

WHY USE MDI?

MDI (RFC 4445) provides users with the tools to measure and diagnose most network induced impairments for IPTV streaming media. It is comprised of two distinct measurements: the delay factor (DF) and media loss rate (MLR).

As a measure of media stream delivery quality, MDI is typically sampled at multiple points throughout the stream path, with the measurements serving as indicators of network problems that can be addressed before they affect the end customer's service.

DF is the time difference between the arrival and the drain of the media packets. It takes into account the amount of jitter present in the media stream and provides a measure of the required buffer needed for error-free transmission at the next downstream point.

Large DF values indicate severe jitter in the network which in turn indicates that the network requires more latency (large buffers) in order to compensate for the time needed to fill the buffers before the packets can begin to be sent to the receiver.

MLR is the count of lost and out-of-order flow packets over a one-second sampling period. It is important to include out-of-order packets in the MLR metric, as many stream consumer-type devices do not reorder packets that are received out of order. Therefore, any lost or out-of-order packet will introduce errors and visible distortions to the media stream which may be perceptible to the end viewer. This fact makes the MLR component of MDI an often-used measure for service-level agreements.

IPTV TESTING WITH THE FTB/IQS-8510B

Equipped with the IPTV option, the FTB/IQS-8510B Packet Blazer modules can be used at different points in the network to collect data and help isolate a fault affecting the IPTV service quality. See figure 1 below.

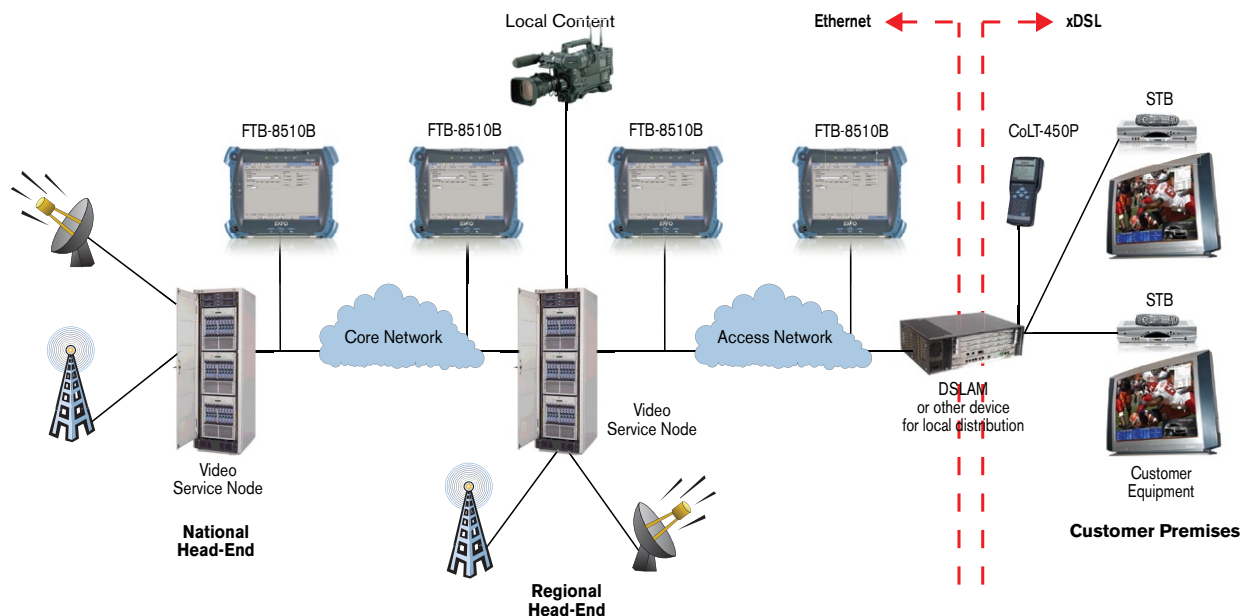


Figure 1. IPTV testing can be performed at multiple points in the network where an electrical or optical Ethernet interface is available, typically through a test port.

The IPTV network must be tested and characterized upon introduction of new services. In addition, it must be monitored constantly to limit unexpected service degradation. Figure 1 presents a typical test configuration where the FTB/IQS-8510B can be used to monitor a specific section of the IPTV network. Test connections using a single- or dual-port test topology. Test connections can be established to monitor the IPTV streams at appropriate test points available from the core or access network devices (video streamers, routers, switches, etc.) using either electrical or optical Ethernet interfaces.

As seen in figure 1, the FTB-8510B modules enable the parallel monitoring of up to 100 unicast or multicast IP addresses to support IPTV monitoring (including VoD basic monitoring). The monitoring includes the ability to report statistics on MDI and PCR jitter in addition to other key statistics such as IP packet metrics, media rate, presence measurements and bandwidth utilization, which are necessary to correctly characterize an IPTV stream.

What's more, while monitoring the selected IP address in the IPTV network, all the functions supported via the Frame Analyzer application are also simultaneously available. This provides additional insight to troubleshoot IPTV issues that could originate from the Ethernet layer.

SPECIFICATIONS

Interfaces	10 Mbit/s, 100 Mbit/s, 1 Gbit/s (electrical) 100 Mbit/s, 1 Gbit/s (optical)
Parallel monitoring capacity	100 streams
Codecs	Video MPEG-2, MPEG-4 Part 2, MPEG-4 Part 10 (H.264) and VC-1 Audio MPEG-1, MPEG-2, Advanced Audio Codec (AAC), Dolby AC-3, MPEG-4 AAC and MPEG-4 HE AAC
Stream information	Stream name Encapsulation (IPv4/UDP or IPv4/UDP/RTP) Transport stream type (SPTS) Video stream type (MPEG-2, MPEG-4 Part 2, MPEG-4 Part 10 (H.264) or VC-1) Source and destination IP address Source and destination UDP port number Start time Elapsed time Presence time
IPTV statistics	RFC 4445 media delivery index <ul style="list-style-type: none"> - Delay factor (current, average, min, max) - Media loss rate (current, average, min, max) - Virtual buffer size (current, average, min, max) ETSI TR 101 290 (Priority 1) <ul style="list-style-type: none"> - TS sync loss - Sync byte error - PAT error2 - Continuity counter error - PMT error2 - PID error (video, audio) PCR jitter (current, average, min, max)
Stream statistics	Ethernet <ul style="list-style-type: none"> - Bandwidth utilization IP <ul style="list-style-type: none"> - IP rate - IP packet size - IP packet count Media <ul style="list-style-type: none"> - Media rate - Packet count - Packet loss
Through mode ^a	Capability to test in Through mode or Pass Through mode

ADDITIONAL FEATURES

IGMP v2 with join/leave statistics

Stream auto-discovery

Stream auto-monitoring

Stream alias table

Configurable alarm thresholds

- MDI DF
- MDI MLR
- PCR jitter
- PID error
- PAT error 2
- PMT error 2

Note

a. Available as a software option.

ORDERING INFORMATION

MODULE

FTB-85XX-XX

Model

- FTB-8510B
- FTB-8510B-1
- FTB-8510B-2

Other options

- 00 = Without other options
- 100optical = 100 Mbit/s optical capability on both ports
- TCP = TCP throughput measurement
- IPTV_MON = IPTV testing and analysis (10 streams)
- IPTV_MaxStream = IPTV testing and analysis (100 streams)
- ETH-THRU = Through mode testing^a

Example: FTB-8510B-2-100Optical

For Ethernet optical interfaces, FTB-859x transceivers have to be ordered separately.

MODULE

IQS-85XX-XX

Model

- IQS-8510B
- IQS-8510B-1
- IQS-8510B-2

Other options

- 00 = Without other options
- 100optical = 100 Mbit/s optical capability on both ports
- TCP = TCP throughput measurement
- IPTV_MON = IPTV testing and analysis (10 streams)
- IPTV_MaxStream = IPTV testing and analysis (100 streams)
- ETH-THRU = Through mode testing^a

Example: IQS-8510B-2-100Optical

For Ethernet optical interfaces, FTB-859x transceivers have to be ordered separately.

TRANSCEIVER

- FTB-8590 = 1000Base-SX (850 nm) LC connectors; optical SFP transceiver module for FTB-8510B Packet Blazer
- FTB-8591 = 1000Base-LX (1310 nm) LC connectors; optical SFP transceiver module for FTB-8510B Packet Blazer
- FTB-8592 = 1000Base-ZX (1550 nm) LC connectors; optical SFP transceiver module for FTB-8510B Packet Blazer
- FTB-85910 = 100Base-FX (1310 nm) MM, LC connectors; optical SFP transceiver module for FTB-8510B Packet Blazer^b
- FTB-85911 = 100Base-LX (1310 nm) SM, LC connectors; optical SFP transceiver module for FTB-8510B Packet Blazer^b

Notes

- a. Available with the FTB/IQS-8510B-2 only.
- b. Available with the 100 optical option.

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