

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-MX000

Report Type: Original Report	Product Type: Facial Recognition Terminal
Test Engineer: <u>Lion Xiao</u>	
Report Number: <u>RBJ150930054-00B</u>	
Report Date: <u>2015-10-29</u>	
Reviewed By: <u>Sula Huang</u> RF Leader	
Test Laboratory: Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
EQUIPMENT MODIFICATIONS	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
SUPPORT CABLE LIST AND DETAILS	5
CONFIGURATION OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
FCC§15.107 - CONDUCTED EMISSIONS.....	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	8
EMI TEST RECEIVER SETUP.....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
CORRECTED AMPLITUDE & MARGIN CALCULATION	9
TEST RESULTS SUMMARY	10
TEST DATA	10
FCC §15.109 - RADIATED SPURIOUS EMISSIONS	13
MEASUREMENT UNCERTAINTY	13
EUT SETUP	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	15
CORRECTED AMPLITUDE & MARGIN CALCULATION	15
TEST RESULTS SUMMARY	15
TEST DATA	15
DECLARATION LETTER	20

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Hanwang Technology Co., Ltd*'s product, model number: *M2000 (FCC ID: XQI-FACEID-MX000)* (the "EUT") in this report was a *Facial Recognition Terminal*, which was measured approximately: 23.6cm (L) x 10.5cm (W) x 15.5 cm (H), rated input voltage: DC12V from adapter. The highest operation frequency is 1000MHz.

Adapter Information:

Model: SOY024A-1200150US

Input: 100-240V, 50/60Hz 0.6A Max.

Output: 12V,1.5A

Note: The series product, model M2000, M1000, M3000, M4000, M5000, M6000, M7000, M8000, M9000, T218, T318, T316, T326, T326U3G, T618, T328, T368, T385, T386, T388, T398, T628, T658, T688, T698 are electrically identical, the difference between them is just the model name, we selected M2000 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: 150930054 (Assigned by Applicant). The EUT was received on 2015-10-09.

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-MX000.

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.

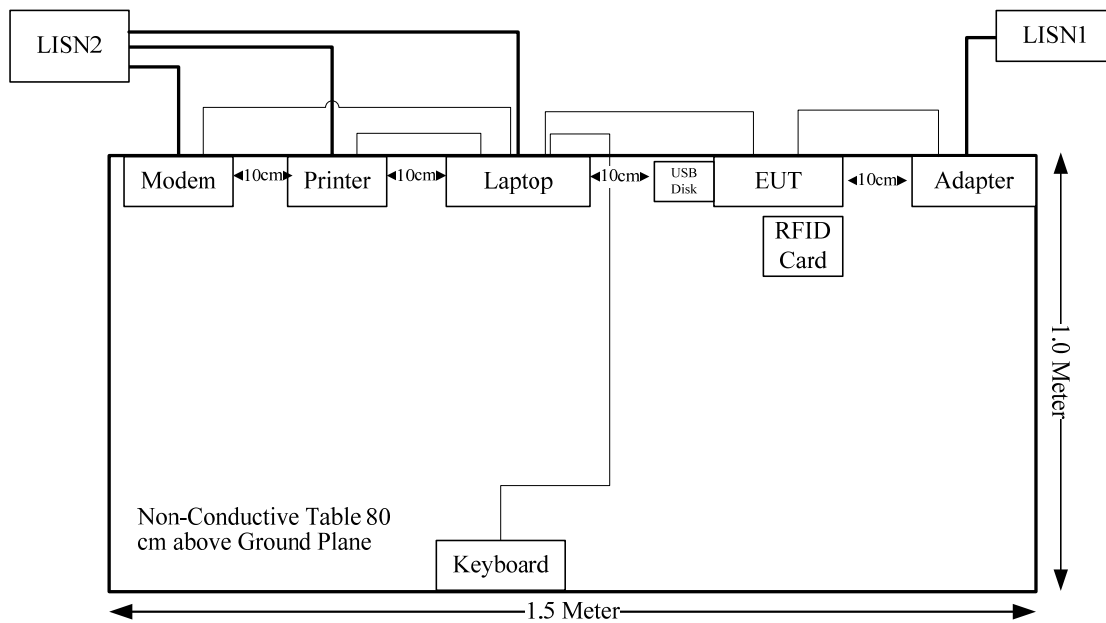
Support Equipment List and Details

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



SUMMARY OF TEST RESULTS

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:

7.70 dB at **0.412647 MHz** in the **Line** conducted mode

Test Data

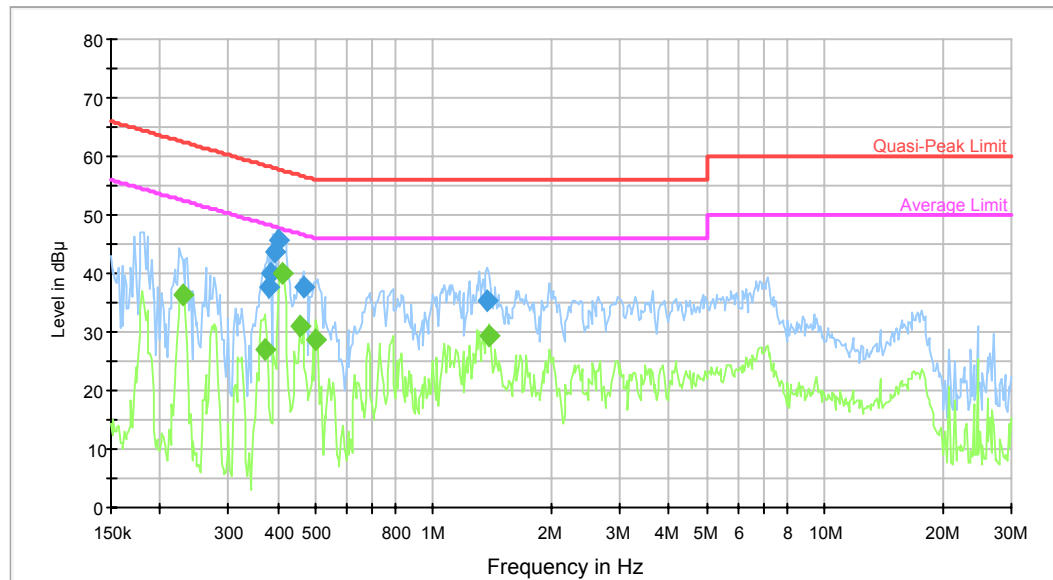
Environmental Conditions

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

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

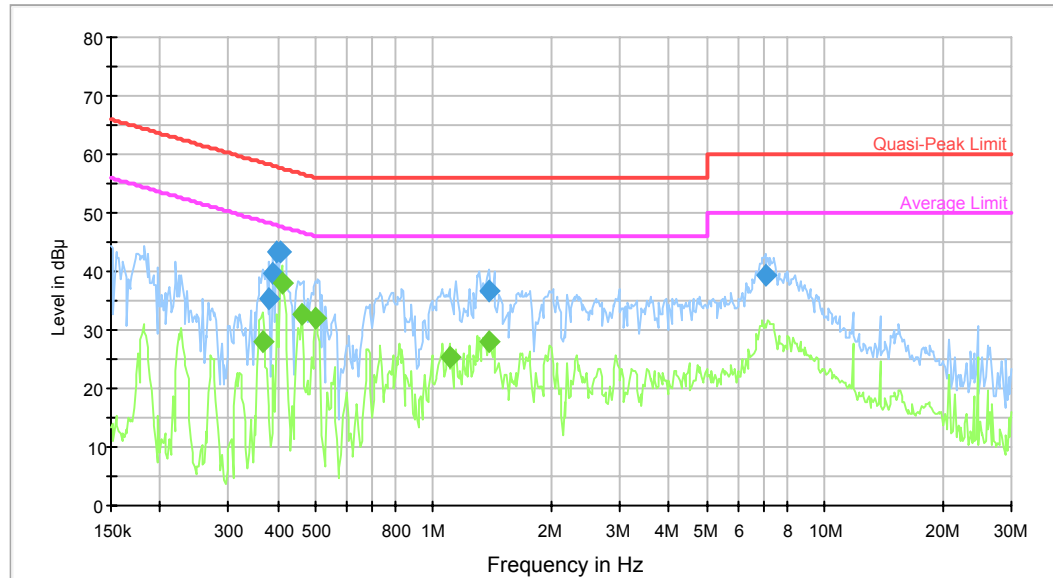
Test Mode: Operating

AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.378019	37.5	9.000	L1	9.8	20.8	58.3	Compliance
0.384091	40.1	9.000	L1	9.8	18.1	58.2	Compliance
0.393383	43.8	9.000	L1	9.8	14.2	58.0	Compliance
0.402900	45.8	9.000	L1	9.8	12.0	57.8	Compliance
0.465037	37.6	9.000	L1	9.8	19.0	56.6	Compliance
1.374420	35.2	9.000	L1	9.8	20.8	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.228823	36.5	9.000	L1	9.8	16.0	52.5	Compliance
0.372042	27.1	9.000	L1	9.8	21.3	48.5	Compliance
0.412647	39.9	9.000	L1	9.8	7.7	47.6	Compliance
0.454052	31.1	9.000	L1	9.8	15.7	46.8	Compliance
0.499611	28.6	9.000	L1	9.8	17.4	46.0	Compliance
1.385415	29.4	9.000	L1	9.8	16.6	46.0	Compliance

AC120V, 60Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.381043	35.4	9.000	N	9.8	22.8	58.3	Compliance
0.390261	39.6	9.000	N	9.8	18.4	58.1	Compliance
0.399703	43.2	9.000	N	9.8	14.7	57.9	Compliance
0.406123	43.3	9.000	N	9.8	14.4	57.7	Compliance
1.385415	36.5	9.000	N	9.8	19.5	56.0	Compliance
7.039285	39.2	9.000	N	10.0	20.8	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.366160	27.9	9.000	N	9.8	20.7	48.6	Compliance
0.409372	38.2	9.000	N	9.8	9.5	47.7	Compliance
0.461346	32.5	9.000	N	9.8	14.2	46.7	Compliance
0.499611	32.1	9.000	N	9.8	13.9	46.0	Compliance
1.099574	25.5	9.000	N	9.8	20.5	46.0	Compliance
1.385415	28.1	9.000	N	9.8	17.9	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.

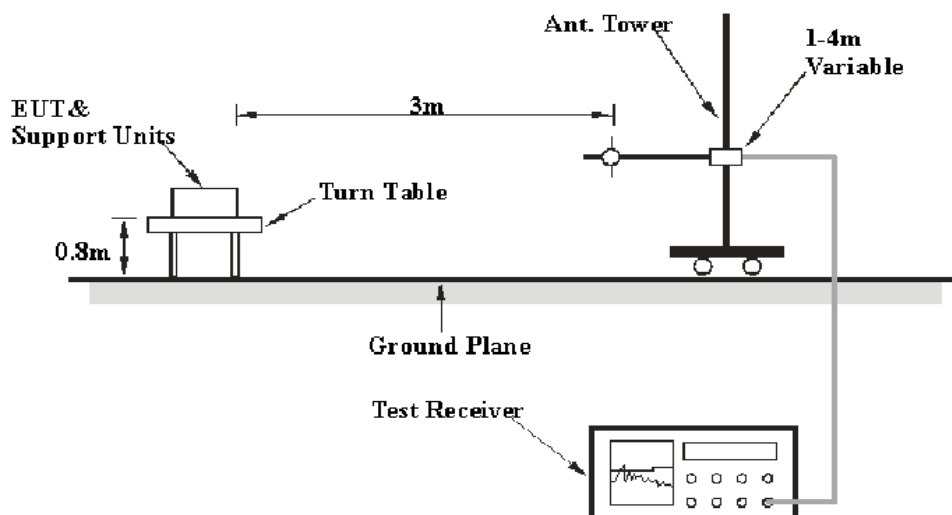
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of U_{cisp}

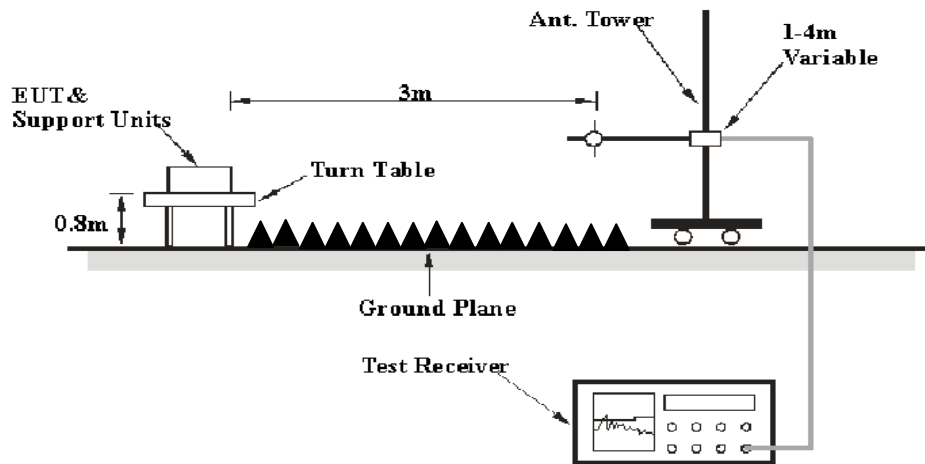
Measurement	U_{cisp}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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:

1.60 dB at 455.8300 MHz in the Horizontal polarization

Test Data

Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	44 %
ATM Pressure:	99.7 kPa

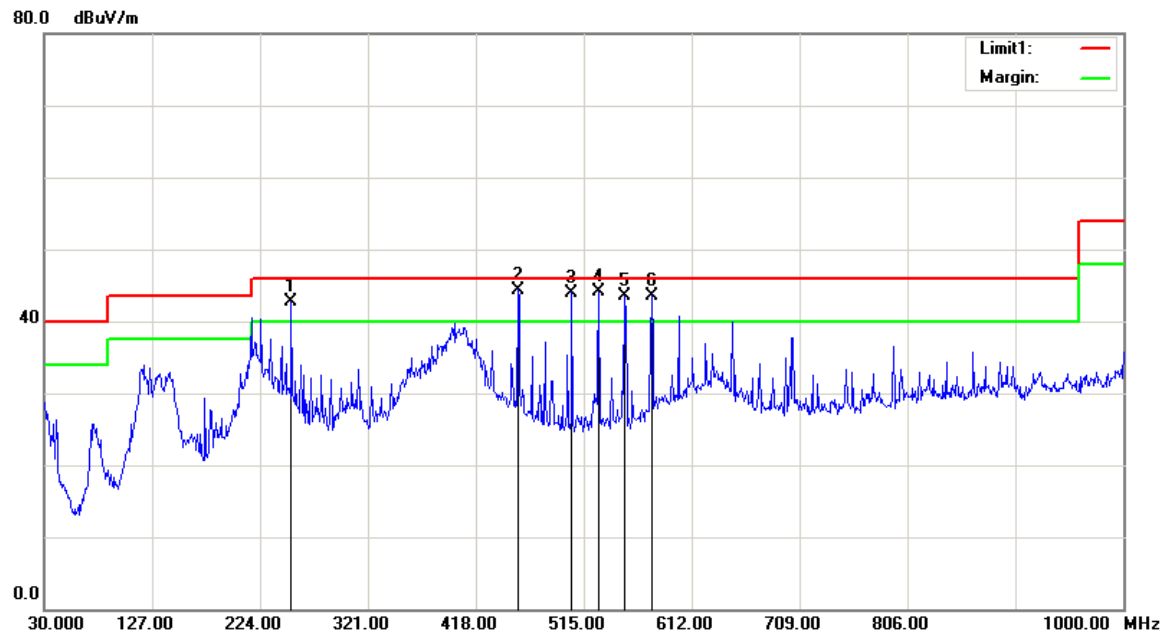
* The testing was performed by Lion Xiao on 2015-10-26.

Test Result: Compliance

Test Mode: Operating

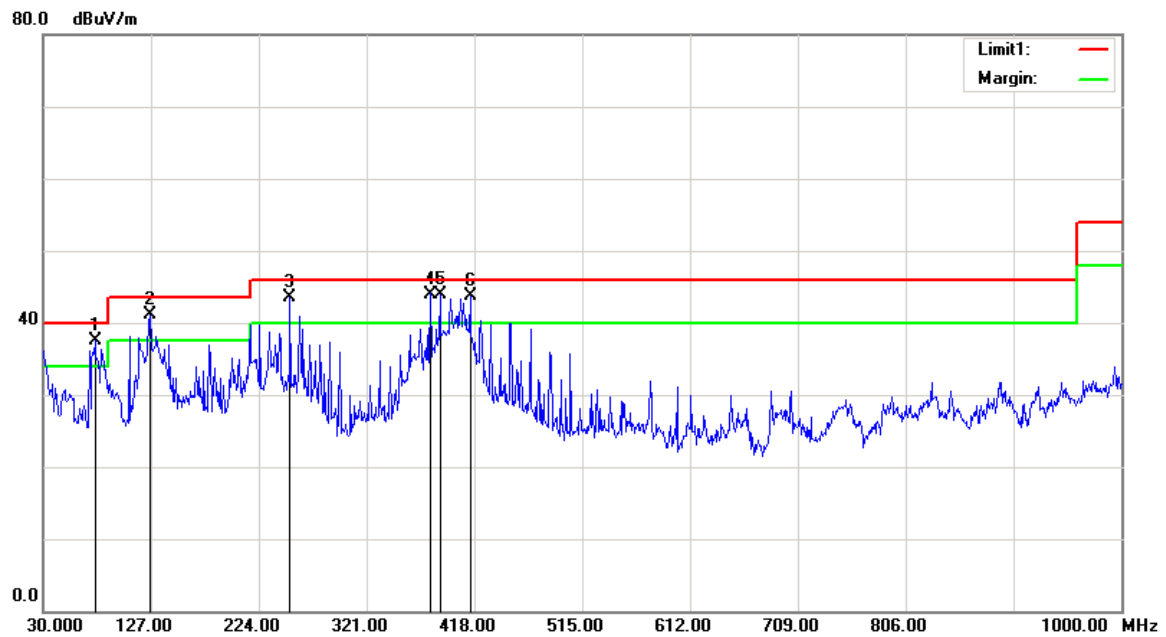
1) Below 1GHz:

Horizontal



Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
252.1300	49.86	QP	-7.16	42.70	46.00	3.30*
455.8300	46.14	QP	-1.74	44.40	46.00	1.60*
504.3300	45.06	QP	-1.06	44.00	46.00	2.00*
528.5800	44.82	QP	-0.72	44.10	46.00	1.90*
551.8600	44.15	QP	-0.65	43.50	46.00	2.50*
576.1100	43.12	QP	0.48	43.60	46.00	2.40*

*Within measurement uncertainty!

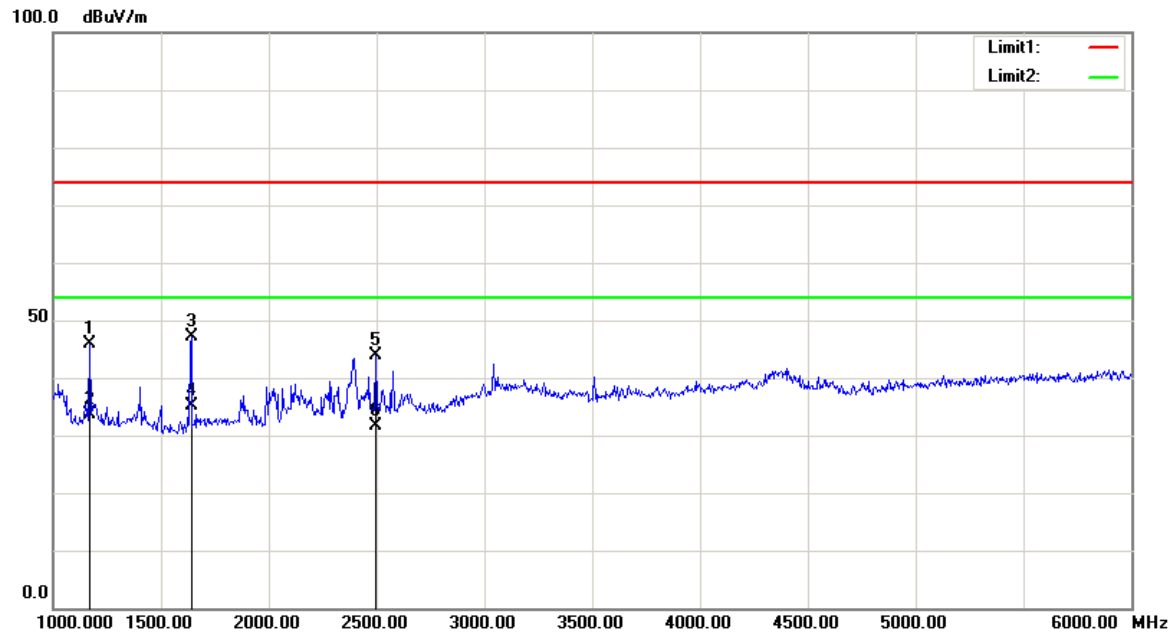
Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
76.5600	48.91	QP	-11.41	37.50	40.00	2.50*
126.0300	46.69	QP	-5.59	41.10	43.50	2.40*
252.1300	50.66	QP	-7.16	43.50	46.00	2.50*
378.2300	47.53	QP	-3.53	44.00	46.00	2.00*
386.9600	47.50	QP	-3.60	43.90	46.00	2.10*
414.1200	46.42	QP	-2.72	43.70	46.00	2.30*

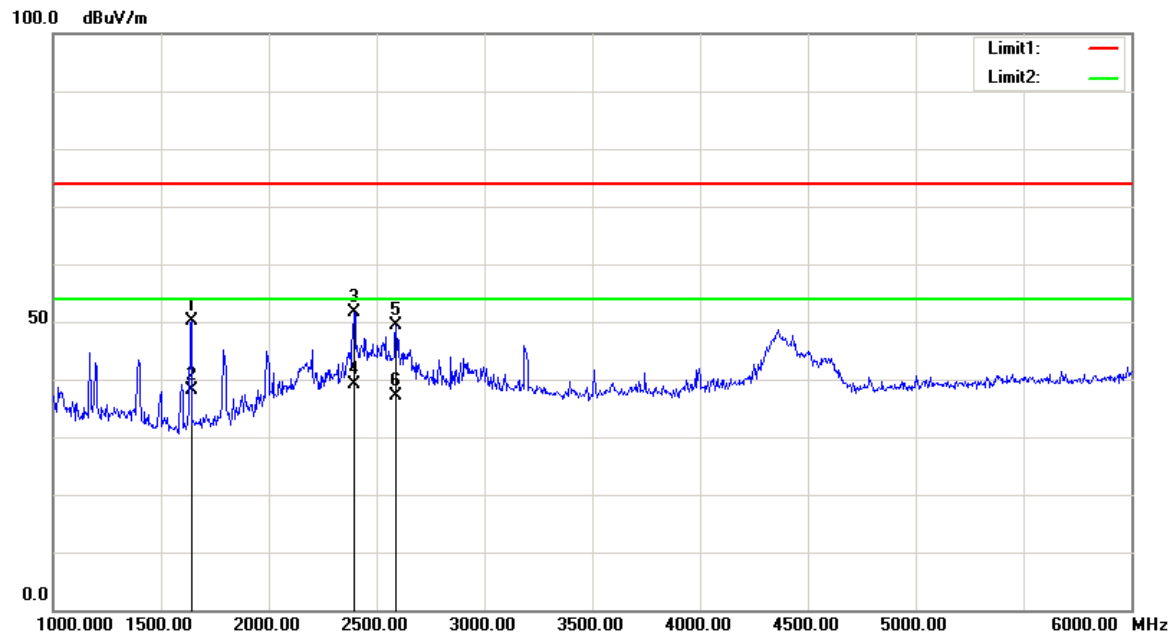
*Within measurement uncertainty!

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)
1170.000	47.03	peak	-1.04	45.99	74.00	28.01
1170.000	34.62	AVG	-1.04	33.58	54.00	20.42
1640.000	48.24	peak	-1.03	47.21	74.00	26.79
1640.000	36.12	AVG	-1.03	35.09	54.00	18.91
2497.500	41.83	peak	2.14	43.97	74.00	30.03
2497.500	29.49	AVG	2.14	31.63	54.00	22.37

Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1640.000	51.25	peak	-1.03	50.22	74.00	23.78
1640.000	39.08	AVG	-1.03	38.05	54.00	15.95
2397.500	49.57	peak	1.96	51.53	74.00	22.47
2397.500	37.28	AVG	1.96	39.24	54.00	14.76
2592.500	46.26	peak	3.11	49.37	74.00	24.63
2592.500	34.05	AVG	3.11	37.16	54.00	16.84

DECLARATION LETTER



Hanwang Technology Co., Ltd

Add: 3rd Floor, Building 5, No. 8 Dongbeiwang West Road Haidian District,
Beijing, china

Tel: +86 (0)10 8278 6760

Fax: +86 (0)10 8278 6766

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):M2000,M1000,M3000,M4000,M5000,M6000,M7000,M8000,M9000,T218,T318,T316,T326,T326U3G,T618,T328,T368,T385,T386,T388,T398,T628,T658,T688,T698,are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics. with the model M2000 that were tested by BACL, the results of which are featured in BACL projects.

Their differences as the following:

The models :M2000,M1000,M3000,M4000,M5000,M6000,M7000,M8000,M9000,T218,T318,T316,T326,T326U3G,T618,T328,T368,T385,T386,T388,T398,T628,T658,T688,T698, 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*****