

FCC PART 15B, CLASS B
MEASUREMENT AND TEST REPORT

For

Shenzhen Foscam Intelligent Technology Co., Ltd.

5/F, Block 1, Vision Business Park, Nanshan District, Shenzhen, PRC

FCC ID: ZDEFI9831PV2

Report Type: Original Report	Product Name: HD WIFI IP Camera
Test Engineer: August He	<i>August. He</i>
Report Number: RSZ140327003-00B	
Report Date: 2014-06-09	
Candy Li	<i>Candy. Li</i>
Reviewed By: RF Engineer	
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 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.

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 (FCC §15.27).....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
SPECIAL ACCESSORIES.....	5
EQUIPMENT MODIFICATIONS	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS.....	7
FCC §15.107 – AC LINE CONDUCTED EMISSIONS.....	8
APPLICABLE STANDARD	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	8
EMI TEST RECEIVER SETUP.....	9
TEST PROCEDURE	9
TEST EQUIPMENT LIST AND DETAILS.....	9
CORRECTED FACTOR & MARGIN CALCULATION	9
TEST RESULTS SUMMARY	10
TEST DATA	10
FCC §15.109 - RADIATED SPURIOUS EMISSIONS	13
APPLICABLE STANDARD	13
MEASUREMENT UNCERTAINTY.....	13
EUT SETUP	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	14
CORRECTED AMPLITUDE & MARGIN CALCULATION	15
TEST RESULTS SUMMARY	15
TEST DATA	15
PRODUCT SIMILARITY DECLARATION LETTER.....	17

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Foscam Intelligent Technology Co., Ltd.*'s product, model number: *FI9831EP V2* (FCC ID: *ZDEFI9831PV2*) or the "EUT" in this report is a *HD WIFI IP Camera*, which was measured approximately: 117 mm (L) x 114 mm (W) x 129 mm (H), rated with input voltage: DC 5.0 V from adapter. The highest operation frequency is 400MHz.

Adapter information:

Model: SAW-0502000

Input: AC 100-240V, 50/60 Hz, 0.5A

Output: DC 5.0V, 2000mA

Note: The product, series model FI9831P V2, HD816P V2, EH8165, FI9821P V2, FC2402P V2 are electrically identical, the only difference among them is their model numbers. Model FI9831P V2 was selected for fully testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.

All measurement and test data in this report was gathered from production sample serial number: FIAI1403000001 (Assigned by applicant). The EUT supplied by the applicant was received on 2014-03-27.

Objective

This report is prepared on behalf of *Shenzhen Foscam Intelligent Technology Co., Ltd.* in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC part 15.247 DTS submission with FCC ID: ZDEFI9831PV2

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. 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 (FCC §15.27)**Justification**

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

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

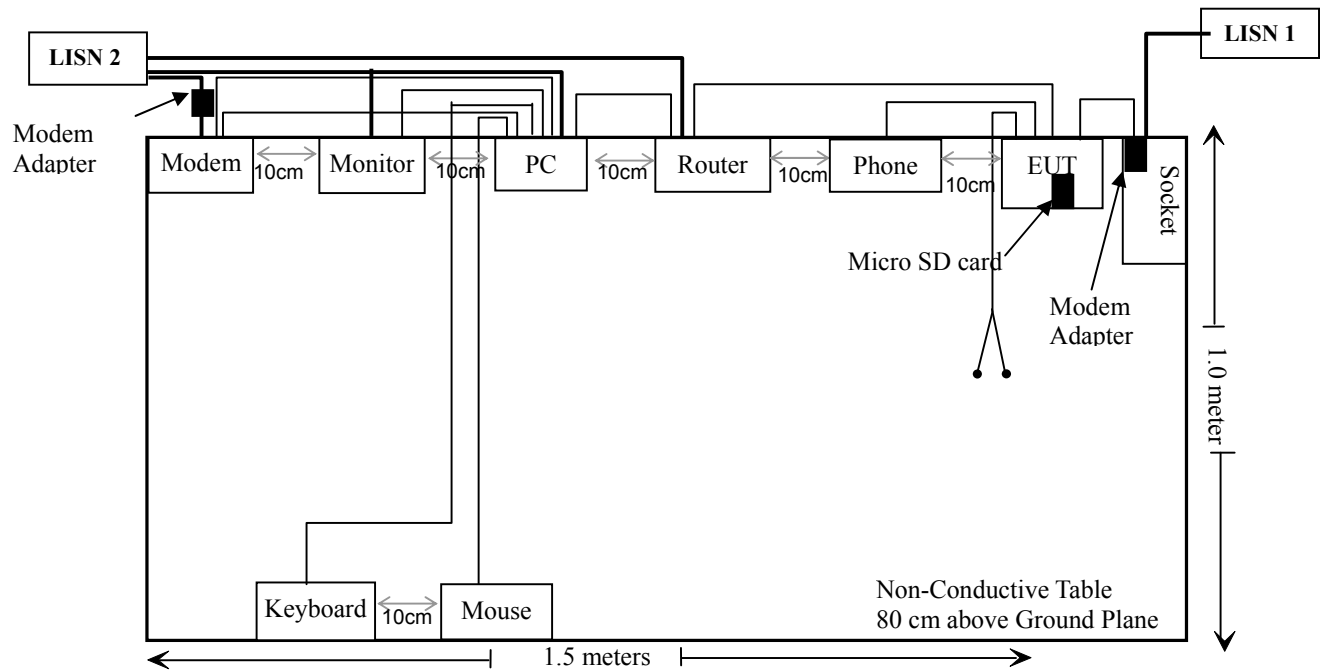
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
SAST	Modem	AEM-2100	0293
Sandisk	T-F Card	N/A	3491
HTC	Phone	G18	HT247V805779
TB-LINK	Wireless Router	TL-WR847N	13203838617

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachabled DC Cable	1.0	Adapter	EUT
Un- shielding Detachabled audio Cable	0.5	Phone	EUT
Un-shielding Un-detachabled Earphone Cable	1.5	Earphone	EUT
Un- shielding Detachabled RJ45 Cable	5.0	EUT	PC

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.107

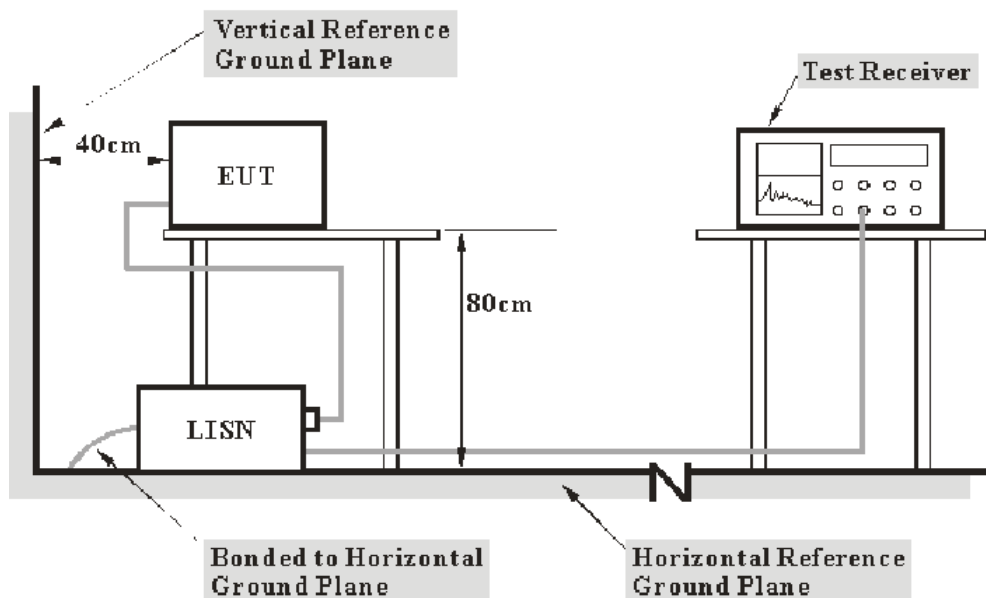
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

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 measurement procedure of EUT setup is according with ANSI C63.4-2009. The related limit was specified in FCC Part 15.107 Class B.

The adapter was connected to an AC 120V/60 Hz 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 Procedure

During the conducted emission test, the socket was connected to the outlet of the LISN.

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-05-07	2015-05-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2013-10-15	2014-10-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53	--	--

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB 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 recorded data in following table, the worst margin reading as below:

11.5 dB at 27.000970 MHz in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

In BACL., $U_{(L_m)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

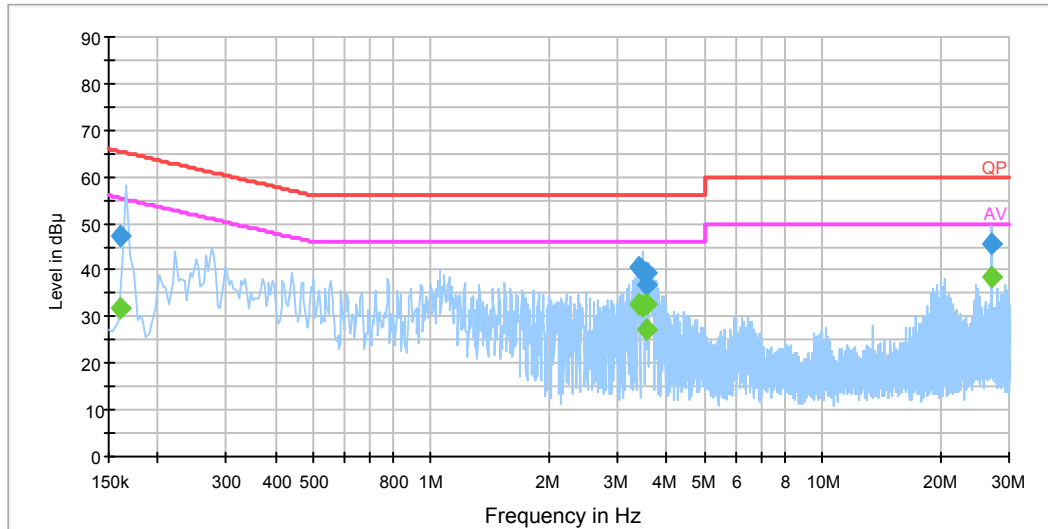
Test Data

Environmental Conditions

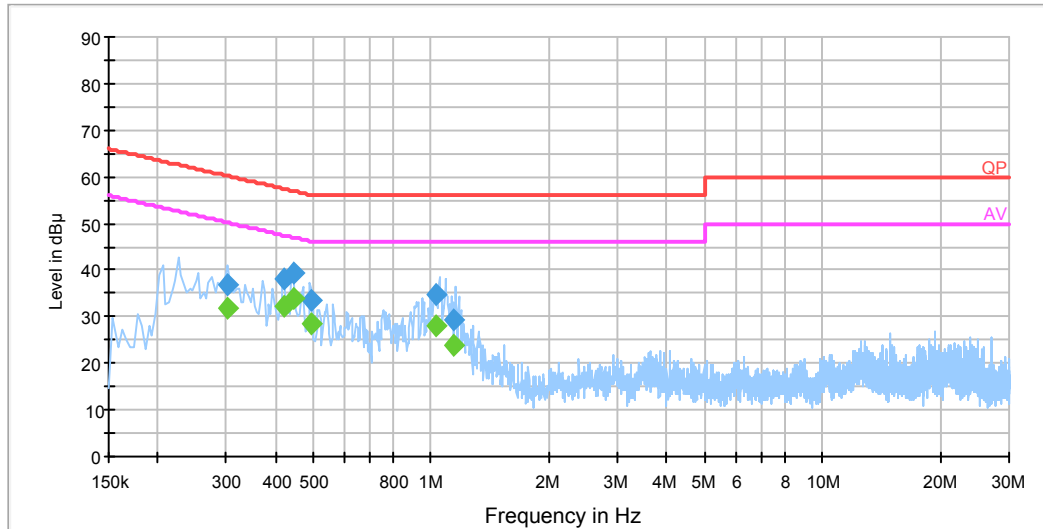
Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by August He on 2014-06-06.

Test Mode: Running

AC 120V/60 Hz, Line**EMI Auto Test L**

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.161500	47.2	19.6	65.4	18.2	QP
0.161500	31.6	19.6	55.4	23.8	Ave.
3.387330	40.4	19.7	56.0	15.6	QP
3.387330	32.7	19.7	46.0	13.3	Ave.
3.489650	39.9	19.7	56.0	16.1	QP
3.489650	32.0	19.7	46.0	14.0	Ave.
3.547970	39.3	19.7	56.0	16.7	QP
3.547970	32.7	19.7	46.0	13.3	Ave.
3.557170	37.0	19.7	56.0	19.0	QP
3.557170	27.2	19.7	46.0	18.8	Ave.
27.000970	45.8	20.1	60.0	14.2	QP
27.000970	38.5	20.1	50.0	11.5	Ave.

AC 120V/60 Hz, Neutral**EMI Auto Test N**

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.301470	36.8	19.5	60.2	23.4	QP
0.301470	31.6	19.5	50.2	18.6	Ave.
0.419730	37.9	19.6	57.5	19.5	QP
0.419730	32.4	19.6	47.5	15.1	Ave.
0.443370	39.2	19.6	57.0	17.8	QP
0.443370	33.9	19.6	47.0	13.1	Ave.
0.494650	33.4	19.7	56.1	22.7	QP
0.494650	28.5	19.7	46.1	17.5	Ave.
1.034250	34.6	19.5	56.0	21.4	QP
1.034250	28.0	19.5	46.0	18.0	Ave.
1.144690	29.4	19.5	56.0	26.6	QP
1.144690	23.9	19.5	46.0	22.1	Ave.

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 3) Margin = Limit – Corrected Amplitude

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §15.109

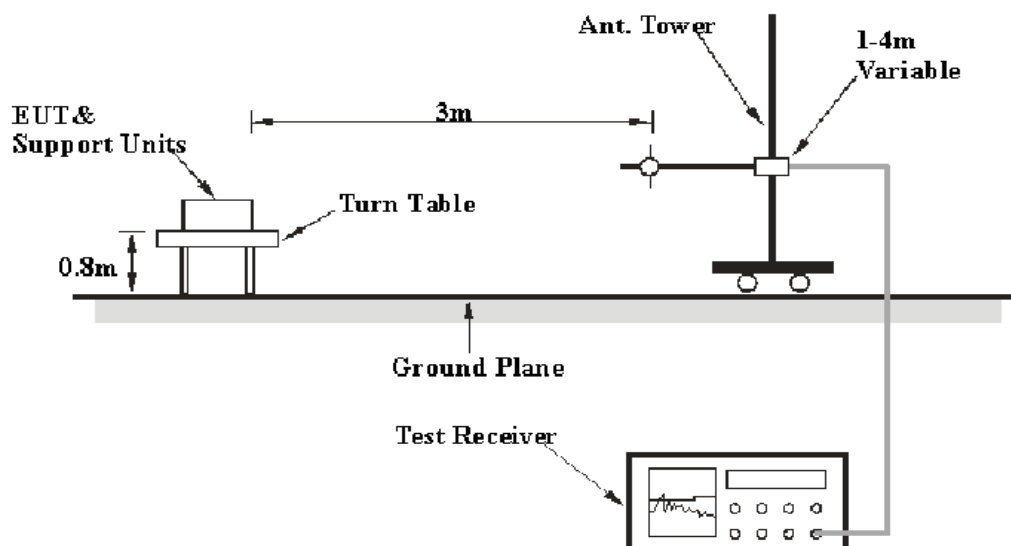
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal / Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal / Vertical	4.92 dB (k=2, 95% level of confidence)

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 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 spacing between the peripherals was 10 cm.

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

EMI Test Receiver Setup

The system was investigated from 30 MHz to 2 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
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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

All final data was recorded in the Quasi-peak detector mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
HP	Amplifier	8447E	1937A01046	2013-09-30	2014-09-30
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2013-11-12	2014-11-12
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
R&S	Auto test Software	EMC32	V9.10	-	-
TDK	Chamber	Chamber B	1#	2011-07-23	2015-07-22
BIZI	Signal Analyzer	FSIQ26	8386001028	2013-11-12	2014-11-12
A. H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2015-02-10
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2014-04-03	2015-04-03

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

Corrected Amplitude & Margin Calculation

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

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

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 recorded data in following table, the worst margin reading as below:

0.69 dB at 81.00 MHz in the Vertical polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{\text{lim}} + U_{\text{cispr}}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Webb Liu on 2014-06-06.

Test mode: Running

30 MHz ~ 2 GHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC PART 15B	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
75.02	58.56	QP	340	2.3	V	-19.3	39.26	40	0.74
81.00	58.61	QP	169	1.1	V	-19.3	39.31	40	0.69
150.00	56.15	QP	331	1.0	V	-13.8	42.35	43.5	1.15
350.99	56.90	QP	122	1.0	H	-12.0	44.90	46	1.10
405.00	55.25	QP	274	1.0	H	-10.1	45.15	46	0.85
621.00	52.19	QP	29	1.1	V	-7.2	44.99	46	1.01
1536.27	55.13	PK	260	1.1	H	1.15	56.28	74	17.72
1536.27	40.22	Ave.	260	1.1	H	1.15	41.37	54	12.63
1835.19	53.21	PK	99	1.2	H	2.63	55.84	74	18.16
1835.19	39.67	Ave.	99	1.2	H	2.63	42.30	54	11.70

Note:

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

PRODUCT SIMILARITY DECLARATION LETTER

FOSCAM

ShenZhen Foscam Intelligent Technology Co., Ltd.

Address: 5/F, Block 1, Vision Business Park, Nanshan District, Shenzhen, PRC

Tel: 0755-26720367-8306; Fax: 0755-26745168

2014-5-26

Product Similarity Declaration

To Whom It May Concern,

We, ShenZhen Foscam Intelligent Technology Co., Ltd. hereby declare that our HD WIFI IP Camera, Model Number: HD816P V2, EH8165, FI9821P V2, FC2402P V2 are electrically identical with the FI9831P V2 that was certified by BACL. They are only different in model names.

Please contact me if you have any question.

Signature:

Yidong Xu
Manager

Yidong Xu

5/26, 2014

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