

# FCC PART 15 B TEST REPORT

For

## Hanwang Technology Co., Ltd

Hanvon Tower, Building No.5, Zhongguancun Software Park, Haidian District, Beijing, China

**FCC ID: XQI-FACEID-MX00**

|   |  |
|---|--|
| <b>Report Type:</b><br>Original Report  | <b>Product Type:</b><br>Facial Recognition Terminal                                  |
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| <b>Report Number:</b> <u>RBJ150930050-00B</u>   |  |
| <b>Report Date:</b> <u>2015-10-28</u>   |  |
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## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *Hanwang Technology Co., Ltd*'s product, model number: *M500 (FCC ID: XQI-FACEID-MX00)* (the "EUT") in this report was a *Facial Recognition Terminal*, which was measured approximately: 20.5cm (L) x9.5m (W) x 11.5 cm (H), rated input voltage: DC12V from adapter. The highest the operating frequency is 1000MHz.

#### Adapter Information:

Model: XCX-CX1201140

Input: AC100~240V 50/60Hz

Output: 12V, 1A

*Note: The series product, model M500, M500, M100, M200, M300, M400, M600, M700, M800, M900, HF36, HF26, TF36, TF236, TF256, TF286, TF296, H58, TH58, H238, H258, H256, H266, H268, H288, H298 are electrically identical, the difference between them just is the model name, we selected M500 for fully testing, the details was explained in the attached declaration letter.*

*All measurement and test data in this report was gathered from production sample serial number: 150930050 (Assigned by Applicant). The EUT was received on 2015-10-10.*

### Objective

This test report is prepared on behalf of *Hanwang Technology Co., Ltd* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B.

### Related Submittal(s)/Grant(s)

FCC Part 15C DXX submissions with FCC ID: XQI-FACEID-MX00.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

### **Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

### Equipment Modifications

No modification was made to the EUT tested.

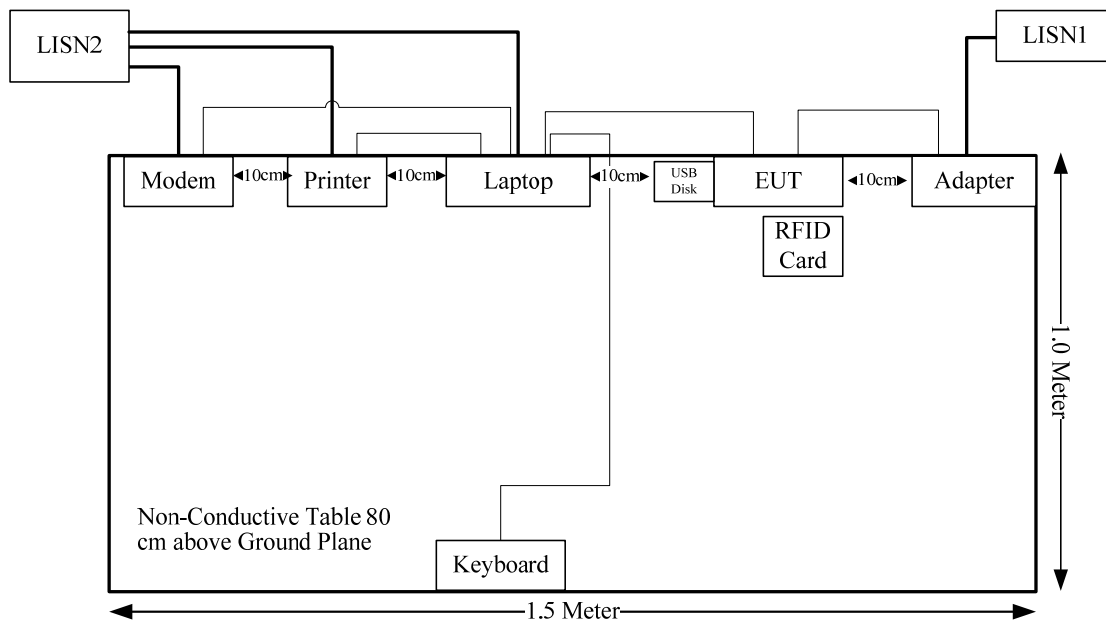
### Local Support Equipment List and Details

| Manufacturer | Description | Model    | Serial Number        |
|--------------|-------------|----------|----------------------|
| DELL         | Laptop      | PP11L    | QDS-BRCM1017         |
| HP           | Printer     | C3941A   | JPTVOB2337           |
| DELL         | Keyboard    | L100     | CNORH656658907BL05DC |
| SAST         | Modem       | AEM-2100 | 0293                 |
| /            | RFID Card   | /        | /                    |
| Kingston     | USB disk    | 8 GB     | /                    |

### Support Cable List and Details

| Cable Description | Shielding Type | Ferrite Core | Length (m) | From                    | To       |
|-------------------|----------------|--------------|------------|-------------------------|----------|
| Serial Cable      | Yes            | No           | 1.2        | Serial Port of Laptop   | Modem    |
| Parallel Cable    | Yes            | No           | 1.2        | Parallel Port of Laptop | Printer  |
| Keyboard Cable    | Yes            | Yes          | 1.8        | USB Port of Laptop      | Keyboard |
| RJ45 Cable        | No             | No           | 1.0        | Network Port of EUT     | Laptop   |

## Configuration of Test Setup



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**SUMMARY OF TEST RESULTS**

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| FCC Rules | Description of Test | Results    |
|-----------|---------------------|------------|
| §15.107   | Conducted Emissions | Compliance |
| §15.109   | Radiated Emissions  | Compliance |

## FCC§15.107 - CONDUCTED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

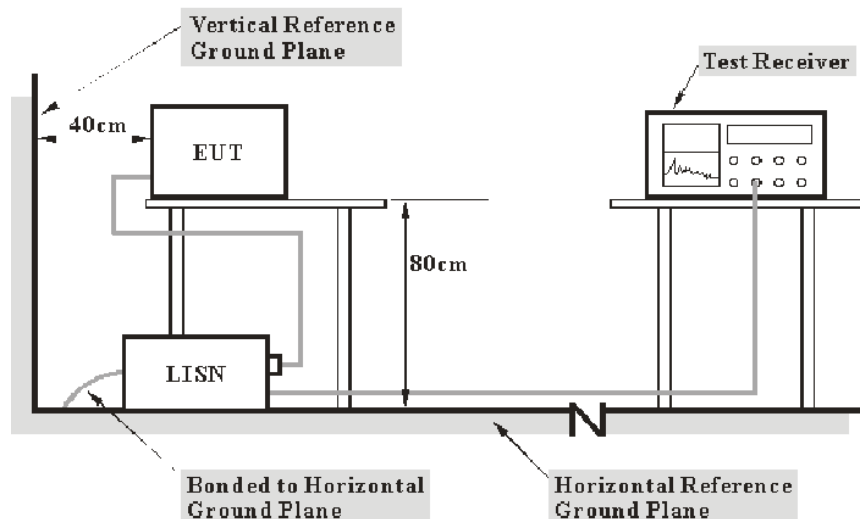
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cisp}$

| Measurement   | $U_{cisp}$ |
|---|------------|
| Conducted disturbance at mains port using AMN (150 kHz to 30 MHz) | 3.4 dB     |

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.



The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120V/60Hz AC power source.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range  | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz  |

### Test Equipment List and Details

| Manufacturer | Description        | Model   | Serial Number | Calibration Date | Calibration Due Date |
|--------------|--------------------|---------|---------------|------------------|----------------------|
| R&S          | EMI Test Receiver  | ESCS 30 | 830245/006    | 2015-10-20       | 2016-10-20           |
| R&S          | L.I.S.N            | ESH2-Z5 | 892107/021    | 2015-07-16       | 2016-07-15           |
| R&S          | Two-line V-network | ENV 216 | 3560.6550.12  | 2014-12-11       | 2015-12-11           |
| R&S          | Test Software      | EMC32   | Version8.53.0 | N/A              | N/A                  |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

$V_C$ : corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_c$ : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

### Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

**11.0 dB at 0.524077 MHz in the Neutral conducted mode**

### Test Data

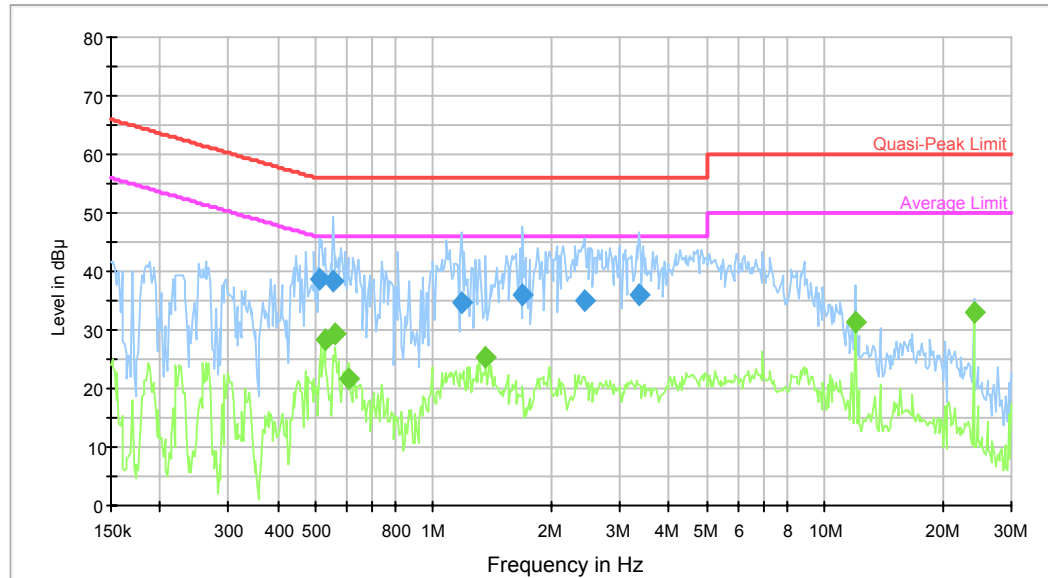
#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 27 °C    |
| Relative Humidity: | 48 %     |
| ATM Pressure:      | 99.9 kPa |

*\* The testing was performed by Lion Xiao on 2015-10-26.*

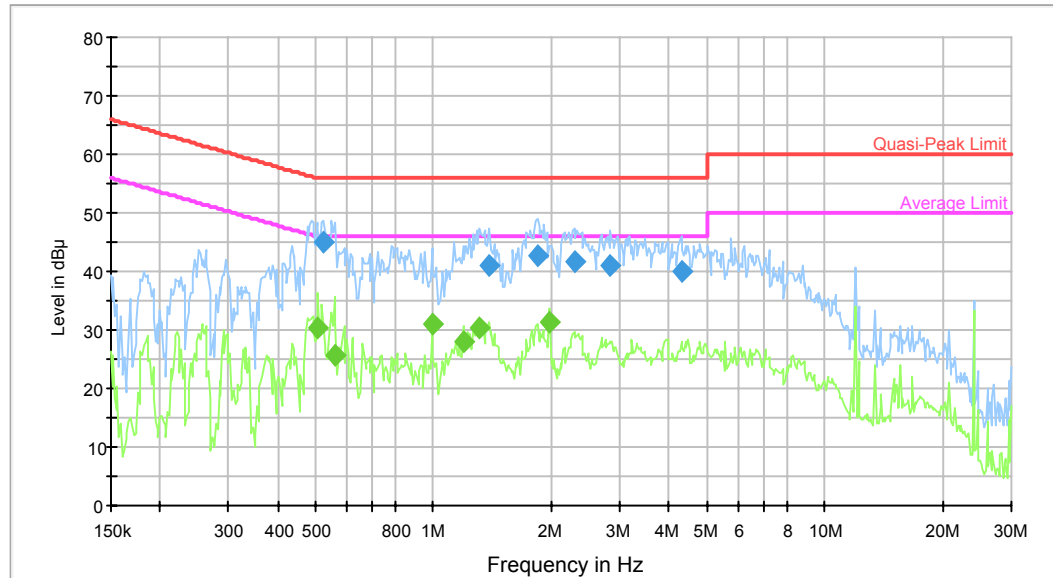
Test Mode: Operating

AC120V, 60Hz, Line:



| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.511698        | 38.7             | 9.000           | L1   | 9.8        | 17.3        | 56.0         | Compliance |
| 0.554139        | 38.4             | 9.000           | L1   | 9.8        | 17.6        | 56.0         | Compliance |
| 1.181325        | 34.5             | 9.000           | L1   | 9.8        | 21.5        | 56.0         | Compliance |
| 1.690804        | 36.0             | 9.000           | L1   | 9.8        | 20.0        | 56.0         | Compliance |
| 2.439371        | 34.9             | 9.000           | L1   | 9.9        | 21.1        | 56.0         | Compliance |
| 3.355051        | 36.0             | 9.000           | L1   | 9.9        | 20.0        | 56.0         | Compliance |

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|----------------|-----------------|------|------------|-------------|--------------|------------|
| 0.528270        | 28.4           | 9.000           | L1   | 9.8        | 17.6        | 46.0         | Compliance |
| 0.563041        | 29.3           | 9.000           | L1   | 9.8        | 16.7        | 46.0         | Compliance |
| 0.604902        | 21.7           | 9.000           | L1   | 9.8        | 24.3        | 46.0         | Compliance |
| 1.363512        | 25.3           | 9.000           | L1   | 9.8        | 20.7        | 46.0         | Compliance |
| 12.005609       | 31.3           | 9.000           | L1   | 10.0       | 18.7        | 50.0         | Compliance |
| 24.013226       | 33.0           | 9.000           | L1   | 10.1       | 17.0        | 50.0         | Compliance |

**AC120V, 60Hz, Neutral:**

| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|------------|
| 0.524077        | 45.0             | 9.000           | N    | 9.8        | 11.0        | 56.0         | Compliance |
| 1.385415        | 41.1             | 9.000           | N    | 9.8        | 14.9        | 56.0         | Compliance |
| 1.845692        | 42.5             | 9.000           | N    | 9.8        | 13.5        | 56.0         | Compliance |
| 2.288725        | 41.6             | 9.000           | N    | 9.8        | 14.4        | 56.0         | Compliance |
| 2.838101        | 41.1             | 9.000           | N    | 9.9        | 14.9        | 56.0         | Compliance |
| 4.295123        | 39.9             | 9.000           | N    | 9.9        | 16.1        | 56.0         | Compliance |

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) | Comment    |
|-----------------|----------------|-----------------|------|------------|-------------|--------------|------------|
| 0.507637        | 30.4           | 9.000           | N    | 9.8        | 15.6        | 46.0         | Compliance |
| 0.558572        | 25.7           | 9.000           | N    | 9.8        | 20.3        | 46.0         | Compliance |
| 0.991374        | 30.9           | 9.000           | N    | 9.8        | 15.1        | 46.0         | Compliance |
| 1.190776        | 28.1           | 9.000           | N    | 9.8        | 17.9        | 46.0         | Compliance |
| 1.310256        | 30.2           | 9.000           | N    | 9.8        | 15.8        | 46.0         | Compliance |
| 1.982914        | 31.4           | 9.000           | N    | 9.8        | 14.6        | 46.0         | Compliance |

## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

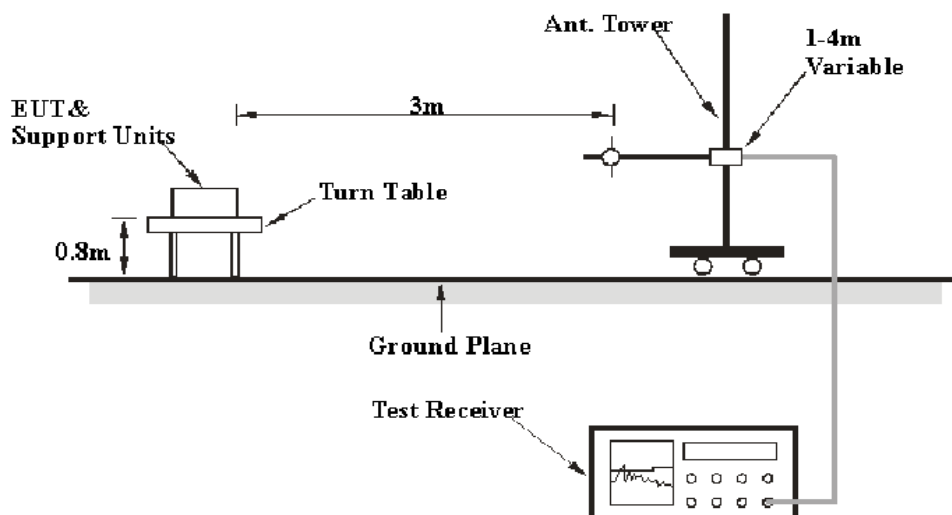
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of  $U_{cisp}$

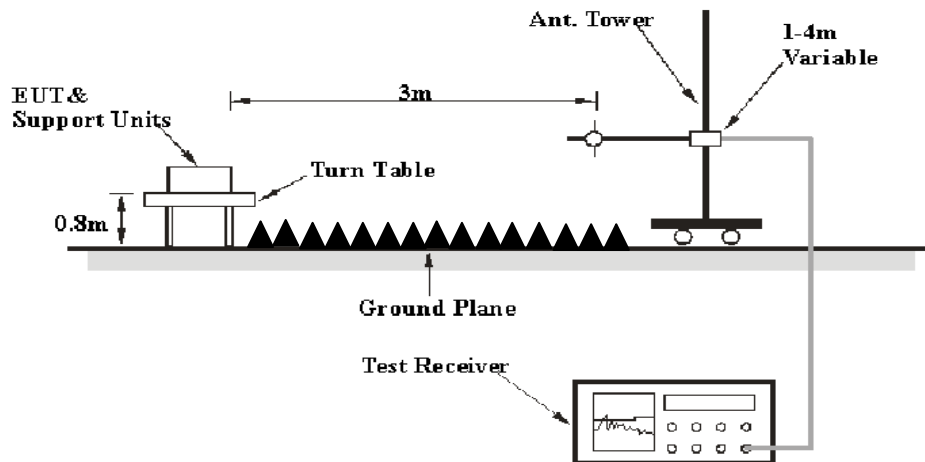
| Measurement  | $U_{cisp}$ |
|--|------------|
| Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz) | 6.3 dB     |
| Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)                   | 5.2 dB     |
| Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)                  | 5.5 dB     |

### EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

### EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

| Frequency Range   | RBW     | Video B/W | IF B/W  | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz   | 120 kHz | QP       |
| Above 1 GHz       | 1 MHz   | 3 MHz     | /       | Peak     |
|                   | 1 MHz   | 10 Hz     | /       | Ave.     |

### Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

### Test Equipment List and Details

| Manufacturer   | Description       | Model      | Serial Number | Calibration Date | Calibration Due Date |
|----------------|-------------------|------------|---------------|------------------|----------------------|
| R&S            | EMI Test Receiver | ESCI       | 100224        | 2015-08-03       | 2016-08-02           |
| Sunol Sciences | Antenna           | JB3        | A060611-3     | 2014-11-06       | 2017-11-05           |
| HP             | Amplifier         | 8447E      | 2434A02181    | 2015-09-01       | 2016-09-01           |
| Agilent        | Spectrum Analyzer | E4440A     | SG43360054    | 2014-12-04       | 2015-12-04           |
| ETS-Lindgren   | Horn Antenna      | 3115       | 9808-5557     | 2015-09-06       | 2018-09-06           |
| Mini-Circuit   | Amplifier         | ZVA-213-S+ | 054201245     | 2015-02-19       | 2016-02-19           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

### Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

**3.10 dB at 510.1500 MHz in the Vertical polarization**

### Test Data

#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 26.2°C   |
| Relative Humidity: | 51 %     |
| ATM Pressure:      | 99.6 kPa |

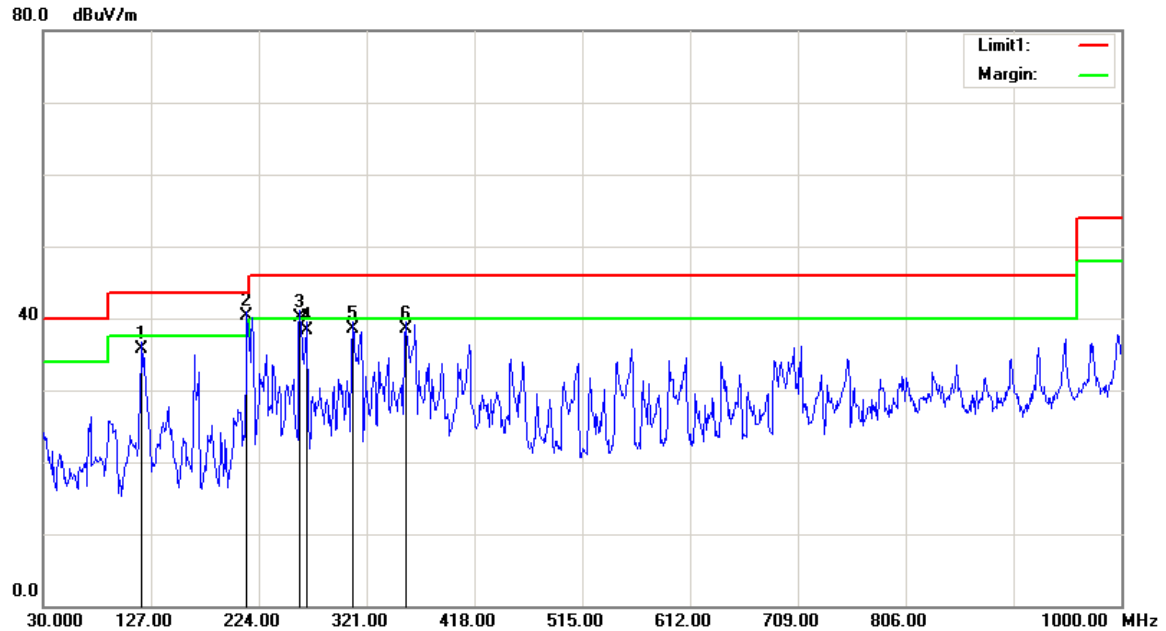
*The testing was performed by Lion Xiao from 2015-10-23.*

*Test Result: Compliance*

*Test Mode: Operating (Facial recognition+Record+Communication)*

## 1) Below 1GHz:

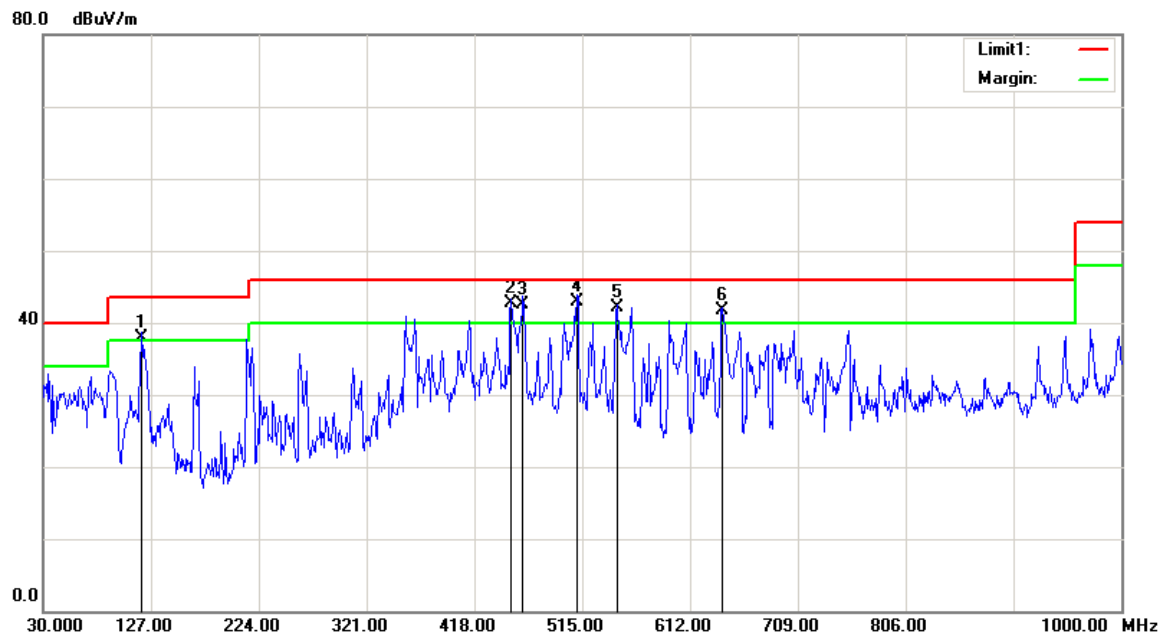
## Horizontal



| Frequency (MHz) | Receiver Reading (dBμV) | Detector (PK/QP/Ave) | Correction Factor (dB/m) | Cord. Amp. (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|-------------------------|----------------------|--------------------------|---------------------|----------------|-------------|
| 118.2700        | 40.84                   | QP                   | -5.14                    | 35.70               | 43.50          | 7.80        |
| 213.3300        | 48.52                   | QP                   | -8.22                    | 40.30               | 43.50          | 3.20*       |
| 260.8600        | 46.57                   | QP                   | -6.47                    | 40.10               | 46.00          | 5.90*       |
| 267.6500        | 44.58                   | QP                   | -6.18                    | 38.40               | 46.00          | 7.60        |
| 308.3900        | 43.29                   | QP                   | -4.69                    | 38.60               | 46.00          | 7.40        |
| 355.9200        | 42.51                   | QP                   | -4.01                    | 38.50               | 46.00          | 7.50        |

\*Within measurement uncertainty!



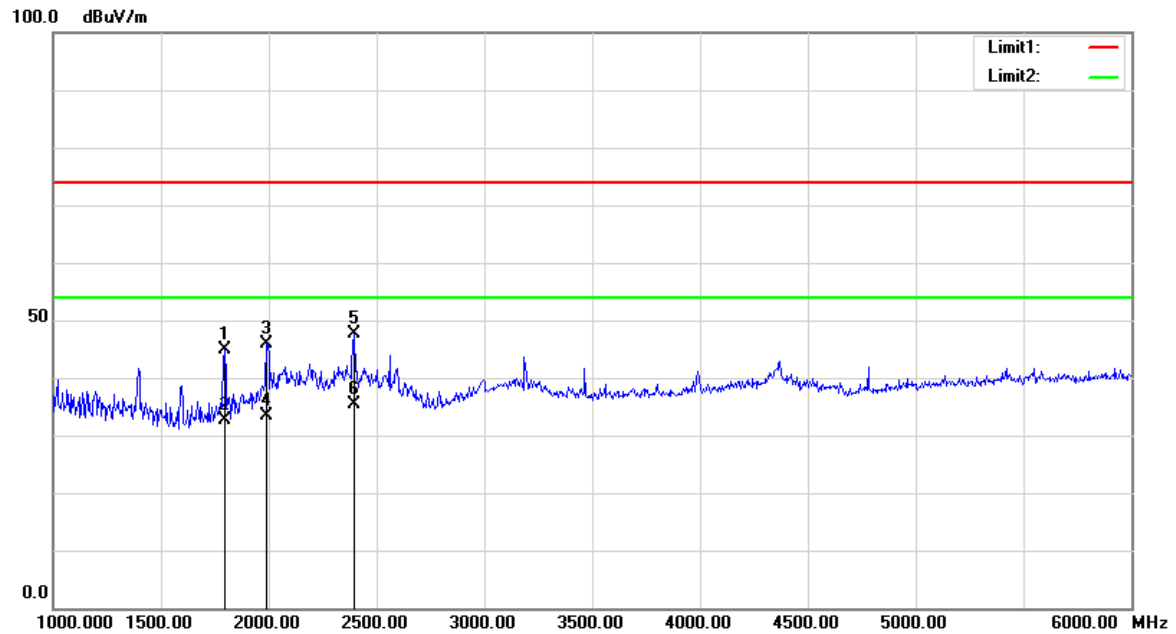
**Vertical**

| Frequency (MHz) | Receiver Reading (dBμV) | Detector (PK/QP/Ave) | Correction Factor (dB/m) | Cord. Amp. (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|-------------------------|----------------------|--------------------------|---------------------|----------------|-------------|
| 118.2700        | 43.04                   | QP                   | -5.14                    | 37.90               | 43.50          | 5.60        |
| 450.9800        | 44.81                   | QP                   | -2.01                    | 42.80               | 46.00          | 3.20*       |
| 461.6500        | 44.11                   | QP                   | -1.51                    | 42.60               | 46.00          | 3.40*       |
| 510.1500        | 43.83                   | QP                   | -0.93                    | 42.90               | 46.00          | 3.10*       |
| 546.0400        | 42.82                   | QP                   | -0.72                    | 42.10               | 46.00          | 3.90*       |
| 641.1000        | 40.54                   | QP                   | 1.26                     | 41.80               | 46.00          | 4.20*       |

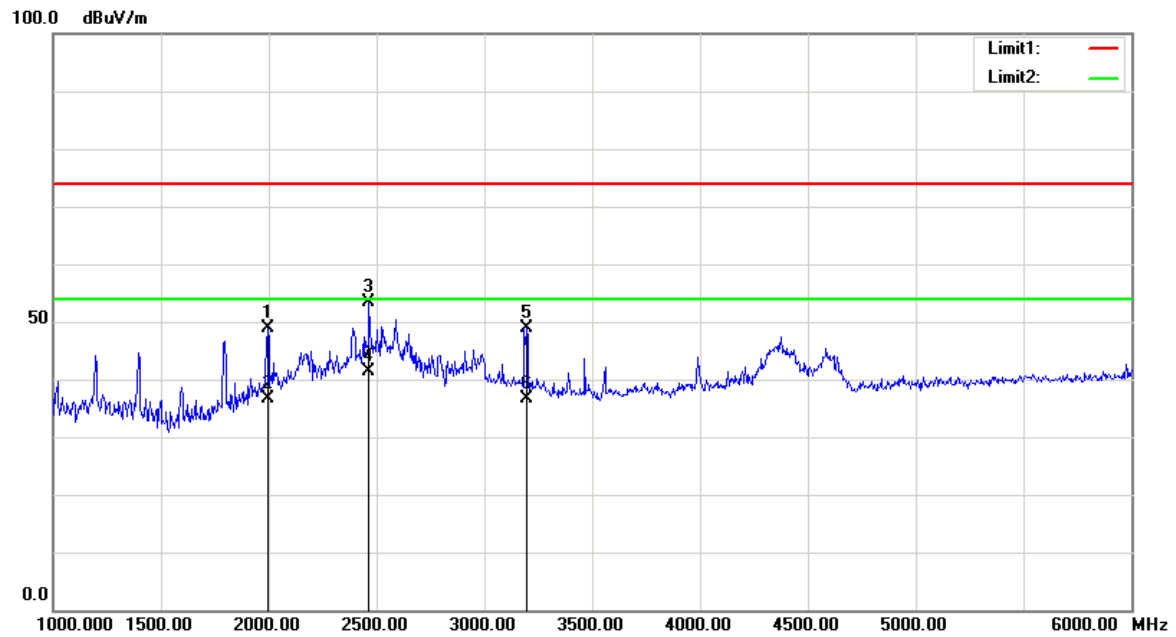
\*Within measurement uncertainty!

## 2) Above 1GHz:

## Horizontal



| Frequency (MHz) | Receiver Reading (dBμV) | Detector (PK/QP/Ave) | Correction Factor (dB/m) | Cord. Amp. (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|-------------------------|----------------------|--------------------------|---------------------|----------------|-------------|
| 1797.500        | 45.54                   | peak                 | -0.73                    | 44.81               | 74.00          | 29.19       |
| 1797.500        | 33.47                   | AVG                  | -0.73                    | 32.74               | 54.00          | 21.26       |
| 1992.500        | 45.70                   | peak                 | 0.22                     | 45.92               | 74.00          | 28.08       |
| 1992.500        | 33.23                   | AVG                  | 0.22                     | 33.45               | 54.00          | 20.55       |
| 2397.500        | 45.77                   | peak                 | 1.96                     | 47.73               | 74.00          | 26.27       |
| 2397.500        | 33.49                   | AVG                  | 1.96                     | 35.45               | 54.00          | 18.55       |

**Vertical**

| Frequency (MHz) | Receiver Reading (dB $\mu$ V) | Detector (PK/QP/Ave) | Correction Factor (dB/m) | Cord. Amp. (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
|-----------------|-------------------------------|----------------------|--------------------------|---------------------------|----------------------|-------------|
| 1997.500        | 48.60                         | peak                 | 0.25                     | 48.85                     | 74.00                | 25.15       |
| 1997.500        | 36.39                         | AVG                  | 0.25                     | 36.64                     | 54.00                | 17.36       |
| 2465.000        | 51.27                         | peak                 | 2.20                     | 53.47                     | 74.00                | 20.53       |
| 2465.000        | 39.15                         | AVG                  | 2.20                     | 41.35                     | 54.00                | 12.65       |
| 3197.500        | 42.23                         | peak                 | 6.59                     | 48.82                     | 74.00                | 25.18       |
| 3197.500        | 30.06                         | AVG                  | 6.59                     | 36.65                     | 54.00                | 17.35       |

## DECLARATION LETTER

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### DECLARATION OF SIMILARITY

Date: 2015-10-10

Dear Sir or Madam:

We, Hanwang Technology Co., Ltd, Hereby declare that product: Facial Recognition Terminal, model(s): M500,M100,M200,M300,M400,M600,M700,M800,M900,HF36, HF26,TF36,TF236,TF256,TF286,TF296,H58,TH58,H238,H258,H256,H266,H268,H288,H298,are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics. with the model M500 that were tested by BACL, the results of which are featured in BACL projects.

Their differences as the following:

The models: M500,M100,M200,M300,M400,M600,M700,M800,M900,HF36,HF26,TF36,TF236,TF256,TF286,TF296,H58,TH58,H238,H258,H256,H266,H268,H288,H298, share same PCB layout and schematic, they just have different model name. Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature:

A handwritten signature in black ink that reads "Shen Yuan".

Printed Name: Shen Yuan

Title: QA Manager

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