



中国认可  
国际互认  
检测  
TESTING  
CNAS L2264

## MPE TEST REPORT

**Applicant** Alcatel-Lucent Shanghai Bell Co.,Ltd.  
**FCC ID** 2ADZRXS250WXA  
**Product** XGSPON ONU  
**Model** XS-250WX-A/XS-240W-A  
**Report No.** YBA1612-0108MPE  
**Issue Date** March 24, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Kai Xu

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# 1 Test Laboratory

## 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

## 1.2 Test facility

### **CNAS (accreditation number:L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

### **FCC (recognition number is 428261)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

### **VCCI (recognition number is C-4595, T-2154, R-4113, G-766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



### 1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
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### 1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 $\Omega$
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

## 2 Description of Equipment under Test

### Client Information

<b>Applicant</b>	Alcatel-Lucent Shanghai Bell CO. Ltd.
<b>Applicant address</b>	388-389#,Ningqiao Road,Pudong Jinqiao, Shanghai, P.R. China
<b>Manufacturer</b>	Alcatel-Lucent Shanghai Bell CO. Ltd.
<b>Manufacturer address</b>	388-389#,Ningqiao Road,Pudong Jinqiao, Shanghai, P.R. China

### General Technologies

<b>Model</b>	XS-250WX-A/XS-240W-A
<b>SN</b>	/
<b>Hardware Version</b>	3FE 46307 AAAA/3FE 46631 AAAA
<b>Software Version</b>	3FE46346
<b>Date of Testing:</b>	December 20, 2016~January 17, 2017

### Distinction information

<b>Model</b>	XS-250WX-A	XS-240W-A
<b>Hardware Version</b>	3FE 46307 AAAA	3FE 46631 AAAA
<b>GE port</b>	With 10GE port	Without 10GE port
Note: Customer declaration, two models is the same except 10GE port and hardware version, This report tested XS-250WX-A.		

	Model	ONU Part number	Kit Part number
US ONU	XS-250WX-A	3FE 46307 AA	-
US Kit	XS-250WX-A	3FE 46307 AA	3FE 46439 AA
US ONU	XS-240W-A	3FE 46631 AA	-
US Kit	XS-240W-A	3FE 46631 AA	3FE 46626 AA

### 3 Maximum conducted output power (measured) and antenna Gain

the numeric gain (G) of the antenna with a gain specified in dB is determined by

$$\text{Numeric gain (G)} = 10^{(\text{antenna gain}/10)}$$

#### 2.4G

Band		Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	Numeric gain (dB)
SISO Antenna 1	802.11b	26	3	2
	802.11g	26	3	2
SISO Antenna 2	802.11g	25	3	2
SISO Antenna 3	802.11g	26	3	2
MIMO	802.11n HT20	25	3	2
	802.11n HT40	25	3	2

#### 5G

Band		Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	Numeric gain (dB)
SISO Antenna 1	802.11a	24	3	2
SISO Antenna 2	802.11a	24	3	2
SISO Antenna 3	802.11a	27	3	2
SISO Antenna 4	802.11a	25	3	2
MIMO	802.11n HT20	29	3	2
	802.11n HT40	28	3	2
	802.11ac HT20	29	3	2
	802.11ac HT40	28	3	2
	802.11ac HT80	27	3	2



According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0 .....	614	1.63	*(100)	6
3-30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300 .....	61.4	0.163	1.0	6
300-1500 .....			f/300	6
1500-100,000 .....			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34 .....	614	1.63	*(100)	30
1.34-30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300 .....	27.5	0.073	0.2	30
300-1500 .....			f/1500	30
1500-100,000 .....			1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



The maximum permissible exposure for 1500~100,000MHz is 1.0. So

Band		The maximum permissible exposure
Wi-Fi 2.4G	802.11b	1.0mW/cm <sup>2</sup>
	802.11g	1.0mW/cm <sup>2</sup>
	802.11n HT20	1.0mW/cm <sup>2</sup>
	802.11n HT40	1.0mW/cm <sup>2</sup>
Wi-Fi 5G	802.11a	1.0mW/cm <sup>2</sup>
	802.11n HT20	1.0mW/cm <sup>2</sup>
	802.11n HT40	1.0mW/cm <sup>2</sup>
	802.11ac HT20	1.0mW/cm <sup>2</sup>
	802.11ac HT40	1.0mW/cm <sup>2</sup>
	802.11ac HT80	1.0mW/cm <sup>2</sup>

**IMPORTANT NOTE:** To comply with the FCC RF exposure compliance requirements, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. No change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's authority to operate the device.



**RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Wi-Fi 2.4G

**802.11b:** PG =26dBm + (2dB) = 28dBm=630.96mW

**802.11g** PG =26dBm + (2dB) = 28 dBm=630.96mW

**802.11n HT20:** PG =25dBm + (2dB) = 27 dBm=501.19mW

**802.11n HT40:** PG =25dBm + (2dB) = 27 dBm=501.19mW

Wi-Fi 5G

**802.11a:** PG =27dBm + (2dB) = 29 dBm=794.33mW

**802.11n HT20:** PG =29dBm + (2dB) = 30.17 dBm=1258.93mW

**802.11n HT40:** PG =28dBm + (2dB) = 29.56 dBm=1000.00mW

**802.11ac HT20:** PG =29dBm + (2dB) = 30.06 dBm=1258.93mW

**802.11ac HT40:** PG =28dBm + (2dB) = 29.55 dBm=1000.00mW

**802.11ac HT80:** PG =27dBm + (2dB) = 28.35 dBm=794.33mW



Band		PG (mW)	Test Result (mW/cm <sup>2</sup> )	Limit Value (mW/cm <sup>2</sup> )	The MPE ratio
WiFi 2.4G	802.11b	630.96	0.125	1.0	0.125
	802.11g	630.96	0.125	1.0	0.125
	802.11n HT20	501.19	0.099	1.0	0.099
	802.11n HT40	501.19	0.099	1.0	0.099
WiFi 5G	802.11a	794.33	0.157	1.0	0.157
	802.11n HT20	1258.93	0.249	1.0	0.249
	802.11n HT40	1000.00	0.198	1.0	0.198
	802.11ac HT20	1258.93	0.249	1.0	0.249
	802.11ac HT40	1000.00	0.198	1.0	0.198
	802.11ac HT80	794.33	0.157	1.0	0.157

Note: The MPE ratio = Mac Test Result ÷ Limit Value

So the simultaneous transmitting antenna pairs as below:

$$\Sigma \text{of MPE ratios} = \text{WiFi 2.4G} + \text{WiFi 5G} = 0.125 + 0.249 = 0.374 < 1$$

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.