

FCC - TEST REPORT

Report Number : **64.790.19.04312.01** Date of Issue: 2019-12-04

Model : H8131.P.-, H8136.P.-.

Product Type : Mini video outdoor station

Applicant : ABB Xiamen Smart Technology 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

Production Facility : ABB Xiamen Smart Technology Co.,Ltd.

Test Result : ☒ **Positive** ☐ **Negative**



Total pages including Appendices : 35

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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 Registration Number: 514049

IC Registration Number: 10320A

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

3 Description of the Equipment Under Test

Product:	Mini video outdoor station
Model no.:	H8131.P.- , H8136.P.-.
FCC ID:	2AEBL-H8131
Options and accessories:	N/A
Rating Input:	DC 24V
RF Transmission Frequency:	125KHz
Modulation:	ASK
Antenna Type:	Coil loop antenna
Description of the EUT:	EUT is a card reader.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2018 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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	15	1	P
§15.215(c)	Occupied Bandwidth	20	1	P

Note 1: N/A=Not Applicable.

6 General Remarks

Two models are identical except appearance, tests only performed on H8131.P.-..

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.

Sample Received Date: 2019-08-27

Testing Start Date: 2019-08-28

Testing End Date: 2019-12-04

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

Reviewed by:

Prepared by:

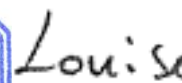
Tested by:



Tony Liu



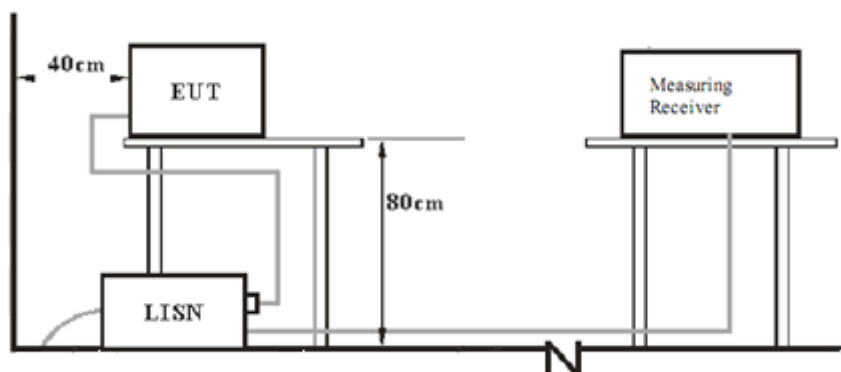
Kevin Ouyang



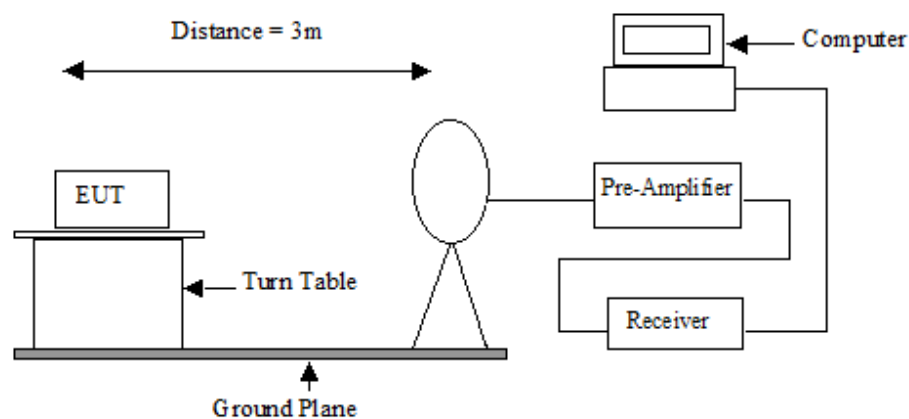
Louise Liu

7 Test Setups

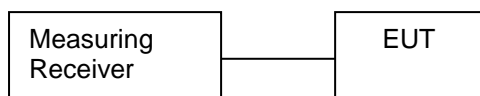
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups (9KHz-30MHz)



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 a 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:

$$\begin{aligned} FS &= R + \text{System Factor} \\ \text{System Factor} &= AF + CF + FA - PA \end{aligned}$$

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	MODEL NO.	MANUFACTURER
Indoor station	H82366-W	ABB
System controller	YSM01	ABB
POE Switch	H3C S1208-PWR	H3C

Remark: All the auxiliary equipment's 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:

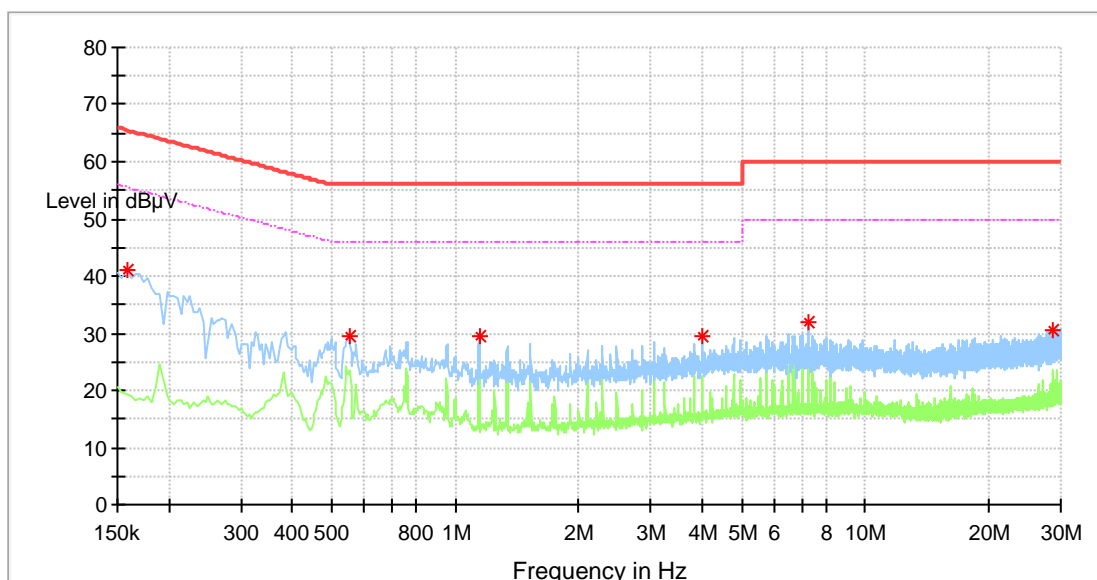
Frequency (MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Method: ANSI C63.4:2014
Test Date: 2019-08-28
Mode of Operation: Test EUT in a representative configuration that can read card.
Detector Function: Quasi-peak and Average

Test data:

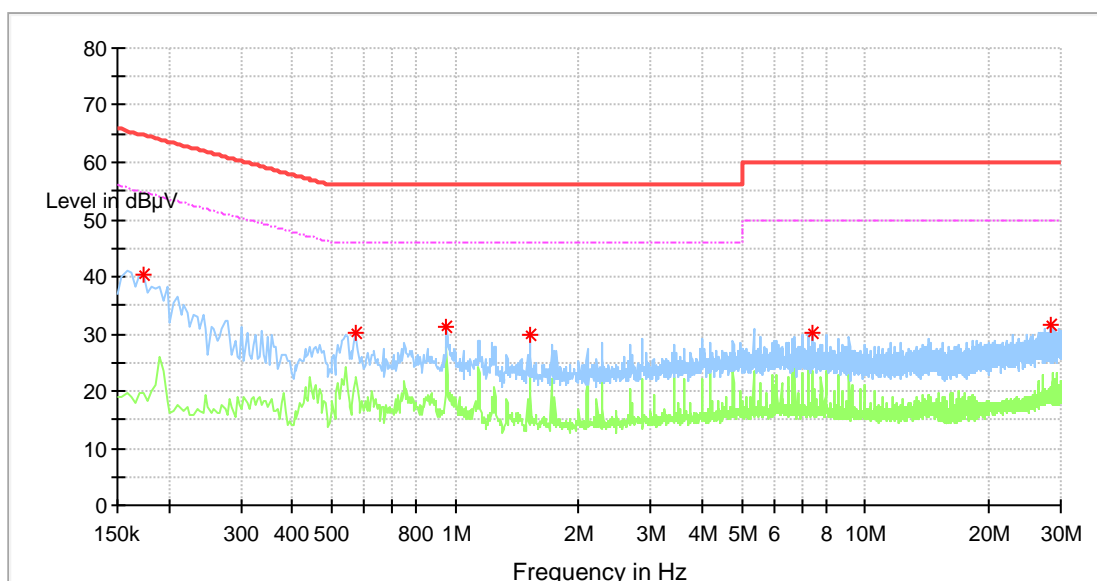
Conducted emission



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	:	2019-08-28
Remark	:	Powered by adaptor

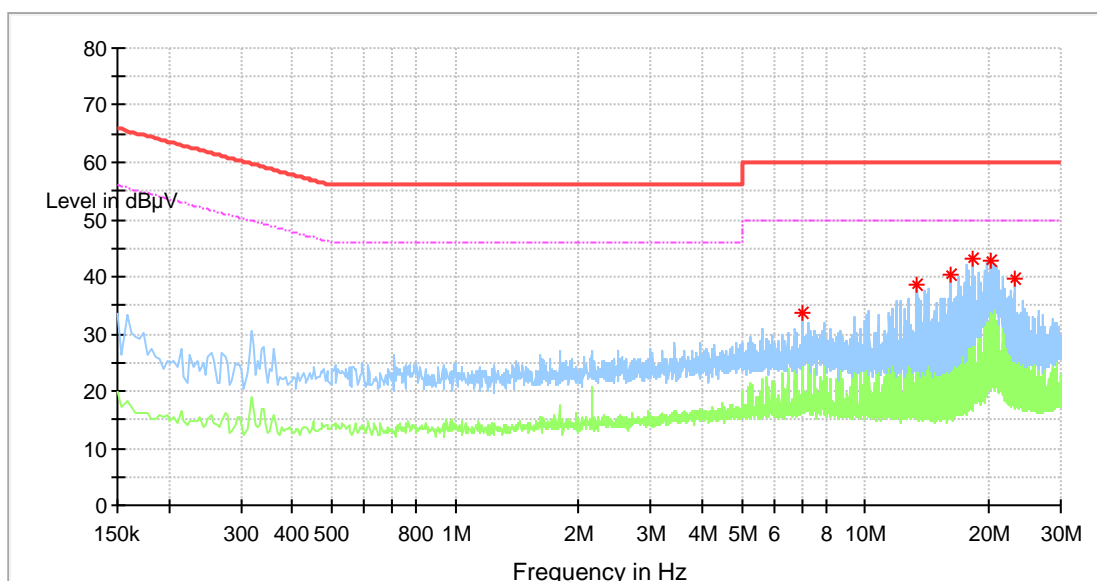
Conducted emission



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	:	2019-08-28
Remark	:	Powered by adaptor

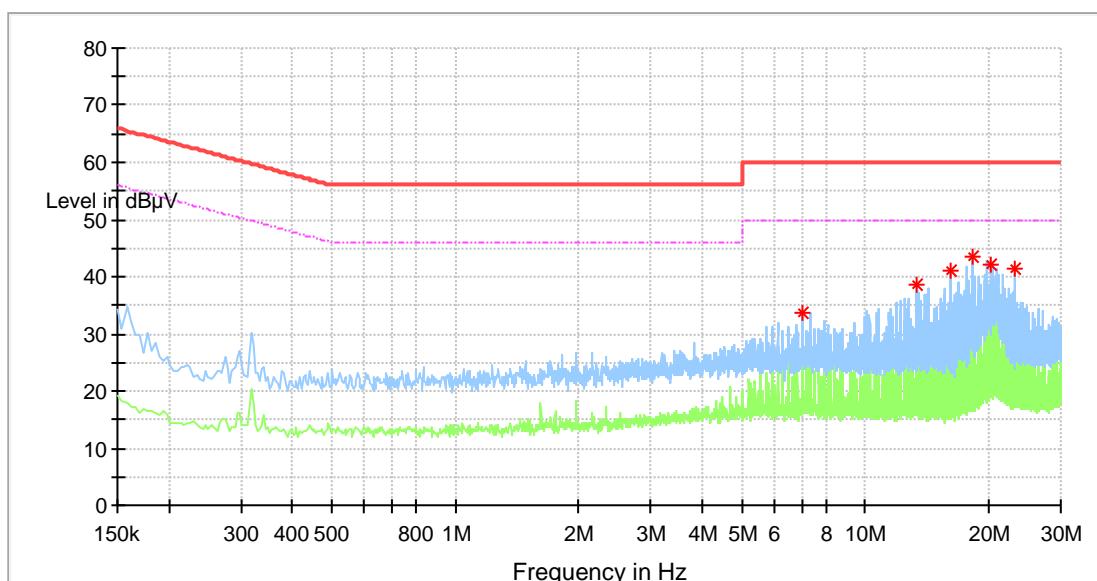
Conducted emission



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	:	2019-08-28
Remark	:	Powered by POE switch

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	:	2019-08-28
Remark	:	Powered by POE switch

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

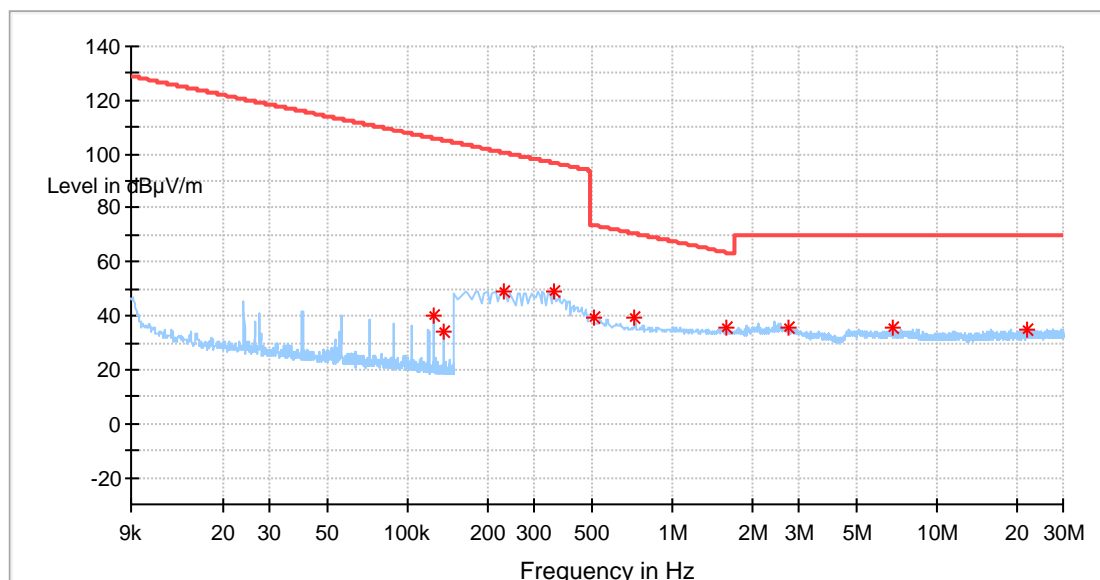
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method: ANSI C63.4:2014
 Test Date: 2019-09-16
 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)

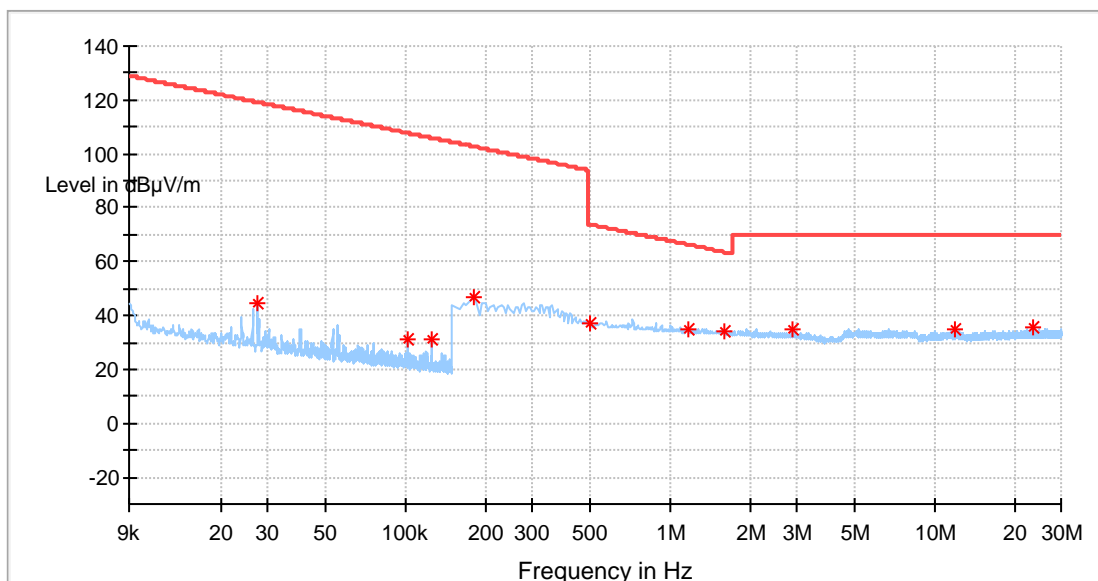
Test data:

Emission 9KHz-30MHz

Powered by adaptor:

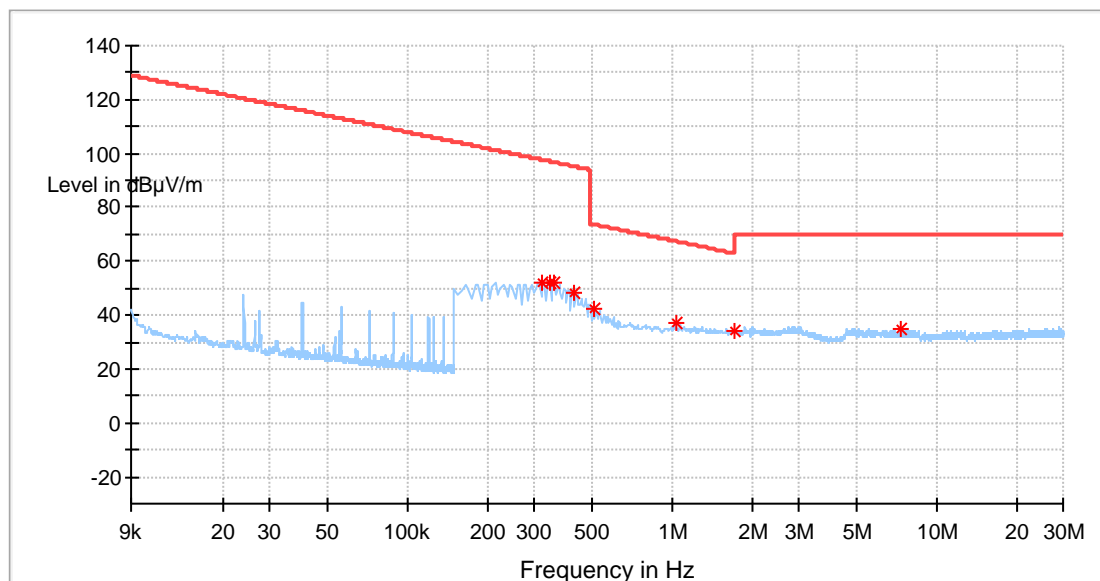


Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
0.125	39.93	105.96	66.03	H	19.9
0.229600	49.01	100.64	51.63	H	19.9
0.358950	48.74	96.73	47.99	H	20.0
0.503225	39.01	73.77	34.75	H	20.2
1.602700	35.49	63.55	28.05	H	20.3
0.135994	34.30	105.22	70.93	H	19.9
6.851325	35.57	70.00	34.43	H	20.2
2.771825	35.91	70.00	34.09	H	20.3
21.890750	35.09	70.00	34.91	H	20.5
0.722125	39.15	70.58	31.43	H	20.1

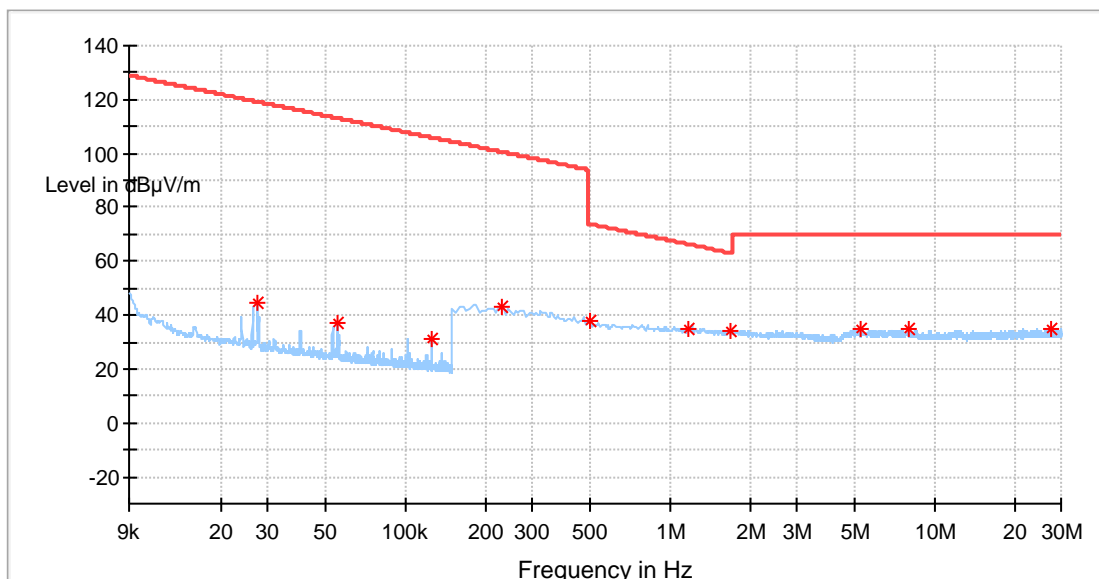


Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
0.179850	47.16	102.78	55.62	V	19.9
0.027518	44.23	119.21	74.98	V	20.4
0.101919	30.97	107.75	76.78	V	20.0
0.125	31.26	105.96	74.70	V	19.9
2.901175	35.05	70.00	34.95	V	20.2
0.498250	37.21	73.85	36.64	V	20.2
1.159925	35.14	66.40	31.26	V	20.3
23.641950	35.42	70.00	34.58	V	20.6
1.607675	34.40	63.52	29.12	V	20.3
11.871100	34.65	70.00	35.35	V	20.2

Powered by POE switch:



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
0.324125	52.12	97.62	45.50	H	20.0
0.344025	51.78	97.10	45.32	H	20.0
0.358950	51.65	96.73	45.07	H	20.0
0.423625	48.17	95.27	47.11	H	20.1
0.503225	42.34	73.77	31.43	H	20.2
1.030575	37.01	67.44	30.43	H	20.3
7.244350	35.03	70.00	34.97	H	20.2
1.702200	34.31	63.01	28.71	H	20.3



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
0.229600	43.18	100.64	57.45	V	19.9
5.224500	34.56	70.00	35.44	V	20.2
1.164900	34.50	66.36	31.86	V	20.3
1.682300	34.18	63.12	28.93	V	20.3
27.527425	34.91	70.00	35.09	V	20.6
0.493275	37.90	73.94	36.04	V	20.2
7.915975	34.80	70.00	35.20	V	20.2
0.125	31.32	105.96	74.64	V	19.9
0.055060	37.12	113.14	76.03	V	20.3
0.027518	44.87	119.21	74.34	V	20.4

Remark: Correction Factor=Antenna Factor + Cable Loss (For Below 1GHz)

Correction Factor = Antenna Factor + Cable Loss- Amplifier Gain (For Above 1GHz)

(The Reading Level is recorded by software which is not shown in the sheet)

Test result: PASS

10.3 Occupied Bandwidth

Test Requirement:

FCC Part 15 C Section 15.215 (c)

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:

2019-12-04

Mode of Operation:

Continuously transmitting mode.

Detector Function

Maxpeak

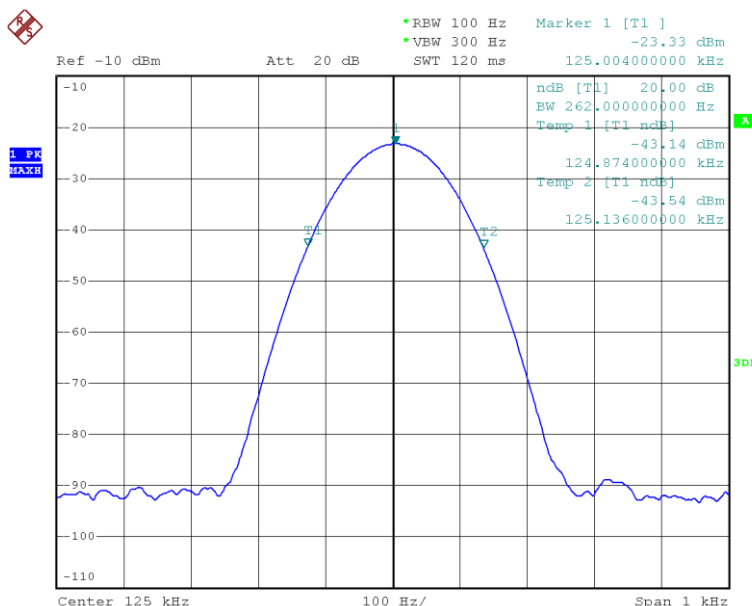
Measurement BW

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	101030	2020-6-28
	Programmable temperature and humidity chamber	SCOTEK	SCD-C40-100E	JW171111TX8	2020-6-28
	DC power supply	GW	SPS-2415	GEO874941	N/A
CE	LISN	Rohde & Schwarz	ENV432	101318	2020-7-19
	EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2020-6-28
RE	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2020-6-28
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2020-8-20
	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2020-7-7

C - Conducted RF tests

- Occupied bandwidth
- Frequency Stability

12 System Measurement Uncertainty

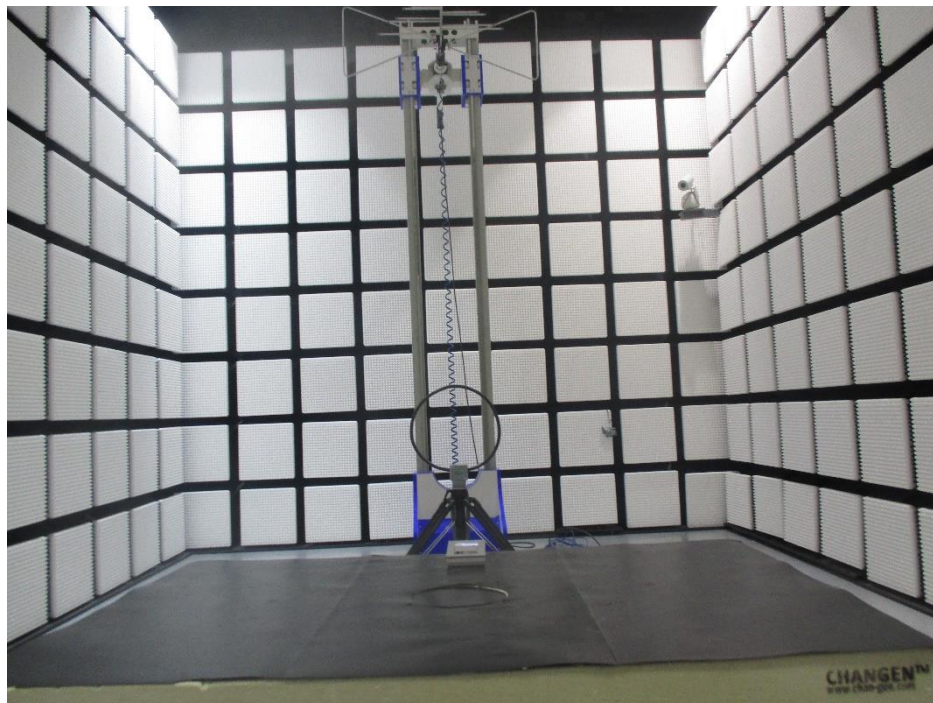
For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz	3.21dB
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.46dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%

13 Appendix A – Setup Photos

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

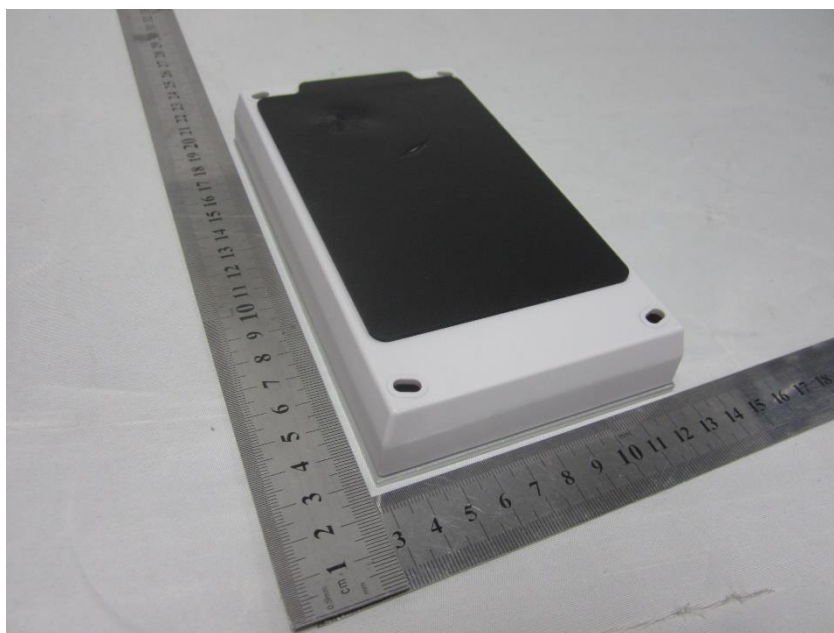
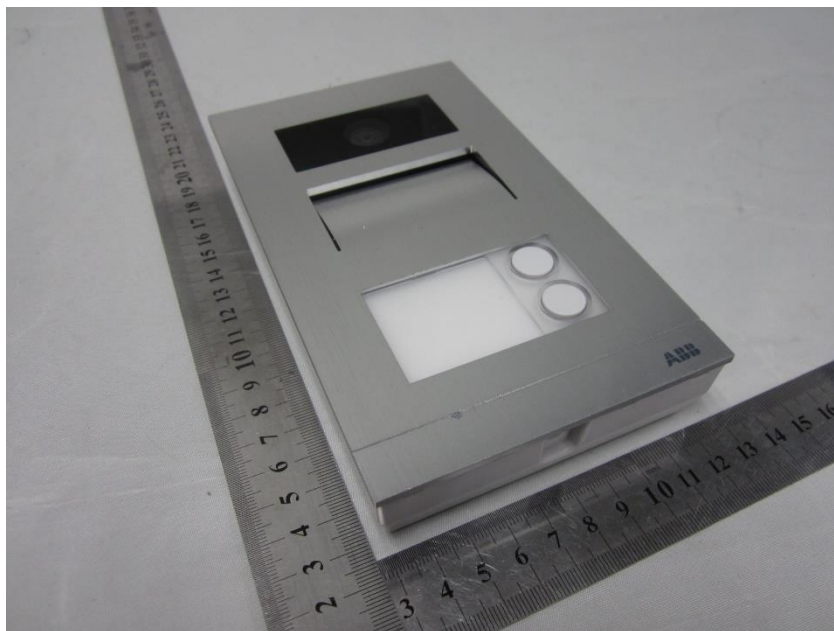


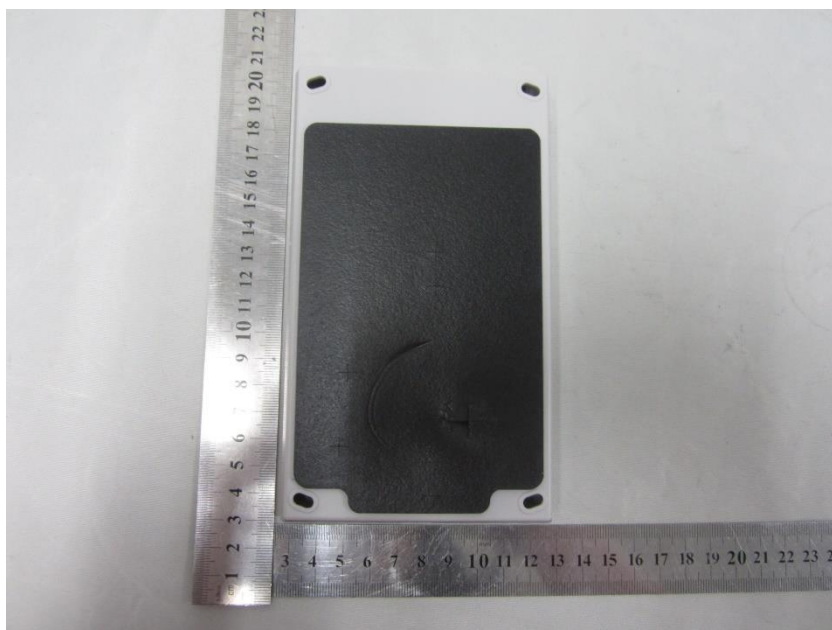
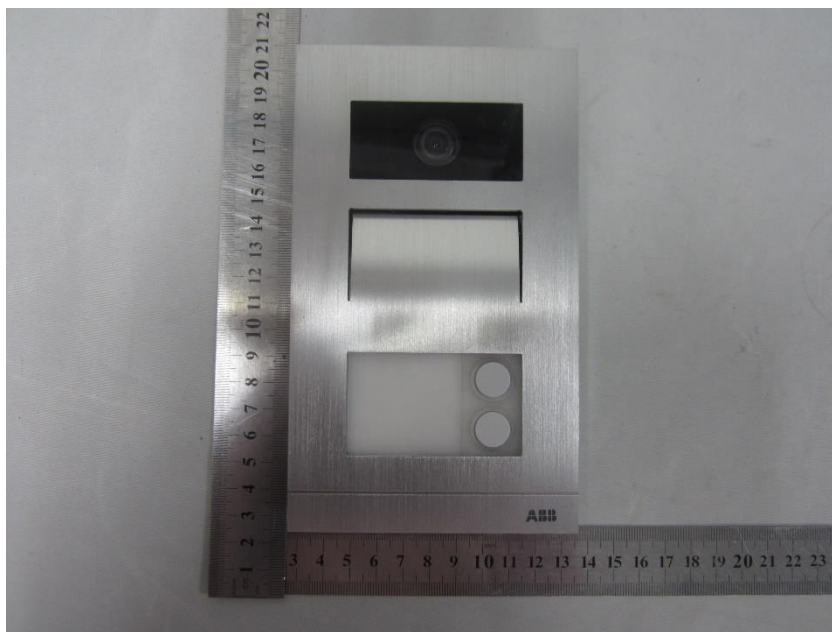
Setup photo of conducted emission (150KHz-30MHz)



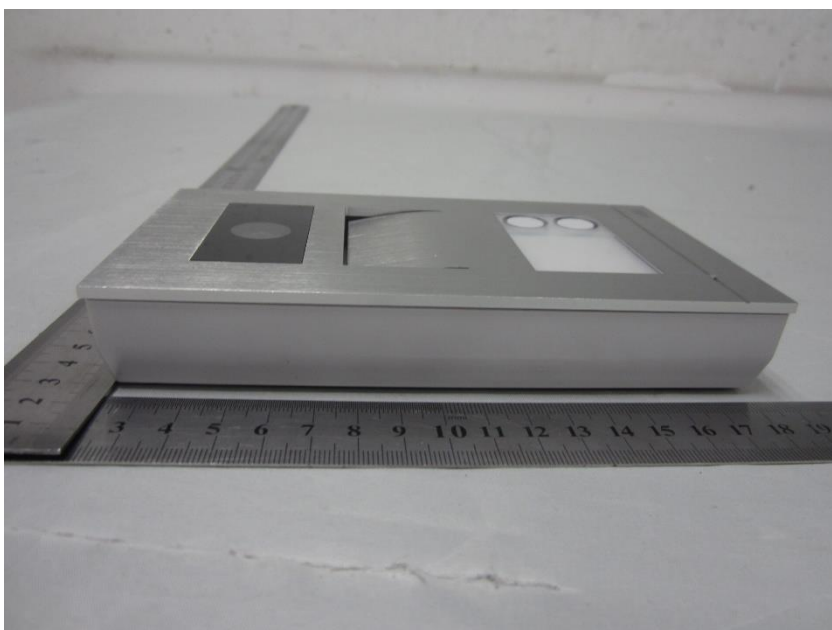
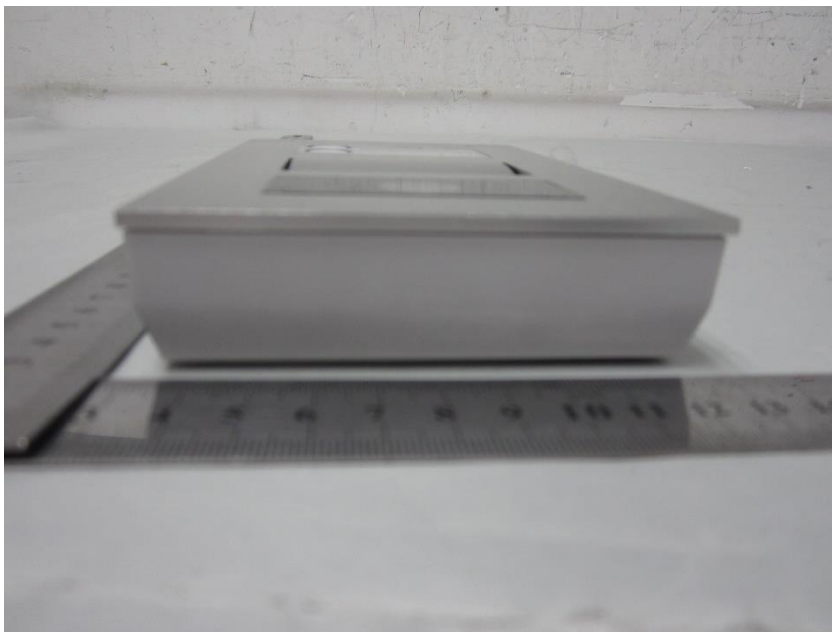
14 Appendix B – EUT Photos

External photos of H8131.P.-.



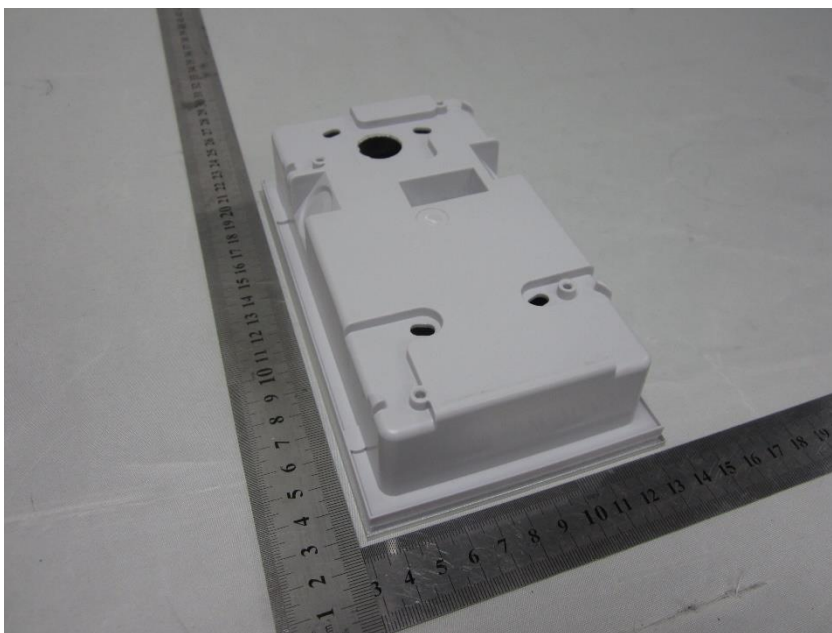


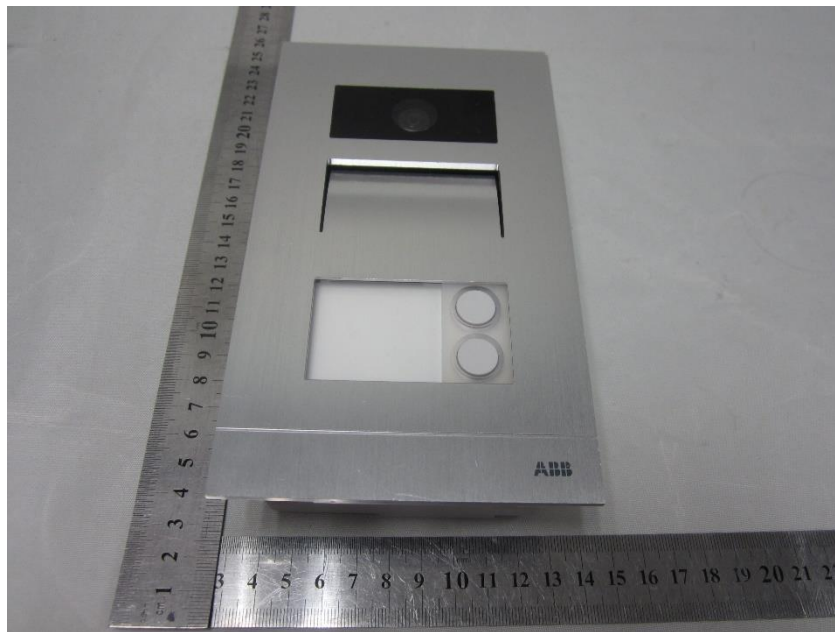




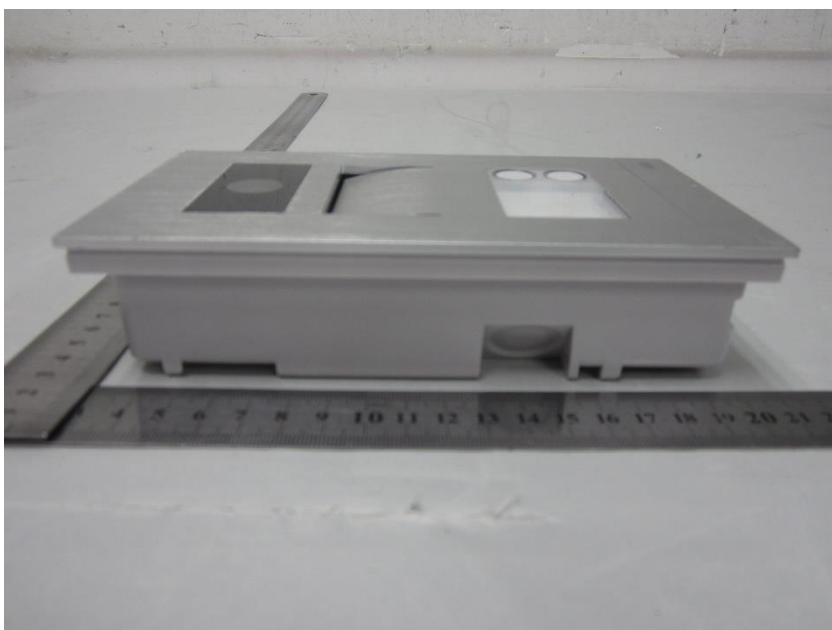
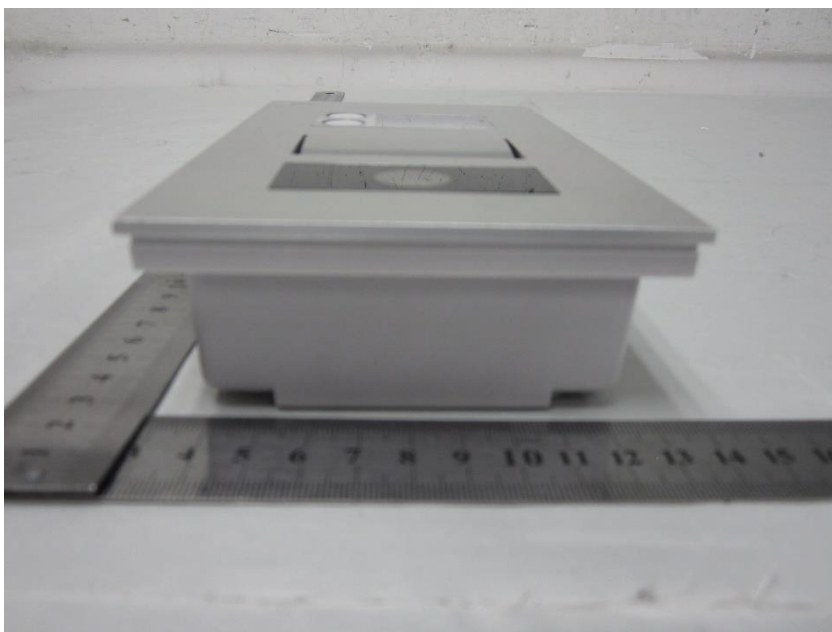


External photos of H8136.P.-.











Internal photos for both models: H8131.P.-, H8136.P.-.

