ETSI EN 301 489-1 & -17 Test Report

Product Name:	WiFi Module
Model Number:	WizFi630S
Applicant:	WIZNET CO.,LTD

KeySense Testing & Certification International Co., Ltd.

1-3F, Lab Building, No.29 District, ZhongKai Hi-Tech Industrial Development Park, Huizhou, Guangdong, China

Test Report Verification				
Product name	WiFi Module			
Model number	WizFi630S			
Applicant	**Name**	WIZNET CO.,LTD		
	Address	5F Humax Village,216 Hwangsaeul-ro,Bundang-gu,Seongnam-si,Gyeonggi-Do,Korea		
Manufacturer	**Name**	Shenzhen Yunlink Technology CO., Ltd		
	Address	B3 Building, An'le Industiral Zone, Hangcheng Road, Gushu, Xixiang Towm, Baoan District, Shenzhen City, Guangdong, P.R.China		
Factory	**Name**	Shenzhen Yunlink Technology CO., Ltd		
	Address	B3 Building, An'le Industiral Zone, Hangcheng Road, Gushu, Xixiang Towm, Baoan District, Shenzhen City, Guangdong, P.R.China		
Trade Name	Wiznet			
Receipt date	June 28, 2019	**Quantity**	1	
Standard	ETSI EN301 489-1 V2.1.1 :2017-02 ETSI EN301 489-17 V3.1.1 :2017-02			
Test period	June 28, 2019 to July 08, 2019	**Issue Date**	July 09, 2019	
Test result	The device described above is tested by KeySense Testing & Certification International Co., Ltd. The measurement results were contained in this test report and KeySense Testing & Certification International Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the ETSI EN301 489-1 V2.1.1 :2017-02 ETSI EN301 489-17 V3.1.1 :2017-02 requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of KeySense Testing & Certification International Co., Ltd.			

Tested by: Bing.He	**Sign:** Bing.He	**Date:** 2019.7.9	
Reviewed by: Lake. Wang	**Sign:** Lake Wang	**Date:** 2019.7.9	**(Stamp)**
Approved by: Jack.Li (Supervisor)	**Sign:** Jack.Li	**Date:** 2019.7.9	

KeySense Testing & Certification International Co., Ltd.

Contents

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Standard description

ETSI EN 301 489 -1 V2.1.1 (2017): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU.

ETSI EN 301 489-17 V3.1.1 (2017): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU.

1.2 Compliance with ETSI EN301 489-1 & ETSI EN301 489-17

CLAUSE	TEST PARAMETER	APPLICATION	BASIC STANDARF OR TEST METHOD	RESULTS
EMC emission				
8.2	Radiated emission	Enclosure of ancillary equipment	EN 55032: 2015	**PASS**
8.3	Conducted emission	DC power input/output port	EN 55032: 2015	**N/A**
8.4	Conducted emission	AC mains input/output port	EN 55032: 2015	**N/A**
8.5	Harmonic Current Emissions	AC mains input port	EN 61000-3-2: 2014	**N/A**
8.6	Voltage Fluctuation & Flicker	AC mains input port	EN 61000-3-3: 2013	**N/A**
8.7	Conducted emission	Wired network port	EN 55032: 2015	**N/A**
Immunity				
9.2	RF electromagnetic field	Enclosure	EN 61000-4-3: 2006+A1: 2008+A2: 2010	**PASS**
9.3	Electrostatic Discharge	Enclosure	EN 61000-4-2: 2009	**PASS**
9.4	Fast transients common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-4: 2012	**N/A**
9.5	RF Common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-6: 2014+AC: 2015	**N/A**
9.7	Voltage dips and interruptions	AC mains power input ports	EN 61000-4-11: 2004	**N/A**
9.8	Surges, line to line and line to ground	AC mains power input ports, wired network ports	EN 61000-4-5: 2014	**N/A**

2 ENERAL INFORMATION

2.1 Description of Device(EUT)

Product Name	:	WiFi Module
Model Number	:	WizFi630S
Modulation	:	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM)
Operation Frequency	:	IEEE 802.11b/g: 2412 ~ 2472 MHz IEEE 802.11n HT20 : 2412 ~ 2472 MHz IEEE 802.11n HT40 : 2422 ~ 2462 MHz
Number of channel	:	IEEE 802.11b: 13 Channels IEEE 802.11g: 13 Channels IEEE 802.11n HT20: 13 Channels IEEE 802.11n HT40: 9 Channels
Antenna and Gain	:	External Dipole Antenna with 3.2dBi gain (Max)
Software Version	:	Ver1.0
Hardware Version	:	Rev2.0
Test Voltage:	:	DC 3.3V

2.2 EUT operating mode(s)

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating mode 1	WiFi Mode

2.3 Tested Supporting System Details

No.	Description	KST No.	Manufacturer	Model	Serial Number
1.	/	/	/	/	/

2.4 Block Diagram of connection between EUT and simulators

2.5 Test Facility

Site Description:	1-3F, Lab Building, No.29 District, ZhongKai Hi-Tech Industrial Development Park, Huizhou, Guangdong, China
Name of Firm:	KeySense Testing & Certification International Co., Ltd.
EMC Lab:	Certificated by CNAS, CHINA
	Registration No.:L9678
	Date of registration: Feb 07, 2017

2.6 Measurement Uncertainty(95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in shielding room	2.5dB(150kHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	4.14dB(30M~1GHz,Polarize:V)
	4.25dB(30M~1GHz,Polarize:H)

2.7 Test Equipments

2.7.1 For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Receiver	R&S	ESR3	102055	2019.01.30	1 year
Spectrum analyzer	R&S	FSV30	103559	2019.01.30	1 year
Trilog-boardband antenna	SCHWARZBECK	VULB 9163D	9163961	2019.04.13	3 years
Horn antenna	Schwarzbeck	BBHA 9120D	9120D-1590	2019.04.13	3 years
Pre-amplifier (High Freq)	Claviio	BDLNA-0118-35 2810	1600019	2019.04.13	3 years

2.7.2 For Electrostatic discharge Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Electrostatic discharge generator	Noiseken	ESS-L1611	ESS1643151	2018.10.20	1 year

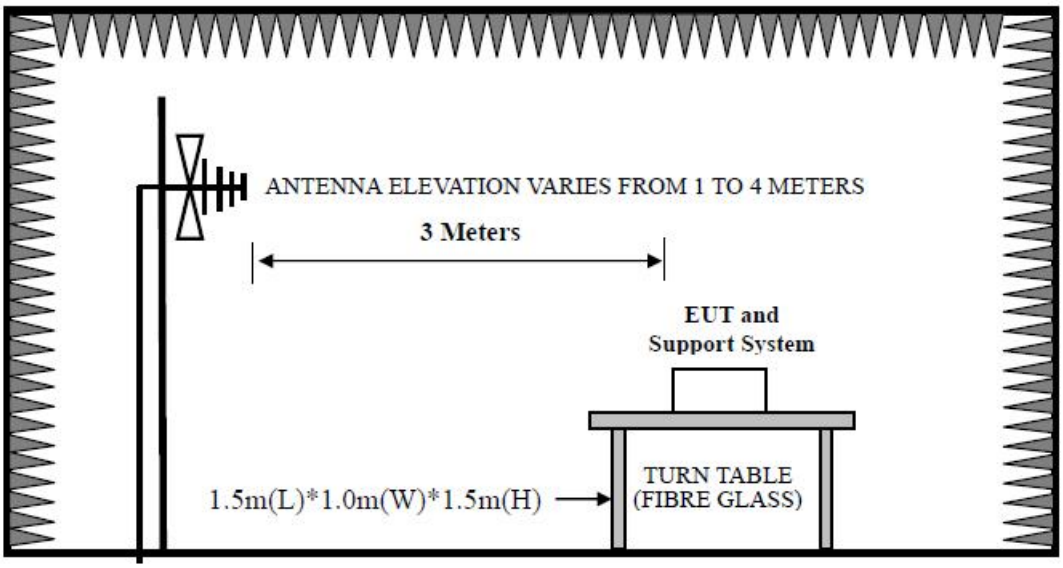
2.7.3 For Radio Frequency Electromagnetic Field Immunity

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal generator	R&S	SMC100A	105651	2019.01.16	1 year
Power amplifier	PRANA	MT400	1507-1746	2019.01.16	1 year
Power amplifier	PRANA	SV70	1602-1820	2019.01.16	1 year
Trilog-boardband antenna	Schwarzbeck	STLP 9128E	9128ES-136	2017.10.25	3 years
Horn antenna	Schwarzbeck	BBHA 9120E	BBHA9120E6 98	2017.10.25	3 years
Power meter	R&S	NRP2	105155	2019.01.16	1 year

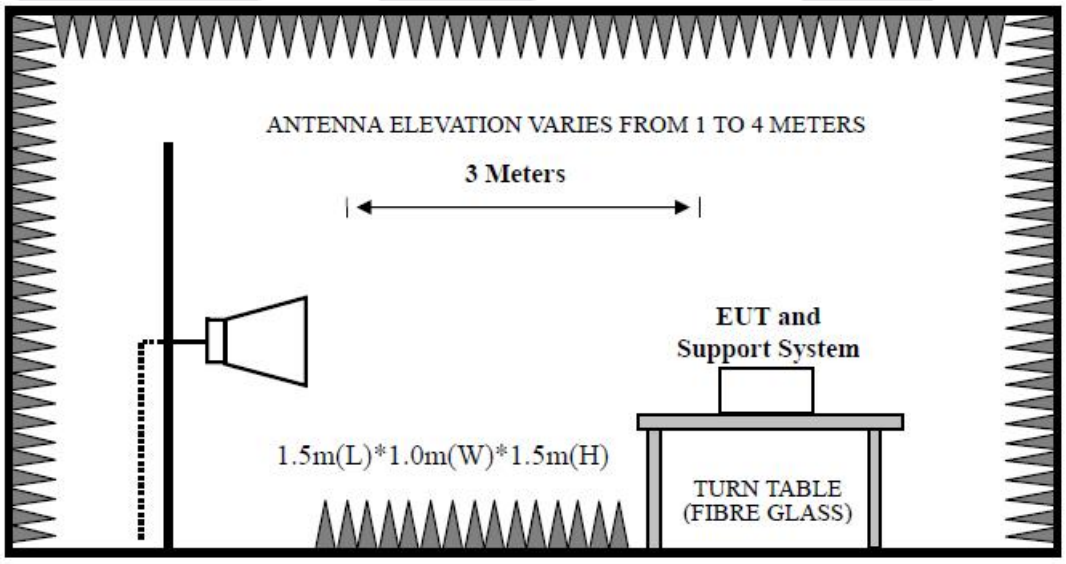
3 RADIATED EMISSION TEST

3.1 Block Diagram of Test Setup

30~1000MHz:



Above 1GHz:



3.2 Test Standard

EN 55032: 2015, Class B

3.3 Limits for radiated disturbance

Frequency MHz	Distance	Limits dB(μV)/m Class B
30 ~ 230	3m	40(Quasi Peak)
230 ~ 1000	3m	47(Quasi Peak)
1000~3000	3m	70 (Peak) 50 (Average)
3000~6000	3m	74 (Peak) 54 (Average)

3.4 Operating Condition of EUT

Test date	Ambient temperature	Relative humidity	Atmospheric pressure
June 28, 2019	25°C	54%	100.3kPa

3.5 Test Procedure

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

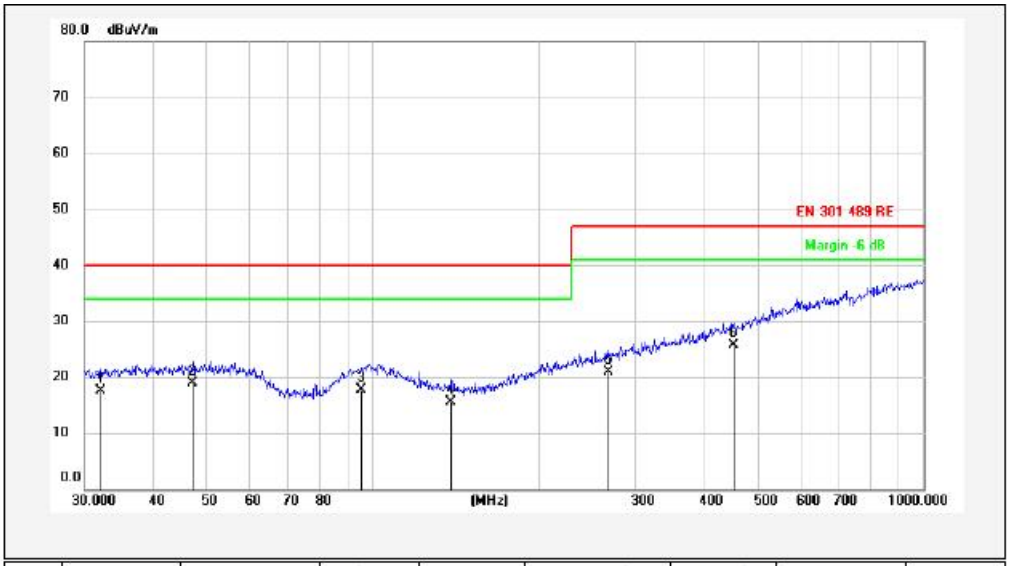
The bandwidth setting on the test receiver was 120 kHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

3.6 Test Data

30-1000MHz

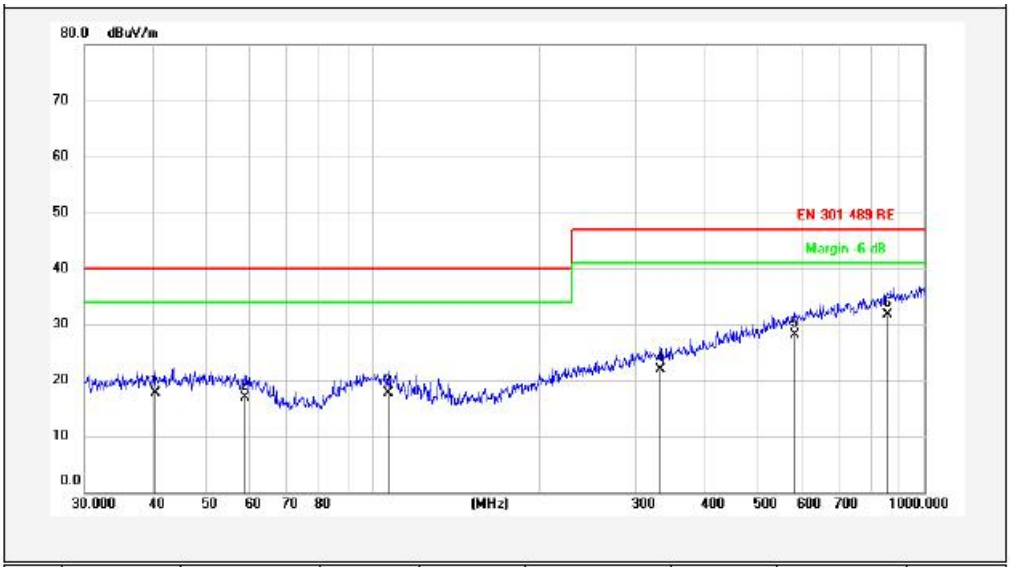
EUT:	WiFi Module	Model Name:	WizFi630S
Test Mode:	WiFi Mode	Test Date:	2019.06.28
Polarization:	Horizontal	Test Voltage:	DC 3.3V
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.0667	5.33	11.16	0.92	17.41	40.00	-22.59	QP
2	47.1600	5.58	12.27	1.08	18.93	40.00	-21.07	QP
3	95.4270	4.89	11.41	1.46	17.76	40.00	-22.24	QP
4	138.8735	6.32	7.39	1.73	15.44	40.00	-24.56	QP
5	267.5455	6.09	12.46	2.33	20.88	47.00	-26.12	QP
6	452.7196	6.21	16.55	2.92	25.68	47.00	-21.32	QP

Remarks: 1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

EUT:	WiFi Module	Model Name:	WizFi630S
Test Mode:	WiFi Mode	Test Date:	2019.06.28
Polarization:	Vertical	Test Voltage:	DC 3.3V
Operator:	Bing.He	Note:	

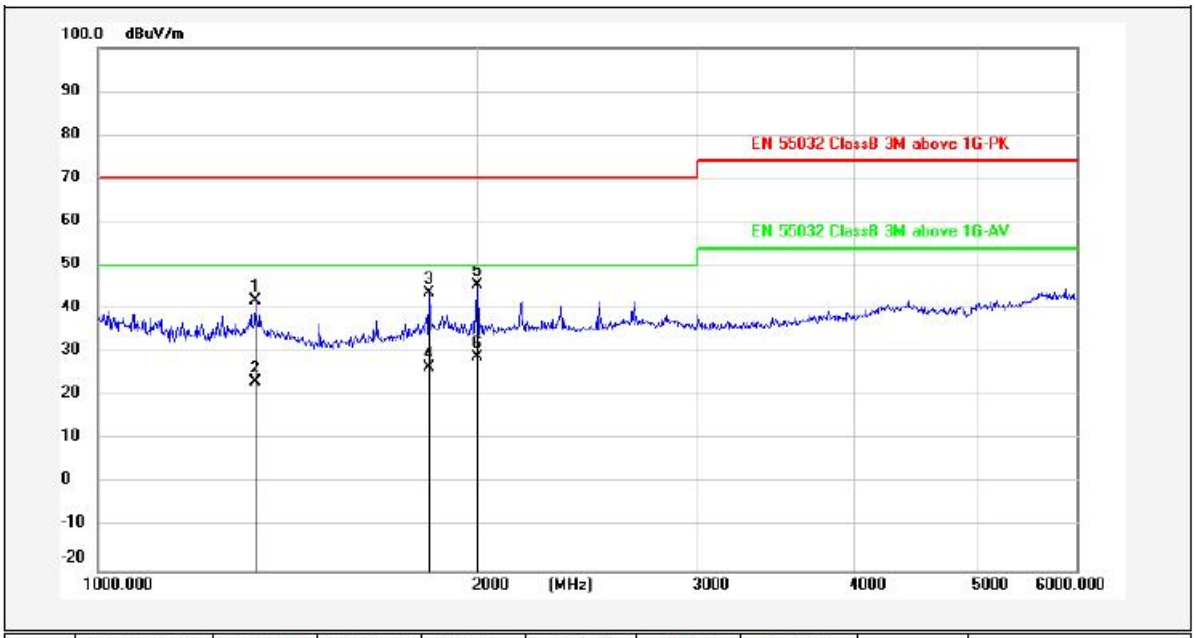


No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.2757	4.55	12.2	1.02	17.77	40.00	-22.23	QP
2	58.6126	4.07	11.52	1.23	16.82	40.00	-23.18	QP
3	106.7587	4.54	11.56	1.56	17.66	40.00	-22.34	QP
4	332.5187	5.11	14.15	2.57	21.83	47.00	-25.17	QP
5	582.7423	5.92	18.99	3.27	28.18	47.00	-18.82	QP
6	860.0352	5.91	21.84	3.97	31.72	47.00	-15.28	QP

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

Above 1GHz

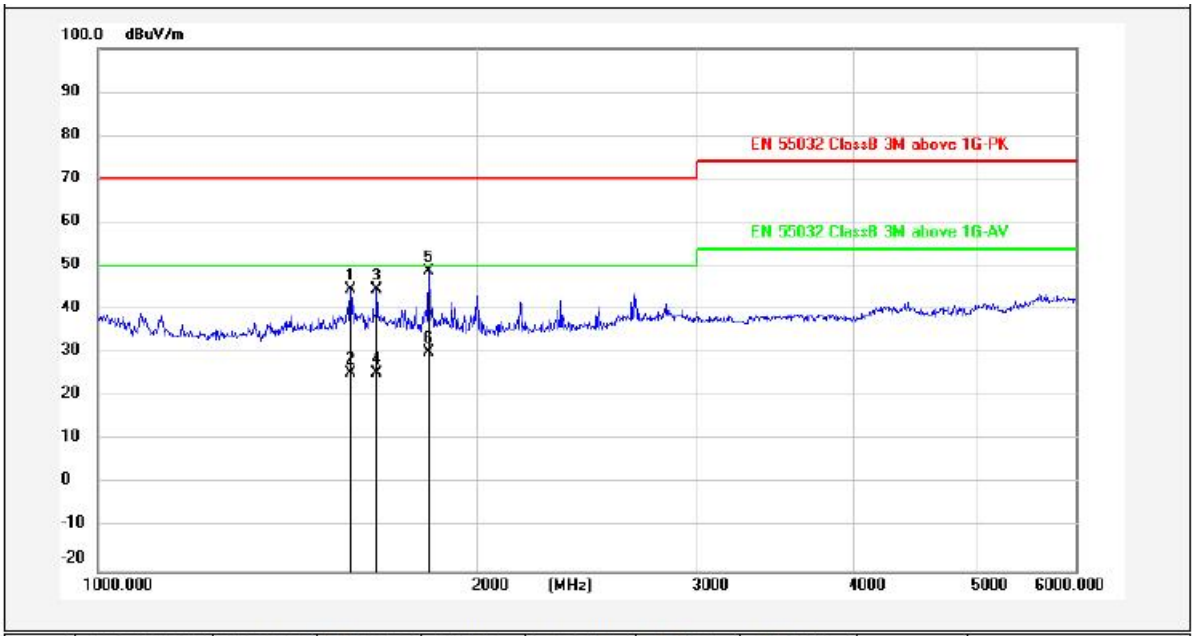
EUT:	WiFi Module	Model Name:	WizFi630S
Test Mode:	WiFi Mode	Test Date:	2019.06.28
Polarization:	Vertical	Test Voltage:	DC 3.3V
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1332.000	51.34	24.86	-34.28	41.92	70.00	-28.08	peak	
2	1332.000	32.92	24.86	-34.28	23.50	50.00	-26.50	AVG	
3	1832.378	52.17	25.15	-33.71	43.61	70.00	-26.39	peak	
4	1832.378	35.26	25.15	-33.71	26.70	50.00	-23.30	AVG	
5	2000.527	52.86	25.9	-33.31	45.45	70.00	-24.55	peak	
6	2000.527	36.61	25.9	-33.31	29.20	50.00	-20.80	AVG	

Remarks:1. Result=Reading+Antenna+Cable

EUT:	WiFi Module	Model Name:	WizFi630S
Test Mode:	WiFi Mode	Test Date:	2019.06.28
Polarization:	Horizontal	Test Voltage:	DC 3.3V
Operator:	Bing.He	Note:	



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1587.680	53.93	24.91	-34.08	44.76	70.00	-25.24	peak	
2	1587.680	34.67	24.91	-34.08	25.50	50.00	-24.50	AVG	
3	1666.376	53.49	24.93	-33.79	44.63	70.00	-25.37	peak	
4	1666.376	34.46	24.93	-33.79	25.60	50.00	-24.40	AVG	
5	1832.378	57.32	25.15	-33.71	48.76	70.00	-21.24	peak	
6	1832.378	38.96	25.15	-33.71	30.40	50.00	-19.60	AVG	

Remarks:1. Result=Reading+Antenna+Cable

4 IMMUNITY TEST RESULT

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

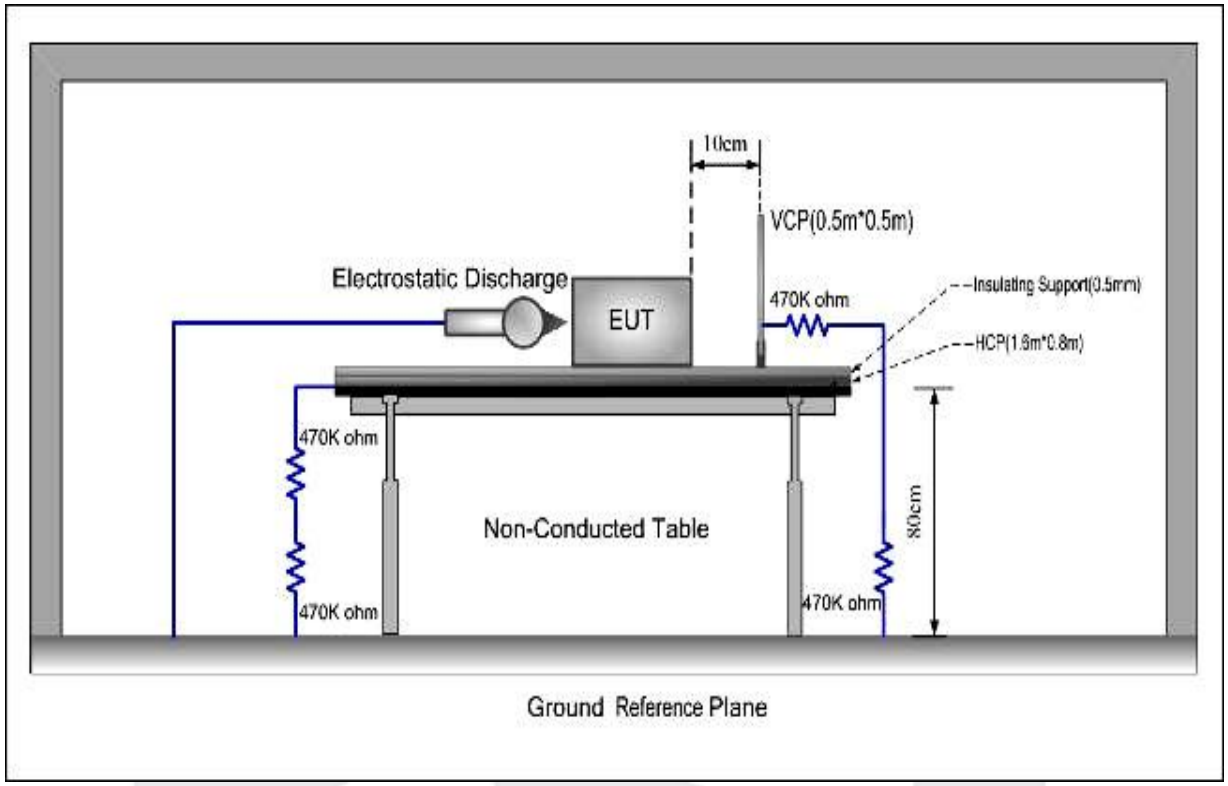
Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

5 ELECTROSTATIC DISCHARGE TEST

5.1 Block Diagram of Test Setup



5.2 Test Standard

EN 61000-4-2: 2009

(Severity Level 1&2&3 for Air Discharge at 2kV 4kV 8kV;

Severity Level 1&2 for Contact Discharge at 2kV 4kV)

5.3 Severity Levels and Performance Criterion

Severity Levels	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)	Performance criterion
1.	2	2	B
2.	4	4	
3.	6	8	
4.	8	15	
x	Special	Special	

5.4 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	WiFi Mode

5.5 Test Procedure

5.5.1 Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

5.5.2 Contact Discharge:

All the procedure was same as Section 8.5.1. except that the generator was re-triggered for a new single discharge and repearted 50 times for each pre-selected test point. The tip of the discharge electrode was touch the EUT before the discharge switch was operated.

5.5.3 Indirect discharge for horizontal coupling plane

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

5.5.4 Indirect discharge for vertical coupling plane

At least 20 single discharge were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

5.6 Test Data

Electrostatic Discharge Test Results

EUT	:	WiFi Module	Temperature	:	24℃
M/N	:	WizFi630S	Humidity	:	55%
Test Voltage	:	DC 3.3V	Test Date	:	2019.06.29
Test Engineer	:	Bing.He	Pressure	:	100.3kPa
Required Performance	:	B	Actual Performance	:	A

Air Discharge: ±2kV ±4kV ±8kV	# For Air Discharge each Point Positive ＞25 times and negative ＞25 times discharge
Contact Discharge: ±2kV ±4kV	# For Contact Discharge each point positive ＞25 times and negative ＞25 times discharge

For the time interval between successive single discharges an initial value of one second.
After discharge to the ungrounded part of EUT, it needs the bleeder resistor to remove the charge prior to next ESD pulse

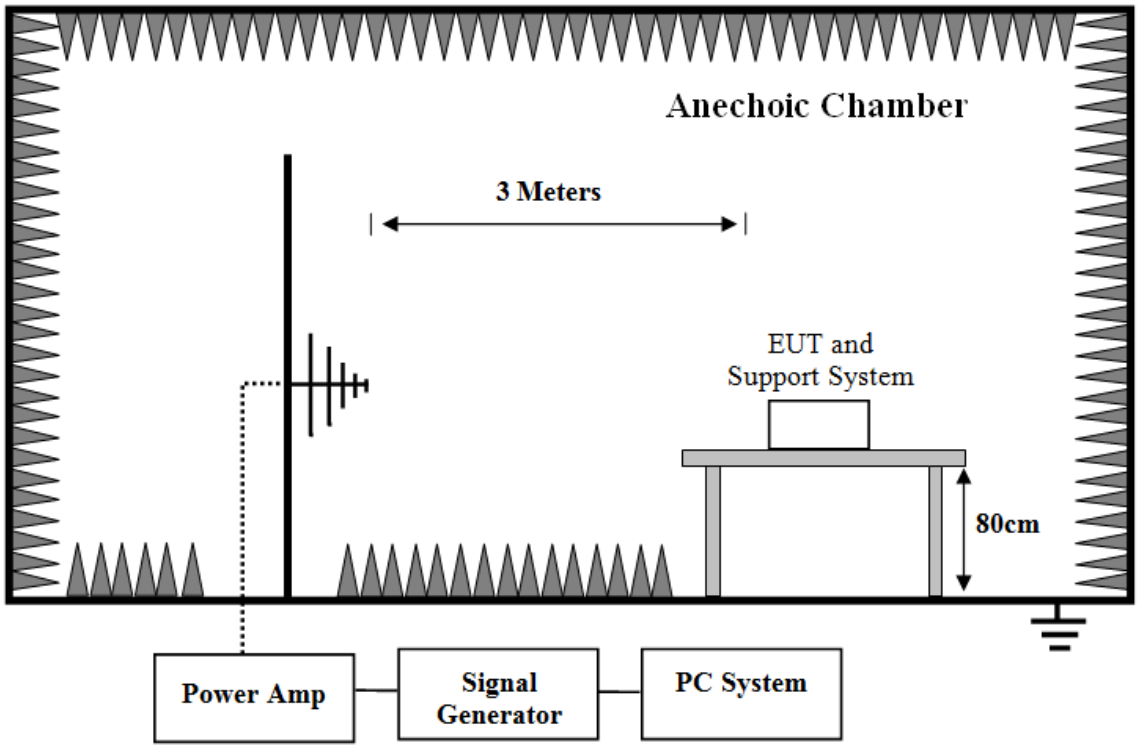
Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±2	Contact	Center of VCP	B	A	**Pass**
±4	Contact	Center of HCP	B	A	**Pass**
±2	Contact	1,2	B	A	**Pass**
±4	Contact	1,2	B	A	**Pass**
±2	Air	/	B	A	**Pass**
±4	Air	/	B	A	**Pass**
±8	Air	/	B	A	**Pass**

1	HCP	8	/
2	VCP	9	/
3	/	10	/
4	/	11	/
5	/	12	/
6	/	13	/
7	/	14	/

Performance:
The EUT was no change compared with initial operation during the test.

6 Radio Frequency Electromagnetic Field Immunity Test

6.1 Block Diagram of Test Setup



6.2 Test Standard

EN 61000-4-3: 2010

Severity Level 2 at 3V/m

Radio Frequency Electromagnetic Field Immunity Test levels

Level	Test field strength V/m
1	1
2	3
3	10
4	30
X	Special
Note: X is an opoen test level and the associated field strength may be any value. This level may be given in the product standard.	

6.3 Operating Condition of EUT

The details of test modes are as follows：

No.	Test Mode
1.	WiFi Mode

6.4 Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator ‘ s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator ’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

All the scanning conditions are as follows **:**

Test Level	
Frequency	80-1000MHz,1000MHz-6000MHz
Test level	3V/m (Severity Level 2)
Antenna polarization	Horizontal & Vertical
Modulation	80%, 1kHz Amplitude Modulation
Steps increment	1%

6.5 Test Data

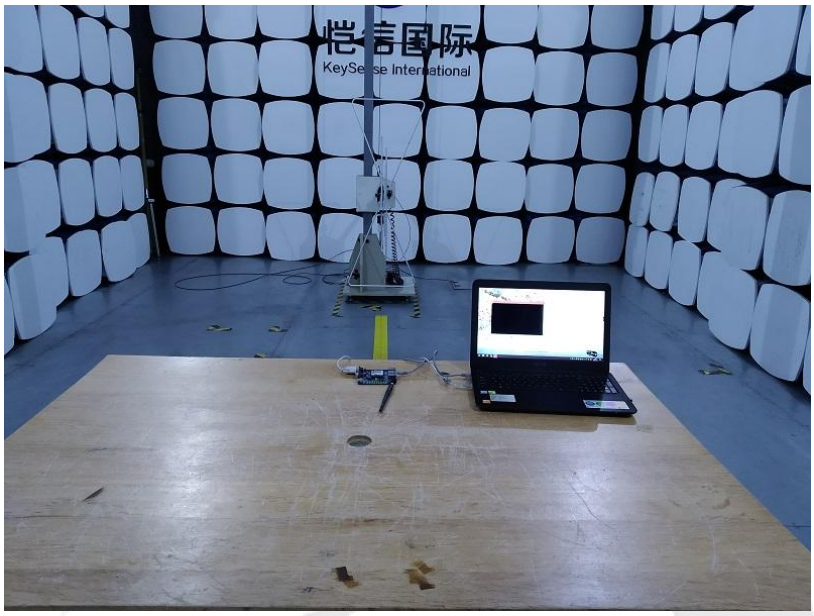
Radio-frequency Continuous radiated disturbance Test Results

EUT: WiFi Module			Temperature: 25℃		
M/N: WizFi630S			Humidity: 55%		
Test Voltage: DC 3.3V			Test Date: 2019.06.30		
Test Engineer: Bing.He			Pressure: 100.3KPa		
Required Performance: A			Actual Performance: A		
Frequency Rage : 80 MHz -1000MHz, 1000-6000MHz			Test Level: 3V/m		
Modulation: ☑ AM ☐ Pulse ☐ none 1 kHz 80%					
EUT Position	Polarization: Horizontal		Polarization: Vertical		Result
	Required	Observation	Required	Observation	(Pass / Fail)
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Performance: The EUT was no change compared with initial operation during the test.					

7 Test setup photo

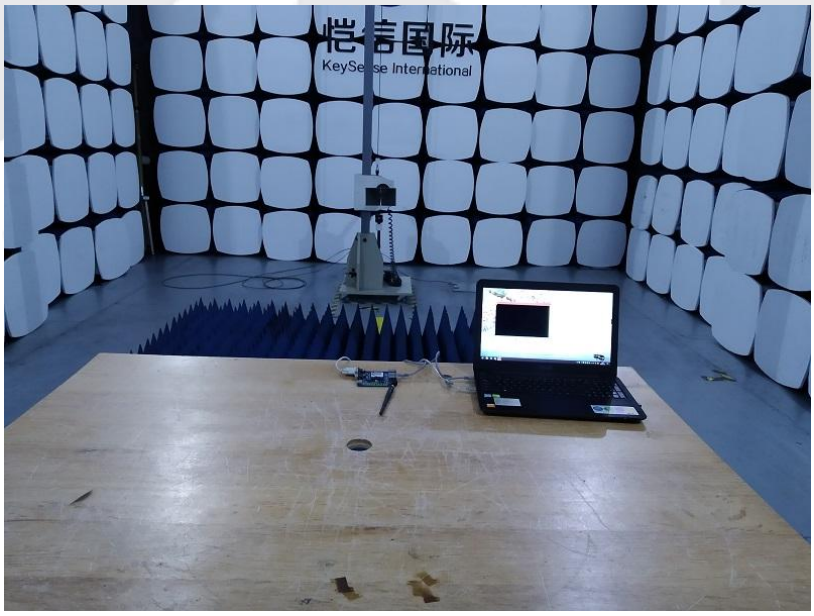
Radiated Disturbance Test

30-1000MHz



Radiated Disturbance Test

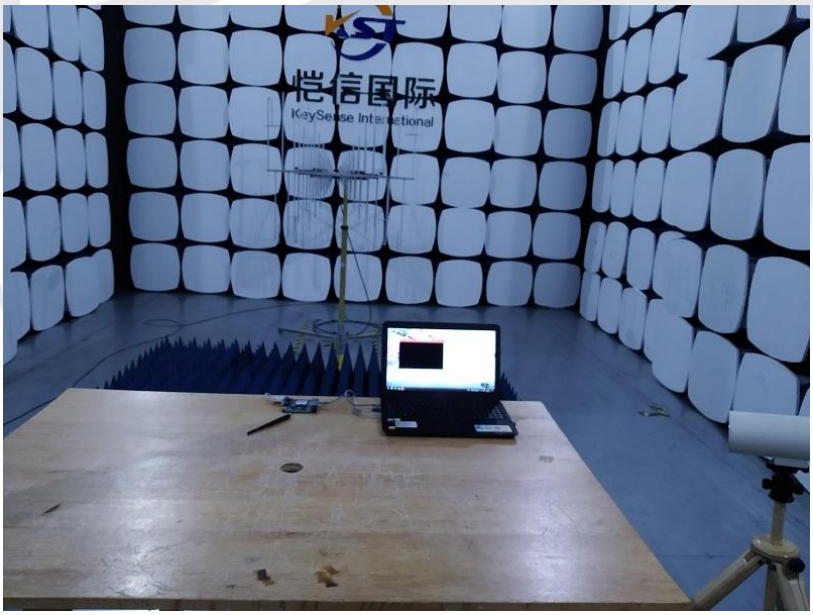
1000-6000MHz



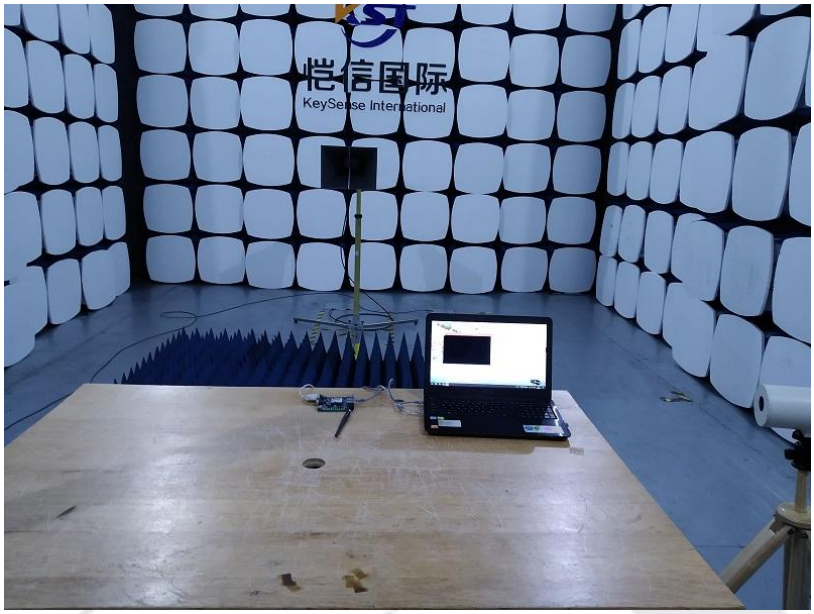
Electrostatic discharge Test

Radio-frequency Continuous radiated disturbance Test

80MHz-1000MHz



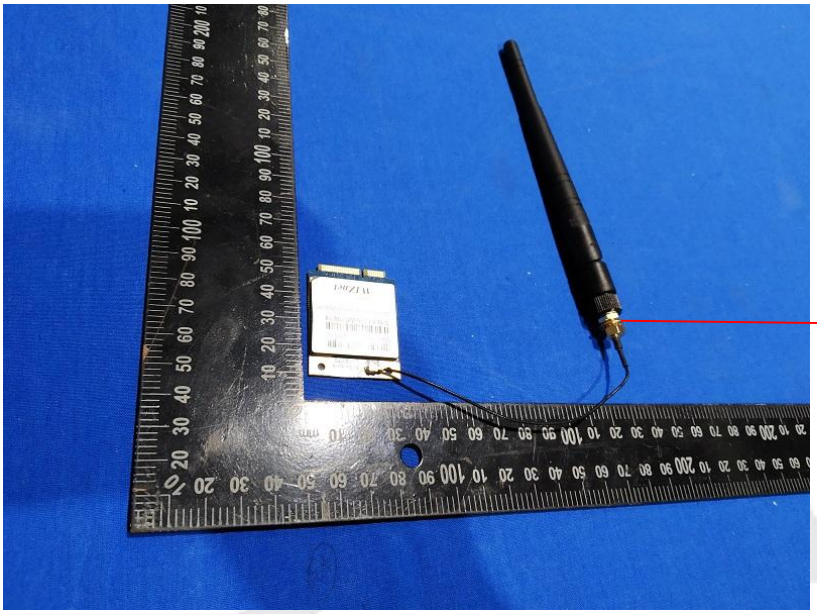
1000MHz-6000MHz

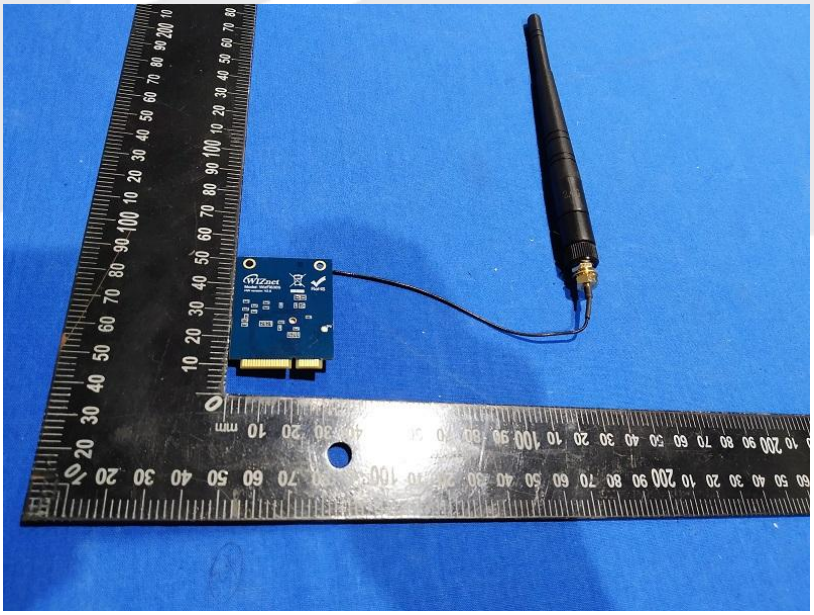


8 PHOTOS OF THE EUT

External photos

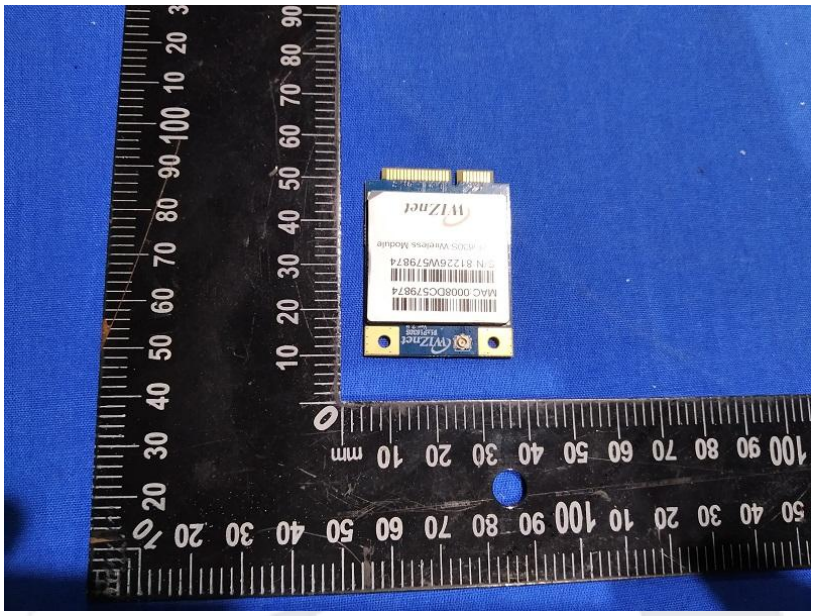
M/N: WizFi630S

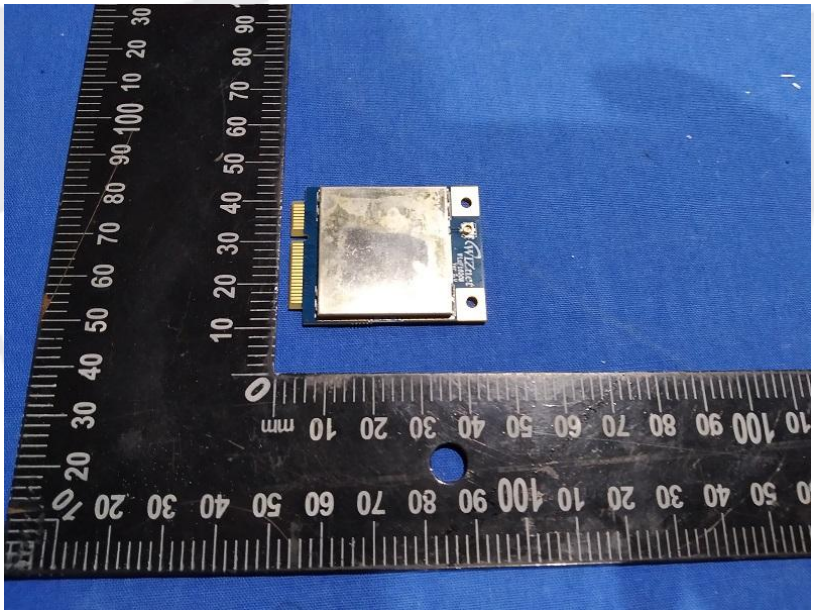




Internal Photos

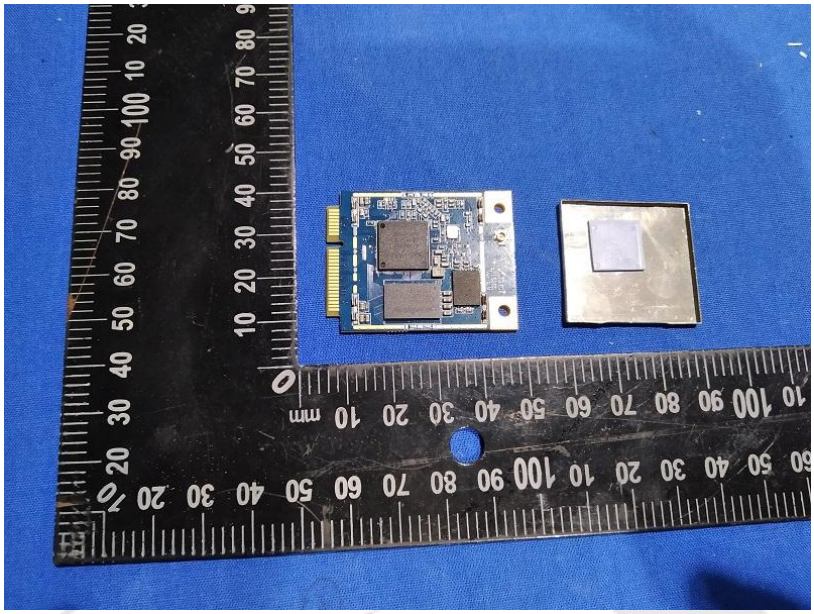
M/N: WizFi630S

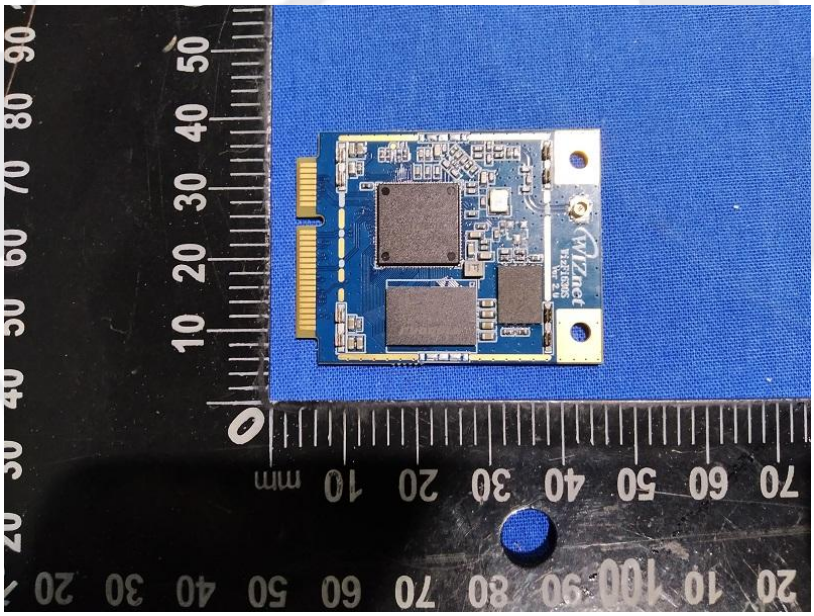




Internal Photos

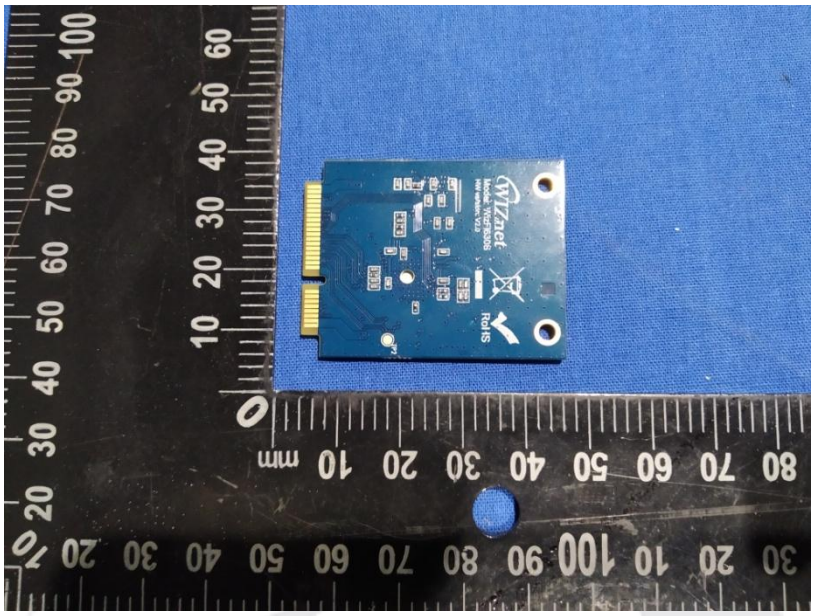
M/N: WizFi630S





Internal Photos

M/N: WizFi630S



..... End of Report .....

Statement

1. The calibration and measurement of test equipments used in our laboratory are traceable to National primary standard of measurement and BIPM.
2. The report is invalid without the special test seal of the company.
3. The test report is invalid without the signature of main tester,examiner and approver.
4. The report is invalid if altered and added or deleted.
5. The test results in this report only apply to the tested samples.
6. This test report shall not be reproduced except in full, without the written approval of our laboratory.
7. “☆”item cannot be Accredited by CNAS.
8. Any objections must be raised to KeySense within 15days since the date when report is received.

Test Laboratory: KeySense Testing & Certification International Co., Ltd.

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