EN 300 440 RADIO TEST REPORT

FOR

Applicant	**:**	Protech Electronics & Technology Limited
Address	**:**	12A floor, Building 12, ZHX Innovation Industrial City, No. 12th, Ganli 6 Road, Jihua Street, Longgang District, Shenzhen, China
Equipment under Test	**:**	Wireless Extender
Model No.	**:**	PET100W, PET100W-R
Trade Mark	**:**	/
Manufacturer	**:**	Protech Electronics & Technology Limited
Address	**:**	12A floor, Building 12, ZHX Innovation Industrial City, No. 12th, Ganli 6 Road, Jihua Street, Longgang District, Shenzhen, China

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, **E-mail:** ddt@dgddt.com, http://www.dgddt.com

REPORT

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TEST REPORT DECLARE

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Test Standard Used: EN 300 440 V2.1.1 (2017-03)

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above ETSI standards.

Report No.:	DDT-R19080620-1E2		
Date of Receipt:	Aug. 15, 2019	**Date of Test:**	Aug. 15, 2019 ~ Sep. 12, 2019

Prepared By: ***Approved By:***

Sam Li

Sam Li/Engineer ***Damon Hu/EMC Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision history

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Sep. 16, 2019	

1. Summary of test results

1.1. Standard description

EN 300 440 V2.1.1: Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

1.2. Test result

Harmonized Standard EN 300 440 The following requirements and test specifications are relevant to the presumption of conformity under article 3.2 of the RED				
No	Test Parameter	Clause No	Condition	Results
1	Equivalent isotropically radiated power	4.2.2	Applies to all devices with transmitters	PASS
2	Permitted range of operating frequencies	4.2.3	Applies to all devices with transmitters	PASS
3	Unwanted emissions in the spurious domain	4.2.4	Applies to all devices with transmitters	PASS
4	Duty cycle	4.2.5.4	Transmitting devices which do not use LBT, DAA, or RFID transmitters operating in the 2 446 to 2454 MHz band transmitting more than 500 Mw e.i.r.p. power level	N/A
	Additional requirements for FHSS equipment	4.2.6	Equipment utilizing FHSS modulation	N/A
5	Adjacent channel selectivity	4.3.3	Applies to equipment Category 1 receivers	N/A
6	Blocking or desensitization	4.3.4	Applies to Category 1 and Category 2 receivers.	PASS
7	Spurious radiations	4.3.5	Applies to all receivers, except receivers used in combination with permanently co-located transmitters continuously transmitting	PASS
8	Spectrum access techniques	4.4	Equipment which are not using duty cycle restrictions for media access	N/A
Note: N/A is an abbreviation for Not Applicable.				

2. General test information

2.1. Description of EUT

EUT* Name	:	Wireless Extender
Model Number	:	PET100W, PET100W-R
Model Differences		PET100W-T is a transmitting signal equipment, PET100W-R is a receiving signal equipment.
EUT function description	:	Please reference user manual of this device
Receiver Category	:	Category 2
Power supply	:	DC 5V, powered by an external adapter
Hardware Version	:	V1.1
Software Version	:	V1.0.0.5
Radio Specification		IEEE802.11a
Operation frequency		5765MHz
Modulation		IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate		IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Antenna Type		Dedicated SMA antenna, maximum PK gain: 5 dBi
Sample Type	:	Series production

Note: EUT is the ab. of equipment under test.

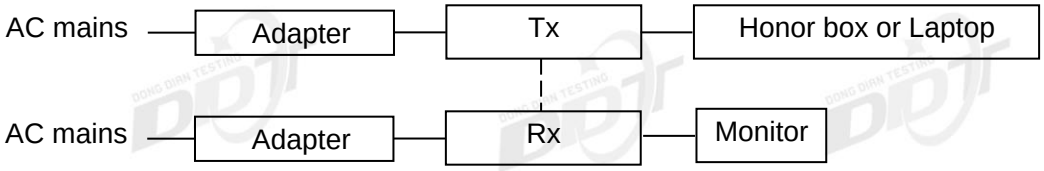
2.2. Assistant equipment used for test

Description of Accessories	Manufacturer	Model number	Serial No.	Other
AC/DC adapter	Shenzhen Keyu Power Supply Technology Co., Ltd.	KA1201A-0502000 EU	N/A	Input: 100-240V~, 50/60Hz, 0.4A Max Output: DC 5V 2A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
Laptop	HP	HP ProBook 445 G6	5CD9112VSV	AC Adapter Mode: TPN-CA17, HP Part No.: L25299-002, Input: 100-240V, 50/60Hz, Output: DC 19.5V, 3.33A, 65W
HP Monitor	HP	S270n	6CM91901Q0	N/A
LCD Monitor	DELL	S2440Lb	CN-0N5XDC-74261-31E-0HFQ	AC/DC ADAPTER MF: DELTA ELECTRONICS INC. MODEL:ADP-400D B; AC Line: 1.8m long, unshielded no core, DC Line: 1.5m unshielded two cores
HP Monitor	HP	Z27n-G2	6CM7301JQ1	N/A
Honor box	HUAWEI	MediaQ M321	21530143458 W7B044553	N/A
HDMI cable	N/A	N/A	N/A	Length: 1.5m, shield

2.4. Block diagram of EUT configuration for test



Mode	Setting Tx Power	Channel	Frequency (MHz)
TX mode	/	/	5765
RX mode	/	/	5765

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

	Normal Conditions	Extreme Conditions
Temperature range	21-25℃	0℃ to +50℃
Humidity range	40-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	AC 230V/50Hz	High volt: 253V and Low volt: 207V (±10% of nominal voltage)
Note: The Extreme temperature range as declared by the manufacturer. The test procedure described in clause 5.7 of EN 300 440 was used for extreme test procedure.		

2.6. Deviations of test standard

No Deviation

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

2.8. Measurement uncertainty

Test Item	Uncertainty
Radio Frequency	3×10^{-8}
Peak Output Power (Conducted) (Spectrum analyzer)	0.86dB (10 MHz ≤ f < 3.6GHz);
	1.38dB (3.6GHz≤ f < 8GHz)
Radiated Emissions	±3.57dB (f<26GHz)
Temperature	±0.4℃
Humidity	±2%
DC and Low frequency voltage	±1.0%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment used during test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test (Tonscend RF Measurement System)					
Spectrum analyzer	R&S	FSU26	200071	Oct. 12, 2018	1 Year
Spectrum analyzer	R&S	FSU26	201124	Oct. 12, 2018	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Jun. 25, 2019	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Oct. 12, 2018	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jun. 25, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	Jun. 28, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	Jun. 28, 2019	1 Year
Temp & Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	Oct. 11, 2018	1 Year
Test Software	JS Tonscent	JS1120-3	Ver.2.7	N/A	N/A
USB Data acquisition	Agilent	U2531A	TW55043503	N/A	N/A
Radiated Emission Test Chamber 1#					
EMI Test Receiver	R&S	ESU8	100316	Oct. 12, 2018	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 25, 2019	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Nov. 09, 2018	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Oct. 20, 2018	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 16, 2018	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Oct. 25, 2018	1 Year
Pre-amplifier	TERA-MW	TRLA-0040G35	101303	Oct. 12, 2018	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	Oct. 12, 2018	1 ear
RF Cable	N/A	SMAJ-SMAJ-1M +11M	17070133+1707 0131	Oct. 12, 2018	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

4. Equivalent isotropic radiated power

4.1. Limits

Frequency Bands	Power limit	Application
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radio determination devices
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices

4.2. Test Procedure

Refer to ETSI EN 300 440 Clause 4.2.2

Measurement	
☒Conducted measurement	☐Radiated measurement

Conducted measurement

Refer to EN 300 440 clauses 4.2.2.3.1 and 4.2.2.3.2

4.3. Test Result

Tx mode: 5765 MHz			
Condition	Frequency (MHz)	Result e.i.r.p (dBm)	Limit e.i.r.p (dBm)
Normal	5765	13.91	14
0℃ 253V	5765	13.84	14
0℃ 207V	5765	13.88	14
50℃ 253V	5765	13.90	14
50℃ 207V	5765	13.86	14
Conclusion: **PASS**			

5. Permitted range of operating frequencies

5.1. Limit

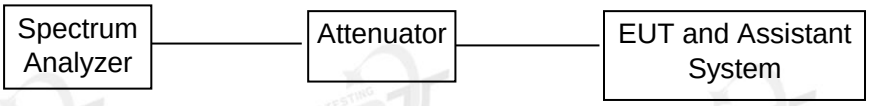
(1) The occupied bandwidth (i.e. the bandwidth in which 99 % of the wanted emission is contained) of the transmitter shall fall within the assigned frequency band.

(2) For all equipment the frequency range shall lie within the frequency band given by EN 300 440 clause 4.2.2.4, table 2. For non-harmonized frequency bands the available frequency range may differ between national administrations.

5.2. Test Procedure

Refer to EN 300 440 clauses 4.2.3.4 and 4.2.3.5

TEST SETUP:



(1) Put the spectrum analyser in video averaging mode with a minimum of 50 sweeps selected;

(2) Select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;

(3) Using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 4.2.3. This frequency shall be recorded in the test report;

(4) Select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 4.2.3. This frequency shall be recorded in the test report;

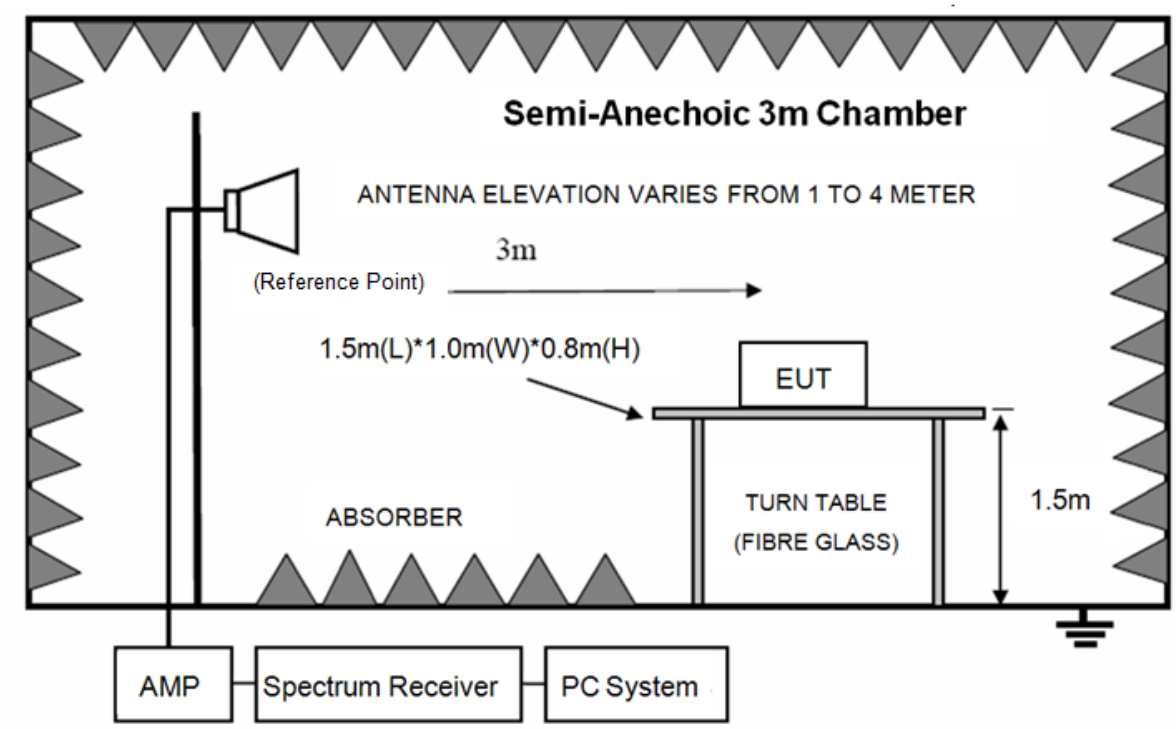
(5) The difference between the frequencies measured in steps (3) and (4) is the operating frequency range. It shall be recorded in the test report.

5.3. Test result

Tx mode: 5765 MHz			
Condition	CH (MHz)	Result (MHz)	Limit (MHz)
Normal	5765	5754.615	>5725
		5775.128	<5875
0℃ 253V	5765	5754.642	>5725
		5775.145	<5875
0℃ 207V	5765	5754.636	>5725
		5775.130	<5875
50℃ 253V	5765	5754.634	>5725
		5775.148	<5875
50℃ 207V	5765	5754.652	>5725
		5775.140	<5875
Conclusion: **PASS**			

6. Unwanted emissions in the spurious domain

6.1. Block diagram of test setup



6.2. Limit

Frequency Range	Limit	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87.5 MHz	-36dBm	100 kHz
87.5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 862 MHz	-54dBm	100 kHz
862 MHz to 1 GHz	-36dBm	100 kHz
Above 1 GHz	-30dBm	1 MHz

6.3. Test Procedure

(1) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency, not exceeding 66 GHz, except for the channel on which the transmitter is intended to operate and for channelized

systems, its adjacent channels. The frequency of each spurious emission detected shall be noted. If the test site is disturbed by interference coming from outside the site, this qualitative search may be performed in a screened room, with a reduced distance between the transmitter and the test antenna.

(2) All the spurious emissions at 3m distance was measured and recorded with receive antenna in both vertical and horizontal by rotating the turntable and by lowering the receive antenna.

(3) The EUT was then removed and replaced with a substitution antenna in the same position and the substitution antenna must have the same polarization with the receive antenna.

(4) A signal which have the same frequency obtained in step 3 was fed to the substitution antenna, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver, the level of the signal generator was adjusted until the measured field strength level in step 2 was obtained, recorded the level of the signal generator.

(5) Repeated step 4 with both antenna polarizations.

(6) The spurious emissions are equal to the power supplied by the signal generator and corrections due to the gain of the substitution antenna and the cable loss between the signal generator and the substitution antenna. Refer to EN 300 440 clauses 4.2.4.3.3

6.4. Test result

Test Mode: Tx mode: 5765 MHz				
Frequency (MHz)	Result (dBm)	Limit (dBm)	Antenna polarization	Conclusion
(below 1GHz)				
148.44	-54.69	-36.00	H	PASS
297.22	-49.15	-36.00	H	PASS
444.85	-55.09	-36.00	H	PASS
595.13	-55.02	-54.00	H	PASS
744.87	-55.45	-54.00	H	PASS
893.86	-54.60	-36.00	H	PASS
148.44	-45.99	-36.00	V	PASS
297.22	-51.14	-36.00	V	PASS
444.85	-49.76	-36.00	V	PASS
595.13	-55.98	-54.00	V	PASS
742.26	-55.90	-54.00	V	PASS
890.73	-54.71	-36.00	V	PASS
(above 1GHz)				
8803.00	-43.22	-30.00	H	PASS
10299.00	-41.04	-30.00	H	PASS
11319.00	-40.72	-30.00	H	PASS
13070.00	-36.33	-30.00	H	PASS
15025.00	-36.62	-30.00	H	PASS
17354.00	-36.15	-30.00	H	PASS
8786.00	-43.17	-30.00	V	PASS
10350.00	-41.18	-30.00	V	PASS
13070.00	-36.14	-30.00	V	PASS
14209.00	-36.35	-30.00	V	PASS
14838.00	-36.55	-30.00	V	PASS
16929.00	-36.16	-30.00	V	PASS

Note: All the emissions are measured with PK detector.

7. Spurious radiations

7.1. Block diagram of test setup

Same with clause 6.1

7.2. Limit

The power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

Frequency Range	Limit	Measurement Bandwidth
30 MHz ~ 1 GHz	-57dBm	100kHz
Above 1 GHz	-47dBm	1MHz

7.3. Test Procedure

Same with 6.3 except change EUT work mode in Rx Mode.

Refer to EN 300 440 clauses 4.3.5.3.3

7.4. Test Result

Test Mode: Rx mode: 5765 MHz				
Frequency (MHz)	Result (dBm)	Limit (dBm)	Antenna polarization	Conclusion
(below 1GHz)				
58.00	-64.88	-57.00	H	PASS
103.81	-66.25	-57.00	H	PASS
126.33	-61.92	-57.00	H	PASS
588.91	-59.02	-57.00	H	PASS
614.21	-57.71	-57.00	H	PASS
912.86	-61.73	-57.00	H	PASS
64.66	-63.93	-57.00	V	PASS
110.18	-67.82	-57.00	V	PASS
333.69	-65.51	-57.00	V	PASS
501.18	-63.45	-57.00	V	PASS
706.70	-62.30	-57.00	V	PASS
925.76	-61.40	-57.00	V	PASS
(above 1GHz)				
6270.00	-59.77	-47.00	H	PASS
9704.00	-54.72	-47.00	H	PASS
13070.00	-53.35	-47.00	H	PASS
15195.00	-54.13	-47.00	H	PASS
17014.00	-53.74	-47.00	H	PASS
17745.00	-53.44	-47.00	H	PASS
6219.00	-60.21	-47.00	V	PASS
8820.00	-57.14	-47.00	V	PASS
10384.00	-56.21	-47.00	V	PASS
13019.00	-54.15	-47.00	V	PASS
14243.00	-53.84	-47.00	V	PASS
17218.00	-53.31	-47.00	V	PASS

Note: All the emissions are measured with PK detector.

8. Blocking or desensitization

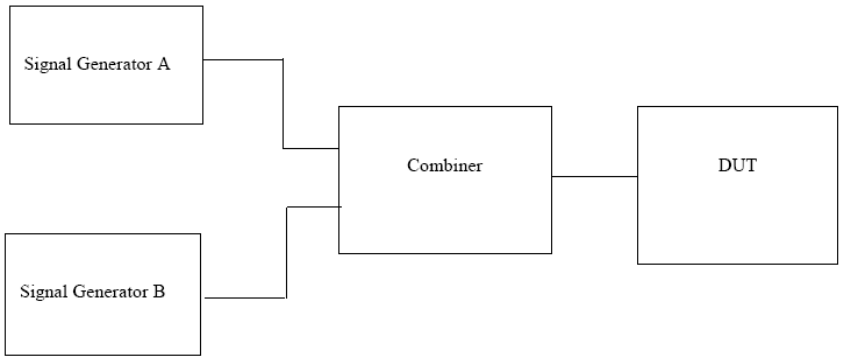
8.1. Limits

Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands.

The blocking level shall not be less than the values given in below table, except at frequencies on which spurious responses are found:

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	No limit

8.2. Block diagram of test setup



8.3. Test procedure

(1) Configure EUT and test equipment as clause 8.2, EUT's antenna output was connected to spectrum analyzer by RF cable. The RF cable's loss was input to spectrum analyzer as amplitude offset.

(2) Follow the test method described in clause 4.3.4.3 of EN 300 440 to measure out the blocking level of transmitter.

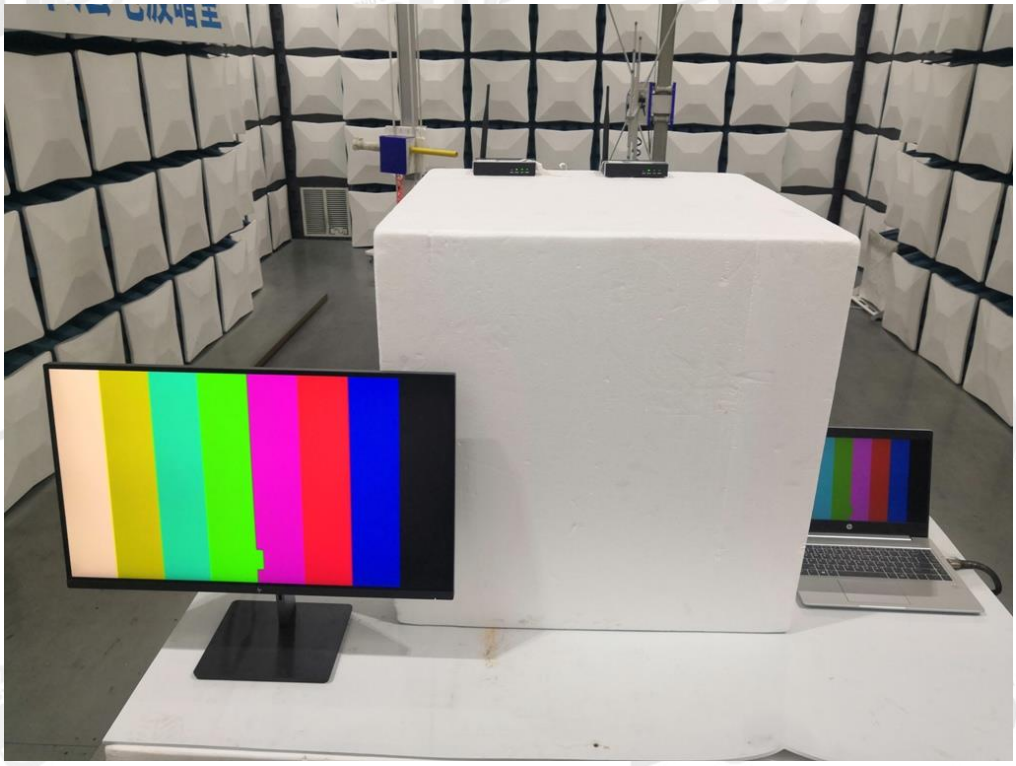
8.4. Test result

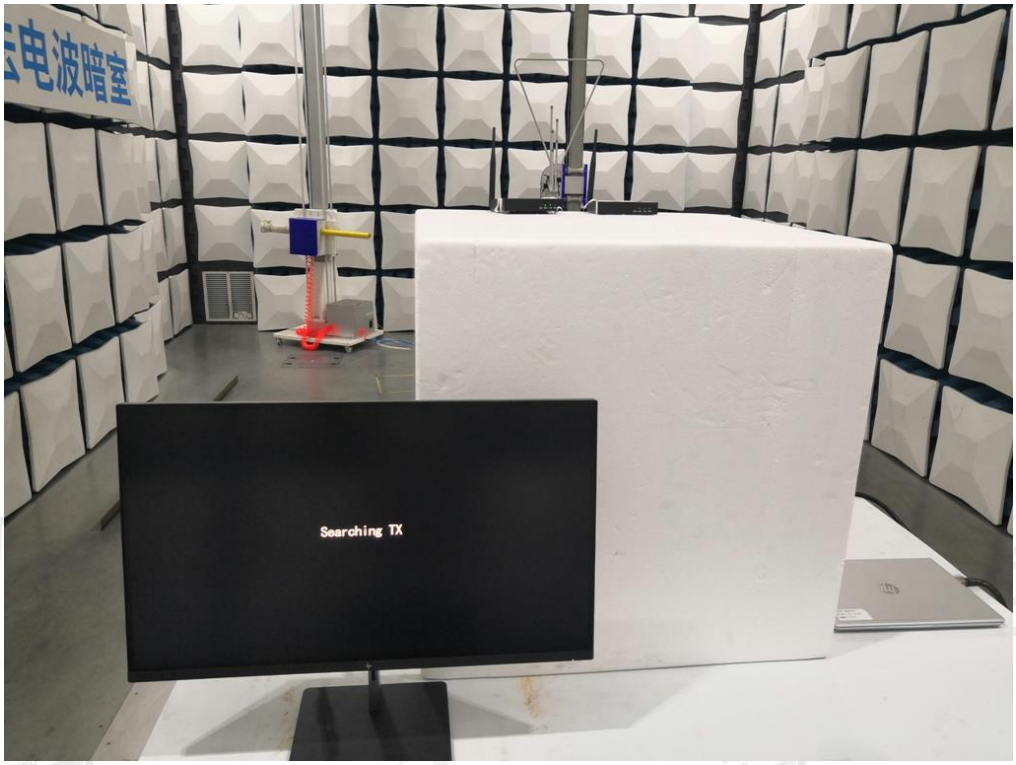
Signal A	Signal B	Blocking level (dBm)	Limit(dBm)	Result
Operation Frequency	Blocking Frequency			
5765 MHz	-50BW	-47	-45 dBm + *k*	Pass
	-20BW	-54	-45 dBm + *k*	Pass
	-10BW	-55	-45 dBm + *k*	Pass
	+10BW	-58	-45 dBm + *k*	Pass
	+20BW	-50	-45 dBm + *k*	Pass
	+50BW	-45	-45 dBm + *k*	Pass

k=-20logf-10logBW

Operation Frequency	Channel bandwidth (MHz)	*k*(dBm)
5.765 GHz	20	-28.23

9. Test setup photograph



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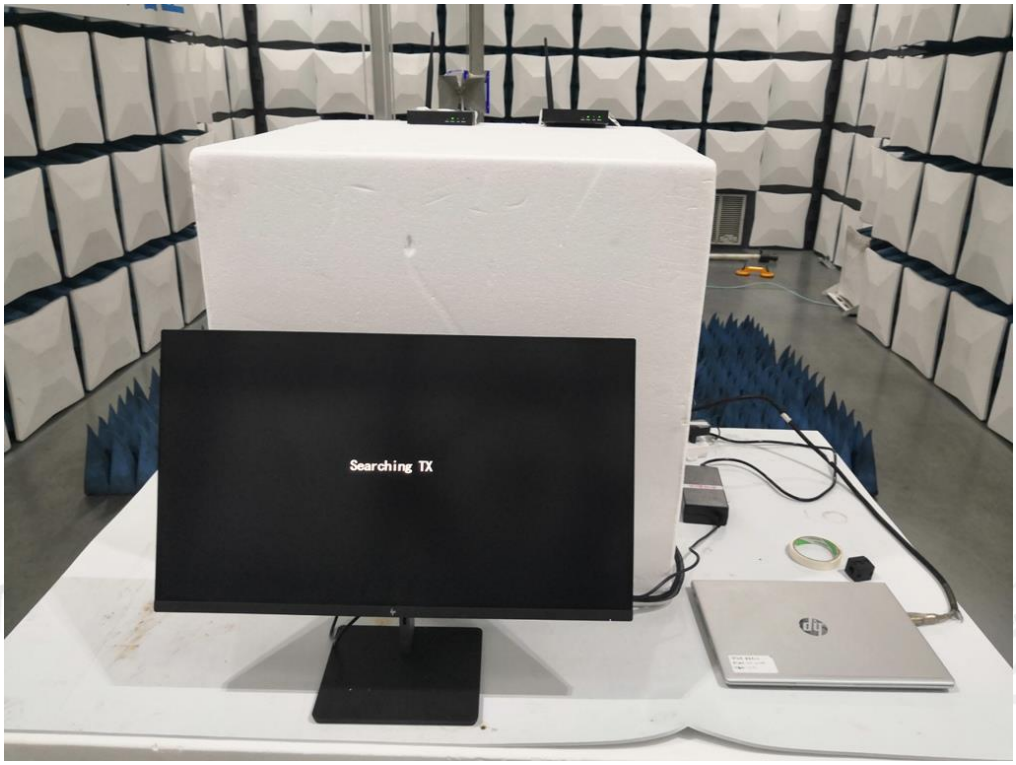

Searching TX

10. Photos of the EUT

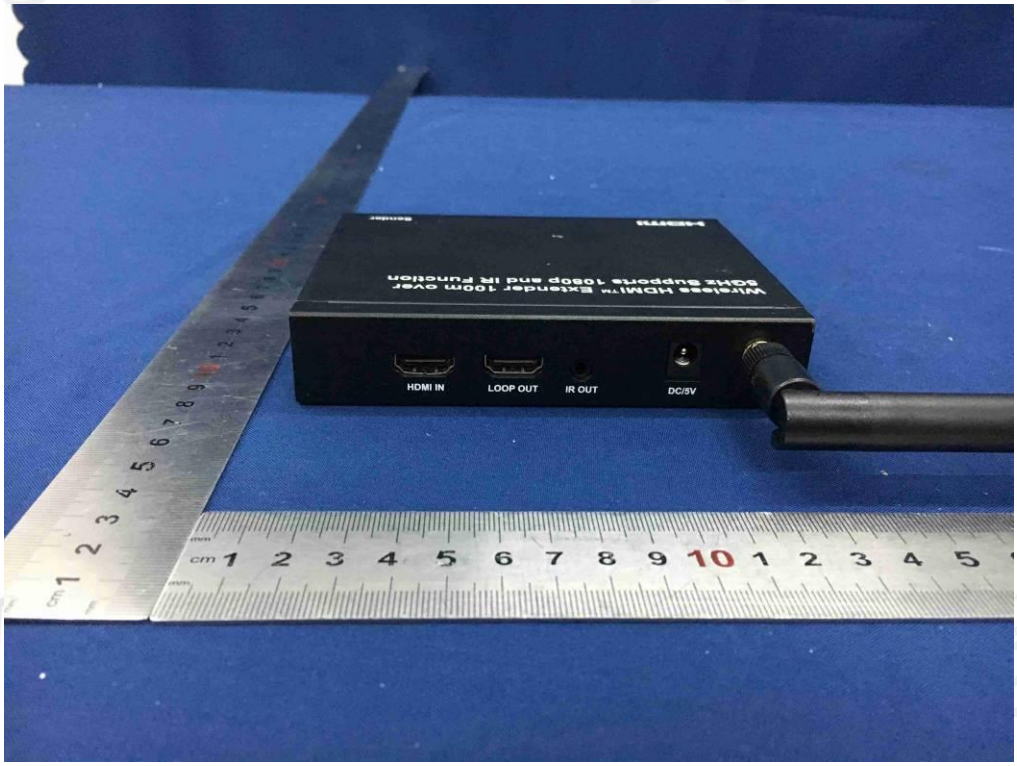

AC/DC ADAPTER
Shenzhen Keyu Power
Supply Technology Co.,Ltd
MADE IN CHINA

Sender:


Wireless HDMI™ Extender 100m over
5GHz Supports 1080p and IR Function
HDMI
Sender


Wireless HDMI™ Extender 100m over
5GHz Supports 1080p and IR Function
HDMI
Sender
Reset
Power
Link
Status


Sender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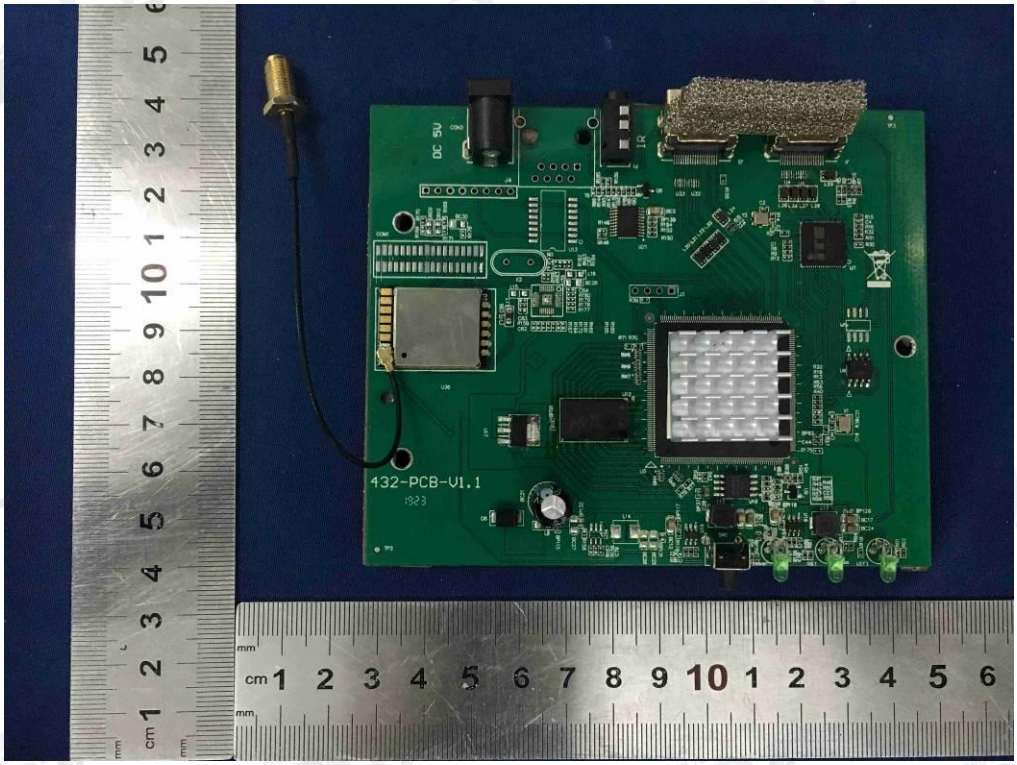
LOOP OUT
IR OUT
DC/5V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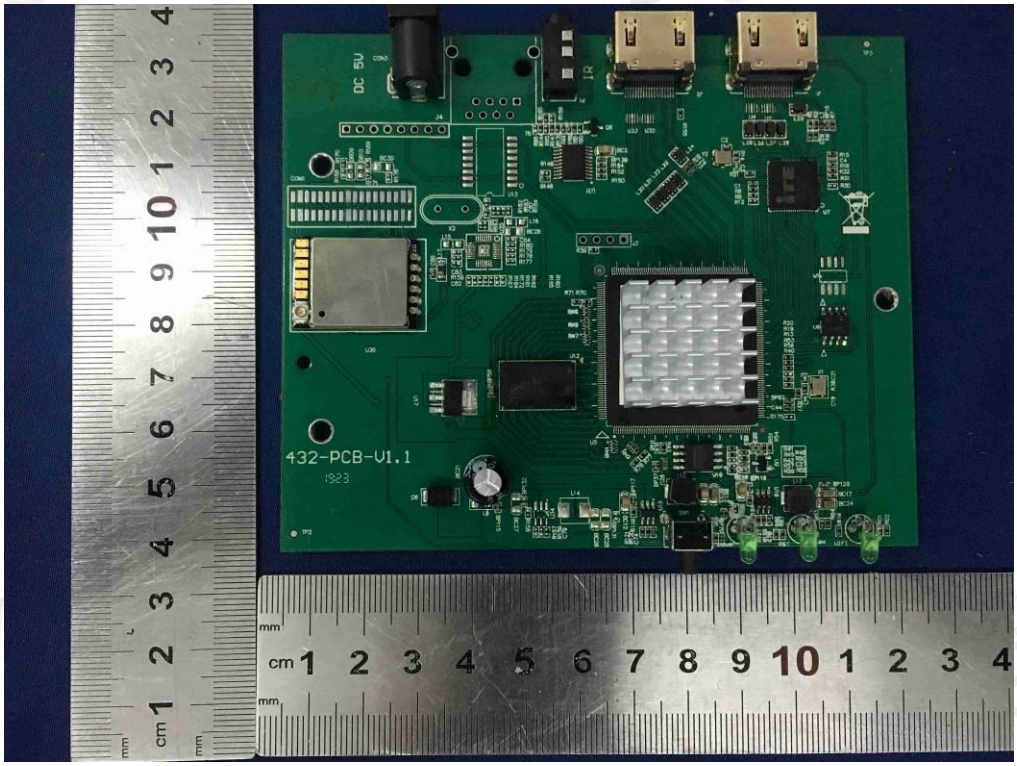
1923


DC 5V
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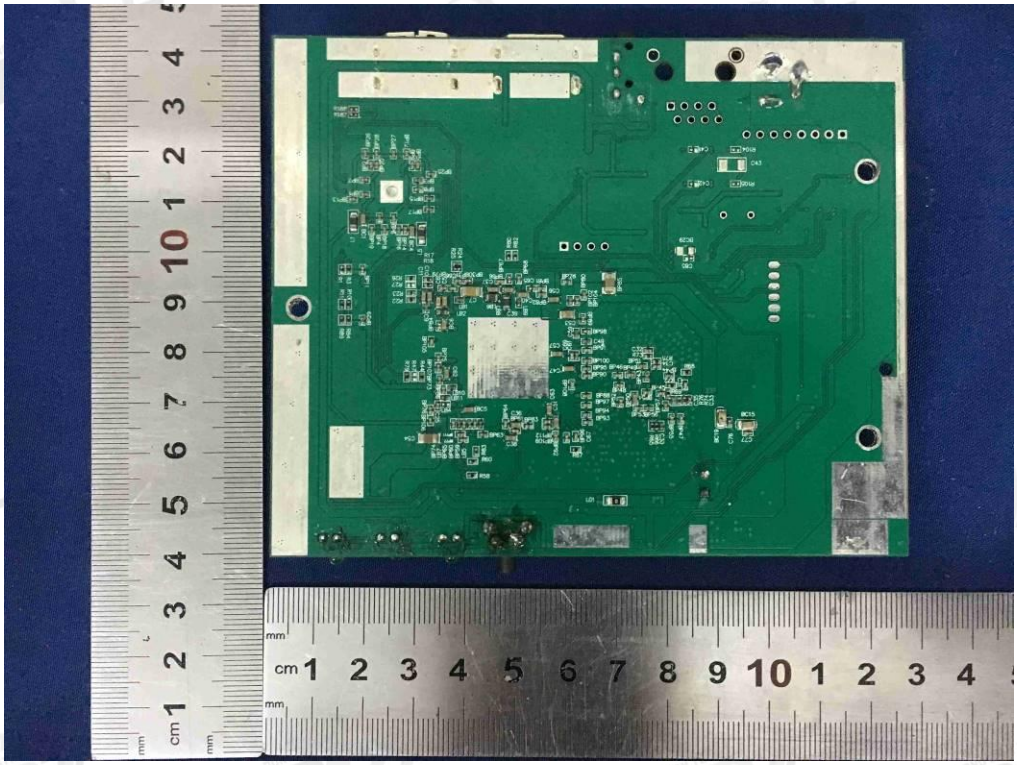
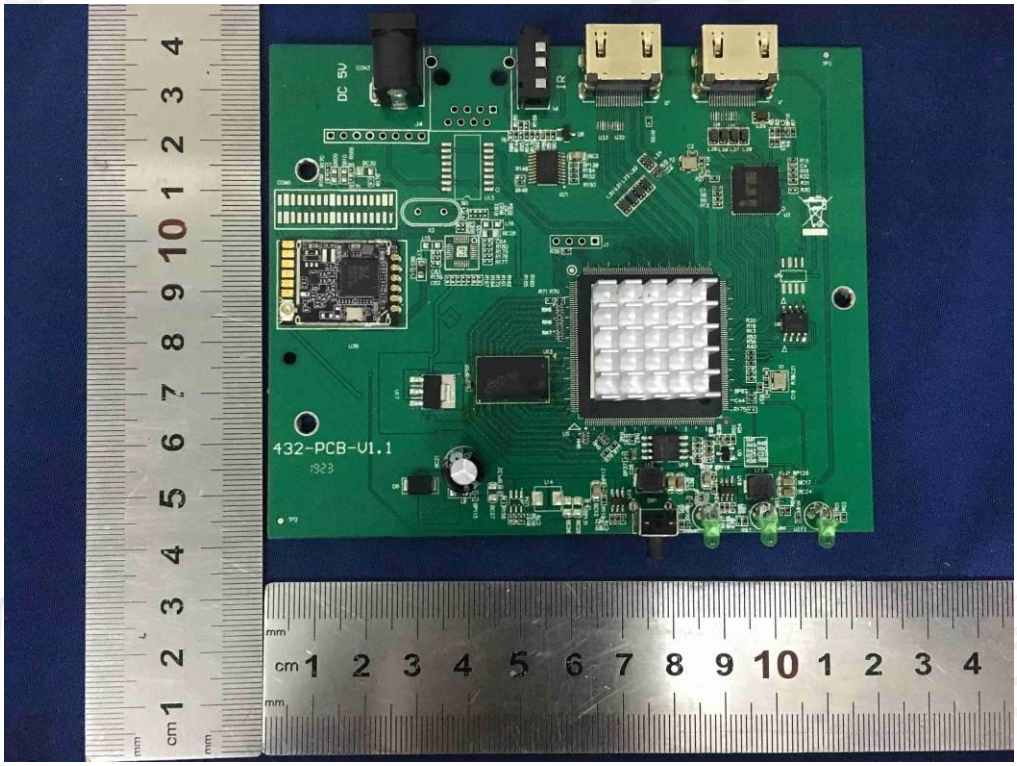
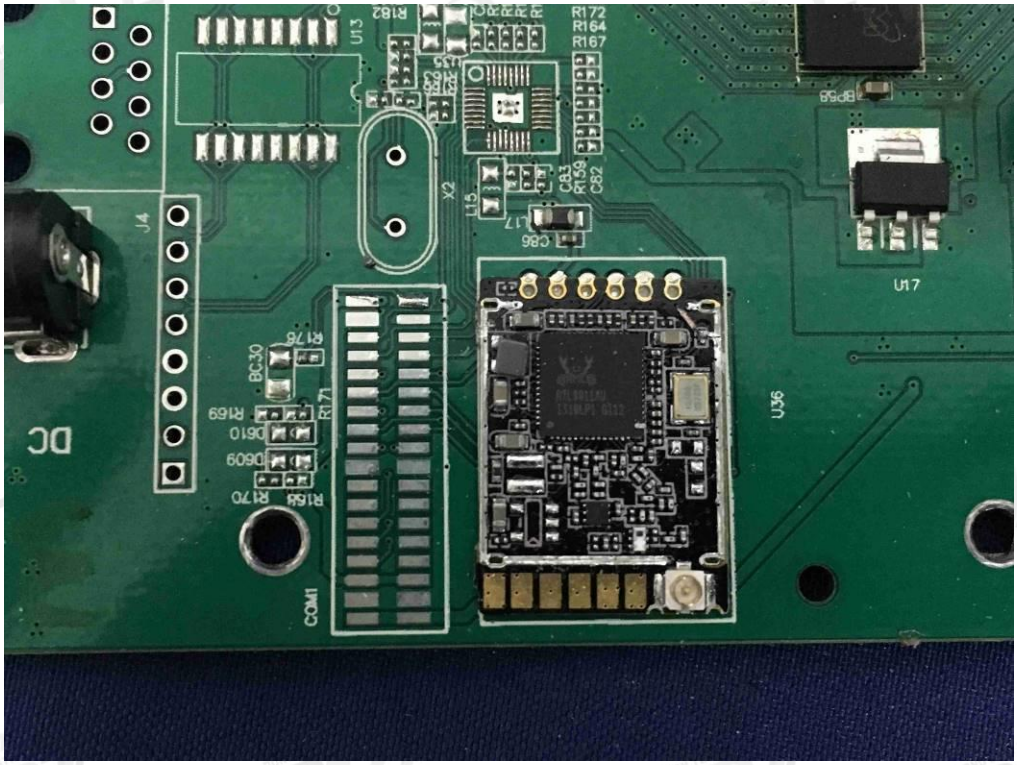
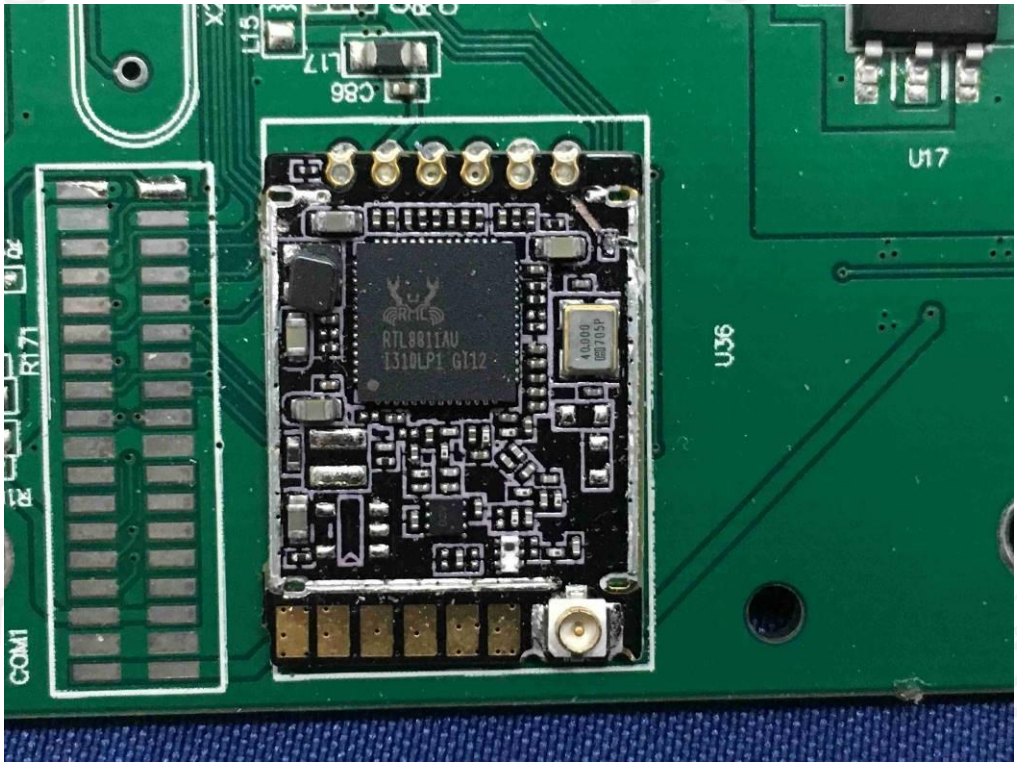
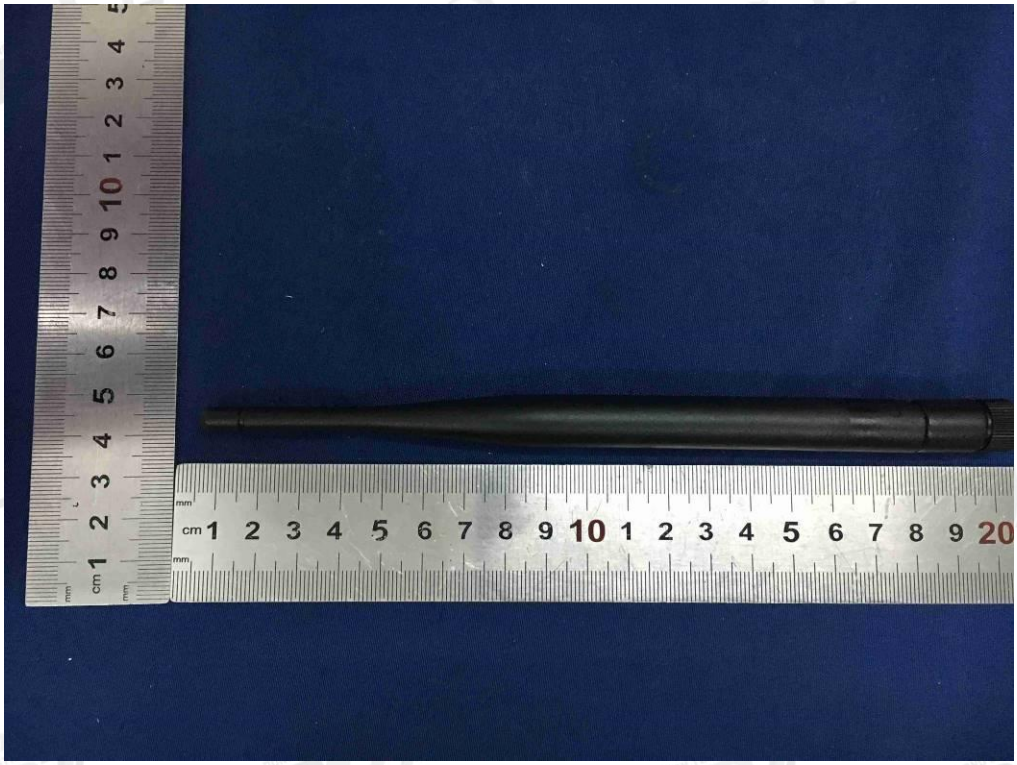
432-PCB-V1.1
1923




DC 5V
IR
432-PCB-V1.1


R172
R164
R167
U13
R182
X2
L15
L17
C86
C83
R159
C82
J4
U17
U36
DC
R176
BC30
R169
D610
D609
R171
R170
R168
COM1

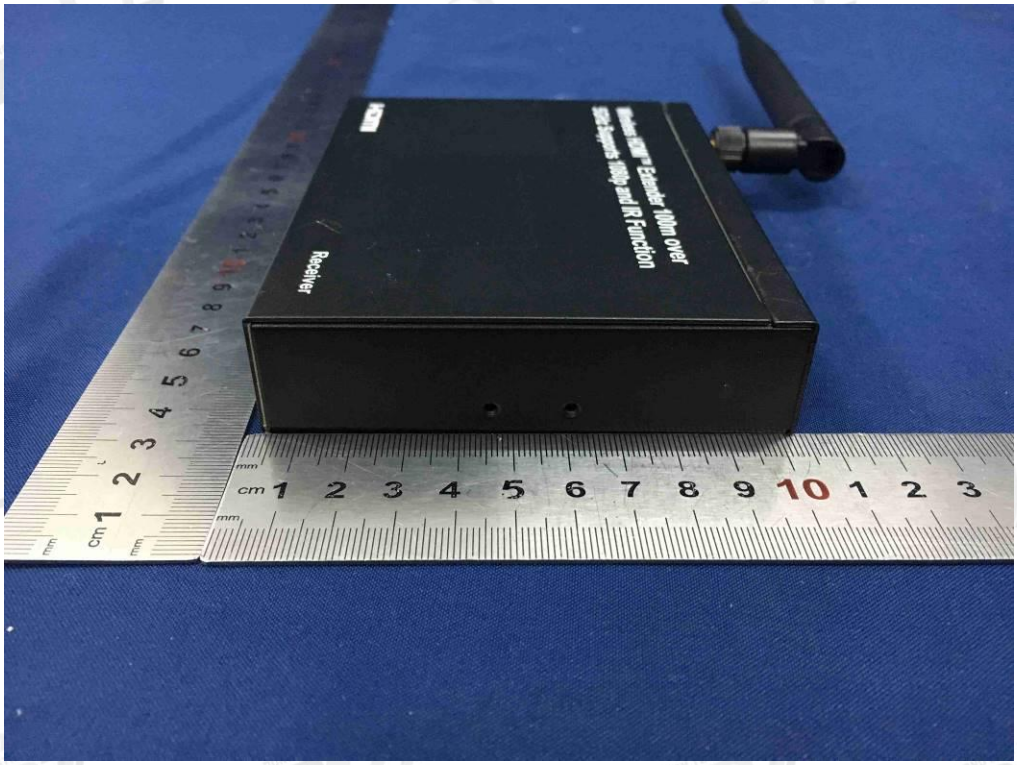

L15
L17
C86
U17
U36
R171
COM1
RTL8811AU
T310LP1 GI12

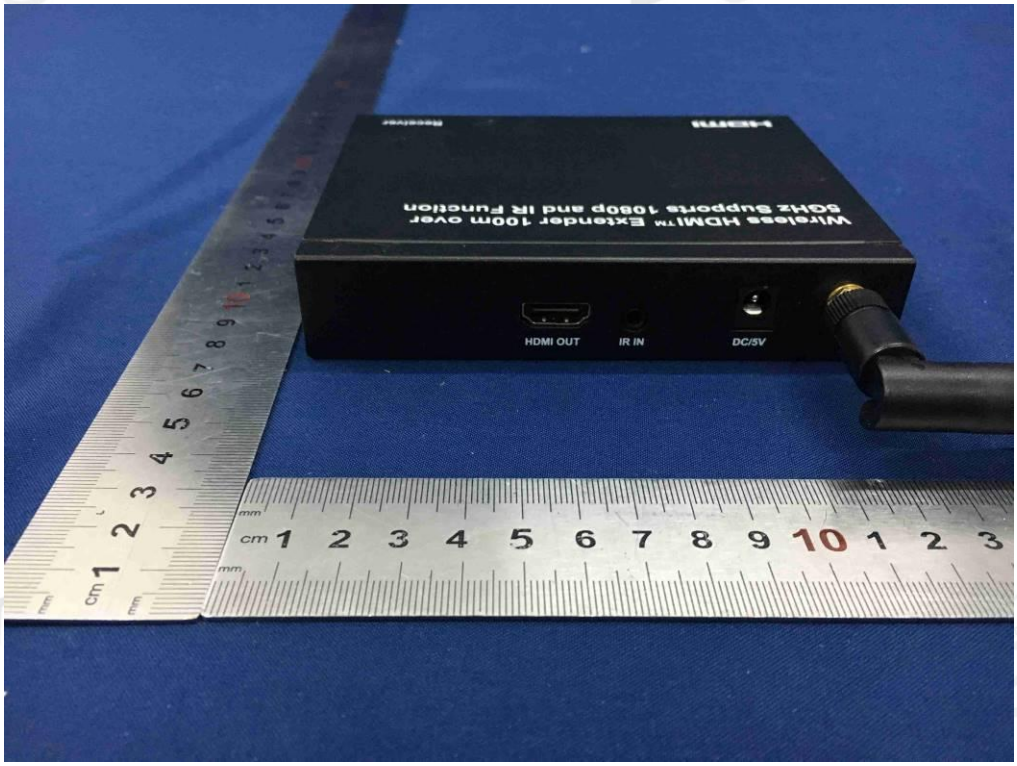


Receiver:


Wireless HDMI™ Extender 100m over
5GHz Supports 1080p and IR Function
HDMI
Receiver

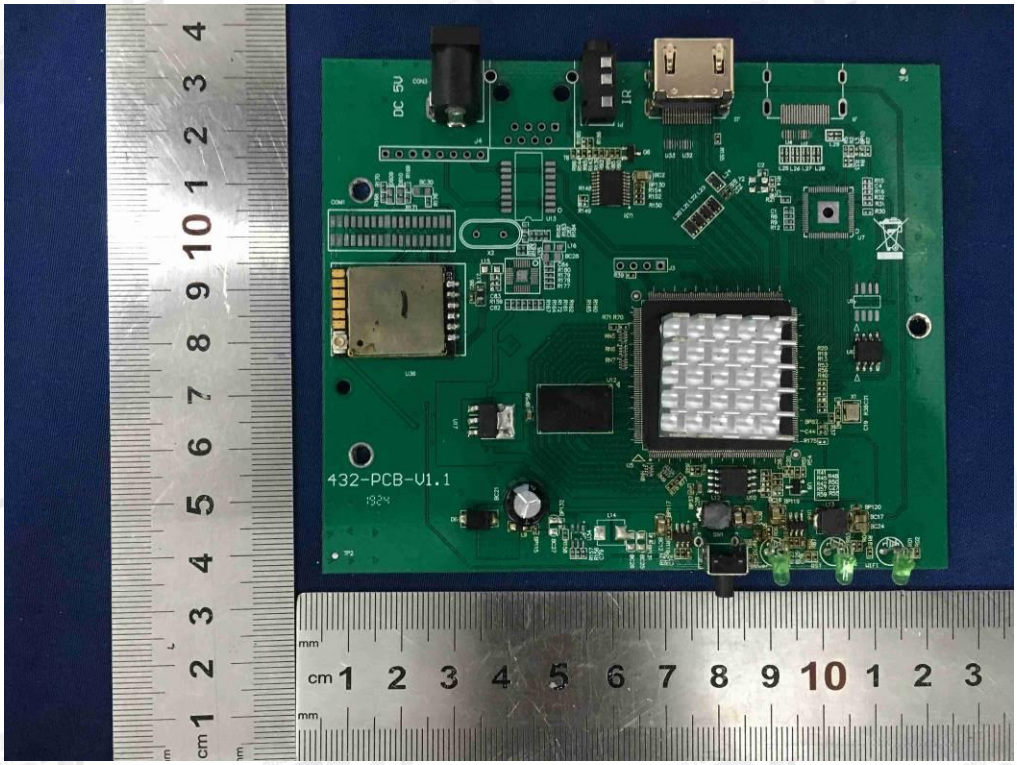

Wireless HDMI™ Extender 100m over
5GHz Supports 1080p and IR Function
HDMI
Receiver
Reset
Power
Link
Status

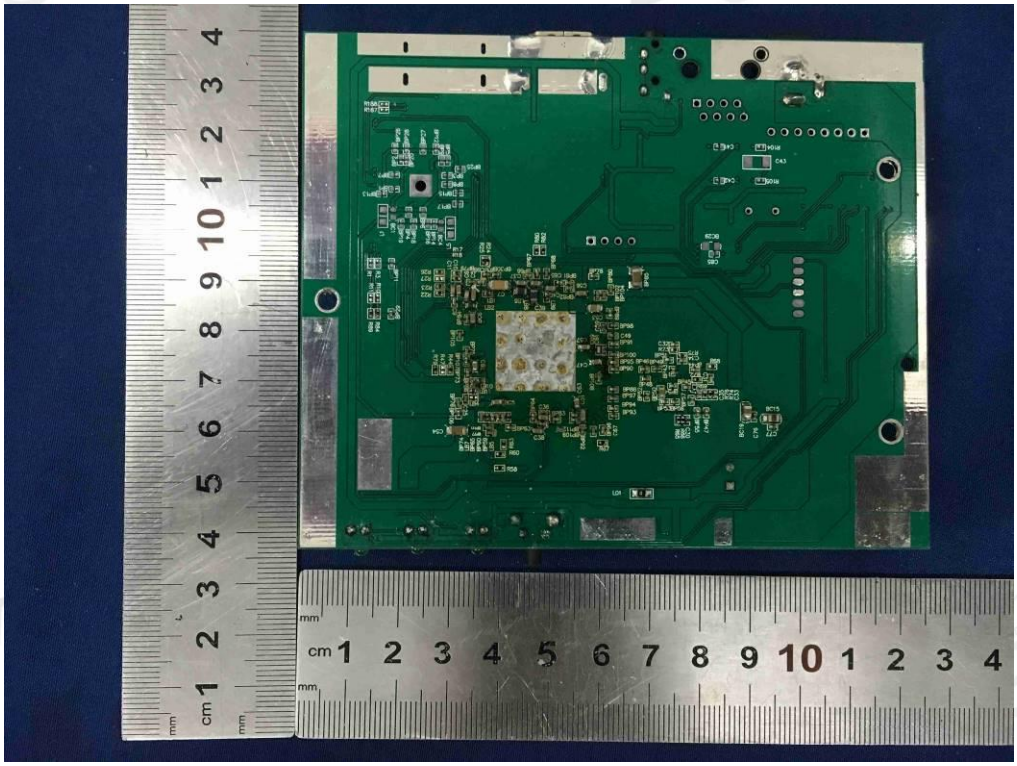

Receiver

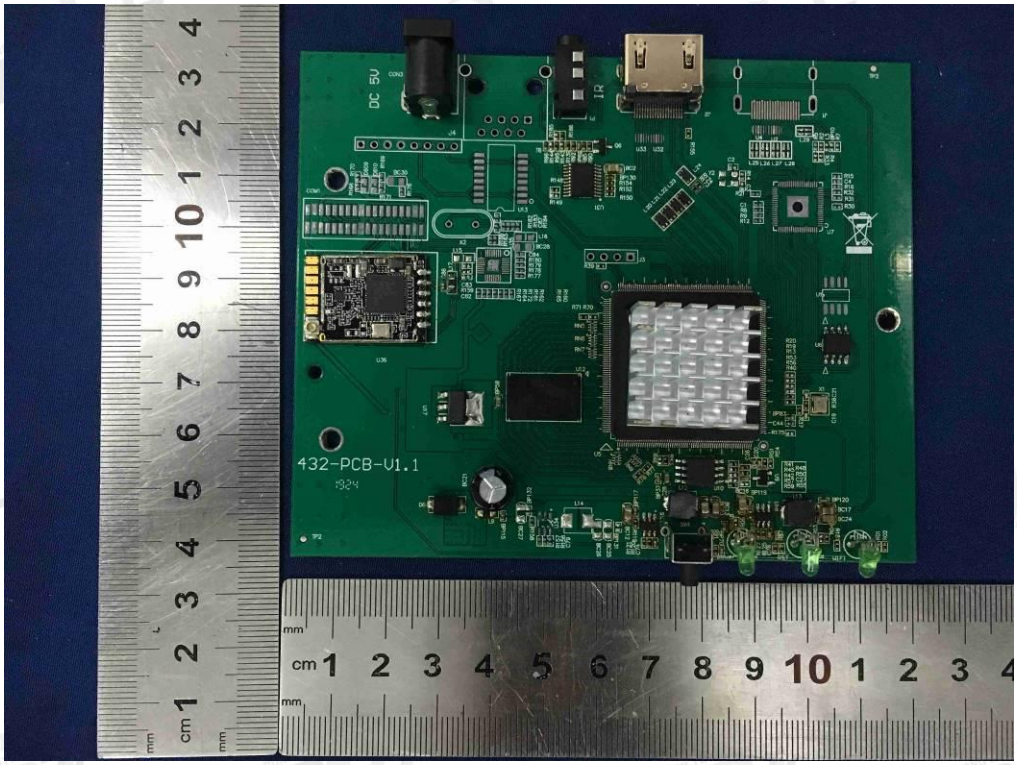

HDMI OUT
IR IN
DC/5V

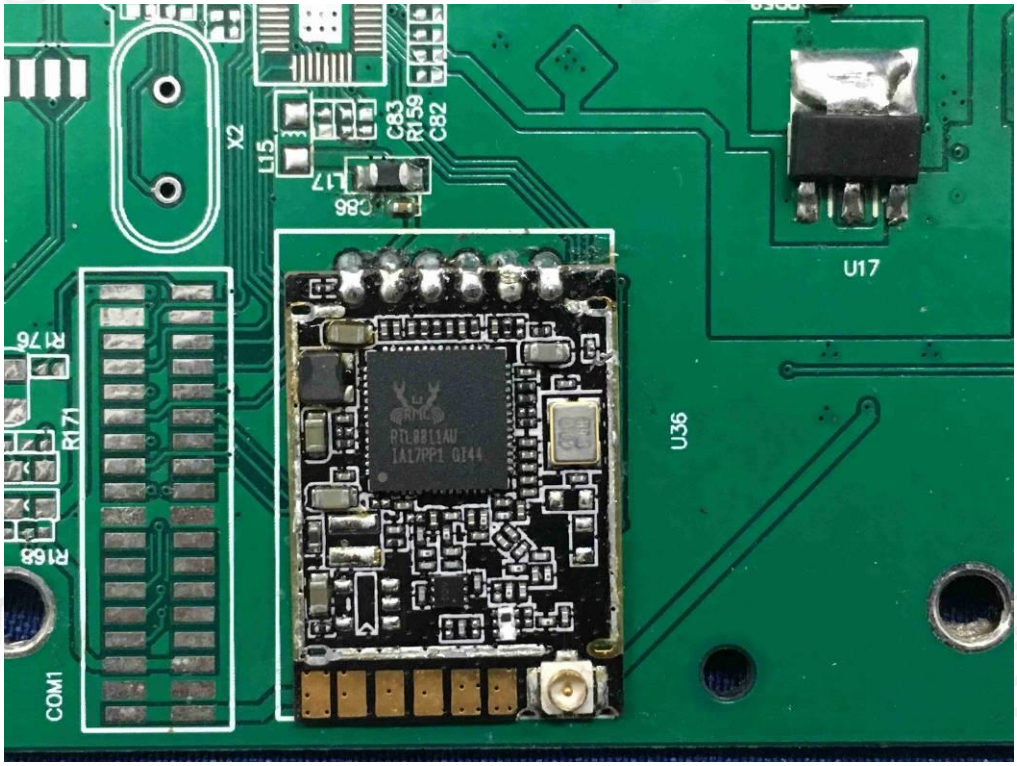

Wireless HDMI Extender 30m over
5GHz Supports 1080p and IR Function
HDMI

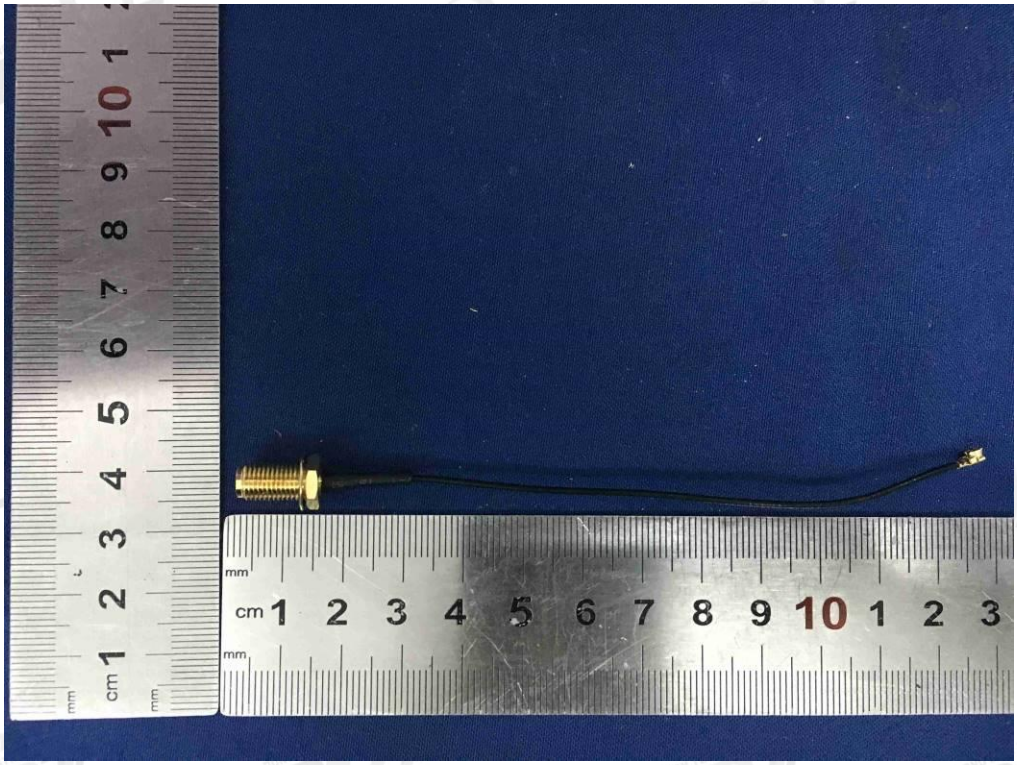

432-PCB-V1.1

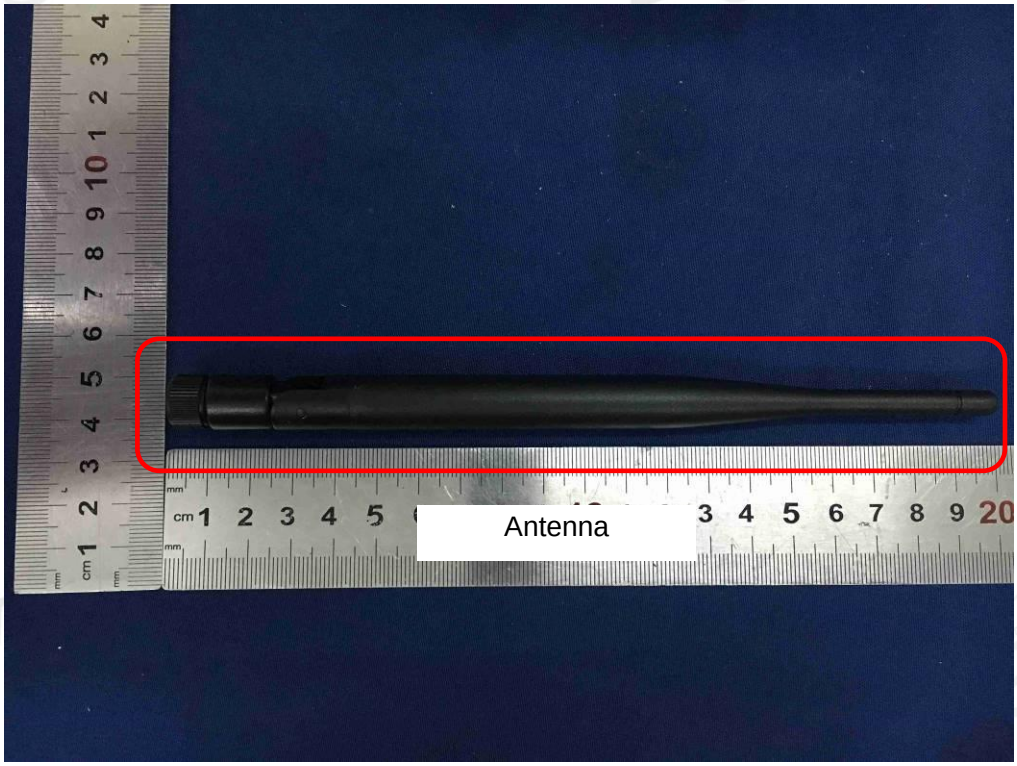

DC 5V
432-PCB-V1.1




DC 5V
IR
432-PCB-V1.1
cm 1 2 3 4 5 6 7 8 9 10 1 2 3 4


X2
L15
C83
R159
C82
L17
C86
U17
R176
R171
R168
COM1
U36
RTL8811AU
1AL7PP1 GI44





END OF REPORT