EMC TEST REPORT

Report No.: 16070202-FCC-E

Supersede Report No.: N/A

Applicant	ZyXEL Communications Corporation
Product Name	HD Cube IP Camera
Model No.	CAM1215
Serial No.	H-918BW, YNC-918BW
Test Standard	FCC Part 15 Subpart B Class B:2015, ANSI C63.4: 2014
Test Date	March 18 to April 20, 2016
Issue Date	April 21, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Winnie Zhang	David Huang	
Winnie Zhang Test Engineer	David Huang Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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CONTENTS

1. Report Revision History

Report No.	Report Version	Description	Issue Date
16070202-FCC-E	NONE	Original	April 21, 2016

2. Customer information

Applicant Name	ZyXEL Communications Corporation
Applicant Add	No. 2, Gongye E. 9th Road, Hsinchu Science Park,Hsinchu, Taiwan
Manufacturer	Yotascope Technologies Co., Ltd.
Manufacturer Add	3F, No. 7-1, Jhongsing Road, Tucheng Dist., New Taipei City 23678, Taiwan, R.O.C

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	HD Cube IP Camera
Main Model:	CAM1215
Serial Model:	H-918BW, YNC-918BW
Date EUT received:	March 17, 2016
Test Date(s):	March 18 to April 20, 2016
Equipment Category：	Class B
Antenna Gain:	WIFI: 4.64dBi
Type of Modulation:	802.11b/g/n: DSSS, OFDM
RF Operating Frequency (ies):	WIFI:802.11b/g/n(20M): 2412-2462 MHz WIFI:802.11n(40M): 2422-2452 MHz
Number of Channels:	WIFI :802.11b/g/n(20M): 11CH WIFI :802.11n(40M): 7CH
Port:	RJ45 Port, Power Port，Micro SD card Port
Input Power:	Adapter : Model: TEKA006-0501500UKC Input: 100-240V~50/60Hz,0.3A Output: 5V,1.5A
Trade Name :	Yotascope
FCC ID:	I88CAM1215

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	Compliance
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

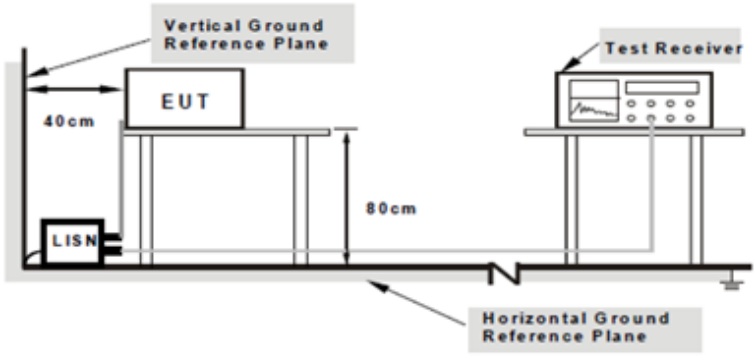
Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	57%
Atmospheric Pressure	1015mbar
Test date :	April 15, 2016
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107</td><td>a)</td><td>For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr>
<tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr>
<tr><td>5 ~ 30</td><td>60</td><td>50</td></tr>
</table>
</td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

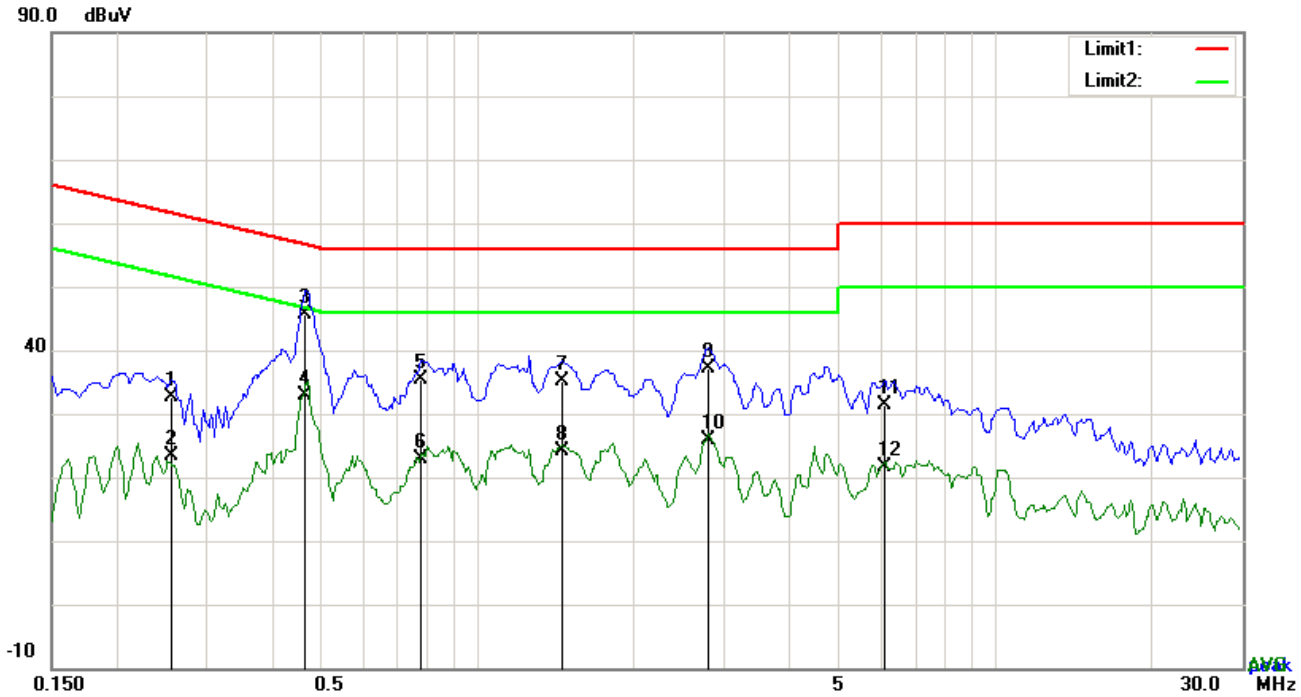
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</td></tr>
</table>

	3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	Ethernet Mode

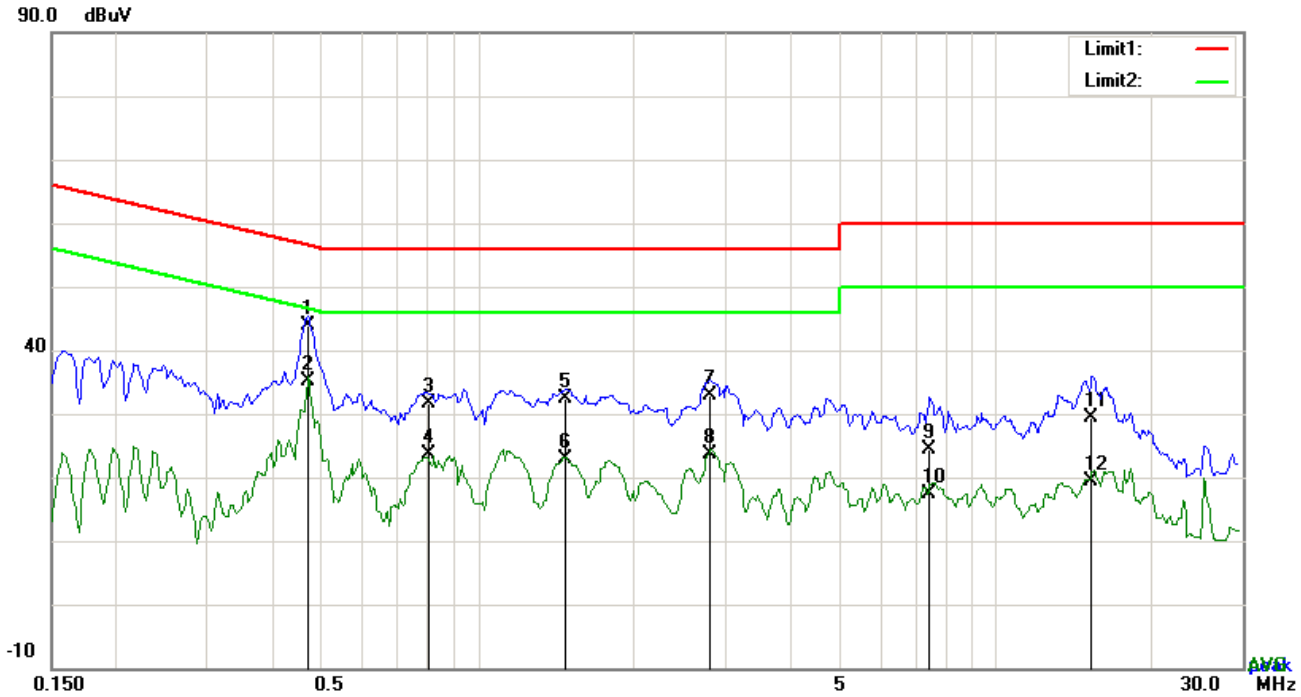


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.2553	22.54	QP	10.03	32.57	61.58	-29.01
2	L1	0.2553	13.25	AVG	10.03	23.28	51.58	-28.30
3	L1	0.4659	35.49	QP	10.03	45.52	56.59	-11.07
4	L1	0.4659	22.92	AVG	10.03	32.95	46.59	-13.64
5	L1	0.7779	25.36	QP	10.03	35.39	56.00	-20.61
6	L1	0.7779	12.74	AVG	10.03	22.77	46.00	-23.23
7	L1	1.4562	25.17	QP	10.04	35.21	56.00	-20.79
8	L1	1.4562	14.07	AVG	10.04	24.11	46.00	-21.89
9	L1	2.7864	27.20	QP	10.05	37.25	56.00	-18.75
10	L1	2.7864	15.87	AVG	10.05	25.92	46.00	-20.08
11	L1	6.1161	21.34	QP	10.10	31.44	60.00	-28.56
12	L1	6.1161	11.42	AVG	10.10	21.52	50.00	-28.48

Test Mode:	Ethernet Mode

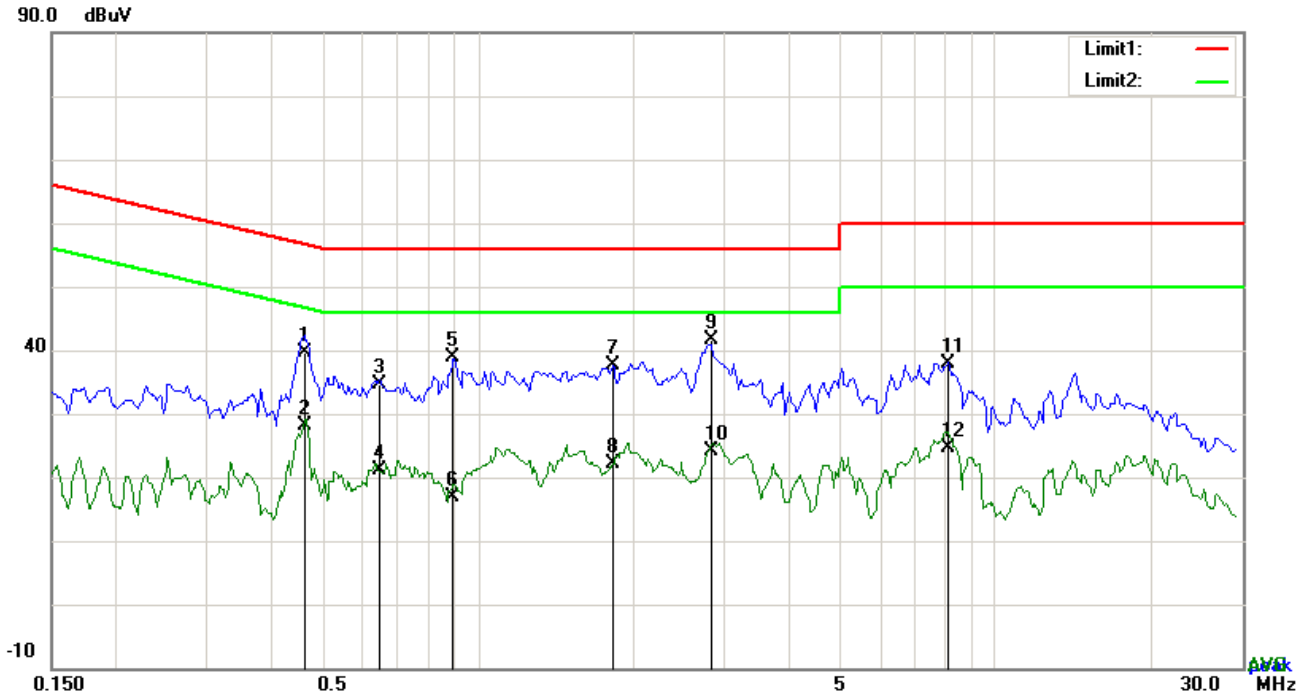


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.4698	33.92	QP	10.02	43.94	56.52	-12.58
2	N	0.4698	25.04	AVG	10.02	35.06	46.52	-11.46
3	N	0.8045	21.63	QP	10.03	31.66	56.00	-24.34
4	N	0.8045	13.48	AVG	10.03	23.51	46.00	-22.49
5	N	1.4760	22.26	QP	10.03	32.29	56.00	-23.71
6	N	1.4760	12.83	AVG	10.03	22.86	46.00	-23.14
7	N	2.7942	22.93	QP	10.05	32.98	56.00	-23.02
8	N	2.7942	13.70	AVG	10.05	23.75	46.00	-22.25
9	N	7.4811	14.26	QP	10.10	24.36	60.00	-35.64
10	N	7.4811	7.25	AVG	10.10	17.35	50.00	-32.65
11	N	15.3864	19.20	QP	10.20	29.40	60.00	-30.60
12	N	15.3864	9.24	AVG	10.20	19.44	50.00	-30.56

Test Mode:	Ethernet Mode

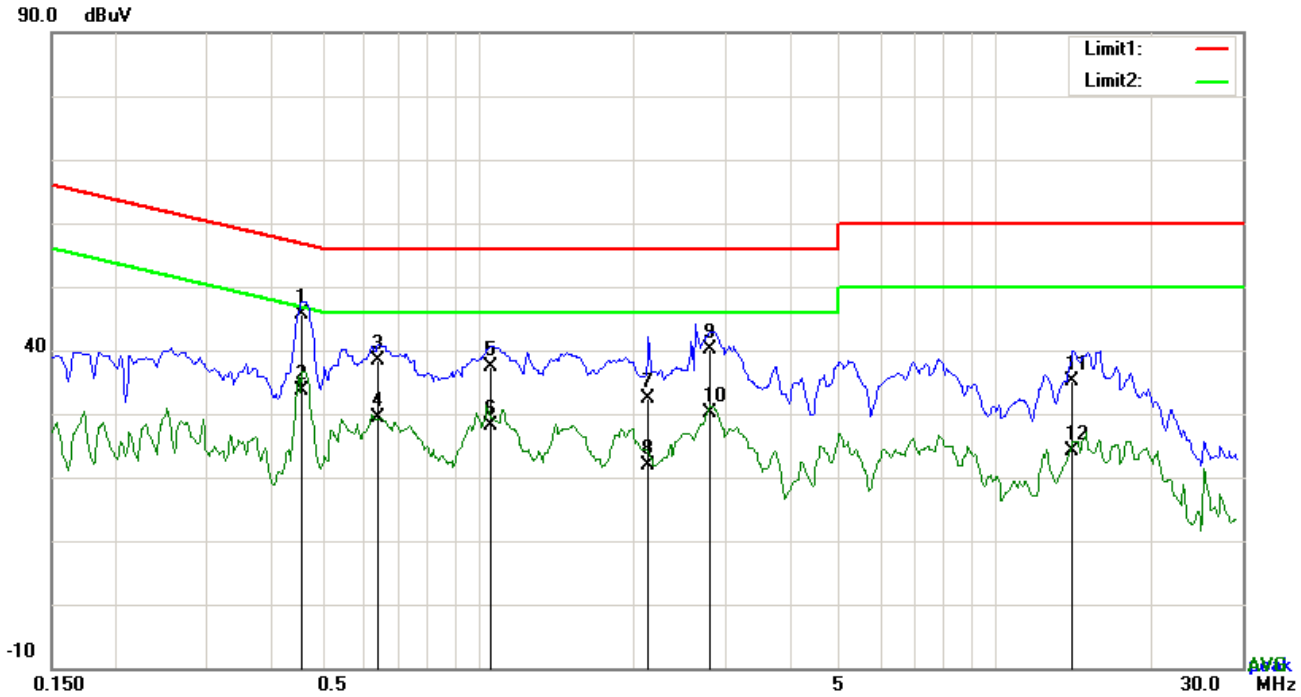


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.4620	29.52	QP	10.03	39.55	56.66	-17.11
2	L1	0.4620	18.11	AVG	10.03	28.14	46.66	-18.52
3	L1	0.6453	24.54	QP	10.03	34.57	56.00	-21.43
4	L1	0.6453	11.19	AVG	10.03	21.22	46.00	-24.78
5	L1	0.8988	28.92	QP	10.03	38.95	56.00	-17.05
6	L1	0.8988	6.84	AVG	10.03	16.87	46.00	-29.13
7	L1	1.8270	27.68	QP	10.04	37.72	56.00	-18.28
8	L1	1.8270	12.09	AVG	10.04	22.13	46.00	-23.87
9	L1	2.8293	31.67	QP	10.05	41.72	56.00	-14.28
10	L1	2.8293	14.00	AVG	10.05	24.05	46.00	-21.95
11	L1	8.1168	27.65	QP	10.12	37.77	60.00	-22.23
12	L1	8.1168	14.53	AVG	10.12	24.65	50.00	-25.35

Test Mode :	Ethernet Mode



Test Data

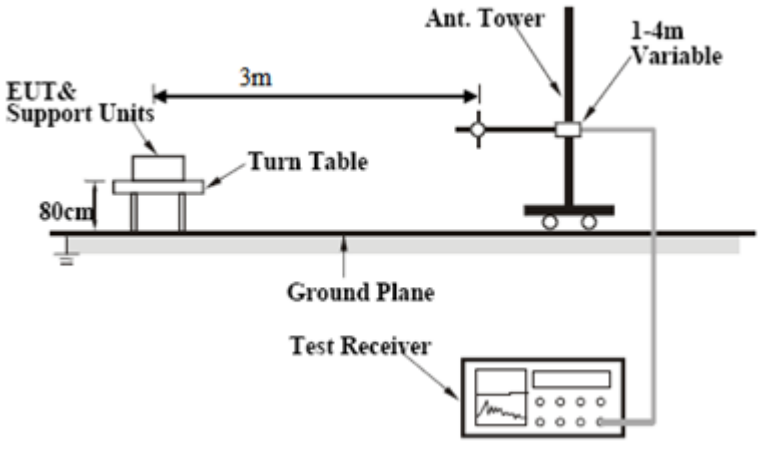
Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.4581	35.72	QP	10.02	45.74	56.73	-10.99
2	N	0.4581	23.64	AVG	10.02	33.66	46.73	-13.07
3	N	0.6414	28.27	QP	10.02	38.29	56.00	-17.71
4	N	0.6414	19.39	AVG	10.02	29.41	46.00	-16.59
5	N	1.0587	27.34	QP	10.03	37.37	56.00	-18.63
6	N	1.0587	18.17	AVG	10.03	28.20	46.00	-17.80
7	N	2.1351	22.25	QP	10.04	32.29	56.00	-23.71
8	N	2.1351	11.83	AVG	10.04	21.87	46.00	-24.13
9	N	2.8059	30.19	QP	10.05	40.24	56.00	-15.76
10	N	2.8059	19.98	AVG	10.05	30.03	46.00	-15.97
11	N	14.1267	24.99	QP	10.19	35.18	60.00	-24.82
12	N	14.1267	13.92	AVG	10.19	24.11	50.00	-25.89

6.2 Radiated Emissions

Temperature	24°C
Relative Humidity	57%
Atmospheric Pressure	1015mbar
Test date :	April 15, 2016
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107(d)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarization (whichever gave the higher emission level</td></tr>
</table>

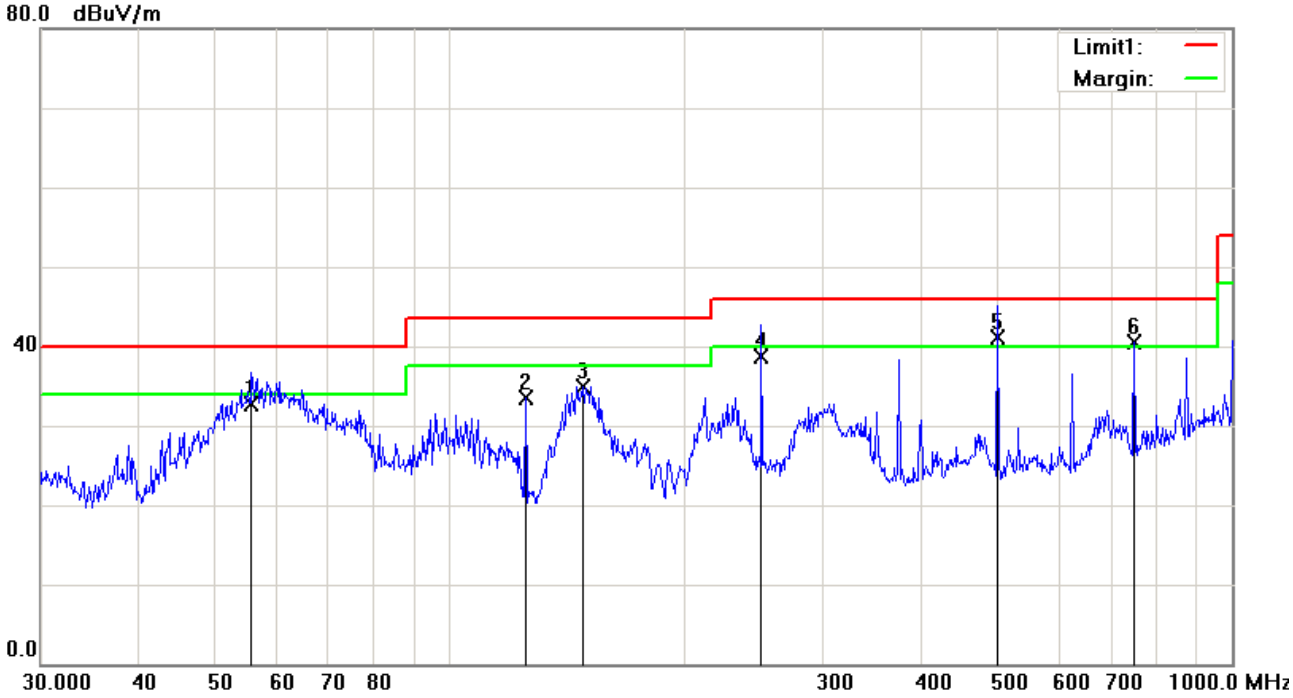
	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz. ■ 1 kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode :	Ethernet Mode

Below 1GHz

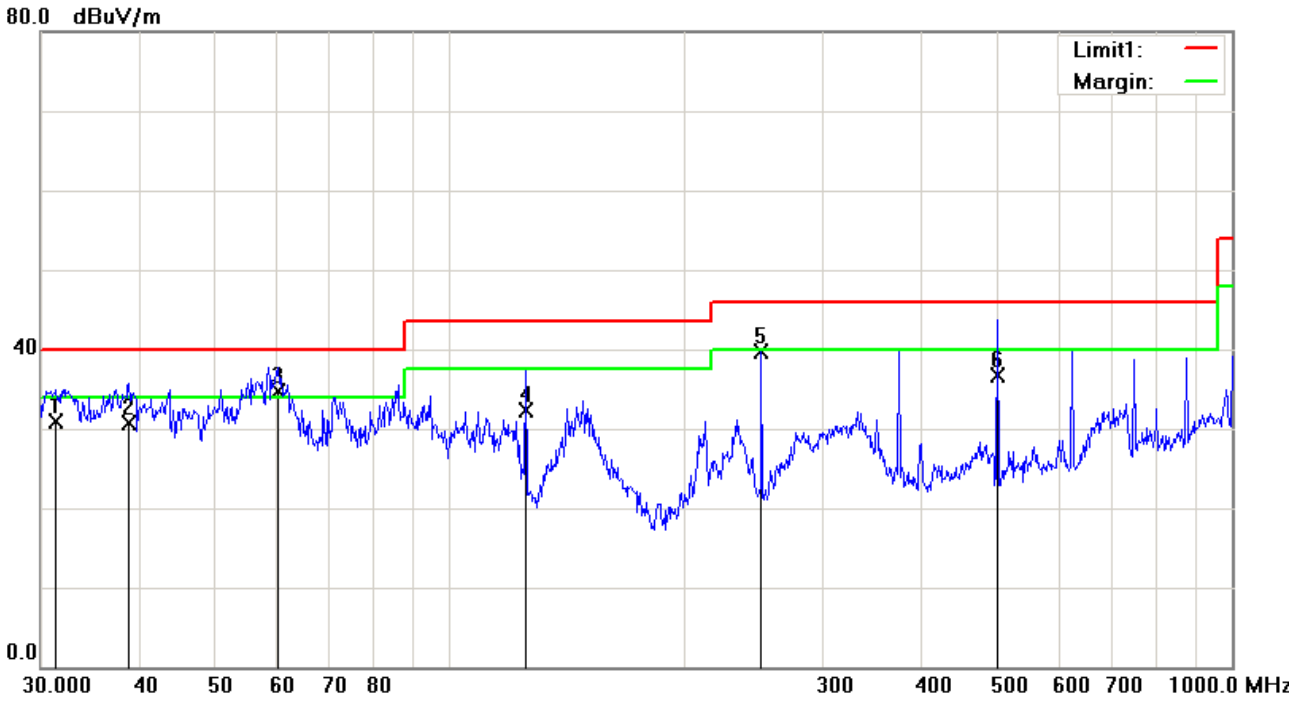


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	55.8047	46.59	QP	-13.86	32.73	40.00	-7.27	100	179
2	H	125.0066	41.05	peak	-7.62	33.43	43.50	-10.07	100	89
3	H	147.9214	43.32	peak	-8.42	34.90	43.50	-8.60	100	78
4	H	250.3012	47.96	QP	-9.18	38.78	46.00	-7.22	100	164
5	H	501.1790	42.69	QP	-1.67	41.02	46.00	-4.98	100	239
6	H	750.1083	38.00	peak	2.42	40.42	46.00	-5.58	100	194

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	V	31.3992	32.28	QP	-1.29	30.99	40.00	-9.01	100	149
2	V	38.8879	37.40	QP	-6.78	30.62	40.00	-9.38	100	225
3	V	60.2801	48.95	QP	-14.34	34.61	40.00	-5.39	100	127
4	V	125.0066	39.90	QP	-7.62	32.28	43.50	-11.22	100	50
5	V	250.3012	48.84	QP	-9.18	39.66	46.00	-6.34	100	183
6	V	501.1790	38.40	QP	-1.67	36.73	46.00	-9.27	100	176

Above 1GHz

Frequency (MHz)	Amplitude (dBμV/m)	Azimuth	Height (cm)	Polarity (H/V)	Factors (dB)	Limit (dBμV/m)	Margin (dB)	Detector (PK/AV)
1543.12	49.82	58	123	V	-22.37	74	-24.18	PK
2033.20	48.62	138	150	V	-21.45	74	-25.38	PK
1647.65	50.10	80	180	V	-23.77	74	-23.90	PK
2132.30	49.73	50	200	H	-21.25	74	-24.27	PK
2877.08	49.22	125	100	H	-23.65	74	-24.78	PK
1825.14	50.38	43	180	H	-22.78	74	-23.62	PK

*Note1: The highest frequency of the EUT is 2480 MHz, so the testing has been conformed to 5*2480MHz=12,400MHz.*

Note2: The frequency that above 3GHz is mainly from the environment noise.

Note3: The AV measurement performed, more than 20dB below limit so AV test data was not presented.

Annex A. TEST INSTRUMENT

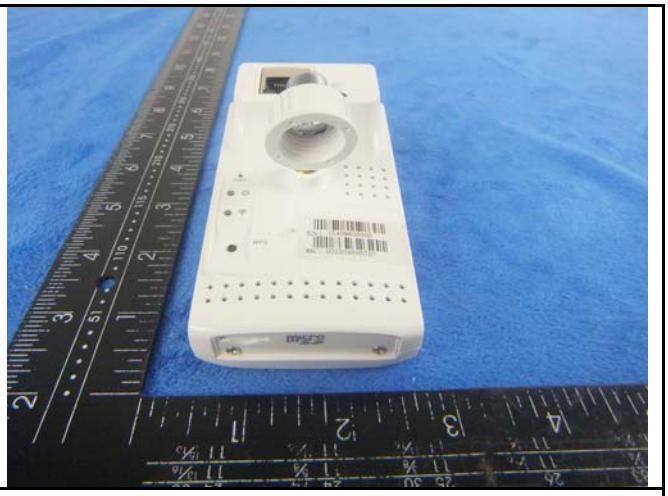
Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☑
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	☑
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	☑
LISN	ISN T800	34373	09/25/2015	09/24/2016	☑
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☑
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

	
Whole package - Front View	Adapter - Front View
	
EUT - Front View	EUT - Rear View

EUT - Top View



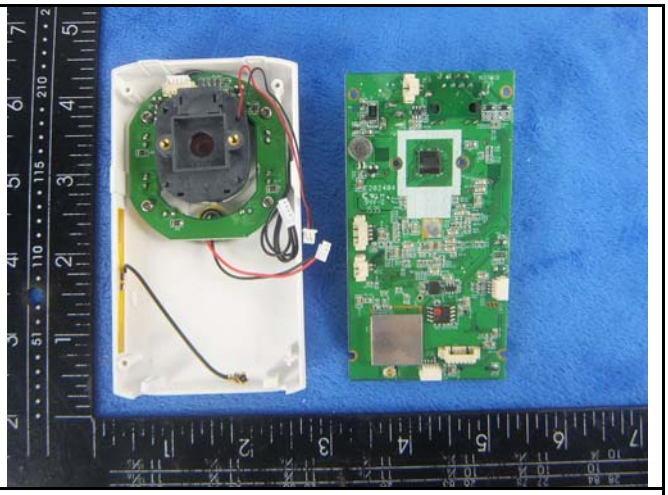
EUT - Bottom View

EUT - Left View

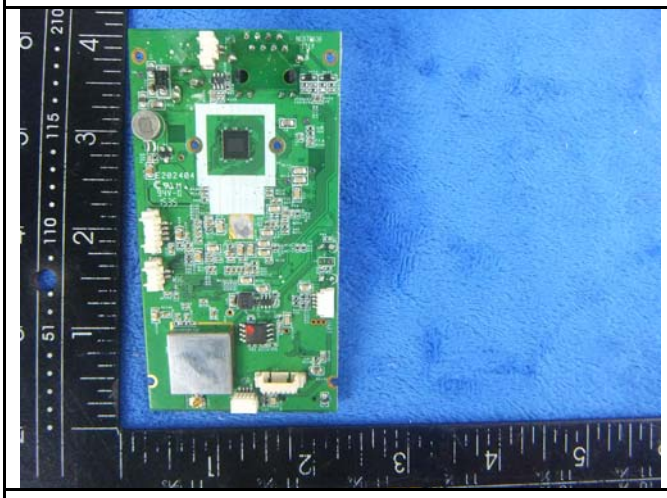
EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo

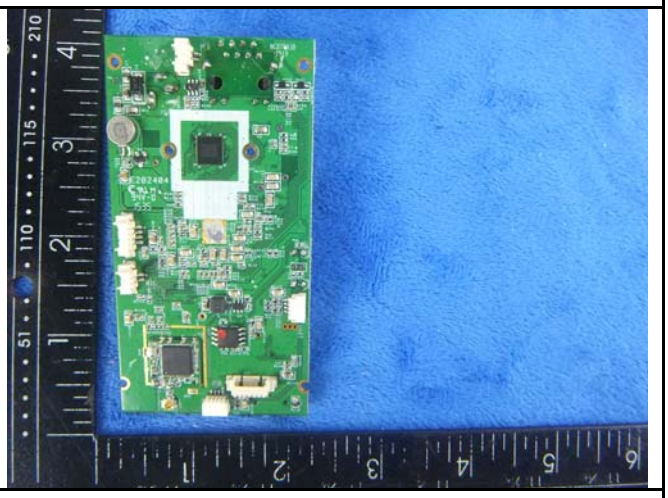
EUT - Uncover Front View 1



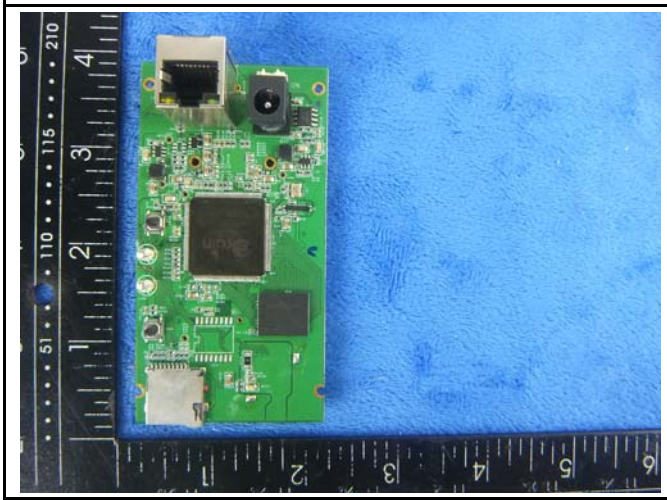
EUT - Uncover Front View 2



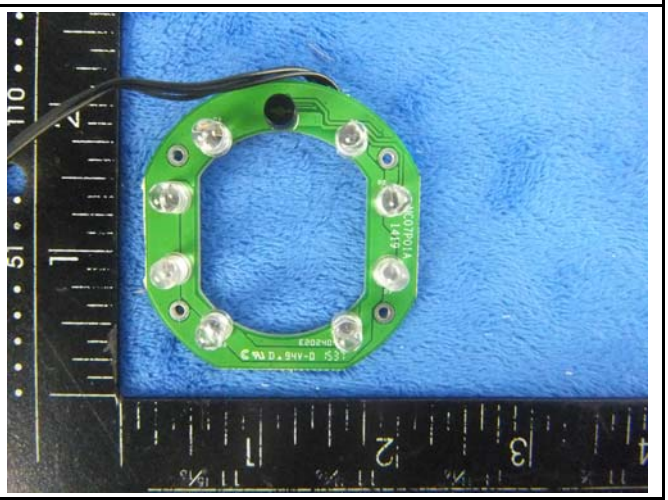
Mainboard with Shielding - Front View



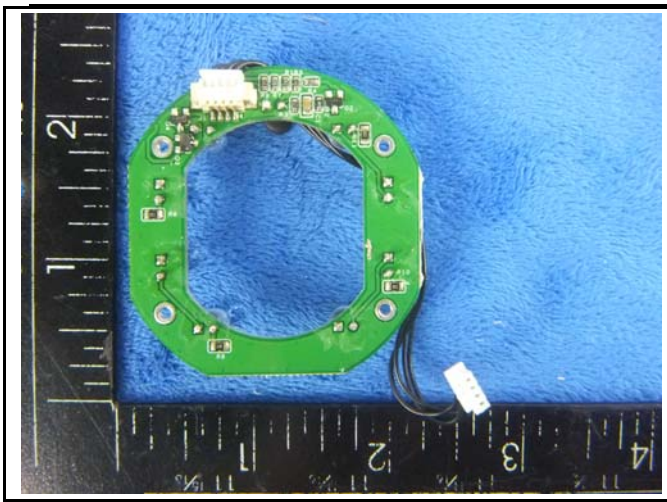
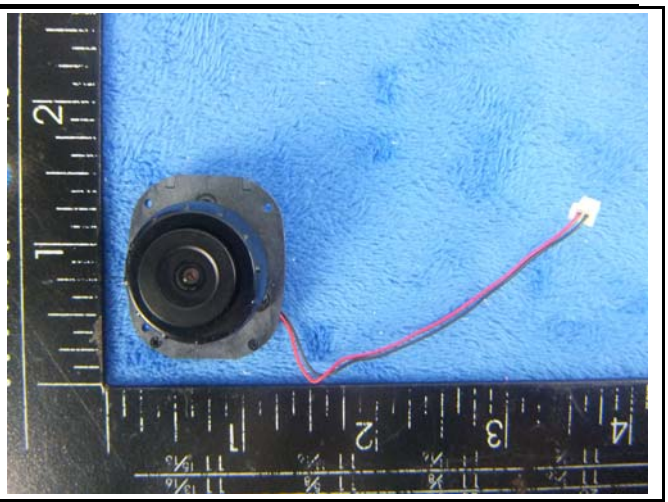
Mainboard without shielding - Front View



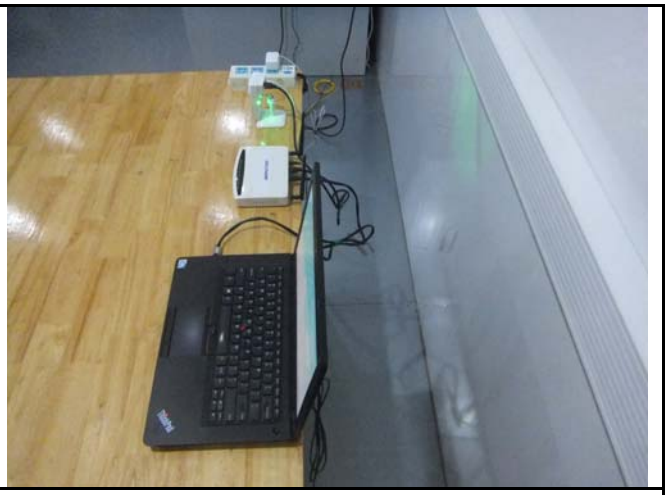
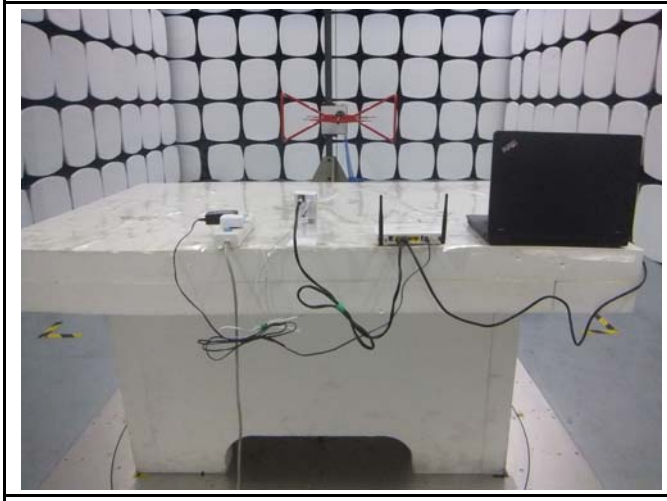
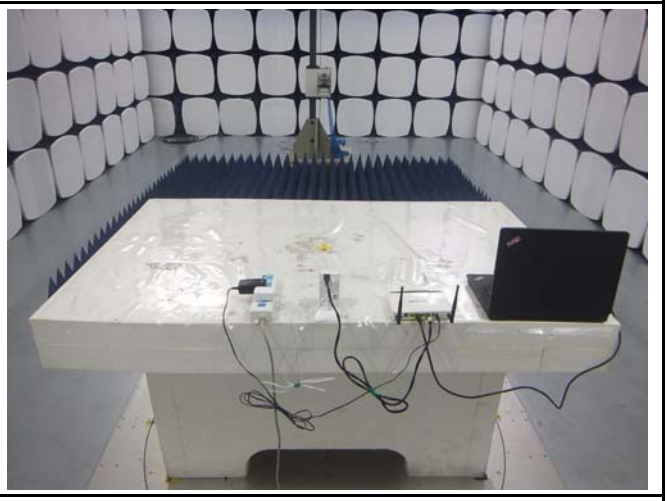
Mainboard - Rear View



Small Mainboard - Front View

	
Small Mainboard – Rear View	Camera - Front View
	
WIFI Antenna View	

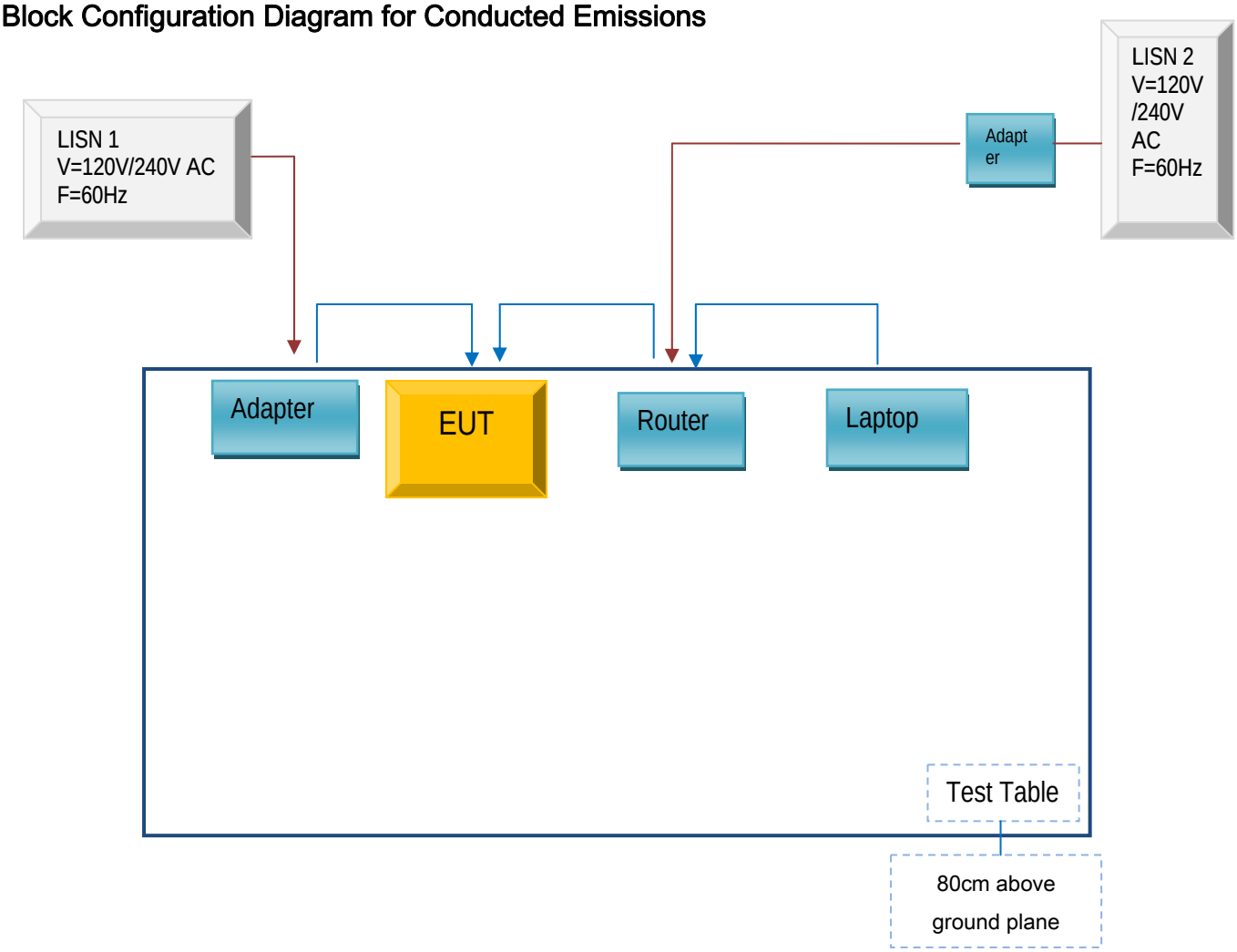
Annex B.iii. Photograph: Test Setup Photo

	
Conducted Emissions Test Setup – TF Card Front View	Conducted Emissions Test Setup – TF Card Side View
	
Radiated Emissions Test Setup Below 1GHz - TF Card Front View	Radiated Emissions Test Setup Above 1GHz - TF Card Side View

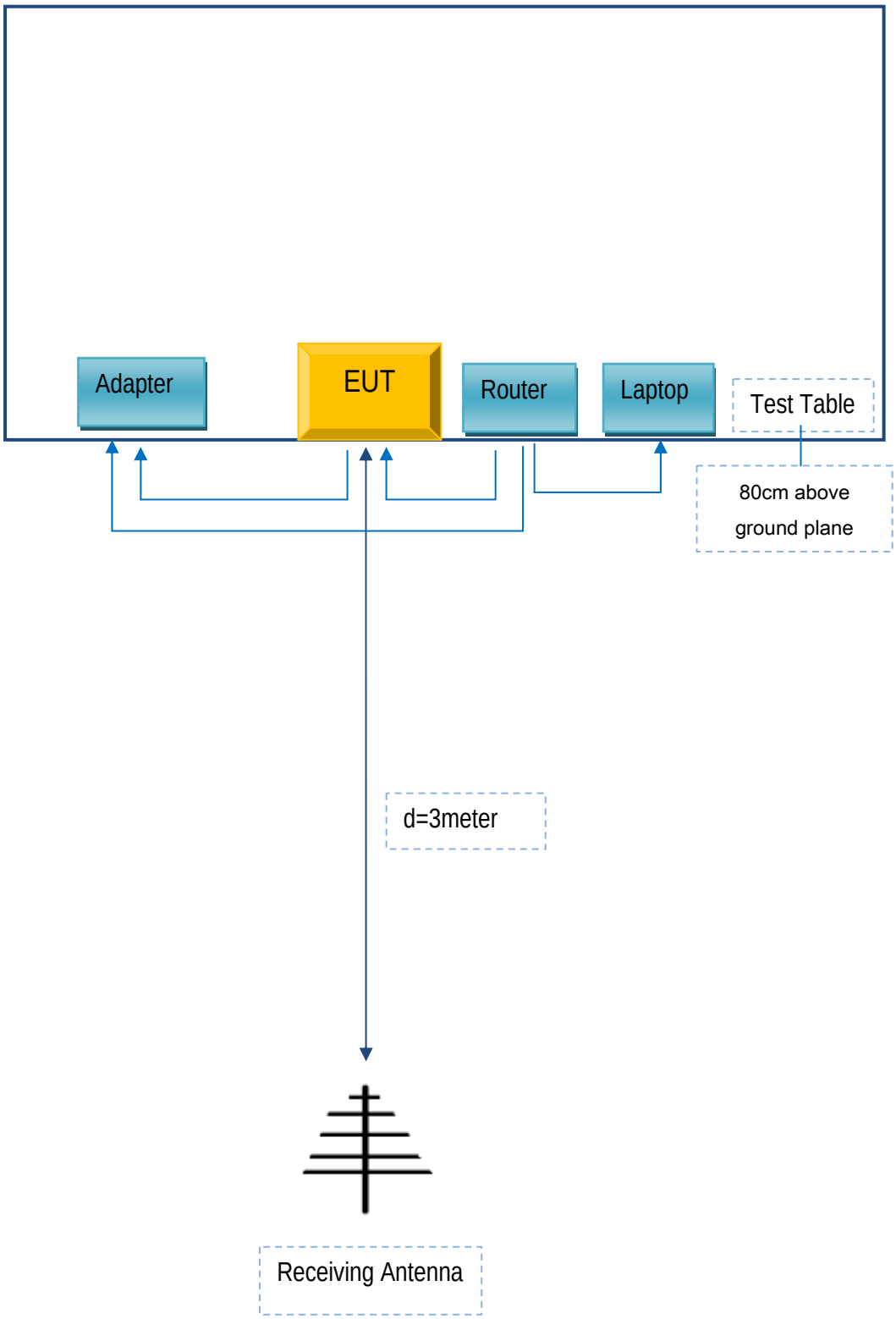
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	Lenovo Laptop	E40& 0579A52	LR-1EHRX
GOLDWEB	Router	R102	1202032094

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	1m	JX120051274
RJ45 Cable	Un-shielding	No	0.8m	KX156327541
Router Power cable	Un-shielding	No	2m	13274630Z

Annex D. User Manual / Block Diagram / Schematics / Partlist

N/A

Annex E. DECLARATION OF SIMILARITY

Zyxel Communication Corp.

To: SIEMIC ,775 Montague Expressway, Milpitas, CA 95035,USA

Declaration Letter

Dear Sir,

For our business issue and marketing requirement, we would like to list 2 model numbers on the FCC certificates and reports, as following:

Model No.: CAM1215, H-918BW YNC-918BW
We declare that, all the model PCB, Antenna and Appearance shape, accessories are the same. The difference of these is listed as below:

Main Model No	Serial Model No	Difference
CAM1215	H-918BW YNC-918BW	Different model name

Thank you!

Signature: Brian Lin 2016.4.12

Printed name/title: Brian Lin

Address: No. 2, Gongye E. 9th Road, Hsinchu Science Park,Hsinchu, Taiwan,R.O.C.