DOCSIS ATP 1.1

PHY-21.1

JUPITER 110 ATP PHY-21.1 TEST SCRIPT DATA SHEET

Cable Modem Receive Power Test

A DOCSIS 1.1 ATP TEST SCRIPT DATA SHEET

Jupiter 110 PHY-21.1

DAQTron, Inc.
1007-B Mansell Road, Roswell, GA 30076
Phone 770.643.1878 • Fax 770.645.6403

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Jupiter 110 – PHY-21.1

"This test measures the capability of the docsIfDownChannelPower MIB object to accurately report the power of the downstream channel." – ***DOCSIS 1.1 ATP***

Introduction

This test script tests the accuracy of the cable modem's downstream channel power MIB. The variable downstream attenuator is set and the downstream channel power is measured at the Cable Modem. The downstream channel power MIB is queried and the difference between the measured channel and the MIB is reported. A calibration table, stored in a file on the system, records the measured downstream power difference between the VSA input and the cable modem input. The downstream channel power is tested from –15 dBmV to 15 dBmV in 1 dB increments.

This test is repeated for downstream frequencies, supplied by the user, in the Std./IRC and HRC channel plans.

EIA Channel	Std/IRCFrequency	HRC Frequency*.
95	93 MHz	91.7545 MHz
19	153 MHz	151.7575 MHz
13	213 MHz	211.7605 MHz
32	273 MHz	271.7635 MHz
42	333 MHz	331.7665 MHz
52	393 MHz	391.7695 MHz
62	453 MHz	451.7725 MHz
72	513 MHz	511.7755 MHz
82	573 MHz	571.7785 MHz
92	633 MHz	631.7815 MHz
107	693 MHz	691.7845 MHz
117	753 MHz	751.7875 MHz
127	813 MHz	811.7905 MHz
134	855 MHz	853.7926 MHz

Test Requirements

This test uses a vector analyzer to measure the downstream channel power, variable attenuator to adjust the level of the downstream channel power, and requires the ability to query CM MIB docsIfDownChannelPower.

Setup

The Jupiter 200 PHY-21.1 Test Script utilizes Jupiter hardware as shown in Figure 1 of the **Jupiter PHY Hardware Setup Data Sheet** document.

Procedure

As Stated by DOCSIS 1.1 ATP:	**As Performed by Jupiter:**	**Deviation**
1. CM AC power off.	The Test Script controls the AC Power Controller via Control Path 1 (Telnet or SNMP) and powers off the CM.	None
2. CMTS power on. Wait for CMTS ready.	The Test Script verifies CMTS ready through use of Control Path 1 (Telnet or SNMP).	None
3. Wait 30 minutes for CM warm-up.	Wait 30 minutes for CM warm-up.	None
4. CM AC power on. Wait for CM registered.	The Test Script controls the AC Power Controller via Control Path 1 (Telnet or SNMP) and powers on the CM.	None
5. Set CMTS downstream frequency to lowest channel (~93 MHz).	The Test Script sets the CMTS docsIfUpChannelFrequency MIB via Control Path 1 (SNMP).	None
6. Set downstream channel power to -15 dBmV at the power measuring device.	The Test Script adjusts the downstream attenuator via Control Path 2 to get the desired power at the measuring device.	None
7. Read docsIfDownChannelPower from CM MIB.	The Test Script queries the CM MIB docsIfDownChannelPower via Control Path 1 (SNMP).	None
8. Increase power 1 dB using variable attenuator or SNMP control.	The Test Script increases the power by 1 dB using the variable downstream attenuator via Control Path 2.	None
9. Read docsIfDownChannelPower from CM MIB.	The Test Script queries the CMTS MIB docsIfDownChannelPower via Control Path 1 (SNMP).	None
10. Repeat until received downstream power exceeds 15 dBmV.	The Test Script repeats steps 8-9 until received downstream power exceeds 15 dBmV.	None
11. Repeat until all combinations of channels have been measured.	The Test Script repeats steps 5-10 until all combinations of channels are measured.	None

Environment File Details

Using this file as shown below with all items set to TRUE will conduct the test in its entirety as described above in the **Procedure** section. Some comments have been added and denoted with "//" preceding the comments. Any test sections set to FALSE will be skipped when the test is executed. The environment file shown below sets up one test case (modulations, channel widths, frequencies). DAQTron's Test Sequencer, described in the **DAQTron Operator's Guide**, is used to cycle through various test cases.

PHY-21.1.env

```
[General]
Modem Warmup Time (minutes) = 0     //** ATP Calls for 30 minutes of warm-up
Channel Plan = Std./IRC   //**Std./IRC or HRC  (for documentation purposes only)
Downstream Frequencies (MHz) = 93,,513,,855   //** Multiple Frequencies Separated By 2 Commas (,,)
64-QAM = TRUE  //**TRUE or FALSE
256-QAM = TRUE  //**TRUE or FALSE
Downstream Power Level Start (dBmV) = -15   //**ATP Lists -15 dBmV
Downstream Power Level Stop (dBmV) = 15   //**ATP Lists 15 dBmV
Settling Time (ms) = 2000   //** default = 2000 ms settling time before measurement taken
```

Limit File Details

The limit file shown below for PHY-21.1 allows user control of test pass/fail criteria without requiring access to the actual test script. One application of this limit file would be to set up 'marginal' criteria for passing, or in other words to allow for a comfort margin in modem performance before submission for certification testing. Acronyms for data format and conditions are as specified in the **DAQTron Jupiter 110/200 Operator's Guide**.

PHY-21.1.lmt

```
[General]
PowerDifference,C0%s%r,WII,3,-3
MaxDelta,C0%s%r,WII,0.5,-0.5
```

Test Results

The Test Results tab in the PHY-21.1 Data Viewer displays a tab for Tabular reports and another tab for Graphical Reports.

Figure 1. Progress Tab for Jupiter 110 PHY-21.1.

Tabular Report

The Tabular report lists the **PICS**, **Measurement**, **Comment**, **Pass/Fail** and **Limit** applied to the measurement. Also, there are filter and Print buttons. The filter button allows you to view all data, only the data that passed the test or only the data that failed the test.

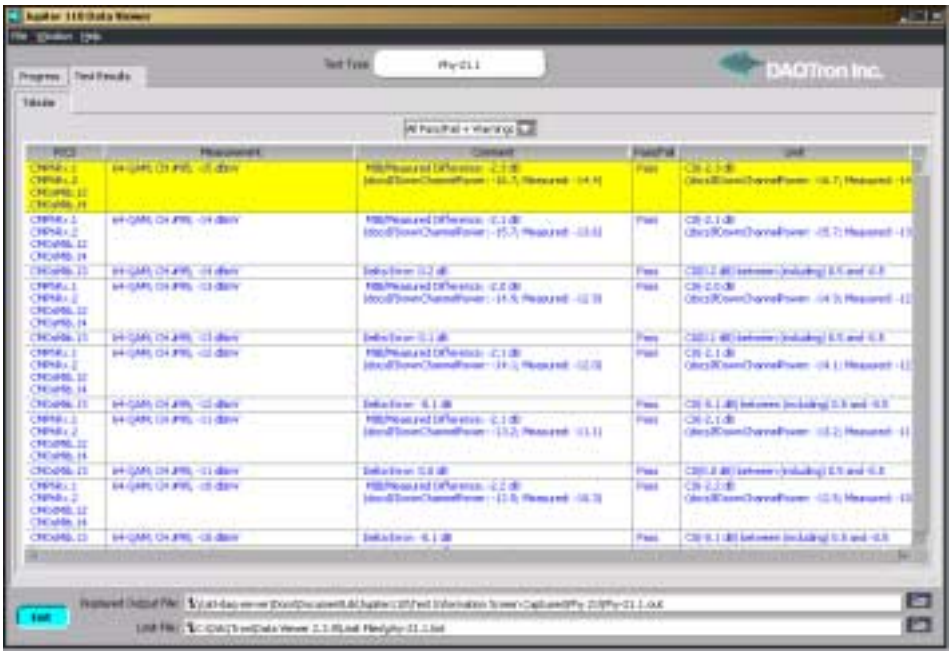

Figure 2. Tabular Results for Jupiter 110 PHY-21.1.

Known Issues: ATP Deviations, Assumptions and Caveats

The following list contains all the current issues. The issues can be with the ATP, 3rd Party Hardware, or DAQTron's implementation.

- No known issues.

Expected Test Times

For each test case (frequency, modulation, 31 power levels) of PHY-21.1, DAQTron's fully-automated Test Script test time averages approximately 11 minutes. The ATP specifies 2 modulations (64QAM and 256QAM), 14 frequencies (spaced 6 MHz from 93 MHz to 855 MHz), and testing at all 31 power levels from –15 dBmV to + 15 dBmV in 1 dB steps. To run all test cases for one modem takes approximately 5 hours.

PICS Coverage

From SP-PICSV11-D08-011220

PICS Item	Feature	Quality
CMTSOsMib.409	RFC-2670 MUST be implemented by DOCSIS 1.1 compliant CMTS and CMs	Direct
CMOsMib.11	RFC-2670 MUST be implemented by DOCSIS 1.1 compliant CMTS and CMs	Direct
CMOsMib.12	When operated at nominal line voltage, at normal room temperature, the reported power MUST be within 3 dB of the actual received channel power	Direct
CMOsMib.13	Across the input power range from -15 dBmV to +15 dBmV, for any 1 dB change in input power, the CM MUST report a power change in the same direction that is not less than 0.5 dB. and not more than 1.5 dB.	Direct
CMOsMib.14	The docsIfDownChannelPower object-type MUST be implemented in DOCSIS 1.1 conforming CM's	Direct
CMPhRx.1	CM MUST receive channels from the above plans on center frequencies from 91 MHz to 857 MHz	Direct
CMPhRx.2	CM MUST receive channels with received levels from -15 dBmV to +15 dBmV per channel	Direct
CmtsRFIMib.30	docsIfSigQMicroreflections:"Total microreflections including in-channel response as perceived on this interface, measured in dBc below the signal level. This object is not assumed to return an absolutely accurate value, but should give a rough indication	
CmtsRFIMib.84	docsIfCmtsCmStatusMicroreflections:"Total microreflections including in-channel response as perceived on this interface, measured in dBc below the signal level. This object is not assumed to return an absolutely accurate value, but should give a rough ind	

DOCSIS Test Result Tables

Results:

Channel Number: _____

Channel Plan: _____ (STD/IRC, HRC)

Carrier modulation: _____ (64QAM or 256QAM)

Nominal Input Power	Measured Input Power	MIB Power Reported	MIB/Measured Difference	Maximum Difference	One dB Delta Reported	One dB Delta Maximum
-15 dBmV				+/- 3 dB	N/A	N/A
-14 dBmV				+/- 3 dB		1 +/- 0.5 dB
-13dBmV				+/- 3 dB		1 +/- 0.5 dB
-12 dBmV				+/- 3 dB		1 +/- 0.5 dB
-11 dBmV				+/- 3 dB		1 +/- 0.5 dB
-10 dBmV				+/- 3 dB		1 +/- 0.5 dB
-9 dBmV				+/- 3 dB		1 +/- 0.5 dB
-8 dBmV				+/- 3 dB		1 +/- 0.5 dB
-7 dBmV				+/- 3 dB		1 +/- 0.5 dB
-6 dBmV				+/- 3 dB		1 +/- 0.5 dB
-5 dBmV				+/- 3 dB		1 +/- 0.5 dB
-4 dBmV				+/- 3 dB		1 +/- 0.5 dB
-3 dBmV				+/- 3 dB		1 +/- 0.5 dB
-2 dBmV				+/- 3 dB		1 +/- 0.5 dB
-1 dBmV				+/- 3 dB		1 +/- 0.5 dB
0 dBmV				+/- 3 dB		1 +/- 0.5 dB
1 dBmV				+/- 3 dB		1 +/- 0.5 dB
2 dBmV				+/- 3 dB		1 +/- 0.5 dB
3 dBmV				+/- 3 dB		1 +/- 0.5 dB
4 dBmV				+/- 3 dB		1 +/- 0.5 dB
5 dBmV				+/- 3 dB		1 +/- 0.5 dB
6 dBmV				+/- 3 dB		1 +/- 0.5 dB
7 dBmV				+/- 3 dB		1 +/- 0.5 dB
8 dBmV				+/- 3 dB		1 +/- 0.5 dB
9 dBmV				+/- 3 dB		1 +/- 0.5 dB
10 dBmV				+/- 3 dB		1 +/- 0.5 dB
11 dBmV				+/- 3 dB		1 +/- 0.5 dB
12 dBmV				+/- 3 dB		1 +/- 0.5 dB
13 dBmV				+/- 3 dB		1 +/- 0.5 dB
14 dBmV				+/- 3 dB		1 +/- 0.5 dB
15 dBmV				+/- 3 dB		1 +/- 0.5 dB