

# 3M™ Dynatel™ Triple Play Customer Service Test Set INS970

## Advanced Diagnostics Software Options – DELT, SELT and Spectral Analysis

The INS970 Test Set has the ability to run “advanced diagnostics” in different scenarios to help the technician troubleshoot problems with both active and inactive pairs.

The DELT (Dual Ended Line Tests) functionality leverages the power of the DSLAM to conduct a two-ended analysis of the line. This is extremely useful for several reasons:

- It saves valuable time, as it doesn't require the DSLAM to be disconnected in order to test the line, saving an extra truck roll.
- It analyzes the line through measurement, which is both more accurate and more realistic, as it tests the line in its final configuration.
- It effectively analyzes the line from both ends in one test, increasing the identification resolution.

When a DSLAM is not available on the pair to be tested, the SELT (Single Ended Line Test) feature set is used. This enables the INS970 test set to test a vacant pair to ensure it is capable of delivering the required service. One of the key features is the data rate estimation (and the associated impairment rate reduction quantification). This is important because the presence of impairment does not necessarily mean the pair is not capable of carrying a particular service. This, in turn, allows the technician to reduce the “false rejection rate” and helps reduce the workload on the cable repair crew.

### Dual Ended Line Tests

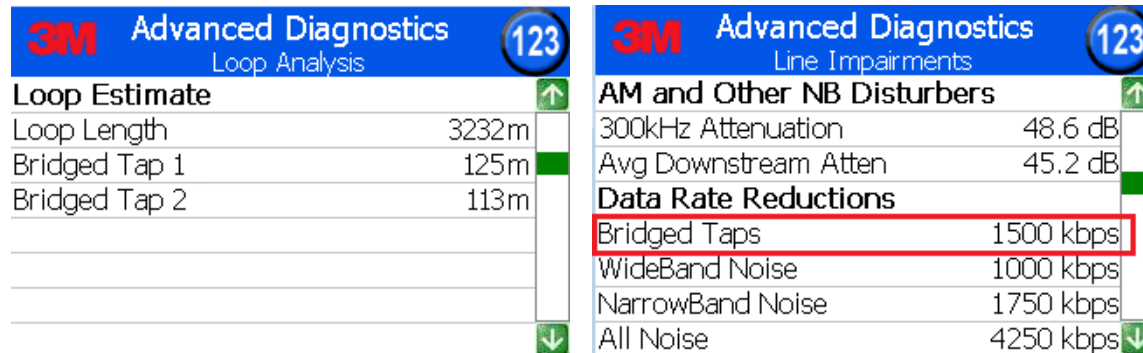
The DELT tests are designed to help the technician characterize line quality impairments on pairs that are currently in service but that do not meet the service standards required. For these tests, a DSLAM is required on the other end of the pair as a link partner.



3M™ Dynatel™ Triple Play Customer Service  
Test Set INS970

## Bridged taps

Bridged taps can be serious concerns for high speed data delivery, as they rob the line of precious bandwidth. The 3M™ Dynatel™ Triple Play Customer Service Test Set INS970 can detect the presence of a bridged tap and quantify its impact in data rate loss:



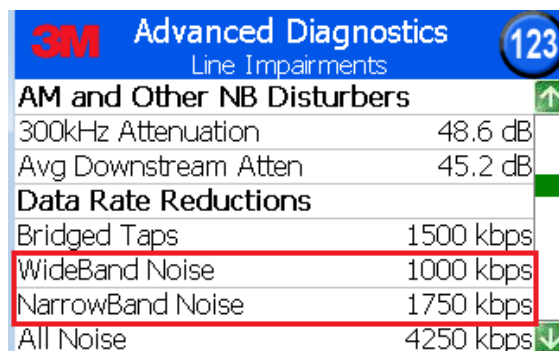
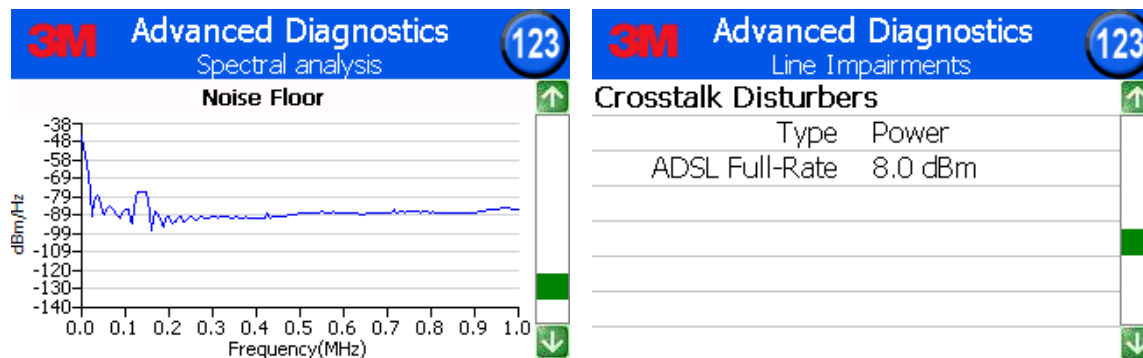
This is important, as it helps identify which pair troubles are worth fixing, and which ones are not.

## Noise

Just like bridged taps, noise can really impair the ability of an otherwise good pair to deliver data at its best. The INS970 test set detects noise by scanning the entire active DSL spectrum (the spectrum used by the current connection) and then plotting it in a frequency based domain (Spectrum Analyzer). This is then automatically interpreted by the unit, to provide the technician with the most useful information:

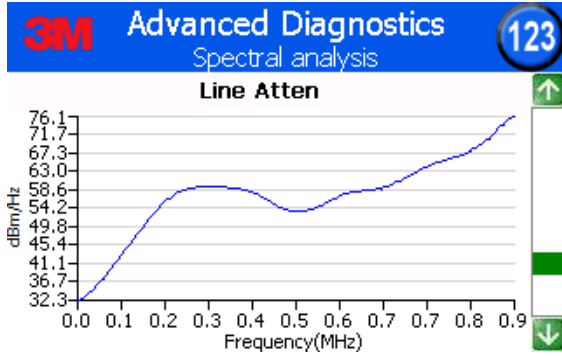
- What are the predominant disturbers?
- What effect do they cause on the data rate?

This interpretation is very useful, as it enables almost any technician (experienced and less experienced) to quickly understand where the noise is coming from and how bad the situation is:



## Line Attenuation

Line attenuation is a graphical representation of the ability of a pair to conduct signals at different frequencies. In DSL technology, data is transmitted at different frequencies, throughout the available spectrum. Signals at different frequencies are affected differently by things like cable length, bridged taps and splices. The attenuation measurements are plotted by frequency, and the data is then automatically interpreted to determine things like bridged tap presence and data rate reductions.



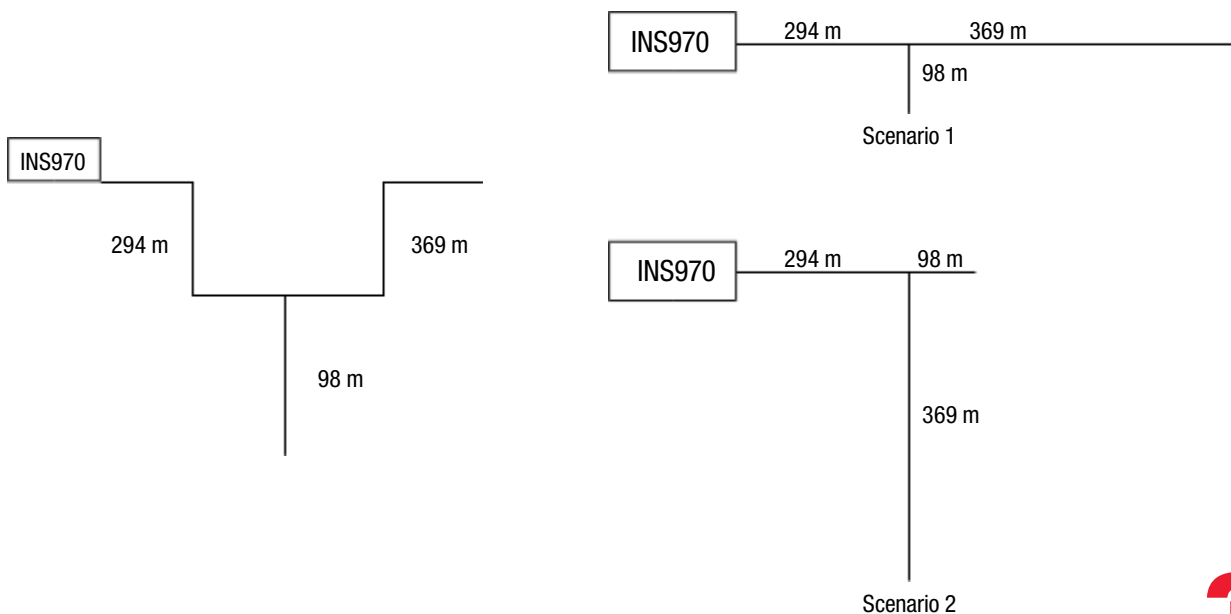
## Single Ended Line Test

The SELT is designed to help the technician “pre-qualify” pairs that are currently not in service, in order to connect new customers or to replace existing customer lines.

## Bridged Taps

Bridged taps can be serious concerns for high speed data delivery, as they rob the line of precious bandwidth. The 3M™ Dynatel™ Triple Play Customer Service Test Set INS970 can detect the presence of a bridged tap, its length and distance from the unit, and quantify its impact in data rate loss.

Since the line is not terminated (vacant), two scenarios are presented to the technician, as it is not logically possible to determine which leg is the bridged tap and which leg belongs to the main path; example:



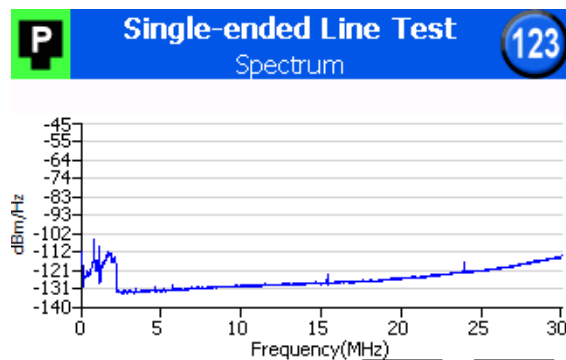
Each scenario is then analyzed and an estimate of the bridged taps rate reduction impact and the achievable data rate, based on the service selected (ADSL or VDSL2), is provided:

Single-ended Line Test		123
Scenario1 Detail		
Loop Length		663m
Distance to bridge tap		294m
BridgedTap Length		98m
Data Rate estimate		
Upstream		27216 kbps
Bridged Taps Reduction		5096 kbps
Downstream		66204 kbps
Bridged Taps Reduction		5216 kbps

Single-ended Line Test		123
Scenario2 Detail		
Loop Length		392m
Distance to bridge tap		294m
BridgedTap Length		369m
Data Rate estimate		
Upstream		46676 kbps
Bridged Taps Reduction		4116 kbps
Downstream		76280 kbps
Bridged Taps Reduction		7376 kbps

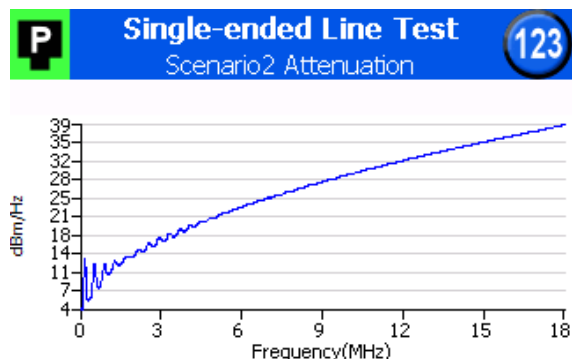
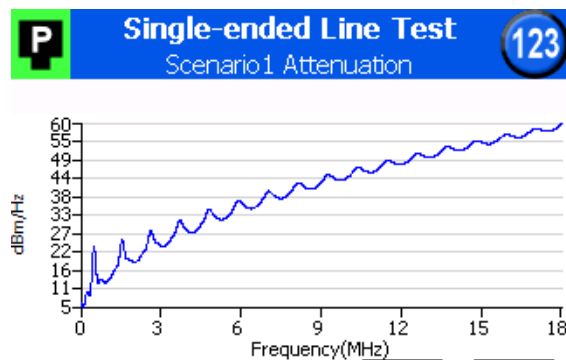
### Noise

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### Line Attenuation

Line attenuation is a graphical representation of the ability of a pair to conduct signals at different frequencies. Just like for the rate estimation, line attenuation plots are provided on a per-scenario basis.



## 3M™ Dynatel™ Accessories

### DELT Diagnostics

Loop Analysis	Bridge tap and noise impairment on the line, noise/crosstalk disturbers
Attenuation Analysis	Line attenuation graph (30 MHz)
Spectrum Analysis	SELT and DELT (30 MHz) spectrum analyzer graphs

### Ordering Information

Product Number	Product Description	3M ID	UPC	Min. Order
INS970-ADV-OPTION	Advanced xDSL Diagnostics Software Option	CE100736632	0-00-51115-54366-1	1

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Note: Product specifications and descriptions in this document are subject to change.

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