

## FCC - TEST REPORT

Report Number : **64.790.17.01916.01** Date of Issue: 2017-12-15

Model : M2136.P.-.

Product Type : Mini video outdoor station

Applicant : ABB Genway Xiamen Electrical Equipment Co.,Ltd

Address : Room 501-1, No.12-14, 3rd Chuang Xin Road, Torch High Technology Development Zone, Xiamen S.E.Z, Fujian Province, P.R.China

Production Facility : ABB Genway Xiamen Electrical Equipment Co.,Ltd

Address : NO.7 Fangshan South Road, Torch High Technology Development Zone (Xiang An) Industrial Zone, Xiamen S.E.Z, Fujian Province, P.R.China

Test Result :  **Positive**  **Negative**



Total pages including Appendices : 24

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China

## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13, Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2, Nanshan District,  
Shenzhen City, 518052,  
P. R. China

FCC Accredited test firm CN5009

Designation

Number

IC Registration Number: 10320A

Number:

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

### 3 Description of the Equipment Under Test

Product:	Mini video outdoor station
Model no.:	M2136.P.-.
FCC ID:	2AEBL-M2136
Brand Name:	ABB
Options and accessories:	N/A
Rating:	Input: DC 20-30V
RF Transmission Frequency:	125KHz
Modulation:	ASK
Antenna Type:	Coil antenna
Description of the EUT:	EUT is a Mini video outdoor station as a part of door entry system.

## 4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

4.

## 5 Summary of Test Results

Technical Requirements				
Test Condition		Pages	Test Site	Test Result
FCC Rules	Test Item			
§15.207	Conducted emission AC power port	10	1	P
§15.209, 15.205	Filed Strength Measurement	13	1	P
§15.215(c)	Occupied Bandwidth	15	1	P

Note 1: N/A=Not Applicable.

## 6 General Remarks

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Testing Start Date: 2017-04-18

Testing End Date: 2017-04-22

- TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch -

Reviewed by:

Prepared by:



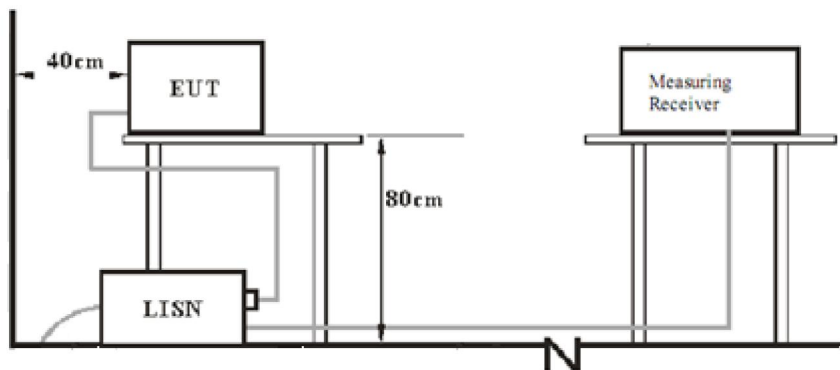
Tony Liu



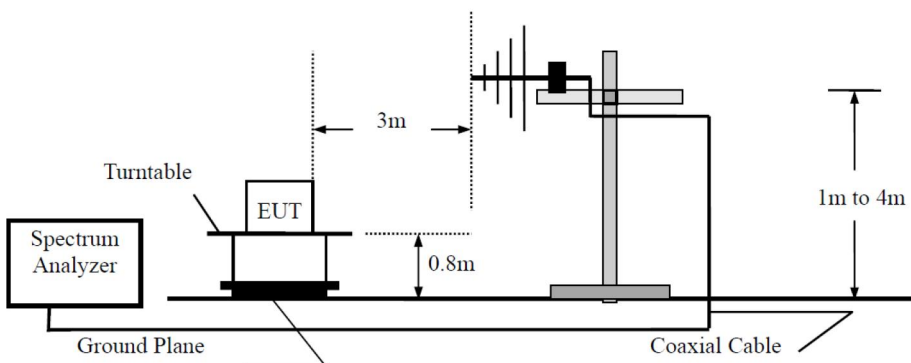
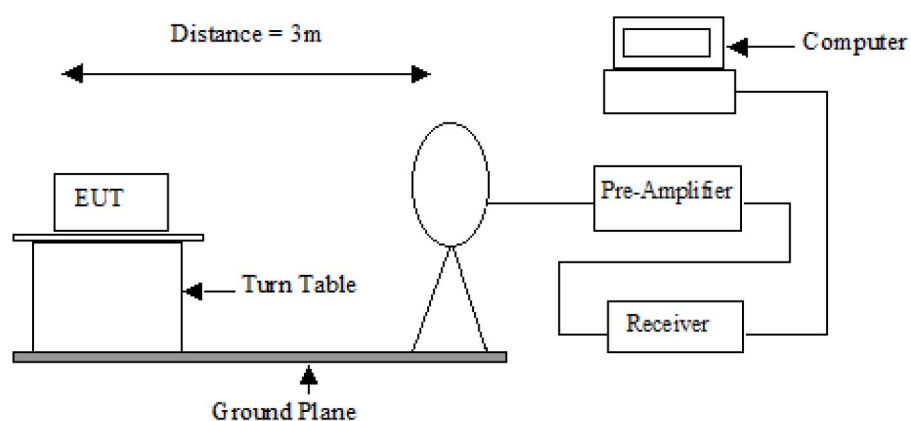
Kevin Ouyang

## 7 Test Setups

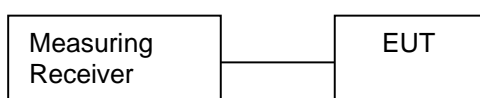
### 7.1 AC Power Line Conducted Emission test setups



### 7.2 Radiated test setups



### 7.3 Conducted RF test setups



## 8 Test Methodology

### 8.1 Conducted Emission

The EUT was placed on a table, which is 0.8m above ground plane, the power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).

Maximum procedure was performed to ensure EUT compliance, A EMI test receiver is used to test the emissions from both sides of AC line.

### 8.2 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site \*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, considered typical configuration, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*On a standard emission test site with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules.

### 8.3 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$FS = R + \text{System Factor}$

$\text{System Factor} = AF + CF + FA - PA$

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.



## 9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	REMARK
System controller	ABB	M2300	Input: 100-240 V a.c., 50/60 Hz, 1.0 A; output: 28.0 V d.c., 1.2 A

Remark: All the auxiliary equipments are used to make this "Mini video outdoor station" works as its representative configuration for conducted emission test.

## 10 Technical Requirement

### 10.1 Conducted Emission Measurement

Test Requirement: FCC part 15 section 15.207  
Limits of 15.207:

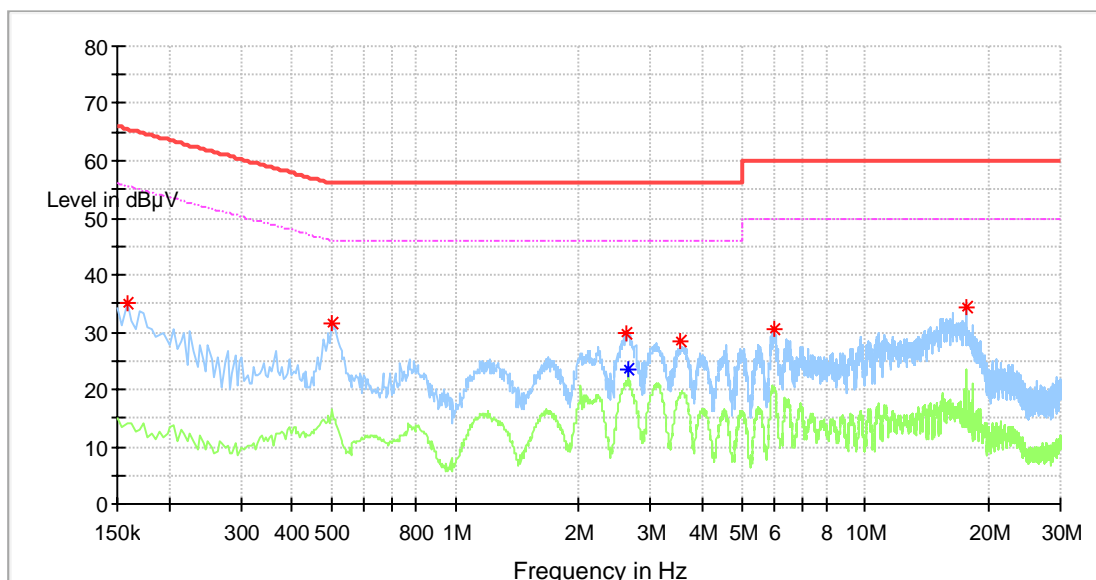
Frequency (MHz)	Conducted limit(dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

Test Method: ANSI C63.4:2014  
Test Date: 2017-04-18  
Mode of Operation: Test EUT in a representative configuration that can read card.  
Detector Function: Quasi-peak and Average

Test data:

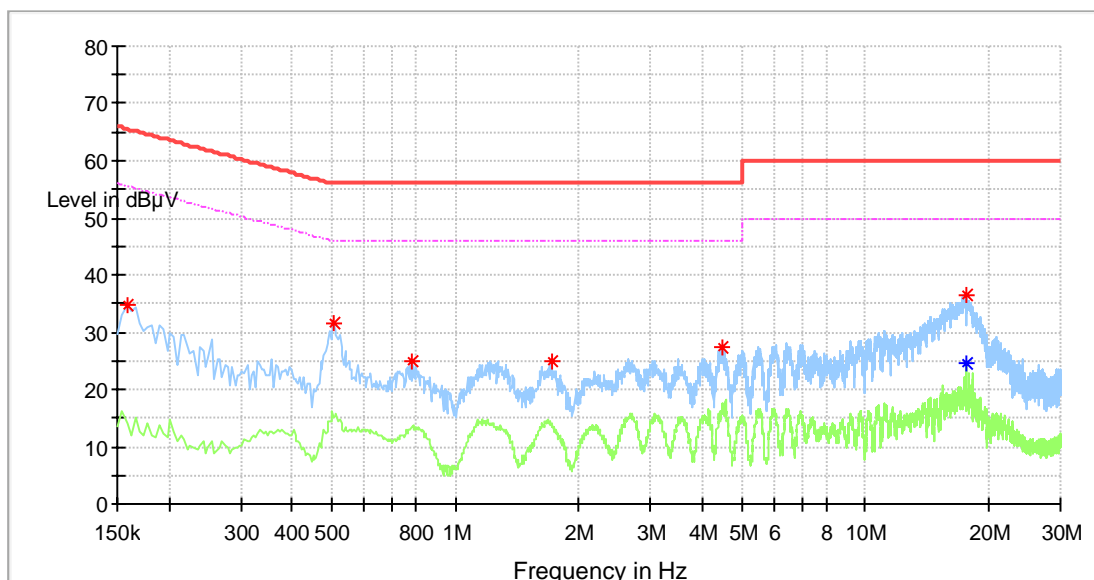
Conducted emission



No significant emission was detected within 10 dB to limit

Operating Mode : Test EUT in a representative configuration with reading card.  
 Conduct Line/Port : L  
 Test By : Kevin Ouyang  
 Test Date : 2017-04-18

Conducted emission



No significant emission was detected within 10 dB to limit

Operating Mode : Test EUT in a representative configuration with reading card.  
 Conduct Line/Port : N  
 Test By : Kevin Ouyang  
 Test Date : 2017-04-18

**Test result: PASS**

## 10.2 Filed Strength Measurement

Test Requirement: FCC part 15 section 15.209, 15.205 &

Limits of 15.209:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method: ANSI C63.4:2014  
 Test Date: 2017-04-22  
 Mode of Operation: Continuously transmitting mode.  
 Detector Function: Quasi-peak (Below 1000 MHz)  
 Average and Peak (Above 1000 MHz)  
 Measurement BW: 200Hz(9KHz-150KHz)  
 9KHz(150KHz-30MHz)  
 120 kHz (30MHz-1000 MHz)  
 1 MHz (Above 1000 MHz)

Test data:

Emission 9KHz-30MHz

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB)
0.023993	63.45	119.99	56.54	H	0.0	20.4
0.124996	72.30	105.66	33.36	H	0.0	19.4
0.135994	57.02	104.93	47.91	H	0.0	19.4
0.344025	57.06	96.87	39.81	H	0.0	19.2
0.468400	61.49	94.19	32.71	H	0.0	19.1
0.503225	47.02	73.57	26.55	H	0.0	19.1
0.975850	39.22	67.83	28.62	H	325.0	19.2
1.687275	36.49	63.09	26.60	H	0.0	19.4
2.891225	40.77	69.50	28.73	H	315.0	19.7
7.050325	34.80	69.50	34.70	H	55.0	19.3
29.169175	35.70	69.50	33.80	H	169.0	21.4

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB)
0.023993	68.44	119.99	51.54	V	0.0	20.4
0.056000	64.89	112.63	47.74	V	0.0	19.0
0.124996	61.96	105.66	43.70	V	339.0	19.4
0.135994	61.09	104.93	43.84	V	0.0	19.4
0.229600	62.46	100.38	37.92	V	0.0	19.3
0.468400	61.46	94.19	32.73	V	0.0	19.1
0.503225	44.66	73.57	28.91	V	0.0	19.1
1.125100	38.34	66.60	28.26	V	0.0	19.2
1.493250	37.44	64.15	26.71	V	0.0	19.4
3.000675	41.12	69.50	28.38	V	86.0	19.7
6.209550	37.11	69.50	32.39	V	253.0	19.5
29.154250	35.70	69.50	33.80	V	346.0	21.4

Test result: PASS

## 10.3 Occupied Bandwidth

Test Requirement:

FCC Part 15 C Section 15.215 (c)  
RSS-Gen Issue 4 clause 6.6

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Method:

ANSI C63.4:2014

Test Date:

2017-04-22

Mode of Operation:

Continuously transmitting mode.

Detector Function

Maxpeak

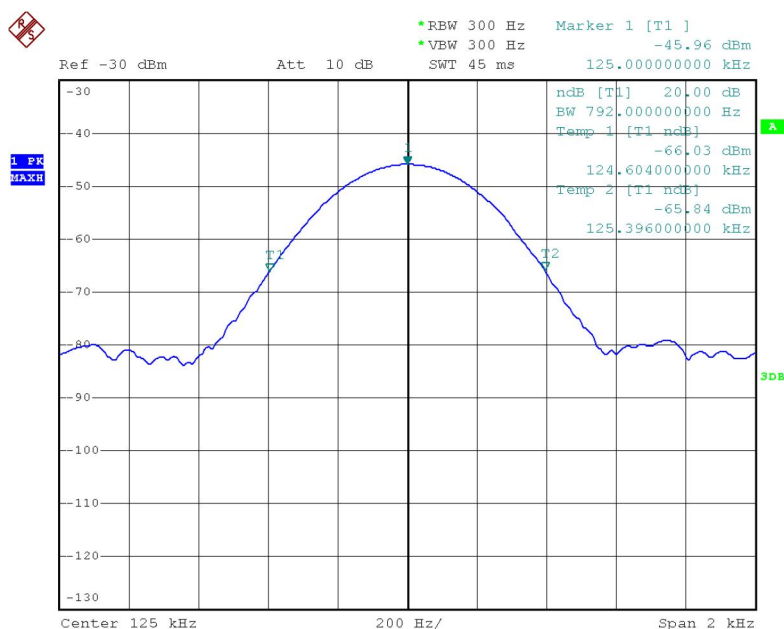
Measurement BW

RBW:100Hz

VBW:300Hz

Test data:

20dB bandwidth



Result: PASS

## 11 Test Equipment List

### List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101031	2018-7-7
CE	EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2018-7-14
	LISN	Rohde & Schwarz	ENV216	100326	2018-7-14
RE	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14
	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2018-7-14
	3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-14

#### C - Conducted RF tests

- Occupied bandwidth
- Frequency Stability

## 12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

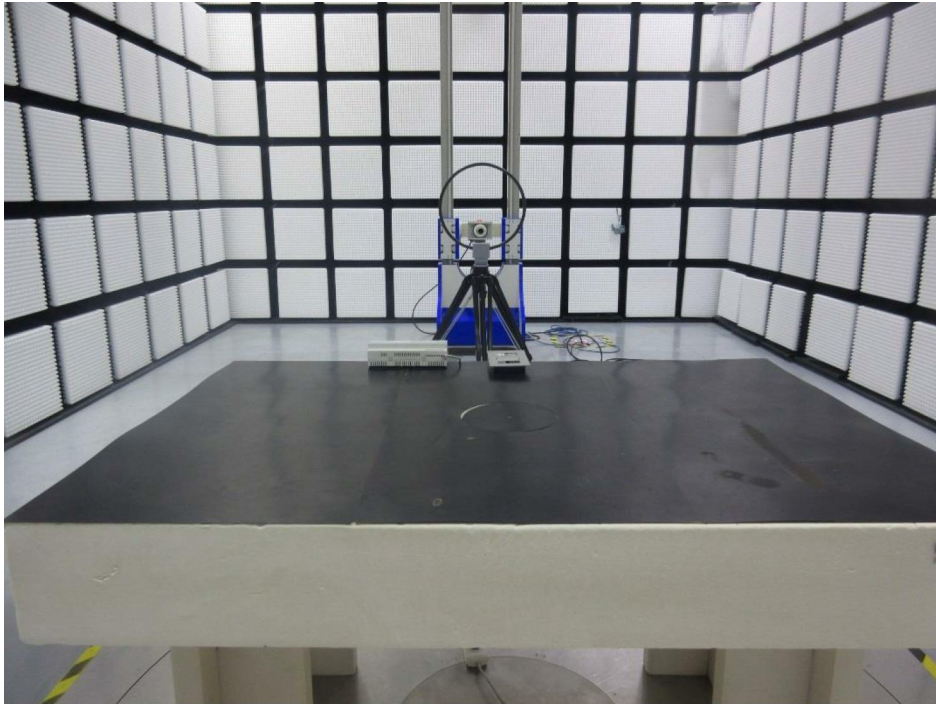
### System Measurement Uncertainty

Items	Extended Uncertainty
Radiated spurious emission	U=±4.54dB ( 9KHz~30MHz )
	U=±4.91dB ( 30MHz~1GHz )
	U=±4.89dB ( 1GHz~18GHz )

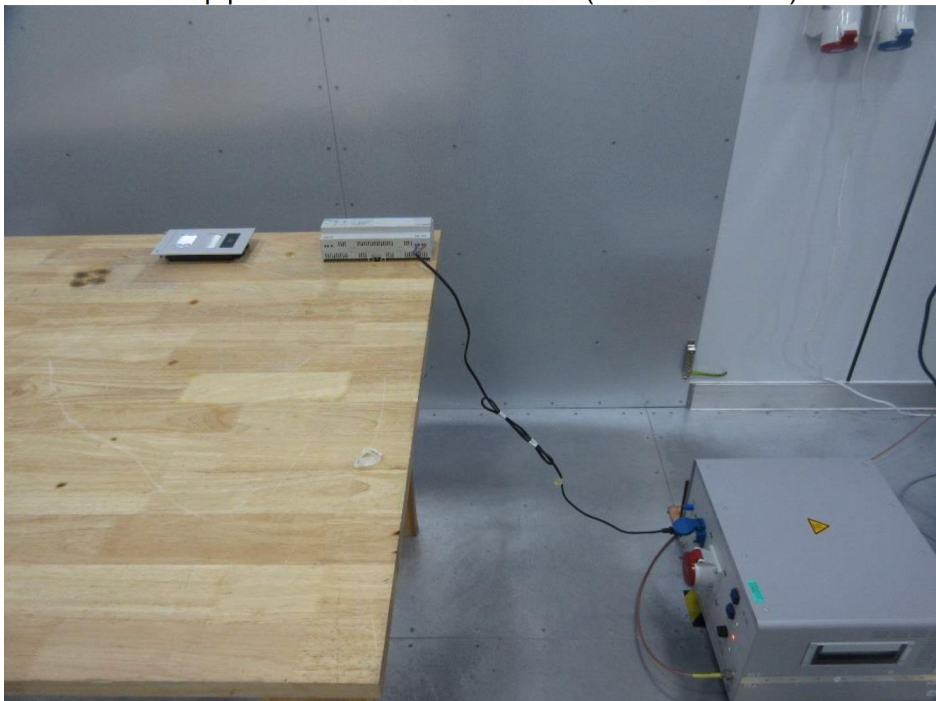


## 13 Appendix A – Setup Photos

Setup photo of radiated emission (9KHz-30MHz)



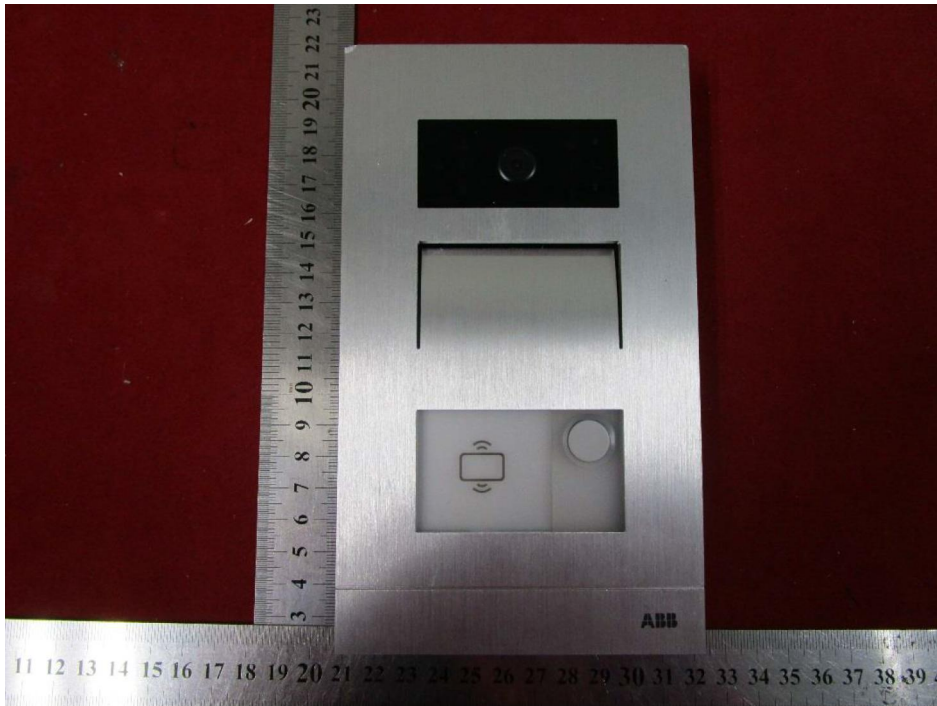
Setup photo of conducted emission (150KHz-30MHz)



# 14 Appendix B – EUT Photos

External photos

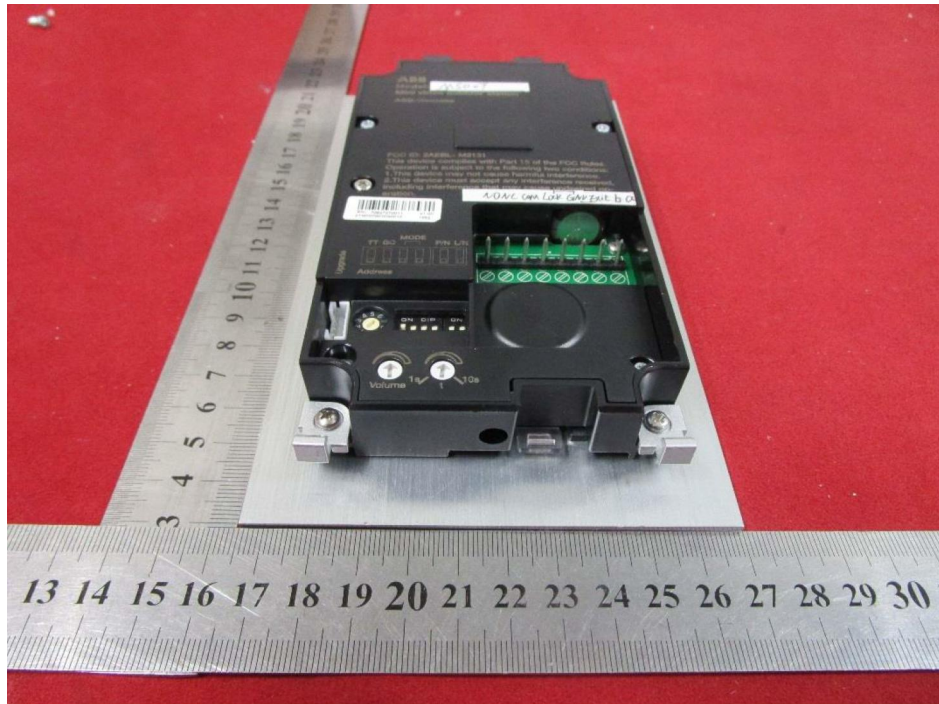
Front View



Back view

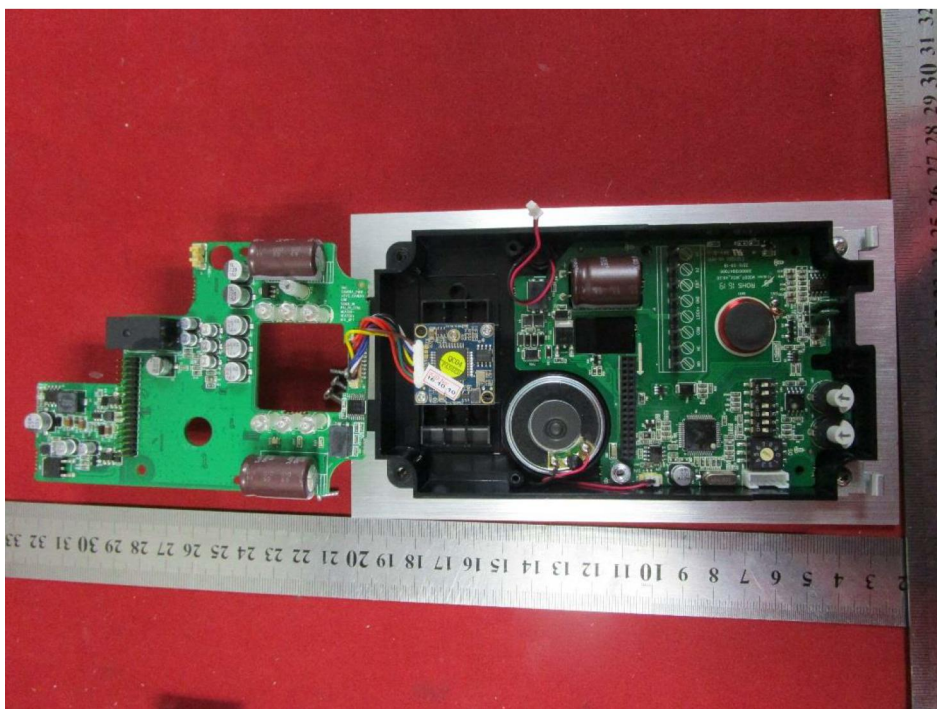


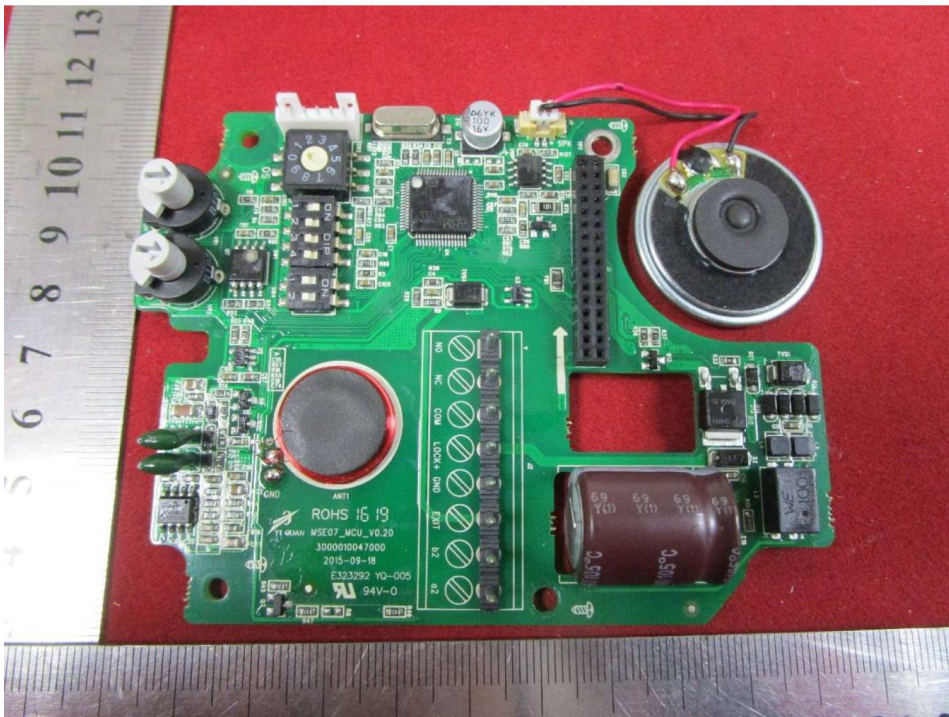
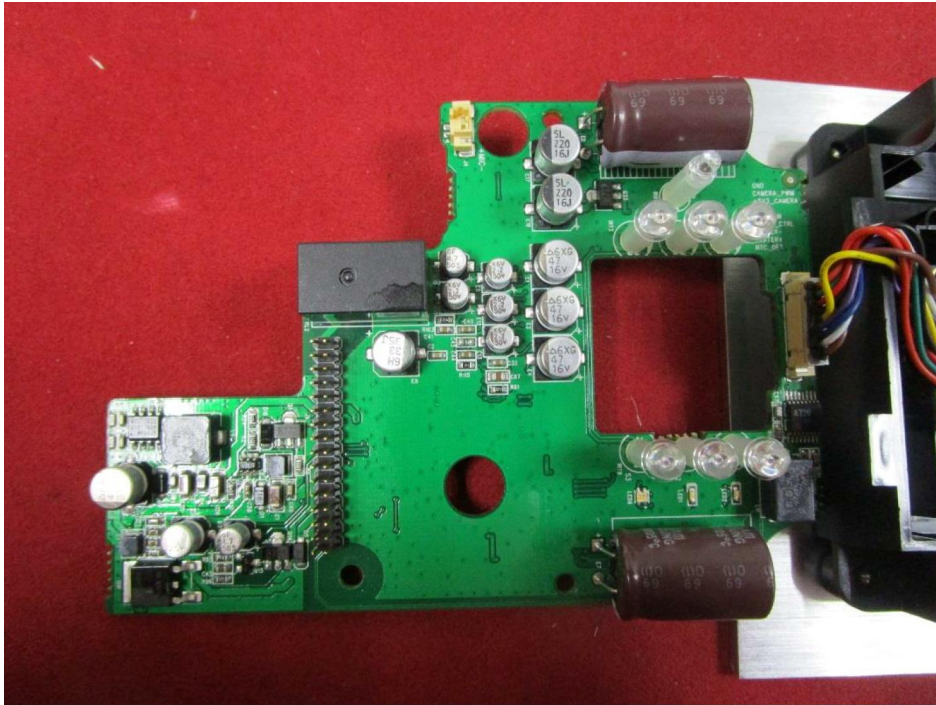
Side view

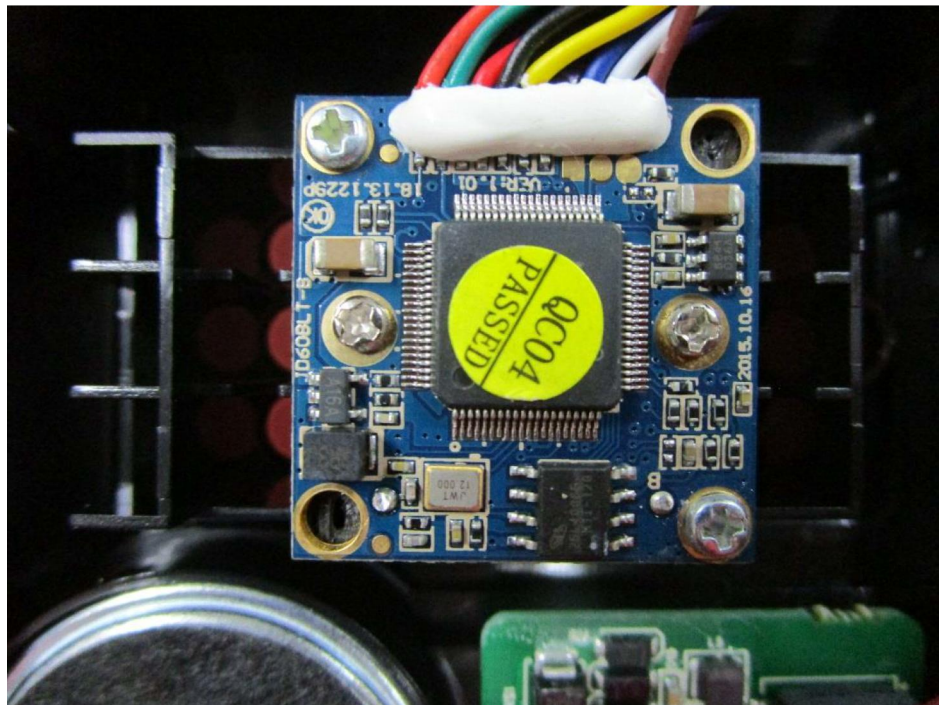
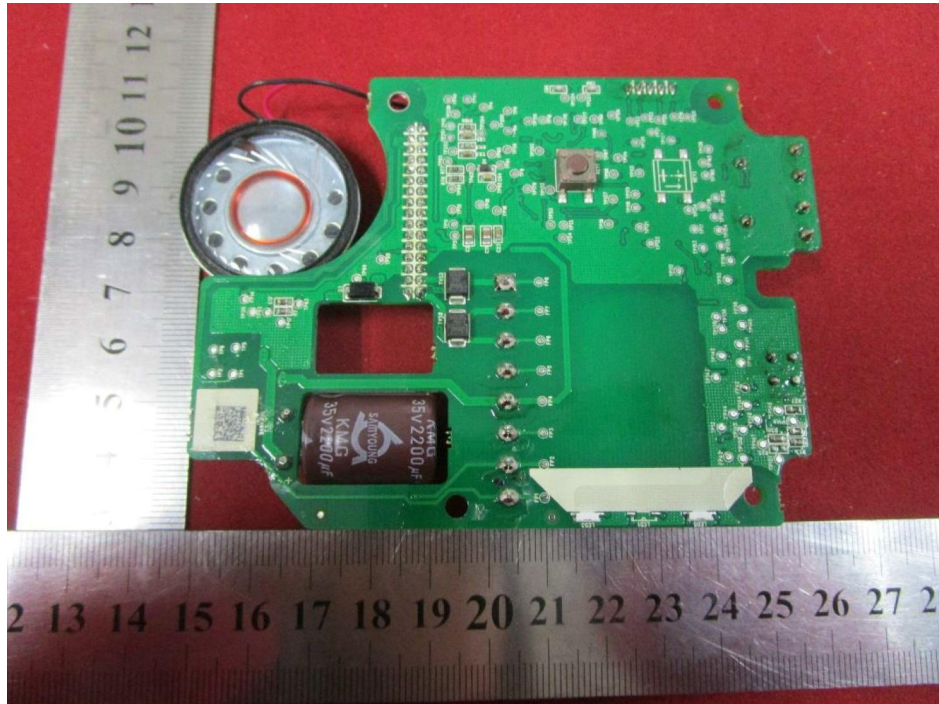


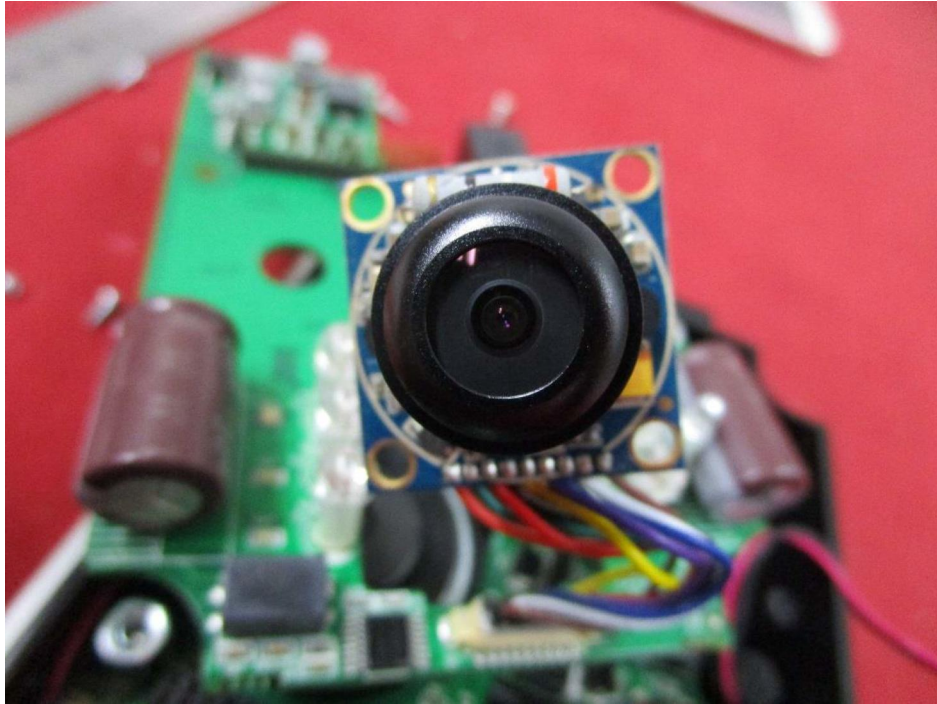


Internal photos









Antenna photo

