



# TEST REPORT

No. I16N00975-GSM

for

**OnePlus Technology(Shenzhen) Co., Ltd.**

**Mobile Phone**

**Model Name: ONEPLUS A3000**

**FCC ID: 2ABZ2-A3000**

with

**Hardware Version: 28**

**Software Version: oxygen OS 3.5.1**

**Issued Date: 2016-11-03**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

**Test Laboratory:**

**FCC 2.948 Listed: No. 342690**

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: [ctl\\_terminals@catr.cn](mailto:ctl_terminals@catr.cn), website: [www.chinattl.com](http://www.chinattl.com)

## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I16N00975-GSM	Rev.0	1st edition	2016-11-03

NOTE: All the original values of this report quoted directly from No.I16N00359, except values of RSE and ERP/EIRP.



## **CONTENTS**

<b>1. TEST LABORATORY .....</b>	<b>4</b>
<b>1.1. TESTING LOCATION .....</b>	<b>4</b>
<b>1.2. TESTING ENVIRONMENT .....</b>	<b>4</b>
<b>1.3. PROJECT DATA .....</b>	<b>4</b>
<b>1.4. SIGNATURE.....</b>	<b>4</b>
<b>2. CLIENT INFORMATION.....</b>	<b>5</b>
<b>2.1. APPLICANT INFORMATION.....</b>	<b>5</b>
<b>2.2. MANUFACTURER INFORMATION.....</b>	<b>5</b>
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....</b>	<b>6</b>
<b>3.1. ABOUT EUT .....</b>	<b>6</b>
<b>3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....</b>	<b>6</b>
<b>3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST .....</b>	<b>6</b>
<b>3.4. GENERAL DESCRIPTION .....</b>	<b>7</b>
<b>4. REFERENCE DOCUMENTS.....</b>	<b>8</b>
<b>4.1. REFERENCE DOCUMENTS FOR TESTING.....</b>	<b>8</b>
<b>5. LABORATORY ENVIRONMENT.....</b>	<b>9</b>
<b>6. SUMMARY OF TEST RESULTS .....</b>	<b>10</b>
<b>7. TEST EQUIPMENTS UTILIZED.....</b>	<b>11</b>
<b>ANNEX A: MEASUREMENT RESULTS.....</b>	<b>12</b>
<b>A.1 EMISSION LIMIT .....</b>	<b>12</b>

## 1. Test Laboratory

### 1.1. Testing Location

Company Name: CTTL ShenZhen, Telecommunication Technology Labs, Academy of  
Telecommunication Research, MIT  
Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan  
District, Shenzhen, Guangdong, China  
Postal Code: 518048  
Telephone: +86(755)33322000  
Fax: +86(755)33322000

### 1.2. Testing Environment

Normal Temperature: 15-35°C  
Relative Humidity: 20-75%  
Air pressure 980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

### 1.3. Project data

Testing Start Date: 2016-08-31  
Testing End Date: 2016-11-03

### 1.4. Signature



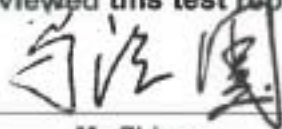
Lai Minghua

(Prepared this test report)



Shen Shaoming

(Reviewed this test report)



Ma Zhiguo

Deputy Director of the laboratory

(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: OnePlus Technology(Shenzhen) Co., Ltd.  
Address /Post: 18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China  
Contact Person: Kevin Ke  
Contact Email: keyoujiang@oneplus.cn  
Telephone: 0755 61898696 EXT 7023  
Fax: /

### **2.2. Manufacturer Information**

Company Name: OnePlus Technology(Shenzhen) Co., Ltd.  
Address /Post: 18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China  
Contact Person: Kevin Ke  
Contact Email: keyoujiang@oneplus.cn  
Telephone: 0755 61898696 EXT 7023  
Fax: /



### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	Mobile Phone
Model Name	ONEPLUS A3000
FCC ID	2ABZ2-A3000
Antenna	Integrated
Output power	31.82dBm maximum EIRP measured for PCS1900
Extreme vol. Limits	3.4VDC to 4.32VDC (nominal: 3.8VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

#### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>IMEI</b>	<b>HW Version</b>	<b>SW Version</b>	<b>Sample Arrival Date</b>
S01	860046030175725	28	oxygen OS 3.5.1	2016-08-31
S02	860046030175667	28	oxygen OS 3.5.1	2016-08-31

\*EUT ID: is used to identify the test sample in the lab internally.

#### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>
AE1	Battery1
AE2	Battery2
AE3	Charger1
AE4	Charger2
AE5	Charger3
<b>AE1</b>	
Model	BLP613
Manufacturer	Leung's Communication & Electric Products(Guangzhou) LTD.
Capacitance	3000mAh
<b>AE2</b>	
Model	BLP633
Manufacturer	Dessary
Capacitance	3400mAh
<b>AE3</b>	
Model	HK0504
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
<b>AE4</b>	
Model	DC0504A5
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
<b>AE5</b>	
Model	DC0504B5GB
Manufacturer	LITEON TECHNOLOGY CORPORATION



\*AE ID: is used to identify the test sample in the lab internally.

### **3.4. General Description**

The Equipment Under Test (EUT) is a model HSDPA/HSUPA/UMTS Triband / GSM quadband / LTE / CDMA mobile phone with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test.



## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-15 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-15 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-15 Edition
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r02



## 5. LABORATORY ENVIRONMENT

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber 2** (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz



## 6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Emission Limit	2.1051/22.917/24.238	P



## **7. Test Equipments Utilized**

<b>NO.</b>	<b>Description</b>	<b>TYPE</b>	<b>SERIES NUMBER</b>	<b>MANUFACTURE</b>	<b>CAL DUE DATE</b>
1	Test Receiver	ESCI	100701	R&S	2017.08.10
2	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017.01.20
3	Horn Antenna	3117	00066577	ETS-Lindgren	2017.04.01
4	Universal Radio Communication Tester	CMU200	114544	R&S	2017.09.09
5	Spectrum Analyser	FSP40	100378	R&S	2016.12.18

## ANNEX A: MEASUREMENT RESULTS

### A.1 EMISSION LIMIT

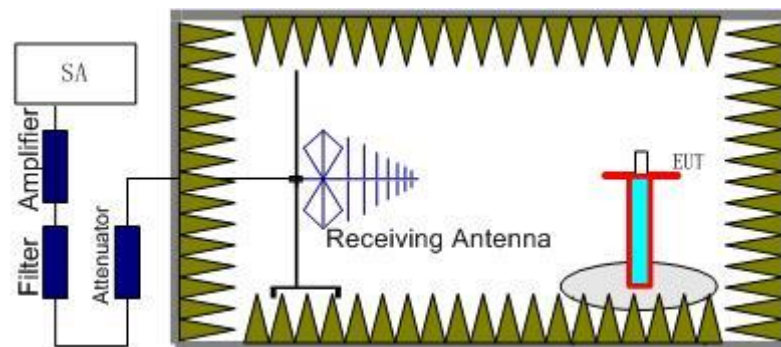
#### **A.1.1 Measurement Method**

The measurement procedures in TIA-603C-2004 are used.

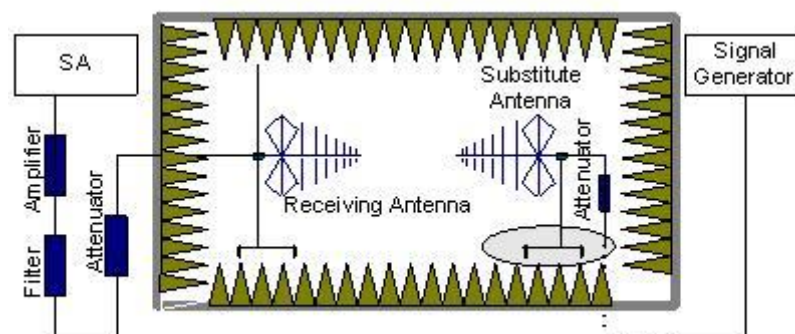
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

**The procedure of radiated spurious emissions is as follows:**

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is

connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ( $P_{pl}$ ) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ( $G_a$ ) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss ( $P_{pl}$ ) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{pl} - G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .



### **A.1.2 Measurement Limit**

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

### **A.1.3 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**A.1.4 Measurement Results Table**

Frequency	Channel	Frequency Range	Result
GSM 850MHz	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
GSM 1900MHz	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

**A.1.5 Sweep Table**

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
850MHz	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
1900MHz	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2



**GSM Mode Channel 128/824.2MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
8097	-56.9	1.8	-13.46	-45.24	-13.00	H
8156.5	-56.91	1.8	-13.46	-45.25	-13.00	H
8594.5	-56.44	1.9	-13.66	-44.68	-13.00	V
9152	-56.75	2.0	-13.78	-44.97	-13.00	V
9255	-55.95	2.1	-13.78	-44.27	-13.00	V
9320	-56.25	2.1	-13.79	-44.56	-13.00	V

**GSM Mode Channel 190/836.6MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
8065.5	-56.63	1.8	-13.46	-44.97	-13.00	V
8160.5	-56.73	1.8	-13.46	-45.07	-13.00	H
8592	-56.75	1.9	-13.66	-44.99	-13.00	H
8688.5	-55.71	1.9	-13.66	-43.95	-13.00	V
9259	-56.4	2.1	-13.78	-44.72	-13.00	V
9409.5	-56.77	2.1	-13.79	-45.08	-13.00	V

**GSM Mode Channel 251/848.8MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
7361.5	-56.32	1.8	-13.1.0	-45.02	-13.00	H
8693.5	-57.04	1.9	-13.66	-45.28	-13.00	V
9189	-56.21	2.0	-13.78	-44.43	-13.00	V
9259.5	-56.65	2.1	-13.79	-44.96	-13.00	V
9316.5	-56.57	2.1	-13.79	-44.88	-13.00	H
9419.5	-56.74	2.1	-13.79	-45.05	-13.00	H



**GSM Mode Channel 512/1850.2MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenn a Gain	Peak EIRP(dBm)	Limit(d Bm)	Polarization
17198.06	-45.14	-13.11	-34.93	-13.00	H
17347.69	-45.74	-13.45	-35.19	-13.00	H
17446.78	-45.18	-13.45	-34.63	-13.00	H
17591.16	-45.73	-13.66	-35.07	-13.00	H
17814.94	-45.19	-13.71	-34.58	-13.00	V
17843.81	-44.25	-13.71	-33.64	-13.00	H

**GSM Mode Channel 661/1880.0MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenn a Gain	Peak EIRP(dBm)	Limit(d Bm)	Polarization
17203.97	-48.85	-13.11	-35.74	-13.00	H
17369.34	-48.89	-13.45	-35.44	-13.00	H
17455.31	-48.67	-13.45	-35.22	-13.00	H
17625.94	-48.71	-13.66	-35.05	-13.00	H
17782.13	-48.56	-13.71	-34.85	-13.00	H
17917.97	-47.74	-13.71	-34.03	-13.00	H

**GSM Mode Channel 810/1909.8MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Antenn a Gain	Peak EIRP(dBm)	Limit(d Bm)	Polarization
16957.88	-47.61	-13.11	-34.50	-13.00	H
17196.09	-47.81	-13.11	-34.70	-13.00	H
17275.5	-48.28	-13.11	-35.17	-13.00	H
17415.28	-48.04	-13.45	-34.59	-13.00	H
17772.94	-46.73	-13.71	-33.02	-13.00	H
17926.5	-46.94	-13.71	-33.23	-13.00	H

\*\*\*END OF REPORT\*\*\*