



**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: ZDEFI9818W**

<b>HD Wireless IP Camera</b> Original Report	<b>Product Type:</b> HD Wireless IP Camera
<b>Test Engineer:</b> <u>Gardon Zhang</u> 	
<b>Report Number:</b> <u>RSZ130801001-00A</u>	
<b>Report Date:</b> <u>2013-11-14</u>	
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## GENERAL INFORMATION

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

The *ShenZhen Foscam Intelligent Technology Co., Ltd.*'s product, model number: *FI9818W V2* (FCC ID: *ZDEFI9818W*) or the "EUT" in this report was a *HD Wireless IP Camera*, which was measured approximately: 11.0cm (L) x 10.3 cm (W) x 12.6 cm (H), rated with input voltage: DC 5V from adapter. The highest operating frequency is 440 MHz.

Adapter Information:

Model: SAW-0502000

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

Output: 5V, 2000mA

*Note: Product HD Wireless IP Camera, model FI9818W V2, FI9818P, HD811W, HD811P, FC2401W, FC2401P they are just different from the model number and has P2P function or not. Model FI9818W V2 was selected for fully testing, which was explained in 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: 1308001 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-08-01.*

### Objective

This report is prepared on behalf of *ShenZhen Foscam Intelligent Technology Co., Ltd.* in accordance with Part 2-Subpart J, 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 submissions with FCC ID: ZDEFI9818W.

### 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

### Description of Test Configuration

The system was configured for testing in a typical mode which is provided by manufacture.

### EUT Exercise Software

No exercise software was used.

### Equipment Modifications

No modification was made to the EUT tested.

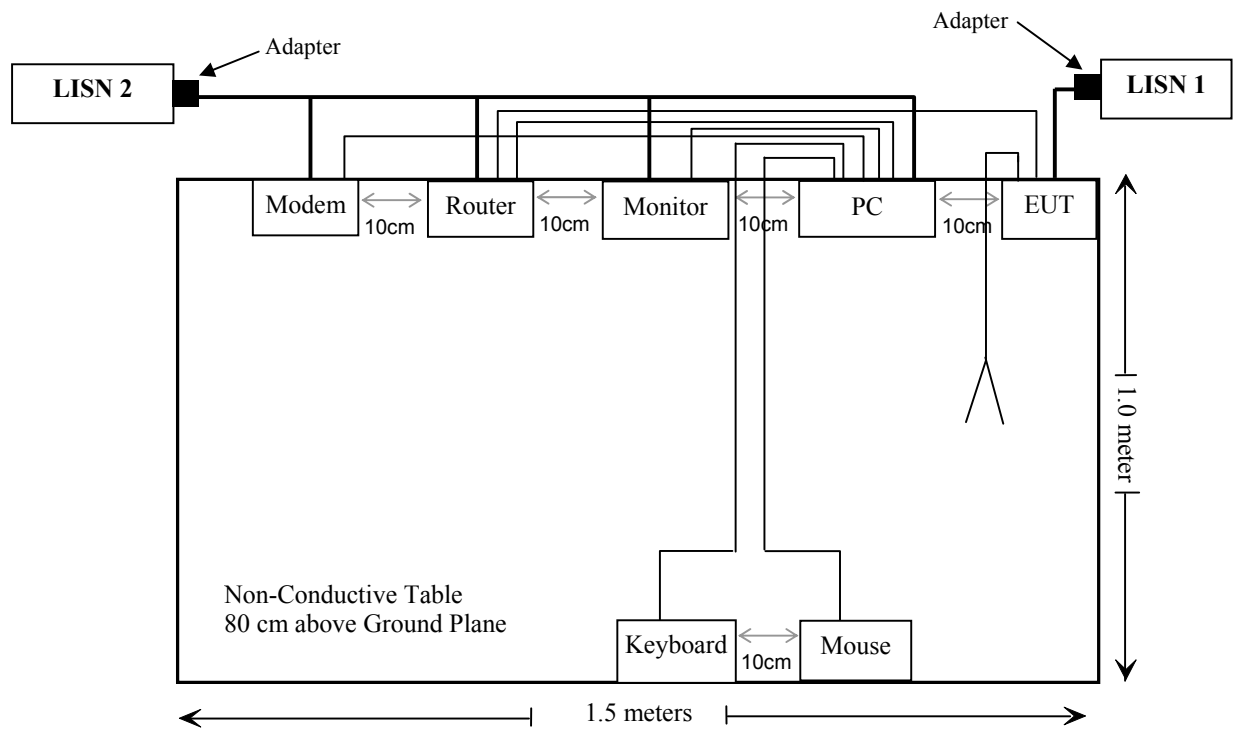
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	Remark
DELL	PC	127BPX2	N/A	EMI
DELL	Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH	/
N/A	Mouse	M-2	N/A	/
DELL	Keyboard	L100	CNORH656658907 BL04TY	/
ECOM	Modem	5600pbs	N/A	/
PHILIPS	Headset	SHM1500	N/A	/
SAGEM	Wireless ADSL Router	SAGEM F@ST™ 2604 White	N/A	

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable AC Cable	1.0	Main	PC
Shielded Undetachable USB cable	1.5	EUT	PC
Shielded Undetachable Mouse Cable	1.5	Mouse	PC
Shielded Undetachable K/B Cable	1.5	K/B	PC
Shielded Detachable VGA Cable	1.5	Monitor	PC
Unshielded Detachable RS232 Cable	1.5	Modem	PC
Unshielded Detachable AC Cable	1.5	Mains	Monitor
Unshielded Undetachable DC Cable	1.7	Adapter	Modem
Unshielded Detachable RJ45 Cable	1.5	Router	PC
Unshielded Undetachable adapter cable	1.5	EUT	Adapter

## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

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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

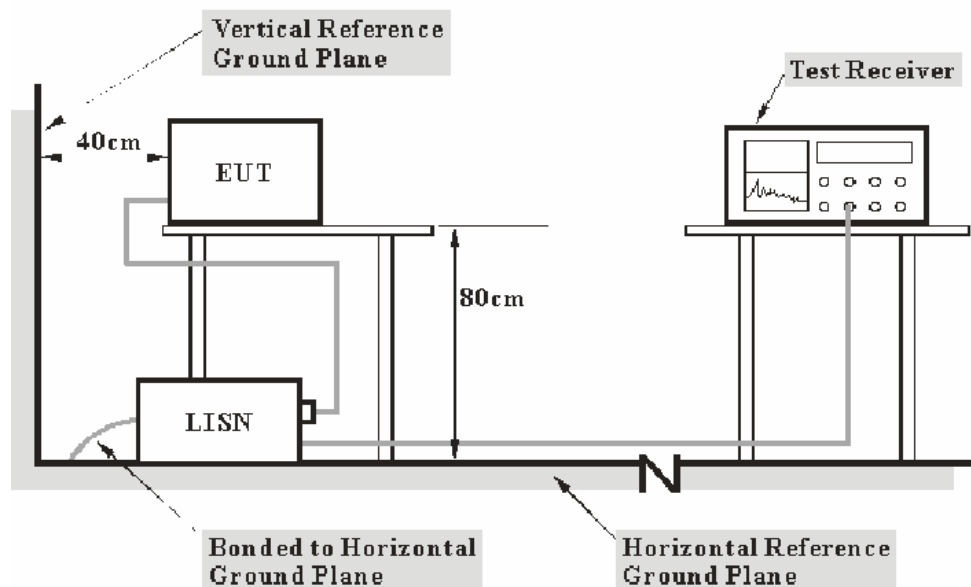
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN 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	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

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.

### 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	L.I.S.N.	ESH2-Z5	892107/021	2013-08-22	2014-08-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2013-10-15	2014-10-15
Rohde & Schwarz	CE Test software	EMC 32	8.95	--	--

\* **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/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

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

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, with the worst margin reading of:

**17.0 dB at 0.578000 MHz** in the **Neutral** conducted mode

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

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

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

## Test Data

### Environmental Conditions

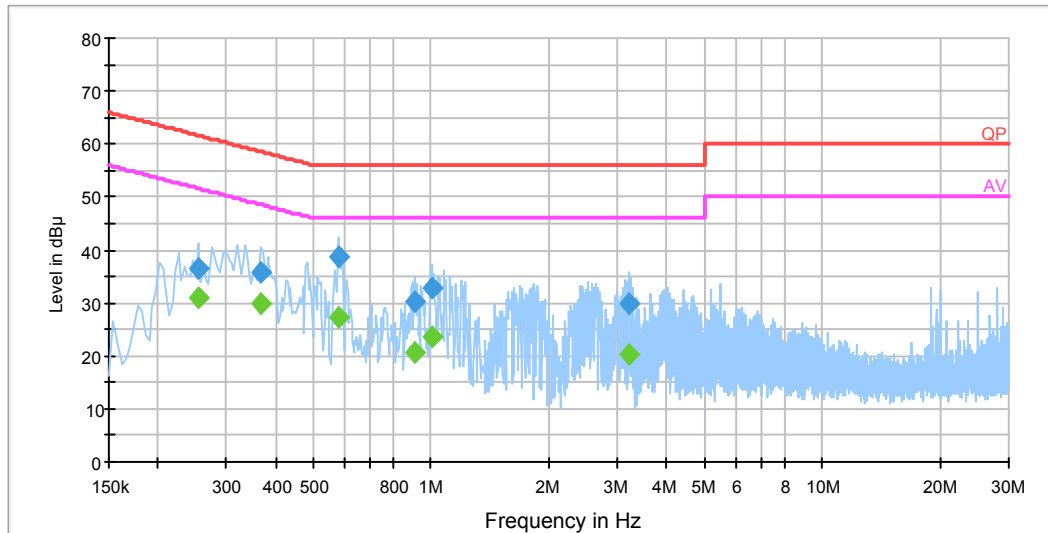
Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

*The testing was performed by Gardon Zhang on 2013-08-06.*

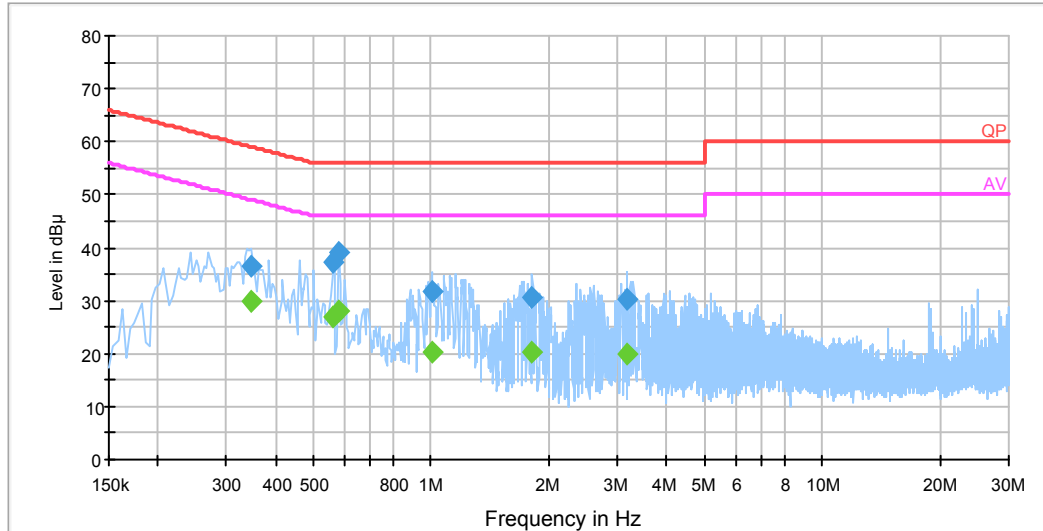
EUT operation mode: Running

AC 120V/60 Hz, Line

EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
0.578000	38.7	19.5	56.0	17.3	QP
0.366000	30.0	19.5	48.6	18.6	Ave.
0.578000	27.3	19.5	46.0	18.7	Ave.
0.254000	30.9	19.5	51.6	20.7	Ave.
1.002000	23.8	19.5	46.0	22.2	Ave.
0.366000	35.9	19.5	58.6	22.7	QP
1.002000	33.0	19.5	56.0	23.0	QP
0.254000	36.5	19.5	61.6	25.1	QP
0.910000	20.8	19.5	46.0	25.2	Ave.
3.214000	20.3	19.6	46.0	25.7	Ave.
0.910000	30.2	19.5	56.0	25.8	QP
3.214000	29.8	19.6	56.0	26.2	QP

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

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
0.578000	39.0	19.5	56.0	17.0	QP
0.578000	28.1	19.5	46.0	17.9	Ave.
0.562000	37.2	19.5	56.0	18.8	QP
0.562000	27.1	19.5	46.0	18.9	Ave.
0.346000	29.8	19.5	49.1	19.2	Ave.
0.346000	36.4	19.5	59.1	22.7	QP
1.002000	31.7	19.5	56.0	24.3	QP
1.814000	30.4	19.5	56.0	25.6	QP
1.002000	20.4	19.5	46.0	25.6	Ave.
3.178000	30.3	19.6	56.0	25.7	QP
1.814000	20.3	19.5	46.0	25.7	Ave.
3.178000	20.1	19.6	46.0	25.9	Ave.

**Note:**

- 1) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation  
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

## FCC §15.109 - RADIATED EMISSIONS

### Applicable Standard

According to FCC §15.109

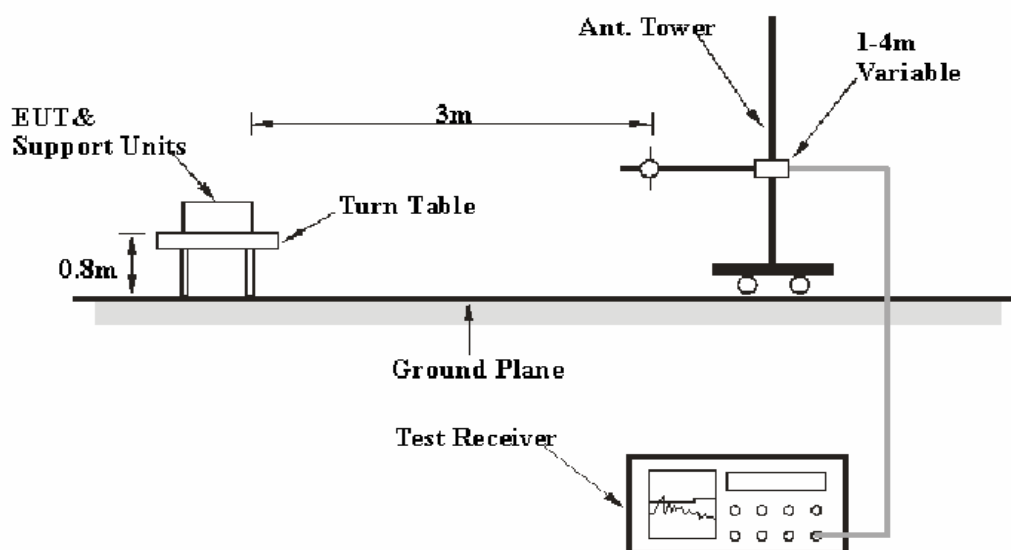
### Measurement Uncertainty

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 expended 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 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 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
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	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 data was recorded in the Quasi-peak detection mode from 30 MHz to 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
HP	Amplifier	8447E	1937A01046	2013-09-30	2014-09-30
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	--	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
R&S	Auto test Software	EMC32	V6.30	--	--

\* **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 Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Correction Factor} = \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB 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, with the worst margin reading of:

**1.1 dB at 417.99 MHz in the Horizontal polarization**

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

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

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

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Gardon Zhang on 2013-11-13.*

*EUT operation mode: Running*

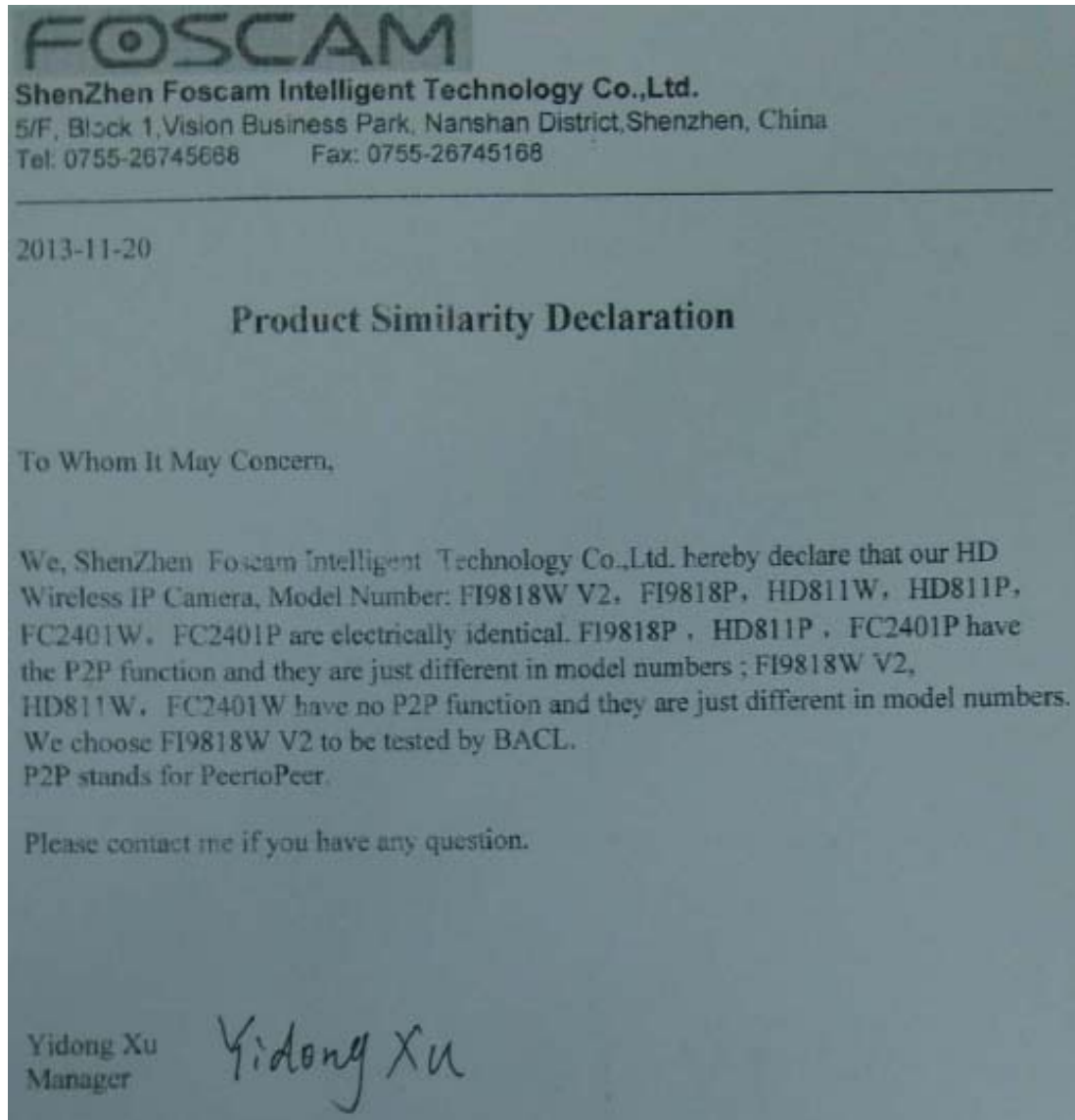
**30MHz ~ 2 GHz**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part 15.109	
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB $\mu$ V/m)	Margin (dB)
239.99	58.4	QP	250	1.5	H	-15.8	42.6	46	3.4*
417.99	56.2	QP	160	1.3	V	-11.3	44.9	46	1.1*
1328.9	55.21	PK	98	1.2	H	0.19	55.4	74	18.6
1328.9	41.65	Ave.	98	1.2	H	0.19	41.84	54	12.16
1576.3	54.69	PK	210	1.4	V	1.15	55.84	74	18.16
1576.3	40.25	Ave.	210	1.4	V	1.15	41.4	54	12.6

Note:

- 1) Corrected Amplitude = Corrected Factor + Reading
- 2) Corrected Factor = Antenna factor (RX) + Cable loss – Amplifier factor
- 3) Margin = Limit - Corrected Amplitude
- 4) \*Within measurement uncertainty

## **DECLARATION LETTER**



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