe
- Easy to use and configure
- Compatible with low bandwidth control network (GPRS/3G/4G)
- Virtualized SW based solution

TECHNICAL CHARACTERISTICS
VM for hypervisor type 1 (ESXi >6.0)
Minimum server requirement: 4 cores CPU, 16GB RAM, 100GB HDD; depending on the number of Probes to centralize

ORDERING CODES
GlobalViewer
Perpetual Software License for server application: centralized EdgeProbe and StreamProbe monitoring

<table>
<thead>
<tr>
<th>Included</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervision</td>
<td>Live monitoring status centralized on map display</td>
</tr>
<tr>
<td>Analytics</td>
<td>Monitoring data history Dashboard and Reports</td>
</tr>
<tr>
<td>Alerting</td>
<td>SMS/Email notifications (requires specific integration with customer’s SMS gateway)</td>
</tr>
<tr>
<td>10 Probes</td>
<td>1 Probe = 1x EdgeProbe Monitoring Unit or HDmE module, or 1x IPTV or OTT StreamProbe</td>
</tr>
</tbody>
</table>

SW Options
- Additional Probes
**StreamProbe**

**IPTV OTT**

Perpetual software license for TS monitoring probe

- Perpetual software license for OTT- ABR monitoring probe

**KEY FEATURES**

**IPTV**

- **QoS TS monitoring:**
  - MDI: Delay Factor, Media Loss Rate, Delta (min, max, average), Drift & Purport Drift
  - FEC support (packets recovered/lost), IP jitter
  - ETSI TR 101 290 Priority 1, 2, 3
  - PSI/SI repetition rates, scrambling
  - Bitrates: TS, service & service components, PSI/SI
- **QoS monitoring:**
  - Video monitoring: freeze, black screen, missing intra detection
  - PID codec information: type, pixel format, profile, level, GOP structure and size, image count and weight, width, height, aspect ration, frame rate and type, VB delay
  - Audio monitoring: levels, silence detection
  - PID codec information: type, channel number and layout, sample rate and format
- **Substitutes DVB and Telatext:** decoding and display
  - Formats: MPEG-1 audio, MPEG-2 audio/video, H264 SD & HD, 4K, HEVC
- **Live Thumbnail Mosaic:** all services or group filtering, audio levels, subtitles, penalty box
- **Live service(s) streaming** over low bandwidth links (service compression)
- **TS recording:** on error or manually scheduled
- **CA processing:**
  - EMM/ECM: presence, repetition, bitrates
  - FTA: Scrambled: transition timing displayed
- **Configurable alarming thresholds:** general and daily alarm profiles
- **NMS integrations:** SNMPv2 support for alarm traps
- **Monitoring information available via an open API** ([HTTP/JSON API])

**OTT**

- **QoS ABR monitoring:** playlist integrity & network performance check
  - HLS, MPEG-DASH
  - Manifest integrity check, content display & download
  - Profile information: availability, type, bitrate statistics, codec, resolution, base and relative URL, playlist content/format, chunk number, media sequence
  - Chunk HTTP information: availability, length, bitrate statistics, playlist format
  - HTTP connection time statistics: connection, DNS redirection, upload, download
- **QoS monitoring:**
  - Video monitoring: freeze, black screen, missing intra detection
  - PID codec information: type, pixel format, profile, level, GOP structure and size, image count and weight, width, height, aspect ration, frame rate and type, VB delay
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- **Monitoring information available via an open API** ([HTTP/JSON API])

**ABR**

- **QoS ABR monitoring:**
  - Manifest integrity check, content display & download
  - Profile information: availability, type, bitrate statistics, codec, resolution, base and relative URL, playlist content/format, chunk number, media sequence
  - Chunk HTTP information: availability, length, bitrate statistics, playlist format
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  - Video monitoring: freeze, black screen, missing intra detection
  - PID codec information: type, pixel format, profile, level, GOP structure and size, image count and weight, width, height, aspect ration, frame rate and type, VB delay
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- **TS recording:** on error or manually scheduled
- **CA processing:**
  - EMM/ECM: presence, repetition, bitrates
  - FTA: Scrambled: transition timing displayed
- **Configurable alarming thresholds:** general and daily alarm profiles
- **NMS integrations:** SNMPv2 support for alarm traps
- **Monitoring information available via an open API** ([HTTP/JSON API])

**APPLICATIONS**

- Monitoring of the content QoS & GoE received from contribution, prior & after encoding/packaging as well as from an end user point of view
- Generation of Service Availability reports for SLA commitments
- Live TS Recording for Compliance Recording and conflict/litigation proof
- Generation of Service Availability reports for SLA as from an end user point of view
- Monitoring of the content QoS & QoE: received from throughout the video service processing chain.

**BENEFITS**

- High density: hundreds of services monitored in real-time & in parallel in a single 1RU server; 100s interfaces supported
- Scalables from an all-in-one system to a fully distributed architecture
- Software only: Linux DS, VM for virtualized environments
- Remotely accessible: compatible with low bandwidth control networks (GPRS/3G/G)
- Northbound interface [SNMP, open API]

**TECHNICAL CHARACTERISTICS**

- SW solution: Linux DS, VM for hypervisor type 1 ([ESXi +6.0])
- Off the shelf server, 1RU or 2RU (for large number of RF receivers)

**ORDERING CODES**

**StreamProbe IPTV**

- Perpetual software license for TS monitoring probe
  - Bitrate: Capacity [bitrate to monitor per probe: 100Mbps, 300Mbps, 500Mbps, 1Gbps, 2Gbps, 4Gbps, 7Gbps or custom]
  - Included: GoS Monitor TS

**StreamProbe OTT HLS**

- Perpetual software license for OTT- ABR monitoring probe
  - Bitrate: Capacity [bitrate to monitor per probe: 100Mbps, 300Mbps, 500Mbps, 1Gbps, 2Gbps, 4Gbps, 7Gbps or custom]
  - Included: GoS Monitor ABR

**StreamProbe OTT DASH**

- Perpetual software license for OTT- ABR monitoring probe
  - Bitrate: Capacity [bitrate to monitor per probe: 100Mbps, 300Mbps, 500Mbps, 1Gbps, 2Gbps, 4Gbps, 7Gbps or custom]
  - Included: GoS Monitor ABR

**QoE monitoring for Contribution/Encoding/Packaging**

- QoE & GoE Monitor: hundreds of services monitored in parallel ABR playlist integrity, ETR 101 290, audio silence, video freeze/black screen
EDGEPROBE

RF & QoS monitoring for Broadcast Distribution & Transmission

Accurate RF signal quality measures

ETR 101 290 compliance
STB decoding assurance

Reference SFN Monitoring – Transmission site
Time & frequency synchronization, distribution link Network Delay

Reference SFN Monitoring – Reception site
Echo monitoring with Echo Pattern mode – more precise echo in error identification, even if the main echo suffers changes!

RF signal time synchronization: measure the RF frame transmission time drift/delay
Before modulation: measure the TS Network Delay between HE and TX site

RF signal frequency synchronization: measure the Carrier Frequency drift

RF & QoS monitoring for Broadcast Distribution & Transmission

Reference SFN Monitoring – Transmission site
Time & frequency synchronization, distribution link Network Delay

Reference SFN Monitoring – Reception site
Echo monitoring with Echo Pattern mode – more precise echo in error identification, even if the main echo suffers changes!
Digital TV & Radio Monitoring   |  DTV Broadcast Networks

**EdgeProbe Advanced**

**KEY FEATURES**
- **DTT & CATV RF** accuracy measurements: signal level, SNR, MER, BER
- **DTT RF** spectrum and constellation display, shoulders measurements
- **DTT SFN** synchronization monitoring:
  - RF Frame Time Drift, Carrier Frequency Drift
  - Channel Impulse Response with unique Echo Pattern, reliable echo in error identification when main echo suffers changes
- **Network Delay**:
  - TS/T2-MI over IP/ASI input
- **Satellite RF** accurate measurements:
  - Signal level, C/N, link margin, Eb/No, BER
  - Multi-stream support, PLx support (foo/gold)
  - LNB power and control
- **IP Distribution** link monitoring:
  - FEC support (packets recovered/lost), IP jitter (Inter-Packet Arrival Time)
  - TS ETSI TR 101 290 validation: Priority 1, 2, 3
  - Optional DVB S4E (Service Availability Error), SDE (Service Degradation Error)
- **Service Plan** monitoring: multiplex structure, bitrate and regionalization check
- **T2-MI** monitoring:
  - L1 post-packet signaling, ETSI TR 101 290 T2-MI alarms, PLP T2-MI packet, Network Delay
  - OneBeam/Single Illumination monitoring: T2-MI marker, In-Band PIDs
  - BTS monitoring: IP, TMCC packets
  - Service streaming over low bandwidth links (compression down to 500Kbps)

**APPLICATIONS**
- **24/7 Monitoring and Maintenance of both Head-End and TX sites**:
  - DTV/CATV RF, Transmission (SPN, FNI), Satellite RF distribution, ASI/IP, Baseband distribution
  - Generation of Service Availability reports for Service Level Agreements
  - Rebroadcast receiver: RF to ASI or IP
  - Live transmission recorder

**TECHNICAL CHARACTERISTICS**
EdgeProbe Advanced models:
- DVB-T/T2, DVB-S/S2, ISDB-T/Tb, DVB-C (J.83 A, C)
- DAVE/DBA/DAB (See Page 25), ATSC 3.0/1.0 (See Page 25) or any combination of two or these standards in 1RU

**KEY BENEFITS**
- Standalone, easy to use and configure, fast deployment, SNMP compatible
- Reduce TX sites maintenance cost by anticipating and identifying issues
- Increase customer satisfaction by detecting & preventing DTV network degradations before your customers do
- Remotely accessible, compatible with low bandwidth control networks (IP/RF/ASI)
- Low power consumption 25W

**ORDERING CODES**

<table>
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<tr>
<th>EdgeProbe Advanced</th>
<th>DTV Advanced Monitoring Probe</th>
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<tr>
<td><strong>CHASSIS</strong></td>
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<td><strong>HW Options</strong></td>
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<td><strong>SW Options</strong></td>
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<tr>
<td>DVB-T/T2 model of EdgeProbe Advanced comes in the form of an independent module (HDMc), for High Density chassis (Hdc) 19” 1RU, which provides:</td>
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<tr>
<td>HDc-Multi-220V</td>
<td>High Density chassis with 220V input</td>
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<tr>
<td>HDc-Multi-48V</td>
<td>High Density chassis with 48V input</td>
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</tbody>
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<tr>
<th>CHASSIS HW Options</th>
<th>DVB-T/T2 EdgeProbe Advanced with different type of ENIENS products (T2Edge, T2Edge-UH, ATSCUH, etc) in the same chassis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAB/DAB+</td>
<td>EdgeProbe Advanced for Hdc</td>
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<td>HDc-Multi-48V</td>
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<tr>
<td>HDmE</td>
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</tbody>
</table>

See above for DVB-T/T2 EdgeProbe Advanced model options

| * Contact us for availability |

DVB-T/T2 model of EdgeProbe Advanced comes in the form of an independent module (HDMc), for High Density chassis (Hdc) 19” 1RU, which provides:

| HDc-Multi-220V     | High Density chassis with 220V input |
| HDc-Multi-48V      | High Density chassis with 48V input |
| HDmE               | High Density module EdgeProbe Advanced for DVB-T/T2 |

See above for DVB-T/T2 EdgeProbe Advanced model options

| * Contact us for availability |

DVB-T/T2 model of EdgeProbe Advanced comes in the form of an independent module (HDMc), for High Density chassis (Hdc) 19” 1RU, which provides:

| HDc-Multi-220V     | High Density chassis with 220V input |
| HDc-Multi-48V      | High Density chassis with 48V input |
| HDmE               | High Density module EdgeProbe Advanced for DVB-T/T2 |

See above for DVB-T/T2 EdgeProbe Advanced model options

| * Contact us for availability |

DVB-T/T2 model of EdgeProbe Advanced comes in the form of an independent module (HDMc), for High Density chassis (Hdc) 19” 1RU, which provides:

| HDc-Multi-220V     | High Density chassis with 220V input |
| HDc-Multi-48V      | High Density chassis with 48V input |
| HDmE               | High Density module EdgeProbe Advanced for DVB-T/T2 |

See above for DVB-T/T2 EdgeProbe Advanced model options

| * Contact us for availability |
EdgeProbe RF is the ideal & most cost-effective high-quality solution for controlling remotely the signal transmission of your low/mid power TX & relay sites that are sometimes difficult to reach.

EdgeProbe Nano is the most tiny and compact RF probe with no compromise on quality!

**APPLICATIONS RF**
- 24/7 Monitoring and Maintenance of DTV live transmission
- Cost-effective Monitoring of transmitters and relay sites
- Generation of Service Availability reports for Service Level Agreements
- Rebroadcasting receiver: RF to ASI or IP (including MUTE feature)
- Live transmission recorder

**APPLICATIONS NANO**
- Network operators:
  - automatic the tests of new transmitters
  - temporary monitoring/investigation tool
  - rebroadcasting receiver: RF to ASI or IP
- Broadcasters off-air monitoring probe to validate the on-air content
- TV/STB producers: automated tests against a professional receiver
- Labs: easy & simple access to live DTV sources via RF

**KEY FEATURES**
- RF accurate measurements: signal level, SNR, MER, BER
- Channel Impulse Response monitoring with unique Echo Pattern mode: reliable echo in error identification when main echo suffers changes
- TS ETSI TR 101 290 validation: Priority 1, 2, 3 and optional QoS SAE/SDI
- BTS monitoring: IIP, TMCC packets
- Service Plan monitoring: multiplex structure, bitrate and regionalization check
- Service Streaming over low bandwidth links (compression down to 500Kbps) (See page 21)

- Demodulated TS streaming over control IP output, or retransmission over ASI out
- Smart Retransmission Receiver (DVB-T/T2) mute the TS retransmission over ASI out upon RF input signal degradation
- Automated & Secure Deployment for small to large networks:
  - SNMPv2 support: alarm traps, monitoring information polling, monitoring settings control
  - FTP connection: log file retrieval, automatic firmware and configuration updates
- Trigger RF signal capture on RF-Catcher (See page 30)

**KEY BENEFITS**
- Standalone, easy to use and configure, fast deployment, SNMP compatible
- Increase customer satisfaction by detecting & preventing DTV network degradations before your customers do
- Reduce TX sites maintenance cost by anticipating and identifying issues
- Remotely accessible, compatible with low bandwidth control networks (GPRS/3G/4G)
- Low power consumption 8W
- Enables SNMP test automation

**TECHNICAL CHARACTERISTICS**
- 2x Video sources via RF
- Laboratories: live testing against a professional receiver
- TV STB producers: automated probe to validate the on-air content
- Broadcasters: off-air monitoring - rebroadcasting receiver: RF to ASI or IP - temporary monitoring/investigation tool - automate the tests of new transmitters
- Network operators: availability reports for Service Level Agreements

**ORDERING CODES**
- **EdgeProbe Nano** or **EdgeProbe RF**
- **DTV RF Monitoring Probe**
  - Select your standard: DVB-T/T2/T2 Lite or DVB-C/C2 or ISDB-T/Tb
  - Included:
    - RF + CIR monitoring, TS over IP input support, VLAN, IP to ASI/TP TS retransmission
  - SW Options:
    - Scanning: Multiple RF channels sequential monitoring over 1 RF input
    - TS Monitor Base: ETR290 Priority 1, 2 monitoring
    - TS Monitor Advanced: ETR290 Priority 3
    - QoS Monitor: SAE, SDE monitoring
    - Service Plan: Multiservice/PIF monitoring
    - BTS Monitor: IP & TMCC packet monitoring
    - TS Monitor Advanced: Multiple RF channels sequential monitoring over 1 RF input
    - TS Monitor Advanced: Multiple RF channels sequential monitoring over 1 RF input
  - HW Options:
    - TRANSDUX: Stream 1 or 2 compressed service(s) (low bitrate)
    - Loop: Preserve the HW from corruption

**TRANSBOX**
Controlled by one EdgeProbe unit (Advanced, RF, Nano), the TRANSBOX provides real-time:
- Service extraction from the input TS (SPTS or MPTS received from the EdgeProbe)
- Service compression (audio/video transcoding, including subtitles), down to 500 Kbps
- Streaming the compressed SPTS over low bandwidth IP Data to third party systems

**APPLICATIONS**
- Confidence monitoring: live service streaming over low bandwidth network links!
- Topological and configuration update
- FTP connection: log file retrieval, automatic firmware and configuration updates

**TECHNICAL CHARACTERISTICS**
- 1 or 2 Transcoding Units (TU) in 1 RU (1 or 2 services transcoded simultaneously up to 10 min)
- 1 RU is controlled by with 1 EdgeProbe Unit
- 1x IP Data in/output (GbE) and 1x IP control (100 Mbps) per TU
- Unicast, VLAN support for IP Data in/out
- 60 Mbps maximum input bitrate
- 500 Kbps to 10 Mbps output bitrate
- Audio/Video input/output formats (contact us for details)
- Output video resolution: CIF, D1/CIF, 2CIF, 4CIF
- Output audio bitrate: 32 kbps to 192 kbps
- HbbTV, subtitles, private data supported

**KEY BENEFITS**
- Easy to use and configure; transcoding controlled via the master EdgeProbe unit, SNMP compatible
- Compatible with low bandwidth data networks: down to 500 Kbps compressed streams
- Low power consumption SW

**ORDERING CODES**
- **TRANSBOX**
  - Transcoding Unit for EdgeProbe
- **HW Options**
  - Dual: Two parallel transcoding units in 1 RU

**TECHNICAL CHARACTERISTICS**
- EdgeProbe RF & Nano models:
  - DVB-T/T2/T2 Lite, ISDB-T/Tb, DVB-C J.83 A, B, C
  - 1x RF in, 1x ASI out, 1x IP Control/Data in/out (VLAN support)
  - 32 GB storage for TS record and 6 months logs & trends

**Applications**
- Confidence monitoring: live service streaming over low bandwidth network links!
- Validate regional service and/or ad insertion
- Service compression (audio/video compression & streaming)
- Topological and configuration update

**KEY BENEFITS**
- Easy to use and configure; transcoding controlled via the master EdgeProbe unit, SNMP compatible
- Compatible with low bandwidth data networks: down to 500 Kbps compressed streams
- Low power consumption SW
ATSC 3.0 BROADCAST NETWORKS
RELIABLE END-TO-END SOLUTION PROVIDED BY ENENSYS TestTree

Centralized Network Quality & Service Availability  ➔  GLOBALVIEWER  See Page 12

Full-software monitoring for virtualized Head-End  ➔  STREAMPROBE  See Page 14

World-renowned SFN Monitoring [TX/RX]  ➔  EDGEPROBE  See Page 23

Efficient Lab & Field operation with world-deployed analyzers & recorders  ➔  RF-CATCHER  ➔  REFEREE 3  See Page 30

EDGEPROBE ADVANCED

EDGEPROBE Advanced ATSC is the ideal tool to achieve accurate & cost-effective monitoring of the quality actually delivered to all points of an ATSC 3.0/1.0 network.

APPLICATIONS
• 24/7 Monitoring and Maintenance of both Head-End and TX sites: RF transmission (SFN/MFN), Satellite RF distribution, IP Baseband distribution
• Generation of Service Availability reports for Service Level Agreements
• SFN Monitoring in Reception Areas: put yourself in the customer shoes

KEY BENEFITS
• ATSC 1.0 compatible for repack monitoring
• Standalone, easy to use and configure, fast deployment, SNMP compatible
• Reduce TX sites maintenance cost by anticipating and identifying issues
• Increase customer satisfaction by detecting & preventing DTV network degradations: before your customers do it
• Remotely accessible, compatible with low bandwidth control networks (GPRS/3G/4G)
• Low power consumption 25W

TECHNICAL CHARACTERISTICS
EdgeProbe Advanced models: DAB/DAB+, DVB-S/S2, DVB-C/C2, ISDB-T/Tb, ATSC 3.0/1.0 or any combination of two of these standards (See Page 16 for DVB-T/T2, DVB-C/C2, ISDB-T/Tb, DVB-S2, ATSC 3.0/1.0)
Up to 4x [RF in, ETI in/out, INI, NAI, IP Data in/out (VLAN support)] in 1 RU
Up to 2x IP Control for low bandwidth remote Web GUI
Up to 32 GB storage for 6 months logs & trends
1PPS: external or internal from GNSS receiver (GPS, GLONASS), 10MHz

KEY FEATURES
• RF accurate measurements: signal level, SNR, MER, BER
• RF spectrum and constellation display, shoulders measurements
• SFN synchronization monitoring:
  - TX ID Detection and echo association
  - RF Frame Time Drift
  - Channel Impulse Response with unique Echo Pattern model: reliable echo in error identification when main echo suffers changes
  - Network Delay: STLTP over IP input
• IP Distribution link monitoring:
  - FEC support [packets recovered/lost], IP jitter (Inter-Packet Arrival Time)
• ATSC 1.0 TS ETSI TR 101 290 validation: Priority 1, 2, 3
  - Optional QoS SAE [Service Availability Error], SDE [Service Degradation Error]
• Service Plan monitoring: multiple structure, bitrate and regionalization check
• STLTP, Network Delay
• ATSC 1.0 Service streaming over low bandwidth links [compression down to 500kbps] (See Page 35)
• Demodulated ATSC 1.0 TS streaming over control IP out, or retransmission over AISI out
• Trigger RF signal capture on RF-Catcher (See Page 30)

ORDERING CODES
EdgeProbe Advanced CHASSIS is composed of 2 BOARDs, each board supporting 2 parallel MONITORING UNITS

Select your standard BOARD 1
Select your standard BOARD 2

Included
2 active Monitoring Units, RF + SFN + CIR + ATSC 1.0 TS over ASI/IP input support, VLAN Scanning
Multiple channels RF, AISI, IP interface round-robin monitoring
Extended Memory
32 GB internal storage: trends, logs, TS record

CHASSIS/1W Options
Dual Power Supply
100-240 VAC, redundant power supply
Internal GNSS receiver (GPS, GLONASS), 1PPS for internal 1PPS generation

SW Options
RF Master ATSC 3.0/1.0
ATSC 1.1 TS Monitoring
ATSC 3.0 STLTP Monitoring
IP Monitoring
RF Transmission, spectrum, constellation, AISI and SFN Time Drift
ETR 101 290 priority 1, 2, 3 and Multiple Service Plan over ASI/IP
STLTP Network Delay and integrity
Jitter, RTP/TEC, Packet Loss/Recovery monitoring

www.test-tree.com
**DIGITAL RADIO NETWORKS**

**DIGITAL TV & RADIO MONITORING**

- DIGITAL RADIO BROADCAST NETWORKS
- DIGITAL RADIO NETWORKS
- High & Mid Power TX / SFN
- Switch / Reg. Content Insertion / Modulator
- ETI*, EDI*
- IP, ETI, DVB-S/S2
- RF & SFN DTTV transmission

**Contribution**

- Head-End Service Encoders
- Ensemble Multiplexer / Broadcast Gateway

**GLOBAL VIEWER**

- QoS & QoE Supervision
- Or 3rd party NMS
- Remote web GUI
- SNMP / HTTP
- ETI*, EDI*
- IP, ETI, DVB-S/S2
- HTTP

**Reception Site**

- EDGEPROBE
- DTTV reception
- GPS/GLONASS
- Ensemble Multiplexer / Broadcast Gateway
- EDGEPROBE

**ETI Probe**

- Contribution / Modulator
- EDGEPROBE
- SFN / MFN Tx Site

**APPLICATIONS**

- Standalone, easy to use and configure, fast deployment, SNMP compatible
- Reduce TX sites maintenance cost by anticipating and identifying issues
- Increase customer satisfaction by detecting & preventing network degradations before your customers do
- Remotely accessible, compatible with low bandwidth control networks (GPRS/3G/4G)
- Low power consumption 25W

**KEY BENEFITS**

- 24/7 Monitoring and Maintenance of both Head-End and TX sites: RF transmission (SFN/MFN), Satellite RF distribution, ETI/EDI Baseband distribution
- Generation of Service Availability reports for Service Level Agreements
- Live transmission recorder

**TECHNICAL CHARACTERISTICS**

- **EdgeProbe Advanced models:** DAB/DAB+, DVB-S/S2, DVB-T/T2, DVB-C/C2, ISDB-T/Tb, ATSC 3.0/1.0 or any combination of two of these standards
- **Up to 4x** [RF in, ETI in/out (NI, NA), IP Data in/out (VLAN support)] in 1 RU
- **Up to 2x IP Control for low bandwidth remote Web GUI**
- **Up to 4x 32 GB storage for 6 months logs & trends**
- **1PPS:** external or internal from GNSS receiver (GPS, GLONASS), 10MHz
- **Up to 4 analog audio output TRS 3.5mm**
- **1x ETH in/out (alarm dry contact)**

**KEY FEATURES**

- **DAB/DAB+ support, compatible Band III VHF (168 to 240 MHz)**
- **Mode I, II support: automatic detection**
- **RF accurate measurements: signal level, SNR, MER, FIB BER, MSC BER (per subchannel)**
- **RF spectrum, shoulder monitoring, constellation**
- **SFN Time Drift monitoring**
- **Channel Impulse Response:**
  - Echo delay & level alarms
  - Echo Pattern monitor: reliable echo in error identification when main echo suffers changes
  - **Tl decoding and presence detection**

**EDGEPROBE ADVANCED**

**EdgeProbe Advanced DAB/DAB+ is the ideal tool to achieve accurate & cost-effective monitoring of the quality actually delivered to all points of a Digital Radio network.**

**.light**

**ORDERING CODES**

**EdgeProbe Advanced Digital Radio Advanced Monitoring Probe**

<table>
<thead>
<tr>
<th>CHASSIS HW Options</th>
<th>Digital Radio Advanced Monitoring Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Power Supply</td>
<td>100-240 Vac redundant power supply</td>
</tr>
<tr>
<td>Internal GNSS</td>
<td>Internal GNSS receiver GPS, GLONASSI for internal 1PPS generation</td>
</tr>
</tbody>
</table>

**Select your options per Digital Radio BOARD (see Page 18 for DTV EdgeProbe Advanced models)**

- **RF Options**
  - **RF DAB Monitor**
    - 2nd monitoring link: total of 2x RF + ETI + IP Data
  - **RF signal quality, CIR - Echoes, SFN monitoring**
  - **ETI, EDI Ensemble Service**
  - **ETI/EDI Monitor**
    - ETI/EDI input monitoring

<table>
<thead>
<tr>
<th>SW Options</th>
<th>Digital Radio BOARD 1</th>
<th>Digital Radio BOARD 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAB/DAB+ or DVB-S/S2 or DVB-T/T2 or DVB-C/C2 or ISDB-T/Tb or ATSC 3.0/1.0</td>
<td>DAB/DAB+ or DVB-S/S2 or DVB-T/T2 or DVB-C/C2 or ISDB-T/Tb or ATSC 3.0/1.0</td>
<td></td>
</tr>
</tbody>
</table>

**Select your options per Digital Radio BOARD: (See Page 18 for DTV EdgeProbe Advanced model)**

- **HW Options**
  - **RF N-type connector**
    - Equip the RF inputs with N-type female 50 Ω connectors (by default F-type female 75 Ω)

* Contact us for availability
TEST TOOLS FOR LAB & FIELD

RF CAPTURE/PLAYBACK & GENERATE
70 MHz – 6 GHz frequency range with down conversion for Ku/C band

RF-Catcher Starter Kit RF record, playback and spectrum analysis 30
Application Suite for RF-Catcher 32
ATSC 3.0 LabMod STL Gateway approved Modulator for Labs 33
RF-LiveSim Real-time RF Channel Simulator 34

ANALYZE RF & BASEBAND
Multi-standard (ATSC 3.0/1.0, DVB-T/T2, DVB-C/C2, DVB-S/S2, ISDB-T/Tb) professional measurement receivers and pocket-size analyzers, recorders and players; connected via USB to a Windows PC running the DiviSuite analysis software
ReFeree 3
DiviSuite™ 35
DiviSuite Base
DiviSuite options: RF Scope, TS Analyzer, T2-MI Analyzer, Drive Test Coverage

Hardware products used with the DiviSuite 41
ReFeree II
DiviCatch RF Series
DiviDual ASI + SPI (LVDS or TTL)
DiviDual ETI

Pure software application using the DiviSuite 45
DiviSuite-IP
RF RECORDING & PLAYBACK

USE-CASES

Interference Detection
- RF record triggering with rolling buffer
- Playback to analyze QoS artefacts
Setup: RF-Catcher + Event Trigger + EdgeProbe

FM/DAB+ Switchover
- Synchronized RF records and/or playbacks
- Radio switchover testing from DAB+ to FM (also compatible with other signals)
Setup: 2x RF-Catcher + Event Trigger [+ IQ Splitter]

TV/STB Validation
- Receivers testing to the edge (echoes, noise)
- Field configuration testing in the lab
Setup: RF-Catcher + RF TroubleMaker

Broadcast Stations Control
- Power level monitoring in reception areas
- Automated RF signal recording & playback
Setup: RF-Catcher + Task Scheduler

and also...

In their «all options» package, our test devices can be shipped in max 48h
RF-CATCHER STARTER KIT
The Most Compact RF Capture & Playback device!

Covering a frequency range from 70 MHz up to 6 GHz, RF-Catcher allows you to record and play real-time RF bandwidth up to 55 MHz. RF-Catcher allows experimentation with a wide range of signals including Radio (FM, DAB…), TV broadcast (DVB-T/T2, C/C2, ISDB-T, etc…), cellular, Wi-Fi, up to satellite signals (DVB-S/S2). The RF-Catcher is equipped with LNB control for frequency down conversion of Ku/C bands. The integrated GNSS receiver provides precise location information, KML file, metadata, NMEA compatible.

TECHNICAL CHARACTERISTICS
2x RF inputs, 2x RF outputs for RF Capture & Playback [SMA/F connectors]*
Frequency range from 70 MHz up to 6 GHz, resolution 1kHz
Variable bandwidth from 1 to 55 MHz
Automatic filtering: harmonic suppression for playback, out of band signal suppression for capture
RF Reception:
• Status indicators: USB connection / IQ sample loss / In band saturation (ADC) / Out of band saturation (LNA)
• FFT display: Spectrum measurements: FFT resolution, FFT markers insertion / Averaging functions: RMS, min/max hold / FFT window functions: rectangular, Hamming, Blackman
• Signal waterfall plot (three-dimensional spectrum)
• Power in band measurement per frequency marker
RF Capture: variable gain, automatic gain setting (AGC), rolling buffer mode
RF playback: variable attenuation
Lightweight and compact 163 x 115 x 32 mm, 600 g, 3 W typical power consumption
Connected to PC via USB3.0 connectivity (SuperSpeed) (USB2 backward compatible, but with lower performances due to limited USB2 bitrate)
IQ files stored on the PC: 12 Msps sample rate, 170 min of record = 512GB
Nonproprietary IQ file format, compatible with Matlab software
Integrated GNSS (GPS, GLONASS) receiver: KML file, metadata, NMEA protocol
Compatibles Windows 7, 8/8.1, 10 (x86 versions only)

APPLICATIONS
• Chipset, STB/Tv field test debugging (a great tool to support your pre-sales team)
• Easy & simple usage: no need for RF experts to capture field RF signals (ex: DAB/FM, TV broadcast, Satellite broadcast, Wi-Fi,…), your sales force can do it for you anywhere in the world
• Handy demonstration setup: bring real RF sources into your laptop
• RF sources stored on a PC: easy to duplicate/transfer between headquarter and regional sites
• Radio/TV Broadcast/Telecom RF troubleshooting
• Text automation (command line tools)
• Telecommunications Regulation Agencies validation tool

ORDERING CODE
RF-Catcher Starter Kit
RF Capture & Playback
Shipped bundled with HW device, software application for Windows 7, 8/8.1, 10 (x64)

RF capture file stored on PC.
170 min of 12 Msps bandwidth record = 512GB
NONPROPRIETARY IQ FILE FORMAT

Easy to use & Responsive GUI
High degree of parameterization for measures

Spectrum analysis
• Power in band
• Averaging functions
• FFT window functions

Automatic Gain Control (AGC) for RF reception: static or dynamic

Waterfall section
Allows detection of bursts & transients (Wi-Fi, 4G,…)

Gain setting for capture
Attenuation setting for playback
Variable acquisition bandwidth from 1 up to 55 MHz
RF Capture & Playback controls
Autostop recording
Sample rate up to 61.44 Msps
Variable acquisition bandwidth from 1 up to 55 MHz

Ordering code
RF-Catcher Starter Kit
RF Capture & Playback
Shipped bundled with HW device, software application for Windows 7, 8/8.1, 10 (x64)

www.test-tree.com

Dedicated side panel for in-app options:
Event Trigger and RF TroubleMaker

Auto-stop control: evaluate the PC performance for RF capture/playback max bandwidth

ADC: Automatic Gain Control for RF reception: static or dynamic

LNB configuration for Satellite capture

Rolling Buffer mode for RF capture

Clock mode for 1PPS generation

Load and save configuration files
APPLICATION SUITE FOR RF-CATCHER

One Global Launcher for all applications
Quickly access the applications without missing any information

ORDERING CODE

Application Suite for RF-Catcher Starter Kit
Software: IQ Converter, IQ Splitter, TaskScheduler, Event Trigger, RF TroubleMaker, ATSC 3.0 LabMod, DiviSuite-IP
Compatible Windows 7, 8/8.1, 10 (x64)
Licenses
Subscription Perpetual licenses
All applications including Advance Software Support for the subscription period
One or several of the above applications with optional Advance Software Support

SOFTWARE OPTION

RF Capture & Playback
Software Application for RF transmission captures, playbacks and spectrum analysis

APPLICATIONS

ATSC 3.0 Lab Modulator is the perfect modulator for discovering ATSC 3.0 standard: generate live ATSC 3.0 RF signals or IQ pattern files, record live ATSC 3.0 transmission in different places over the world and playback them to test your receiver.

APPLICATIONS

• ATSC 3.0 RF record & playback
• ATSC 3.0 reception validation
• R&D or factory tests and measurements
• Chipset development
• TV Set Top Box development
• Demonstrations and roadshows

KEY BENEFITS

• 1st ATSC 3.0 modulator
• Compact (600g), USB self-powered
• 3-in-1 product: RF Record + Playback + Generate
• ATSC 3.0 PlugFest proven
• Intuitive & easy to use GUI
• Easy to configure: real-time Frame configuration validation engine
• All modulation schemes supported (from QPSK to 4096 QAM, LDM support)

TECHNICAL CHARACTERISTICS

Input interface
STLTP IP, STLTP PCAP File, PRBS, TS File
2x RF Inputs (Sigma-type female 50 Ω, F-type female 75 Ω)
ATSC 3.0 live RF recording

Clock and synchronisation
Input
10 MHz, 1 PPS, Built-in GNSS receiver
Output
10 MHz
Internal clock
10 MHz
GUI
Windows 7, 8/8.1, 10 (x64) application
Easy to use, configuration validation engine
Capability to save/load settings profiles

Output interface
2x RF outputs (Sigma-type female 50 Ω, F-type female 75 Ω)
ATSC 3.0 live RF playback and generate

Modulation
ATSC 3.0 constellation (NUC)
L1
Compatible with all L1 modes
LDM (Layered Division Multiplexed)
Yes
Channel bandwidth
6, 7 or 8 MHz
Guard Interval
10 MHz, 20ns, 512 ns, 1024 ns, 1536 ns, 2688 ns, 2372 ns, 3648 ns, 4864 ns
FFT mode
8k, 16k, 256k, 4k, (all 'Cred_coeff' modes)
Code rate
2/15 up to 13/15
FEC
Inner: LDPC 16k and 64k, mode A or B
Outer: BCH, CRC or no outer
Pilot pattern
SP_1, SP_3, SP_5, SP_10, SP_15, SP_20, SP_25, SP_30, SP_40, SP_50, SP_60, SP_70, SP_80, SP_90, SP_100
TU (Time interleaving) mode
CTI up to 1448 depth, HTI
Subframes
Multiple subframes: single/multiple PLP
TXID
Transmitter identification

ORDERING CODES

ATSC 3.0 Lab Modulator for Lab
Downloaded with the ATSC 3.0 LabMod Application for Windows 7, 8/8.1, 10 (x64)

ATSC 3.0 Lab Mod Application
ATSC 3.0 LabMod Application for Lab
Windows 7, 8/8.1, 10 (x64)
Software application for RF-Catcher Starter Kit
Software Option
RF Capture & Playback
Software Application for RF transmission captures, playbacks and spectrum analysis
RF-LiveSim is a cost-effective solution for intensive automatic non-regression tests at the physical layer level.

**TECHNICAL CHARACTERISTICS**

- Standalone unit with PS/2 & VGA interfaces for screen-keyboard-mouse control
- 1x RF in, 1x RF out (iso-frequency)
- Ethernet port for remote control
- Full remote control via SCPI (Standard Commands for Programmable Instruments) protocol
- Signal level: output from -110 to -20 dBm without any interruption
- Frequency range from 50 to 900 MHz, resolution 1 Hz
- Variable bandwidth from 20 kHz to 20 MHz, resolution 1 kHz
- Channel Propagation Profile: 20 independent paths adjustable (amplitude, delay, phase, Doppler)
- Doppler profiles: -70 000 to +70 000 Hz (step 1 Hz), Amplitude distributions (Pure, Flat, Gaussian, Rayleigh, Rice)
- Frequency drift & hopping without losing receiver synchronization
- Preset configurations: terrestrial broadcast profiles such as TU6, rural, indoor/outdoor for fixed/portable devices as well as profiles for physical layers for WiMAX/LTE
- AWGN Generator: Signal+Noise, Burst noise, Impulsive noise, Noise only
- 1x TRIG, 1x 10MHz in & 1x 10MHz out
- Rack form factor: 1U (450x500x44)

**APPLICATIONS**

- Real-time channel profile simulations
- Up to 20 adjustable independent terrestrial paths
- Several preset configurations available
- Remotely accessible
- Easy to use & configure
- Test automation (SCPI compliant)

**KEY BENEFITS**

- Real-time channel profile simulations
- Up to 20 adjustable independent terrestrial paths
- Several preset configurations available
- Remotely accessible
- Easy to use & configure
- Test automation (SCPI compliant)

**ORDERING CODE**

RF-LiveSim
RF Live Channel Simulator - 50-900 MHz input/output - 1U rack

---

**RF-LIVESIM**

Real-time RF Channel Simulator

Covering a frequency range from 50 to 900 MHz, RF Live Simulator can emulate RF channels propagation modes for a signal bandwidth from 20 kHz to 20 MHz (gaussian noise, multipath, Doppler and frequency drift tools).

---

**ReFeree 3**

The 1st ATSC 3.0 analyzer designed for the field!

ReFeree 3 is the first ATSC 3.0 analyzer designed to be used on the field to generate maps including measurements of the field quality of service, enabling identification of reception issues and efficient troubleshooting.

**ORDERING CODES**

ReFeree 3
ATSC 3.0 Field Analyzer

*Contact us for availability*
DIVISUITE BASE

Common Features coming as a default package!

- Bitrate, Log Files
- H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...

DIVISUITE SOFTWARE OPTION

- Signal Quality: level, SNR, MER, BER
- Modulation Parameters
- Constellation
- SNR Measurement: level, SNR, MER, BER
- Modulation parameters
- Constellation
- Channel Impulse Response
- SFN Synchronisation

Test the field RF Quality

TX Echoes diagram

Validate the Modulator/TX RF Quality
- Signal Quality measurement: level, SNR, MER, BER
- Modulation parameters
- Constellation
- DVB-T2 L1 signalling

Validate SFN synchronization
- SFN Drift
- 1 PPS & 10 MHz inputs

Modulator/TX endurance tests
- Log & Report files
- Save events and trend measurements
DIVISUITE SOFTWARE OPTION

Transport Stream complete Analysis!

- Validate PSI/SI Tables
- Supported TS: MPEG, DVB, ATSC 1.0, ISDB-T/Tb
- Add your own table analysis specification

- PCR Graphs
- ASI Network Delay

Validate ETSI TR 101 290 measurements
ETSI TR 101 290 Priority 1,2,3
Customized alarm thresholds
Log files

Check PCR
- Drag & Drop PID containing PCR
- PCR accuracy graphs

Advanced Service Analysis
- Component type & structure
- Component bitrates

DIVISUITE SOFTWARE OPTION

Validate your DVB-T2 Gateway!

- T2 L1 pre/post signaling, PLP allocation
- TBB frame, TS, padding/overflow
- Single & Multi-PLP, PLP extraction

- T2 timestamp, BB frame header, ISSY field
- T2-MI Network Delay

- PLP extraction/filter

Check T2-MI streams
- T2 L1 pre/post signaling
- ETSI TR 101 290 T2-MI alarms

Check T2 Frames
- BB frame header
- ISSY field
- T2 timestamp

Check T2-MI Analyzer

- T2-MI Network Delay
- Single & Multi-PLP, PLP extraction

- T2 timestamp, BB frame header, ISSY field
- T2-MI Network Delay
**DIVISUITE SOFTWARE OPTION**

- GNSS Receiver (GPS/GLONASS)
- Test Reports (Google Earth compliant)
- Internal 1PPS source

Test the field coverage!

**(Display results in Google Earth or Google Fusion Tables applications)**

*Option delivered with a magnet mount GNSS L1 Antenna*

**TECHNICAL CHARACTERISTICS**

1x RF input for DVB-T/DVB-T2 (T2 Lite supported) & DVB-C/DVB-C2
ITU-J83 Annexes A, C (roll-off 0.15) supported
1x ASI input and 1x ASI output
1x IP Data input/output
1x 1PPS & 1x 10MHz inputs for SFN delay measurement
1x GPS/GLONASS connector for coverage tests
RF Scanning (DVB-T/T2, DVB-C/C2)
RF measurements: signal level, SNR, MER, BER, graphical constellation
SFN Drift, Network Delay, Channel Impulse Response display
Single and multi-PLP support
T2-MI analysis: L1 pre & post signaling, T2 frame statistics, BB frame header, ISSY field, T2 timestamp
DVB-C2 specific analysis: L1, C2 frame, BB frame, Data Slice...
PSI/SI and PIDs parsing, PCR graphs
ETSI TR 101 290 validation (priority 1, 2, 3)
Services decoding: H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...
TS record scheduling (PLP extraction)
TS playback over ASI (loop counters management: CC, PCR, PTS/PTS)
TS over IP forward (IP’s Ethernet interface selection)
Command Line mode
Compatible Windows 7, 8/8.1, 10
USB self-powered, 660 g

**ORDERING CODES**

ReFeree II is a high performance, compact and portable measurement receiver for Terrestrial and Cable TV, cumulating single and multi-PLP live reception with real-time TS analysis and recording.

**APPLICATIONS**

- Easy to use and configure
- Compact (660 g), USB self-powered
- Complete product: RF + baseband (ASI, IP, File) analysis, baseband record & playback
- All modulation schemes supported (from QPSK to 256 QAM, Normal & Rotated for Terrestrial, from 16 QAM to 4096 QAM for Cable)
- Adapted format for Drive Tests

**KEY BENEFITS**

- All Options Bundle (RF + TS + T2-MI + Drive Test Coverage)
- Internal 1PPS source
- Drive Test Coverage

**ORDERING CODES**

ReFeree II DVB-T/T2/T2 Lite & DVB-C/C2 Measurement Receiver
Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10

**R&D Test & Measurement**
- Baseband Signal Generation
- RF Reception Quality Measurement
- Terrestrial & Cable Network Troubleshoot
- Head-End/TX site/off-air measurements
- Installation & Maintenance Test Tool
- Test automation (command line mode)
- Coverage & Drive Tests for DVB-T & DVB-C

**DIVISUITE SOFTWARE OPTION**

- GNSS Receiver (GPS/GLONASS)
- Test Reports (Google Earth compliant)
- Internal 1PPS source

Test the field coverage!

**TECHNICAL CHARACTERISTICS**

1x RF input for DVB-T/DVB-T2 (T2 Lite supported) & DVB-C/DVB-C2
ITU-J83 Annexes A, C (roll-off 0.15) supported
1x ASI input and 1x ASI output
1x IP Data input/output
1x 1PPS & 1x 10MHz inputs for SFN delay measurement
1x GPS/GLONASS connector for coverage tests
RF Scanning (DVB-T/T2, DVB-C/C2)
RF measurements: signal level, SNR, MER, BER, graphical constellation
SFN Drift, Network Delay, Channel Impulse Response display
Single and multi-PLP support
T2-MI analysis: L1 pre & post signaling, T2 frame statistics, BB frame header, ISSY field, T2 timestamp
DVB-C2 specific analysis: L1, C2 frame, BB frame, Data Slice...
PSI/SI and PIDs parsing, PCR graphs
ETSI TR 101 290 validation (priority 1, 2, 3)
Services decoding: H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...
TS record scheduling (PLP extraction)
TS playback over ASI (loop counters management: CC, PCR, PTS/PTS)
TS over IP forward (IP’s Ethernet interface selection)
Command Line mode
Compatible Windows 7, 8/8.1, 10
USB self-powered, 660 g

**ORDERING CODES**

ReFeree II DVB-T/T2/T2 Lite & DVB-C/C2 Measurement Receiver
Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10

**R&D Test & Measurement**
- Baseband Signal Generation
- RF Reception Quality Measurement
- Terrestrial & Cable Network Troubleshoot
- Head-End/TX site/off-air measurements
- Installation & Maintenance Test Tool
- Test automation (command line mode)
- Coverage & Drive Tests for DVB-T & DVB-C

**KEY BENEFITS**

- All Options Bundle (RF + TS + T2-MI + Drive Test Coverage)
- Internal 1PPS source
- Drive Test Coverage

**ORDERING CODES**

ReFeree II DVB-T/T2/T2 Lite & DVB-C/C2 Measurement Receiver
Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10

**R&D Test & Measurement**
- Baseband Signal Generation
- RF Reception Quality Measurement
- Terrestrial & Cable Network Troubleshoot
- Head-End/TX site/off-air measurements
- Installation & Maintenance Test Tool
- Test automation (command line mode)
- Coverage & Drive Tests for DVB-T & DVB-C

**KEY BENEFITS**

- All Options Bundle (RF + TS + T2-MI + Drive Test Coverage)
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- Drive Test Coverage

**ORDERING CODES**

ReFeree II DVB-T/T2/T2 Lite & DVB-C/C2 Measurement Receiver
Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10

**R&D Test & Measurement**
- Baseband Signal Generation
- RF Reception Quality Measurement
- Terrestrial & Cable Network Troubleshoot
- Head-End/TX site/off-air measurements
- Installation & Maintenance Test Tool
- Test automation (command line mode)
- Coverage & Drive Tests for DVB-T & DVB-C

**KEY BENEFITS**

- All Options Bundle (RF + TS + T2-MI + Drive Test Coverage)
- Internal 1PPS source
- Drive Test Coverage

**ORDERING CODES**

ReFeree II DVB-T/T2/T2 Lite & DVB-C/C2 Measurement Receiver
Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10

**R&D Test & Measurement**
- Baseband Signal Generation
- RF Reception Quality Measurement
- Terrestrial & Cable Network Troubleshoot
- Head-End/TX site/off-air measurements
- Installation & Maintenance Test Tool
- Test automation (command line mode)
- Coverage & Drive Tests for DVB-T & DVB-C

**KEY BENEFITS**

- All Options Bundle (RF + TS + T2-MI + Drive Test Coverage)
DIVICATCH RF Series

The DiviCatch RF devices are pocket analyzers cumulating RF live reception with Transport Stream real-time analysis, recording and stream playing.

APPLICATIONS
• R&D Streams or Signal Analysis
• RF Broadcast Troubleshoot
• Installation & Maintenance Test Tools
• Test automation (command line mode)
• Portable Demonstration Setup

KEY BENEFITS
• 4-in-1 products: RF + Baseband + Recorders + Players
• Compact (pocket size, 160 g) and USB self-powered
• Analyze/Validate TS/T2-MI/BTS Layer in real-time
• All modulation schemes supported
• Must-have Lab Tools

TECHNICAL CHARACTERISTICS

**DIVICATCH RF-S/S2**
- 1x RF input for DVB-S/S2
- RF measurements: signal level, SNR, BER, PER, CNR, Eb/No, link margin
- Stream ID selection
- LNB powering & configuration

**DIVICATCH RF-ISDB-T/Tb**
- 1x RF input for ISDB-T/Tb
- RF measurements: signal level, SNR, MER, BER per Layer A/B/C
- Stream ID selection
- LNB powering & configuration

**DIVICATCH RF-T/C T2/C2**
- 1x RF input for DVB-T/T2/T2 Lite & DVB-C/C2
- ITU-J83 Annexes A, C (rolloff 0.15) supported
- RF Scanning (DVB-T/T2, DVB-C/C2)
- RF measurements: signal level, SNR, MER, BER

**DIVICATCH RF-C**
- 1x RF input for Digital Cable
- 1x RF loop output
- ITU-J83 Annexes A, B, C supported
- RF measurements: signal level, SNR, MER, BER, EVM

1x ASI input/output
- IP source analysis (from PC)
- Graphical constellation, Channel Impulse Response display
- PID and PSI/SI parsing, PCR graphs
- ETSI TR 101 290 validation (priority 1, 2, 3)
- Audio/Video player (H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...)
- TS record scheduling (IPLP extraction)
- TS playback over ASI loop counters management - CC, PCR, PTS/DTSI
- TS over IP forward (PCI’s Ethernet interface selection)
- Command Line mode
- Compatible Windows 7, 8/8.1, 10
- USB self-powered, 160 g

ORDERING CODES

**DIVICATCH RF-S/S2**
- DVB-S/S2 Pocket Analyzer

**DIVICATCH RF-ISDB-T/Tb**
- ISDB-T/Tb Pocket Analyzer

**DIVICATCH RF-T/C T2/C2**
- DVB-T/T2/T2 Lite & DVB-C/C2 Pocket Analyzer

**DIVICATCH RF-C**
- DVB-C Pocket Analyzer

Shipped bundled with DiviSuite Base software for Windows 7, 8/8.1, 10 and RF Scope option

**Software Options**
- RF Scope (included)
- TS Analyzer
- Transport Stream Analyzer
- T2-MI Analyzer

**All Options Bundle** (RF + TS + T2-MI)
DIVIDUAL ASI+SPI (LVDS or TTL)

Baseband TS Analyzer

The DiviDual ASI + SPI is a pocket analyzer providing Transport Stream (MPEG-2 TS, T2-MI, BTS) real-time analysis, recording and stream playing, on both DVB-ASI and DVB-SPI (LVDS or TTL) connectors.

TECHNICAL CHARACTERISTICS
- 1x ASI input and 1x ASI output
- 1x SPI input/output (LVDS or TTL, optional)
- IP source analysis (from PC)
- PIDs and PSI/SI parsing, PCR graphs
- TS-MI analysis, L1 pre & post signaling, T2 frame statistics, BB frame header, E2T field, T2 timestamp
- BTS analysis, IP Packet parsing, TMCC alarms, TS-MI real information
- ETIS TR 101 290 validation (priority 1, 2, 3)
- Audio/Video player (H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...)
- TS record scheduling (PLP extraction)
- TS playback over ASI (loop counters management: CC, PCR, PTS/DTS & Raw player)
- TS over IP forward (PC’s Ethernet interface selection)
- Command Line mode
- Compatible Windows 7, 8/8.1, 10
- USB self-powered, 140 g

ORDERING CODES
DiviDual ASI + SPI

TS over DVB-ASI and DVB-SPI (LVDS or TTL) Analyzer, Recorder, Player
Shipped bundled with DiviSuite software for Windows 7, 8/8.1, 10

Software Options
- TS Analyzer
- T2-MI Analyzer

DIVIDUAL ETI

The DiviDual ETI is a real-time ETI Stream recorder and player in a pocket-sized and robust device.

TECHNICAL CHARACTERISTICS
- 1x ETI input and 1x ETI output for DAB/DAB+/T-DMB
- ETI NI (G703) supported
- ETI NA5592 & NA5376 (G704) supported
- Playlist/segment/loop play mode
- Scheduled recording
- Player/Recorder command line software
- Compatible Windows XP/ Vista/7
- USB self-powered, 140 g

ORDERING CODES
DiviDual ETI

DAB, DAB+, T-DMB Recorder, Player
Shipped bundled with DiviSuite software for Windows XP/ Vista/7

DIVISUITE-IP

Pure Software Application

The most complete analyzer software application for baseband TS/T2-MI/BTS streams.

No need to plug HW device (ReFeree, DiviDual, DiviCatch) to the PC: DiviSuite-IP can analyze TS over IP or file-based input streams.

Two licensing models: Fixed PC License or Floating Server License.

Fixed PC License Model
Install & use the DiviSuite-IP on N independent PCs.
One license key attached to one physical machine.

Floating Server License Model
Enables N PCs (connected in the same LAN) to use the DiviSuite-IP simultaneously.
The floating license token distribution is handled by one PC in the LAN, assigned with the Server role.

ORDERING CODES
DiviSuite-IP

DiviSuite-IP software for Windows 7, 8/8.1, 10
License
- PC Fixed: Choose the number of PCs → one license key delivered per PC
- Floating Server: Choose the number of simultaneous use for the default package (DS Base + TS Analyzer) and for the software option (T2-MI Analyzer) → one unique license key delivered, to be activated on one PC in the LAN (Server role)

Included
- DiviSuite Base, TS Analyzer
- T2-MI Analyzer

Software Option
- T2-MI Analyzer
TestTree

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