



# TEST REPORT

No.I16N00975-EMC02

for

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

**Mobile Phone**

**Model Name: ONEPLUS A3000**

**FCC ID: 2ABZ2-A3000**

with

**Hardware Version: 28**

**Software Version: oxygen 3.5.1**

**Issued Date: 2016-10-31**

**Test Laboratory:**

***FCC 2.948 Listed: No.342690***

**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:**

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## **REPORT HISTORY**

| Report Number   | Revision | Description | Issue Date |
|-----------------|----------|-------------|------------|
| I16N00975-EMC02 | Rev.0    | 1st edition | 2016-10-31 |

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## **1. Test Laboratory**

### **1.1. Testing Location**

Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China  
Postal Code: 518048  
Telephone: +86(755)33322000  
Fax: +86(755)33322001

### **1.2. Testing Environment**

Normal Temperature: 15-35℃  
Relative Humidity: 20-75%

### **1.3. Project data**

Testing Start Date: 2016-08-31  
Testing End Date: 2016-10-29

### **1.4. Signature**



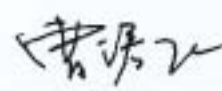
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Liang Yong  
(Prepared this test report)



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(Reviewed this test report)



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Cao Junfei  
Director of the laboratory  
(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: OnePlus Technology(Shenzhen) Co., Ltd.  
Address: 18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China

### **2.2. Manufacturer Information**

Company Name: OnePlus Technology(Shenzhen) Co., Ltd.  
Address: 18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China

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

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

|             |               |
|-------------|---------------|
| Description | Mobile Phone  |
| Model Name  | ONEPLUS A3000 |
| FCC ID      | 2ABZ2-A3000   |

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

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

**EUT ID\*    SN or IMEI**

EUT        860046039212719

\*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> | <b>SN</b> |
|---------------|--------------------|-----------|
| AE1           | Battery            | /         |
| AE2           | Travel charger     | /         |
| AE3           | USB cable          | /         |

##### **AE1**

|                 |         |
|-----------------|---------|
| Model           | BLP633  |
| Manufacturer    | DESAY   |
| Capacitance     | 3400mAh |
| Nominal Voltage | 3.85V   |

##### **AE2-1**

|              |                                    |
|--------------|------------------------------------|
| Model        | HK0504                             |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| SN           | HC1608500001                       |

##### **AE2-2**

|              |                                    |
|--------------|------------------------------------|
| Model        | DC0504A5                           |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| SN           | H11619000004                       |

##### **AE2-3**

|              |                               |
|--------------|-------------------------------|
| Model        | DC0504B5GB                    |
| Manufacturer | LITEON TECHNOLOGY CORPORATION |
| SN           | LCYYWWWSSSSSS                 |

##### **AE3**

|                 |       |
|-----------------|-------|
| Model           | /     |
| Manufacturer    | /     |
| Length of cable | 102cm |

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

### **3.4. General Description**

Equipment Under Test (EUT) is a model of Mobile Phone with integrated antenna. It supports GSM 850/1900;UMTS FDD Band II(W1900)/IV(W1700)/Band V(W850); CDMA Band 0;LTE Band 2/4/5/7/12/17/30/41

It has FM, Camera, MP3, USB, WiFi, Bluetooth, GPS;

Samples undergoing test were selected by the Client.

### **3.5. EUT set-ups**

| <b>EUT set-up No.</b> | <b>Combination of EUT and AE</b> | <b>Remarks</b>     |
|-----------------------|----------------------------------|--------------------|
| Set.1                 | EUT+ AE1                         | ERP/EIRP/RSE tests |

#### **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 22      | PUBLIC MOBILE SERVICES                                                                                                                     | 10-1-2015<br>Edition |
| ANSI C63.4       | Methods of Measurement of Radio-Noise Emissions from<br>Low-Voltage Electrical and Electronic Equipment in the<br>Range of 9 kHz to 40 GHz | 2014                 |
| ANSI/TIA-603-D   | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards                                                     | 2010                 |

## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber** did not exceed following limits along the EMC testing:

|                                   |                                             |
|-----------------------------------|---------------------------------------------|
| Temperature                       | Min. = 15 °C, Max. = 30 °C                  |
| Relative humidity                 | Min. = 35 %, Max. = 60 %                    |
| Shielding effectiveness           | 0.014MHz-1MHz,>60dB;<br>1MHz-18000MHz,>90dB |
| Electrical insulation             | > 2MΩ                                       |
| Ground system resistance          | < 4 Ω                                       |
| Normalised site attenuation (NSA) | < ±4 dB, 3 m distance, from 30 to 1000 MHz  |

**Shield room** did not exceed following limits along the EMC testing:

|                          |                                             |
|--------------------------|---------------------------------------------|
| Temperature              | Min. = 15 °C, Max. = 30 °C                  |
| Relative humidity        | Min. =35 %, Max. = 60 %                     |
| Shielding effectiveness  | 0.014MHz-1MHz,>60dB;<br>1MHz-10000MHz,>90dB |
| Electrical insulation    | > 2MΩ                                       |
| Ground system resistance | < 4 Ω                                       |

**Fully-anechoic chamber** did not exceed following limits along the EMC testing:

|                                    |                                             |
|------------------------------------|---------------------------------------------|
| Temperature                        | Min. = 15 °C, Max. = 30 °C                  |
| Relative humidity                  | Min. = 35 %, Max. = 60 %                    |
| Shielding effectiveness            | 0.014MHz-1MHz,>60dB;<br>1MHz-18000MHz,>90dB |
| Electrical insulation              | > 2MΩ                                       |
| Ground system resistance           | < 4 Ω                                       |
| Voltage Standing Wave Ratio (VSWR) | ≤ 6 dB, from 1 to 18 GHz, 3 m distance      |
| Uniformity of field strength       | Between 0 and 6 dB, from 80 to 3000 MHz     |

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of test results

| Abbreviations used in this clause: |    |                |
|------------------------------------|----|----------------|
| Verdict Column                     | P  | Pass           |
|                                    | F  | Fail           |
|                                    | NA | Not applicable |
|                                    | NM | Not measured   |

#### CDMA800

| Items | Test Name      | Clause in FCC rules | Section in this report | Verdict |
|-------|----------------|---------------------|------------------------|---------|
| 1     | Emission Limit | 22.917(a), 2.1051   | 5.5                    | P       |

**7. Test Equipments Utilized**

| NO. | NAME                                    | TYPE      | PRODUCER     | SERIES<br>NUMBER | CAL. DUE<br>DATE | CAL.<br>INTERVAL |
|-----|-----------------------------------------|-----------|--------------|------------------|------------------|------------------|
| 1.  | Test Receiver                           | ESCI      | R&S          | 100702           | 2017-06-26       | 1 Years          |
| 2.  | BiLog Antenna                           | VULB9163  | Schwarzbeck  | 9163 330         | 2017-04-22       | 3Years           |
| 3.  | Horn Antenna                            | 3117      | ETS-Lindgre  | 00066577         | 2019-04-05       | 3 Years          |
| 5.  | Fully Anechoic Chamber                  | FACT5-2.0 | ETS-Lindgren | 4166             | 2018-05-13       | 3Year            |
| 6.  | Spectrum Analyzer                       | FSP40     | R&S          | 100378           | 2016-12-18       | 1 Year           |
| 7.  | Universal Radio<br>Communication Tester | CMU200    | R&S          | 114540           | 2016-12-24       | 1 Year           |

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 EMISSION LIMIT**

#### **Reference**

FCC: CFR 2.1051, Part 22.917(a),

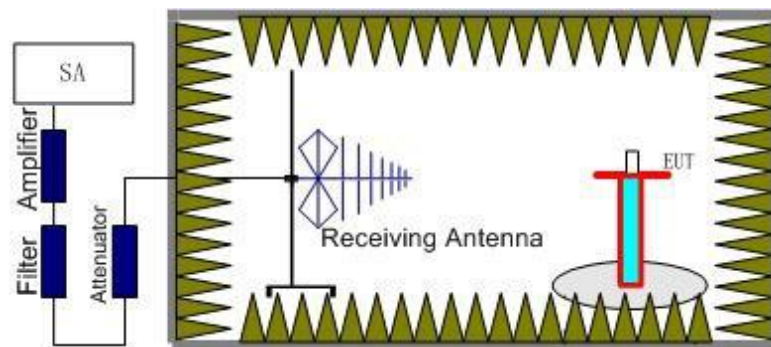
#### **A.2.1 Measurement Method**

The measurements procedures in TIA-603-D-2010 are used. This measurement is carried out in fully-anechoic chamber 3.

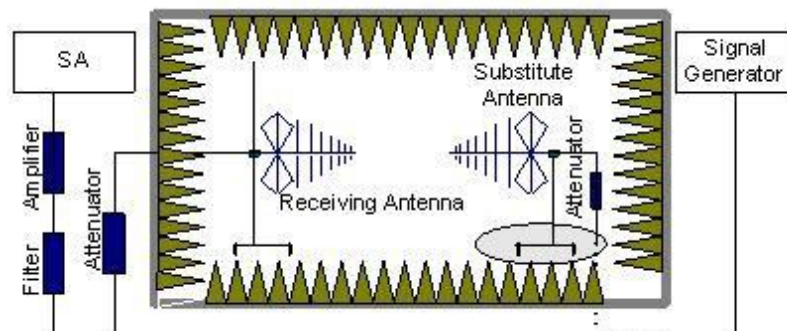
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 22.917(a). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of CDMA800 .

#### **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. Adjust the level of the signal generator output until the value of the receiver reaches 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.

An 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 (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dB}$ .

Note: the result contains vertical part and Horizontal part

### A.2.2 Measurement Limit

Part 22.917(a) 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.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the CDMA BC0 (836.52MHz, 848.31MHz and 824.7MHz). 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 CDMA BC0 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.

**The worst case**
**CDMA BC0, Channel 384/836.52MHz**

| Frequency (MHz) | PMea (dBm) | Ppl (dB) | Ga (dBi) | Peak ERP | Limit (dBm) | Polarity |
|-----------------|------------|----------|----------|----------|-------------|----------|
| 7351            | -54.98     | 1.80     | 11.91    | -47.02   | -13.00      | Vertical |
| 7528.5          | -53.41     | 1.80     | 11.91    | -45.45   | -13.00      | Vertical |
| 8369            | -55.14     | 1.90     | 12.17    | -47.02   | -13.00      | Vertical |
| 8727.5          | -55.67     | 1.90     | 12.7     | -47.02   | -13.00      | Vertical |
| 9201            | -50.94     | 2.10     | 12.89    | -42.30   | -13.00      | Vertical |
| 9366.5          | -55.06     | 2.10     | 12.89    | -46.42   | -13.00      | Vertical |

**CDMA BC0, Channel 777/848.31MHz**

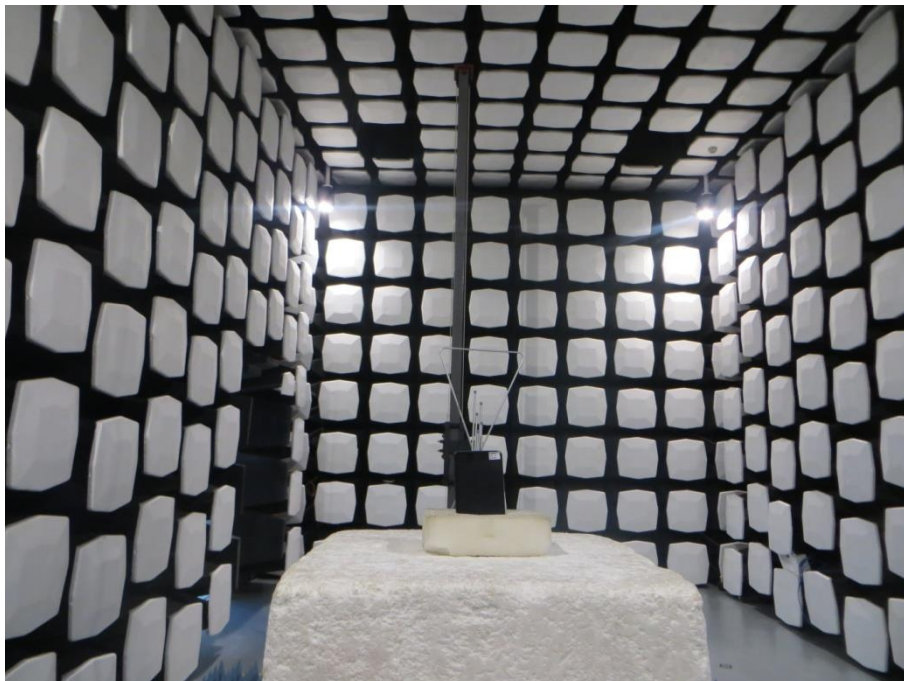
| Frequency (MHz) | PMea (dBm) | Ppl (dB) | Ga (dBi) | Peak ERP | Limit (dBm) | Polarity |
|-----------------|------------|----------|----------|----------|-------------|----------|
| 8501            | -56.20     | 1.90     | 12.7     | -47.55   | -13.00      | Vertical |
| 8650            | -55.94     | 1.90     | 12.7     | -47.29   | -13.00      | Vertical |
| 8689.5          | -56.26     | 1.90     | 12.7     | -47.61   | -13.00      | Vertical |
| 9173            | -55.86     | 2.00     | 12.89    | -47.12   | -13.00      | Vertical |
| 9204            | -54.88     | 2.10     | 12.89    | -46.24   | -13.00      | Vertical |
| 9344            | -55.76     | 2.10     | 12.96    | -47.05   | -13.00      | Vertical |

**CDMA BC0, Channel 1013/824.7MHz**

| Frequency (MHz) | PMea (dBm) | Ppl (dB) | Ga (dBi) | Peak ERP (dBm) | Limit (dBm) | Polarity   |
|-----------------|------------|----------|----------|----------------|-------------|------------|
| 7422            | -54.31     | 1.80     | 11.91    | -46.35         | -13.00      | Vertical   |
| 8175.5          | -55.21     | 1.80     | 12.17    | -46.99         | -13.00      | Vertical   |
| 9073.5          | -52.37     | 2.00     | 12.89    | -43.63         | -13.00      | Vertical   |
| 9212.5          | -55.73     | 2.10     | 12.89    | -47.09         | -13.00      | Horizontal |
| 9406            | -55.83     | 2.10     | 12.96    | -47.12         | -13.00      | Vertical   |
| 9901.5          | -55.71     | 2.20     | 13.11    | -46.95         | -13.00      | Vertical   |

Note: Expanded measurement uncertainty for CDMA800 (BC0) is : below 3GHz: 3.14dB (k=2);  
Above 3GHz: 4.86 dB (k=2)

## **ANNEX B: TEST LAYOUT**



**Pic.1 Radiated spurious emission(below 3GHz)**



**Pic.1 Radiated spurious emission(Above 3GHz)**

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