

# Broadband Rate and Reach Calculator

## **Preface Material**

### **Document Identification**

Broadband Calculator Introduction  
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Product Marketing

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### **Intended Audience**

The intended audience for this document is both technical and non-technical staff within Network Service Provider (NSP) organizations, and it is assumed that the reader has a general understanding of voice and data communications, the xDSL industry and high-speed digital services.

## 1. HOW TO USE THE DATA

After you have opened the Actelis Performance Calculator, you will be able to operate it to estimate the achievable bonded-copper link performance utilizing Actelis' ML G.shdsl or DMT-based solutions.

## 2. GENERAL VIEW OF THE BROADBAND CALCULATOR SCREEN

**Broadband Rate and Reach Calculator**  
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Product Line:  Region:  Units:   ☒ EWL Pane ☒ Comment Pane

EWL in Kft: CO - 4.5 - Rep 1 - 4.5 - Rep 2 - **4.95** - Rep 3 - 4.5

Circuit Description: Company 12345, 45 main Ave, Portland  
Circuit Comments: Gold, Voice+Data+Video

Actelis CO:  DRB:   
Actelis CPE:  Temperature:   
Number of Rep.:   
Spectral Mode:   
Required NM:   
Required Gap:     No file chosen

Equipment, Link & Calibration Setting

Displaying Loop between the Second Repeater and the Third Repeater

Section	Range in Kft	Cable Type	Cable Plant	Coating
1	5	AWG24	Underground	PIC
2	2	AWG22	Underground	PIC
3	0		Underground	PIC
4	0		Underground	PIC
5	0		Underground	PIC
6	0		Underground	PIC
7	0		Underground	PIC
8	0	AWG28	Underground	PIC
9	0	AWG26	Underground	PIC
10	0	AWG26	Underground	PIC

Copper Plant Configuration

Number of Pairs	Throughput [Mbps]	Throughput [Mbps]
1	6.48	6.03
2	12.86	10.45
3	18.03	15.32
4	23.08	20.20
5	27.57	25.23
6	32.06	30.26
7	36.55	35.28
8	41.03	40.31

Numbers above show the expected net bonded throughput which is lower than sum of modems' rates

## 3. INSTRUCTIONS

### Step 1: Run the Application

Click "Run Calculator" button below to begin.

### Step 2: General Setting

When the calculator main screen is displayed, select the main parameters included as part of the "General Setting" area:

**Broadband Rate and Reach Calculator**  
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Product Line:  Region:  Units:   ☒ EWL Pane ☒ Comment Pane

- **Product line:** SHDSL or DMT
- **Region:** North America/CALA, Europe or Asia Pacific
- **Loop length measurements units:** km or Kft

### Step 3: Equipment, Link Configuration and Calibration Setting

If SHDSL line was selected, the following should be specified:

- The equipment at both ends of the link: CO side and CPE/RT side.
- Repeaters, if included and how many.
- Spectral mode and Noise Margin (NM) required.
- DRB level
- High Temperature in the area.
- Loop Influence Gap.

Actelis CO	ML2300	DRB	Disabled
Actelis CPE	ML600	Temperature	70F
Number of Rep.	None	G.shdsl	
Spectral Mode	Max Performance		
Required NM	6dB		
Required Gap	0%		

\*\* Please note when choosing NA3 spectral mode on a repeater configurations the calculator would provide the expected performance per T1.417 spectral limitations (implementing rDSS)

If DMT line was selected, the following should be specified:

- Noise Margin (NM) required.
- Impulse Noise Protection Level (INP).
- DMT mode (ADSL2 /ADSL 2+/VDSL2).
- DMT Profile – Different option would be presented based on the DMT mode selected:
  - For VDSL - VDSL profiles and US0 configuration
  - For ADSL - ADSL annex A or M
- High Temperature in the area.

Required SNRM	6dB	DMT
INP Mode	Interleaved	
DMT Mode	VDSL2	
VDSL Profile	8b	
US0 Type	EU32/D-32	
Temperature	70F	

  

Required SNRM	6dB
INP Mode	Interleaved
DMT Mode	ADSL2+
Annex	A
Temperature	70F

Note: The comment pane can be enabled from the global setting area, allowing the user to enter free data associated with the specific link.

Circuit Description:	Company 12345, 45 main Ave, Portland
Circuit Comments:	Gold, Voice+video +data

**Step 4: Cable Plant Configuration**

- Up to 10 segments can be set per link section. Cable characteristics, including length, cable type, and coating, should be specified.

Note: The EWL pane can be enabled to present the Effective Working Length in Kft (26AWG) or km.

Section	Range in Kft	Cable Type	Cable Plant	Coating
1	1	AWG26	Underground	PIC
2	2	AWG24	Underground	PIC
3	1	AWG22	Underground	PIC
4	0	AWG26	Underground	PIC
5	0	AWG26	Underground	PIC
6	0	AWG26	Underground	PIC
7	0	AWG26	Underground	PIC
8	0	AWG26	Underground	PIC
9	0	AWG26	Underground	PIC
10	0	AWG26	Underground	PIC

- For a repeatered link, the user will be required to define each “Segment” of the link (hop) and its sections. The EWL pane will present the whole link, as can be seen by the example below - 2 repeaters, 3 hop link.

Displaying Loop between the First Repeater and the Second Repeater

1      Segment 2      3

Section	Range in Kft	Cable Type	Cable Plant	Coating
1	5	AWG24	Underground	PIC
2	4	AWG24	Underground	PIC
3	0	AWG26	Underground	PIC
4	0	AWG26	Underground	PIC
5	0	AWG26	Underground	PIC
6	0	AWG26	Underground	PIC
7	0	AWG26	Underground	PIC
8	0	AWG26	Underground	PIC
9	0	AWG26	Underground	PIC
10	0	AWG26	Underground	PIC

EWL in Kft: CO - 5 - Rep 1 - **6.75** - Rep 2 - 3.75 - CPE

**Step 5: Calculate Throughput – Link Performance**

- Click “Calculate Throughput” to run the calculator.
- The Actelis link performance will be presented as per the input parameters entered on the left-hand side.
  - Actelis G.shdsl link throughput will be presented for 1 to 8 bonded copper pairs when ML600 is selected as CPE or up to 32 pairs when ML230 is selected as CPE.
  - Actelis DMT solution performance will be presented for 1 to 8 bonded copper pairs.

Calculate Throughput

Save Settings

Choose File: No file chosen

Get Settings

Generate Report

Number of Pairs	Throughput [Mbps]	
	Low	High
1	9.46	7.51
2	18.77	14.24
3	27.88	21.47
4	37.04	28.68
5	45.12	35.88
6	53.20	42.07
7	61.46	50.26
8	69.92	57.45

**G.shdsl**

- Numbers above show the expected net bonded throughput which is lower than sum of modems' rates

Calculate Throughput

Save Settings

Choose File: No file chosen

Get Settings

Generate Report

Number of Pairs	Throughput [Mbps]		Throughput [Mbps]	
	US	DS	US	DS
1	6.59	24.63	5.79	21.47
2	13.35	49.26	11.73	42.94
4	26.19	98.52	23.46	85.88
8	52.39	197.04	46.92	171.76

**DMT**

- Click “Generate Report” to print the link configuration (all entered information) including calculated throughput to a PDF file.

**Broadband Rate and Reach Calculator**  
**Span Calculation Results**  
 The Broadband Acceleration Company

**Input Parameters**

Date	10/2/2012 9:52:08 AM
Circuit Description	Company 12345, 45 main Ave, Portland
Product Type	SHDSL
Region	North American
Units	US
Product CO	ML2300
Product CPE	ML600
Number of repeaters	2
Spectral Mode	Max Performance
Required NM	6dB
Required Gap	0%
DRB	Disabled
Temperature	70F
Calc Ver	R73Calculator_2012_09_24.exe

  

**Span Layout Used For Calculations**

Segment	Section	Length	Cable Type	Plant Type	Coating Type
1	1	5 Kft	AWG26	Underground	PIC
1	2	1 Kft	AWG24	Underground	PIC
2	1	3 Kft	AWG24	Underground	PIC
2	2	3 Kft	AWG22	Underground	PIC
3	1	3 Kft	AWG22	Underground	PIC
3	2	6 Kft	AWG24	Underground	PIC

  

**EWL Representation of Span in Kft**  
 CO - 5.75 - Rep 1 - 4.95 - Rep 2 - 6.3 - CPE

  

**Expected Results**

Alien disturbance Number of Pairs	Expected Results	
	Low Throughput (Mbps)	High Throughput (Mbps)
1	4.13	4.13
2	8.25	7.68
3	12.38	11.61
4	16.50	15.53
5	20.63	19.25
6	24.37	22.97
7	27.76	26.70
8	31.15	30.42

- Numbers above show the expected net bonded throughput which is lower than sum of modems' rates

## Other

### Save Link Input Parameters – “Save Settings” (Optional)

- Link input parameter (left-hand side) can be saved to be used in the future to represent changes in the link and then recalculate the expected performance with no need to re-enter all parameters.
- The data should be saved as a “txt” file.
- After saving the data, the input file can be opened, viewed or modified and then uploaded back to the system.

InputParam (5).txt - Notepad

File Edit Format View Help

Input parameters for the Actelis Broadband Rate and Reach Calculator. These parameters may be edited and uploaded

Date: 10/2/2012 9:52:17 AM  
 IP address: 68.38.226.198 68.38.226.198

Circuit Description: "Company 12345, 45 main Ave, Portland"

Product Type: SHDSL  
 Region: North American  
 Units: US  
 Product CO: ML2300  
 Product CPE: ML600  
 Number of repeaters: 2  
 Spectral Mode: Max Performance  
 Required NM: 6dB  
 Required gap: 0%  
 DRB: Disabled  
 Temperature: 70F  
 Calc Ver: R73Calculator\_2012\_09\_24.exe

Circuit Comments: "Go1d, voice+Data+video"

Segment 1, Section 1: 5 Kft, AWG26, underground, PIC  
 Segment 1, Section 2: 1 Kft, AWG24, underground, PIC  
 Segment 2, Section 1: 3 Kft, AWG24, underground, PIC  
 Segment 2, Section 2: 3 Kft, AWG22, underground, PIC  
 Segment 3, Section 1: 3 Kft, AWG22, underground, PIC  
 Segment 3, Section 2: 6 Kft, AWG24, underground, PIC

### Load Input File - “Get Settings” (Optional)

- Using the "Choose File" button and then "Get Settings", the user can upload a “txt” file representing a link configuration (left-hand side).
- After "Get Settings" is clicked, the user can update the data, if required, and calculate the throughput.

For detailed information about system configuration and functionality please refer to Actelis' ML specific user manual and release notes



## 4. HOW TO CONTACT ACTELIS

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