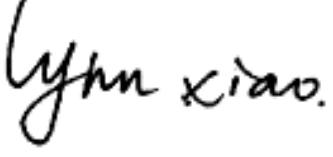
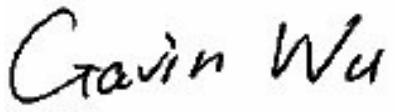


## TEST REPORT

Report No.:	EM201301038-10	Application No.:	ZJ00038221
Client:	Pace Micro Technology plc		
Address:	Saltaire, Shipley, West Yorkshire, BD18 3LF, UK		
Sample Description:	EPON ONU		
Model:	ONT-2-E4020iWn		
Adding model:	/		
FCC ID:	NQ8-ONT2E4020IWN		
Test Specification:	FCC PART 15 Subpart B:2013		
Test date:	2013-12-10 to 2013-12-23		
Issue Date:	2013-12-24		
Test Result:	Pass.		
Prepared By:	Reviewed By:	Approved By:	
Lynn Xiao / Test Engineer	Jane Cao / Technical Assistance	Gavin Wu / Manager	
			
Other Aspects:			
None			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			

### **DIRECTIONS OF TEST**

- 1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**
- 2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.**
- 3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

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## 1. TEST RESULT SUMMARY

FCC PART 15 SUBPART B			
Standard	Item	Limit / Severity	Result
<b>FCC PART 15 SUBPART B</b>	Conducted Emission	Class B	PASS
	Radiated Emission	Class B	PASS

## 2. GENERAL DESCRIPTION OF EUT

### 2.1 APPLICANT

Name: Pace Micro Technology plc  
Address: Saltaire, Shipley, West Yorkshire, BD18 3LF, UK

### 2.2 MANUFACTURER

Name: Pace Micro Technology plc  
Address: Saltaire, Shipley, West Yorkshire, BD18 3LF, UK

### 2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: EPON ONU  
Model No.: ONT-2-E4020iWn  
Adding Model: /  
Trade Name: Aurora  
Power Supply: 100-240V~50/60Hz  
AC adapter: S24B12-120A150-04  
Input: 100-240V~50/60Hz MAX 0.7A  
Output: 12V 1.5A  
Note: /

### 2.4 TEST OPERATION MODES

Emission: Test mode: The EUT is set up as the Test Configuration of Computer Peripheral with data exchange function.

### 2.5 LOCAL SUPPORTIVE INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number
Microcomputer	Lenovo	M2680	G022
Broadband Access System	ZXDL	980DH	9806H

### 3. LABORATORY AND ACCREDITATIONS

#### 3.1 LABORATORY

The tests and measurements refer to this report were performed by EMC Laboratory of Guangzhou GRG Metrology and Test Technology Co., Ltd.

Add. : 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China

Telephone: +86-20-38699959, 38699960, 38699961

Fax : +86-20-38695185

#### 3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC Listed Lab No. 688188
<b>China</b>	CNAS NO.L0446
<b>China</b>	DILAC No.DL175
<b>Canada</b>	Registration No.:8355A-1

#### 3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

<b>Measurement</b>		<b>Frequency</b>	<b>Uncertainty</b>	
Radiated disturbance	Horizontal	30MHz~1000MHz	4.2 dB	
		1000MHz~6000MHz	3.8 dB	
	Vertical	30MHz~1000MHz	4.4 dB	
		1000MHz~6000MHz	3.9 dB	
Conducted disturbance		9kHz~150kHz	2.6 dB	
		150kHz~30MHz	2.4 dB	

Note: This uncertainty represents an expanded uncertainty factor of  $k=2$ .

### 3.4 LIST OF USED TEST EQUIPMENT AT GRT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
<b>Radiated Disturbance (RE)</b>				
Bi-Log Antenna	ETS-LINDGREN	3142C	75971	2014-05-25
EMI Receiver	Rohde & Schwarz	ESU 40	100106	2014-01-20
Horn antenna	SCHWARZBECK	BBHA9120D	752	2014-10-13
Semi anechoic chamber	ETS	966(RFD-F/A-100)	3730	2014-03-25
<b>Conducted Disturbance (CE)</b>				
EMI Receiver	Rohde & Schwarz	ESCI	100529	2014-01-23
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2014-07-20
Shielded room	ETS	RFD_100	3728	2014-03-25

## 4. EMISSION TEST

### 4.1 RADIATED ELECTROMAGNETIC DISTURBANCE MEASUREMENT

#### 4.1.1 LIMITS

Frequency (MHz)	Quasi-peak(dB $\mu$ V/m)
30 ~ 88	40
88~216	43.5
216 ~ 960	46
Above 960	54

FREQUENCY (GHz)	peak(dB $\mu$ V/m)	Average (dB $\mu$ V/m)
1GHz ~6GHz	74	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

#### 4.1.2 TEST PROCEDURE

##### 1) Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3 m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

- Table-top equipment is placed on a non-conductive set-up table with height  $0,8\text{ m} \pm 0,01\text{ m}$ , ANSI C63.4 specifies the method to determine the impact of the non-conductive set-up table on test results.
- Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

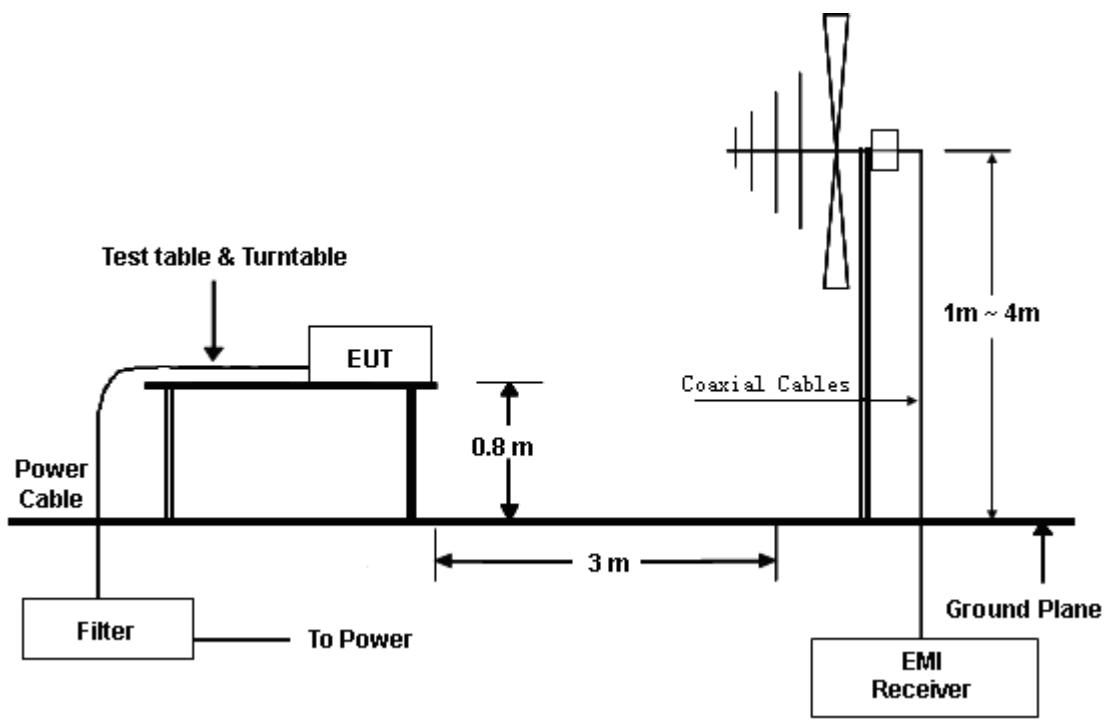
The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT and cable configuration, antenna position, polarization and

turntable position of the above highest emission level were recorded for the final test.

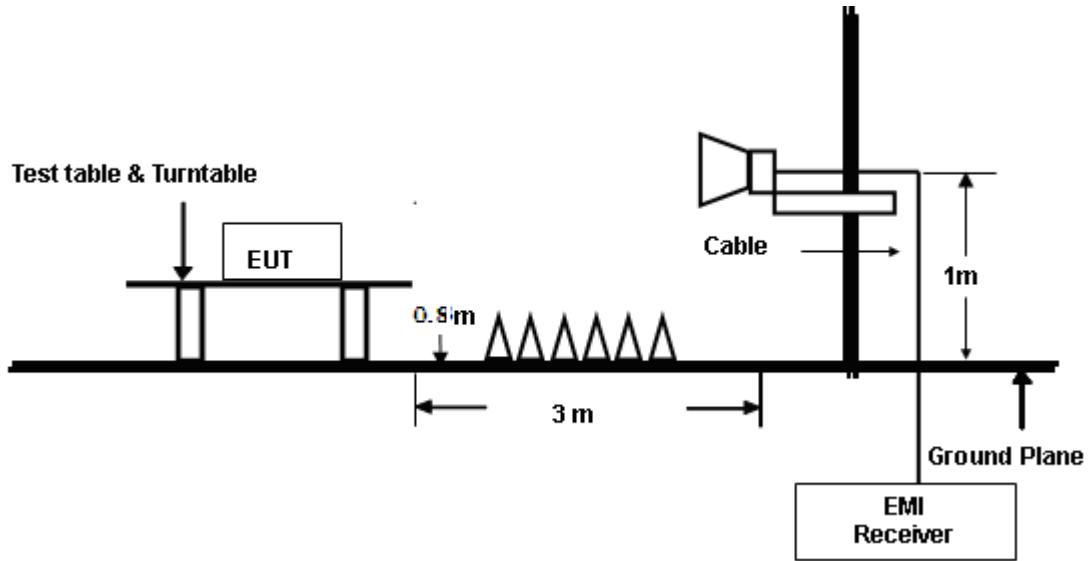
## 2) Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

#### 4.1.3 TEST SETUP



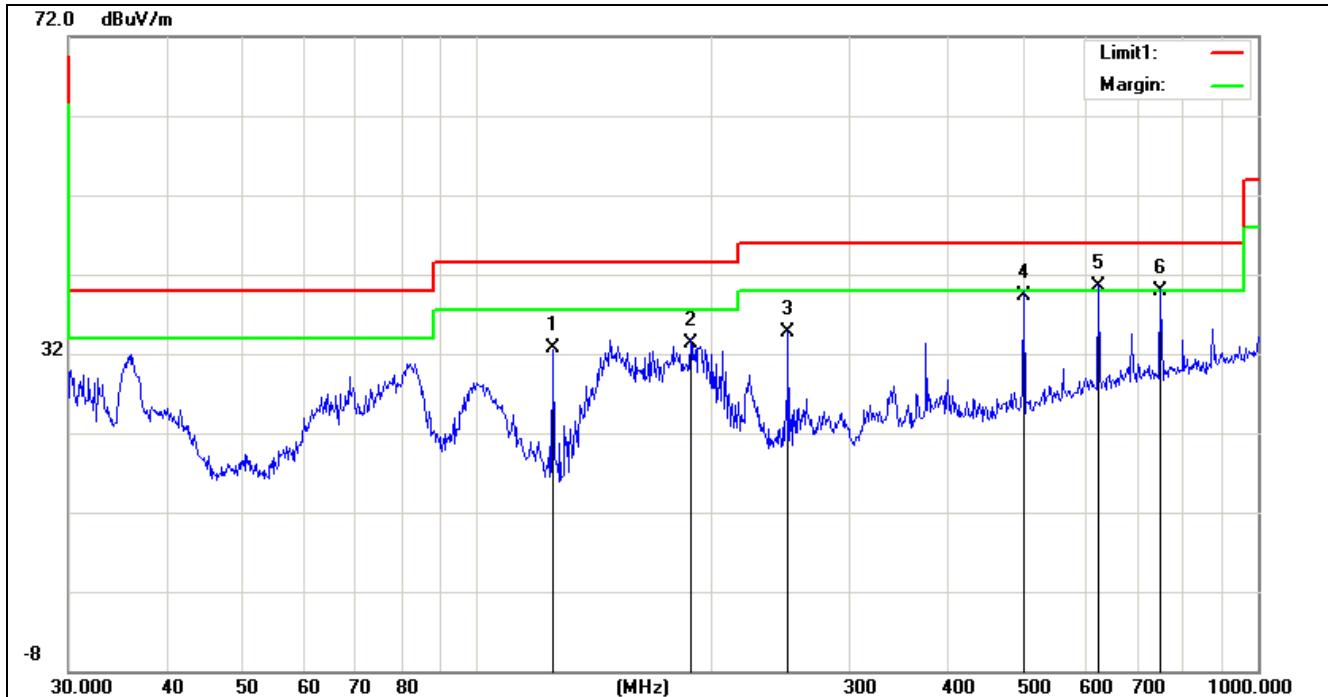
30MHz -1000MHz



above 1GHz

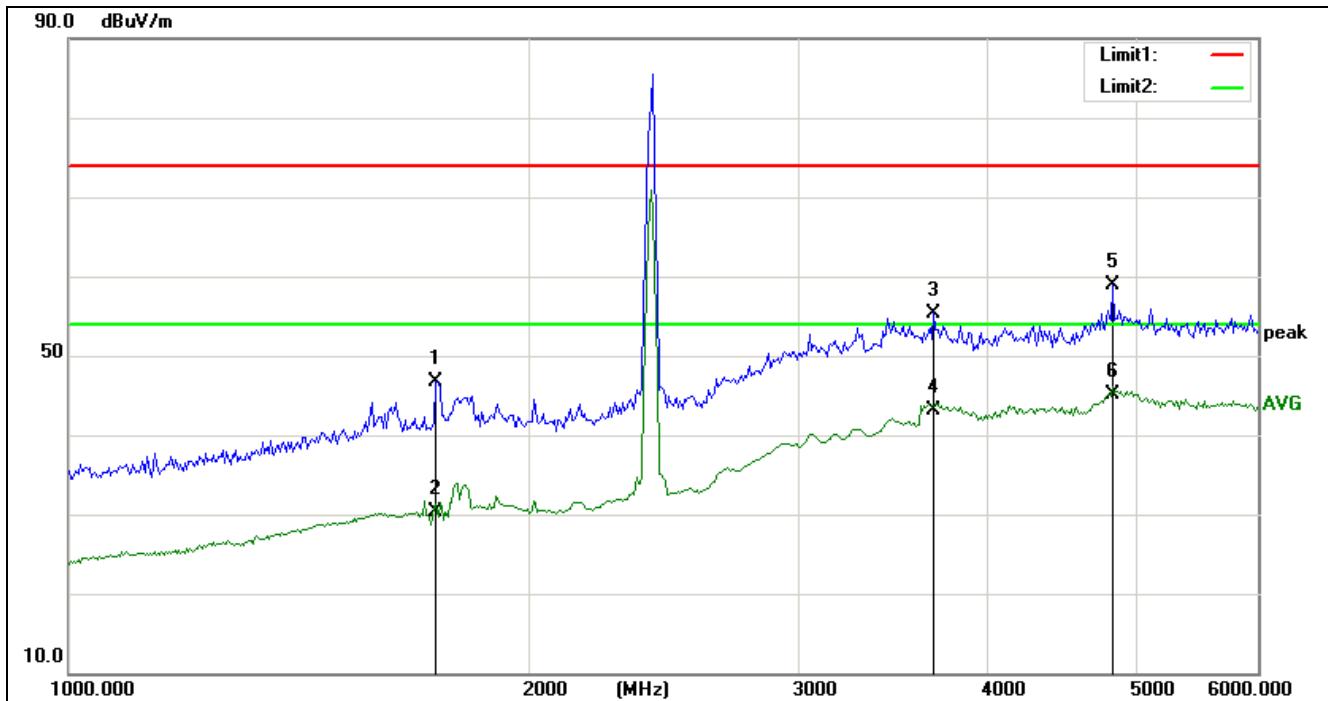
#### 4.1.4 TEST RESULTS

Project No.:	ZJ00038221	Polarization:	Vertical
Standard:	1-(RE) FCC-15.209	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2013-12-18
Temp./Hum.(%RH):	23/57%RH	Time:	15:55:15
EUT:	EPON ONU	Distance:	3m
Model:	ONT-2-E4020iWn	Test Result:	Pass
Note:			



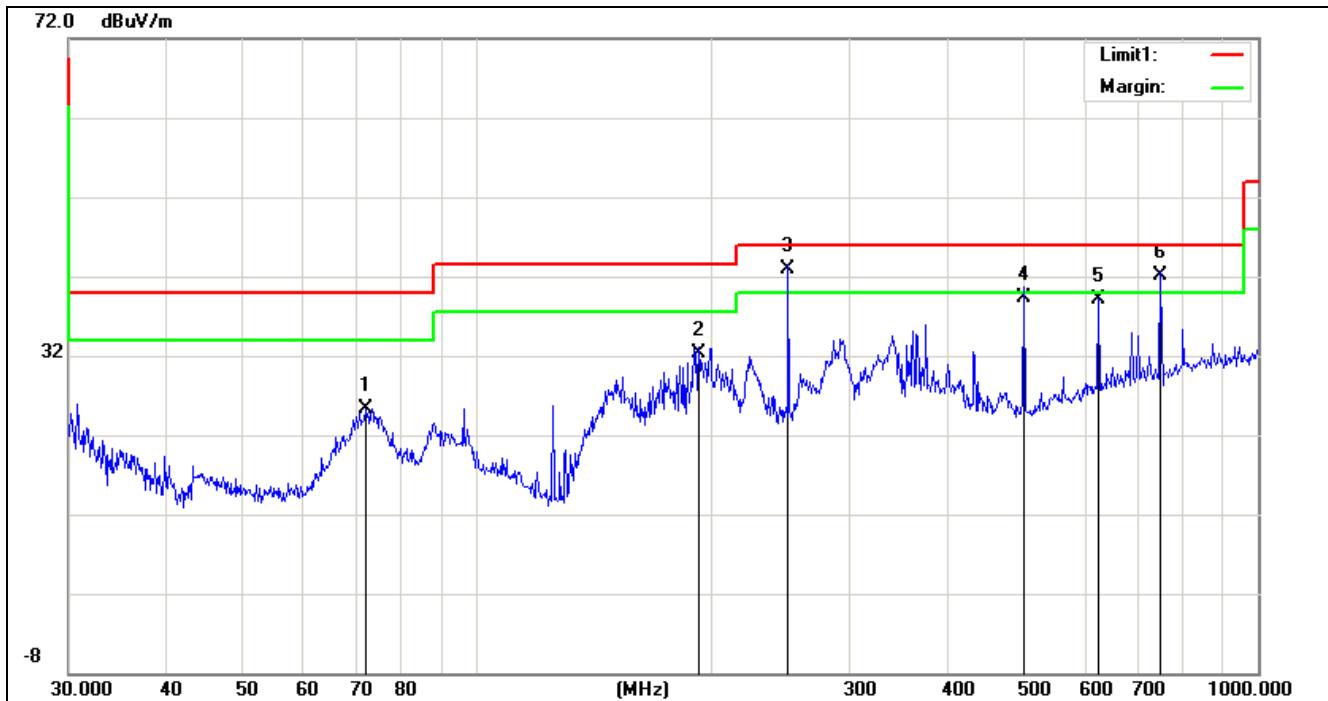
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	125.0066	23.94	8.76	32.70	43.50	-10.80	QP
2	187.7529	22.02	11.38	33.40	43.50	-10.10	QP
3	250.3011	21.02	13.68	34.70	46.00	-11.30	QP
4	501.1790	19.60	19.80	39.40	46.00	-6.60	QP
5	625.0780	17.67	22.83	40.50	46.00	-5.50	QP
6	750.1083	15.79	24.21	40.00	46.00	-6.00	QP

Project No.:	ZJ00038221	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m_PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2013-12-18
Temp./Hum.(%RH):	23/57%RH	Time:	16:35:17
EUT:	EPON ONU	Distance:	3m
Model:	ONT-2-E4020iWn	Test Result:	Pass
Note:			



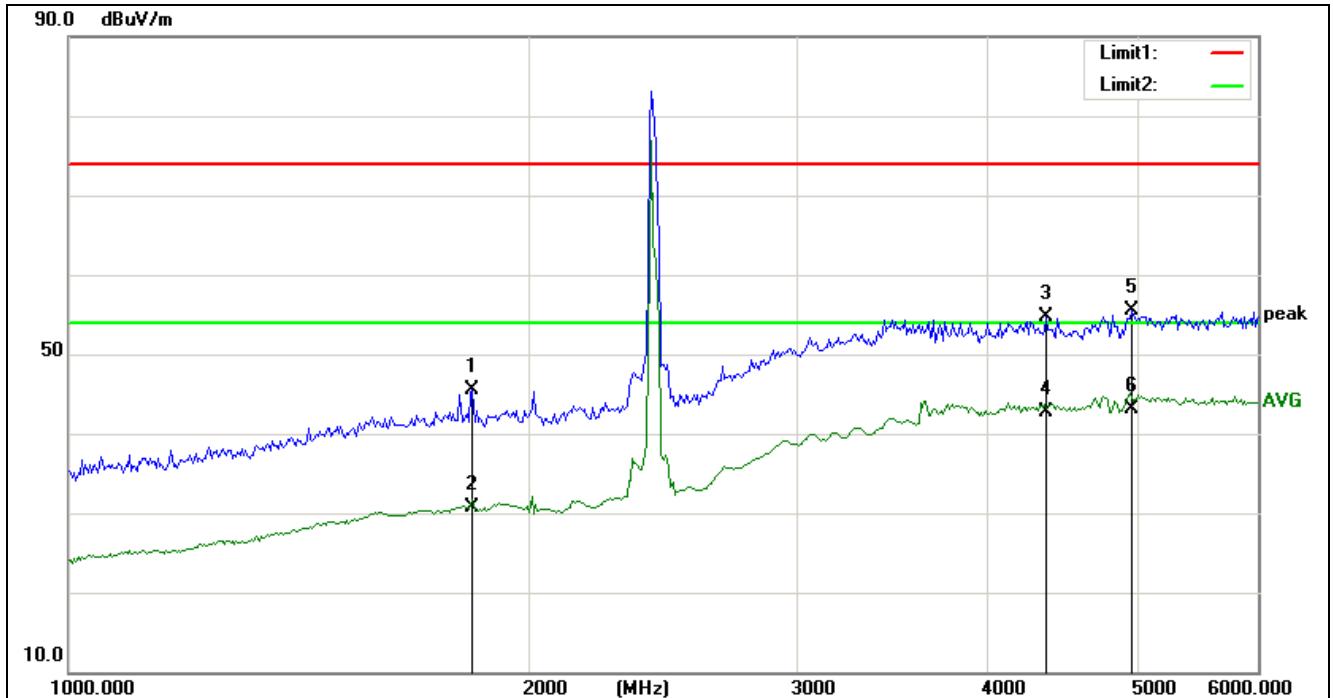
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1740.517	33.75	13.00	46.75	74.00	-27.25	peak
2	1740.517	17.30	13.00	30.30	54.00	-23.70	AVG
3	3682.603	30.75	24.65	55.40	74.00	-18.60	peak
4	3682.603	18.55	24.65	43.20	54.00	-10.80	AVG
5	4823.657	31.22	27.77	58.99	74.00	-15.01	peak
6	4823.657	17.33	27.77	45.10	54.00	-8.90	AVG

Project No.:	ZJ00038221	Polarization:	Horizontal
Standard:	1-(RE) FCC-15.209	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2013-12-18
Temp./Hum.(%RH):	23/57%RH	Time:	15:57:17
EUT:	EPON ONU	Distance:	3m
Model:	ONT-2-E4020iWn	Test Result:	Pass
Note:			



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	72.0841	17.57	7.83	25.40	40.00	-14.60	QP
2	192.4185	20.96	11.44	32.40	43.50	-11.10	QP
3	250.3012	29.22	13.68	42.90	46.00	-3.10	QP
4	501.1789	19.60	19.80	39.40	46.00	-6.60	QP
5	625.0779	16.37	22.83	39.20	46.00	-6.80	QP
6	750.1083	17.89	24.21	42.10	46.00	-3.90	QP

Project No.:	ZJ00038221	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2013-12-18
Temp./Hum.(%RH):	23/57%RH	Time:	16:47:23
EUT:	EPON ONU	Distance:	3m
Model:	ONT-2-E4020iWn	Test Result:	Pass
Note:			



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1838.111	32.06	13.48	45.54	74.00	-28.46	peak
2	1838.111	17.22	13.48	30.70	54.00	-23.30	AVG
3	4362.447	28.18	26.51	54.69	74.00	-19.31	peak
4	4362.447	16.29	26.51	42.80	54.00	-11.20	AVG
5	4964.172	27.27	28.15	55.42	74.00	-18.58	peak
6	4964.172	14.95	28.15	43.10	54.00	-10.90	AVG

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS

Frequency range	Limits (dB $\mu$ V)	
	Quasi-peak	Average
150kHz ~ 0.5MHz	66~56	56~46
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

**NOTE:** (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150kHz to 0.5MHz.

### 4.2.2 TEST PROCEDURES

#### Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:
  - 1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or
  - 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;
- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;
- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.
- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

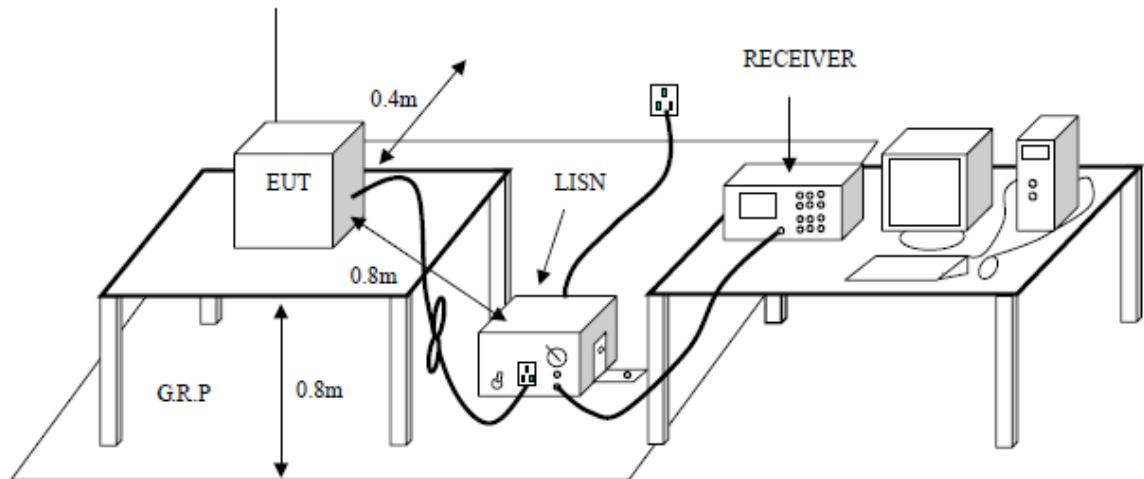
The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

#### Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded

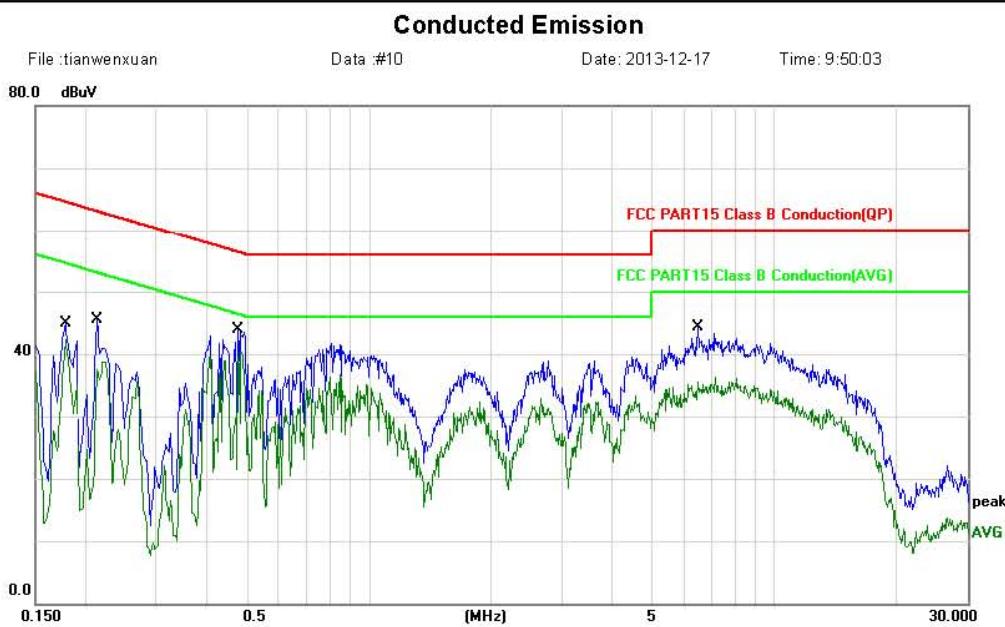
into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

#### 4.2.3 TEST SETUP



#### 4.2.4 TEST RESULTS

Site	Site #1	Phase:	<b>L1</b>	Temperature:	26
Limit:	FCC PART15 Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	46 %
Mode:	Normal Link				
Note:	S24B12-120A150-04 FCC				

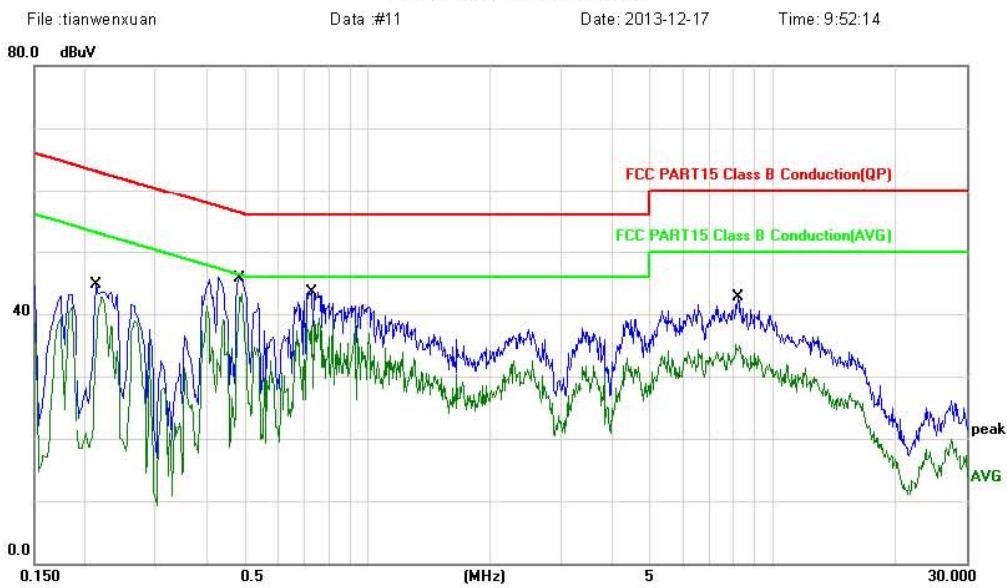


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB	Detector	Comment	
1		0.1780	35.73	9.89	45.62	64.58	-18.96	QP	
2		0.1780	28.91	9.89	38.80	54.58	-15.78	AVG	
3		0.2140	30.14	10.01	40.15	63.05	-22.90	QP	
4		0.2140	19.43	10.01	29.44	53.05	-23.61	AVG	
5 *		0.4780	32.67	9.94	42.61	56.37	-13.76	QP	
6		0.4780	22.63	9.94	32.57	46.37	-13.80	AVG	
7		6.5220	29.04	9.66	38.70	60.00	-21.30	QP	
8		6.5220	22.73	9.66	32.39	50.00	-17.61	AVG	

\*:Maximum data    x:Over limit    !:over margin

Site: Site #1  
 Phase: **N**  
 Temperature: 26  
 Limit: FCC PART15 Class B Conduction(QP)  
 Power: AC 120V/60Hz  
 Humidity: 46 %  
 Mode: Normal Link  
 Note: S24B12-120A150-04 FCC

### Conducted Emission

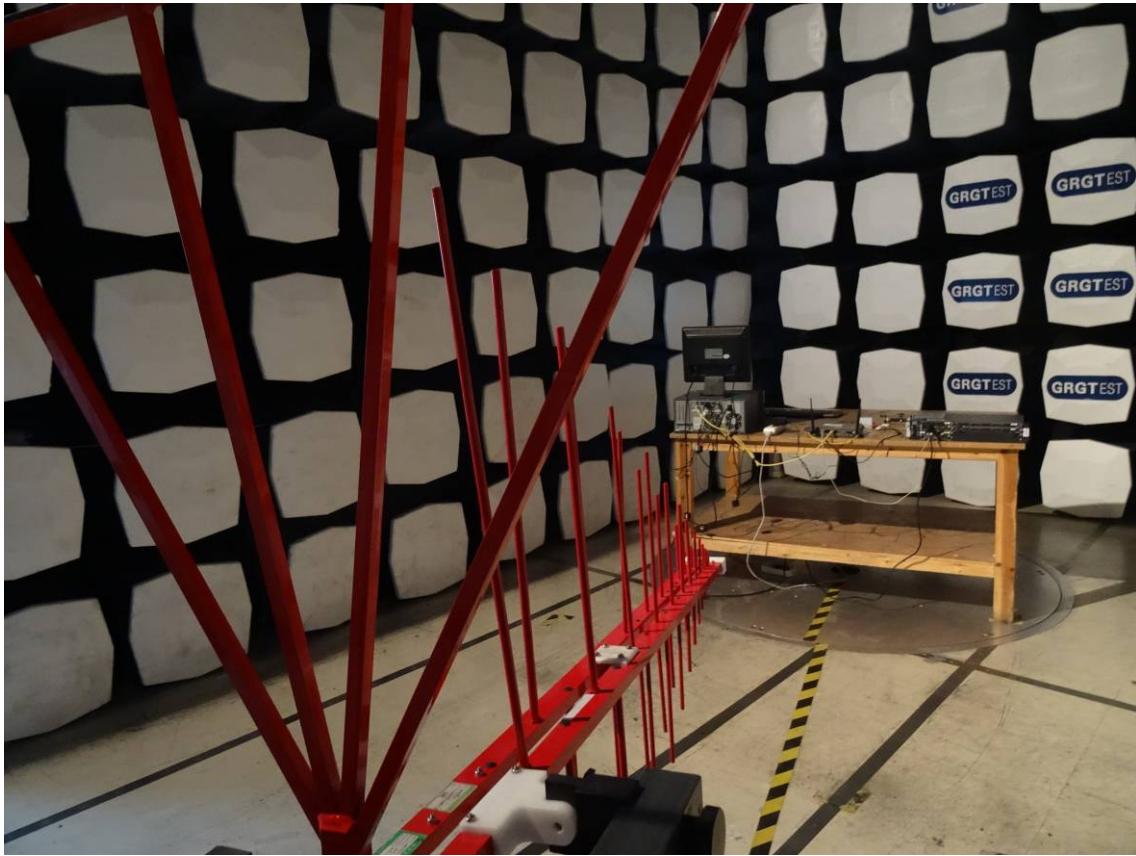


No.	Mk.	Reading		Correct Factor	Measure- ment	Limit	Over	Comment
		MHz	dBuV	dB	dBuV	dB	Detector	
1	0.2140	32.32	9.90	42.22	63.05	-20.83	QP	
2	0.2140	21.99	9.90	31.89	53.05	-21.16	AVG	
3	0.4820	34.80	9.94	44.74	56.30	-11.56	QP	
4 *	0.4820	27.04	9.94	36.98	46.30	-9.32	AVG	
5	0.7300	31.18	9.88	41.06	56.00	-14.94	QP	
6	0.7300	21.51	9.88	31.39	46.00	-14.61	AVG	
7	8.1980	27.63	9.75	37.38	60.00	-22.62	QP	
8	8.1980	21.57	9.75	31.32	50.00	-18.68	AVG	

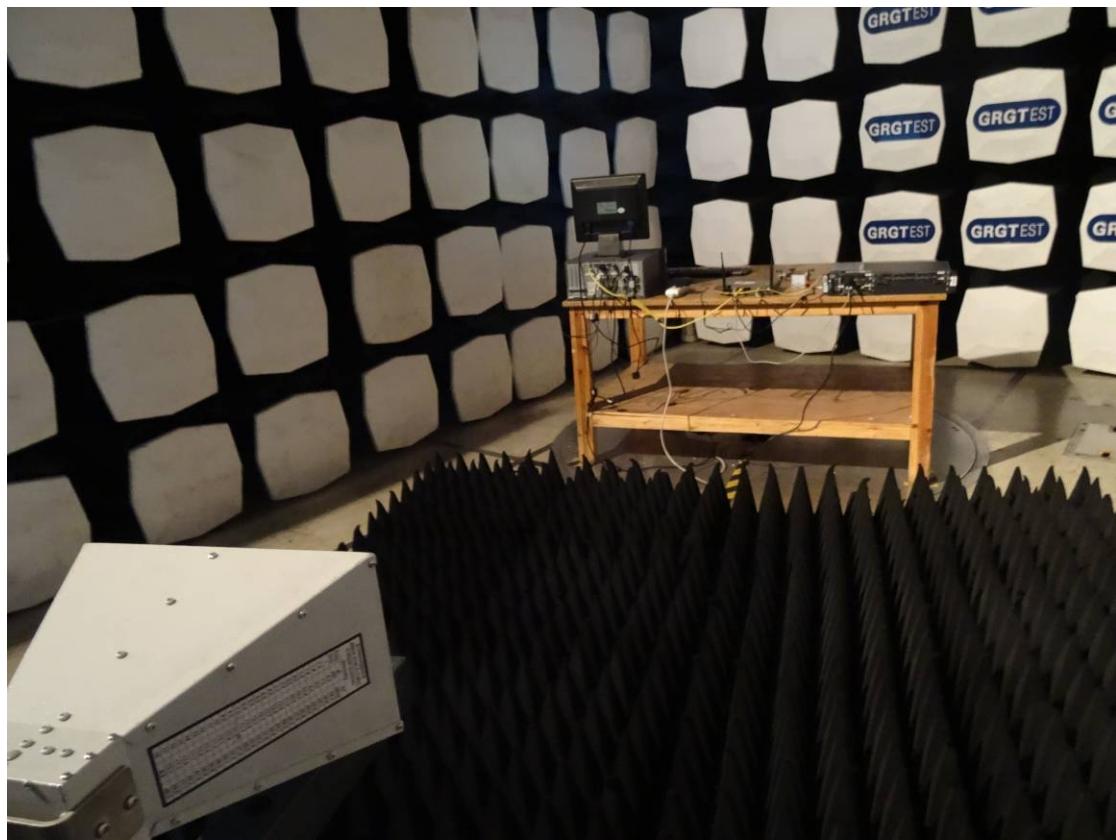
\*:Maximum data x:Over limit l:over margin

**APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT**

Radiated Emission (Below 1GHz)



Radiated Emission (Above 1GHz)

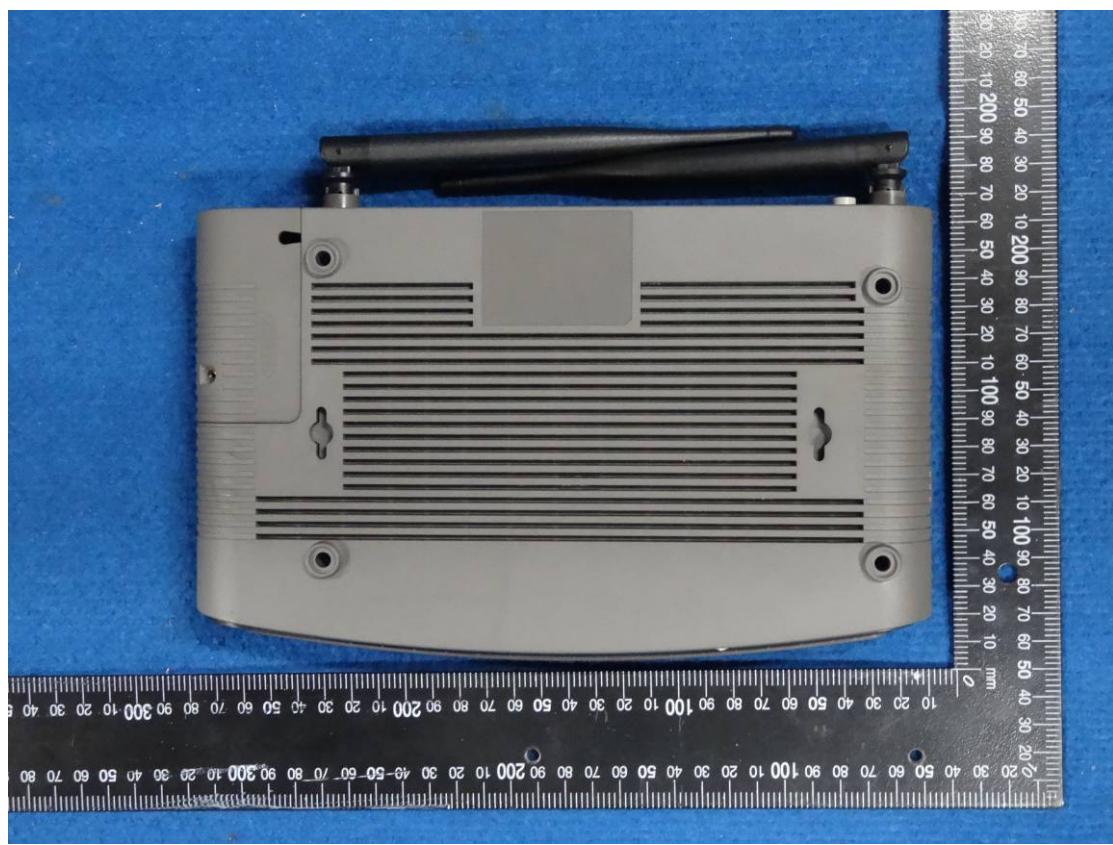


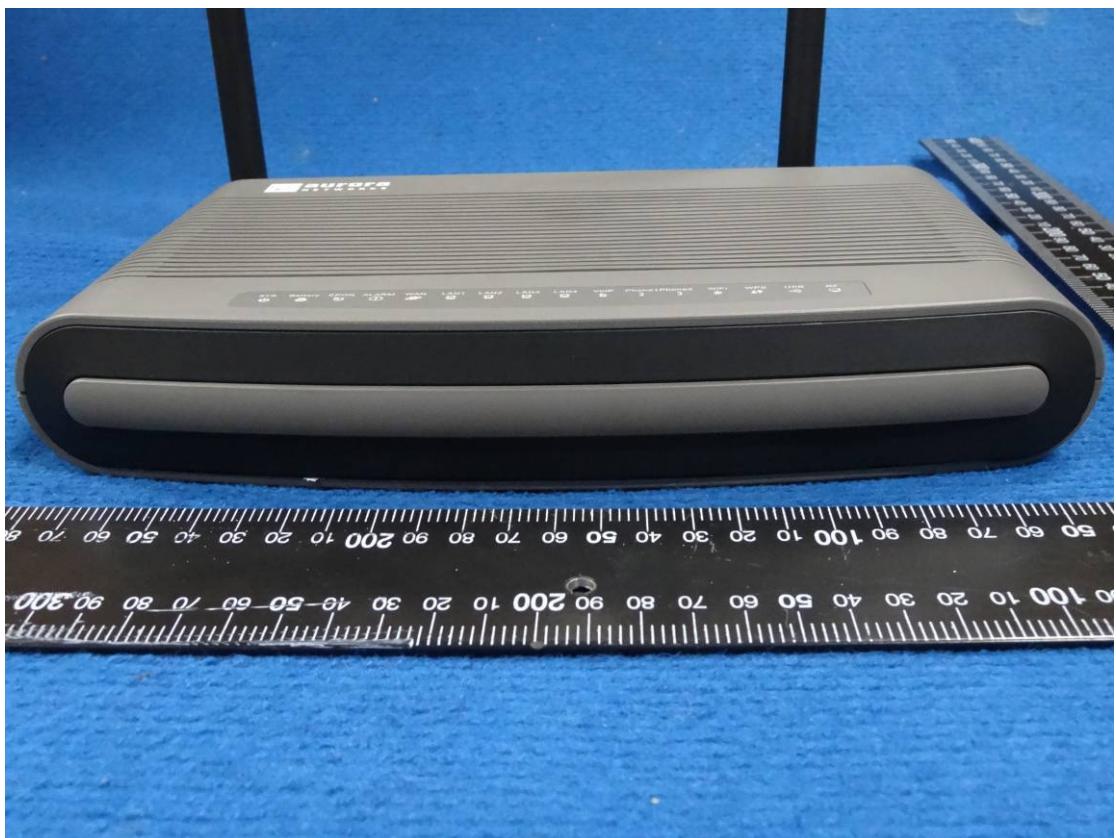
## Conducted Emission (Power Line)



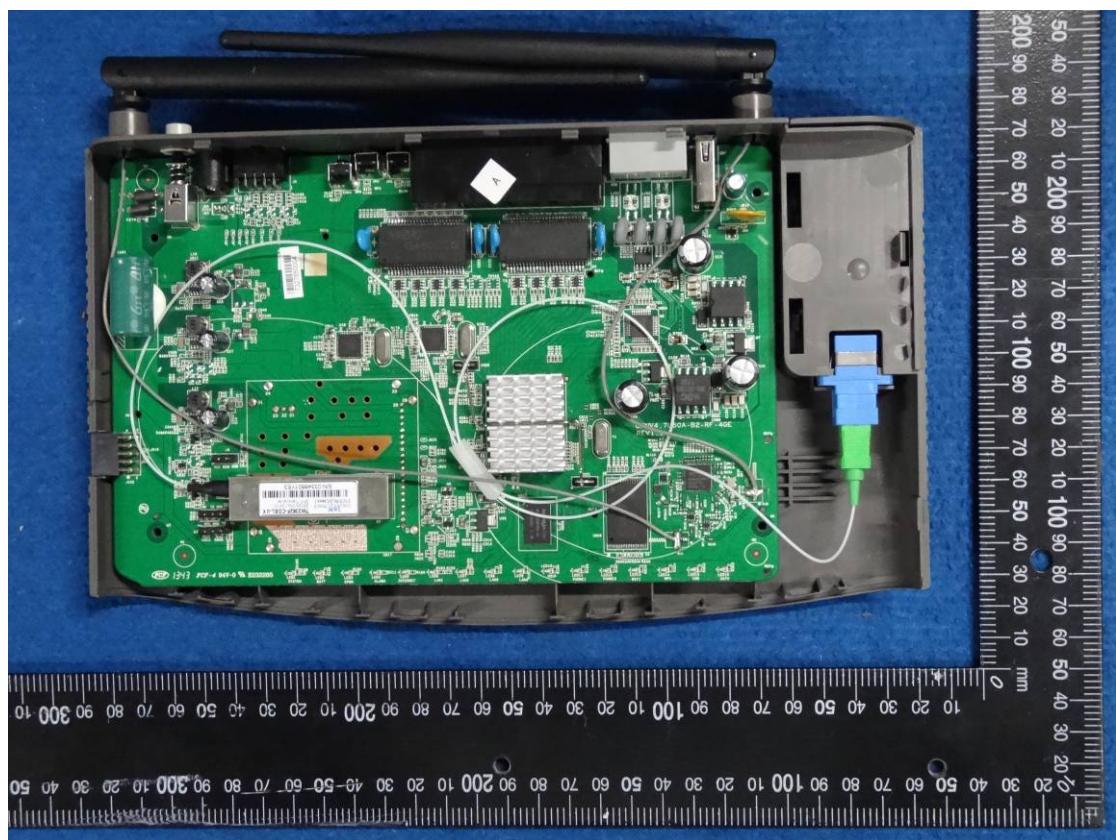
**APPENDIX B: PHOTOGRAPH OF THE EUT**

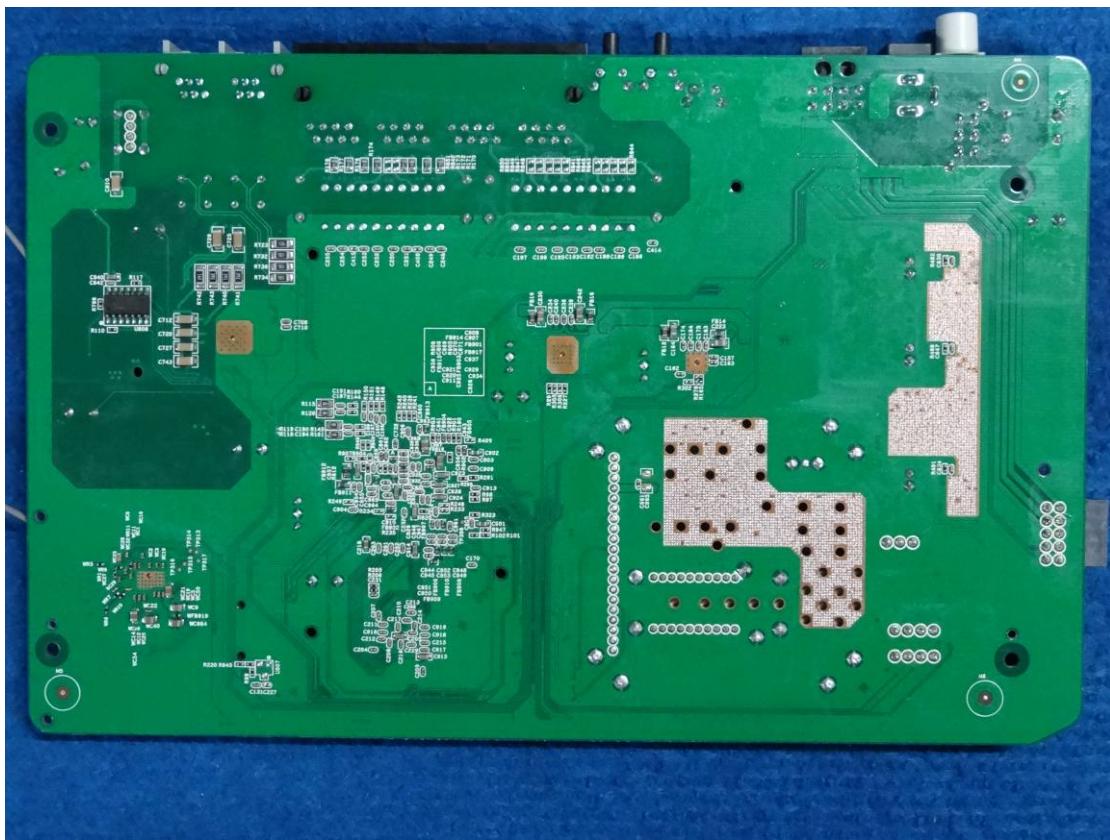
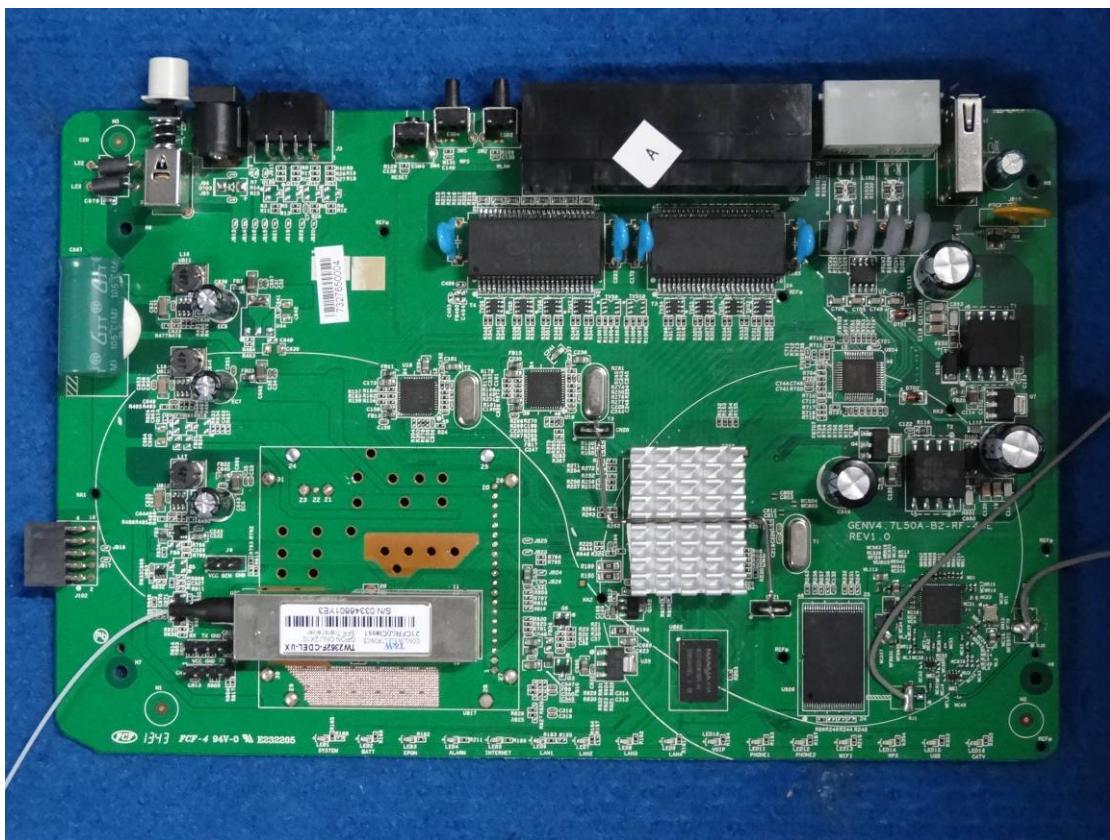
Model:ONT-2-E4020iWn











**Adapter: S24B12-120A150-04**

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