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## FCC Test Report

#### Report No.: AGC03175180502FE01

| FCC ID              | : 2AF6M3396993S51              |
|---------------------|--------------------------------|
| APPLICATION PURPOSE | : Original Equipment           |
| PRODUCT DESIGNATION | : MOBILE PHONE                 |
| BRAND NAME          | : Cellacom                     |
| MODEL NAME          | : S51_lite, S51_pro            |
| CLIENT              | : Mobile Commodity Corporation |
| DATE OF ISSUE       | : June 21, 2018                |
| STANDARD(S)         | : FCC Part 15B Rules           |
| REPORT VERSION      | : V1.0                         |
|                     |                                |

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|----------------|-------------|----------------------|---------------|-----------------|
| Report Version | Revise Time | Issued Date          | Valid Version | Notes           |
| V1.0           | 1           | June 21, 2018        | Valid         | Original Report |

#### **Report Revise Record**

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| Mobile Commodity Corporation                                 |  |  |  |  |  |
|--|--|--|--|--|--|
| 20955 Pathfinder Road, Suite 200, Diamond Bar, CA 91765, USA |  |  |  |  |  |
| ellacom Incorporation  |  |  |  |  |  |
| 20955 Pathfinder Road, Suite 100, Diamond Bar, CA 91765, USA |  |  |  |  |  |
| MOBILE PHONE   |  |  |  |  |  |
| Cellacom   |  |  |  |  |  |
| S51_lite   |  |  |  |  |  |
| S51_pro  |  |  |  |  |  |
| All the same except the model name.                          |  |  |  |  |  |
| May. 28, 2018~June 19, 2018                                  |  |  |  |  |  |
| None   |  |  |  |  |  |
| Normal   |  |  |  |  |  |
| AGCRT-US-IT/AC   |  |  |  |  |  |
|  |  |  |  |  |  |

#### 1. VERIFICATION OF CONFORMITY

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

Tested By

Nice.xie

Nice Xie(Xie xiaosong)

June 21, 2018

**Reviewed By** 

BONG Nie

Bart Xie(Xie Xiaobin)

June 21, 2018

Approved By

owest is

Forrest Lei(Lei Yonggang) Authorized Officer

June 21, 2018

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#### 2. SYSTEM DESCRIPTION

#### EUT test procedure:

- 1. Connect EUT and peripheral devices (PC) through USB port.
- 2. Power on the EUT, use the software to transfer data between EUT and PC.
- 3. Make sure the EUT operates normally during the test.

#### **Test Mode**

| TEST MODE DESCRIPTION |   |                         |  |  |  |  |  |
|-----------------------|---|-------------------------|--|--|--|--|--|
| NO.                   | TEST MODE DESCRIPTION                       | WORST                   |  |  |  |  |  |
| 1                     | USB (connection for data transferring)      | C The second of the V-C |  |  |  |  |  |
|                       | EMI worst mode<br>e is provided by AGC-Lab. |                         |  |  |  |  |  |

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#### **3. MEASUREMENT UNCERTAINTY**

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in

- measurement" (GUM) published by CISPR and ANSI.
- Uncertainty of Conducted Emission,  $Uc = \pm 3.2 dB$
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
  - Uncertainty of Radiated Emission above 1GHz,  $Uc = \pm 4.8 \text{ dB}$

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#### 4. PRODUCT INFORMATION

| Housing Type     | Plastic and metal                   | C The store of the | and a coon a |
|------------------|-------------------------------------|--|--|
| Hardware Version | L71_M_V3.0                          |  |  |
| Software Version | S51_Lite_V1.0                       |  | 10 10  |
| EUT Input Rating | DC3.8V by battery or DC 5V by Micro | -USB   | Contraction of Colorad Contraction   |

#### I/O Port Information (Applicable INot Applicable)

| Item Equipment |              | Equipment Model No. ID or Sp |                 | Remark    |
|----------------|--------------|------------------------------|-----------------|-----------|
| 1              | MOBILE PHONE | S51_lite                     | 2AF6M3396993S51 | EUT       |
| 2              | Battery      | S51_lite                     | DC 3.8V/2000mAh | Accessory |
| 3              | Earphone     | N/A                          | N/A             | Accessory |

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#### **5. SUPPORT EQUIPMENT**

| 1   | Device Type | Manufacturer | Model Name     | Serial No. | Data Cable | Power Cable      |
|-----|-------------|--------------|----------------|------------|------------|------------------|
| 5   | PC          | Apple Inc.   | Color of Color | 6          | -CC        | 0.8m Unshielded  |
| N.C | Adapter     | Apple Inc.   | SO-            |            |            | 1.25m Unshielded |

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

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#### 6. TEST FACILITY

| Site               | Attestation of Global Compliance (Shenzhen) Co., Ltd   |  |  |  |  |
|--------------------|--|--|--|--|--|
| Location           | 1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang,<br>Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang<br>Inner Ring Road, Baoan District, Shenzhen 518012 |  |  |  |  |
| NVLAP LAB CODE     | 600153-0   |  |  |  |  |
| Designation Number | CN5028   |  |  |  |  |
| Description        | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0  |  |  |  |  |

#### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

| Equipment     | Manufacturer | Model   | S/N    | Cal. Date    | Cal. Due     |
|---------------|--------------|---------|--------|--------------|--------------|
| TEST RECEIVER | R&S          | ESPI    | 101206 | Jun.20, 2017 | Jun.19, 2018 |
| LISN          | R&S          | ESH2-Z5 | 100086 | Aug.21, 2017 | Aug.20, 2018 |

#### TEST EQUIPMENT OF RADIATED EMISSION TEST

| Manufacturer | Model   | S/N   | Cal. Date   | Cal. Due  |
|--------------|---|---|---|---|
| R&S          | ESCI  | 10096   | Jun.20, 2017  | Jun.19, 2018  |
| Aglient      | N9010A  | MY53470504  | Dec.08, 2017  | Dec.07, 2018  |
| SCHWARZBECK  | BBHA 9170   | #768  | Sep.20, 2017  | Sep.19, 2018  |
| ChengYi      | EMC184045SE   | 980508  | Sep.15, 2017  | Sep.14, 2018  |
| ETS LINDGREN | 3117  | 00034609  | May.18, 2017  | May.17, 2019  |
| SCHWARZBECK  | BBV 9718  | 9718-205  | Jun.20, 2017  | Jun.19, 2018  |
| SCHWARZBECK  | VULB9168  | D69250  | Sep.28, 2017  | Sep.27, 2018  |
|              | R&S<br>Aglient<br>SCHWARZBECK<br>ChengYi<br>ETS LINDGREN<br>SCHWARZBECK | R&SESCIAglientN9010ASCHWARZBECKBBHA 9170ChengYiEMC184045SEETS LINDGREN3117SCHWARZBECKBBV 9718 | R&S ESCI 10096   Aglient N9010A MY53470504   SCHWARZBECK BBHA 9170 #768   ChengYi EMC184045SE 980508   ETS LINDGREN 3117 00034609   SCHWARZBECK BBV 9718 9718-205 | R&S ESCI 10096 Jun.20, 2017   Aglient N9010A MY53470504 Dec.08, 2017   SCHWARZBECK BBHA 9170 #768 Sep.20, 2017   ChengYi EMC184045SE 980508 Sep.15, 2017   ETS LINDGREN 3117 00034609 May.18, 2017   SCHWARZBECK BBV 9718 9718-205 Jun.20, 2017 |

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#### 7. TEST ITEMS AND THE RESULTS

| Test item             | Test Requirement      | Test Method     | Class/Severity | Result |
|-----------------------|-----------------------|-----------------|----------------|--------|
| CONDUCTED<br>EMISSION | FCC Part 15.107 Rules | ANSI C63.4:2014 | Class B        | Pass   |
| RADIATED<br>EMISSION  | FCC Part 15.109 Rules | ANSI C63.4:2014 | Class B        | Pass   |

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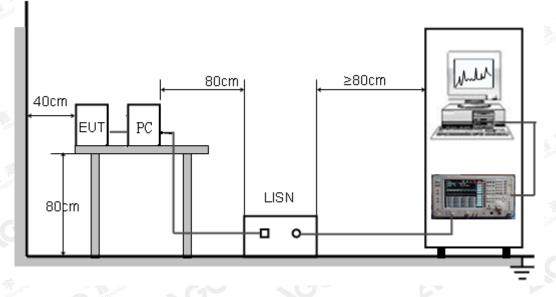
#### 8. FCCLINE CONDUCTED EMISSION TEST 8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

| Fromuency     | Maximum R   | RF Line Voltage |
|---------------|-------------|-----------------|
| Frequency     | Q.P.( dBuV) | Average( dBuV)  |
| 150kHz-500kHz | 66-56       | 56-46           |
| 500kHz-5MHz   | 56          | 46              |
| 5MHz-30MHz    | 60          | 50              |

Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

#### 8.2. BLOCK DIAGRAM OF TEST SETUP



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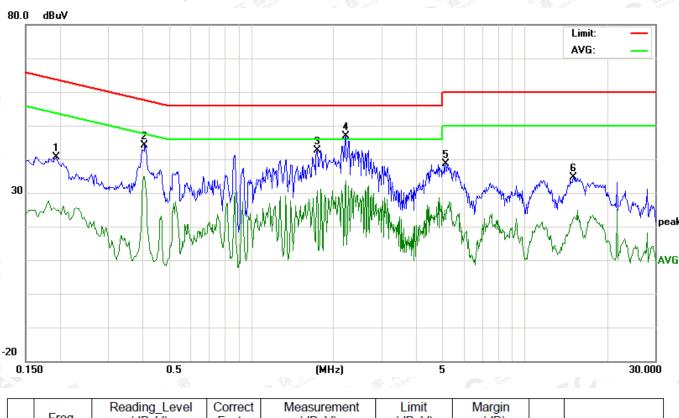
#### 8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT received DC5V power from PC with receive AC120V/60Hz power from a LISN.
- (5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- (7) During the above scans, the emissions were maximized by cable manipulation.
- (8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (9) 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. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition (mode 1) was reported on the Summary Data page.

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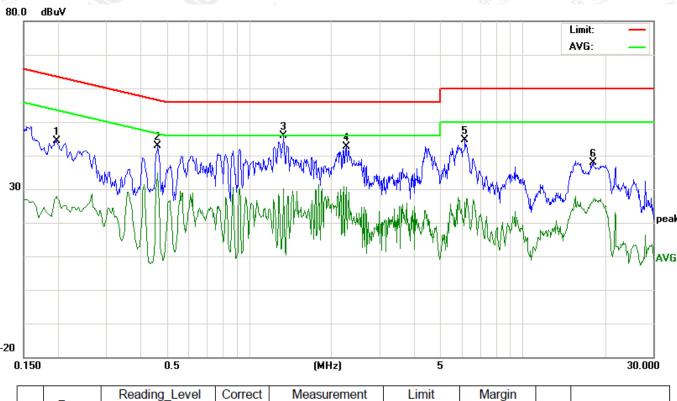
#### 8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST LINE CONDUCTED EMISSION TEST-L

|   | No. | Freq.   | Reading_Level<br>(dBuV) |    | Correct Measurement<br>Factor (dBuV) |       |       | Limit Margin<br>(dBuV) (dB) |       |       | P/F   | Comment |        |   |  |
|---|-----|---------|-------------------------|----|--------------------------------------|-------|-------|-----------------------------|-------|-------|-------|---------|--------|---|--|
|   |     | (MHz)   | Peak                    | QP | AVG                                  | dB    | Peak  | QP                          | AVG   | QP    | AVG   | QP      | AVG    |   |  |
|   | 1   | 0.1940  | 30.45                   |    | 14.73                                | 10.21 | 40.66 |                             | 24.94 | 63.86 | 53.86 | -23.20  | -28.92 | Ρ |  |
|   | 2   | 0.4097  | 33.89                   |    | 23.87                                | 10.34 | 44.23 |                             | 34.21 | 57.65 | 47.65 | -13.42  | -13.44 | Ρ |  |
|   | 3   | 1.7459  | 32.40                   |    | 20.29                                | 10.30 | 42.70 |                             | 30.59 | 56.00 | 46.00 | -13.30  | -15.41 | Р |  |
|   | 4   | 2.2139  | 36.58                   |    | 23.29                                | 10.31 | 46.89 |                             | 33.60 | 56.00 | 46.00 | -9.11   | -12.40 | Ρ |  |
|   | 5   | 5.1577  | 28.38                   |    | 12.00                                | 10.24 | 38.62 |                             | 22.24 | 60.00 | 50.00 | -21.38  | -27.76 | Ρ |  |
| 1 | 6   | 15.1059 | 24.47                   |    | 12.43                                | 10.12 | 34.59 |                             | 22.55 | 60.00 | 50.00 | -25.41  | -27.45 | Ρ |  |

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LINE CONDUCTED EMISSION TEST-N

| No. | Freq.   | Reading_Level<br>(dBuV) |    | Correct<br>Factor |       |       |    | Limit<br>(dBuV) |       | Margin<br>(dB) |        | P/F    | Comment |  |
|-----|---------|-------------------------|----|-------------------|-------|-------|----|-----------------|-------|----------------|--------|--------|---------|--|
|     | (MHz)   | Peak                    | QP | AVG               | dB    | Peak  | QP | AVG             | QP    | AVG            | QP     | AVG    |         |  |
| 1   | 0.1985  | 37.17                   |    | 16.67             | 10.21 | 47.38 |    | 26.88           | 63.67 | 53.67          | -16.29 | -26.79 | Р       |  |
| 2   | 0.4660  | 32.52                   |    | 22.17             | 10.38 | 42.90 |    | 32.55           | 56.58 | 46.58          | -13.68 | -14.03 | Р       |  |
| 3   | 1.3380  | 35.46                   |    | 19.69             | 10.38 | 45.84 |    | 30.07           | 56.00 | 46.00          | -10.16 | -15.93 | Р       |  |
| 4   | 2.2659  | 32.29                   |    | 20.33             | 10.33 | 42.62 |    | 30.66           | 56.00 | 46.00          | -13.38 | -15.34 | Р       |  |
| 5   | 6.1817  | 34.31                   |    | 15.80             | 10.29 | 44.60 |    | 26.09           | 60.00 | 50.00          | -15.40 | -23.91 | Р       |  |
| 6   | 18.0939 | 27.70                   |    | 16.16             | 10.12 | 37.82 |    | 26.28           | 60.00 | 50.00          | -22.18 | -23.72 | Р       |  |

**RESULT: PASS** 

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#### 9. FCC RADIATED EMISSION TEST

#### 9.1. EXCEPT FOR CLASS A DIGITAL DEVICES, THE FIELD STRENGTH OF RADIATED EMISSIONS FROM UNINTENTIONAL RADIATORS AT A DISTANCE OF 3 METERS SHALL NOT EXCEED THE FOLLOWING VALUES:

| Frequency<br>(MHz) | Distance<br>(m) | Maximum Field Strength Limit<br>(dBuV/m/ Q.P.) |
|--------------------|-----------------|--|
| 30~88              | 3               | 40.0   |
| 88~216             | <b>3</b>        | 43.5   |
| 216~960            | 3               | 46.0   |
| Above 960          | 3               | 54.0   |

Note: The lower limit shall apply at the transition frequency.

#### 9.1.1 The following table is the setting of spectrum analyzer and receiver:

|                      | Spectrum Parameter    | Setting   |
|----------------------|-----------------------|---|
|                      | Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP                               |
| Conpland<br>Conpland | Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP                               |
| CO Press             | Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP                            |
|                      | Start ~Stop Frequency | 1GHz~26.5GHz<br>1MHz/1MHz for Peak, 1MHz/10Hz for Average |

| Receiver Parameter    | Setting                        |
|-----------------------|--------------------------------|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP    |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP    |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |

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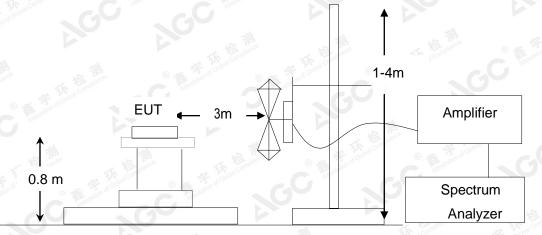


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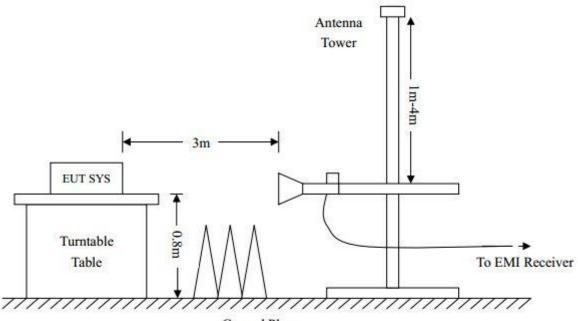
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#### 9.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



#### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



Ground Plane

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#### 9.3. PROCEDURE OF RADIATED EMISSION TEST

- 1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 3MHz VBW for average reading in spectrum analyzer. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.
- 11. The test data of the worst case condition (mode 1) was reported on the Summary Data page.

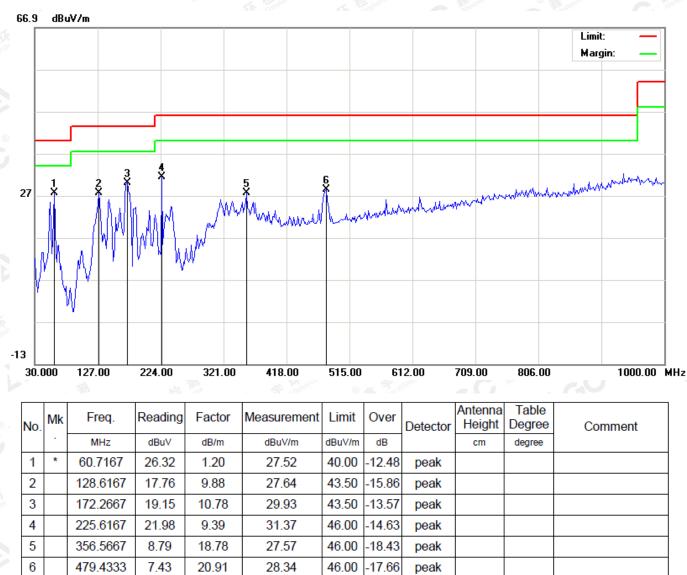
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#### 9.4. TEST RESULT OF RADIATED EMISSION TEST

#### RADIATED EMISSION TEST AT 3M DISTANCE-HORIZONTAL



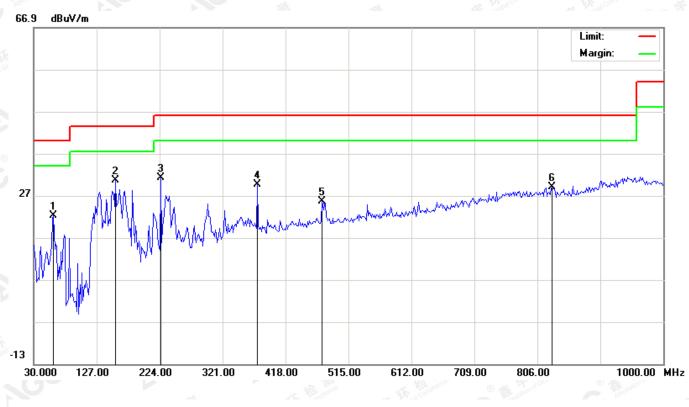
#### **RESULT: PASS**

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#### RADIATED EMISSION TEST AT 3M DISTANCE-VERTICAL

| N | . Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna<br>Height |        | Comment |
|---|------|----------|---------|--------|-------------|--------|--------|----------|-------------------|--------|---------|
|   | -    | MHz      | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB     |          | cm                | degree |         |
| 1 |      | 60.7167  | 14.25   | 7.87   | 22.12       | 40.00  | -17.88 | peak     |                   |        |         |
| 2 | *    | 156.1000 | 15.33   | 15.30  | 30.63       | 43.50  | -12.87 | peak     |                   |        |         |
| 3 |      | 225.6167 | 19.60   | 11.51  | 31.11       | 46.00  | -14.89 | peak     |                   |        |         |
| 4 |      | 374.3500 | 10.70   | 18.90  | 29.60       | 46.00  | -16.40 | peak     |                   |        |         |
| 5 |      | 474.5833 | 4.65    | 20.86  | 25.51       | 46.00  | -20.49 | peak     |                   |        |         |
| 6 |      | 828.6333 | 1.66    | 27.31  | 28.97       | 46.00  | -17.03 | peak     |                   |        |         |

#### **RESULT: PASS**

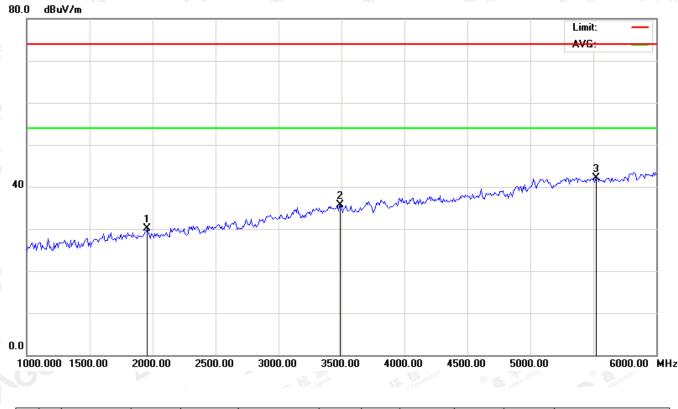
- Note: 1.Measurement = Reading + Factor, Over = Measurement Limit.
  - 2. The "Factor" value can be calculated automatically by software of measurement system.

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#### RADIATED EMISSION ABOVE 1GHZ (1-10<sup>TH</sup> HARMONICS) -HORIZONTAL

| No | Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna<br>Height | Table<br>Degree | Comment |
|----|----|----------|---------|--------|-------------|--------|--------|----------|-------------------|-----------------|---------|
|    | -  | MHz      | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB     |          | cm                | degree          |         |
| 1  |    | 1958.333 | 14.54   | 15.56  | 30.10       | 74.00  | -43.90 | peak     |                   |                 |         |
| 2  |    | 3491.667 | 19.46   | 16.25  | 35.71       | 74.00  | -38.29 | peak     |                   |                 |         |
| 3  | *  | 5525.000 | 26.28   | 15.84  | 42.12       | 74.00  | -31.88 | peak     |                   |                 |         |

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80.0 dBuV/m

#### RADIATED EMISSION ABOVE 1GHZ (1-10<sup>TH</sup> HARMONICS) –VERTICAL

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| No. | Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna<br>Height | Table<br>Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|-------------------|-----------------|---------|
|     | -  | MHz      | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB     |          | cm                | degree          |         |
| 1   |    | 1725.000 | 15.37   | 15.47  | 30.84       | 74.00  | -43.16 | peak     |                   |                 |         |
| 2   |    | 3975.000 | 19.69   | 17.16  | 36.85       | 74.00  | -37.15 | peak     |                   |                 |         |
| 3   | *  | 5491.667 | 26.25   | 15.84  | 42.09       | 74.00  | -31.91 | peak     |                   |                 |         |

Note: 1. Emissions range from 6GHz to 12.5GHz have 20dB margin. No recording in the test report.

- 2. Factor=Antenna Factor + Cable loss Amplifier gain, Margin=Measurement-Limit.
- 3. The "Factor" value can be calculated automatically by software of measurement system.

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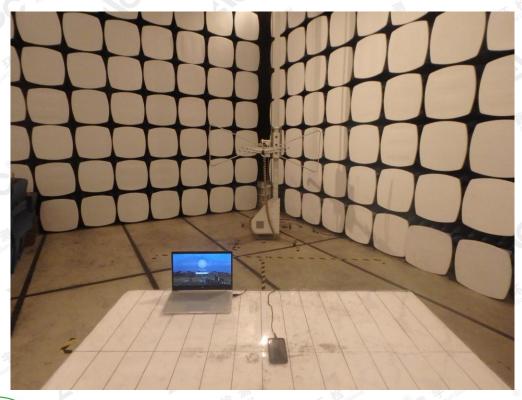
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#### APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP



#### FCC RADIATED EMISSION TEST SETUP

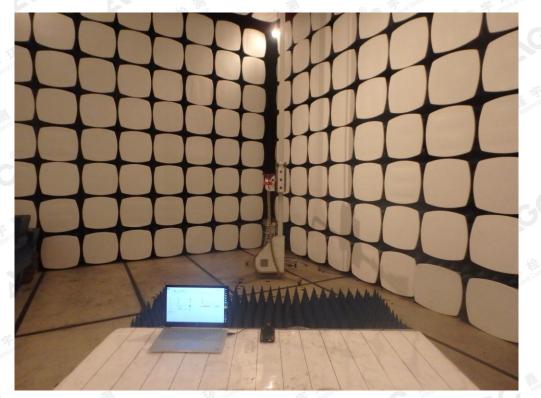


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FCC RADIATED EMISSION TEST SETUP

----END OF REPORT----

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