FCC TEST REPORT

FCC ID: 2AJFC-QHY168C

On Behalf of

Light Speed Vision (Beijing) Co.,Ltd.

Camera

Model No.: QHY168C, QHY165C, QHY247C, QHY367C, QHY268C, QHY42M

Prepared for	:	Light Speed Vision (Beijing) Co.,Ltd.
Address	:	Xinyuan Science Park A808, Shahezhen Changping Road No.97 Changping Beijing China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

Report Number	:	T1870155 03
Date of Receipt	:	February 17, 2017
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TEST REPORT DECLARATION

Applicant	:	Light Speed Vision (Beijing) Co.,Ltd.
Manufacturer	:	Light Speed Vision (Beijing) Co.,Ltd.
EUT Description	:	Camera
	(A) Model No.	: QHY168C, QHY165C, QHY247C, QHY367C, QHY268C, QHY42M
	(B) Trademark	: QHYCCD
	(C) Ratings Supply	: DC 12V
	(D) Test Voltage	: DC 12V from Adapter with AC 120V/60Hz

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B 2016, ANSI C63.4:2014

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Reak Yang Test Engineer	Reak Yang
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	March 15, 2017	

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	**Standard**	**Limits**	**Results**
Power Line Conducted Emission Test	FCC Part 15:2016 ANSI C63.4:2014	Class B	**P**
Radiated Emission Test	FCC Part 15:2016 ANSI C63.4:2014	Class B	**P**
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.			

2. GENERAL INFORMATION

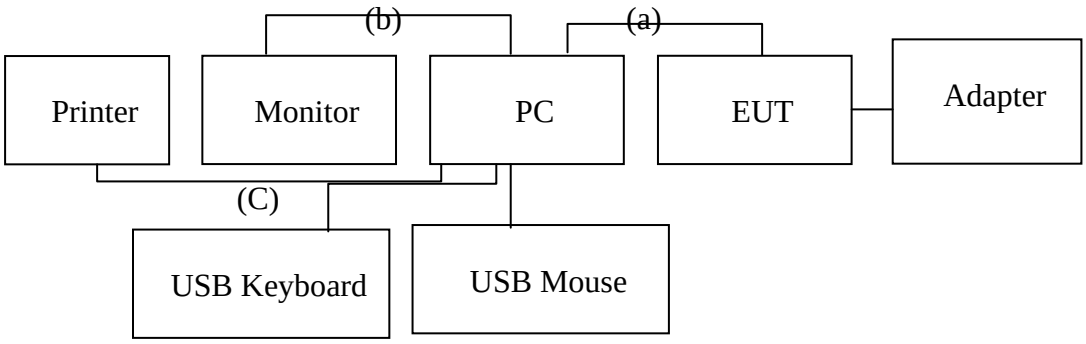
2.1.Description of Device (EUT)

Description	:	Camera
Model Number	:	QHY168C, QHY165C, QHY247C, QHY367C, QHY268C, QHY42M
Diff	:	There is no difference between all the models, except the appearance color and model name, so this report performs the model QHY168C.
Test Voltage	:	DC 12V from Adapter with AC 120V/60Hz
AC Adapter	:	Input: AC 100-240V, 50/60Hz Output: DC 12V/6A
Highest frequency	:	480MHz
Software version	:	EACAP_QT_V134
Hardware version	:	QHY168C_V3
Trademark	:	QHYCCD
Applicant	:	Light Speed Vision (Beijing) Co.,Ltd.
Address	:	Xinyuan Science Park A808, Shahezhen Changping Road No.97 Changping Beijing China
Manufacturer	:	Light Speed Vision (Beijing) Co.,Ltd.
Address	:	Xinyuan Science Park A808, Shahezhen Changping Road No.97 Changping Beijing China
Sample Type	:	Prototype production

2.2.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Personal Computer	DELL	D11M	CN-0LV772-C0887-378-H8UR	DOC
2	Monitor	DELL	E2014Hf	CN-011HFV-72872-397-CHEM	DOC
3	USB Keyboard	ACER	SK-9625	KBUSB1580500037E0100	DOC
4	USB Mouse	ACER	MS.11200.014	M-UAY-ACR2	DOC
5.	Printer	HP	HP1020	CNCJ410726	DOC

2.3.Block Diagram of connection between EUT and simulators



Signal Cable Description of the above Support Units					
No.	**Port Name**	**Cable**	**Length**	**Shielded (Yes or No)**	**Detachable (Yes or No)**
(a)	USB Port	USB Cable	150CM	Yes(Shielding and foil shields)	Yes
(b)	VGA Port	VGA Cable	120CM	Yes(Shielding)	Yes
(C)	Serial Port	Serial Cable	150CM	Yes(Shielding)	Yes

EUT: Camera

2.4.Test mode Description

No.	Test Mode
※1.	Communicate with PC
2.	Standby
Note: ※ is worst case mode for, so this report only reflected the worst mode.	

2.5.Test Facility

Shenzhen Alpha Product Testing Co., Ltd.
Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road, Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2.6.Measurement Uncertainty

(95% confidence levels, k=2)

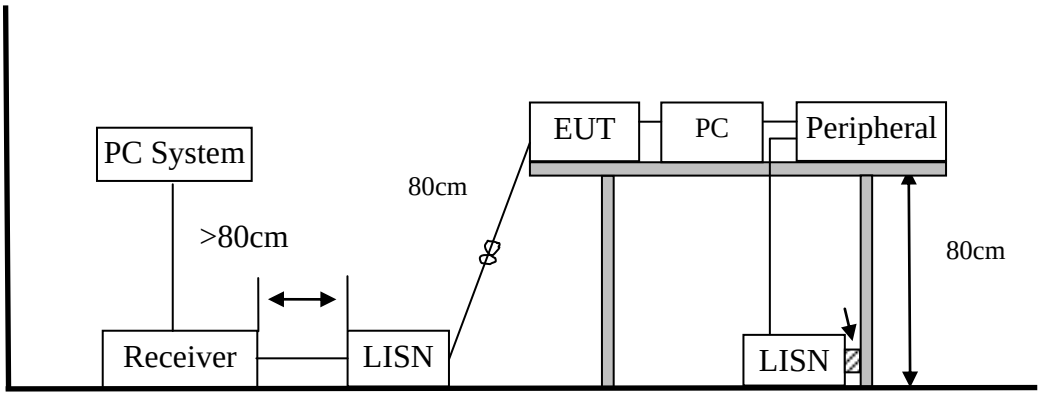
Test Item	Uncertainty
Uncertainty for Conduction emission test	2.71dB
Uncertainty for Radiation Emission test (<1G)	3.90 dB (Distance: 3m Polarize: V)
	3.92 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test (>1G)	4.26 dB (Distance: 3m Polarize: V)
	4.28 dB (Distance: 3m Polarize: H)

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2016.09.29	1 Year
2.	L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2016.09.29	1 Year
3.	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2016.09.29	1 Year
4.	Pulse Limiter	Schwarzbeck	9516F	9618	2016.09.29	1 Year
5	Cable	Resenberger	SUCOFLEX 104	MY6562/4	2016.09.29	1 Year

3.2.Block Diagram of Test Setup



3.3.Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. Emission level=Read level + LISN factor-Preamp factor + Cable loss

2. * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.4.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.5.Operating Condition of EUT

（1） Setup the EUT as shown as Section 3.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

3.6.Test Procedure

（1） The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on conducted Emission test.

（2） The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.

（3） The frequency range from 30MHz to 1000MHz was pre-scanned with a Peak detector and all final readings of measurement from Test Receiver are Quasi-Peak and Average values.

（4） The test results are reported on Section 3.7.

3.7.Conducted Disturbance at Mains Terminals Test Results

EUT	:	Camera	Test Date	:	2017.03.8
M/N	:	QHY168C	Temperature	:	24.1℃
Test Engineer	:	Reak Yang	Humidity	:	51%
Test Mode	:	Communicate with PC			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

2. This mode is worst case mode, so this report only reflected the worst mode.

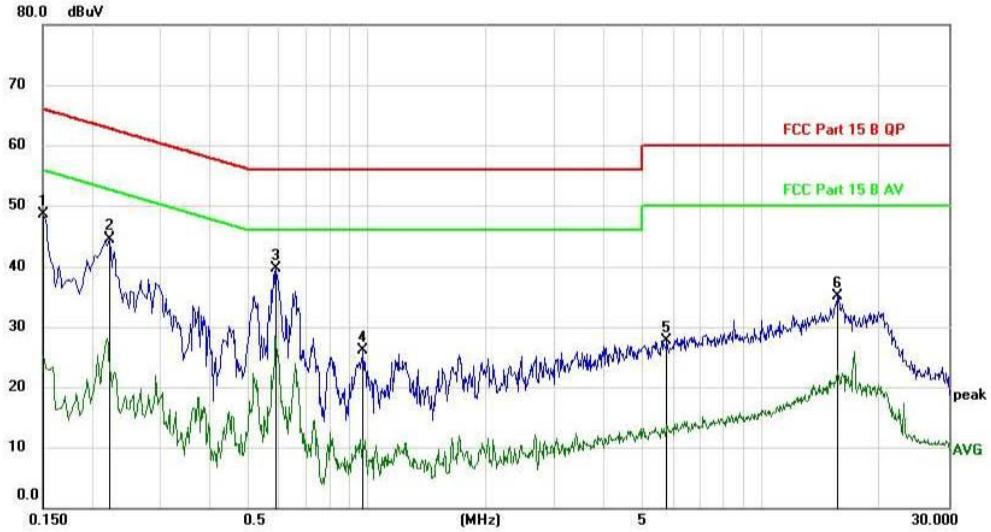
3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.

4. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Site LAB		Phase:	L1	Temperature:	24.1
Limit: FCC Part 15 B QP		Power:	AC 120V/60Hz	Humidity:	54 %
EUT: CCD Camera					
M/N: QHY					
Mode: Working					
Note:					

Conducted Emission Measurement

File :2017 Data :#12 Date: 2017-3-10 Time: 18:58:53



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	42.28	6.19	48.47	66.00	-17.53	peak	
2		0.2220	38.38	6.19	44.57	62.74	-18.17	peak	
3	*	0.5910	33.53	6.19	39.72	56.00	-16.28	peak	
4		0.9750	19.96	6.21	26.17	56.00	-29.83	peak	
5		5.7750	21.46	6.33	27.79	60.00	-32.21	peak	
6		15.5550	28.61	6.55	35.16	60.00	-24.84	peak	

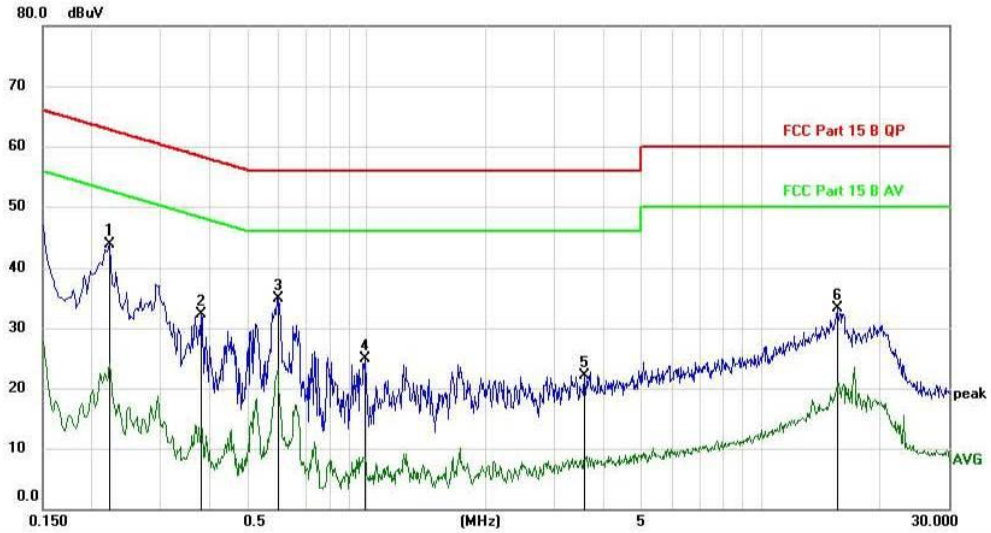
*:Maximum data x:Over limit !:over margin (Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Site LAB		Phase:	N	Temperature:	24.1
Limit: FCC Part 15 B QP		Power:	AC 120V/60Hz	Humidity:	54 %
EUT: CCD Camera					
M/N: QHY					
Mode: Working					
Note:					

Conducted Emission Measurement

File :2017 Data :#13 Date: 2017-3-10 Time: 19:01:14



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2220	37.76	6.19	43.95	62.74	-18.79	peak	
2		0.3810	26.03	6.19	32.22	58.26	-26.04	peak	
3		0.5940	28.63	6.19	34.82	56.00	-21.18	peak	
4		0.9870	18.61	6.21	24.82	56.00	-31.18	peak	
5		3.5700	15.93	6.27	22.20	56.00	-33.80	peak	
6		15.6180	26.67	6.55	33.22	60.00	-26.78	peak	

*:Maximum data x:Over limit !:over margin (Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

4. RADIATED EMISSION TEST

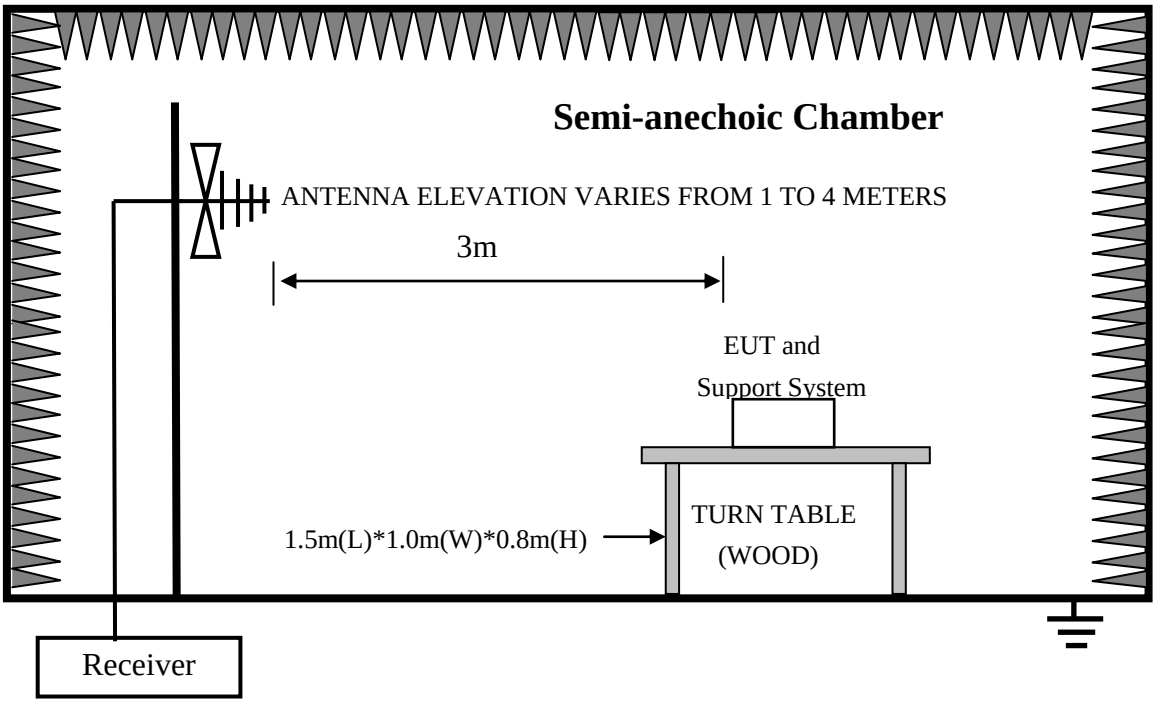
4.1.Test Equipment

For frequency range 30MHz~1GHz (At Semi Anechoic Chamber)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003 K03-102082-Wa	2016.09.29	1 Year
2	Antenna	Schwarzbeck	VULB9168	9168-438	2016.09.30	2 Year

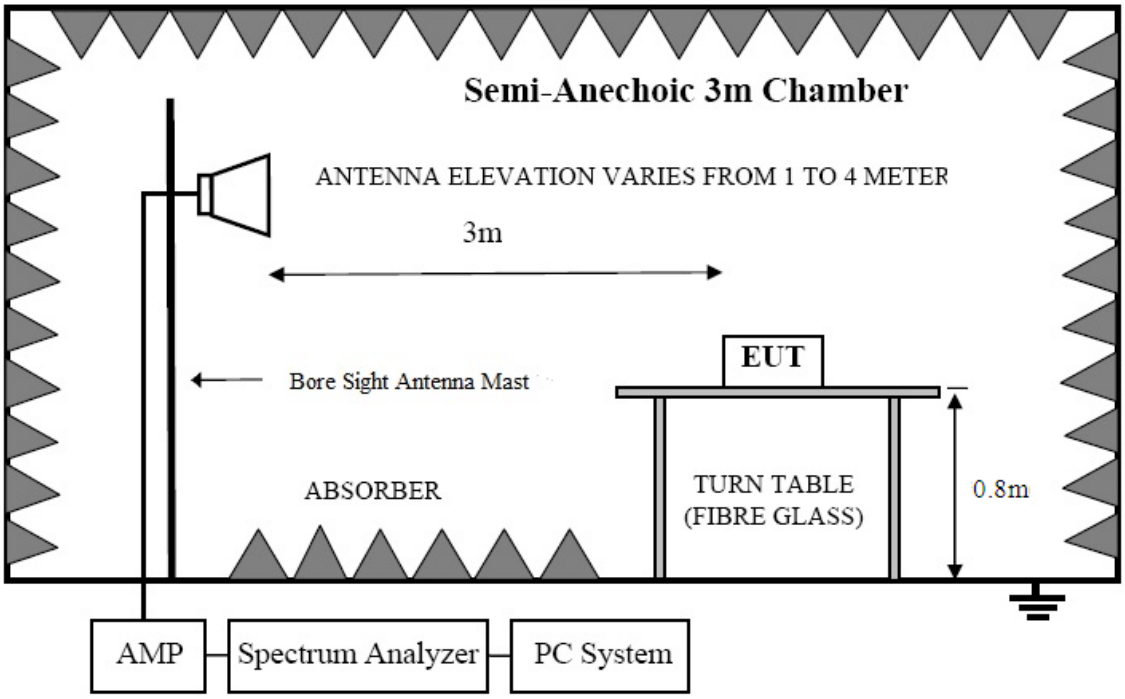
For frequency range above 1GHz (At Semi Anechoic Chamber (3m))						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY49510055	2016.09.29	1 Year
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2017.01.21	1 Year
3	Amplifier	Agilent	8449B	3008A02664	2017.01.19	1 Year
4	Cable	Resenberger	SUCOFLEX 104	329112/4	2016.09.29	1 Year

4.2.Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



4.3.Radiated Emission Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μV)/m
30 ~ 88	3	40.0
88 ~ 216	3	43.5
216 ~ 960	3	46.0
960 ~ 1000	3	54.0
Above 1GHz	3	74(Peak) 54(Average)

Notes: 1. Emission level = Read level + Antenna Factor - Preamp Factor + Cable Loss

2. The smaller limit shall apply at the cross point between two frequency bands.

3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

4. Frequency range of radiated measurements:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

4.4.Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.5.Operating Condition of EUT

（1） Setup the EUT as shown as Section 4.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

4.6.Test Procedure

（1） The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on Radiated Emission test.

（2） For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

（3） The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 120kHz.

（4） The frequency range from above 1GHz is checked, the bandwidth of spectrum analyzer (Analyzer Spectrum Analyzer E4407B) is set at 1MHz.

（5） The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.

（6） The test results are reported on Section 4.7.

4.7.Radiated Disturbance Test Results

Frequency Range	:	**30MHz~1000MHz**			
EUT	:	Camera	Test Date	:	2017.03.08
M/N	:	QHY168C	Temperature	:	24.1℃
Test Engineer	:	Reak Yang	Humidity	:	54%
Test Mode	:	Communicate with PC			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.
2. This mode is worst case mode, so this report only reflected the worst mode.
3. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

Frequency Range	:	**Above 1GHz**			
EUT	:	Camera	Test Date	:	2017.03.12
M/N	:	QHY168C	Temperature	:	23.5℃
Test Engineer	:	Reak Yang	Humidity	:	51%
Test Mode	:	Communicate with PC			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.
2. This mode is worst case mode, so this report only reflected the worst mode.
3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Site LAB	Polarization: ***Horizontal***	Temperature: 24.1
Limit: FCC Class B Radiation	Power: AC 120V/60Hz	Humidity: 54 %
EUT: CCD Camera	Distance: 3m	
M/N: QHY		
Mode:Working		
Note:		

Radiated Emission Measurement

File :MID6901-GA Data :#9 Date: 2017/3/08 Time: 17:16:55

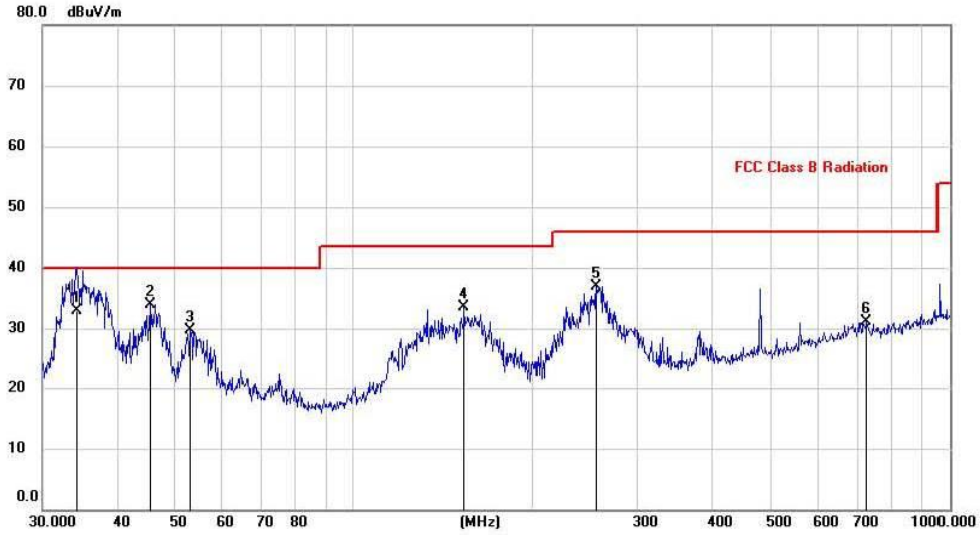
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.1561	18.57	13.46	32.03	40.00	-7.97	peak			
2		52.9453	13.51	13.45	26.96	40.00	-13.04	peak			
3		162.0414	19.57	14.41	33.98	43.50	-9.52	peak			
4	*	282.9852	29.08	13.01	42.09	46.00	-3.91	peak			
5		480.5276	23.60	17.08	40.68	46.00	-5.32	peak			
6		965.5421	18.21	23.88	42.09	54.00	-11.91	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Site LAB	Polarization: ***Vertical***	Temperature: 24.1
Limit: FCC Class B Radiation	Power: AC 120V/60Hz	Humidity: 54 %
EUT: CCD Camera	Distance: 3m	
M/N: QHY		
Mode:Working		
Note:		

Radiated Emission Measurement

File :MID6901-GA Data :#10 Date: 2017/3/08 Time: 17:18:50



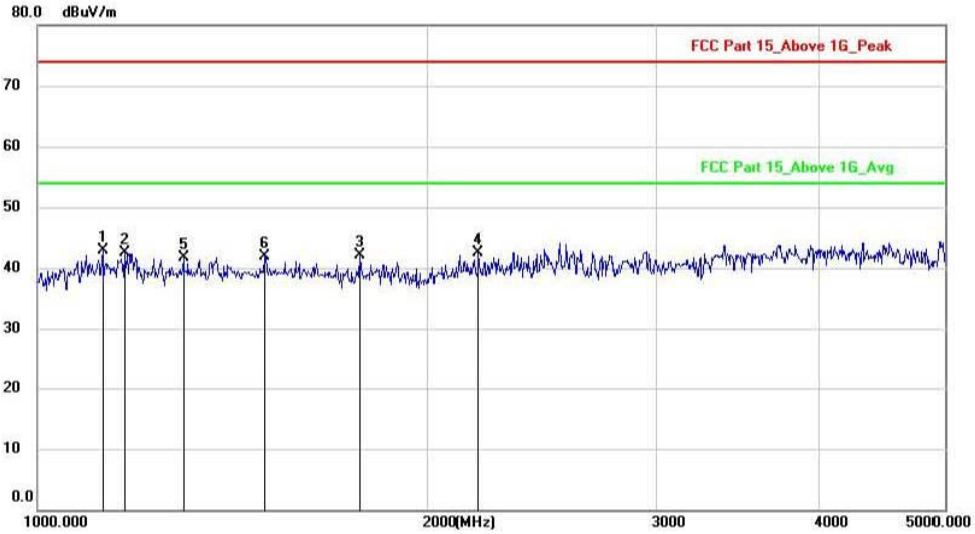
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.2760	19.53	13.47	33.00	40.00	-7.00	QP			
2	*	45.3755	20.26	13.69	33.95	40.00	-6.05	peak			
3		52.9453	16.22	13.45	29.67	40.00	-10.33	peak			
4		153.2004	18.98	14.56	33.54	43.50	-9.96	peak			
5		254.7284	24.78	12.18	36.96	46.00	-9.04	peak			
6		726.8052	9.68	21.33	31.01	46.00	-14.99	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Site LAB	Polarization: ***Horizontal***	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: AC 120V/60Hz	Humidity: 51 %
EUT: Camera	Distance:	
M/N: QHY		
Mode:Wokring		
Note:		

Radiated Emission Measurement

File :QHY Data :#9 Date: 2017/3/12 Time: 19:04:09



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	1122.991	51.44	-8.50	42.94	74.00	-31.06	peak			
2		1167.262	50.96	-8.36	42.60	74.00	-31.40	peak			
3		1771.670	48.59	-6.57	42.02	74.00	-31.98	peak			
4		2187.960	45.97	-3.43	42.54	74.00	-31.46	peak			
5		1296.125	49.09	-7.37	41.72	74.00	-32.28	peak			
6		1498.363	48.91	-7.00	41.91	74.00	-32.09	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

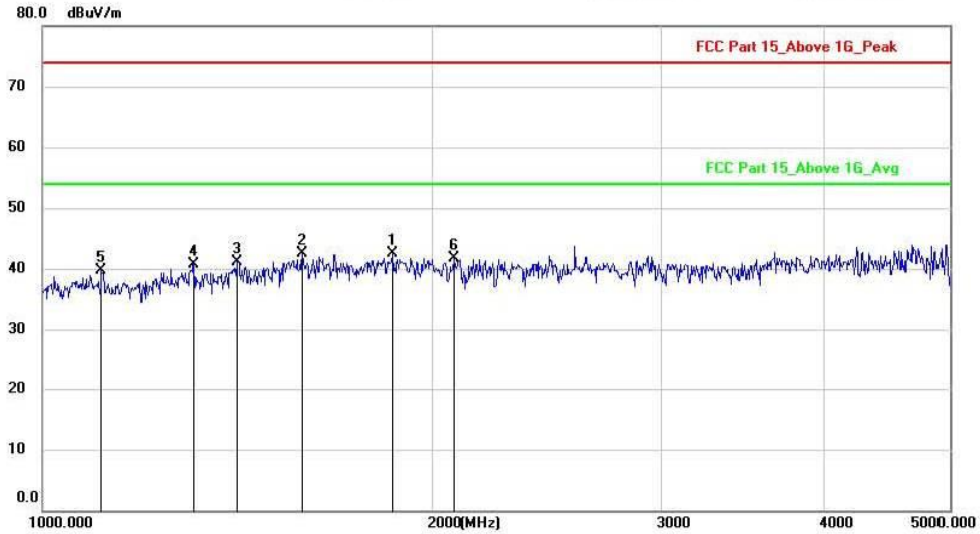
Site LAB
Limit: FCC Part 15_Above 1G_Peak
EUT: Camera
M/N: QHY
Mode:Wokring
Note:

Polarization: ***Vertical***
Power: AC 120V/60Hz
Distance:

Temperature: 23.5
Humidity: 51 %

Radiated Emission Measurement

File :QHY Data :#10 Date: 2017/3/12 Time: 19:15:14

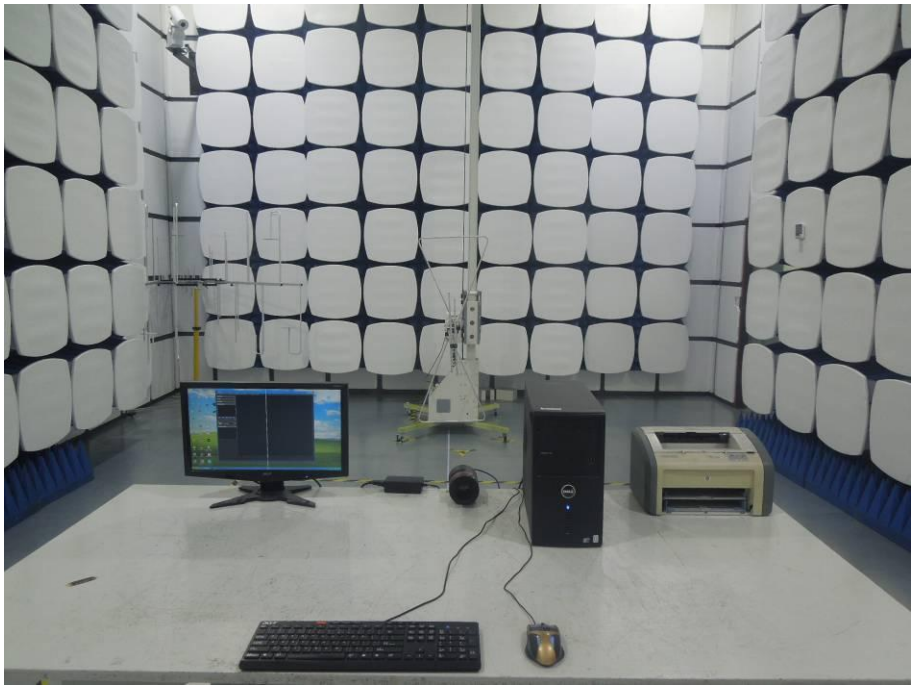


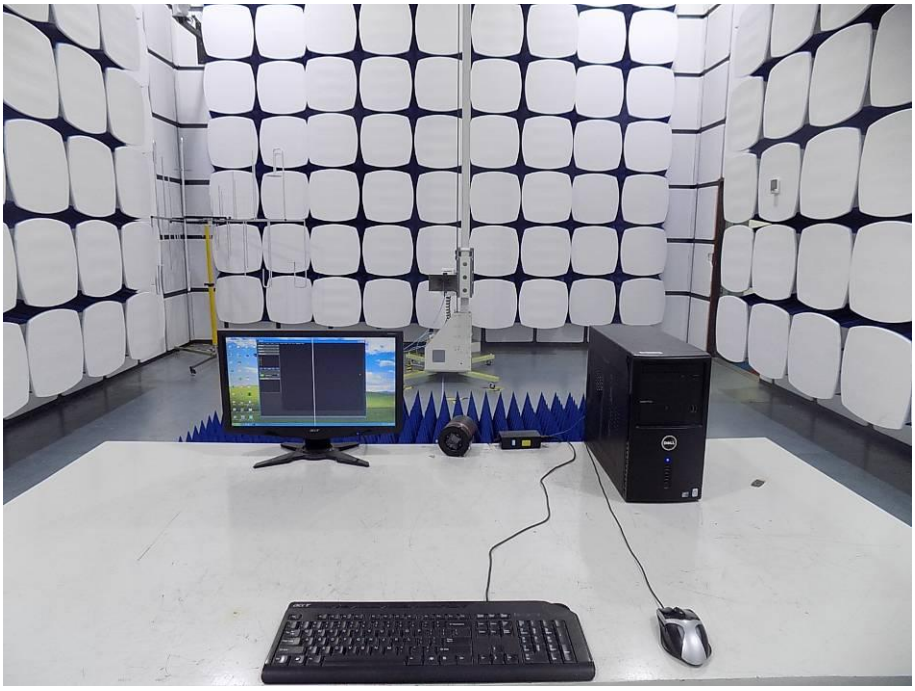
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1862.398	48.59	-6.18	42.41	74.00	-31.59	peak			
2	*	1585.278	49.37	-6.86	42.51	74.00	-31.49	peak			
3		1411.657	48.21	-7.01	41.20	74.00	-32.80	peak			
4		1308.714	47.94	-7.31	40.63	74.00	-33.37	peak			
5		1110.398	48.20	-8.53	39.67	74.00	-34.33	peak			
6		2081.372	46.00	-4.37	41.63	74.00	-32.37	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

5. PHOTOGRAPH

5.1.Photos of Radiated Emission Test (In Semi Anechoic Chamber)

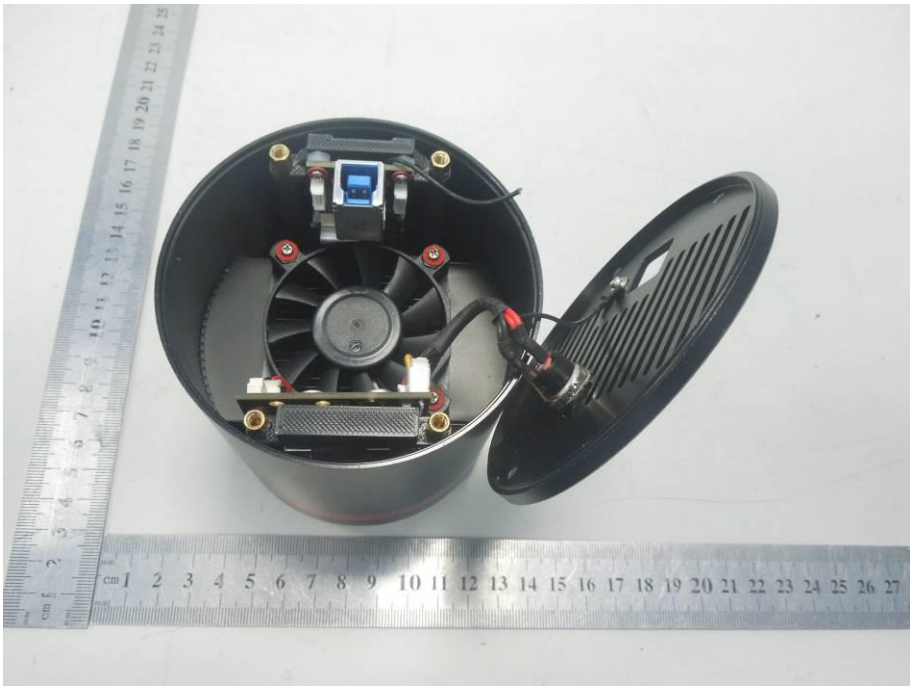


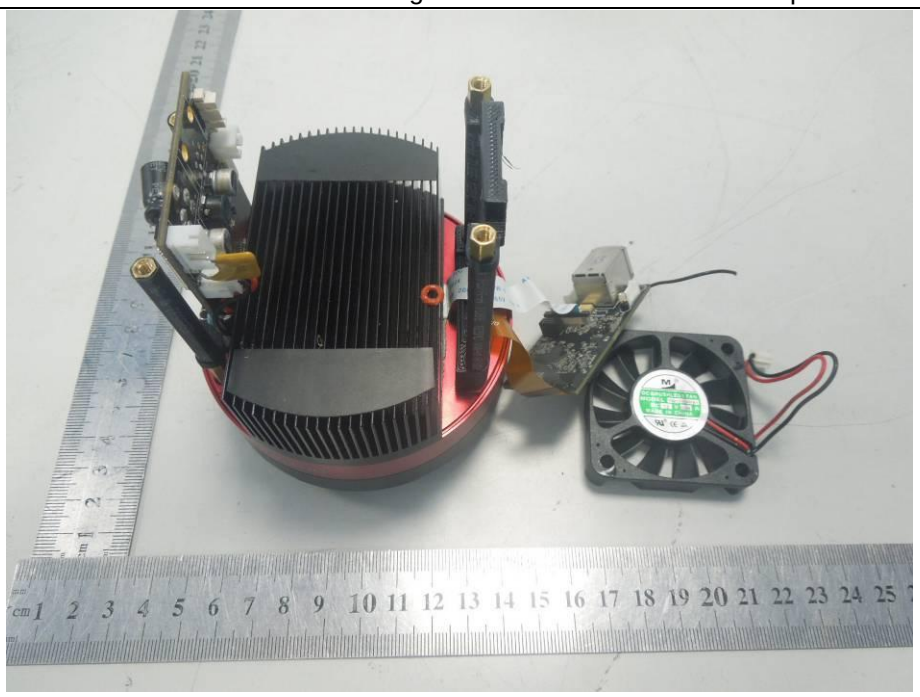


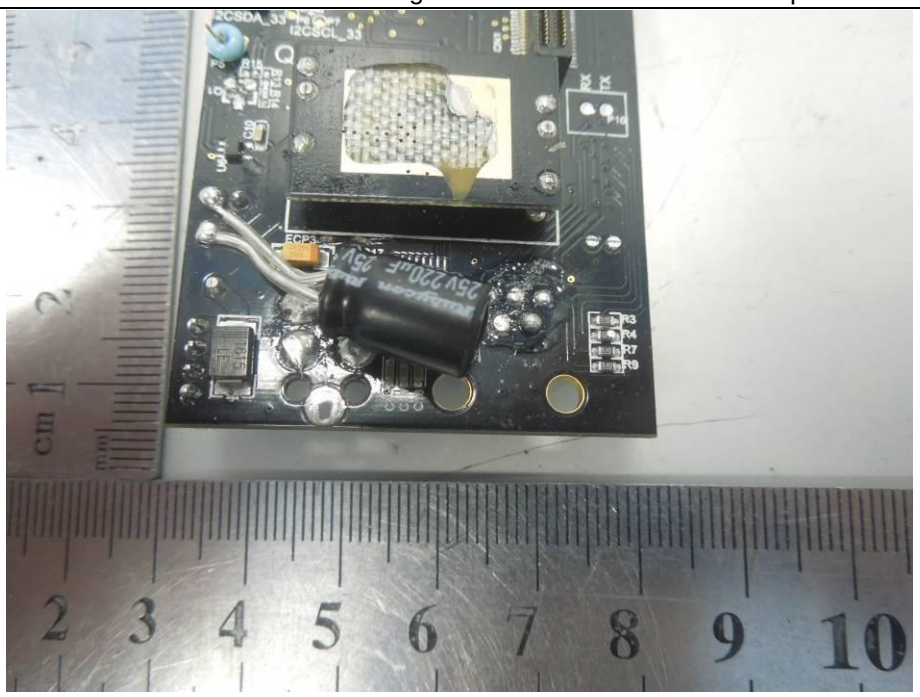
5.2.Photos of Power Line Conducted Emission Test

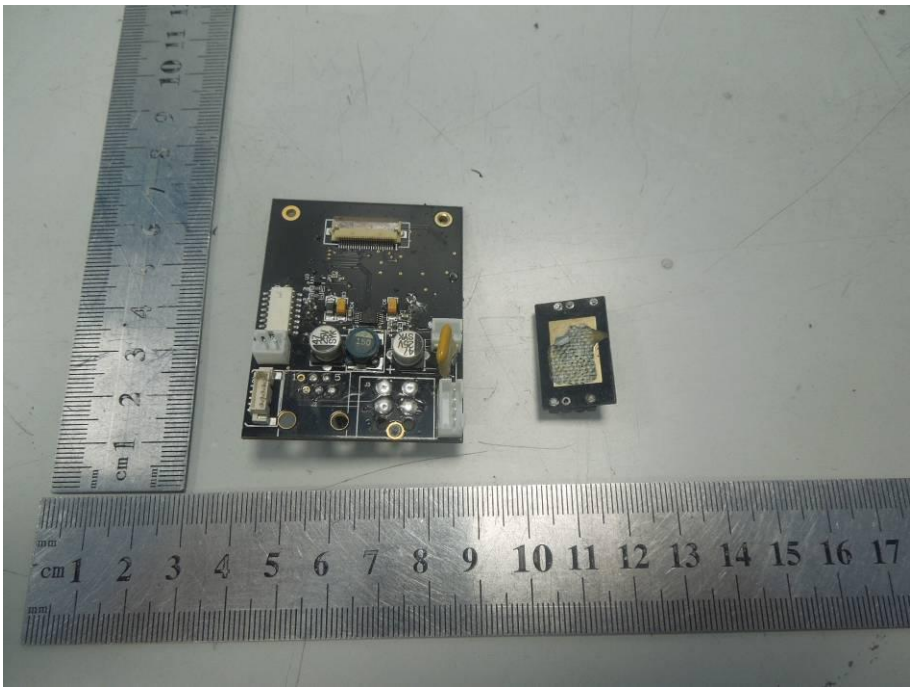
6. PHOTOS OF THE EUT

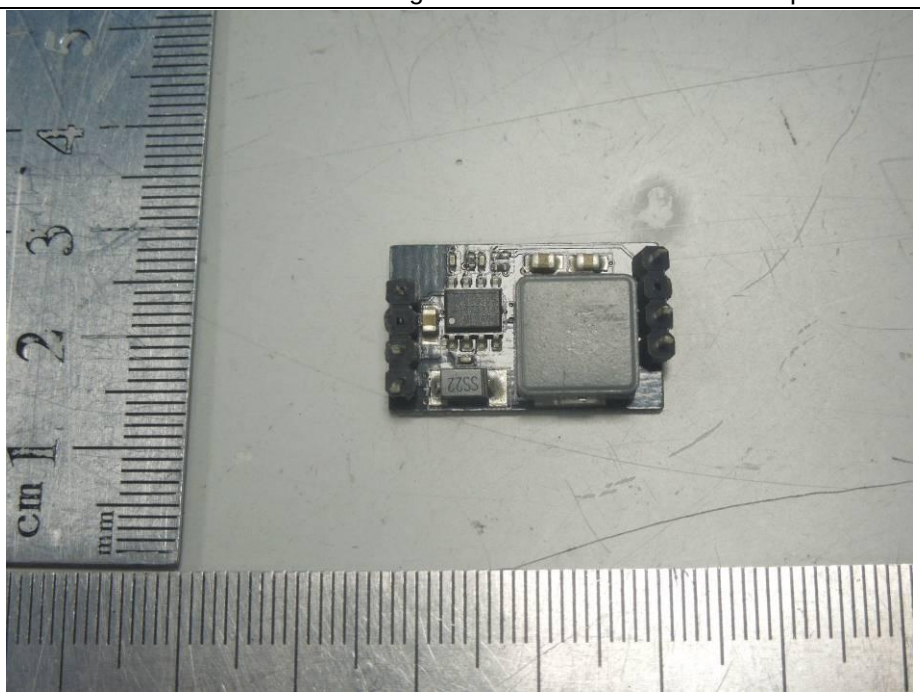
QHYCCD

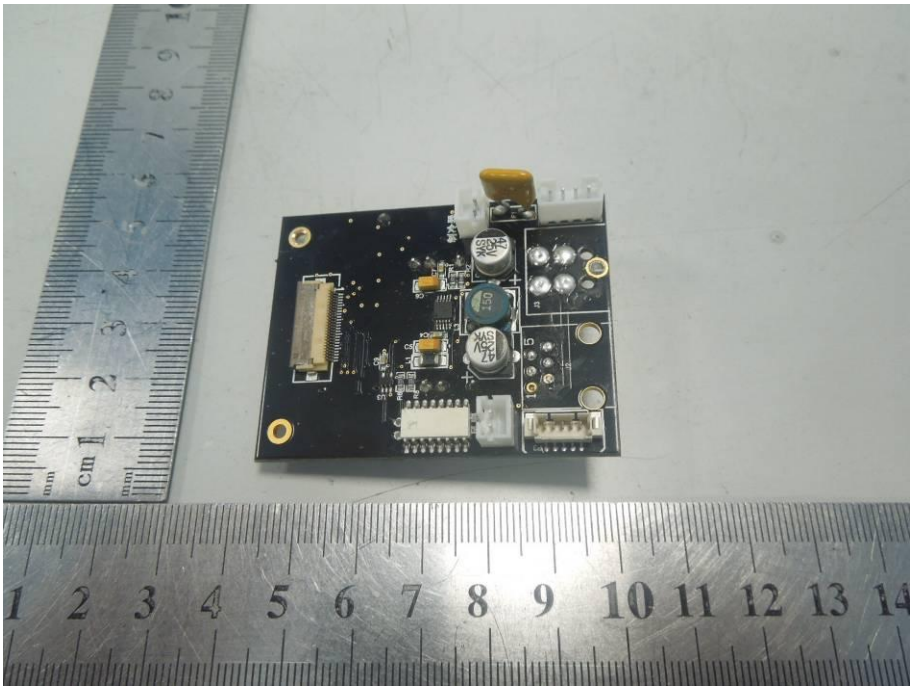


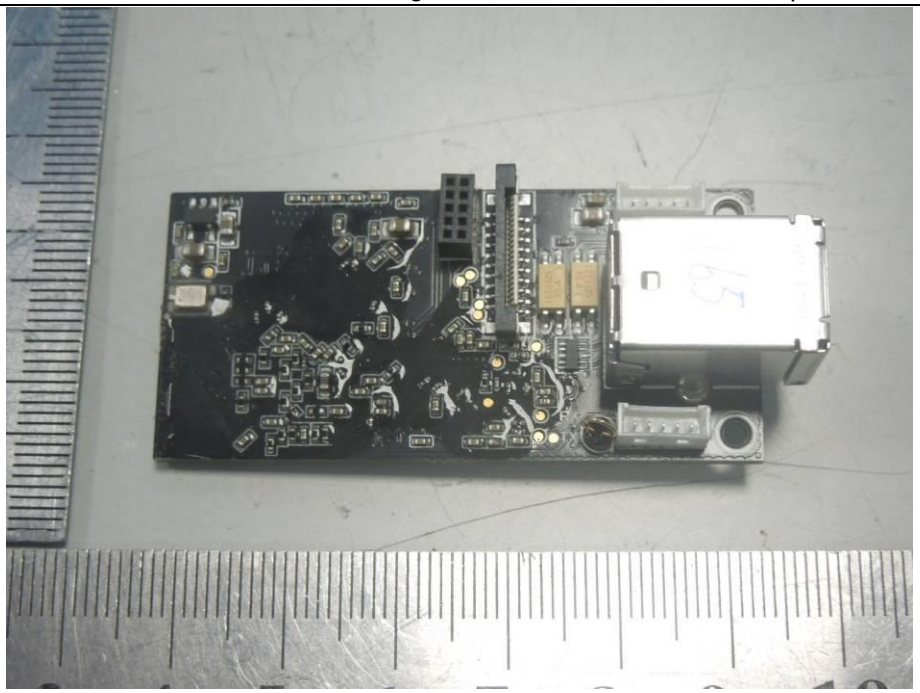


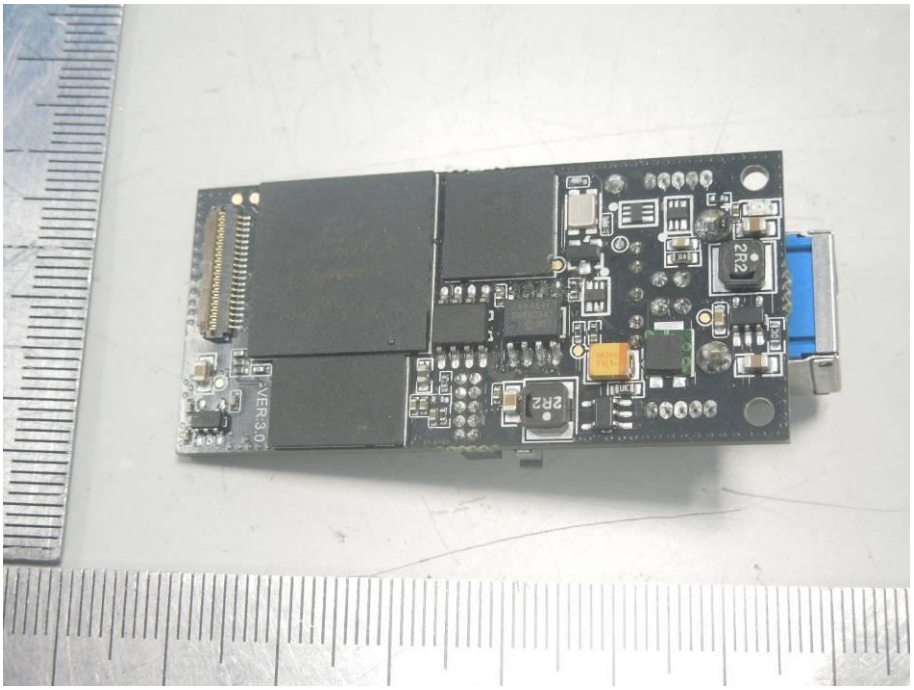

I2CSDA_33
I2CSCL_33
ECP3
25V 220uF 25V
R3
R4
R7
R9
cm 1
2 3 4 5 6 7 8 9 10

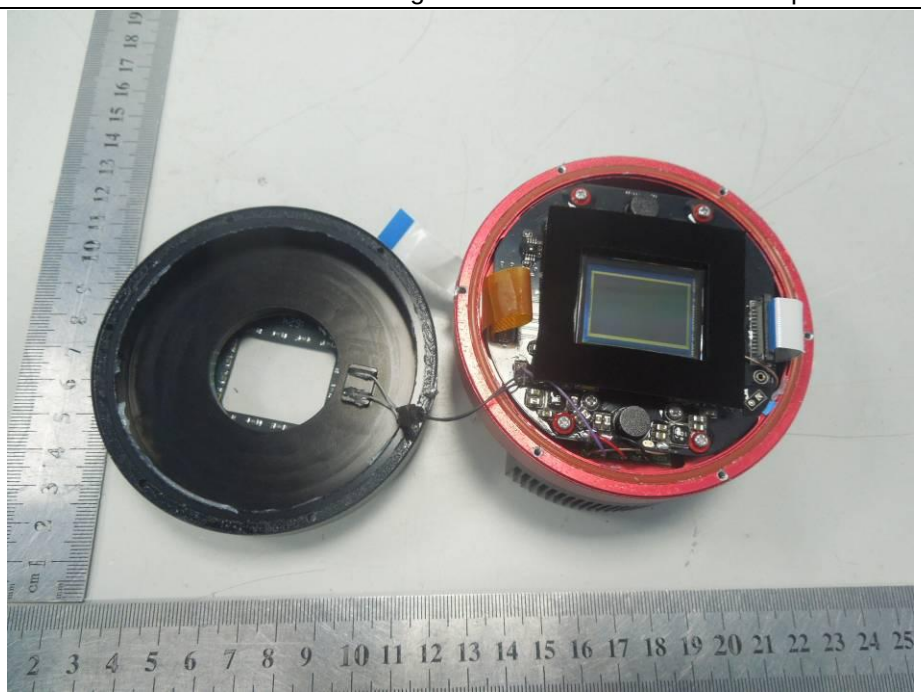

cm 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

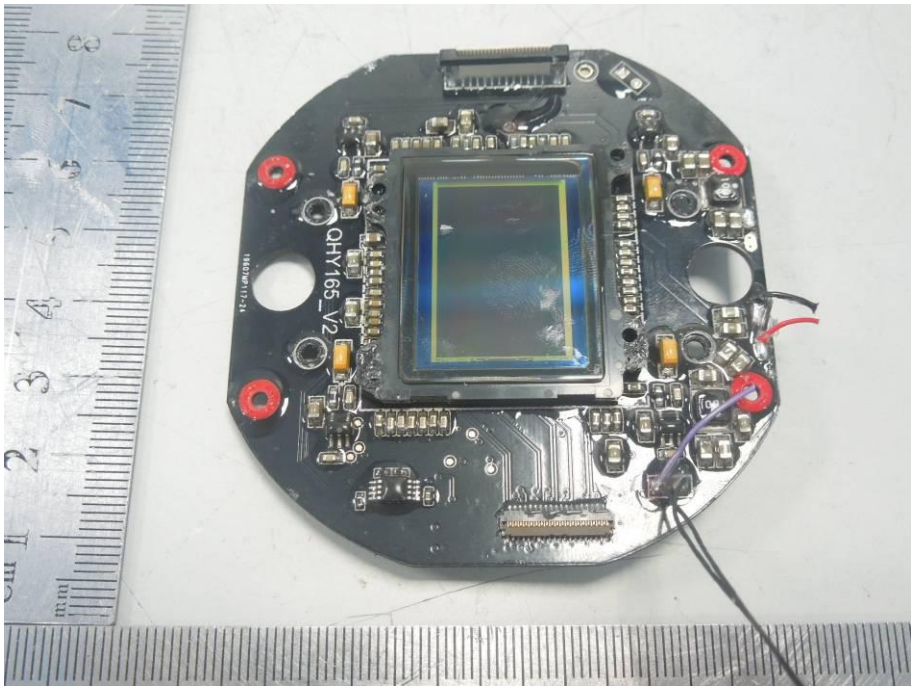


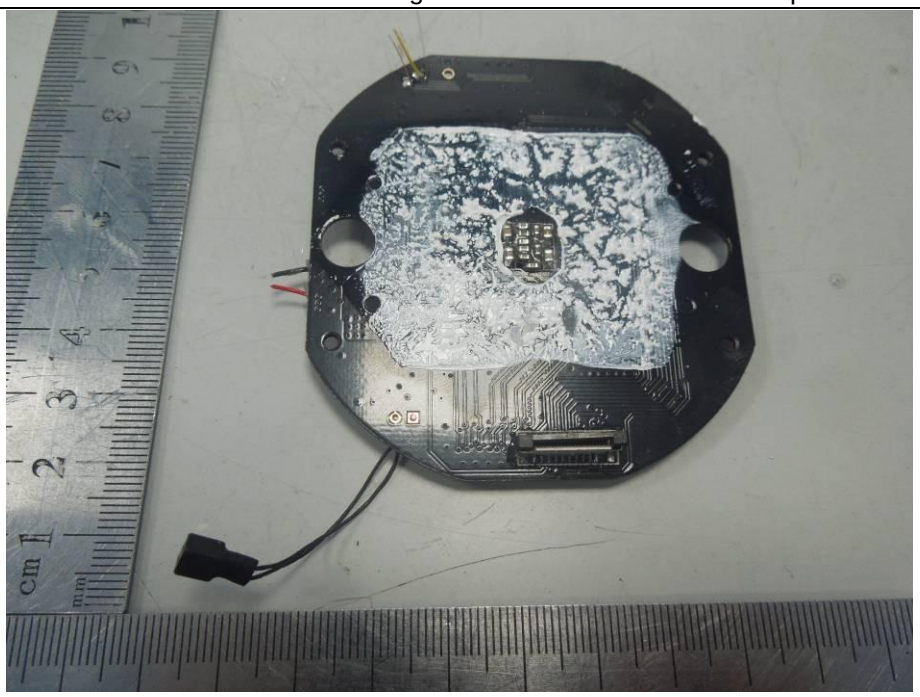


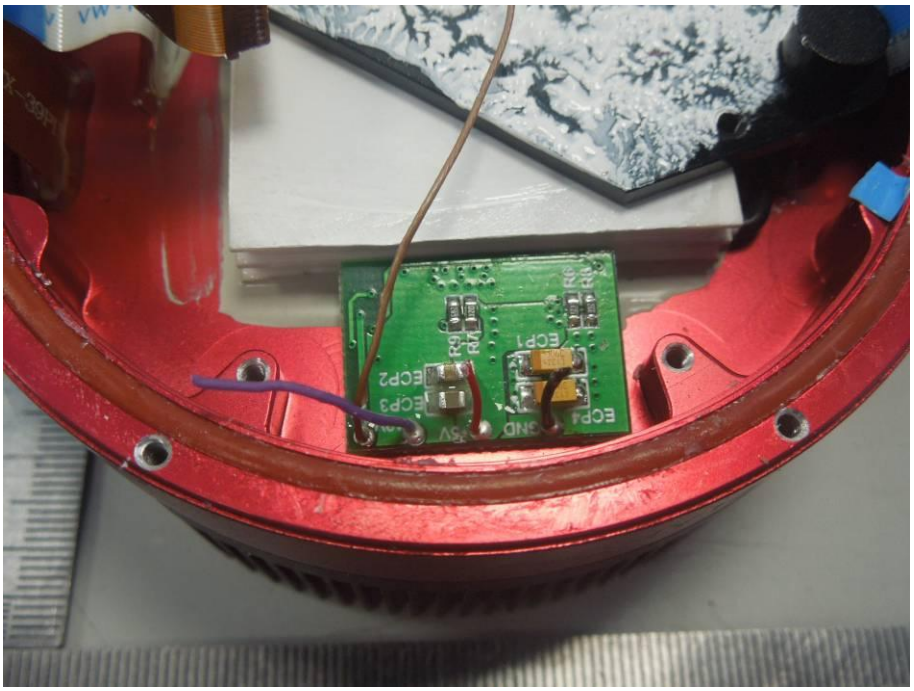


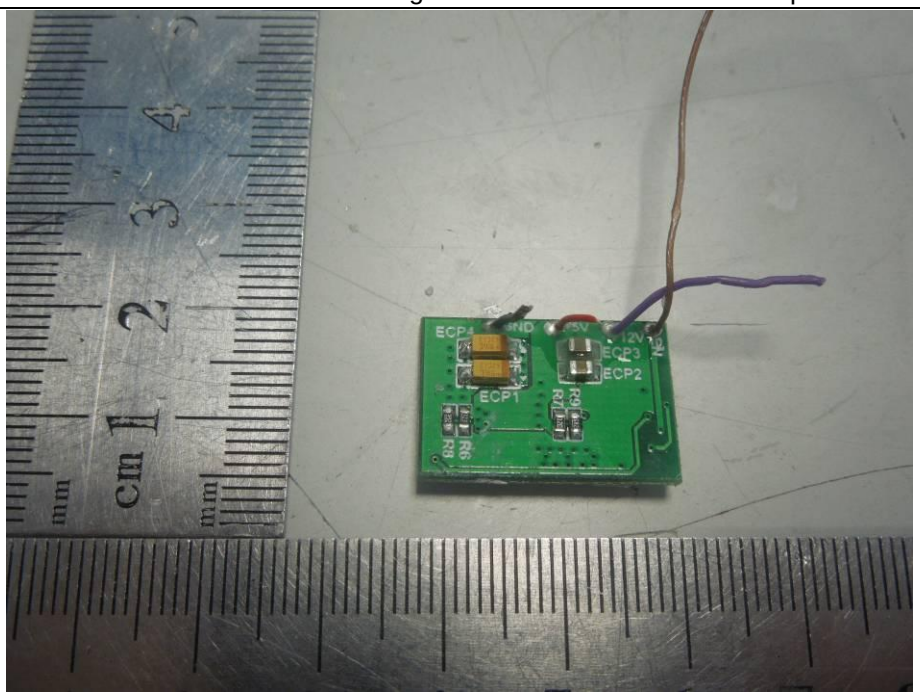

2R2
2R2
VER 3.0

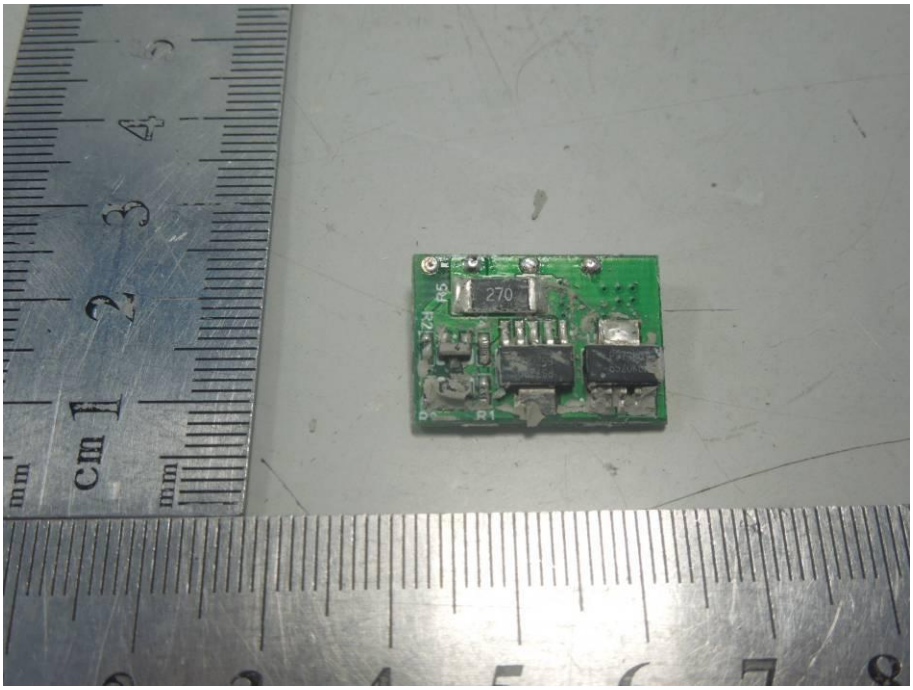



QHY165_V2




ECP1
ECP2
ECP3
ECP4
GND
5V





----END OF REPORT----