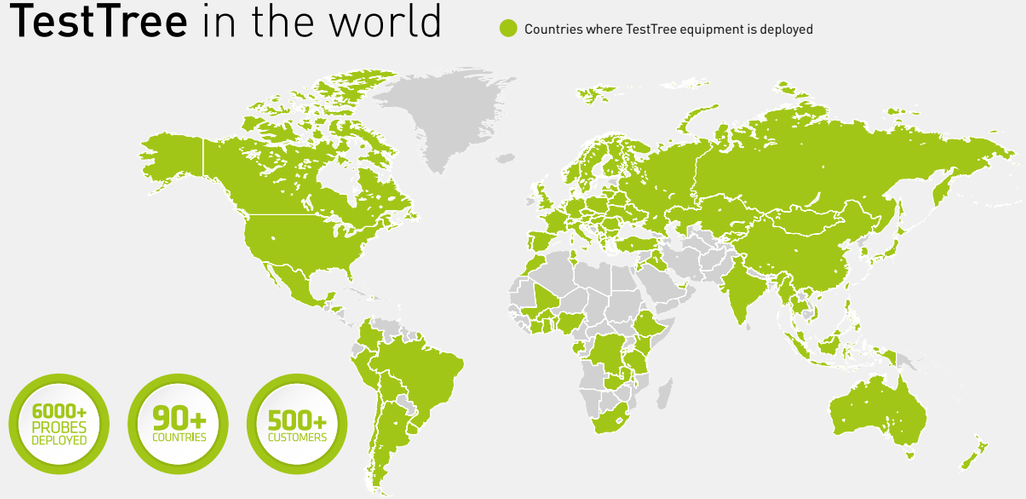
TEST & MONITORING

2019/2020

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 in the world



Serial **Inventor**

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.

MADE IN FRANCE

La FRENCH TECH

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...

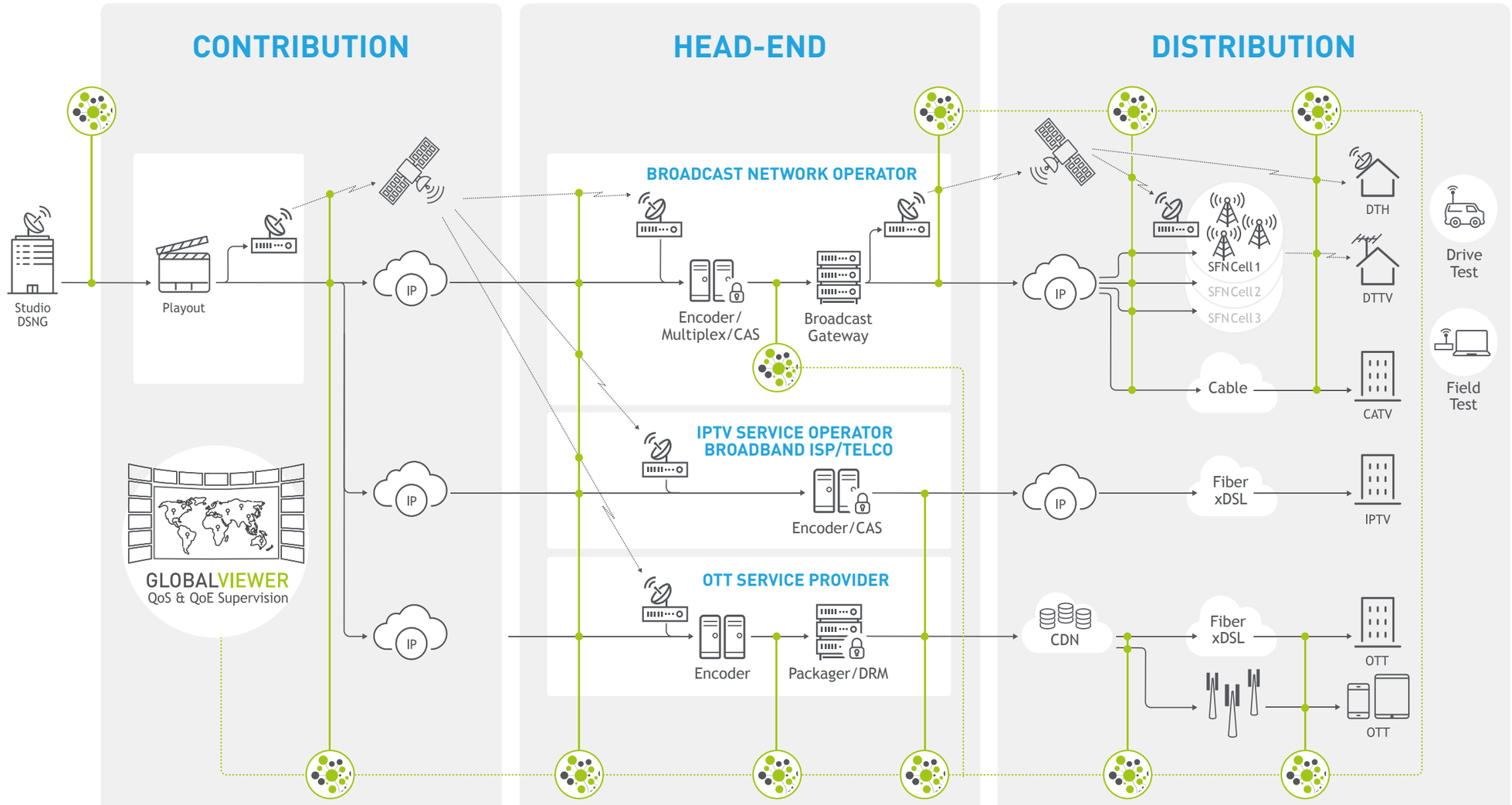
FM & Digital Radio & Info Traffic
Field testing & recording / R&D Lab investigation
Video Content Providers
Service processing & delivery monitoring
IPTV & OTT Service Platform & Broadcast Network Operators
System Design and Operational teams / Network Monitoring
Broadcast regulators
Field testing & recording / Network compliance monitoring

QoS & QoE TEST & MONITORING SOLUTIONS FOR THE DIGITAL VIDEO DELIVERY CHAIN

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

6000+ PROBES DEPLOYED

24/7 MONITOR PRODUCT RANGE

STREAMPROBE IPTV
STREAMPROBE OTT

SOFTWARE SOLUTION:

Linux OS, VM for hypervisor type 1 (ESXi >6.0)

Off the shelf server, 1RU or 2RU (for large number of RF receivers)

CPU, RAM, HDD: depending on number of streams to monitor

One or Multiple **IP Data**: 1Gbps, 10Gbps support

One or Multiple **RF input**(s) F-type 75 Ω: DVB-T/T2, DVB-S/S2, DVB-C (J.83 A,B,C); demodulation for TS extraction

One or Multiple **ASI input**(s): TS extraction

TSoIP OTT-ABR

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

EDGEPROBE ADVANCED

STANDALONE UNIT:

1 RU 19'' format: multi-standard support in 1 RU

Up to 4x **RF** inputs: N-type 50 Ω or F-type 75 Ω

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 **1PPS**, 1x **10MHz** inputs

1x **GNSS** input (GPS, GLONASS)

1x **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

ATSC 3.0/1.0 DVB T/T2 DVB S/S2 ISDB-T/Tb DVB C J.83 A, C

dab+ also available (See Page 25)

- **RF Monitor:**
  - RF spectrum, Signal Quality
  - SFN time & frequency synchronization
  - Channel Impulse Response (Echoes)
- **TS Monitor:**
  - TS, DVB T2-MI (PLP extraction), OneBeam / Single Illumination, STLTP, BTS
  - ETSI TR 101 290 Priority 1, 2 & 3 and QoS SAE/SDE
  - SFN Network Delay & IP Jitter
- **Multiplex Service Plan description**
- **Extended Storage:**
  - Logs & Trends up to 6 months, TS recording
- **Easy integration for NMS supervision:**
  - Low bitrate Web GUI (GPRS/3G/VSAT/4G)
  - SNMPv2 Support + v2c INFORM (no trap loss)

EDGEPROBE NANO
EDGEPROBE RF

STANDALONE UNIT:

1 RU 19'' format: EdgeProbe RF

Compact 144x137x30 mm format: EdgeProbe Nano

1x **RF** input N-type 50 Ω (RF) / F-type 75 Ω (Nano)

1x **IP Control & Data** in/out (VLAN support)

1x **ASI** output

1x **32 GB** internal storage

DVB T/T2 ISDB-T/Tb DVB C J.83 A, B, C

- **RF Monitor:**
  - Signal Quality, Channel Impulse Response (Echoes)
- **TS Monitor:**
  - TS, BTS
  - ETSI TR 101 290 Priority 1, 2 & 3 and QoS SAE/SDE
- **Multiplex Service Plan description**
- **Extended Storage:**
  - Logs & Trends up to 6 months, TS recording
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  - Low bitrate Web GUI (GPRS/3G/VSAT/4G)
  - SNMPv2 Support + v2c INFORM (no trap loss)

TRANSBOX

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

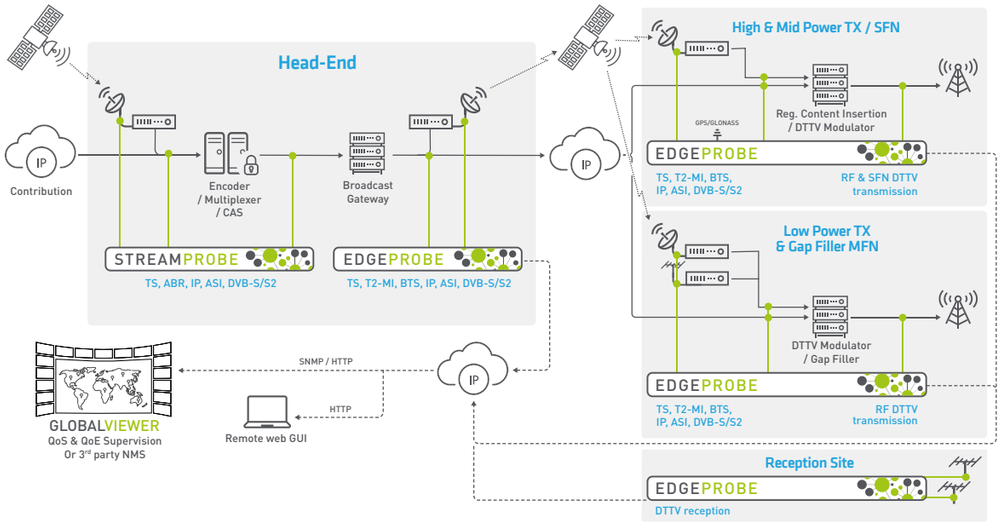
GLOBALVIEWER

- **Server Application for a Centralized Network Quality & Service Availability view**
- **Supervision: live monitoring status on a world map**
- **Analytics: measurement data storage for customizable dashboard and automatic reports**

** Contact us for availability*

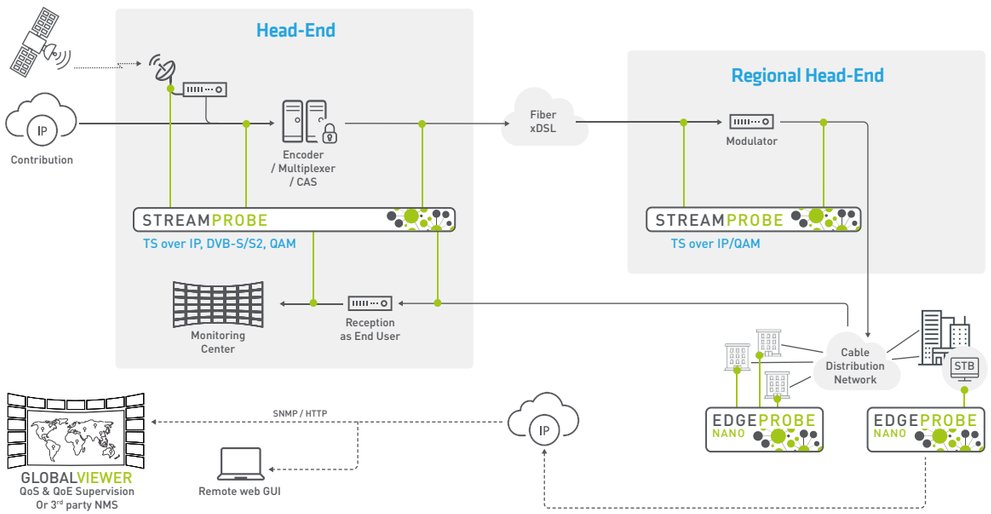
DTTV Broadcast Network Operators

DVB T/T2 ISDB-T/Tb DVB S/S2 ATSC 3.0/1.0 *See Page 23* dab+ *See Page 25*



CATV Broadcast Network Operators

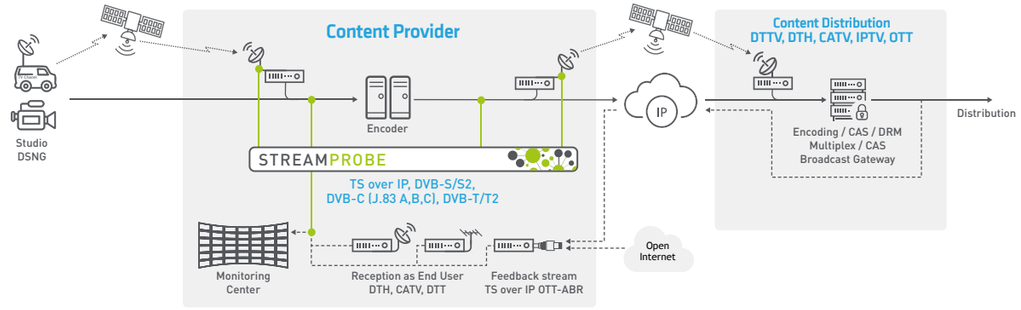
DVB C (A, B, C)



** Contact us for availability*

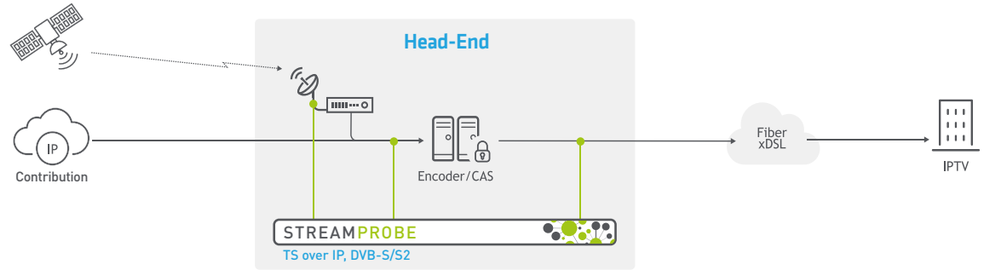
Video Content Provider

TSoIP OTT-ABR



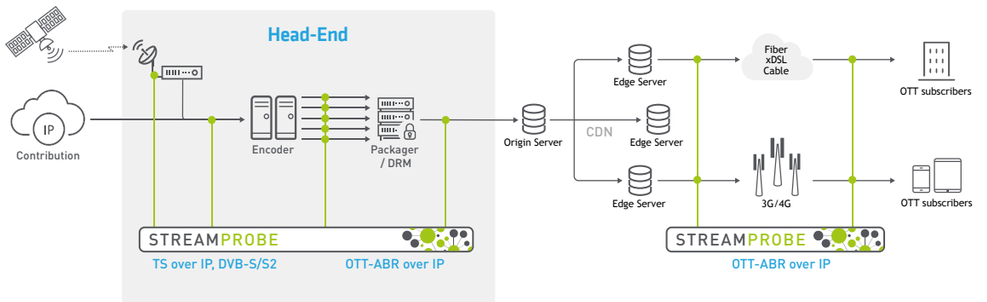
IPTV Service Platform Operator (Broadband ISP/Telco)

TSoIP



OTT Service Platform Operator (Live, VoD, Catch-up TV)

OTT-ABR



GLOBALVIEWER

FULLY VIRTUALIZED

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

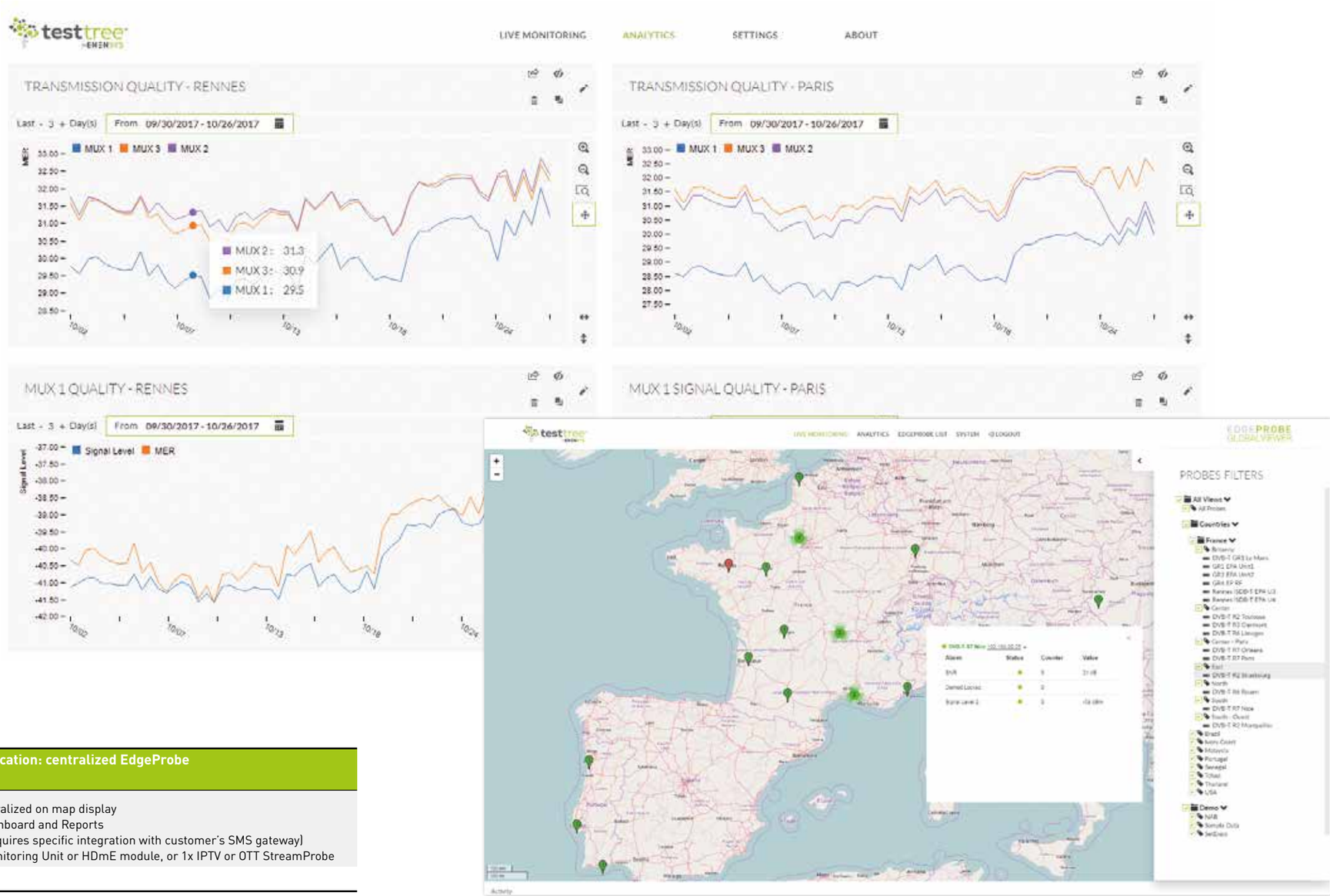
BENEFITS

- 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	
Included	Supervision	Live monitoring status centralized on map display
	Analytics	Monitoring data history Dashboard and Reports
	Alerting	SMS/Email notifications (requires specific integration with customer's SMS gateway)
	10 Probes	1 Probe = 1x EdgeProbe Monitoring Unit or HDmE module, or 1x IPTV or OTT StreamProbe
SW Options	Additional Probes	

STREAMPROBE IPTV OTT

FULLY VIRTUALIZED

THOUSANDS OF SERVICES IN //

QoE monitoring for Contribution/Encoding/Packaging

StreamProbe is a high density & scalable software solution for content QoS & QoE monitoring throughout the video service processing chain.

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

Live Thumbnail Mosaic:
all services, groups, penalty box, audio level, subtitles

APPLICATIONS

- Monitoring of the content QoS & QoE: 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
- All services view at-a-glance: Live Thumbnail Mosaic

BENEFITS

- High density: hundreds of services monitored in real-time & in parallel in a single 1RU server; 10Gb interfaces supported
- Scalable: from an all-in-one system to a fully distributed architecture
- Software only: Linux OS, VM for virtualized environments
- Remotely accessible: compatible with low bandwidth control networks (GPRS/3G/4G)
- Northbound interface (SNMP, open API)

KEY FEATURES IPTV TSoIP

- **QoS TS** monitoring:
  - **MDI**: Delay Factor, Media Loss Rate, Delta (min, max, average), Drift & Period 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
- **QoE** 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
  - **Subtitles** DVB and Teletext: 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 detailed display
- Configurable alarming thresholds: general and daily alarm profiles
- **NMS integration:** SNMPv2 support for alarm traps
- Monitoring information available via an open API (HTTP/JSON API)

KEY FEATURES OTT ABR

- **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
- **QoE** 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
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- Configurable alarming thresholds: general and daily alarm profiles
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- Monitoring information available via an open API (HTTP/JSON API)

TECHNICAL CHARACTERISTICS

SW solution: Linux OS, **VM** for hypervisor type 1 (ESXi >6.0)
Off the shelf server, 1RU or 2RU (for large number of RF receivers)
CPU, RAM, HDD: depending on number of streams to monitor
One or Multiple **IP Data: 1Gbps, 10Gbps** support
One or Multiple **RF input**(s) F-type 75 Ω: **DVB-T/T2, DVB-S/S2, DVB-C (J.83 A,B,C)** receiver – demodulation for TS extraction • RF front end module: up to 4x RF inputs (8x RF channels tuning)
One or Multiple ASI input(s): TS extraction

ORDERING CODES

StreamProbe IPTV — Perpetual software license for TS monitoring probe

Bitrate	Capacity bitrate to monitor per probe: 100Mbps, 300Mbps, 600Mbps, 1Gbps, 1.5Gbps, 2Gbps, 4Gbps, 7Gbps or custom	
Included	QoS Monitor TS	
SW Options	QoE Monitor	Audio, Video monitoring and decoding, Live Thumbnail Mosaic; Formats: MPEG-2, H264
	HEVC & 4K QoE	4K format support for QoE Monitor
	Compliancy Recording	24/7 recording of all streams/services - per 7-day depth periods
	On-error Recording	On-error recording on all streams/services, 24/7 recording of 5 services (7-day depth)
	Video Streaming	Live video streaming via the web GUI - per number of services streamed simultaneously
	CA Monitor	EMM/ECM decoding
	CA Transition Monitor	Free-to-Air (FTA) <-> Scrambled transition timing monitoring
HW Options	RF Module	DVB-T/T2 or DVB-S/S2 or DVB-C (J.83 A,B,C) RF front end receiver

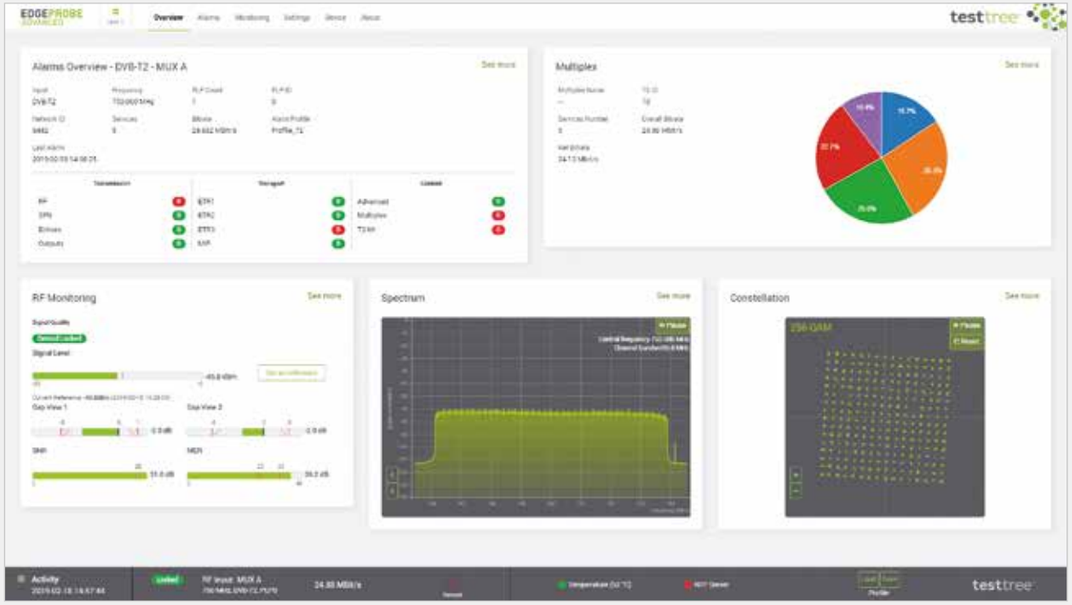
StreamProbe OTT HLS or **StreamProbe OTT DASH** — Perpetual software license for OTT- ABR monitoring probe

Bitrate	Capacity bitrate to monitor per probe: 100Mbps, 300Mbps, 600Mbps, 1Gbps, 1.5Gbps, 2Gbps, 4Gbps, 7Gbps or custom	
Included	QoS Monitor ABR	
SW Options	QoE Monitor	Audio, Video monitoring and decoding, Live Thumbnail Mosaic; Formats: MPEG-2, H264
	HEVC & 4K QoE	4K format support for QoE Monitor
	Round-Robin	Split the list of URLs to monitor in sub-lists, monitor sequentially the sub-lists

EDGEPROBE

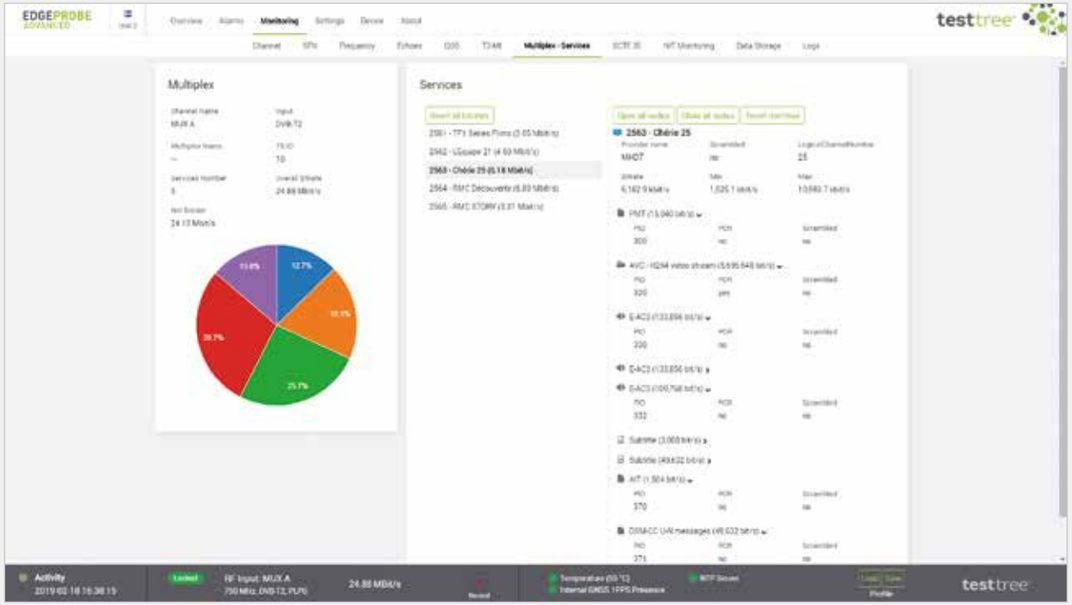
RF & QoS monitoring for Broadcast Distribution & Transmission

Accurate RF signal quality measures



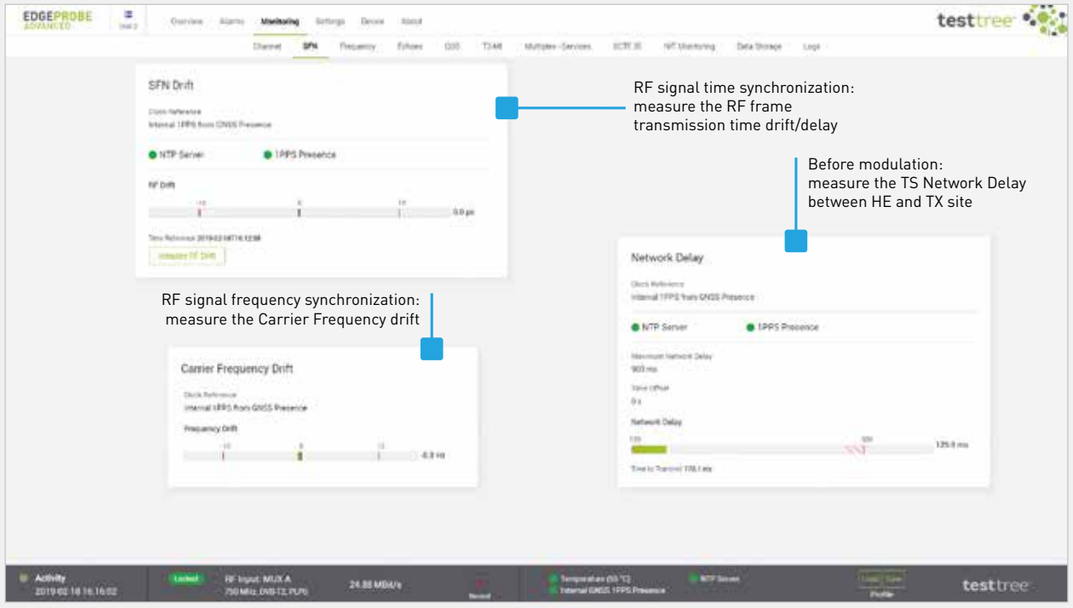
ETR 101 290 compliancy

STB decoding assurance



Reference SFN Monitoring – Transmission site

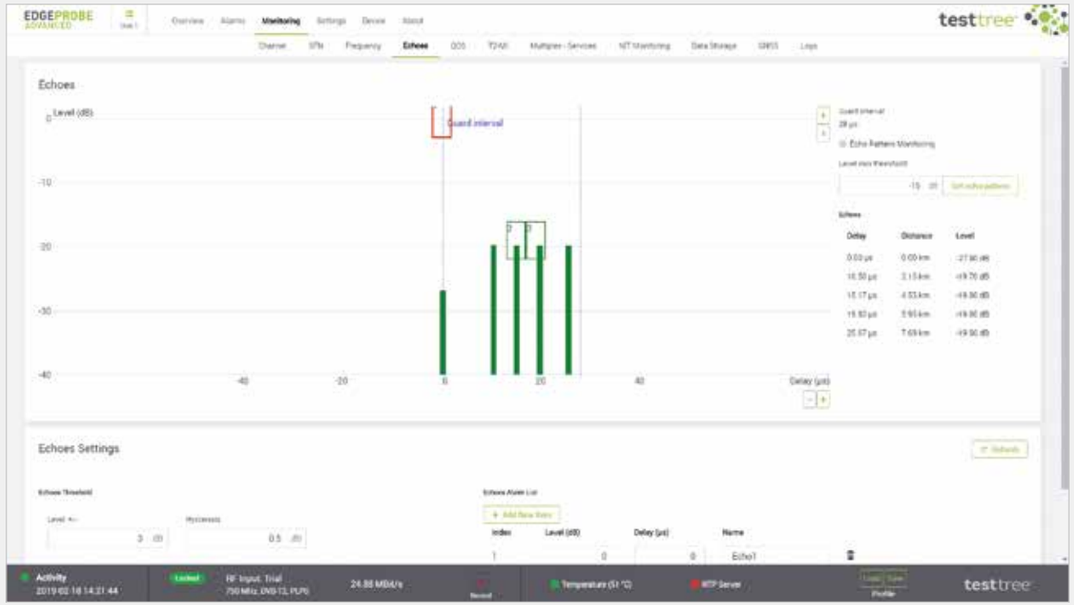
Time & frequency synchronization, distribution link Network Delay



UNIQUE TestTree FEATURE

Reference SFN Monitoring – Reception site

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



EDGEPROBE ADVANCED

HE & SFN TX Site

Multi Standard Chassis

DVB T/T2 DVB S/S2 ISDB-T/Tb DVB C J.83 A, C

ATSC 3.0/1.0 *See Page 23*

dab+ *See Page 25*

KEY FEATURES

- **DTT & CATV RF** accurate 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** mode: reliable echo in error identification when main echo suffers changes
  - **Network Delay**: TS/T2-MI over IP/ASI input

UNIQUE TestTree FEATURE

- **Satellite RF** accurate measurements :
  - Signal level, CNR, link margin, Eb/N0, BER
  - Multi-stream support, PLS support (root/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 QoS SAE (Service Availability Error), SDE (Service Degradation Error)
- **Service Plan** monitoring: multiplex structure, bitrate and regionalization check
- **T2-MI** monitoring: L1 pre/post signaling, ETSI TR 101 290 T2-MI alarms, PLP TS extraction, Network Delay
- **OneBeam/Single Illumination** monitoring: T2-MI marker, In-Band PIDs
- **BTS** monitoring: IIP, TMCC packets
- **Service streaming** over **low bandwidth links** (compression down to 500Kbps) *(See Page 21)*
- Demodulated **TS streaming** over control **IP out**, or **retransmission** over **ASI out**
- **Smart Retransmission** Receiver (DVB-T/T2): **mute the TS retransmission** over ASI out upon RF signal degradation
- Trigger RF signal capture on RF-Catcher *(See Page 30)*

TECHNICAL CHARACTERISTICS

EdgeProbe Advanced models: **DVB-T/T2, DVB-S/S2, ISDB-T/Tb, DVB-C (J.83 A,C), DAB/DAB+** *(See Page 25)*, **ATSC 3.0/1.0** *(See Page 23)* or **any combination of two** of these standards **in 1RU**
Up to **4**x [**RF in**, **ASI in/out**, **IP Data in/out** (VLAN support)] in **1RU**
1 or 2x IP Control for low bandwidth remote Web GUI
Up to **4x 32 GB storage** for TS record and 6 months logs & trends
1PPS: external or internal from **GNSS** receiver (GPS, GLONASS), **10MHz**
2x **DVB-CI** slots (decrypt up to two CA systems in parallel)*
Up to 4x HDMI outputs* / 1x ETH in/out (alarm dry contact)* / Dual Power Supply

EdgeProbe Advanced is the ideal tool to achieve accurate & cost-effective monitoring of the quality actually delivered to all points of a DTV broadcast network.

APPLICATIONS

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

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 (GPRS/3G/4G)**
- **Low power consumption 25W**

ORDERING CODES

EdgeProbe Advanced — **DTV Advanced Monitoring Probe**

EdgeProbe Advanced CHASSIS is composed of 2 BOARDS, each board supporting 2 parallel MONITORING UNITS

Select your standard BOARD 1	ATSC 3.0/1.0 or DVB-T/T2 or DVB-S/S2 or ISDB-T/Tb or DVB-C (J.83 A,C) or DAB/DAB+	
Select your standard BOARD 2	ATSC 3.0/1.0 or DVB-T/T2 or DVB-S/S2 or ISDB-T/Tb or DVB-C (J.83 A,C) or DAB/DAB+	
Included	1 active Monitoring Unit, RF + SFN + CIR + Frequency Drift monitoring, TS over ASI/IP input support, VLAN, RF to ASI/IP TS retransmission	
CHASSIS HW Options	Dual Power Supply	100-240 VAC redundant power supply
	Internal GNSS	Internal GNSS receiver (GPS, GLONASS) for internal 1PPS generation
	TRANSBOX	Stream 1 or 2 compressed service(s) *(See Page 21)*
Select your options per DTV BOARD *(See Page 25 for DAB+ EdgeProbe Advanced model)*		
SW Options	Dual ADV	Activate 2nd Monitoring Unit: total of 2x (RF + ASI + IP Data)
	TS Monitor Base	ETR290 Priority 1, 2 monitoring
	TS Monitor Advanced	ETR290 Priority 3 monitoring
	QoS Monitor	SAE, SDE monitoring
	Service Plan	Multiplex Service/PID monitoring
	T2-MI Monitor	T2-MI monitoring
	BTS Monitor	IIP & TMCC packets monitoring
	OneBeam/Single Illumination	T2-MI marker & In-Band PIDs monitoring
	IP Monitor	Jitter, RTP/FEC, Packet Loss/Recovery monitoring
	Scanning	Multiple channels (RF, ASI, IP) sequential round-robin monitoring
HW Options	Extended Memory	32 GB internal storage: trends, logs, TS record
	DVB-CI*	Dual CAM slot
	HDMI*	HDMI ouput

** Contact us for availability*

EDGEPROBE ADVANCED for HDc

DVB-T/T2 model of EdgeProbe Advanced comes in the form of an independent module (HDmE), for High Density chassis (HDc) 19'' 1RU, which provides:

DENSITY

HIGH DENSITY
Up to 6 products in the same chassis

MODULAR

MODULARITY
Combine DVB-T/T2 EdgeProbe Advanced with different type of ENENSYS products (T2Edge, T2Edge-DTH, ASIIPGuard, NetMod) in the same chassis

HOT PLUG

STRAIGHT FORWARD MAINTENANCE
All products are hot swappable and may be automatically configured

SCALABLE

SCALABILITY
Start with one product and upgrade with additional products later

RELIABLE

RELIABILITY
Hot plug and independent products with redundant power supply in 220V or 48V

ORDERING CODES

HDc-Multi-220V	**High Density chassis with 220V input**
HDc-Multi-48V	**High Density chassis with 48V input**

CHASSIS HW options	HDcMulti-In220VRedundant	110V/220V redundant power supply
	HDcMulti-In48VRedundant	48V DC redundant power supply
Up to x6 monitoring modules	HDmE	High Density module EdgeProbe Advanced for DVB-T/T2
HDmE SW Options	*See above for DVB-T/T2 EdgeProbe Advanced SW options*	

EDGEPROBE RF MFN TX Site NANO Reception Site

DVB T/T2 ISDB-T/Tb DVB C J.83 A, B, C

EdgeProbe RF is the ideal & most cost-effective high-quality solution for controling 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:
  - automate 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 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 band width control networks (GPRS/3G/4G)
- Low power consumption 8W
- Enables SNMP test automation

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 (UNIQUE TestTree FEATURE)
- TS **ETSI TR 101 290** validation: Priority 1, 2, 3 and optional QoS SAE/SDE
- **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 out**, 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 update
- Trigger RF signal capture on RF-Catcher *(See Page 30)*

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**

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, RF to ASI/IP 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	Multiplex Service/PID monitoring
	BTS Monitor	IIP & TMCC packet monitoring
	Extended Memory	32 GB storage: trends, logs, TS record
HW Options	TRANSBOX	Stream 1 or 2 compressed service(s) *(See below)*
	Tropicalization	Preserve the HW from corrosion

TRANSBOX

Confidence monitoring: live service streaming over low bandwidth network links!

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**

TECHNICAL CHARACTERISTICS

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

APPLICATIONS

- Confidence monitoring: live transmission check
- Validate regional service and/or ad insertion
- Service (audio/video) compression & streaming

KEY BENEFITS

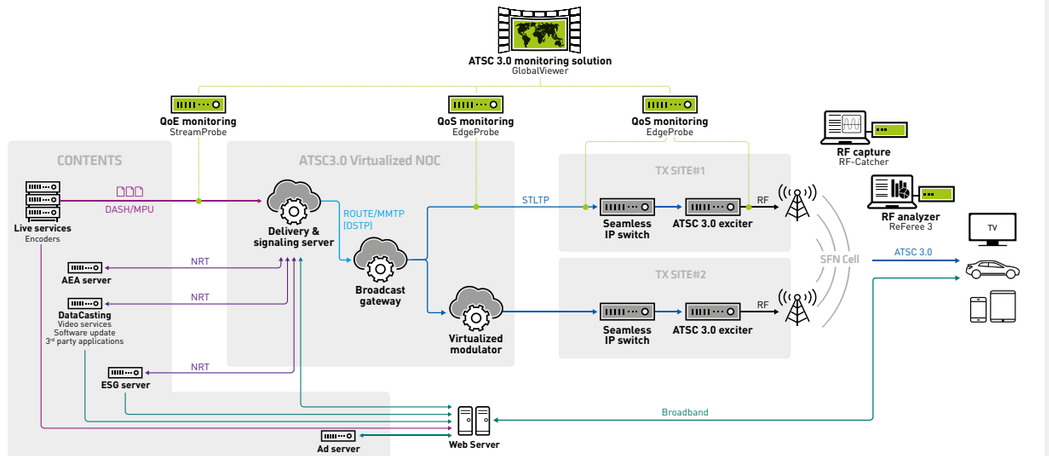
- Easy to use and configure: transcoding controlled via the master EdgeProbe unit, SNMP compatible
- Compatible with low bandwidth data networks: down to 500 Kbps compressed streams
- Low power consumption 5W

ORDERING CODES

TRANSBOX	Transcoding Unit for EdgeProbe	
HW Option	Dual	Two parallel transcoding units in 1 RU

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** *See Page 30*

→ **REFEREE 3** *See Page 35*

EDGEPROBE ADVANCED

HE & SFN TX Site Reception Site

Multi Standard Chassis

ATSC 3.0/1.0

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.

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** mode: 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: multiplex structure, bitrate and regionalization check
- **STLTP** integrity, Network Delay
- **ATSC 1.0 Service streaming** over **low bandwidth links** (compression down to 500Kbps) *(See Page 21)*
- Demodulated **ATSC 1.0 TS streaming** over control **IP out**, or **retransmission** over **ASI out**
- Trigger RF signal capture on RF-Catcher *(See Page 30)*

UNIQUE TestTree FEATURE

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**
- **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-T/T2**, **DVB-C/C2**, **ISDB-T/Tb**, **ATSC 3.0/1.0** or any combination of two of these standards (See Page 18 for DVB-T/T2, DVB-C/C2, ISDB-T/Tb, DVB-S/S2, ATSC 3.0/1.0)
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**

ORDERING CODES

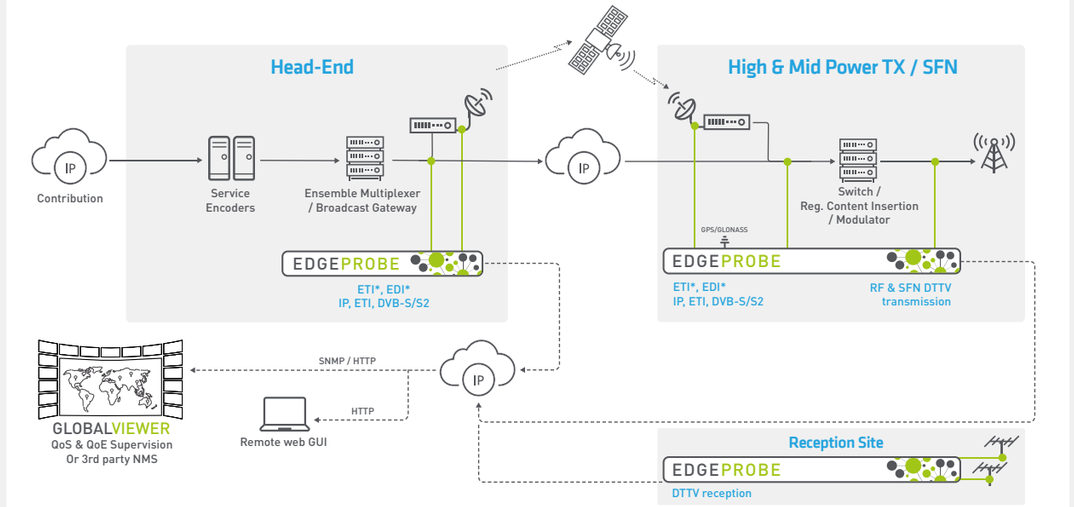
EdgeProbe Advanced — **ATSC 3.0/1.0 Advanced Monitoring Probe**

EdgeProbe Advanced CHASSIS is composed of 2 BOARDS, each board supporting 2 parallel MONITORING UNITS

Select your standard BOARD 1	ATSC 3.0/1.0 or DVB-T/T2 or DVB-S/S2 or ISDB-T/Tb or DVB-C (J.83 A,C) or DAB/DAB+	
Select your standard BOARD 2	ATSC 3.0/1.0 or DVB-T/T2 or DVB-S/S2 or ISDB-T/Tb or DVB-C (J.83 A,C) or DAB/DAB+	
Included	2 active Monitoring Units, RF + SFN + CIR + ATSC 1.0 TS over ASI/IP input support, VLAN	
	Scanning	Multiple channels (RF, ASI, IP) sequential round-robin monitoring
	Extended Memory	32 GB internal storage: trends, logs, TS record
CHASSIS HW Options	Dual Power Supply	100-240 VAC redundant power supply
	Internal GNSS	Internal GNSS receiver (GPS, GLONASS) for internal 1PPS generation
Select your options per DTV BOARD *(See Page 25 for DAB+ EdgeProbe Advanced model)*		
SW Options	RF Monitor ATSC 3.0/1.0	RF transmission, spectrum, constellation, CIR and SFN Time Drift
	ATSC 1.0 TS Monitoring	ETR 101 290 priority 1, 2, 3 and Multiplex Service Plan over ASI/IP
	ATSC 3.0 STLTP Monitoring	STLTP Network Delay and integrity
	IP Monitoring	Jitter, RTP/FEC, Packet Loss/Recovery monitoring

DIGITAL RADIO NETWORKS

DAB



** Contact us for availability*

EDGEPROBE ADVANCED

SFN & MFN TX Site
Reception Site
Multi Standard Chassis

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.

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**:
  - Echoes delay & level alarms
  - **Echo Pattern monitor**: reliable echo in error identification when main echo suffers changes
  - **TII decoding** and presence detection

UNIQUE TestTree FEATURE

*DAB transport monitoring: FIC, CU occupation, sub-channel structure **
Ensemble Service Plan: check ensemble structure
Service information (SI), PAD (DLS, MOT/SLS)
Audio processing: silence detection, audio recording and streaming
ETI, EDI input analysis

APPLICATIONS

- **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
(See Page 18 for DVB-T/T2, DVB-C/C2, ISDB-T/Tb, DVB-S/S2, ATSC 3.0/1.0)

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)*

Dual Power Supply

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 network degradations before your customers do**
- **Remotely accessible, compatible with low bandwidth control networks (GPRS/3G/4G)**
- **Low power consumption 25W**

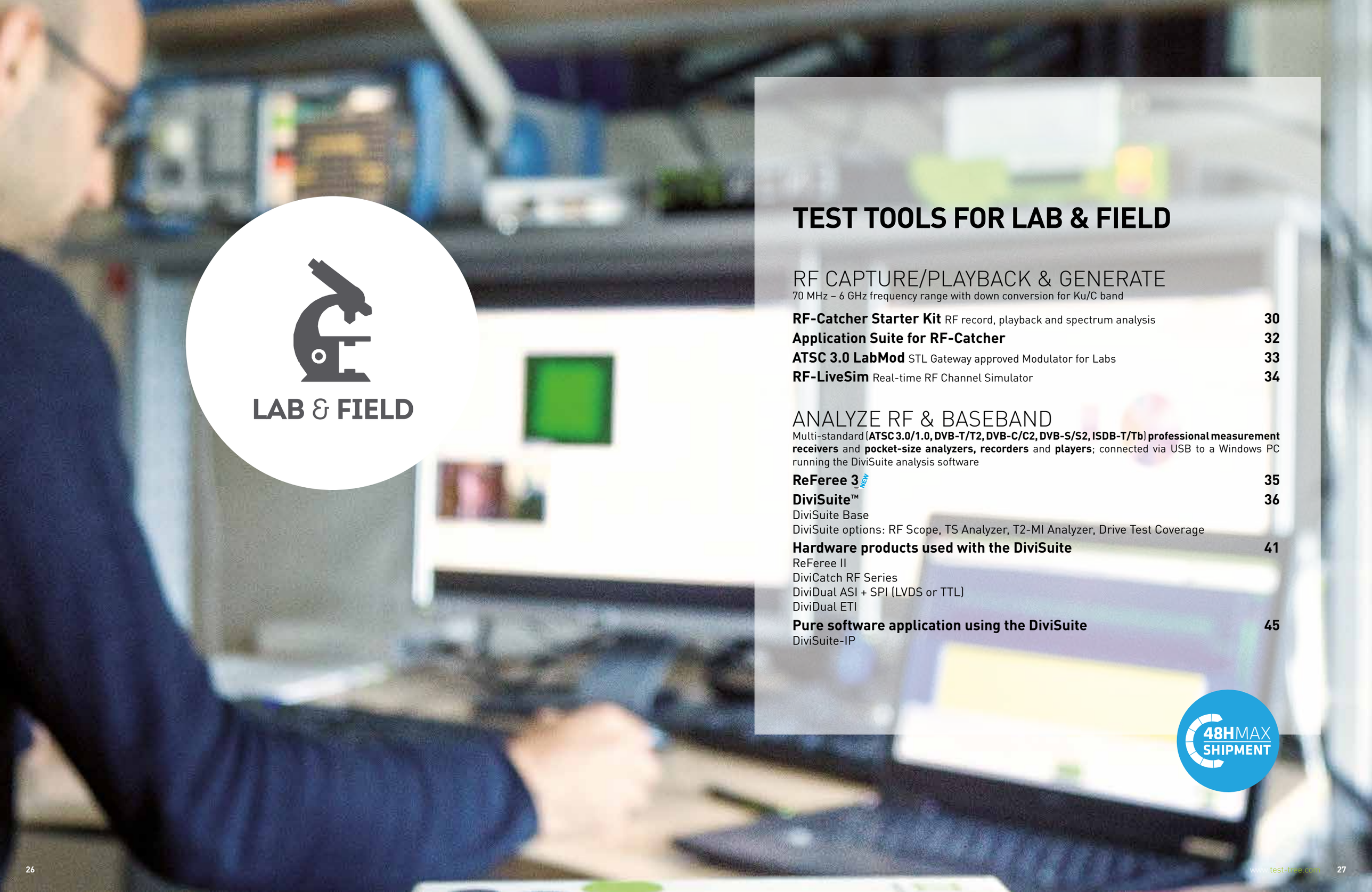
ORDERING CODES

EdgeProbe Advanced — **Digital Radio Advanced Monitoring Probe**

EdgeProbe Advanced CHASSIS is composed of 2 BOARDS, each board supporting 2 parallel MONITORING UNITS

Select your standard BOARD 1	**DAB/DAB+** or **DTV** (DVB-S/S2 or DVB-T/T2 or DVB-C/C2 or ISDB-T/Tb or ATSC 3.0/1.0)	
Select your standard BOARD 2	**DAB/DAB+** or **DTV** (DVB-S/S2 or DVB-T/T2 or DVB-C/C2 or ISDB-T/Tb or ATSC 3.0/1.0)	
Included	**1 active Monitoring Unit, RF + ETI + IP Data, 32 GB internal storage per Unit, sequential round-robin monitoring, analog audio output**	
CHASSIS HW Options	**Dual Power Supply**	100-240 VAC redundant power supply
	Internal GNSS	Internal GNSS receiver (GPS, GLONASS) for internal 1PPS generation
Select your options per Digital Radio BOARD *(See Page 18 for DTV EdgeProbe Advanced model)*		
SW Options	**Dual ADV**	Activate 2nd Monitoring Unit: total of 2x (RF + EDI + IP Data)
	RF DAB Monitor	RF signal quality, CIR - Echoes, SFN monitoring
	Transport Ensemble Service	FIC, MSC, Ensemble Services monitoring, silence detection*, audio streaming*
	ETI/EDI Monitor*	ETI/EDI input monitoring
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*



LAB & FIELD

TEST TOOLS FOR LAB & FIELD

RF CAPTURE/PLAYBACK & GENERATE

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

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

48H MAX SHIPMENT

TEST TOOLS FOR LAB & FIELD DEVICE SELECTOR

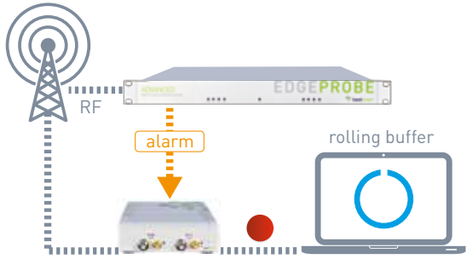
LIGHTWEIGHT DEVICES
USB SELF-POWERED

	RF Record & Playback	RF Spectrum Analysis	RF Demodulation	SFN Measurements	Baseband TS	T2-MI	STLTP	DAB+ ETI	GNSS Tracking	Factory Calibration
PORTABLE SPECTRUM ANALYZER										
RF-Catcher	•	•							•	
MEASUREMENT RECEIVERS										
ReFeree 3 NEW		•	ATSC 3.0/1.0	•			•		•	•
ReFeree II			DVB-T DVB-T2 DVB-C DVB-C2	•	•	•			•	•
PROFESSIONAL RECEIVERS										
DiviCatch RF-S/S2			DVB-S DVB-S2		•	•				
DiviCatch RF-ISDB-T/TB			ISDB-T/Tb		•					
DiviCatch RF-T/C T2/C2			DVB-T DVB-T2 DVB-C DVB-C2		•	•				
DiviCatch RF-C			DVB-C ITU-J83 Annexes A, B, C		•					
BASEBAND ADAPTERS										
DiviDual ASI+SPI					•	•				
DiviDual ETI								•		
PURE SOFTWARE APPLICATION										
DiviSuite IP			If Hardware Device connected		•	•				

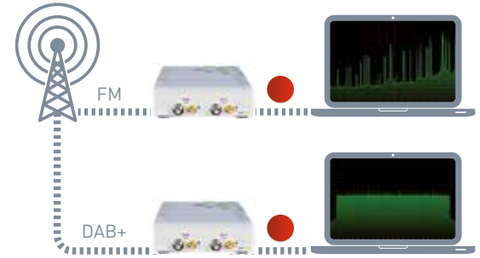
48HMAX SHIPMENT — In their «all options» package, our test devices can be shipped in max 48h

RF RECORDING & PLAYBACK

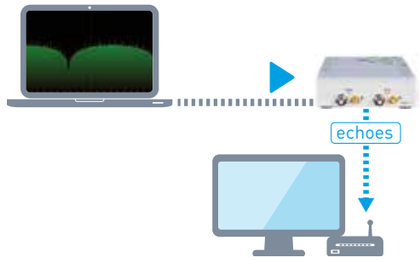
USE-CASES



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

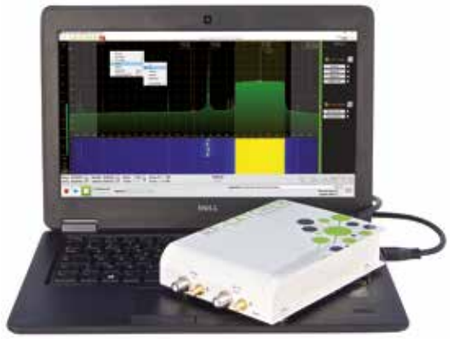
and also...

RF-CATCHER STARTER KIT

The Most Compact RF Capture & Playback device!

Covering a frequency range from 70 MHz up to 6 GHz, RF-Catcher can record and play real-time RF bandwidth up to 55 MHz.

RF-Catcher allows experimentation of 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.



The RF-Catcher is compact, robust, lightweight (600g) and cost-effective: your technicians and engineers can bring it everywhere in their hand bag.

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 up 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, Hann...
- 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

Compatible Windows 7, 8/8.1, 10 (x64 versions only)

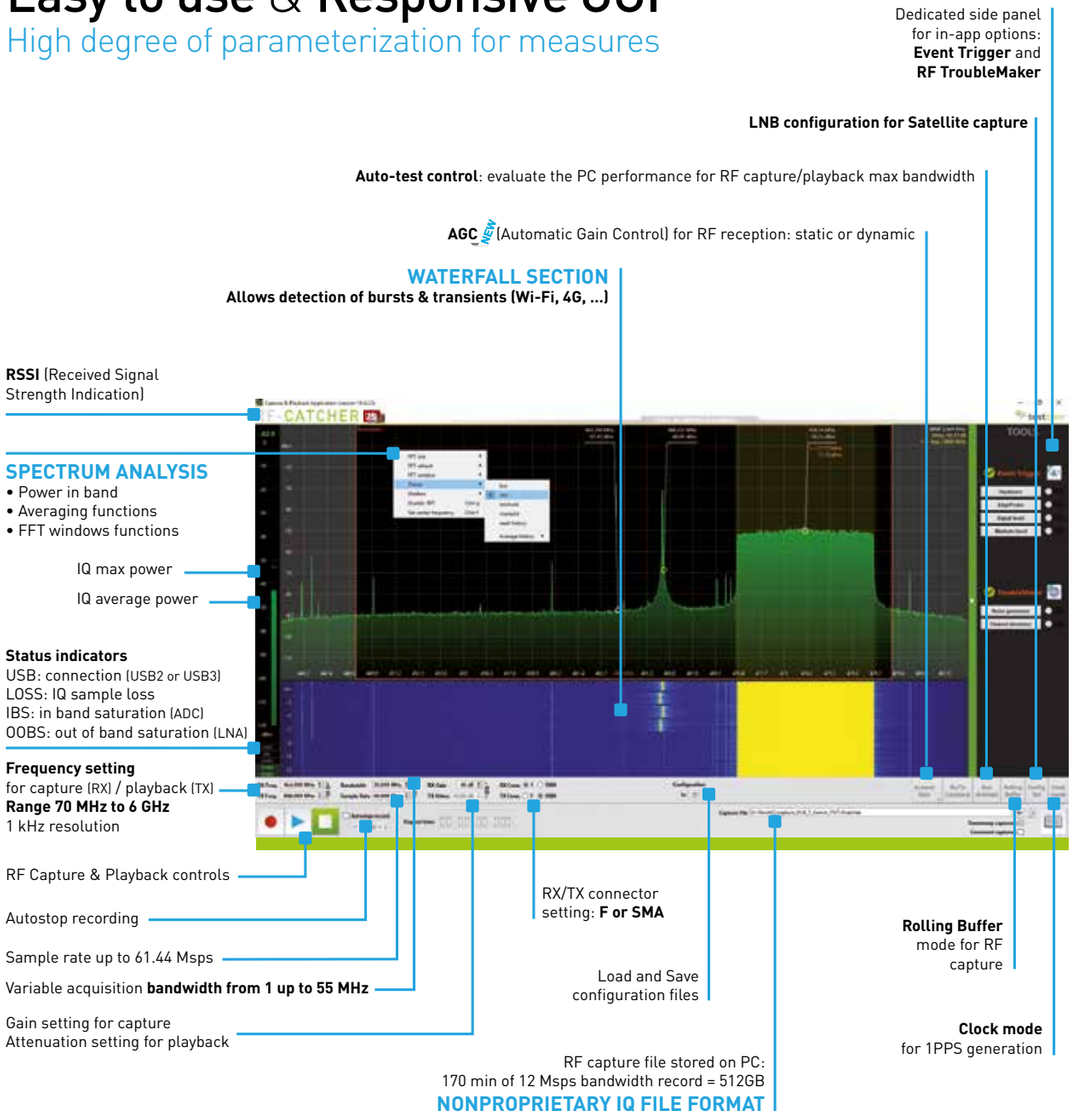
*Both input/output connectors cannot be used at the same time

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 head-quarter and regional sites**
- **Radio/TV Broadcast/Telecom RF troubleshooting**
- **Test automation (command line tools)**
- **Telecommunications Regulation Agencies validation tool**

Easy to use & Responsive GUI

High degree of parameterization for measures



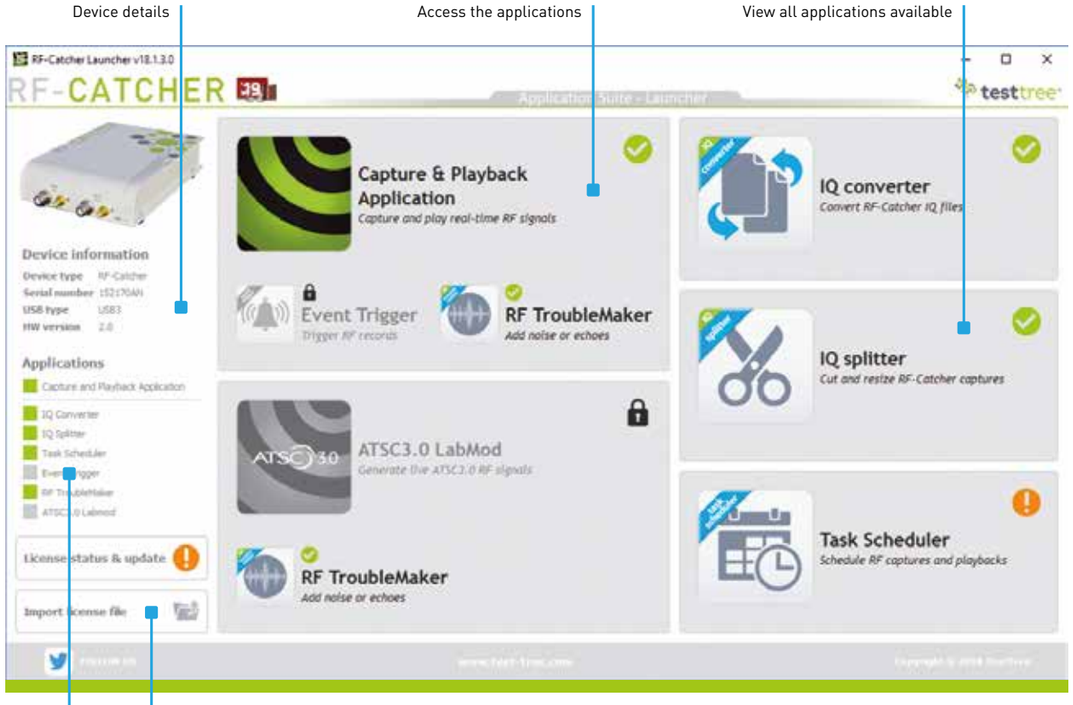
ORDERING CODE

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

APPLICATION SUITE FOR RF-CATCHER

One Global Launcher for all applications

Quickly access the applications without missing any information



SUBSCRIPTION
- Complete Suite and future applications
- Software updates & privileged support
- Licenses for the subscription duration

PURCHASE
- Choose the applications from the Suite
- Optional software updates & support
- Permanent licenses

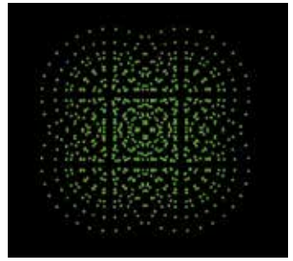
ORDERING CODE

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	All applications including Advance Software Support for the subscription period
	Perpetual licenses	One or several of the above applications with optional Advance Software Support

ATSC 3.0 LABMOD

STL Gateway approved Modulator for Lab!

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.



TECHNICAL CHARACTERISTICS

Input interface	STLTP IP, STLTP PCAP File, PRBS, TS File 2x RF inputs (SMA-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 (SMA-type female 50 Ω, F-type female 75 Ω) ATSC 3.0 live RF playback and generate
Modulation	
ATSC 3.0 constellation (NUC)	QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM
L1	Compatible with all L1 modes
LDM (Layered Division Multiplex)	Yes
Channel bandwidth	6, 7 or 8 MHz
Guard Interval	192, 384, 512, 768, 1024, 1536, 2048, 2432, 3072, 3648, 4096, 4864
FFT mode	8k, 16k, 32k (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	SP3_2, SP3_4, SP4_2, SP4_4, SP6_2, SP6_4, SP8_2, SP8_4, SP12_2, SP12_4, SP16_2, SP16_4, SP24_2, SP24_4, SP32_2, SP32_4
TI (Time Interleaving) mode	CTI up to 1448 depth, HTI
Subframes	Multiple subframes: single/multiple PLP
TXID	Transmitter identification

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)**

ORDERING CODES

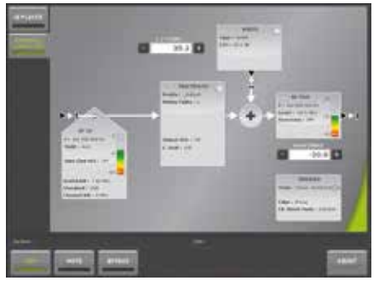
ATSC 3.0 LabMod		**ATSC 3.0 Modulator for Lab** Shipped bundled with HW device and ATSC 3.0 LabMod Application for Windows 7, 8/8.1, 10 (x64)
ATSC 3.0 LabMod Application		**ATSC 3.0 Modulator Application for Lab** Windows 7, 8/8.1, 10 (x64) software application for RF-Catcher Starter Kit
Software Option	RF Capture & Playback	Software Application for RF transmission captures, playbacks and spectrum analysis

RF-LIVESIM

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).

RF-LiveSim is a cost effective solution for intense 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 (isofrequency)
1x 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 loosing 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
1U rack form (450x500x44)

APPLICATIONS

- **Chipset designers: complete modulator/demodulator testing**
- **Receivers manufacturers: operating limit testing and robustness**
- **R&D Laboratories: intensive non-regression testing, design/product verification**

KEY BENEFITS

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

ORDERING CODE

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

ATSC 3.0 REFEREE 3

NEW

The 1st ATSC 3.0 analyzer designed for the field !

ATSC 3.0/1.0

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.

BEST of SHOW NAB SHOW 2019 TVTechnology

2019 PRODUCT of the YEAR NABSHOW

TECHNICAL CHARACTERISTICS

1x RF input for ATSC 3.0/1.0 ; 1x RF input for Satellite (reserved for future use)
2x IP Data inputs/outputs (Ethernet, SFP)
1x 1PPS & 1x 10MHz inputs for SFN delay measurements
1x GPS/GLONASS input for coverage tests
Spectrum & Constellation display
RF measurements: Signal level, MER, SNR, BER
SFN Drift, Network Delay, Channel Impulse Response (CIR/echoes)
ATSC 3.0 Frame analysis: frame decoding, structure display, service list, bitrate monitoring
Logs & Reports files generation (CSV, KML formats)
Audio/Video decoding for unencrypted programs
DASH (ROUTE/MMTP) reception
STLTP analysis: QoS monitoring (jitter, FEC), bitrate monitoring (inner, outer, by PLP/Service)
Road test & Field coverage: Internal GPS receiver
Google-compliant report files including RF measurements
USB self-powered (2x USB 3.0 connectors)
210 x 120 x 35 mm ; 730g

APPLICATIONS

- **Coverage & Drive Tests for ATSC 3.0 & ATSC 1.0**
- **Installation & Maintenance Test Tool**
- **RF Reception Qualification**
- **Head-End/TX site/off-air measurements**
- **ATSC 3.0/1.0 Network Troubleshoot**
- **R&D Test & Measurements**

KEY BENEFITS

- **The 1st analyzer designed for field measurements**
- **Easy to use and configure**
- **Compact (730 g), USB self-powered**
- **Complete product: RF + STLTP analysis**
- **Analyze/Validate ATSC 3.0 signals in real-time down to the frame structure**
- **Control audio/video content decoded in real-time**

ORDERING CODES

ReFeree 3		**ATSC 3.0 Field Analyzer** Shipped bundled with ReFeree 3 software for Windows 7, 8/8.1, 10
Software Option	Video decoding	ATSC 3.0 ROUTE/MMTP live video decoding, ATSC 1.0 live video decoding
	ATSC 3.0 STLTP	STLTP analysis, Network Delay, IP Jitter, FEC (enables HW RJ45 connector)
	ATSC 3.0 NRT	ESG, AEA, Data Casting analysis

* Contact us for availability

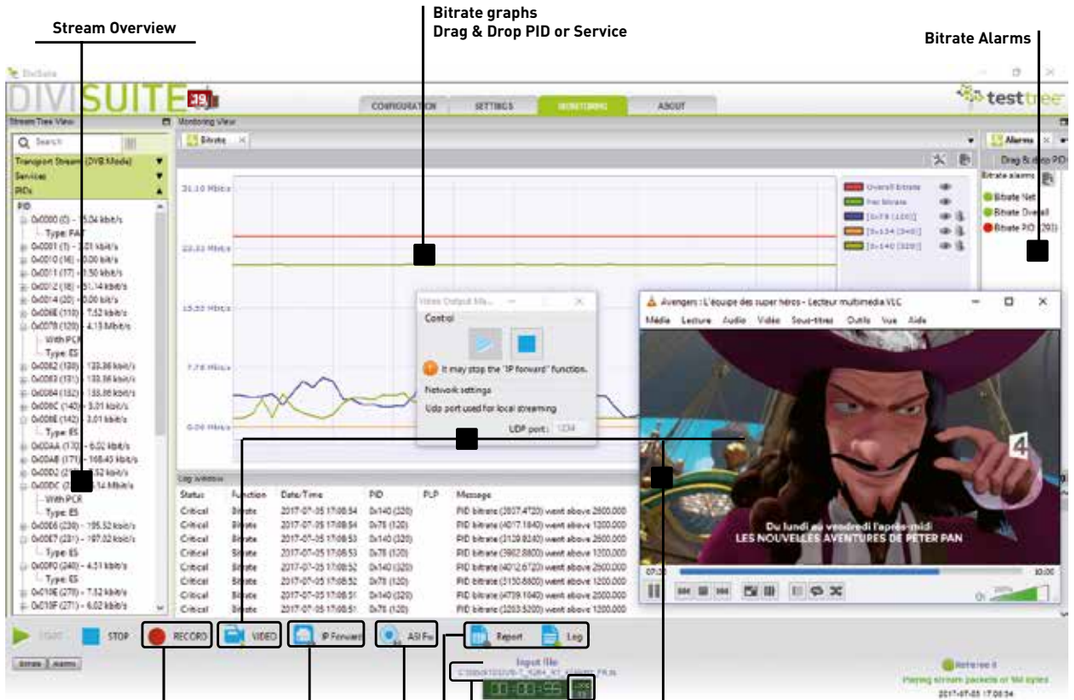
DIVISUITE BASE

DiviSuite Base

- **TS Recorder**
- **TS Player over ASI**
- **TS Player over IP**
- **A/V Output**
- **RF Scan**

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

Common Features coming as a default package!



Schedule the analyzed TS recording to file format

Forward the analyzed TS over the PC's IP interface to unicast/multicast

Offline Analysis

Report & Log files

Live Audio/Video decoding H.265/HEVC, H.264/MPEG-4 AVC, MPEG-1/2, AAC, MP3...

H.264 MPEG-AVC H.265 HEVC

Counters management at file analysis loop: no false alarm (CC, PCR, PTS, DTS)

Play the analyzed TS over the ASI output (188/204 framing, null packets removal, raw player mode)

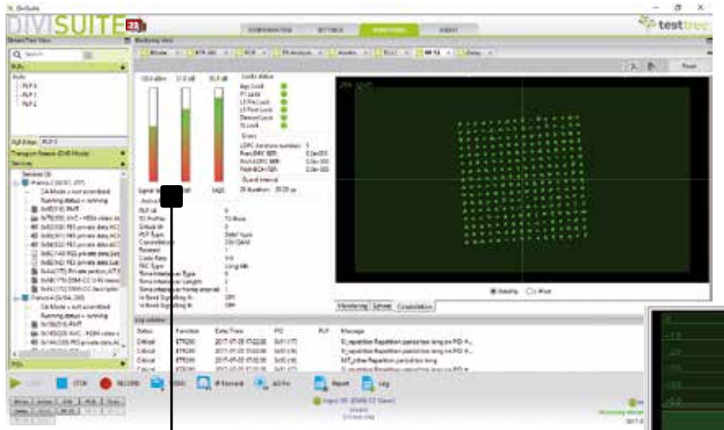
RF Scan
Scan for available frequencies and import them for analysis (DVB-T/T2, DVB-C/C2)

Command Line Mode
Automate your tests

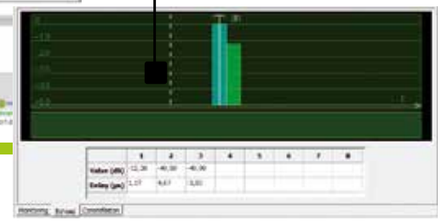
DIVISUITE SOFTWARE OPTION

RF Scope

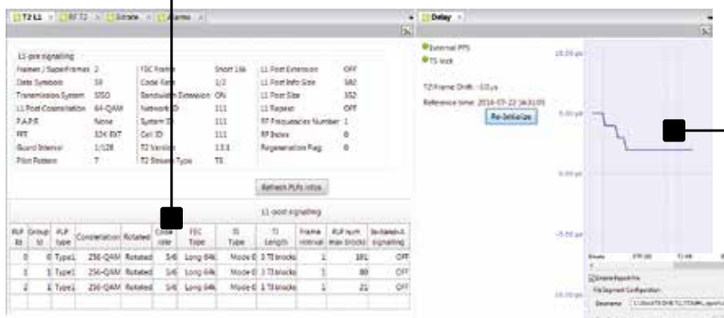
- Signal Quality: level, SNR, MER, BER
- Graphs, Report Files
- Modulation Parameters
- Constellation
- Channel Impulse Response
- SFN Synchronisation



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 signaling



Validate SFN synchronization
SFN Drift
1 PPS & 10 MHz inputs

Modulator/TX endurance tests
Log & Report files
Save events and trend measurements

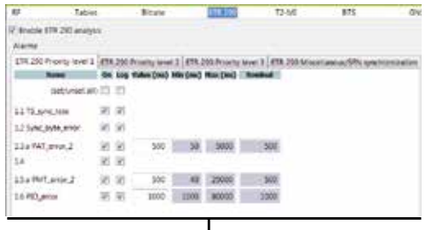
DIVISUITE SOFTWARE OPTION

TS Analyzer

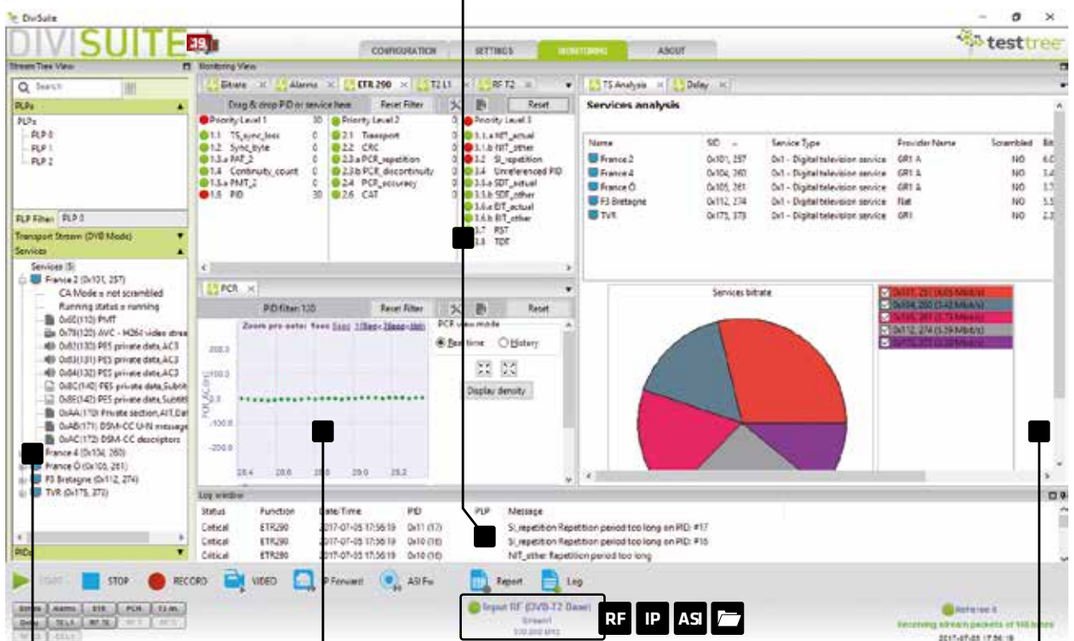
- TS Standard: MPEG, DVB, ATSC 1.0, ISDB-T/Tb (BTS)
- PSI/SI Tables Decoding
- ETSI TR 101 290
- PCR Graphs
- ASI Network Delay

Transport Stream complete Analysis!

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



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



Check regionalization
Service Plan

Check PCR
Drag & Drop PID containing PCR
PCR accuracy graphs

Advanced Service Analysis
Component type & structure
Component bitrates

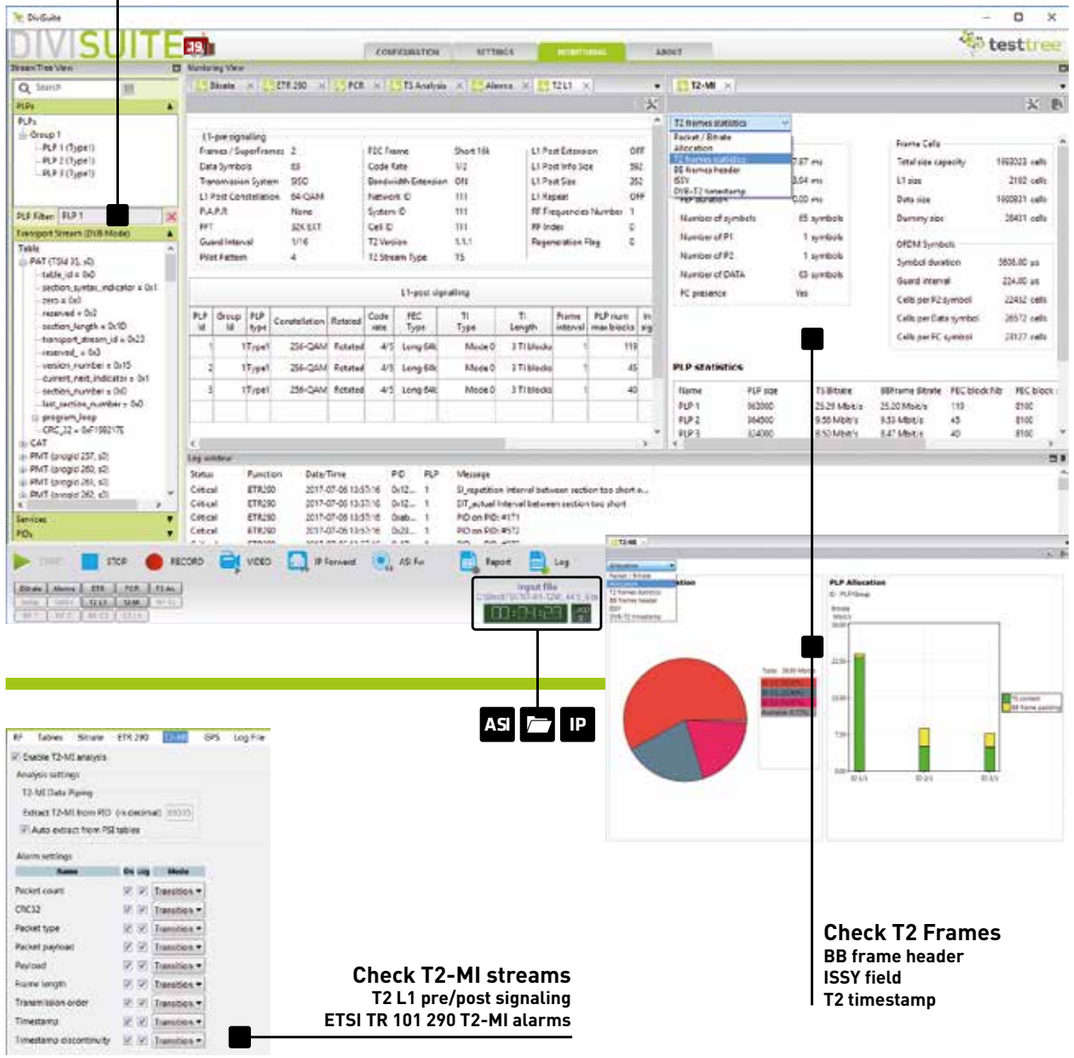
DIVISUITE SOFTWARE OPTION

T2-MI Analyzer

- T2 L1 pre/post signaling, PLP allocation (BB frame, TS, padding/overflow)
- T2 timestamp, BB frame header, ISSY field
- Single & Multi-PLP, PLP extraction
- T2-MI Network Delay

Validate your DVB-T2 Gateway!

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

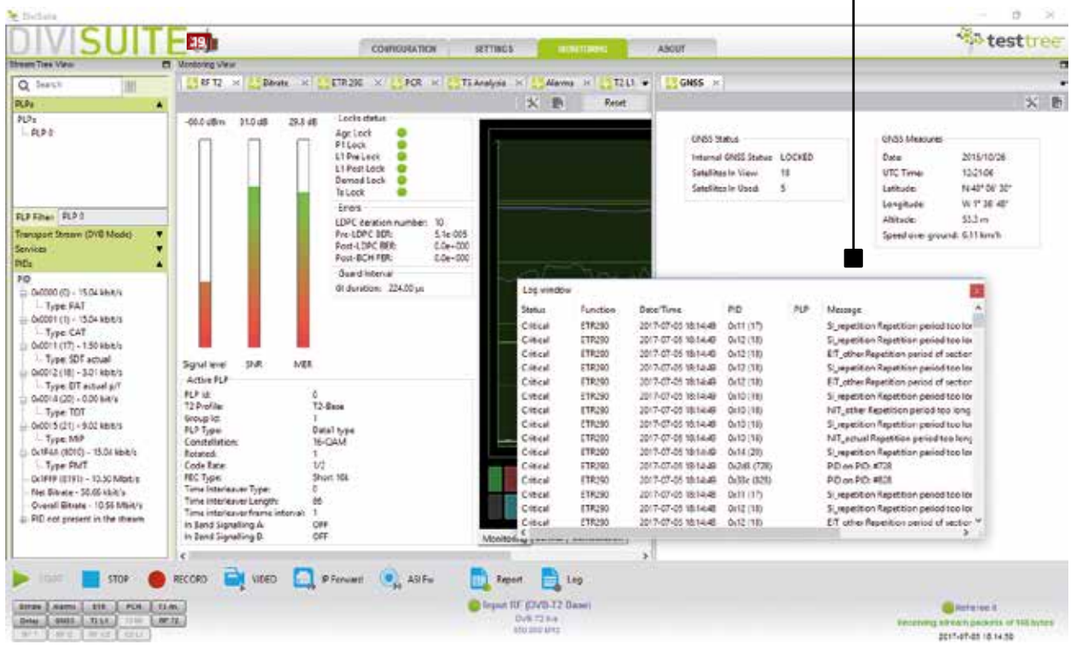
DIVISUITE SOFTWARE OPTION

Drive Test Coverage

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

Test the field coverage!

GNSS receiver enabled
Real-time measurement



Display results in Google Earth or Google Fusion Tables applications

* Option delivered with a magnet mount GNSS L1 Antenna

Generate Google Earth compliant files (KML)
Customize measured parameters

REFEREE II

TERRESTRIAL TV
CABLE TV

DVB T/T2 DVB C/C2

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.

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/DTS)
TS over IP forward (PC's Ethernet interface selection)
Command Line mode
Compatible Windows 7, 8/8.1, 10
USB self-powered, 660 g

APPLICATIONS

- **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-T2**

KEY BENEFITS

- **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**

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

Software Options	RF Scope	RF Analysis	Bundle
	TS Analyzer	TS Analysis	
	T2-MI Analyzer	T2-MI Analysis	
	Drive Test Coverage	GPS/GLONASS location information	

48HMAX SHIPMENT | 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.

H.264 MPEG-4 AVC | H.265 HEVC

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**

PRODUCTS HIGHLIGHTS

DVB S/S2

Receive **DTH streams** and all modes of satellite distribution links
All modulation schemes supported (from QPSK to 32APSK)
Allows antenna **LNB powering & configuration**

ISDB-T/Tb

All modulation schemes supported (DQPSK, from QPSK to 64QAM)
Complete **BTS analysis**: IIP packet parsing, TMCC alarms and information

DVB T/T2 DVB C/C2

All modulation schemes supported (from QPSK to 256QAM, 4096QAM for DVB-C2)
ITU-J83 Annexes A, C (roll-off 0.15) supported

DVB C CABLE

All modulation schemes supported (from QPSK to 256QAM)
ITU-J83 Annexes A, B, C supported

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 (roll-off 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 (PLP extraction)	
TS playback over ASI (loop counters management : CC, PCR, PTS/DTS)	
TS over IP forward (PC'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)**	RF Analysis
	TS Analyzer	Transport Stream Analysis
	T2-MI Analyzer	T2-MI Analysis (for DiviCatch RF-S/S2 and DiviCatch RF-T/C T2/C2 only)

48HMAX **SHIPMENT** | 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
T2-MI analysis: L1 pre & post signaling, T2 frame statistics, BB frame header, ISSY field, T2 timestamp
BTS analysis: IIP Packet parsing, TMCC alarms, TMCC next information
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 (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	TS Analysis
	T2-MI Analyzer	T2-MI Analysis

DIVIDUAL ETI

DAB dab+ T-DMB

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

TECHNICAL CHARACTERISTICS

1x ASI input and 1x ASI 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 CODE

DiviDual ETI	**DAB, DAB+, T-DMB Recorder, Player** Shipped bundled with DiviSuite ETI 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.

DiviSuite Base

TS Recorder
TS IP Forward
A/V Output

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

TS Analyzer

TS Standard: MPEG, DVB, ATSC 1.0, ISDB-T/Tb (BTS)
PSI/SI Tables Decoding
ETSI TR 101 290
PCR Graphs
ASI Network Delay

T2-MI Analyzer

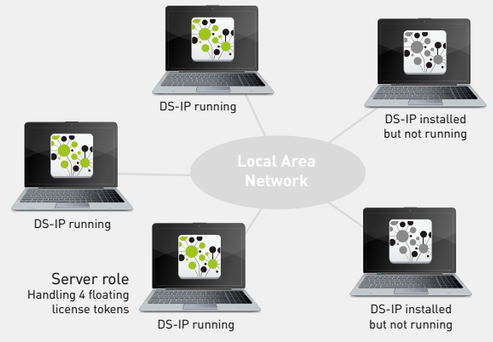
T2 L1 pre/post signaling, PLP allocation (BB frame, TS, padding/overflow)
T2 timestamp, BB frame, ISSY field
Single & Multi-PLP, PLP extraction

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.



Detach license token for temporary use outside of the LAN

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	
Software Option	T2-MI Analyzer	

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