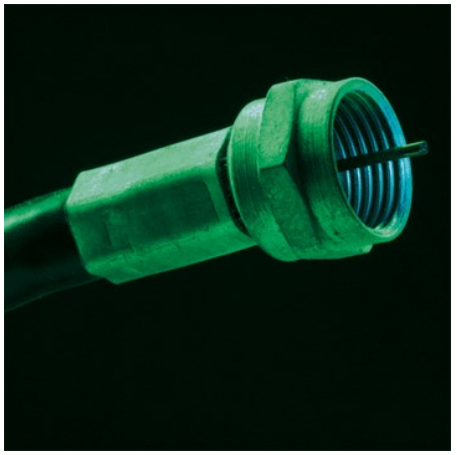


VeEX
The Verification Experts

Y.1564 Standard
V-SAM Overview

Rev A04 – September 2011

Agenda

- Introduction to Y.1564 Standard
  - Y.1564 versus RFC2544
  - Important Definitions
  - Test Methodology
- VSAM
  - VeEX Service Activation Methodology
  - Test features and User Interface

Y.1564 Introduction

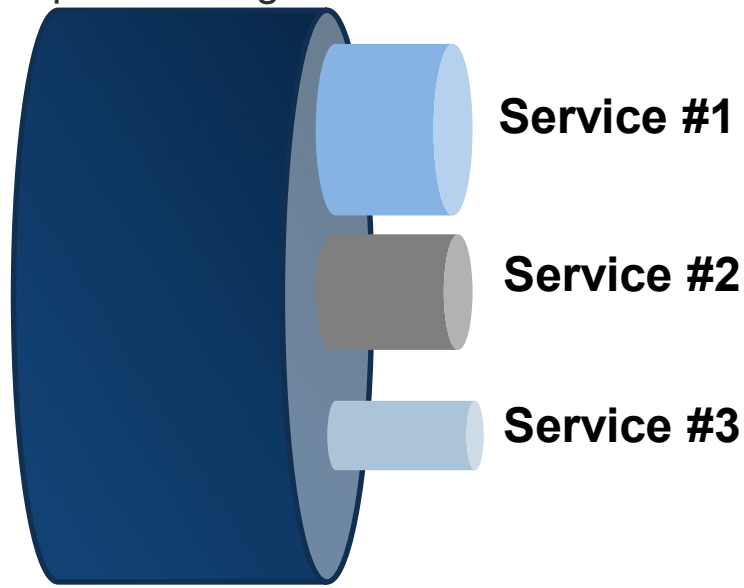
- ITU-T Y.1564 defines an out-of-service test methodology
  - Service Activation Test Methodology (SAM)
  - Users can assess the proper configuration and performance of an Ethernet service prior to customer delivery.
  - In particular, Y.1564 is aimed at addressing and solving the deficiencies of RFC 2544
- Benefits to the User
  - Total test time is drastically reduced - Services are being tested over a longer duration simultaneously, and all the SLA parameters are also measured simultaneously.
  - Results reporting - clear and simple “Pass/Fail” indication in Green/Red. This is for each test, each service, with a global indication.

Y.1564 versus RFC2544

	RFC2544	Y.1564
Key Test Objective	Device performance	Network Service verification/activation
Service validation	One service at a time	Multiple services simultaneously
Throughput	Yes	Yes
Latency	Yes	Yes
Frame Loss	Yes	Yes
Burstability	Yes	Yes
Packet Jitter	No	Yes
Multiple Streams	No	Yes
Test Duration	Long (serialized test procedure)	Short (simultaneous test/service)
Test Result	Link performance limit	Related to SLA, fast, simple, Pass/Fail

Important Definitions
Services

- **Service:**
  - EVC (Ethernet Virtual Connection) in the MEF standards
  - Connects customer sites with a 10/100/1000 or 10G Ethernet interface
  - Service rate below the Ethernet line rate i.e. Full rate granularity
  - Multiple services can share the same line
  - Easy remote provisioning or re-provisioning



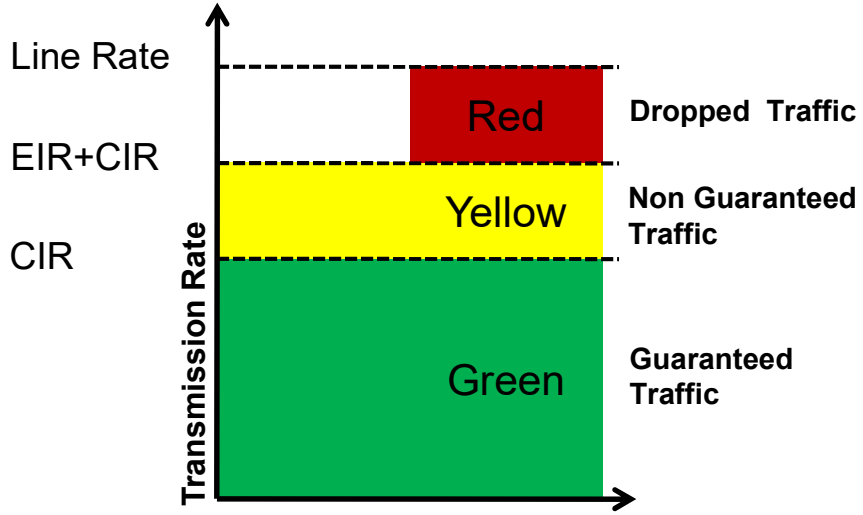
Ethernet Line:
10/100/1000 or 10G

Service Definitions Key Parameters

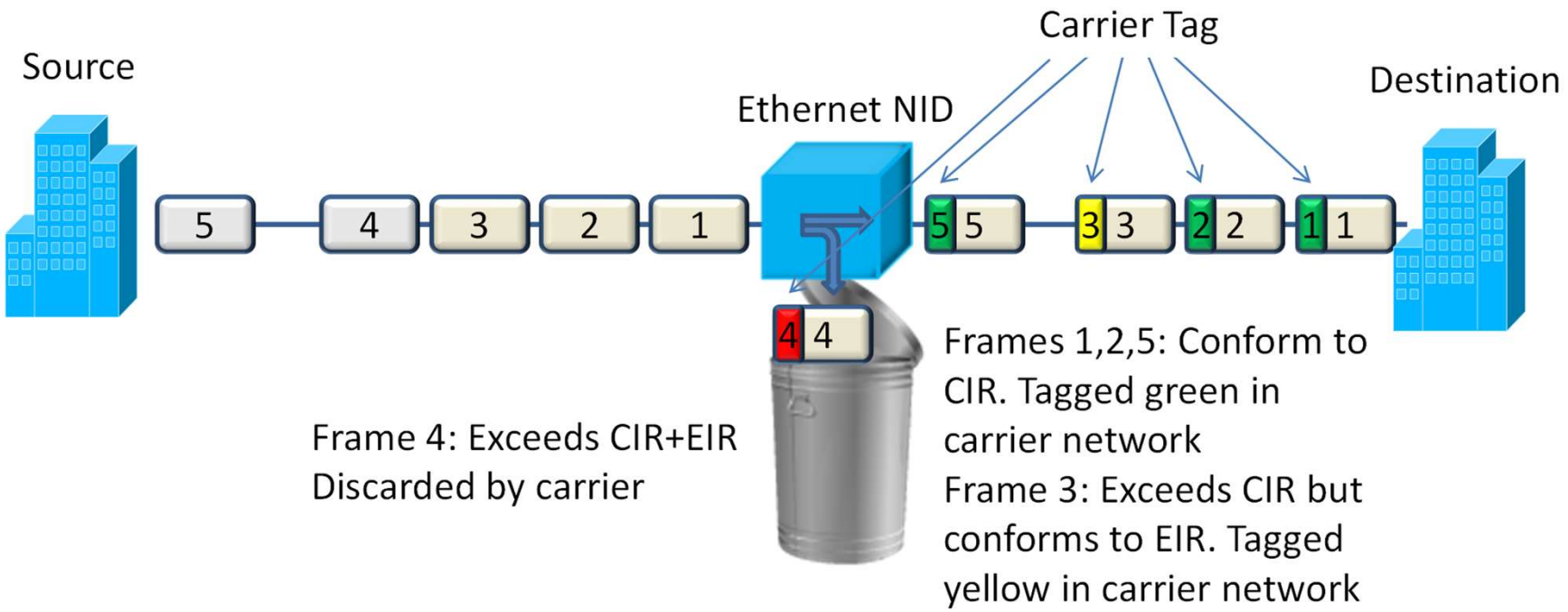
- **Service is defined by the following key parameters:**
  - **Bandwidth Profile**: Specifies how much traffic the customer is authorized to transmit and how the frames are prioritized within the network.
    - **Committed Information Rate (CIR)**
    - **Excess Information Rate (EIR)**
    - **Committed Burst Size (CBS)**
    - **Excess Burst Size (EBS)**
    - **Color Mode (CM)**
  - **Service Acceptance Criteria:** Parameters defining the performance objectives. Values define the minimum requirements to ensure that the service meets the Service Level Agreement (SLA).
    - **Frame Transfer Delay (FTD)**
    - **Frame Delay Variation (FDV)**
    - **Frame Loss Ratio (FLR)**
    - **Availability (AVAIL)**

CIR and EIR Definitions

- **Committed Information Rate (CIR):**
  - Guaranteed maximum rate at which the customer can send frames that are assured to be forwarded through the network without being dropped.
- **Excess Information Rate (EIR):**
  - Maximum rate above the CIR at which the customer can send frames that will be forwarded on a best effort basis, but may be dropped in the event of congestion within the network. Traffic beyond CIR + EIR will be dropped when it enters the carrier's network.

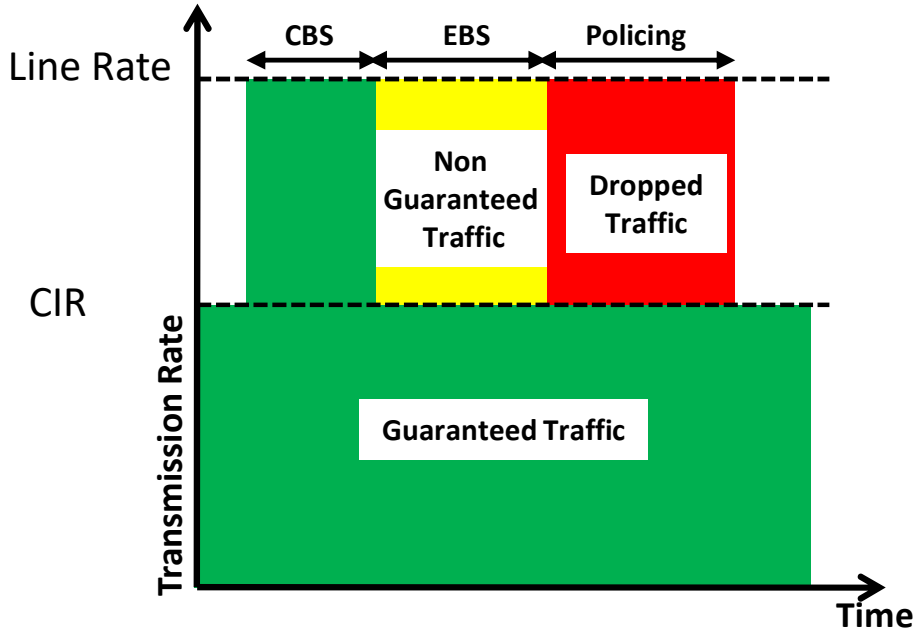


Traffic Tagging Carrier Networks



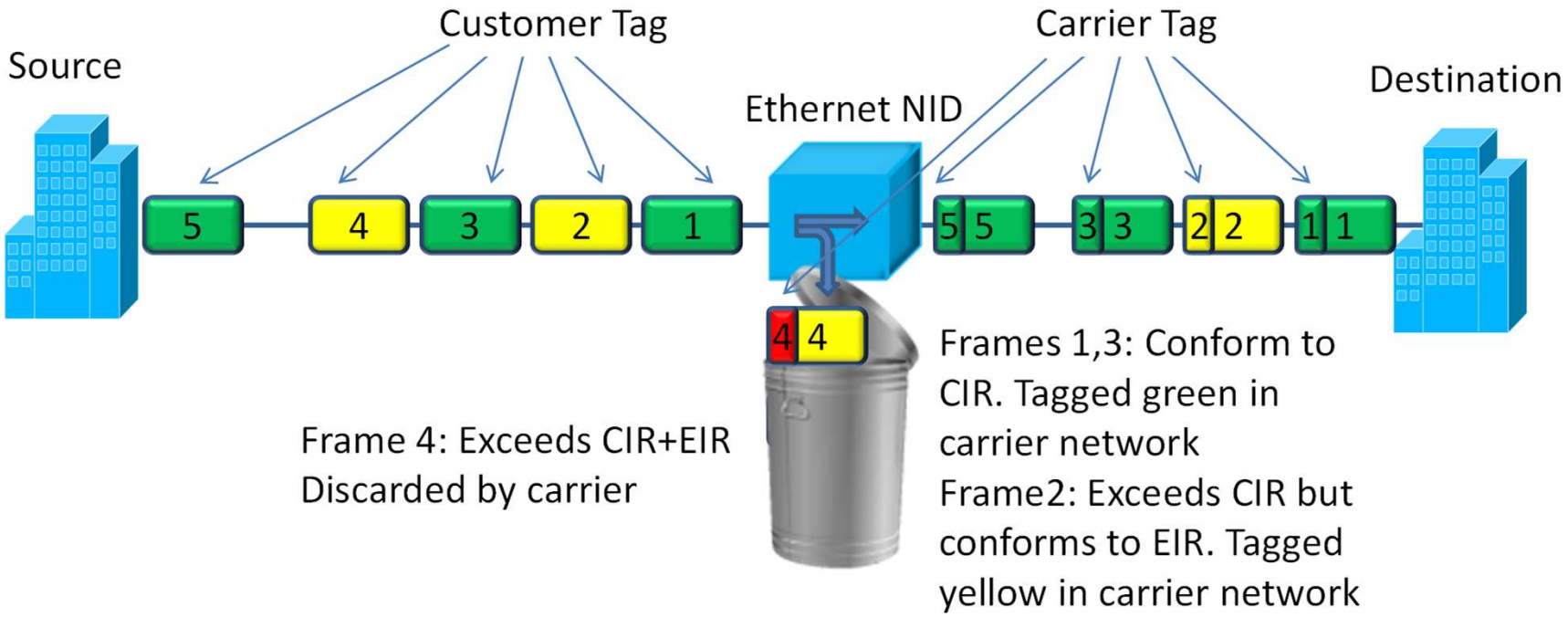
CBS and EBS Definitions

- **Committed Burst Size (CBS):**
  - Describes the maximum number of consecutive frames sent at full line rate that the service is allowed to transmit and that are assured to be forwarded.
- **Excess Burst Size (EBS):**
  - Describes the maximum number of frames sent at full line rate on top of the CBS that will be forwarded on a best effort basis, but may be dropped in the event of congestion within the network.



Bandwidth Profiles Color Mode

- **Color Mode (CM):**
  - Allows the customer to pre-mark their traffic with a priority tag rather than letting the carrier blindly enforce the CIR/EIR/CBS/EBS algorithm on the traffic.

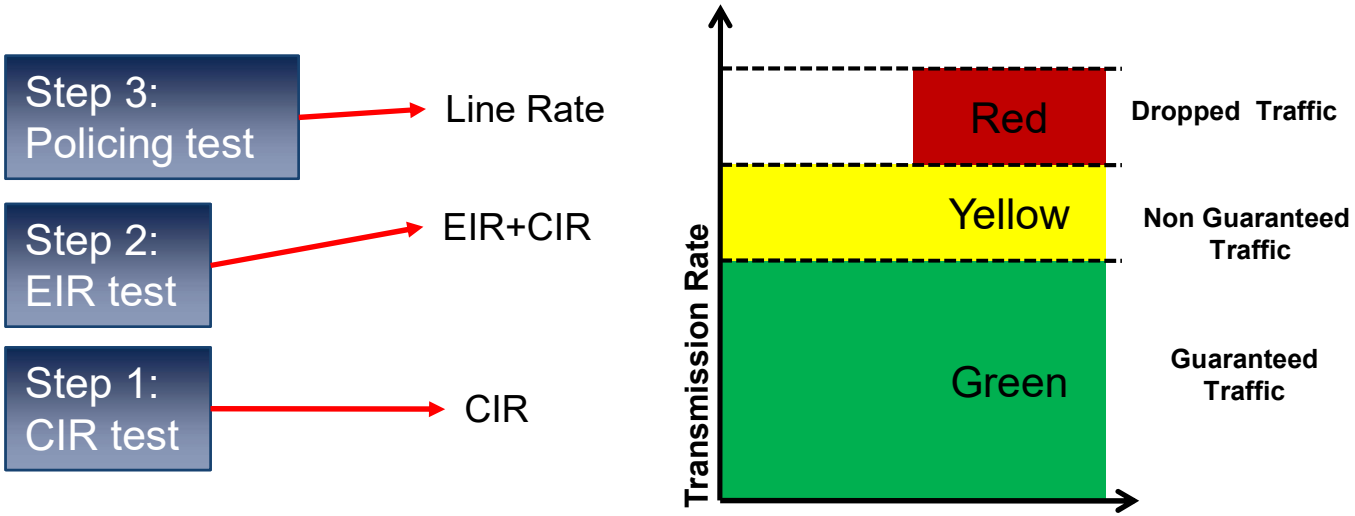


Service Activation Criteria Definitions

- **Frame Transfer Delay (FTD):**
  - Maximum transfer time that the frames can take to travel from source to destination, and still be compliant with the SLA. FTD is only guaranteed for traffic conforming to the CIR.
- **Frame Delay Variation (FDV):**
  - Maximum frame jitter allowed to still be compliant with the SLA. FDV is only guaranteed for traffic conforming to the CIR.
- **Frame Loss Ratio (FLR):**
  - Maximum ratio of lost frames to the total transmitted frames allowed to still be compliant with the SLA. FLR is only guaranteed for traffic conforming to the CIR.
- **Availability (AVAIL):**
  - Minimum percentage of service availability allowed to still be compliant with the SLA. The service becomes unavailable if more than 50% of the frames are errored or missing in a one second interval. Availability is only guaranteed for traffic conforming to the CIR.

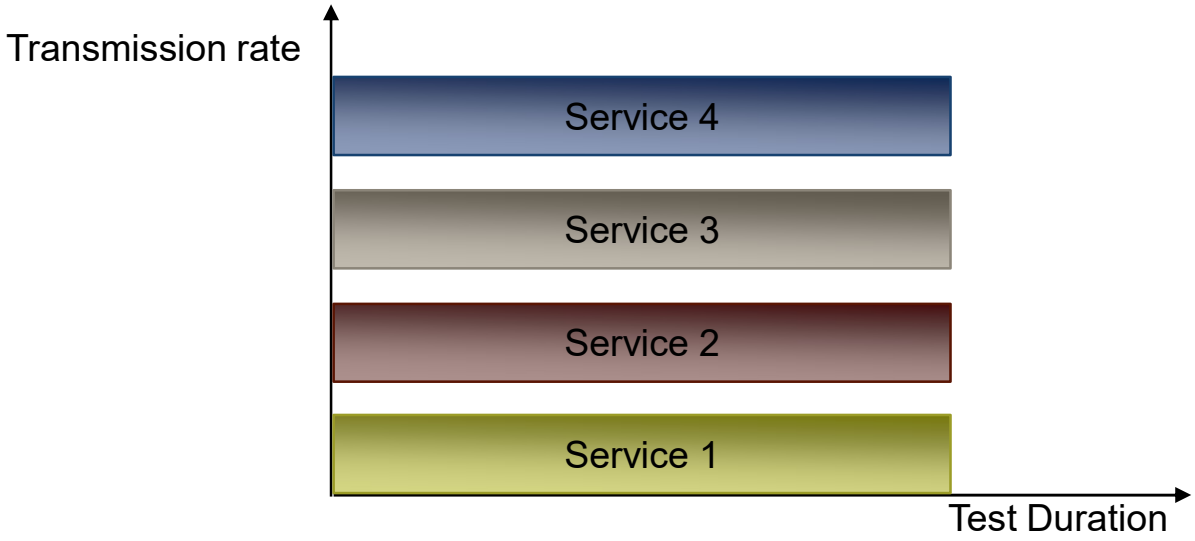
Test Methodology Phase 1

- **Phase 1: Bandwidth Profile test:**
  - Service running on the same line are tested one by one to verify the correct service profile provisioning.
    - **Step 1 CIR Test:**
      - TX at CIR rate and measure SAC on RX traffic
    - **Step 2 EIR Test** (optional):
      - TX at CIR+EIR rate and measure that RX traffic >= CIR
    - **Step 3 Traffic Policing or overshoot Test** (optional):
      - TX at 25% greater than CIR+EIR and verify that traffic greater than CIR+EIR is blocked
    - **CBS and EBS Tests:** experimental and not an integral part of the standard



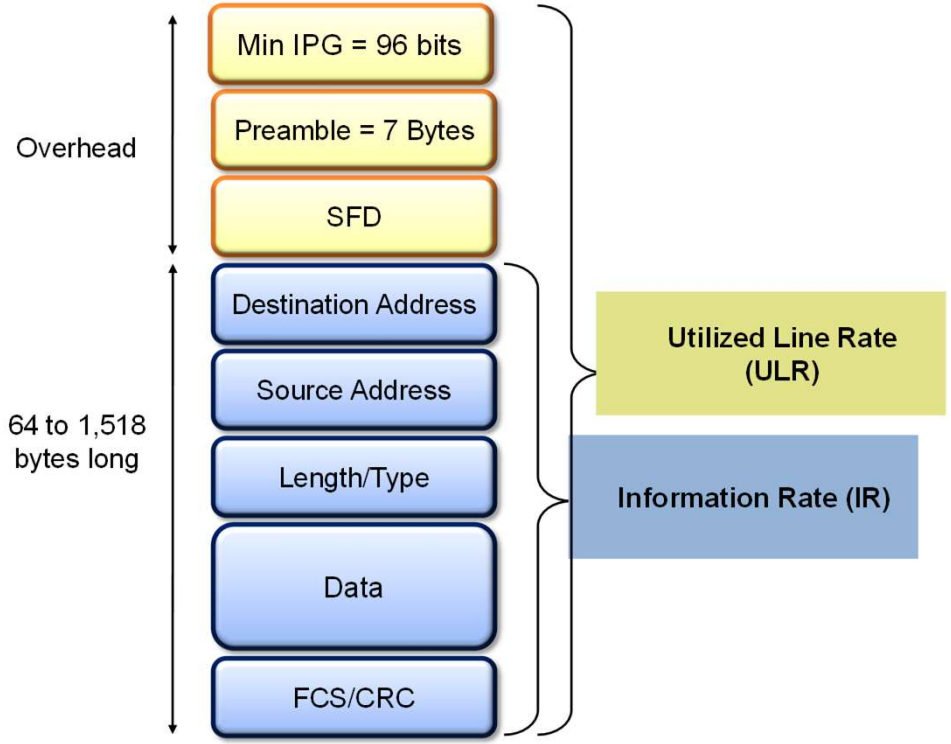
Test Methodology Phase 2

- **Phase 2: Service Performance test:**
  - Services running on the same line are tested simultaneously over an extended period of time, to verify network robustness.
  - SACs (Service Acceptance Criteria)
    - Frame Transfer Delay (FTD), Frame Delay Variation (FDV), Frame Loss Ratio (FLR) and Availability (AVAIL) are verified for each service



Y.1564 Rate measurement explained

- CIR and EIR can be expressed in terms:
  - **Information Rate (IR)** - measures the average Ethernet frame rate starting at the MAC address field and ending at the CRC.
  - **Utilized Line Rate (ULR)** - measures the average Ethernet frame rate starting with the overhead and ending at the CRC.
    - Example: 100 Mbps line
    - @1518byte Max IR is 98.7Mbps
    - @ 64byte Max IR is 76.19Mbps
    - ULR stays constant at 100Mbps



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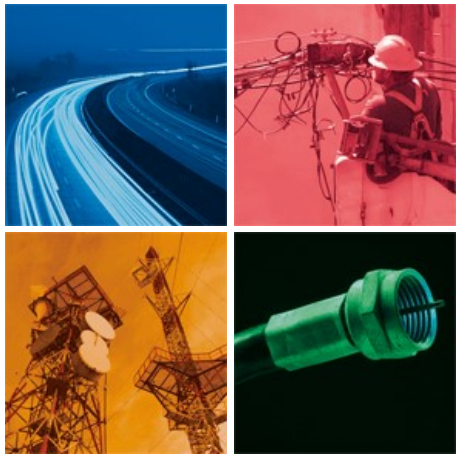


V-SAM Overview

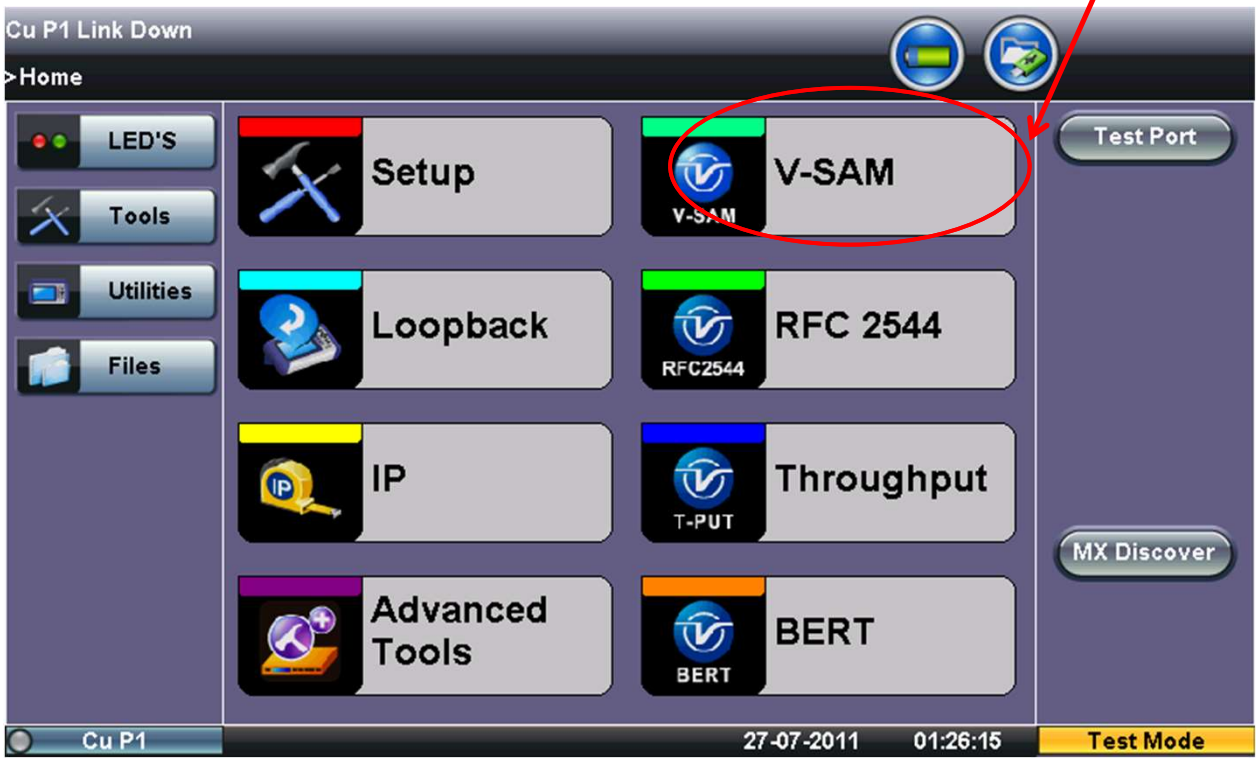
Test Features and User Interface

V-SAM Overview

- V-SAM is an automated Ethernet service activation test feature conforming to the new Y.1564 standard approved and published by ITU-T in March 2011.
- V-SAM (VeEX Service Activation Methodology) ensures repeatable, simple and rapid pass/fail results for activating multiple Ethernet-based services.
- V-SAM enhances VeEX testers used to verify mobile backhaul networks and Ethernet business services.
- V-SAM is available for all VeEX V100+ and V300 testers supporting Ethernet test capability.
  - TX300 and MX300 units (Q3'2011)
  - MX100+, MX120+, TX130E+ and TX130M+ platforms (early Q4'2011).
- V-SAM is a no-charge option which complements the RFC-2544 and Advanced SLA verification test applications

V300
Home Menu

V-SAM Test is accessed from the Home menu

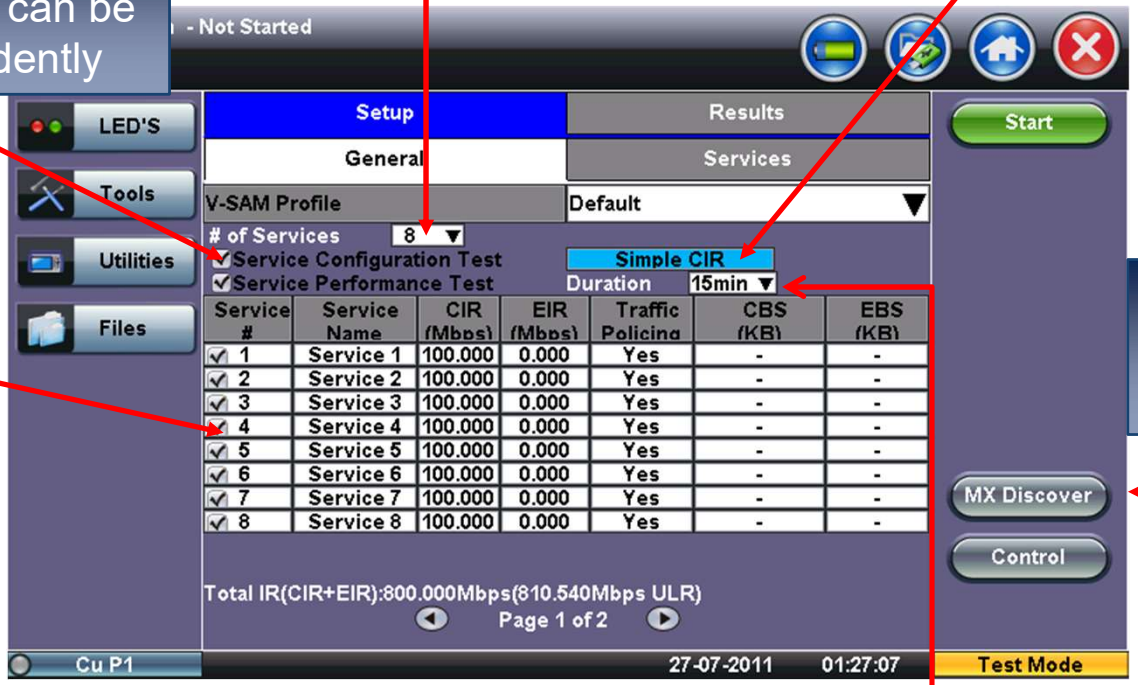


General Test Setup

Select # of Services
Up to 8 on 1GE interface
Up to 10 on 10GE interface

Committed Information Rate Test setup

Service Configuration and Performance Tests can be enabled independently



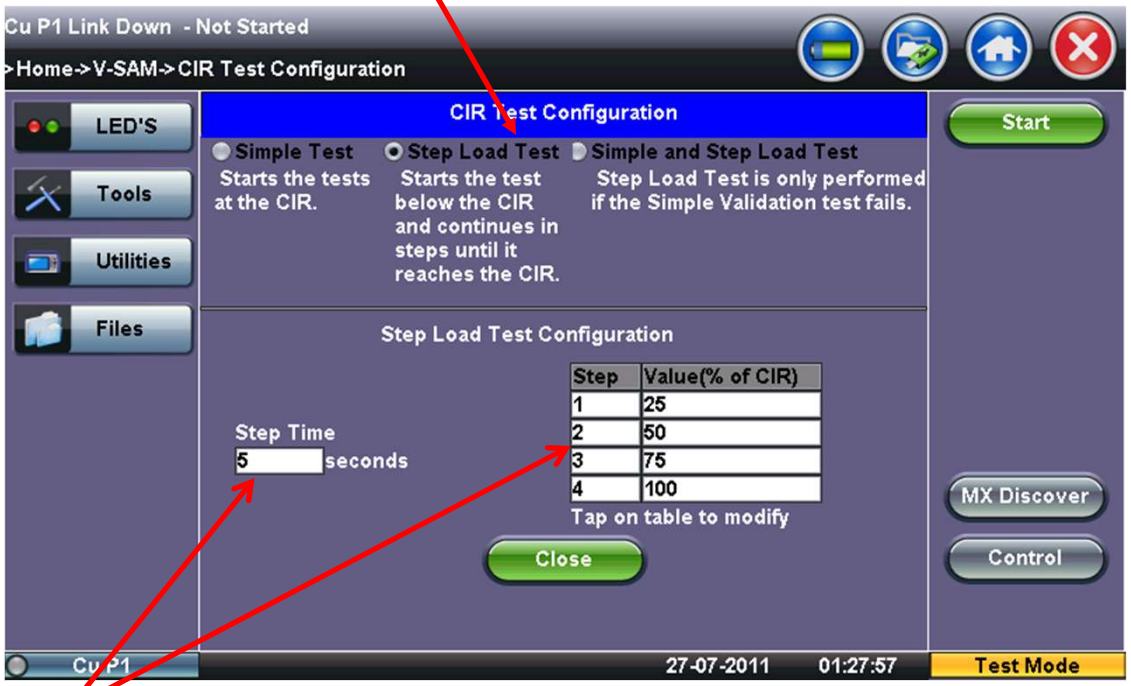
Summary table of Service configuration

Loopback control And OAM loopback control

Service Configuration Test Duration: If Simple is selected, user can configure the value in seconds.
Service Performance Test Duration: Selections are 15min, 30 min, 1hr, 2hr, 24hr, or user defined

CIR Test Setup

Select CIR Test type and duration

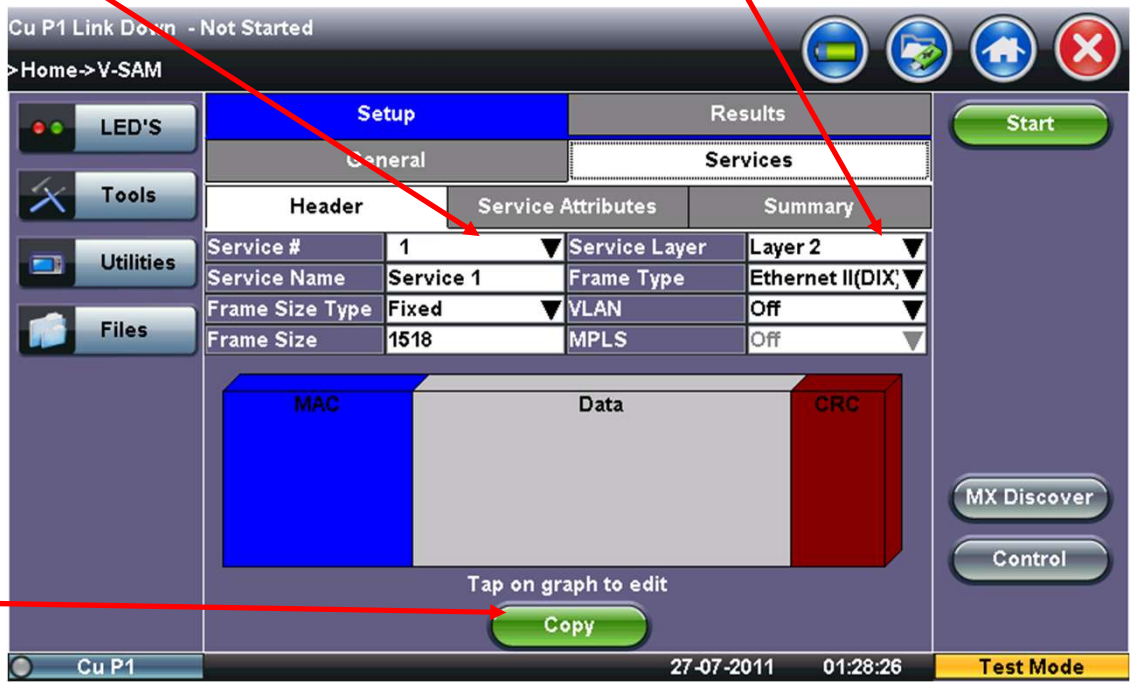


# of Steps: Default number of steps is 4
Step Time: Default is 5 seconds.

Test Frame Header Setup

Select Service to configure

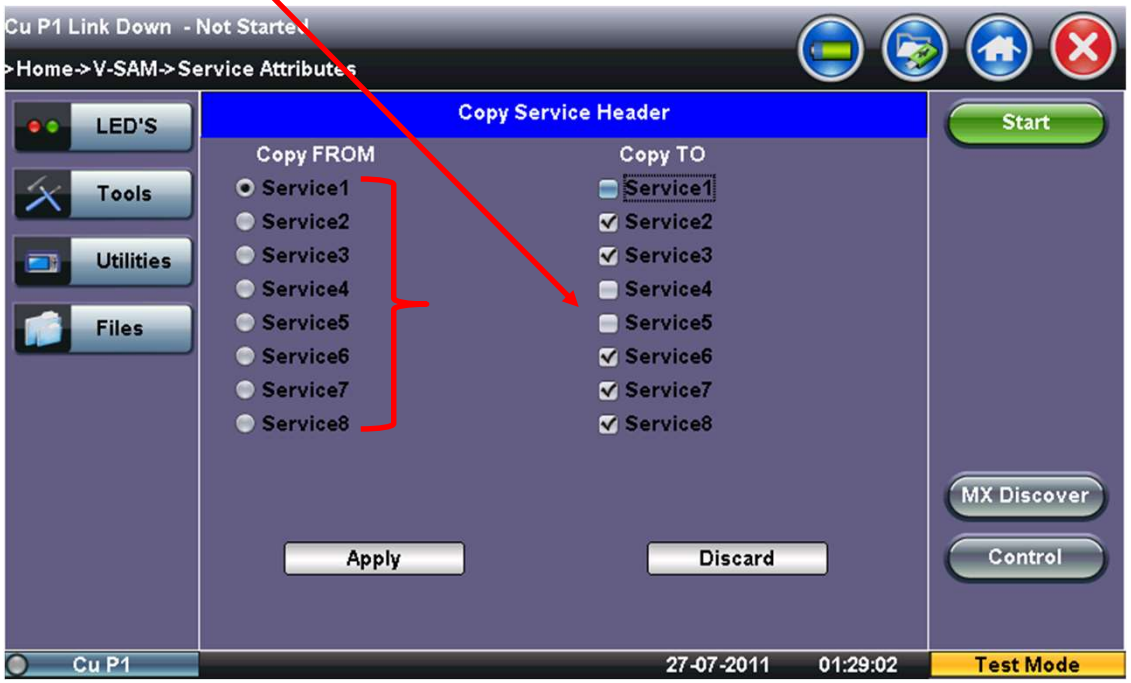
Layer 2 through Layer 4 test traffic



Copy Test frame setup

Copying Service Profiles

Frame configuration can be copied between services



Service Attributes Setup

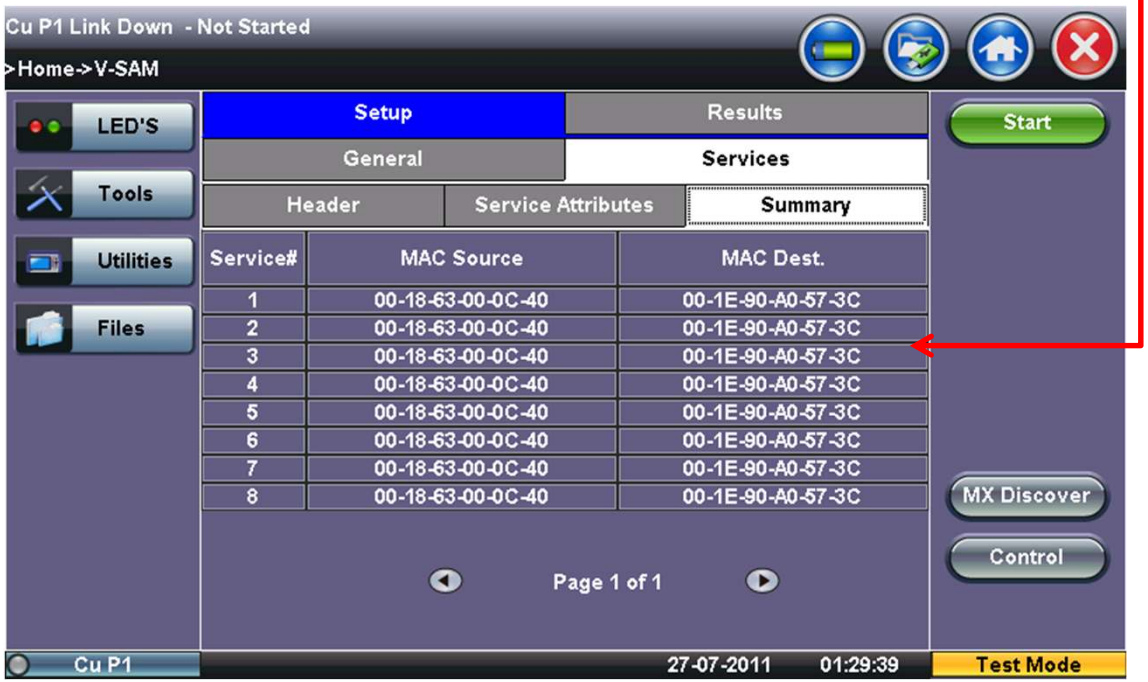
CIR, EIR, and Traffic Policing testing can be enabled independently. (EBS/CBS future)

Service Acceptance Thresholds can be configured and enabled independently

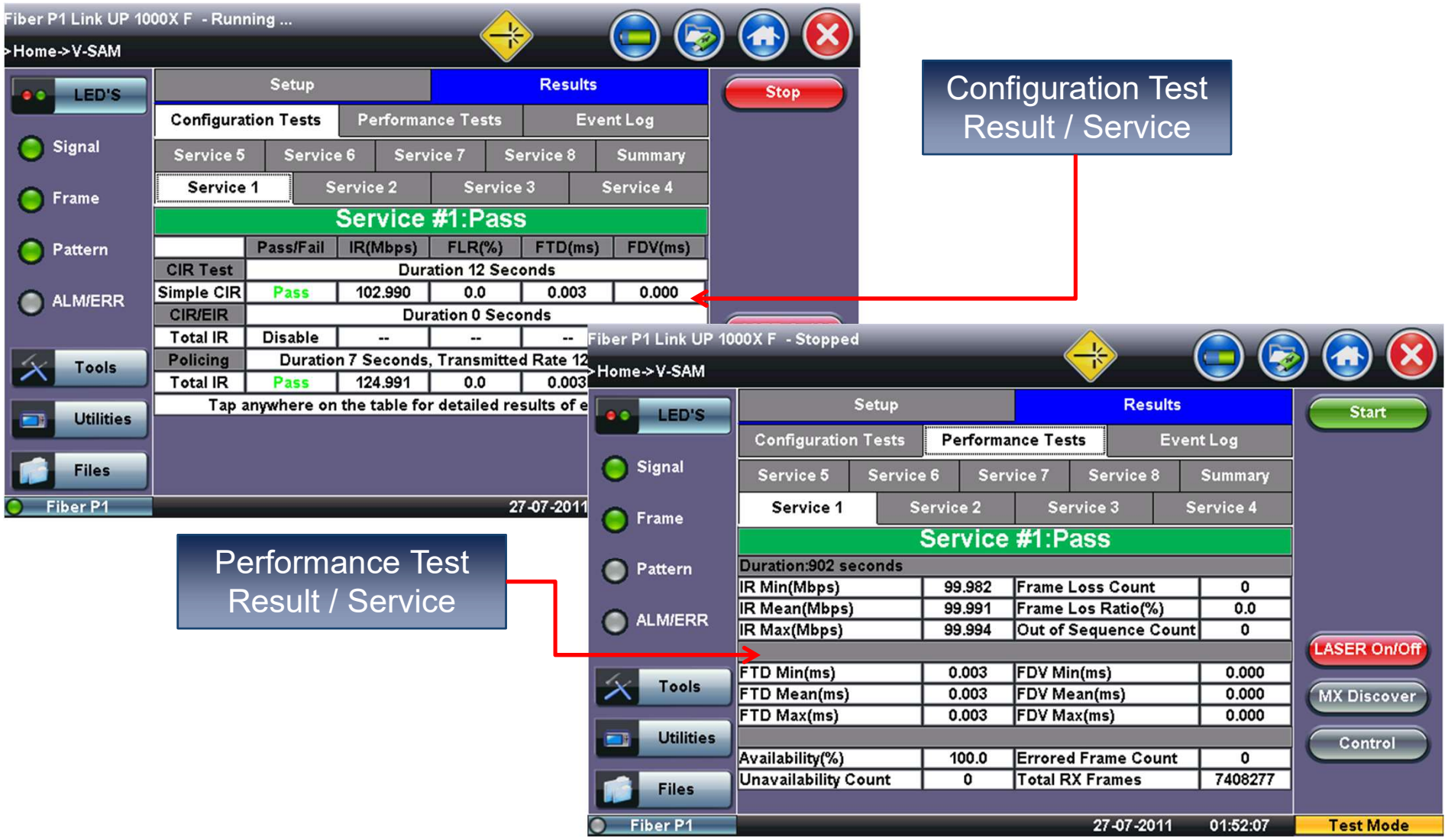
Note:
CBS: Max # of frames able to be sent (bytes) with a min IFG (Inter Frame Gap) at the interface line rate above the CIR.
EBS: Max # of frames able to be sent (bytes) with a min IFG at the interface line rate above the EIR.

Configuration/Setup Summary

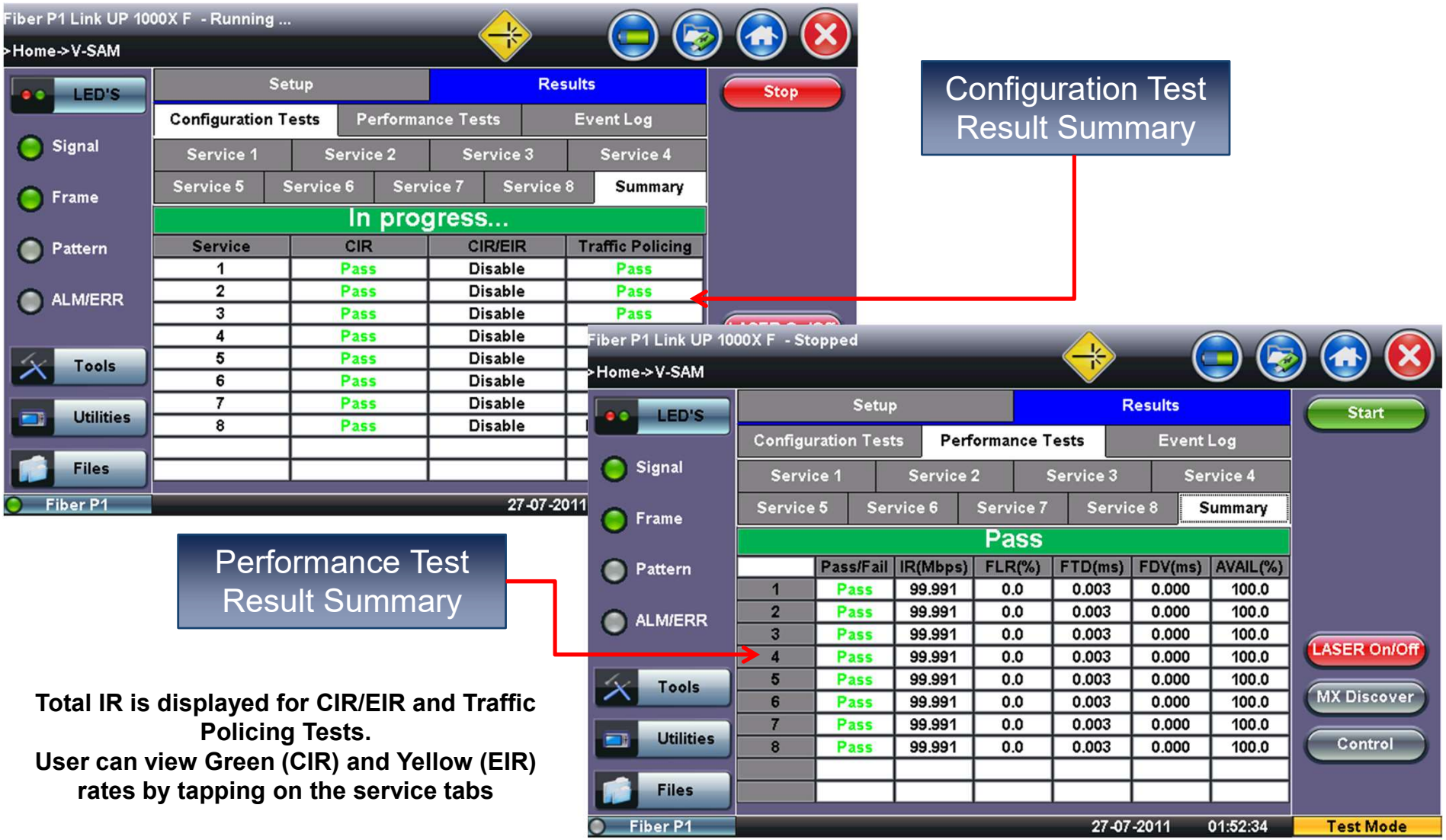
Table summarizing frame configuration for all services



Results Services



Results Summary



Total IR is displayed for CIR/EIR and Traffic Policing Tests.
User can view Green (CIR) and Yellow (EIR) rates by tapping on the service tabs

Thank you.

Any questions?