LX125G GPON Testing Report

Company				
name:				
Equipment	LX125G	1GE	GPON	
model:				
Fiction:		Tony	,	2018年8月26日
Review:				2018年8月26日
Approve:				2018年8月26日

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0 version record

Table 1 version record table

Serial numb er	version number	Generatio n time	Major modification record	Author	Remarks
1	RA		First edition		

1 Product Overview

1.1 Introduction

Briefly introduce the basic functions of the device and the usage scenarios.

product information



Positive



Negative

Table 2 Product panel light description

Name	status	meaning	Remarks
	Off	The device is not powered on.	conform
POWER	Constantly bright	The device is powered on	conform
	Off	The network port is not connected.	conform
LAN	Constantly bright	The network port is connected.	conform
	flicker	Network port has data transmission	conform
	Off	Indicates that the ONU has not started the	
	Oil	activation process.	
PON	flicker	Indicates that the ONU is active	
	Constantly bright	Indicates that the ONU has been activated.	conform
	Off	Indicates that the ONU receives normal optical power.	conform
LOS	flicker	Indicates that the ONU receiving optical power is lower than the optical receiver sensitivity	conform

Test content and purpose

This test report is provided in accordance with the requirements of the device LX125G technical specification. This test report provides test items as well as test procedures and test results.

1.2 Test instruments and auxiliary equipment

Table 4 Test instrument list

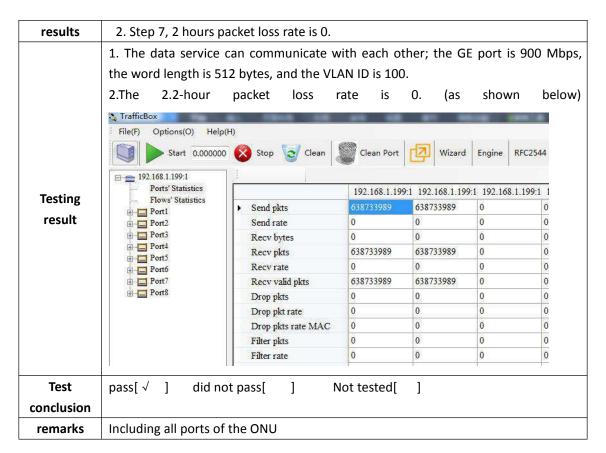
Name	factory	type
High and low temperature box	Su Rui Electronic Equipment Co.,	AG-100
	Ltd.	
OLT	ZTE C300	C300
ONU		LX125G GPON
Optical power meter	Optical technology	PMS-1
Optical attenuator	Optical technology	
Network Analyzer	Nustrerms	Nustrerms-600i
Network tester		
Fiber		20 km of real fiber

2 test project summary

2.1 Data part and hardware test of PON port

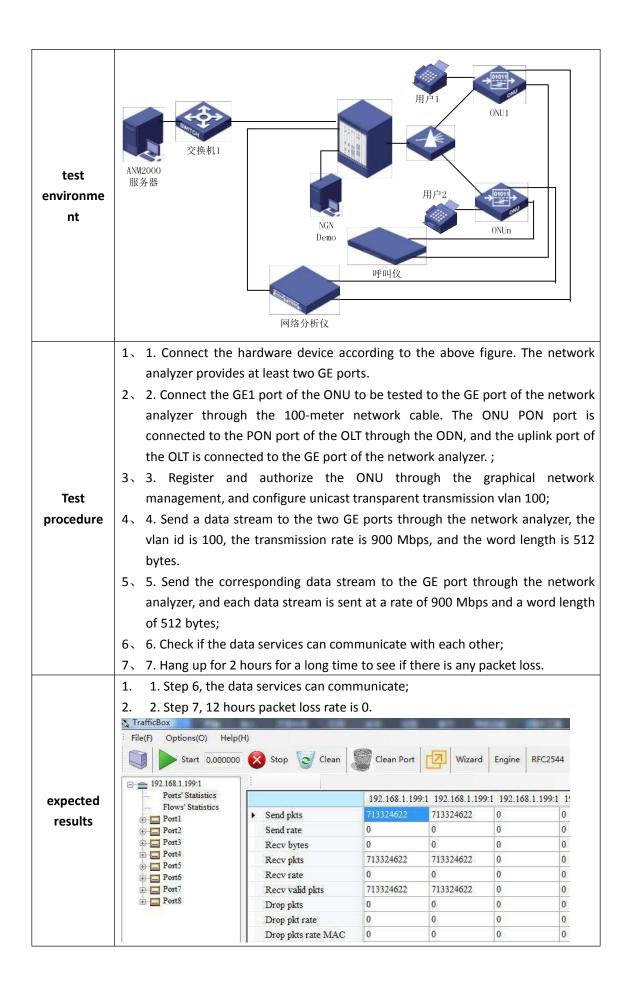
2.1.1 Data exchange and uplink function test

Use case	TC-1					
number						
Use case	Packet switching and uplink function					
name						
Testing	Detect whether the data port of the tested ONU can exchange data with the OLT					
purposes	through the optical module.					
Preconditio	1.The ONU to be tested;					
ns	2. Network analyzer;					
	3.OLT system.					
test environme nt	RANM2000 RANM200					
Test procedure	 1. Connect the hardware device according to the above figure. The network analyzer provides at least two GE ports. 2. Connect the GE port of the ONU to the GE port of the network analyzer. The ONU PON port is connected to the PON port of the OLT through the ODN, and the uplink port of the OLT is connected to the GE port of the network analyzer. 3. Register and authorize the ONU through the graphical network management, and configure unicast transparent transmission vlan 100; 4. Send a data stream to the GE port through the network analyzer, the vlan id is 100, the transmission rate is 900 Mbps, and the word length is 512 bytes. 5. Send the corresponding data stream to the GE port through the network analyzer, and each data stream is sent at a rate of 900 Mbps and a word length of 512 bytes; 6. Check if the data services can communicate with each other; 7. Hang up for 2 hours for a long time to see if there is any packet loss. 					
Expected	Step 6, data services can communicate;					
pooted						



2.1.1 Data port 100 meter network cable test

Use case	TC-2			
number				
Use case	Data port 100 meter network cable transmission test			
name				
Testing	Check whether the data port of the tested ONU can support 100m network			
purposes	transmission.			
Preconditio	1. The ONU to be tested;			
	2. Network analyzer;			
ns	3. OLT system.			



T	est	pass[√]	did not pass[]	Not tested[]
conc	lusion						
ren	narks	Including	g all	ports of the ONU			

2.1.1 Reading the Parameter Information of an ONU Optical Module

2.1.1 Read	ling the Parameter Information of an ONU Optical Module				
Use case	TC-3				
number					
Use case	Read the ONU optical module parameter information test				
name					
Testing	Read the ONU optical module parameter information when the OLT and the ONU				
purposes	work normally.				
Precondit	The ONU is registered normally, the relevant data has been configured, and the				
ions	relevant test instruments are ready.				
test environm ent	用户1 ONU1				
Test procedur e	 1. Connect the line as shown above; 2. Fully equipped with 32 ONUs under one OLT PON interface; 3. Enable optical module parameter detection in the performance classification switch of the service card; 4. Read back the parameter information of the optical module of the service board, and record the received optical power value of each ONU; 5. Enable optical module parameter detection in the performance classification switch of each ONU; 6. Read back the parameter information of each ONU optical module, and record the optical power and received optical power value of each ONU. 7. Test the optical power value and the received optical power value of each ONU using a PON optical power meter, and record; 8. Compare the test values obtained in steps 4, 6, and 7. 				
expected	In step 8, the error of the test result obtained three times does not exceed ± 1				
results	dBm.				
Test	The test error of 3 times is within ± 1 dBm.				
Results					
Test	pass[√] did not pass[] not tested[]				

conclusio	
n	
remarks	

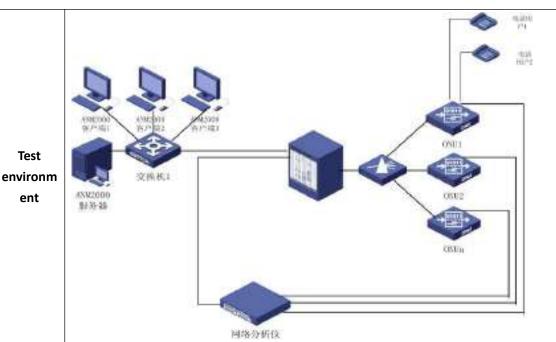
2.1.1 Input voltage range test

Use case	TC-4
number	
Use case	Power pull test (ONU)
name	
Testing	The input voltage range at which the test equipment is operating normally.
purposes	
	1. The test platform should be: ONU is in the network and has normal working status of full service;
Preconditi	2. Test instrument:
ons	Variable AC voltage source
	DC voltage source;
	multimeter.
Test environm ent	ASSESSORE ANGELIE APPRET APPR
	1. Connect the test environment according to the above figure, where
	ONU1 directly adopts adjustable AC or DC power supply, and this use case
	tests for ONU1;
Test	2. Confirm that the device under test is designed with input voltage
procedure	overvoltage and undervoltage protection;
	3. If the terminal device has input voltage overvoltage and undervoltage
	3. If the terminal device has input voltage overvoltage and undervoltage protection, test the following method:

The AC voltage source directly supplies power to the device. When the device is in full service and in normal working condition, the input voltage range is adjusted by the AC voltage source, and the voltage range in which the device can work normally is tested and recorded; b) DC power supply: The DC voltage source is used to directly supply power to the device. When the device is in full service and in normal working condition, the voltage range of the device can be tested and adjusted by adjusting the input voltage range. 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results Test conclusion "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert AC 220V power to DC 12V.		
range is adjusted by the AC voltage source, and the voltage range in which the device can work normally is tested and recorded; b) DC power supply: The DC voltage source is used to directly supply power to the device. When the device is in full service and in normal working condition, the voltage range of the device can be tested and adjusted by adjusting the input voltage range. 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results Test Results Test Conclusion "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		The AC voltage source directly supplies power to the device. When the
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When the device is in full service and in normal working condition, the voltage range of the device can be tested and adjusted by adjusting the input voltage range. 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results range. Test conclusion "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		b) DC power supply:
range of the device can be tested and adjusted by adjusting the input voltage range. 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results range. Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		The DC voltage source is used to directly supply power to the device.
range. 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results range. Test conclusion Test conclusion "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		When the device is in full service and in normal working condition, the voltage
expected results 1. AC mains voltage in the range of 90 ~ 264V, frequency 50Hz ± 5%, voltage waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results Test range. Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		range of the device can be tested and adjusted by adjusting the input voltage
expected results waveform distortion rate is less than 5%, the equipment should be able to work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results The AC mains and DC voltages operate normally within the required deflection range. Test conclusion pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		range.
results work normally; 2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results range. Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		1. AC mains voltage in the range of 90 $^{\sim}$ 264V, frequency 50Hz $~\pm~$ 5%, voltage
2. DC input requires 12V to allow variable range from 11.5V to 12.5V; Test Results range. Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert	expected	waveform distortion rate is less than 5%, the equipment should be able to
Test range. Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert	results	work normally;
Results range. Test conclusion pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		2. DC input requires 12V to allow variable range from 11.5V to 12.5V;
Test pass[√] did not pass[] not tested[] "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert	Test	The AC mains and DC voltages operate normally within the required deflection
remarks "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert	Results	range.
remarks "China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert		pass[√] did not pass[] not tested[]
remarks power supply adaptability requirements: SFU equipment should be powered by using an external power adapter to convert	conclusion	
remarks SFU equipment should be powered by using an external power adapter to convert		"China Telecom GPON Equipment Technical Requirements V2.1" 20.2.2.2 ONU
SFU equipment should be powered by using an external power adapter to convert	nomeonic:	power supply adaptability requirements:
AC 220V power to DC 12V.	remarks	SFU equipment should be powered by using an external power adapter to convert
		AC 220V power to DC 12V.

2.1.2 high temperature and high humidity test

Use case	TC-5
number	
Use case	High temperature and high humidity environment test
name	
Testing	Start-up and working stability of test equipment in high temperature and high
purposes	humidity environment
Precondit	1. 1. OLT and ONU equipment;
ions	2. Data network analyzer, optical power meter, temperature and humidity test
IONS	chamber, optical splitter, etc.。



- 1. Set up a high temperature and high humidity environment test platform;
- 2. Before the test, test the appearance, mechanical properties and electrical performance of the test sample (OLT/ONU) at room temperature to verify whether the OLT/ONU can start normally, whether the service configuration is normal, whether the two-way service is normal, and test. Transmit optical power of OLT/ONU; (initial detection)
- 3. Put the test sample at room temperature into the test chamber in the normal position or other regulations without being packaged, energized, or ready for use. At this time, the temperature of the test chamber is also room temperature;
- 4. The test chamber is heated to 1° C/min to the test temperature TL (the TL value depends on the ambient temperature range category supported by the OLT/ONU);

Test procedur е

Test

- 5. After t3 hours at TL temperature and 90% humidity, power on the test sample to verify whether the OLT/ONU can start normally, whether the service configuration is normal, whether the two-way service is normal, and test the optical power of the OLT/ONU.;
- 6. After the test sample has completed the high-temperature and high-humidity start test, the 16-hour long-term high-temperature and high-humidity stability test is carried out under TL temperature and 90% humidity, and two 100 Mbps bidirectional flows are generated for the SFU through the data network analyzer, and the test is long-term stable. For the MDU (LAN), configure a bidirectional traffic for each GE port (the traffic of each GE UNI port is 100 Mbps), and test its long-term stability. For the MDU (DSL) two 16 Mbps/512 Kbps bidirectional traffic, test Long-term stability;
- 7. The temperature of the test chamber is restored to room temperature (25 °C), and the cooling rate is 1 °C/min. After t7 hours, the test sample is powered on to verify whether the OLT/ONU can be started normally, whether

the service configuration is normal, and whether the two-way service is normal. And test the OLT/ONU to send optical power. Also test the appearance, mechanical properties, electrical properties, etc. of the test sample; (final test) 1. Step 5: The OLT/ONU can start normally and complete the automatic service configuration. The two-way service is normal; there is no obvious change before the optical power and temperature rise. 2. Step 6: The OLT bidirectional packet loss rate is less than 10-11 in long-term 2. high temperature and high humidity environment; SFU bidirectional packet loss rate is less than 10-11; MDU (LAN) bidirectional packet loss rate is less than expected results 10-11; MDU (DSL) The two-way packet loss rate is less than 10-11; 3. Step 7: After returning to room temperature, the OLT/ONU can start 3. normally and complete the automatic service configuration, the two-way service is normal; there is no obvious change before the optical power and the temperature drop; the appearance, mechanical properties and electrical performance of the test sample have no obvious change; The service configuration can be completed automatically, and no packet loss is found in the high temperature and high humidity environment; after returning to room temperature (25 $^{\circ}$ C), everything is normal and there is no obvious change. TrafficSon File(F) Ciptiono(C) Help(H) Start 0.000000 🔞 Stop 🤝 Clean Would Engine RECOSE Facto Test 192 (88 1 199 f Parts' Statistics 192 168 1 199 1 1 192 168 1 199:1:1 192.168.1.199.1 result Flower Statistics Soud plate 1354546687 H- Peril Send rate 0 0 ō a Rocy bytes Ð Statutes 1354546687 1354546687 à Recy pkts Ford. Recy rate ø Flores Hosts. Recy valid plets 1354546687 1354546687 0 Statesten Drop plas ti D 0 El- Peris Drop plet rate H - Ferri Drop plots rate MAC 0 0 a Tent H- Zenő Filter plea 'n G đ B- Peri7 10 0 ů. Filter care Test pass[√] did not pass[1 not tested[1 conclusio n 1. Adopt ETSI 300019 Class 3.2 standard test to meet TL9000 requirements; 2. During the test, equipment damage may occur. It is recommended to perform remarks this test after other functional tests are completed; 3. The temperature control box for testing shall have a temperature rise and fall capability of 1.0 $^{\circ}$ C/min, and the temperature range is -31 to 56 $^{\circ}$ C;

4. The lower and upper temperature limits selected in the OLT environmental test are: low temperature TL=-1° C, high temperature TL=51° C; the lower and upper temperature limits selected in the SFU environmental test are: low temperature TL=-6 $^{\circ}$ C, high temperature TL =46 $^{\circ}$ C; the lower and upper temperature limits selected in the MDU environmental test are: low temperature TL=-31 ° C, high temperature TL=56 $^{\circ}\,$ C; (actual test temperature requirement is greater than the manual declared value $\pm 1^{\circ}$ C) 5. The test uses a randomly selected MDU (LAN) device and randomly selects two GE ports. During the test, two ADSL2+ ports are randomly selected from one ADSL2+ interface board of the MDU (DLS) device. For a multi-GE port modem, each modem uses only one GE interface for testing. The temperature control curve shown the figure below; 注: 阴影部分为上电测试时期 $^{\circ}$ C 初始检测 条件检测 恢复 最后检测 TL 1度/ /min 25 TL (试验温度值): 40℃ t₁ (室温初始检测时间): 0.5h t, (温度上升时间): (TL-25)/60h (样品温度稳定时间): 0.5h t₄ (样品在高温下启动和业务检测时间): 0.5h (样品高温长期稳定性测试时间): 16h (温度下降时间): (TL-25)/60h (样品恢复时间时间): 0.5h (室温重新检测时间): 0.5h

2.1.3 Low temperature test

Use case	TC-6
number	
Use case	Low temperature environment test
name	
Testing	Start-up and working stability of test equipment in low temperature environments
purposes	
Dunnandit	1. 1. OLT and ONU equipment;
Precondit	2. Data network analyzer, optical power meter, temperature and humidity test
ions	chamber, optical splitter, etc.

test environm

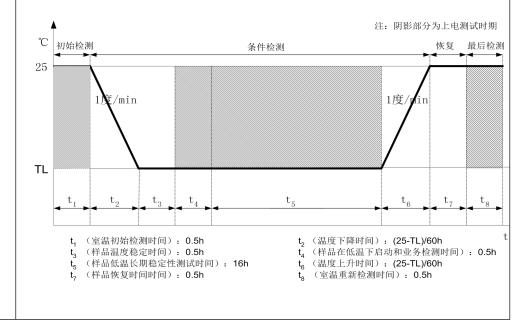
- 1. Set up a low temperature environment test platform;
- 2. Before the test, test the appearance, mechanical properties and electrical performance of the test sample (OLT/ONU) at room temperature to verify whether the OLT/ONU can start normally, whether the service configuration is normal, whether the two-way service is normal, and test. Transmit optical power of OLT/ONU; (initial detection)
- 3. Put the test sample at room temperature into the test chamber in the normal position or other regulations without being packaged, energized, or ready for use. At this time, the temperature of the test chamber is also room temperature;
- 4. The test chamber is cooled to 1 ° C/min to the test temperature TL (the TL value depends on the ambient temperature range category supported by the OLT/ONU);

Test procedur e

- 5. At TL temperature, after t3 hours, power on the test sample to verify whether the OLT/ONU can be started normally, whether the service configuration is normal, whether the two-way service is normal, and test the optical power of the OLT/ONU.
- 6. After the test sample has completed the low temperature start test, perform 16 hours long-term low temperature stability test at TL temperature, and generate a 900 Mbps bidirectional flow rate for the SFU through the data network analyzer to test long-term stability;
- 7. The temperature of the test chamber is restored to room temperature (25 ° C), and the heating rate is 1 ° C / min. After t7 hours, the test sample is powered on to verify whether the OLT / ONU can be started normally, whether the service configuration is normal, and whether the two-way service is normal. And test the OLT/ONU to send optical power. Also perform performance checks on the appearance, mechanical properties, electrical properties, etc. of the test samples; (final test)

			> OLT/O				-a +ha a		comic
	1.	1. Step 5: The	3 OLI/OI	NU can start	normally a	na complet	e the a	utomatic	servic
		configuration	. The tw	o-way service	e is normal;	; there is no	obviou	us change	befor
		the optical po	wer and	l cooling.					
	2.	2. Step 6: The	e OLT tw	o-wav packe	t loss rate	is less than	10-11	in the lor	ng-tern
		•							
		low temperat	ture env	ronment; th	e SFU two	-way packe	et loss i	rate is le	ss tha
expected		10-11; the M	IDU (LAI	N) bidirectior	nal packet	loss rate is	less th	nan 10-11	l; MDI
results		(DSL) two-wa	y The pa	cket loss rate	is less thar	า 10-11;			
	3.	3. Step 7: Afte	er returr	ning to room	temperatui	re, the OLT,	/ONU ca	an start n	ormall
		and complet	e the a	utomatic sei	vice confi	guration. 1	The two	o-way se	rvice i
		normal; ther	re is no	o obvious c	hange bef	ore the o	ptical	power a	nd th
		temperature	rise· t	he annearai	nce mech	nanical nro	nerties	and el	ectrica
		temperature	1130, 0	iic appearai	icc, incen	iamear pre	perties	una ci	CCCITCC
		norformanco	of +ho +c	est cample ha	va na abvid	ous shange			
		performance	of the te	est sample ha	ve no obvid	ous change;	;		
	The	performance appearance is		•				ed autom	atically
		-	s intact,	the service c	onfiguratio	on can be c	omplete		
	and	appearance is	s intact,	the service o	onfiguratio temperatu	on can be core	omplete	ity enviro	nment
	and	appearance is	s intact,	the service o	onfiguratio temperatu	on can be core	omplete	ity enviro	nment
	and	appearance is no packet loser returning to	s intact, ss is four p room t	the service o	onfiguratio temperatu	on can be core	omplete	ity enviro	nment
	and	appearance is no packet lost returning to	s intact, as is four o room t	the service on the low emperature (onfiguratio temperatu	re and high	omplete humidi g is nori	ity enviro	nment
T 4	and	appearance is no packet lost returning to	s intact, ss is four p room t	the service o	onfiguratio temperatu	on can be core	omplete humidi g is nori	ity enviro	nment
Test	and	appearance is no packet lost returning to	s intact, ss is four p room t	the service on the low emperature (onfiguratio temperatu	on can be core and high, everything	ompleten humidig is norn	ity enviro	onment there i
Test result	and	appearance is no packet lost returning to	s intact, ss is four p room t	the service of the se	onfiguration temperatu 25° C),	on can be core and high, everything	ompleten humidig is norn	mal and	onment there in
	and	appearance is no packet lost returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperatu 25° C),	re and high , everything	ompleten humidig is norn	mal and	onmen there i
	and	appearance is no packet lost returning to	s intact, ss is four p room t	the service of the se	onfiguration temperatu 25° C),	re and high , everything	ompleten humidig is norn	mal and	onment there in
	and	appearance is no packet lost returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	re and high, everything	ompleten humidig is norn	mal and	onmen there i
	and	appearance is no packet los or returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperatu 25 ° C),	re and high, everything	ompleten humidig is norn	remove Person	onmen there i
	and	appearance is no packet lost returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	en can be core and high, everything	ompleten humidig is norn	reserve Pari	onmen there i
	and	appearance is no packet los or returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidig is norn	remove from	onmen there i
	and	appearance is no packet los or returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	en can be core and high, everything	ompleten humidi	reserve Pari	onmen there i
	and afte no	appearance is no packet los or returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidi	remove from	onmen there obviou
	and afte no	appearance is no packet los or returning to	s intact, ss is four o room t	the service of the low emperature (onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidi	remove from	onmen there obviou
result	and after no cha	appearance is no packet los or returning to	s intact,	the service of the low emperature (Seed plus Seed rate Ency bets Reny plus Ency rate Ency plus Ency plus Drug plus rate Mac Peter plus Plus rate Mac Peter plus Plus rate Plus	onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidi	remove from	onmen there i
result	and after no cha	appearance is no packet los or returning to	s intact,	the service of the low emperature (Seed plus Seed rate Ency bets Reny plus Ency rate Ency plus Ency plus Drug plus rate Mac Peter plus Plus rate Mac Peter plus Plus rate Plus	onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidi	remove from	onment there i
result	and after no cha	appearance is no packet los or returning to	s intact,	the service of the low emperature (Seed plus Seed rate Ency bets Reny plus Ency rate Ency plus Ency plus Drug plus rate Mac Peter plus Plus rate Mac Peter plus Plus rate Plus	onfiguration temperature 25 ° C),	on can be core and high, everything	ompleten humidi	remove from	onment there i

- 1. Adopt ETSI 300019 Class 3.2 standard test to meet TL9000 requirements;
- 2. During the test, equipment damage may occur. It is recommended to perform this test after other functional tests are completed;
- 3. The temperature control box for testing shall have a temperature rise and fall capability of 1.0 $^{\circ}$ C/min, and the temperature range is -31 to 56 $^{\circ}$ C;
- 4. The lower and upper temperature limits selected in the OLT environmental test are: low temperature TL=-1 $^{\circ}$ C, high temperature TL=51 $^{\circ}$ C; the lower and upper temperature limits selected in the SFU environmental test are: low temperature TL=-6 $^{\circ}$ C, high temperature TL =46 $^{\circ}$ C; the lower and upper temperature limits selected in the MDU environmental test are: low temperature TL=-31 $^{\circ}$ C, high temperature TL=56 $^{\circ}$ C; (actual test temperature requirement is greater than the manual declared value $\pm 1^{\circ}$ C)
- 5. When testing at low temperature, if necessary, the heating plate can be used to assist the MDU to achieve low temperature start-up (preferably MDU support can be started normally without the aid of the heating plate);
- 6. The test uses a randomly selected MDU (LAN) device and randomly selects two GE ports. During the test, two ADSL2+ ports are randomly selected from one ADSL2+ interface board of the MDU (DLS) device. For a multi-GE port modem, each modem uses only one GE interface for testing.
- 7. The temperature control curve is shown below



Remarks

2.1.7 Maximum transmission distance test

Use case	TC-8
number	
	Maximum transmission distance test
name	Widaling in Cransmission distance test
	The maximum distance that can be reached between the PON interface of the
Testing	OLT and the ONU under normal working conditions of the OLT and the ONU
purposes	(20km)
	The ONU is registered normally, the relevant data has been configured, and the
Preconditions	relevant test instruments are ready.
'	relevant test instruments are ready.
test environment	用户1
Test a procedure	 Connect the line as shown above; Fully equipped with 32 ONUs under one OLT PON interface; The trunk road uses 20KM fiber and is equipped with ONU, OLT and network analyzer; Start the OLT and turn on all ONU power supplies; Record whether all ONUs are successfully registered to the OLT and the time to verify whether the service is normal.
	Step 5: All ONUs are successfully registered to the OLT, and the uplink and
'	downlink services are normal.
	The distance between the ONU and the OLT is 20Km. The ONU can be
Test Results	successfully registered to the OLT, and the uplink and downlink services are
	normal.
	Pass [√] fail [] not tested []
conclusion	Pass [√] fail [] not tested []

2.1.7 Average emitted optical power

Use case	TC-9
number	
Use case name	ONU optical port average transmission optical power
Testing	The average optical power of the transmitter is measured.
purposes	
Preconditions	1. 1. The ONU to be tested;
test environment	ONU PON光功率计
Test procedure	2. Connect to the test environment as shown above;
expected	3. Set the ONU optical module to be in a long-light working state;
results	
Test Results	4. Measure the TX optical power and record.
Test conclusion	EPON ONU
Remarks	

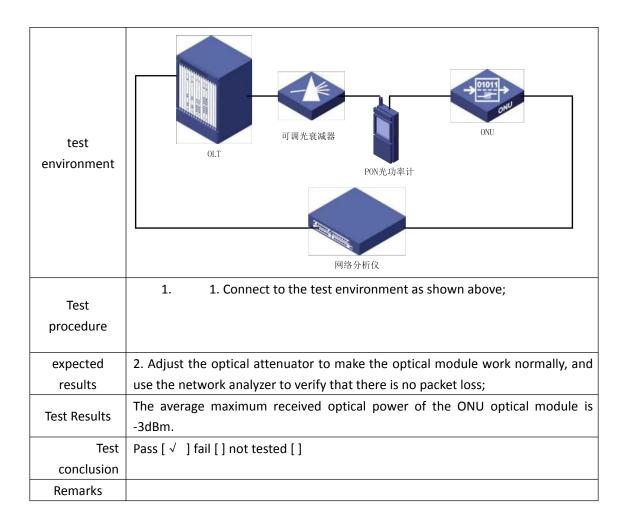
2.1.7 Receive sensitivity

Use case	TC-10
number	
Use case	Receive sensitivity of ONU optical port
name	
Testing	The minimum value of the average received power required by the receiver to
purposes	reach a BER value of 1 x 10-12 at the receiver.
Preconditions	2. 1. The ONU to be tested;

test environment	可调光衰减器 ONU PON光功率计 网络分析仪
Test procedure	 Connect to the test environment as shown above; Adjust the dimming attenuator to increase the attenuation, make the optical module work normally, and verify that there is no packet loss with the network analyzer; Read the optical power value and record it.
expected results	EPON ONU The receiving sensitivity of the ONU optical module is ≤-27dBm; GPON ONU GPON PON-R interface receiver sensitivity (downstream rate is 2488 Mbit/s, Class B+): -30 dBm.
Test Results	The acceptance sensitivity of the ONU optical port is -29.2dBm
Test	Pass [√] fail [] not tested []
conclusion	
Remarks	

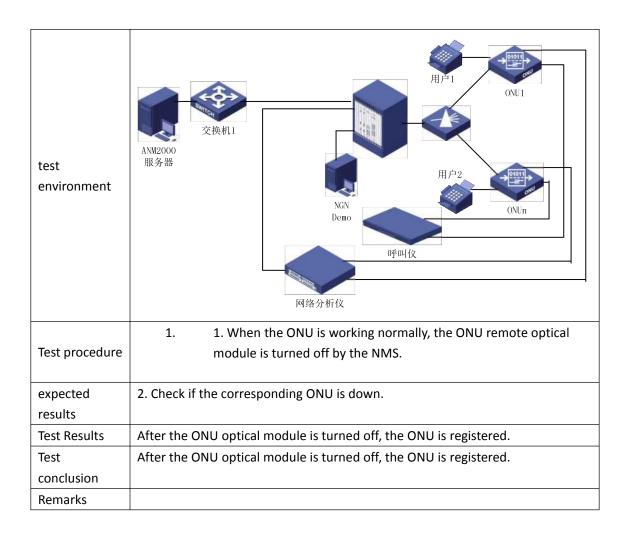
2.1.4 Maximum received optical power

Use case	TC-11
number	
Use case	ONU optical module average maximum received optical power
name	
Testing	Measure the maximum average received power required by the ONU optical
purposes	module to reach a BER value of 1 $ imes$ 10 -12
Preconditions	1. 1. The ONU to be tested and the corresponding OLT system;



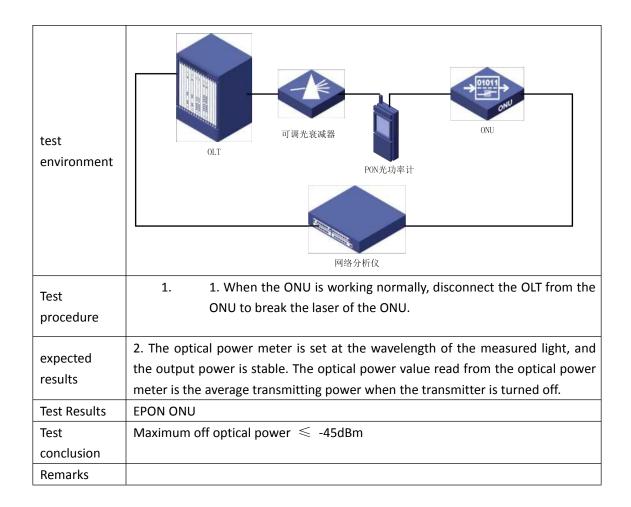
2.1.8 Optical Module Shutdown Test

Use case	TC-12
number	
Use case	ONU optical module shutdown test
name	
Testing	The ONU optical module can be shut down through the network management.
purposes	
Preconditions	1. 1. The ONU to be tested;



2.1.8 Maximum turn-off optical power

Use case	TC-13
number	
Use case	ONU optical module maximum off optical power
name	
Testing	The ONU optical module emits power without the transmitter transmitting data.
purposes	
Preconditions	1. 1. The ONU to be tested;



2.2 performance test

Throughput

Use case	TC-14
number	
Use case name	ONU throughput test
Testing	Detecting the data port bidirectional throughput of the tested ONU
purposes	
Preconditions	1. 1. The ONU to be tested;

test environment	交的 ANM2000 服务器		NGN Demo B 络分析仪	用户1	ONU1
Test procedure	a o o o o o o o o o o o o o o o o o o o	ser ports of onalyzer port. (ptical splitter [c]. 2. Turn on. 3. In the thernet service the CVLAN of the VLAN to each C. 4. In the ouble-tagged EVLAN=CVLAN, and CVLAN of the couple of the couple of the the erform the uplication. 6. The test to the test time of the couple of the cou	cone ONU are of Connect 20km optional]. the encryption of uplink direction flow to the GE are service flow of VLAN. The downstream thernet service flow service flow. St. uses the stank and downlink est uses 7 types, 1280 bytes, 1	pical packet len /tes), 128 bytes, 514 bytes (downs econds, each pac	e data network ne OLT and the I]. sends an untag The ONU marks the OLT adds an meter sends a a port of the OLT. mark the SVLAN test method to gths: 64 bytes 256 bytes, 512 stream direction
expected	Record the det	ailed test result	ts, and the result	value is as large	as possible.
results				_	
	detailed data:				
	Test items	Guideline	Packet length	Upstream (Mbps)	Down (Mbps)
			64	999. 6	1000
Test Results			128	999. 6	1000
	Throughput	1000Mbps	256	999. 9	1000
	(Mbps)	_	512	999. 7	1000
			1024	999. 1	1000

		1280	999. 6	1000
		1518	999. 7	1000
Test conclusion	Pass [√] fail [] not tested []			
Remarks				

Delay

Use case number	TC-15
Use case name	ONU delay test
Testing purposes	Detecting the data port forwarding delay of the measured ONU
Preconditions	1. 1. The ONU to be tested;
test environment	R
Test procedure	 1. Connect as shown in the test configuration diagram. All user ports of one ONU are connected to the data network analyzer port. Connect 20km disk between the OLT and the optical splitter [optional]. 2. Enable encryption function [optional]. 3. In the uplink direction, the meter sends an untagged Ethernet service flow to the GE port of the ONU. The ONU marks the CVLAN of the service flow of each port. The OLT adds an SVLAN to each CVLAN, and CVLAN=SVLAN. 4. In the downstream direction, the meter sends a double-tagged Ethernet service flow to the uplink port of the OLT. SVLAN=CVLAN, the OLT and ONU respectively mark the SVLAN and CVLAN of the service flow. 5. The test uses the standard RFC2544 test method to perform the uplink and downlink two-way test. 6. The test uses 7 typical packet lengths: 64 bytes (downstream direction is 72 bytes), 128 bytes, 256 bytes, 512 bytes, 1024 bytes, 1280 bytes, 1514 bytes (downstream direction is 1522) byte).

	7.	The te	st time is set to 30) seconds, each pac	kage length is tested	
		and th	e detailed result is	recorded.		
	3.	3. Reco	ord detailed test res	sults.		
	4.	4. GPON standard: When the traffic volume does not exceed 90%				
		of the system throughput, the transmission delay in the uplin				
		direction (UNI to SNI) should be less than 1.5ms (any Ether				
	packet length between 64Byte and 1518Byte) The transmidelay in the downlink direction (SNI to UNI) should be less					
expected results		1ms (a	ny Ethernet packet	length)		
	5.	EPON	standard: When c	arrying only Etherne	et/IP services, if the	
		traffic	volume does not e	xceed 90% of the sys	stem throughput, the	
		uplink (UNI to SNI) transmission delay should be less than 1.5ms				
	(64Byte to 1518Byte). Any Ethernet packet length), the					
		transm	ission delay in tl	ne downstream dire	ection (SNI to UNI)	
		should	be less than 1ms (any Ethernet packet l	ength)	
	detailed da	ata:				
	Test	items	Packet length	Upstream (µs)	Down (µs)	
			64	56. 30	30. 76	
			128	60. 34	32. 76	
Test Results			256	66. 19	34. 93	
	Delay	(µs)	512	63. 24	40. 68	
			1024	89. 26	53. 30	
			1280	80. 24	59. 52	
			1518	87. 98	65. 49	
Test conclusion	Pass [√] fail [] not tested []					
Remarks	Including all ports of the ONU					

Packet loss rate

Use case number	TC-16	
Use case name	ONU packet loss rate test	
Testing purposes	Detecting the data port overload loss rate of the tested ONU	
Preconditions	1. 1. The ONU to be tested;	

test environment	交换机1 ANM2000 服务器	NGN Demo 网络分析仪	用户1	ONU1 ONU1 ONU1
Test procedure	ports port. ([optio 2. 2. Turr 3. In the service CVLAN 1001+ SVLAN 4. 4. In the Etherr SVLAN OLT an service 5. 5. The the up 6. 6. The directi bytes, byte). 7. The te	of one ONU are composed one on the encryption uplink direction, as flow to the GE of the service flow. The OLT adds as the downstream direct service flow eflow. The ONU respective of the service on is 72 bytes), 1280 bytes, 1514	function [optional] the meter sends a port of the ONU. ow of each port, rean SVLAN to each ection, the meters to the uplink SVLAN range is: 10 ely mark the SVLAI and RFC2544 test two-way test. Il packet lengths: 6 lengths: 6 bytes (downstreau) seconds, each page of the output of the uplink seconds.	n untagged Ethernet The ONU marks the anging from 1001 to CVLAN, and CVLAN= ends a double-tagged
expected results	6. Record	d detailed test resul	ts.	
	detailed data:			
	Test items	Packet length	Test rate	Average packet
Test Results		64	900	0
	Packet loss	128	900	0
	rate	256	900	0
		512	900	0

		1024	900	0
		1280	900	0
		1518	900	0
Test conclusion	Pass [√] fail [] no	t tested []		
Remarks	Including all ports o	Including all ports of the ONU		

Multicast service forwarding delay

Use case number	TC-17		
Use case name	Multicast service forwarding delay test		
Testing purposes	Test multicast service forwarding delay		
Preconditions	 1. If the ONU data port is 4 (or less than 4), connect one OLT and 10 tested ONUs as shown in the following figure. Each ONU uses a GE/GE interface. 2. If there are 8 ONU data ports, connect 2 tested ONUs, one of which connects all 8 ports to the data network analyzer port, and the other ONU selects 2 ports to connect to the data network analyzer. 3. If there are more than 10 ONU data ports (including 10), connect one ONU to be tested, and select 10 ports to connect to the data network analyzer. 4. Connect the 20km disk between the OLT and the optical splitter. 5. The test was conducted using an automated script. 		
test environment	ANM2000 RS		
Test procedure	7. Connect to the network according to the above figure and complete the system multicast service configuration. 8. The data network analyzer is used to test the multicast service forwarding delay. The test uses three typical packet lengths: 64 bytes, 512 bytes, and 1518 bytes. The test time is set to 30 seconds. Each packet length is tested once for each ONU port. Join 16 groups, the total traffic of the 16 groups is 95M, all the ONU ports are added to		

	the same 16 groups, and the join mode is Accumulate. Record	
	minimum forwarding delay, average forwarding delay,	
	maximum forwarding delay.	
expected results	The multicast forwarding delay should be less than 100ms.	
Test Results	Forwarding delay is 4.9ms	
Test conclusion	Pass [√] fail [] not tested []	
Remarks		

Multicast join/leave delay

Use case number	TC-18		
Use case name	Group join/leave delay test		
Testing purposes	Test group join/leave delay		
Preconditions	 1. If the ONU data port is 4 (or less than 4), connect one OLT and 10 tested ONUs as shown in the following figure. Each ONU uses a GE/GE interface. 2. If there are 8 ONU data ports, connect 2 tested ONUs, one of which connects all 8 ports to the data network analyzer port, and the other ONU selects 2 ports to connect to the data network analyzer. 3. If there are more than 10 ONU data ports (including 10), connect one ONU to be tested, and select 10 ports to connect to the data network analyzer. 4. Connect the 20km disk between the OLT and the optical splitter. 5. Enable the IGMP proxy function of the OLT and enable IGMP Snooping on the ONU. The test is performed using an automated script. 		
test environment	ANM2000 RAM2000 RA		
Test procedure	 Connect to the network according to the above figure and complete the system multicast service configuration. Use the data network analyzer to test the multicast service forwarding delay. The test uses a 64-byte packet length. The test time is set to 30 seconds. The test is performed 		

	once. Each ONU port is added to 4 groups. The total traffic
	of the four groups is 20M. All ONUs. The ports are all added
	to the same 16 groups, and the join mode is Accumulate.
	Record the join/leave delay of the 16th group.
expected results	
Test Results	Group join and leave delay should be less than 30ms
Test conclusion	Pass [√] fail [] not tested []
Remarks	

2.2 indicator test

Use case number	TC-20		
Use case name	Indicator test		
Testing purposes	Test the ONU hardware indicator		
	1. The ONU to be tested;		
Preconditions	2. Network analyzer;		
reconditions	3. Caller		
	OLT system.		
test environment	用户1 ONU1 ANM2000 服务器 用户2 FIDE NGN ONUN Demo ONUN FF叫仪 M络分析仪		

Test procedure	1.	1. Power on the ONU and connect the PON port fiber,				
	network cable and telephone line respectively.					
	2.	Compare the status of the actual indicator and record the				
		status of each hardware port indicator.				
expected results	name	status	meaning			
	power	Off	The device is not powered on.			
	supply	Constantl	The device is newered on			
		y bright	The device is powered on			
	Networ	Off	The network port is not connected.			
	k port	Constantl	Network port connection			
		y bright				
	Network G/optical signal	Off	Indicates that the ONU has not started the			
			activation process.			
		flicker	Indicates that the ONU is active			
		Constantl	Indicator that the ONU has been activated			
		y bright	Indicates that the ONU has been activated.			
Test Results	All indicators are lit and the status is normal.					
Test conclusion	Pass [√] fail [] not tested []					
Remarks						

3 test conclusions

The test lasted for 5 days and tested 20 items, of which 20 items were passed, 0 items were not passed, and 0 items were not tested.

- 1. The panel indicator of the device is functioning normally.
- 2. The full indicator of the Ethernet service of the device is tested normally.
- 3. The indicator test of the optical port of the device passes;
- 4. The high temperature test of the equipment passed.

Tester: Tony

Date: 2018-8-26