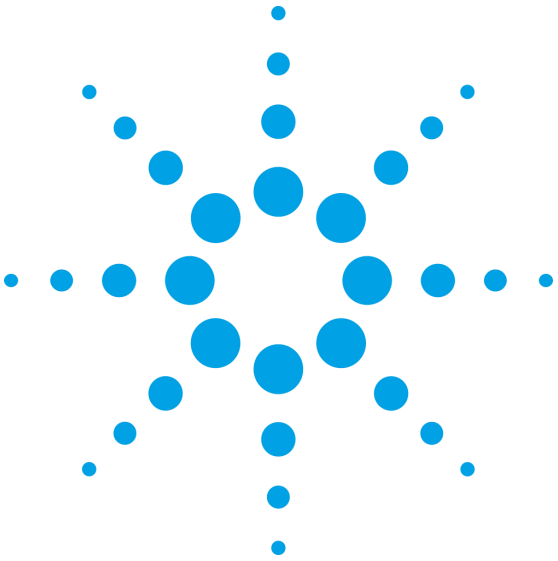

Agilent N2648A WireScope™ Pro Alien Crosstalk Stimulator

User Manual

Version 1.0

Notices

Manual Part Number
5972-2792

Edition
First Edition May 2007

Agilent Technologies Deutschland GmbH
Herrenberger Str. 130
71034 Böblingen, Germany.

Safety Notices

CAUTION **WARNING**

A ⚠ or **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

If this instrument is not used as specified, the protection provided by the equipment could be impaired.

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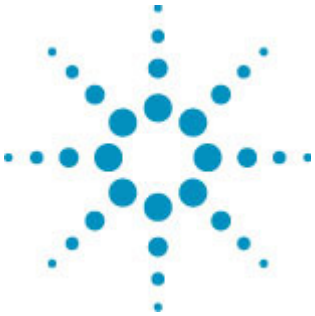
Contents



1
Getting Started

Introduction to the SwiftAXT Stimulators

Description of input and output connections

Product Overview

Introduction to the SwiftAXT Stimulators

SwiftAXT (**Sw**eep **I**nterleaved **F**requency Domain **T**esting of **A**lien **X**-**T**alk) technology achieves sequential measurements through control of measurement timing.

The Stimulator is a high performance, low cost, palm size frequency generator that doubles as a load termination for use in Alien Crosstalk measurements

For cable vendors, it is for the usage in the lab to have better yield in the manufacturing mass test of the 10Gbps cables.

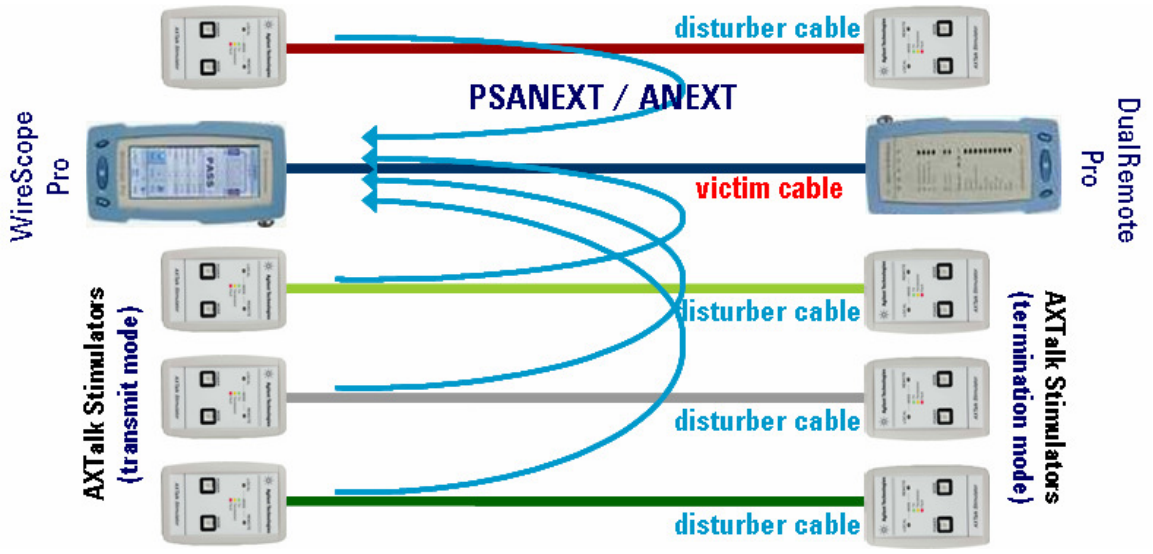
For cable installers, it is aimed for the new 10GbE installation and the upgrade of the existing network. The cable vendors need to have a better yield in the 10G cable manufacturing mass test and ideally the test is to be done within a short time, 2 minutes or less per link.

To cable installers who perform the new installation in the field, high success rate in the network implementation is crucial and it boosts the work efficiency if the job could be done with short test time.

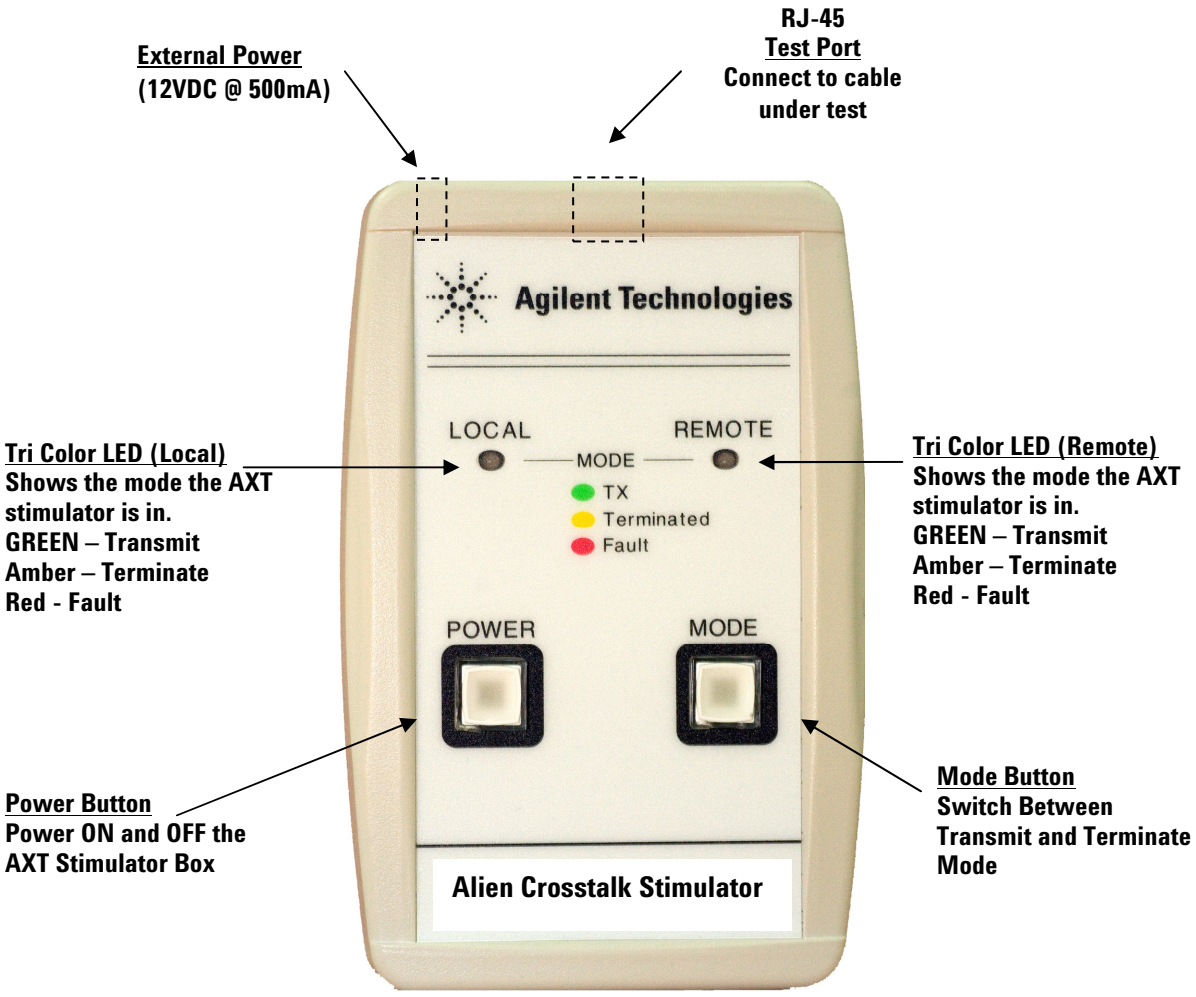
To cable installers who carry out the upgrade of existing network, it is expected to have better yield in the asset upgrade and the task is to be done in short period of test time.

The cable installers need to

- Evaluate a cable and verify its alien cross-talk performance meets requirements for 10GBASE-T.
- Find out the worst disturbing cable from a group of cables affecting a disturbed cable.
- Find out the cable that is most vulnerable to Alien Crosstalk.



Description of input and output connections



Battery Compartment
(on rear side)

Product Overview

Operation Modes

- Stimulator supports frequency sweep (transmit), termination and calibration modes.
- For each configuration, Stimulator will support the following use models:

Frequency Sweep Initiated by the Local Unit

- In this mode, Stimulator will make continuous sweeps from 1 – 500 MHz. It will set the Remote Stimulator in termination mode.
- Local Stimulator can set Remote Stimulator to generate continuous sweeps. In this case, the Local Stimulator will automatically set in termination mode.
- Both Stimulator units cannot sweep simultaneously. However, both Stimulator units can be in termination mode at the same time.
- Red LED – Fault. Restart Stimulator.
- Green LED –Transmit Mode
- Amber LED – Termination Mode (100 Ohms)

Test Initiated by the Remote Unit

- Details same as test initiated by Local Stimulator

Use Model

- The Stimulator has a simple user interface with two buttons and two LED indicators.
- The unit is powered ON/OFF using the Power button.
- The Mode button sets the operation mode of the Stimulator units. Only one Stimulator per cable can be transmit mode, but both Stimulators can be in termination mode at the same time.

Communications

- Local Stimulator at power ON:
    - Defaults to termination mode (Local LED – Amber)
    - Waiting for remote stimulator to response (Local LED – blinking Green)
- Remote Stimulator at power ON:
    - Defaults to termination mode (Local LED – Amber)
    - Waiting for remote stimulator to response (Local LED – blinking Green)

- If the handshake between the Local and Remote Stimulator units is successful, then Remote LEDs for both Stimulator units will be solid Amber.

- The following Mode sequencing is applicable for both Stimulator units (upon successful handshaking):
  - Pressing the Mode button on Local Stimulator will cause Local Stimulator to instruct Remote Stimulator to go into termination mode (if it is not in termination mode).

- Pressing the Mode button again, will cause local Stimulator to change into termination mode, and instruct the remote Stimulator to sweep (transmit).

- Pressing the Mode button again, will cause both Stimulator units to go into termination mode.

- This pattern repeats.

- LEDs will change to reflect current status for both Stimulator units.

- The unit is switched OFF by holding down the Power button for 5 seconds.

2
Using the SwiftAXT Stimulator

Powering Up and Down

Preparing the test

Measuring one victim cable and one disturber

Measuring the “6 around 1” set up of the same cable length

Measuring the “6 around 1” set up of the different cable length

Using the SwiftAXT stimulators

Preparing for the test – Requirements

WireScope Pro N2640A-200 Category 6A/Class E_A Certification Kit with its corresponding accessories in particularly:

- 2 x N2644A-101 Cat 6A/Class E_A Permanent Link SmartProbes
- 2 x N2644A-100 Cat 6A/ Class E_A Channel SmartProbes
- 2 x AC/DC Universal Power Adapter

Alien Crosstalk Stimulator Kits N2648A-100, 150 or 200

- Alien Crosstalk Stimulator units
- AC/DC Universal Power Adapters (supplied)
- Shielded Patch Cords (supplied)

Software version on WireScope Pro version 2.4.x or higher

If the Alien Crosstalk function is not available, please ensure that the license key is entered. Please refer to the License Sheet and/or the WireScope Pro User Manual for activation steps.

IMPORTANT

If your WireScope Pro and DualRemote Pro has serial numbers lower than SG47250001 and SG47260001 respectively and you would like to use the Alien Crosstalk and External (Ambient) Noise feature, you will need to send the WireScope Pro and DualRemote Pro back to Agilent for calibration. Please contact your Agilent Sales Representative for more information.

With software release 2.5.x or higher, the calibration status is also shown on the System Information menu of the WireScope Pro.

Shielded patch cords MUST be used with the Stimulators.

Powering Up and Down

Insert the AC/DC adapter connector to the dc input which is located on the top right of the Alien Crosstalk Stimulator box.

Alternatively, the Alien Crosstalk stimulator box can also be powered by a 9V battery (not supplied). The recommended battery capacity is at least 250 mAh.

To operate using battery, slide open, the battery cover located on the back of the stimulator. Insert the battery into the battery slot, noting the battery polarity. Slide the cover back into place.

To turn on the stimulator, press the power on/off button
To turn off the stimulator, press and hold the power on/off button.

CAUTION

Use only the 12V AC/DC power adapter supplied with your Alien Crosstalk Stimulator. Using an incompatible power adapter can damage the equipment and void its warranty.

Please use the supplied power cord to disconnect the 12V AC/DC power adapter from mains.

WARNING

Never connect the Alien Crosstalk Stimulator's test port to a voltage source such as a telephone jack. Excessive voltages can damage the stimulator and void your warranty.

Measuring one victim cable and one disturber

1 Power up the WireScope Pro

2 Select *Alien Crosstalk* on the main menu

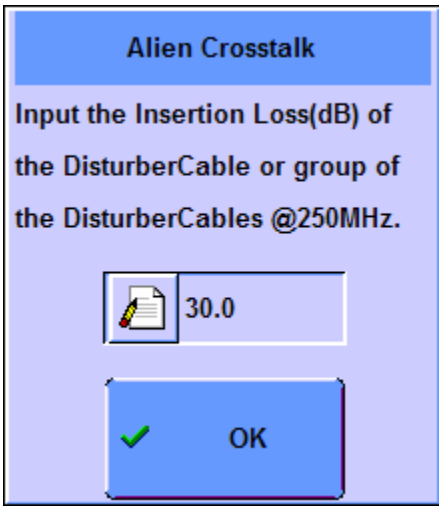
3 Connect the WireScope Pro and Dual Remote to the Victim cable. Press *Start Test* and WireScope will perform an Insertion Loss measurement on the cable.

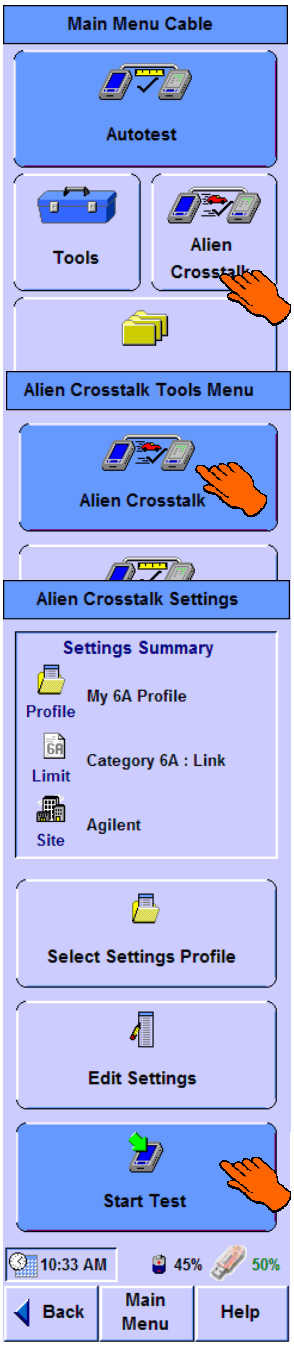
4 Connect the Stimulator to both ends the disturber cables. Turn on the Stimulators by pressing the *POWER* button.

5 Press the *MODE* button to select the Transmit mode (Green) on the local stimulator. This also automatically switches the remote stimulator to Termination Mode.

6 Press the *OK* button on the WireScope Pro

7 WireScope Pro will show the measured victim cable's insertion loss value in dB at 250 MHz. Modify if required and press *OK*



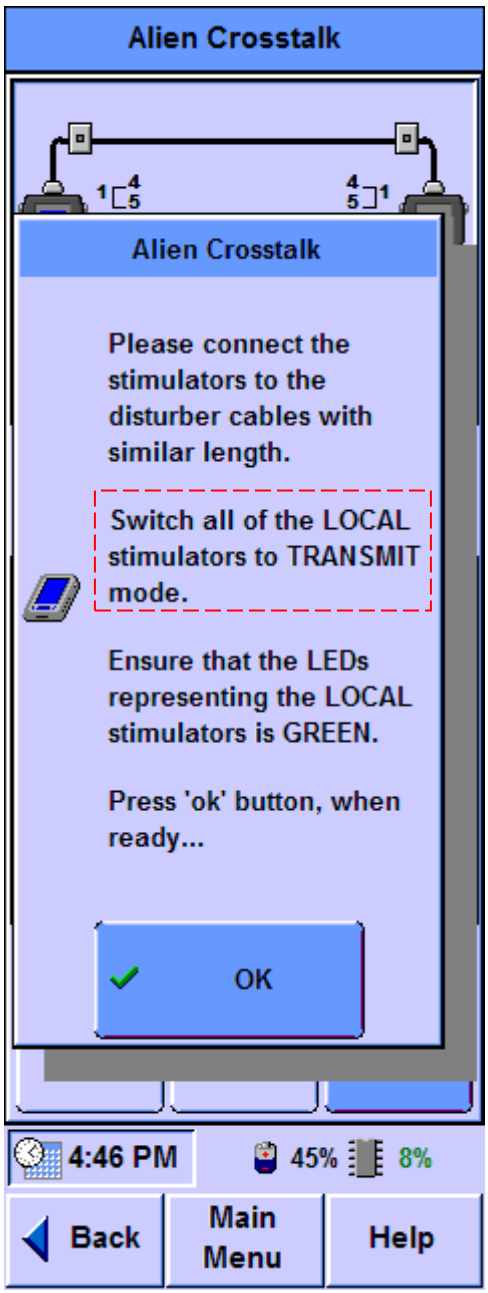


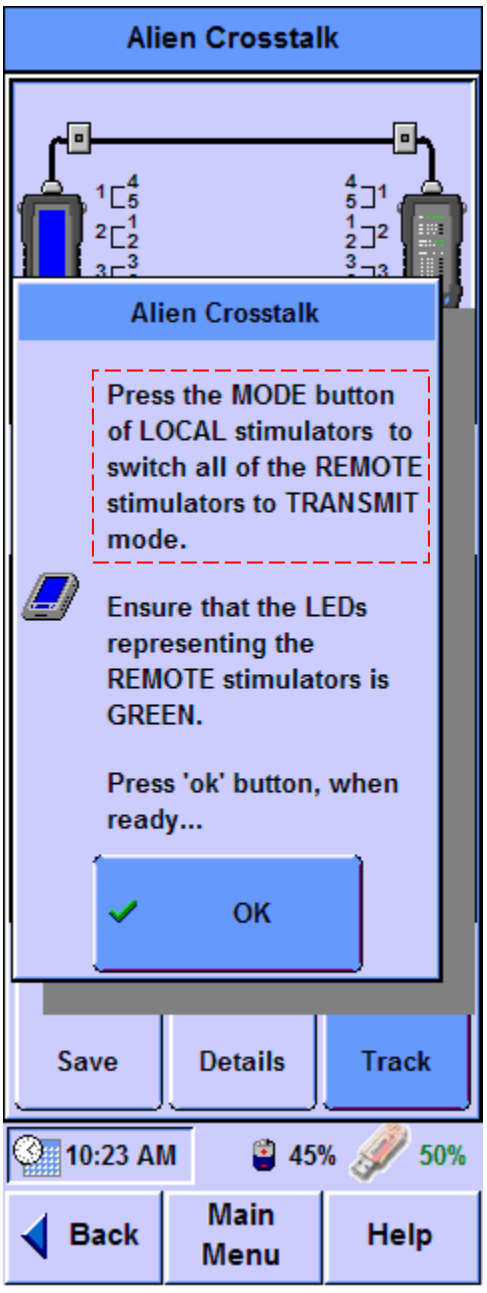
8 Switch the local stimulator to Termination Mode by pressing the *MODE* button. This will automatically switch the remote stimulator to Transmit Mode.

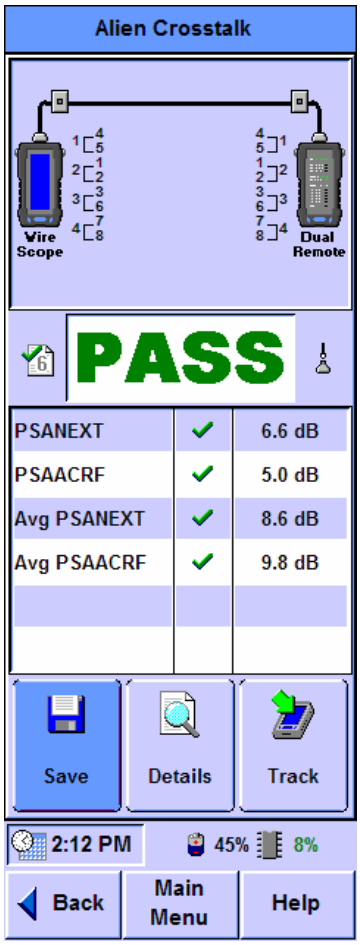
9 Press OK on the WireScope Pro to continue the test

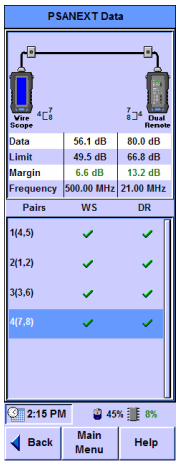
10 Since there are only one victim and one disturber, click *No* when asked to add more disturber cables.

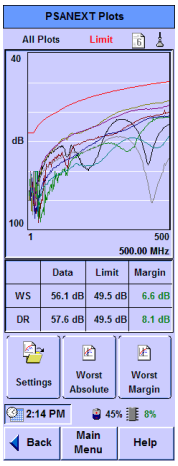
11 Save the test results and view the results on WireScope Pro



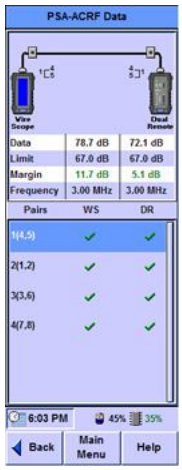


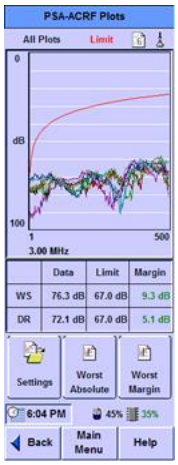






PSANEXT Data & Plot





PSA-ACRF Data & Plot

Measuring one victim cable and six disturber

"6 around 1" configuration of the same length

1 Power up the WireScope Pro

2 Select *Alien Crosstalk* on the main menu

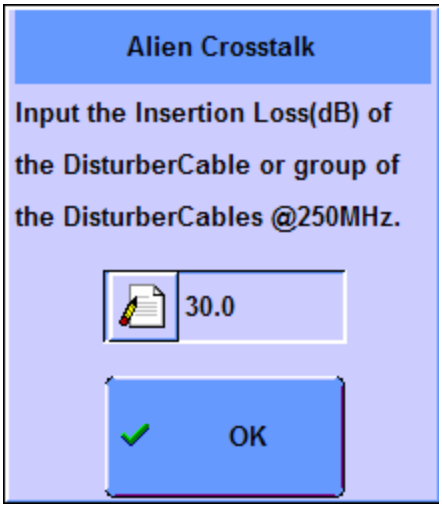
3 Connect the WireScope Pro and Dual Remote to the Victim cable. Press *Start Test* and WireScope will perform an Insertion Loss measurement on the cable.

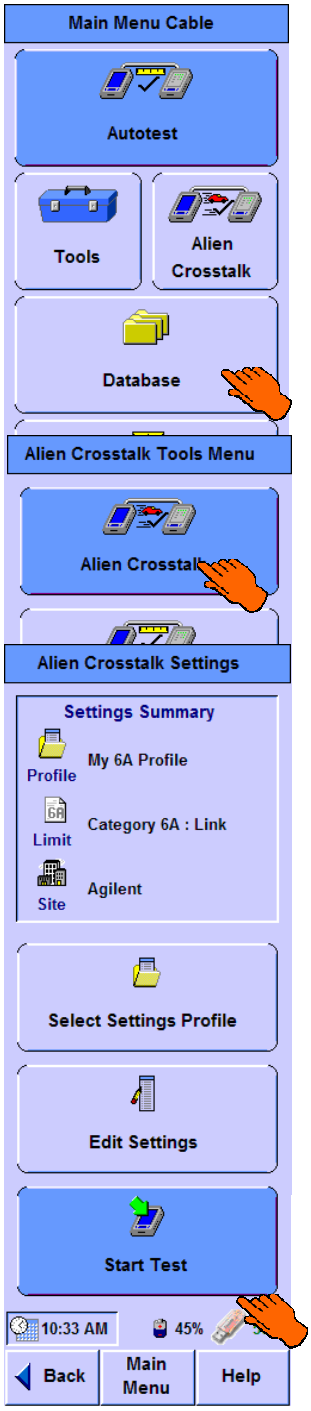
4 Connect the stimulators to both ends of the disturber cables. Turn on all Stimulators by pressing the *POWER* button.

5 Press the *MODE* button to select the Transmit mode (Green) on the all 6 local stimulators. This also automatically switches the remote stimulators to Termination Mode

6 Press the *OK* button on the WireScope Pro

7 WireScope Pro will show the measured victim cable's insertion loss value in dB at 250 MHz. Modify if required and press *OK*





8 Switch the local stimulators to Termination Mode by pressing the *MODE* button. This will automatically switch the remote stimulators to Transmit Mode.

9 Press *OK* on the WireScope Pro to continue the test

10 Since the 6 disturbers are tested at one go in parallel, click *No* when asked to add more disturber cables.

11 Save the test results and view the results on WireScope Pro

Measuring one victim cable and six disturber "6 around 1" configuration of the different length

When the cables under test are of different length, the cables with the same lengths should be group together for sequential testing.

1 Power up the WireScope Pro

2 Select *Alien Crosstalk* on the main menu

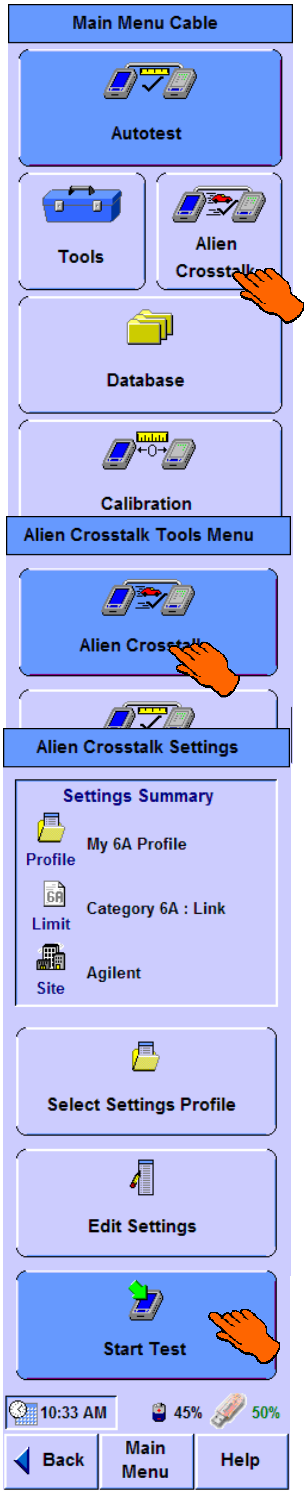
3 Connect the WireScope Pro and Dual Remote to the Victim cable. Press *Start Test* and WireScope will perform Insertion Loss measurement on the cable.

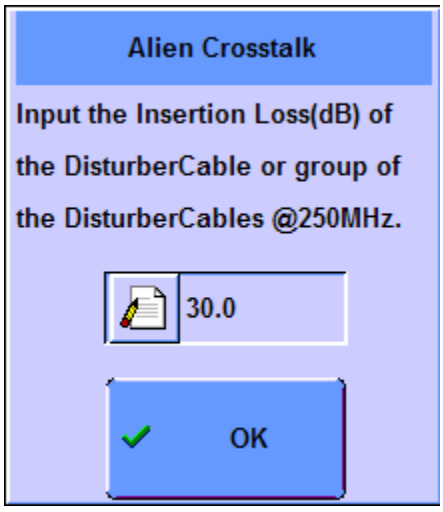
4 Connect the stimulators to both ends of the disturber cables. Turn on the Stimulators in groups by pressing the *POWER* button.

5 Press the *MODE* button to select the TRANSMIT mode (Green) on the group of local stimulators with the same length. This also automatically switches the remote stimulators to Termination Mode

6 Press the *OK* button on the WireScope Pro

7 WireScope Pro will show the measured victim cable's insertion loss value in dB at 250 MHz. Modify if required and press *OK*





8 Switch the local stimulators to Termination mode by pressing the *MODE* button. This will automatically switch the remote stimulators to Transmit mode.

9 Press *OK* on the WireScope Pro to continue the test

10 When asked to add more disturber, click *YES*.

11 Turn on the Stimulators on next group of disturber cables.
Similarly, press the *MODE* button to switch the local Stimulator to Transmit Mode.

12 Press the *OK* button on the WireScope Pro

13 Enter the Insertion Loss (dB) @ 250 MHz of the group of disturber cables and press *OK*

14 Switch the local stimulators to Termination mode by pressing the *MODE* button. This will automatically switch the remote stimulators to Transmit mode.

15 Repeat step 10 to 14 until all groups of disturber cables are covered.

16 Save the test results and view the results on WireScope Pro

3
Specifications

Technical

Electrical

Environmental

Physical

Technical Construction File for Radiated Emission

Specifications

Alien Crosstalk Stimulator RF Output

- RF frequency range: 1 MHz to 500 MHz
- RF output power: 0.5dBm ±1.0dBm

Electrical Specification

- DC Input: 12 V, 0.5A (Use AC/DC adaptor provided with unit)
- AC Power adapter: 100 – 240V ac (Use AC/DC adapter provided with unit)
- Battery: 9V Battery, not supplied (recommended capacity at least 250 mAh)

Environmental Specification

- Operating temperature range: 10°C to + 40°C
- Storage temperature range: - 40°C to +70°C
- Maximum humidity: 95% relative humidity for temperatures to 31° C
- Operating Power: 1.3W (Existing AXT :130mA @ 10V)

Physical Dimensions

- Size 5.5″ x 3.6″ x 1.1″ (140 x 91.4 x 27.9 mm)
- Weight 0.35 lb (160g)

Agilent Technologies	**DECLARATION OF CONFORMITY** According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014	CE

Manufacturer's Name: Agilent Technologies International sarl
Manufacturer's Address: Rue de la Gare 29
CH - 1110 Morges
Switzerland

Declares under sole responsibility that the product as originally delivered

Product Name: **Alien Crosstalk Stimulator**
Product Number: **N2648A**

complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- The Low Voltage Directive 73/23/EEC, amended by 93/68/EEC
- The EMC Directive 89/336/EEC, amended by 93/68/EEC

and conforms with the following product standards:

EMC (Technical Construction File)	Against:	EMC test specification EN 55011:1998 +A1:1999 (Group 1, Class A)
	As detailed in	Electromagnetic Compatibility (EMC) Competent Body Certificate No. 07-019
	Assessed by:	CETECOM GmbH, D-45219 Essen

	Standard	**Limit**
EMC	IEC 61326:2002 / EN 61326:1997+A1:1998+A2:2001+A3 :2003	
	CISPR 11:1997+A1:1999 / EN 55011:1998+A1:1999	Group 1 Class A
	IEC 61000-4-2:1995+A1:1998+A2 :2000 / EN 61000-4-2:1995+A1:1998+A2:2001	4 kV CD, 8 kV AD
	IEC 61000-4-3:2002+A1:2002 / EN 61000-4-3:2002+A1:2002	3 V/m, 80-1000 MHz
	IEC 61000-4-4:1995+A1 :2000+A2 :2001 / EN 61000-4-4:1995+A1:2001+A2:2001	0.5 kV signal lines, 1 kV power lines
	IEC 61000-4-5:1995+A1:2000 / EN 61000-4-5:1995+A1:2001	0.5 kV line-line, 1 kV line-ground
	IEC 61000-4-6:1995+A1:2000 / EN 61000-4-6:1996+A1:2001	3 V, 0.15-80 MHz
	IEC 61000-4-8:1993+A1:2000 / EN 61000-4-8:1993+A1:2001	30A/m
	IEC 61000-4-11:1994+A1:2000 / EN 61000-4-11:1994+A1:2001	1 cycle/100%
	Canada: ICES/NMB-001:1998	
	Australia/New Zealand: AS/NZS CISPR 11:2002	
Safety	IEC 61010-1:2001 / EN 61010-1:2001	
	Canada: CAN/CSA-C22.2 No. 61010-1:2004	
	USA: UL 61010-1:2004	

Supplementary Information:

The products were tested in a typical configuration with Agilent Technologies test systems.
For operation, the 'EMC Regulatory Instruction - Site Attenuation Requirement' must be observed

This DoC applies to above listed products placed on the EU market after:

2007-April-10
Date

Hans-Martin Fischer
Name

PNT Quality Manager
Agilent Technologies
Title

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Technical Construction File for Radiated Emission

EMC Regulatory Instruction - Site Attenuation Requirement

Introduction

All EMC relevant products must comply with the local requirements, internationally with the CISPR 11, in the European Union with the EMC Directive 89/336/EEC including 93/68/EEC, in Canada with the ICES/NMB-001, in Australia with the AS/NZS CISPR 11.
For the N2648A, the derived standards as well as the classes are noted in the Declaration of Conformity in this Guide.

EU-Conformity from a Competent Body

For products that do not fulfill the requirements the EU EMC Directive (§ 10.2) requires a Technical Construction File (TCF) with a Declaration of Conformity or a Certificate issued by a Competent Body (CB). For the Site Attenuation Requirements and the methods stated herein a review by a CB is mandatory.

Technical Rational

The systems concerned meet all requirements with the exception of Radiated Emissions of CISPR11 class A or the corresponding local standard. The measurement environment with specified high-speed test data traffic through open connections causes radiated electromagnetic emission above the required limits.

In order to meet the requirements appropriate preventive measures for the site must be considered and established before the systems will be switched on for its intended application. The methods described herein are sufficient to keep the system within the required limits of the standard.

Site Attenuation:

This document describes the methods for Site Attenuation to meet the requirements of Class A**.**

Product: **N2648A - Alien Crosstalk Stimulator**
Required Target Site Attenuation: 9 dB

Installation Instruction

If your site received permission from a local (PTT) agency to exceed the levels of radiation, this exceeded level has to be considered. In case of e.g. +10 dB, subtract this ratio from the Required Target Site Attenuation.

Based on the location where the system is to be installed, obtain the Available Site Attenuation. The calculating method is described in the section *Calculating Method*. Preventive measures might be necessary by optimization of the equipment and/or additional walls to be instal**led.**

Note: After installation of the preventive measures the available Site Attenuation must be calculated

The available Site Attenuation must be higher than the Required Target Site Attenuation value!
If not, additional measures as a shielded Cabin with specified shielding performance must be considered.
Other shielding methods as conductive wallpaper, metal walls etc. require an approval test ("in situ") by a local (PTT) agency. Appropriate arrangements have to be organized.
Install the system as described in the Installation Guide.

The product installation will then meet the requirements for radiation levels of Class A of CISPR 11 or the corresponding local standard.

Calculating Method

To obtain the Required Target Site Attenuation **at the customer site:**

1. Available Site Attenuation:

A = n * W + X

A = Available Site Attenuation in dB
n = number of concrete walls within distance D
W = 10 dB (attenuation of a concrete wall without openings)
X = attenuation reached by distance between equipment and exterior Wall plus 30 m to estate border

2. Attenuation X

X = 20 * log (D/30) **D = real estate border distance in m**

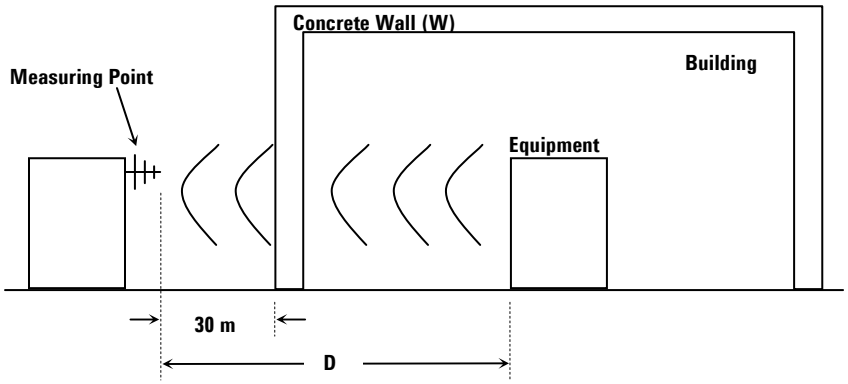


Figure 1: Site attenuation calculation

Calculation for this product:

Req. Target Site Attenuation in dB	Walls/n	X in dB	**D in m**
9	0	9	**85**
9	1	-1	**27**

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