

# TEST REPORT

Report No. ....: **KS2203S1008E01**

FCC ID.....: **2AZVSA321B**

Applicant.....: **TCL OVERSEAS MARKETING LIMITED**

Address.....: **7/F BUILDING 22E, 22 SCIENCE PARK EAST AVENUE, HONG KONG  
SCIENCE PARK SHATIN NT**

Manufacturer.....: **TCL OVERSEAS MARKETING LIMITED**

Address.....: **7/F BUILDING 22E, 22 SCIENCE PARK EAST AVENUE, HONG KONG  
SCIENCE PARK SHATIN NT**

Product Name.....: **AIR PURIFIER**

Trade Mark.....: **TCL**

Model/Type reference.....: **breeva Pro 400**

Listed Model(s) .....: **breeva Pro 400 Premium, A400225W, A400225B, A400P225G,  
A400P225W**

Standard.....: **FCC 15.247**

Date of receipt of test sample...: **March 23, 2022**

Date of testing.....: **March 23, 2022 ~ April 15, 2022**

Date of issue.....: **May 17, 2022**

Test Result.....: **PASS**

Compiled by:  
( Printed Name + Signature ) Allen Li

*Allen Li*

Supervised by:  
( Printed Name + Signature ) Sky Dong

*Sky Dong*

Approved by:  
( Printed Name + Signature ) Neil Wan

*Neil Wan*

Testing Laboratory Name.....: **KSIGN(Guangdong) Testing Co., Ltd.**

Address.....: **West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu  
Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen,  
Guangdong, China**

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## 1. TEST SUMMARY

### 1.1. Test Standards

The tests were performed according to following standards:

**FCC Rules Part 15.247:** Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

**ANSI C63.10-2013:** American National Standard for Testing Unlicensed Wireless Devices.

**KDB 558074 D01 :** The measurement guidance provided herein is applicable only to Digital Transmission System (DTS) devices operating in the 902-928 MHz, 2400-2483.5 MHz and/or 5725-5850 MHz bands under §15.247 of the FCC rules (Title 47 of the Code of Federal Regulations).

### 1.2. Report version

Revised No.	Date of issue	Description
01	May 17, 2022	Original



### 1.3. Test Description

FCC Part 15 Subpart C(15.247)			
Test Item	Standard Section	Result	Test Engineer
	FCC		
Antenna Requirement	15.203	Pass	Cyril Cai
Conducted Emission	15.207	Pass	Cyril Cai
6dB&99% Bandwidth	15.247(a)(2)	Pass	Cyril Cai
Peak Output Power	15.247(b)	Pass	Cyril Cai
Power Spectral Density	15.247(e)	Pass	Cyril Cai
Restricted Band	15.247(d)/15.205	Pass	Cyril Cai
Band Edge and Spurious Emission(Conducted)	15.247(d)	Pass	Cyril Cai
Spurious Emission(Radiated)	15.247(d)&15.209	Pass	Cyril Cai

Note: The measurement uncertainty is not included in the test result.



## 1.4. Test Facility

### Address of the report laboratory

#### **KSIGN(Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

### Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-Lab Code: L13261**

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 5457.01**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **IC Registration No.: CN0096**

The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

#### **FCC-Registration No.: CN1272**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.



## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the KSIGN(Guangdong) Testing Co., Ltd. system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Below is the best measurement capability for KSIGN(Guangdong) Testing Co., Ltd.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.20 dB	(1)
Radiated Emissions 30~1000MHz	4.70 dB	(1)
Radiated Emissions 1~18GHz	5.00 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	2.80 dB	(1)

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 1.6. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba



## 2. GENERAL INFORMATION

### 2.1. General Description of EUT

Test Sample Number:	1-1-1(Normal Sample),1-1-2(Engineering Sample )
Product Name:	AIR PURIFIER
Trade Mark:	TCL
Model/Type reference:	breeva Pro 400
Listed Model(s):	breeva Pro 400 Premium , A400225W, A400225B, A400P225G, A400P225W
Model Different:	The series models are the same as the main test models except for different colors.The Breeva Pro 400 Premium has more UV lights and VOC sensors than the Breeva Pro 400.
Power supply:	INPUT: AC 120V~60Hz, 34W
Hardware version:	V1.3
Software version:	V1.0
<b>2.4GHz WIFI</b>	
Modulation:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM,64QAM)
Operation frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz
Max Output Power:	802.11b: 8.60dBm 802.11g: 8.16dBm 802.11n (HT20): 8.17dBm
Channel number:	802.11b/g/n(HT20):11 channels
Test frequency:	CH01: 2412MHz; CH06: 2437MHz; CH11: 2462MHz
Channel separation:	5MHz
Antenna type:	PCB Antenna
Antenna gain:	3dBi



## 2.2. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

Channel	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

Note:

- 1.CH 01~CH 11 for 802.11b/g/n(HT20)
- 2.The display in grey were the channel selected for testing.

Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the WLAN AP under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

TRF No. FCC 15.247\_R1

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### 2.3. Measurement Instruments List

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
2	Vector Signal Generator	Agilent	N5182A	MY50142520	03/04/2023
3	Analog Signal Generator	HP	83752A	3344A00337	03/04/2023
4	Power Sensor	Agilent	E9304A	MY50390009	03/04/2023
5	Power Sensor	Agilent	E9300A	MY41498315	03/04/2023
6	Wideband Radio Communication Tester	R&S	CMW500	157282	03/04/2023
7	Climate Chamber	Angul	AGNH80L	1903042120	03/04/2023
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	03/04/2023
9	RF Control Unit	Tonscend	JS0806-2	/	03/04/2023

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/04/2023
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/04/2023
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/04/2023
4	Spectrum Analyzer	HP	8593E	3831U02087	03/04/2023
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	12/04/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/04/2023
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/04/2023
10	Pre-Amplifier	EMCI	EMC051835S E	980662	03/04/2023
11	Pre-Amplifier	Schwarzbeck	BBV-9721	57	03/04/2023
12	Horn Antenna	Schwarzbeck	BBHA 9170	00939	03/04/2023

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV432	1326.6105.02	03/04/2023
2	EMI Test Receiver	R&S	ESR	102524	03/04/2023
3	Manual RF Switch	JS TOYO	/	MSW-01/002	03/04/2023

Note:

1)The Cal. Interval was one year.

2)The cable loss has calculated in test result which connection between each test instruments.

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## 2.5. Test Software

Software name	Model	Version
Conducted emission Measurement Software	EZ-EMC	EMC-Con 3A1.1
Radiated emission Measurement Software	EZ-EMC	FA-03A.2.RE
Bluetooth and WIFI Test System	JS1120-3	2.5.77.0418



### 3. TEST ITEM AND RESULTS

#### 3.1. Antenna requirement

##### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

##### Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

Note: The antenna is permanently fixed to the EUT

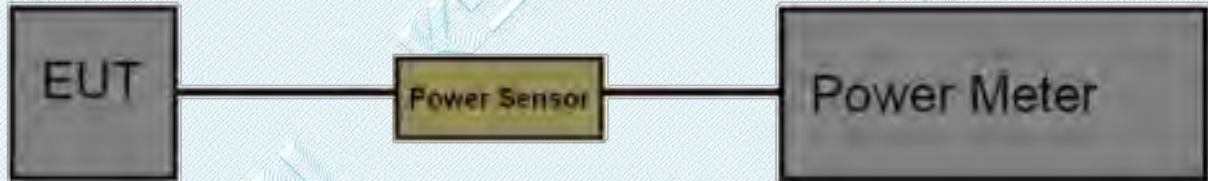


### 3.2. Peak Output Power

#### Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. The measurement is according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.
3. Spectrum Setting:  
Set analyser center frequency to DTS channel center frequency.  
Set the RBW to: 1MHz  
Set the VBW to: 3MHz  
Detector: peak  
Sweep time: auto  
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.
4. The power sensor video bandwidth is greater than or equal to the DTS bandwidth of the equipment.

#### Test Mode

Please refer to the clause 2.2



**Test Result**

Mode	Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	Result
802.11b	2412	8.38	30	PASS
	2437	8.60	30	PASS
	2462	8.49	30	PASS
802.11g	2412	7.86	30	PASS
	2437	8.07	30	PASS
	2462	8.16	30	PASS
802.11n (HT20)	2412	7.79	30	PASS
	2437	7.98	30	PASS
	2462	8.17	30	PASS

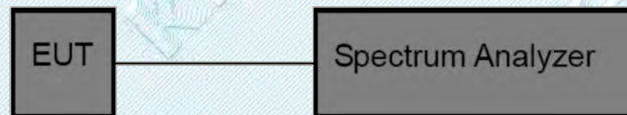


### 3.3. Power Spectral Density

#### Limit

FCC Part 15 Subpart C(15.247)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.
3. Spectrum Setting:  
 Set analyser center frequency to DTS channel center frequency.  
 Set the span to 1.5 times the DTS bandwidth.  
 Set the RBW to: 10 kHz  
 Set the VBW to: 30 kHz  
 Detector: peak  
 Sweep time: auto  
 Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

#### Test Mode

Please refer to the clause 2.2



### Test Result

Note:

Power Density(dBm/3kHz)=Power Density(dBm/10kHz)-10\*Log(10/3)

Mode	Frequency	Power Density (dBm/10kHz)	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	2412 MHz	-15.51	-20.74	8	Pass
	2437 MHz	-15.23	-20.46	8	Pass
	2462 MHz	-14.64	-19.87	8	Pass
802.11g	2412 MHz	-22.52	-27.75	8	Pass
	2437 MHz	-22.39	-27.62	8	Pass
	2462 MHz	-22.06	-27.29	8	Pass
802.11n(HT20)	2412 MHz	-22.55	-27.78	8	Pass
	2437 MHz	-23.04	-28.27	8	Pass
	2462 MHz	-22.23	-27.46	8	Pass

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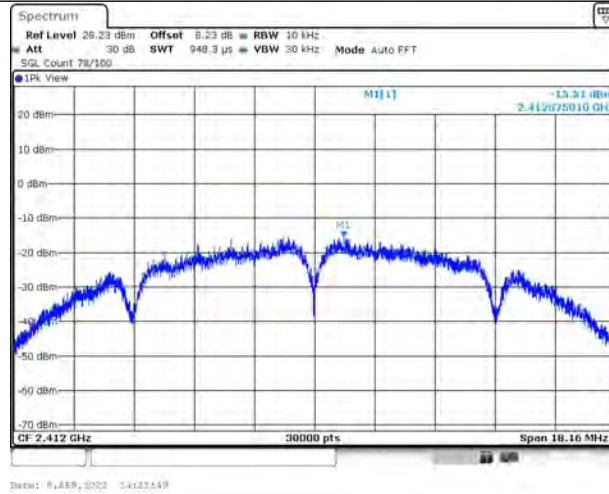
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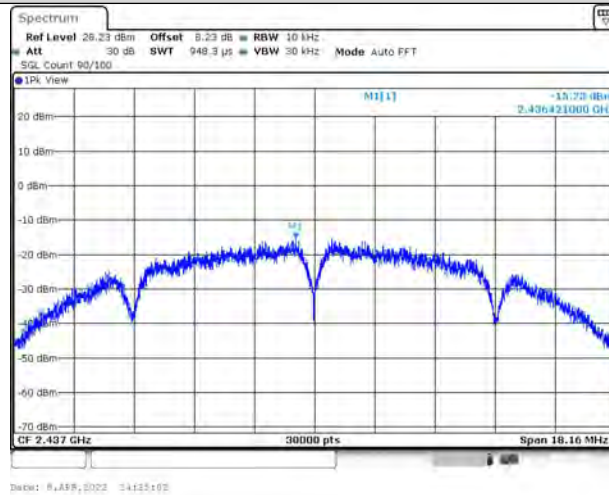


## 802.11b

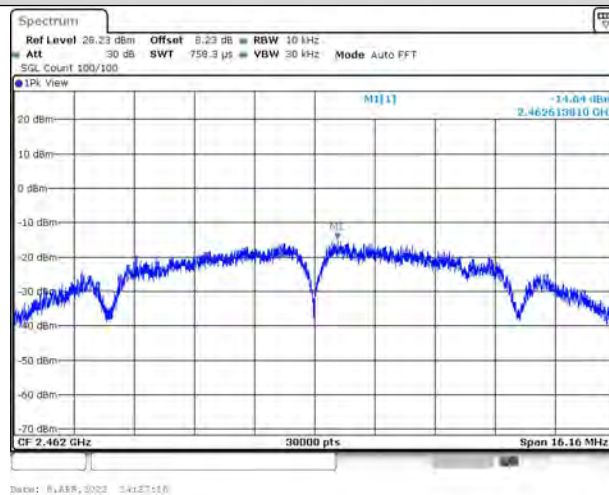
## 2412 MHz



## 2437 MHz



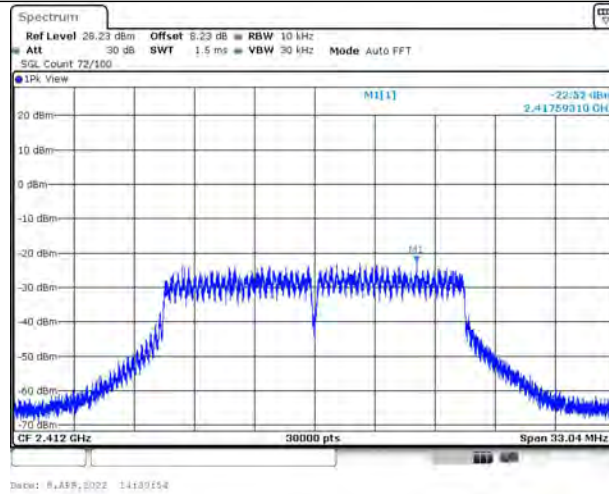
## 2462 MHz



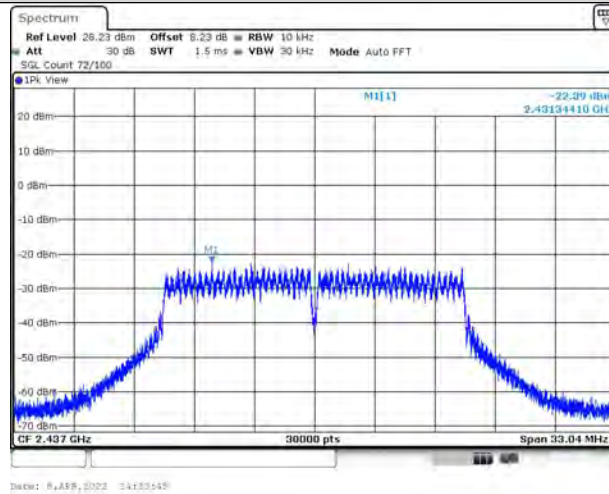


802.11g

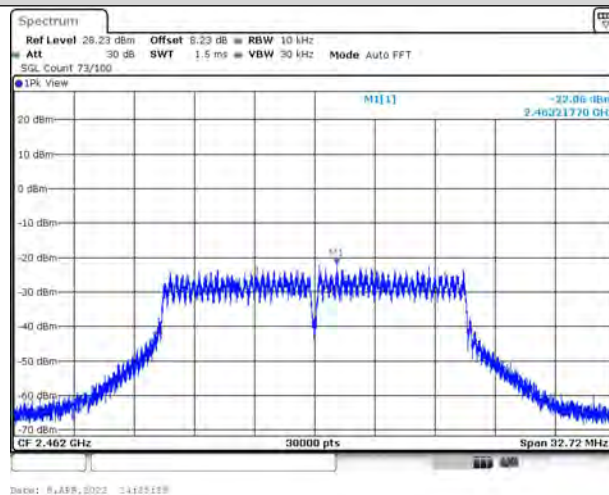
2412 MHz



2437 MHz



2462 MHz



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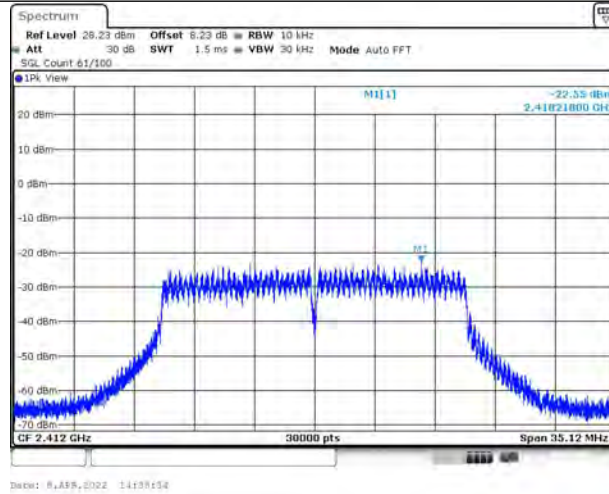
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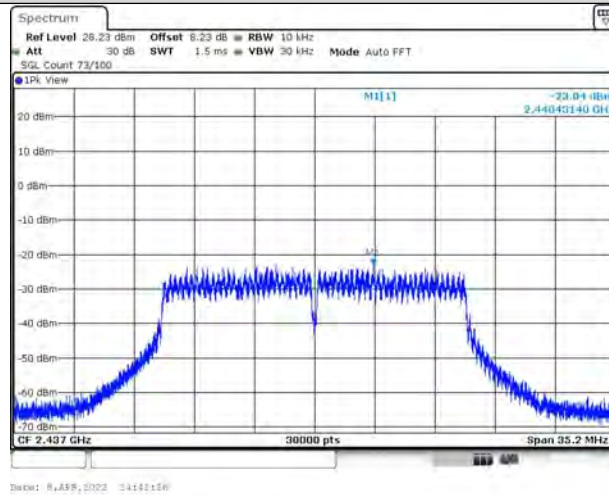


## 802.11n(HT20)

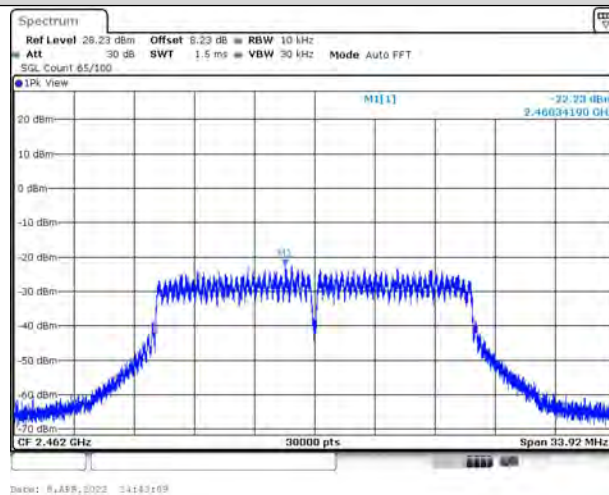
## 2412 MHz



## 2437 MHz



## 2462 MHz



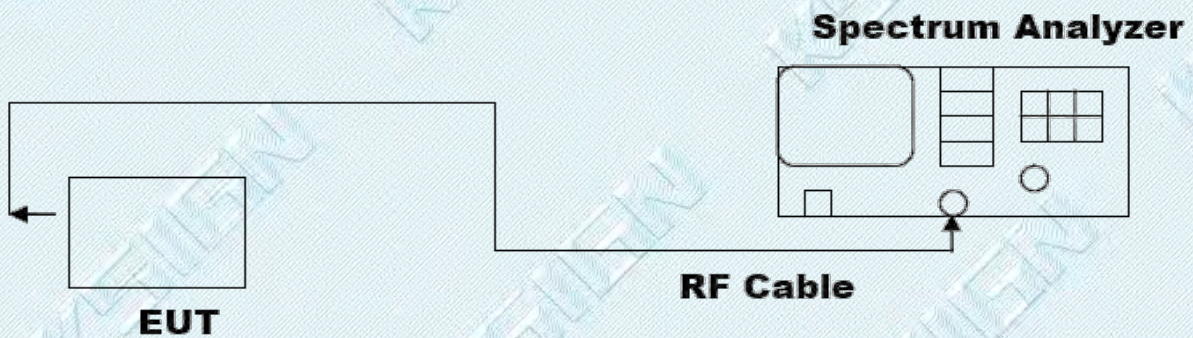


### 3.4. Bandwidth

#### Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	$\geq 500$ KHz (6dB bandwidth)	2400~2483.5

#### Test Configuration



#### Test Procedure

- Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator:  
6db Bandwidth
  - Set RBW = 100 kHz.
  - Set the video bandwidth (VBW)  $\geq 3$  RBW.
  - Detector = Peak.
  - Trace mode = Max hold.
  - Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

#### Test Mode

Please refer to the clause 2.2.



### Test Results

Mode	Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
802.11b	2412 MHz	9.08	14.665	$\geq 0.5$	Pass
	2437 MHz	9.08	14.705	$\geq 0.5$	Pass
	2462 MHz	8.08	14.705	$\geq 0.5$	Pass
802.11g	2412 MHz	16.52	18.861	$\geq 0.5$	Pass
	2437 MHz	16.52	17.702	$\geq 0.5$	Pass
	2462 MHz	16.36	18.022	$\geq 0.5$	Pass
802.11n(HT20)	2412 MHz	17.56	18.781	$\geq 0.5$	Pass
	2437 MHz	17.60	18.901	$\geq 0.5$	Pass
	2462 MHz	16.96	18.581	$\geq 0.5$	Pass

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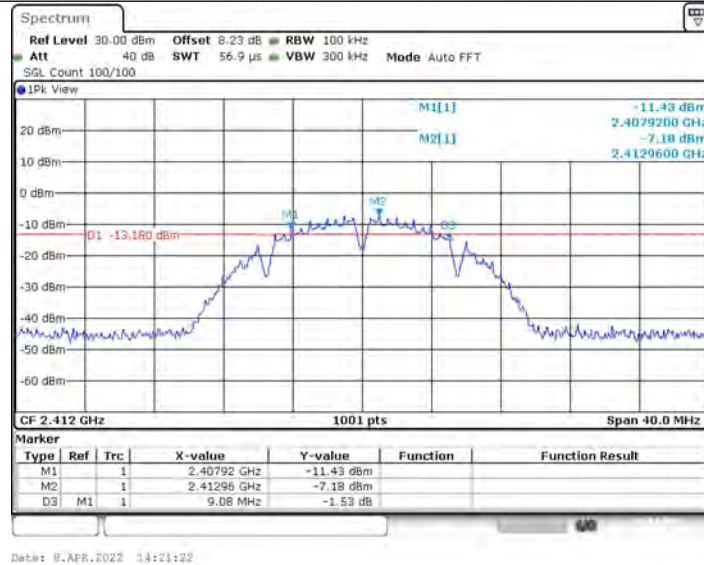
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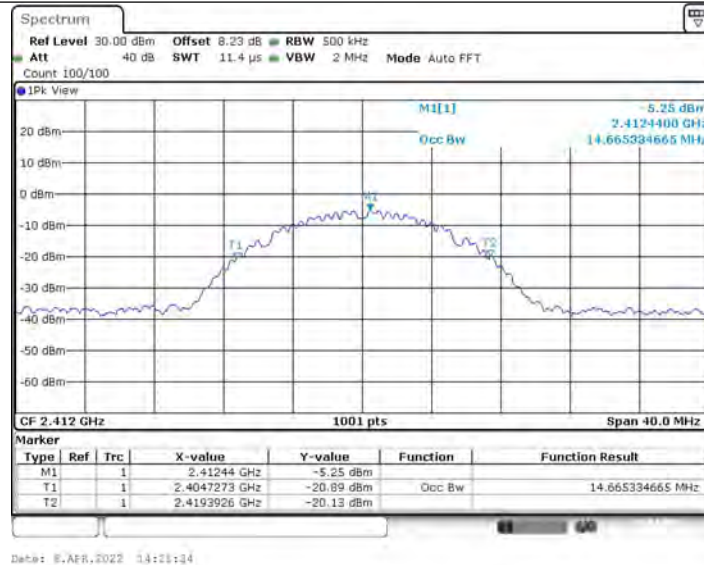


## 802.11b\_2412 MHz

### 6dB Bandwidth



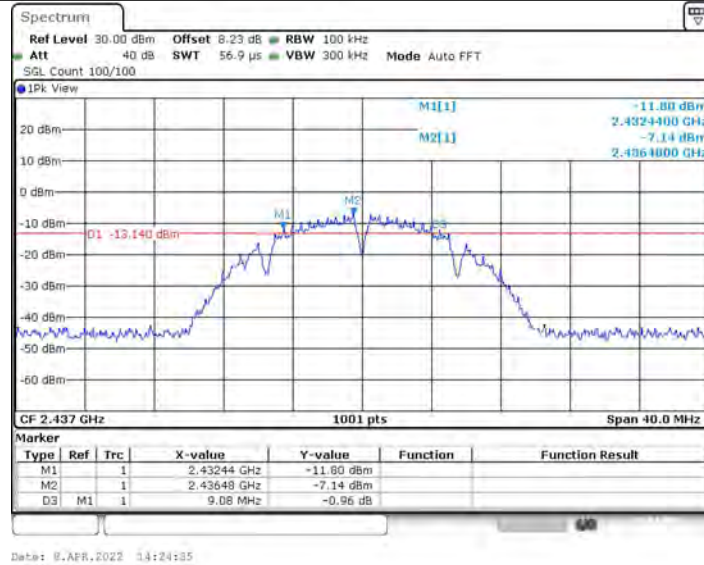
### 99% Bandwidth



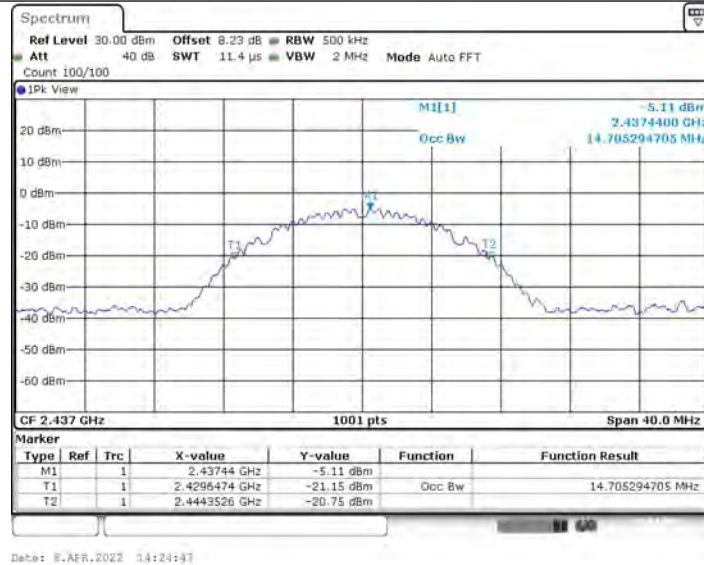


## 802.11b\_2437 MHz

### 6dB Bandwidth



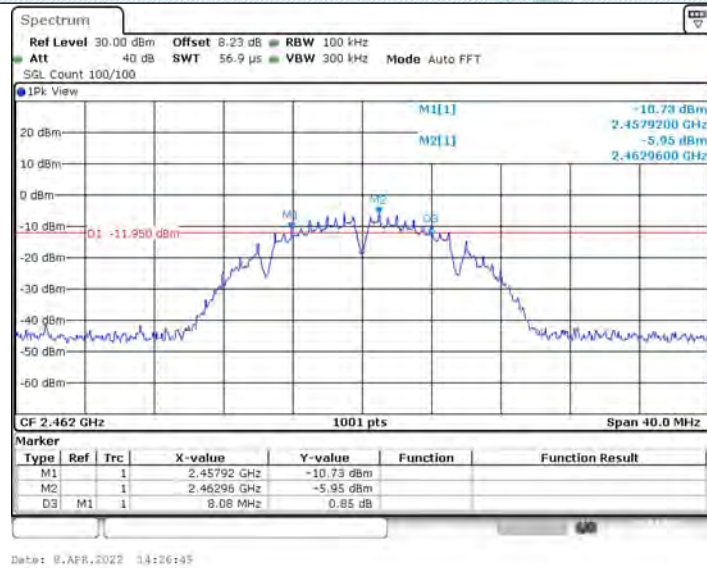
### 99% Bandwidth



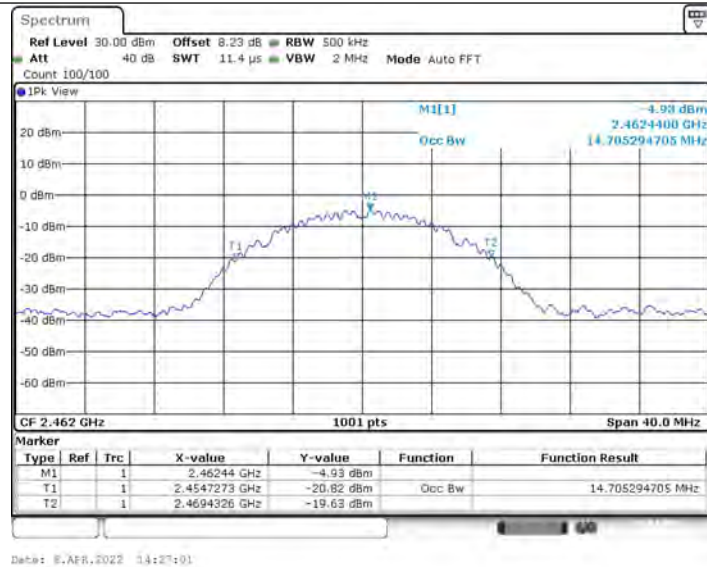


## 802.11b\_2462 MHz

### 6dB Bandwidth



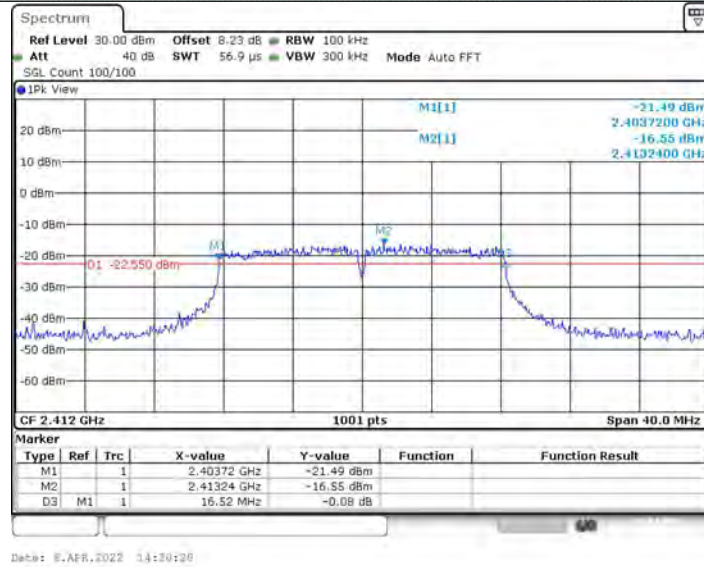
### 99% Bandwidth



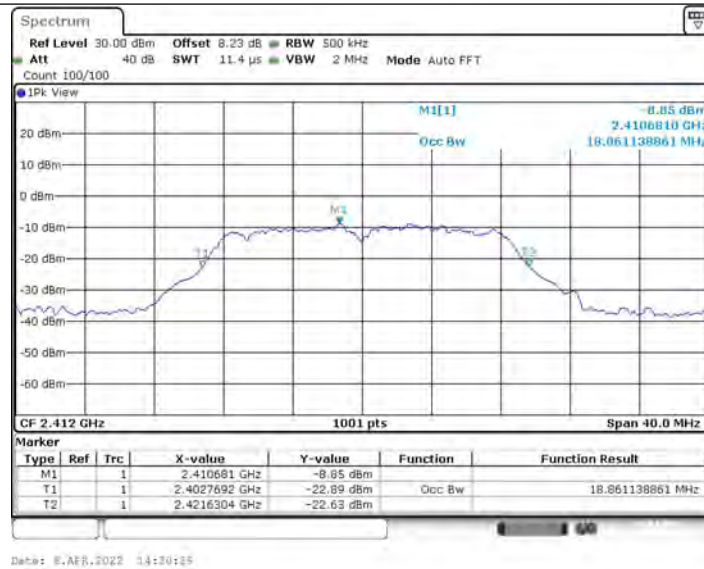


## 802.11g\_2412 MHz

### 6dB Bandwidth



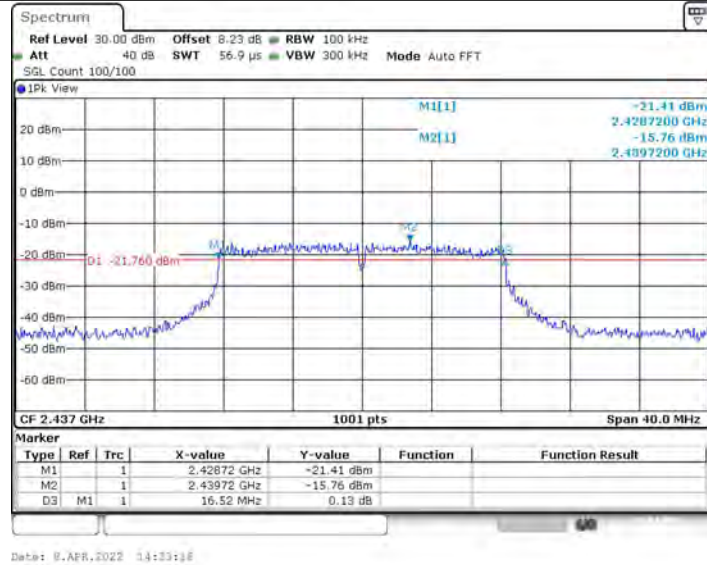
### 99% Bandwidth



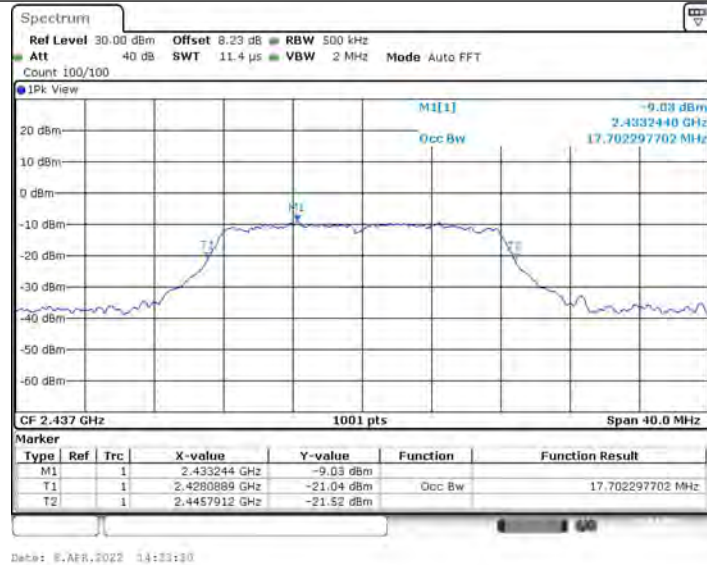


## 802.11g\_2437 MHz

### 6dB Bandwidth



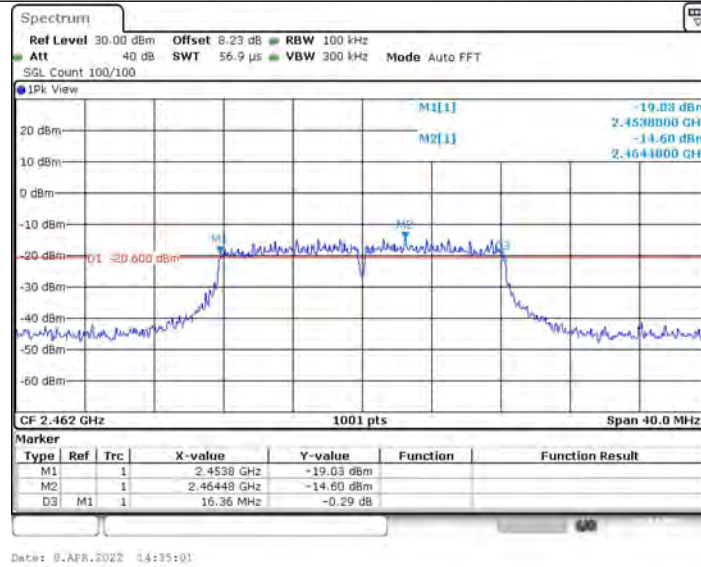
### 99% Bandwidth



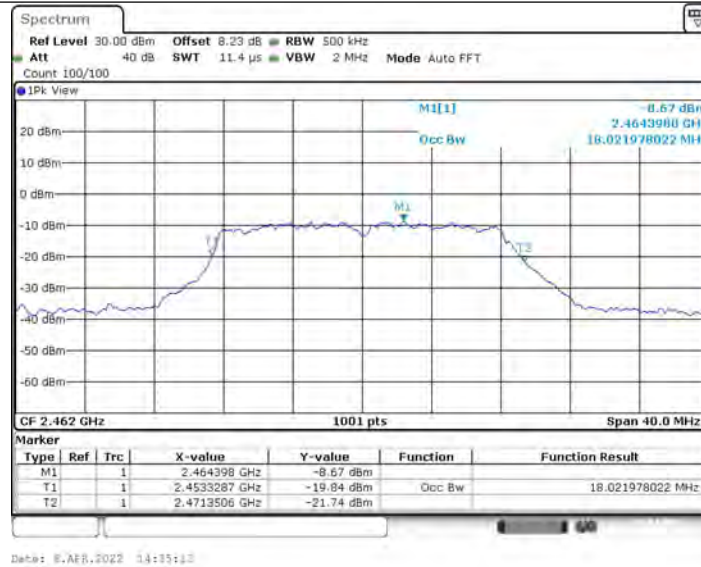


## 802.11g\_2462 MHz

### 6dB Bandwidth



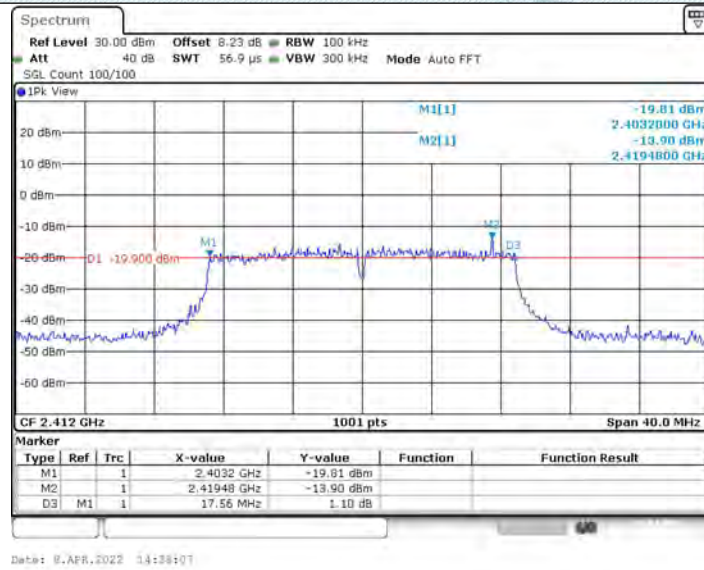
### 99% Bandwidth



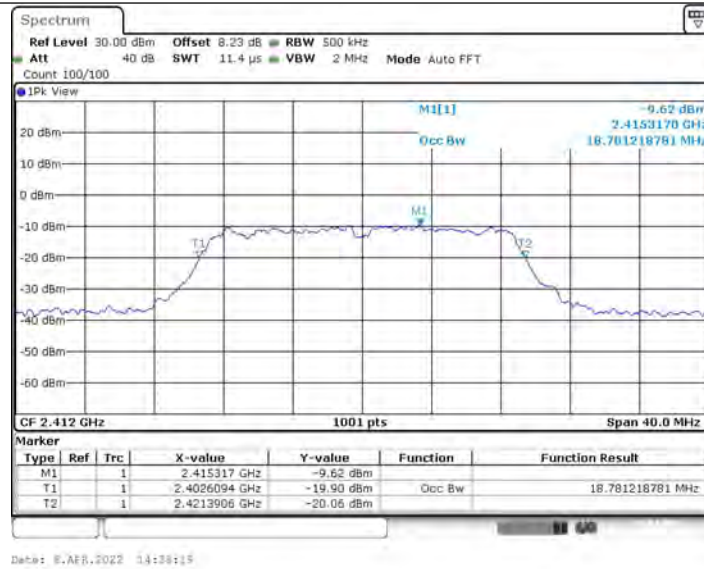


## 802.11n(HT20)\_2412 MHz

### 6dB Bandwidth



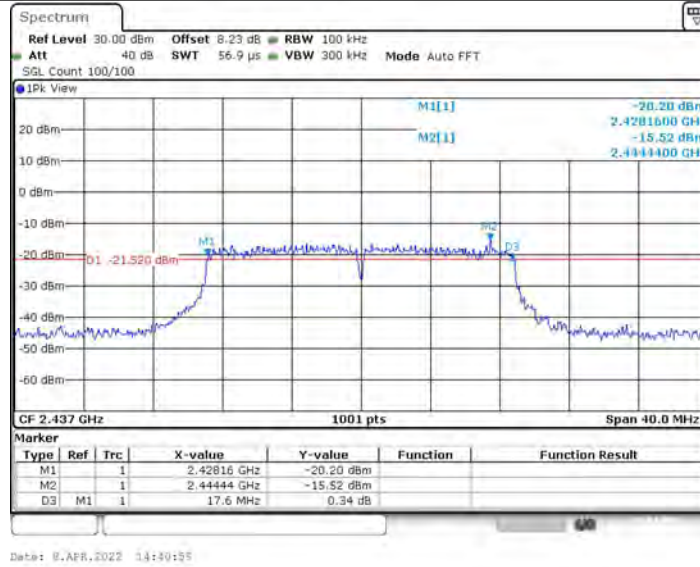
### 99% Bandwidth



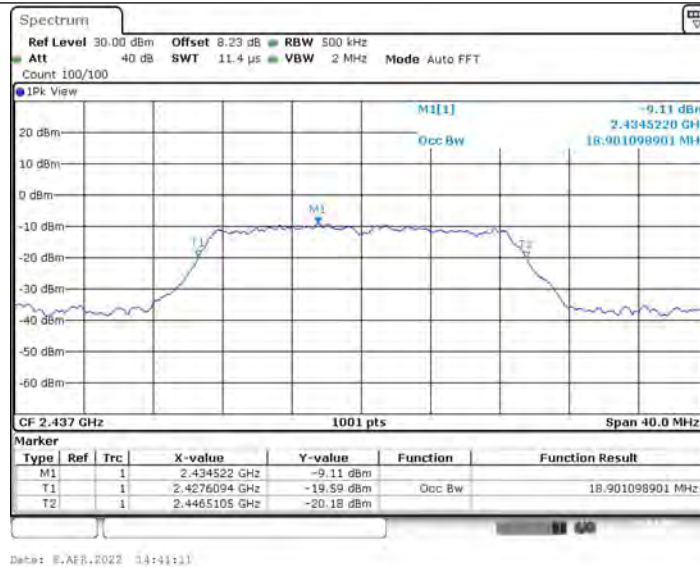


## 802.11n(HT20)\_2437 MHz

### 6dB Bandwidth



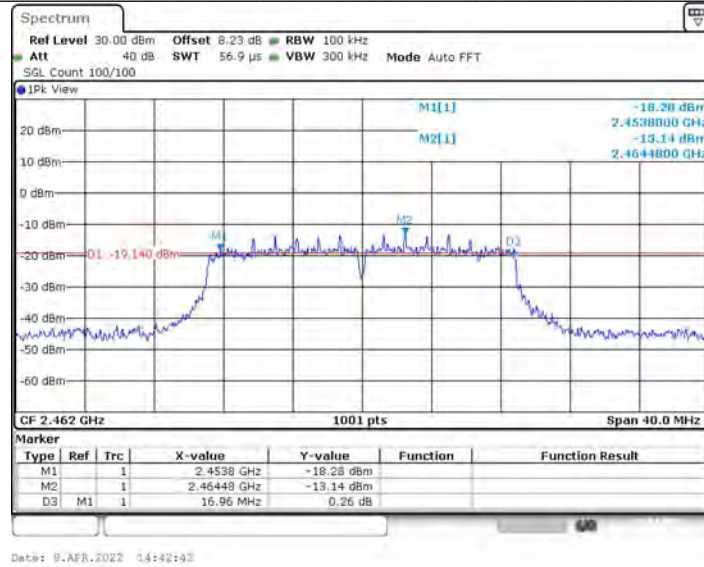
### 99% Bandwidth



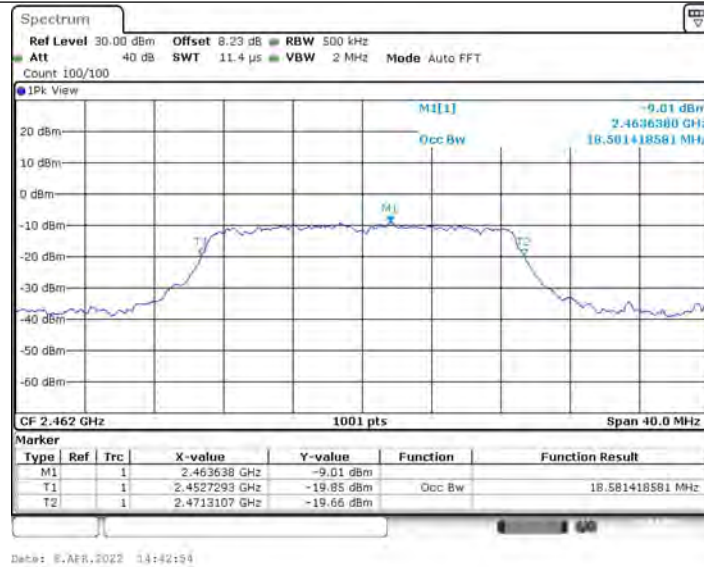


## 802.11n(HT20)\_2462 MHz

### 6dB Bandwidth



### 99% Bandwidth





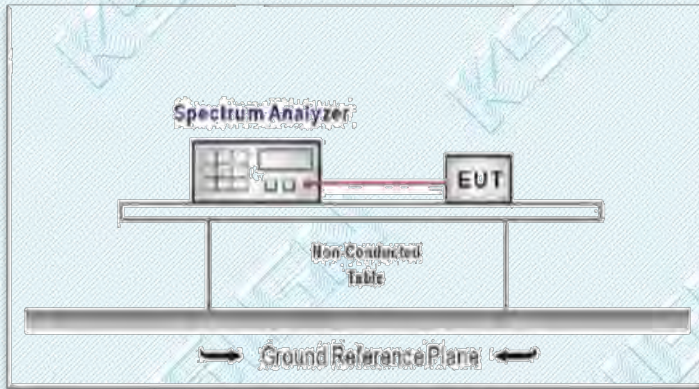
### 3.5. Band edge and Spurious Emission (Conducted)

#### Limit

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### Test Configuration



#### Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:  
 RBW=100KHz  
 VBW=300KHz.  
 Detector function: Peak.  
 Trace: Max hold.  
 Sweep = Auto couple.

Allow the trace to stabilize.

#### Test Mode

Please refer to the clause 2.2.

#### Test Results

TRF No. FCC 15.247\_R1

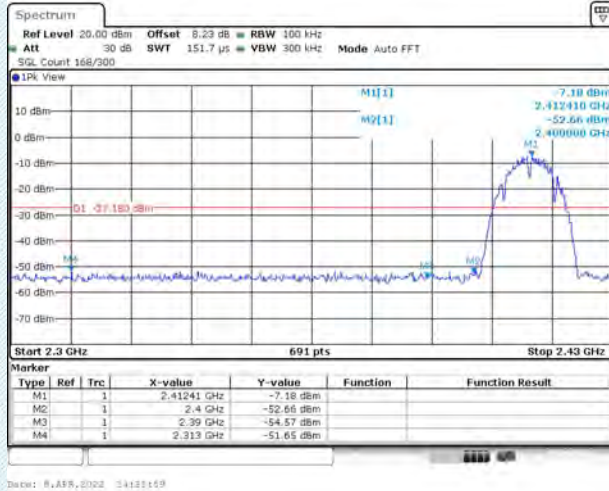
Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

Tel : +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail : info@gdksign.cn Web: www.gdksign.com

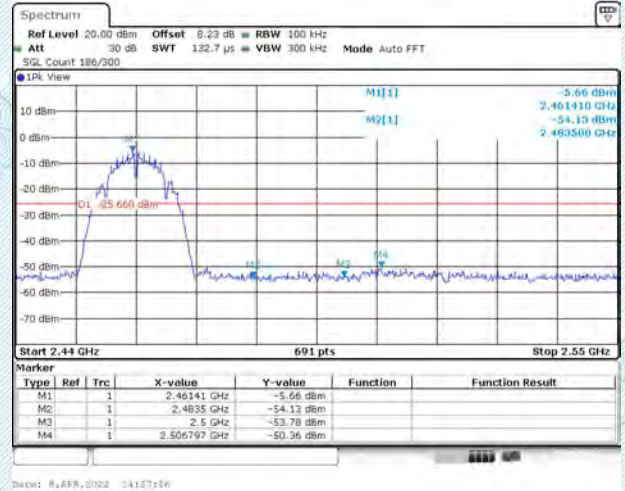


## 802.11b

## CH01-Bandedge

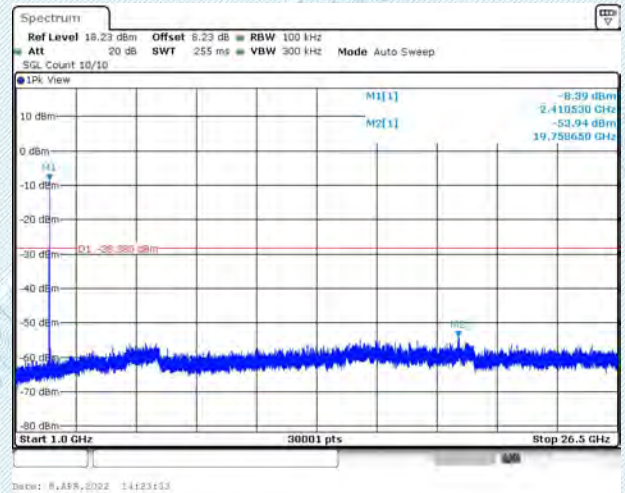
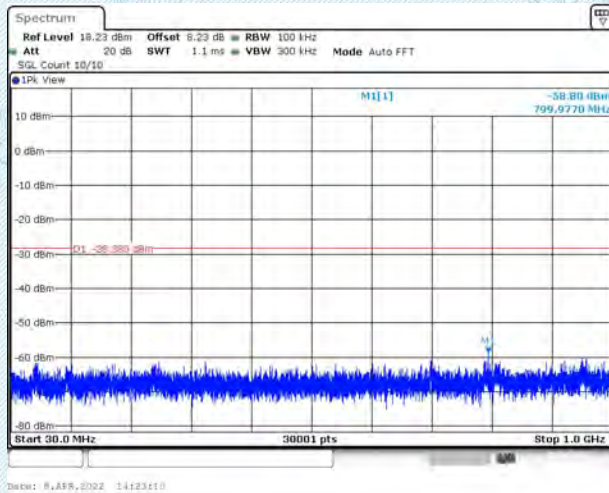


## CH11-Bandedge

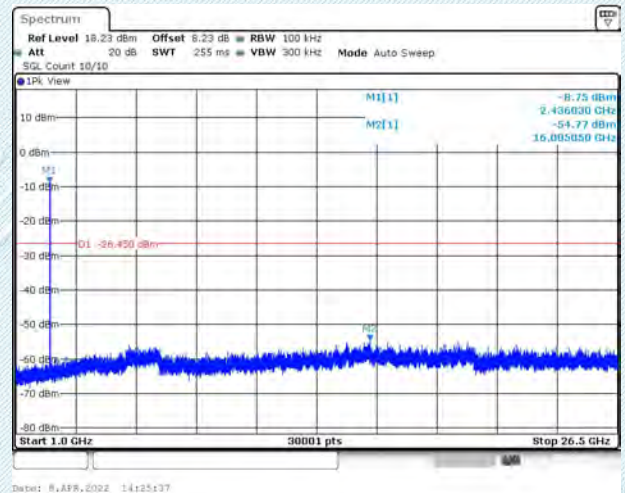
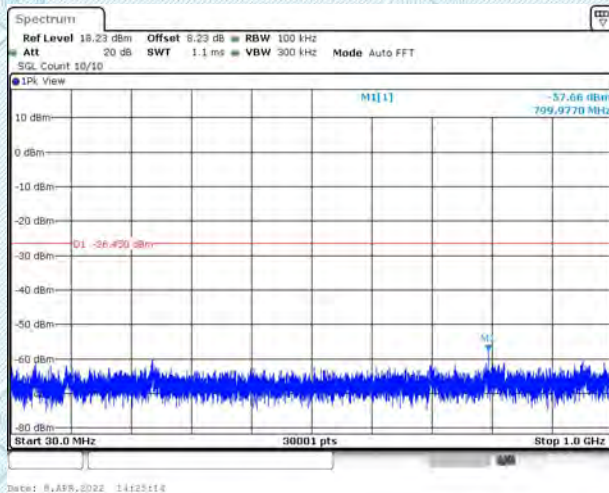


## 802.11b

## CH01-SE



## CH06-SE



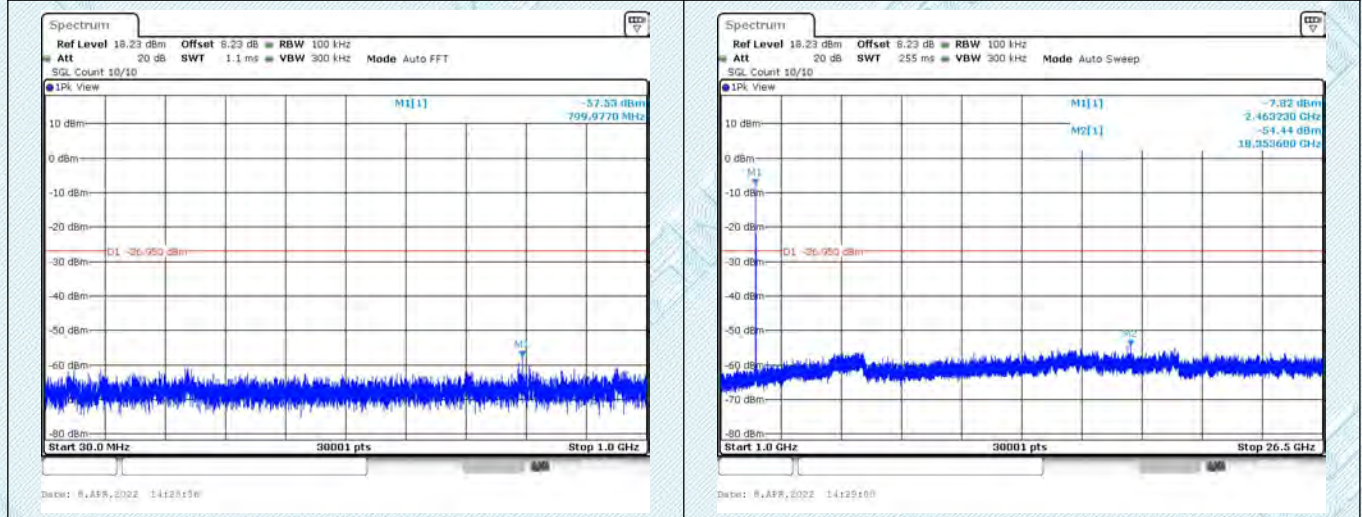
TRF No. FCC 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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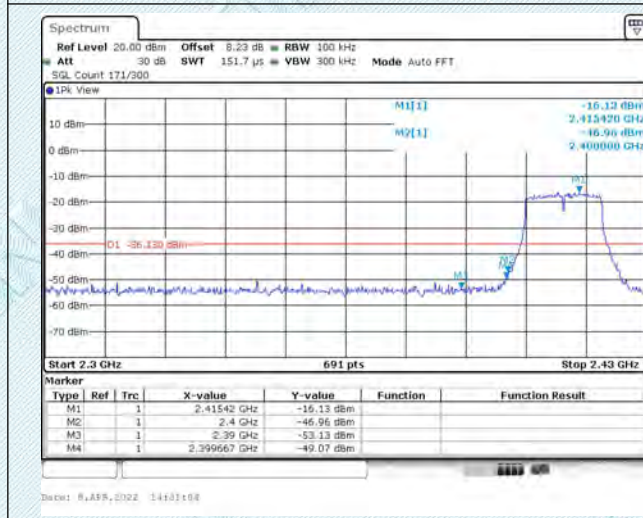


## CH11-SE

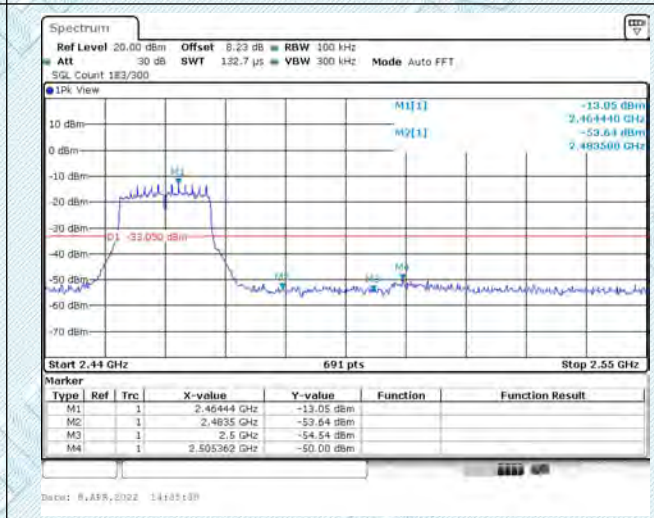


## 802.11g

## CH01-Bandedge

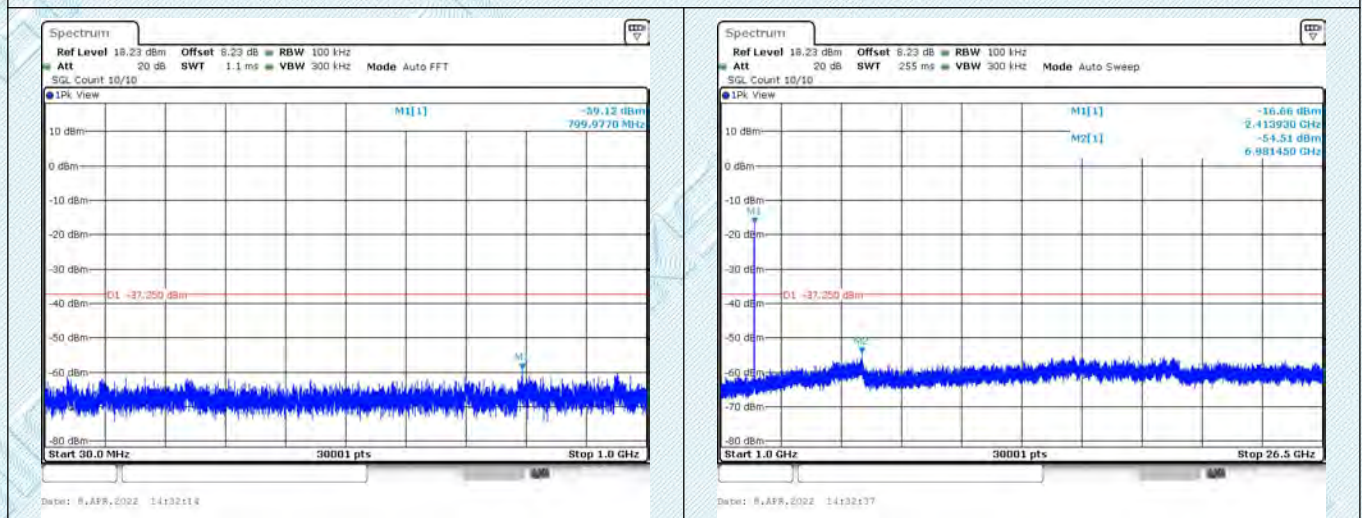


## CH11-Bandedge



## 802.11g

## CH01-SE



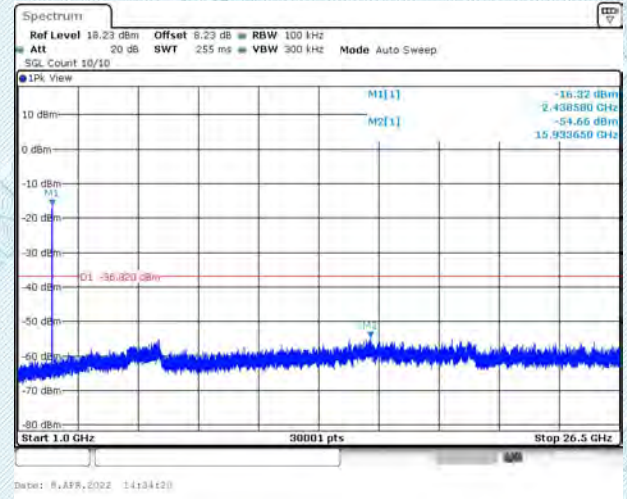
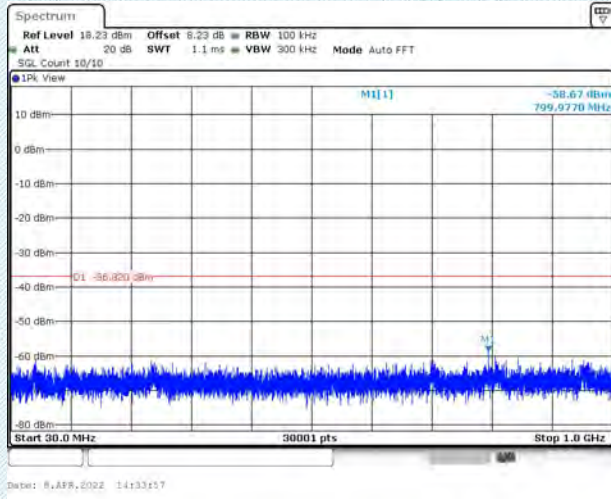
TRF No. FCC 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

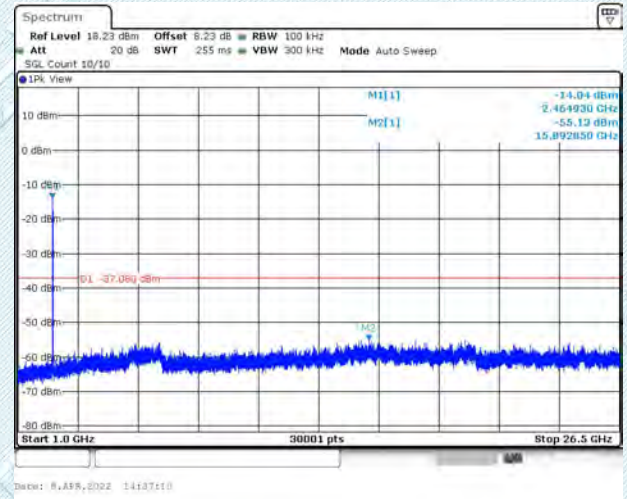
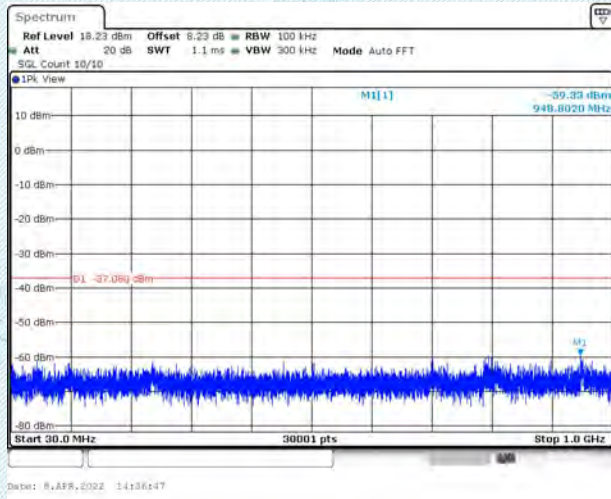
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### CH06-SE



### CH11-SE

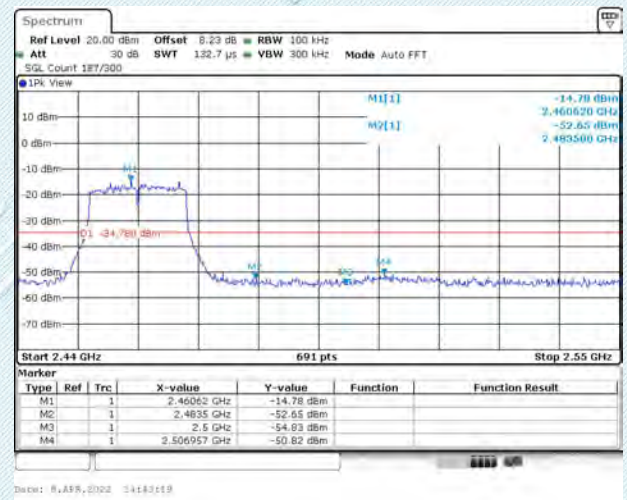


### 802.11n(HT20)

#### CH01-Bandedge



#### CH11-Bandedge



TRF No. FCC 15.247\_R1

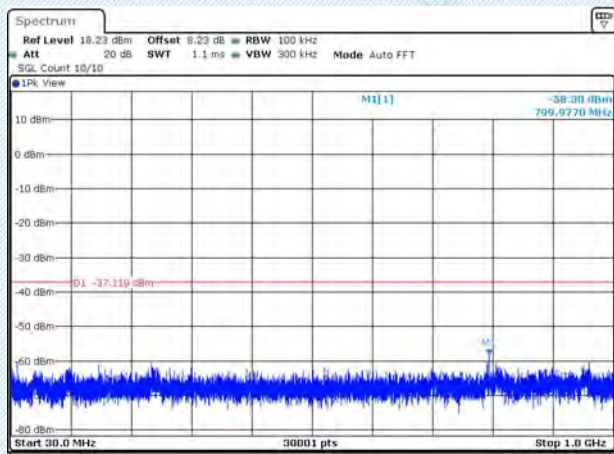
Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

Tel : +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail : info@gdksign.cn Web: www.gdksign.com

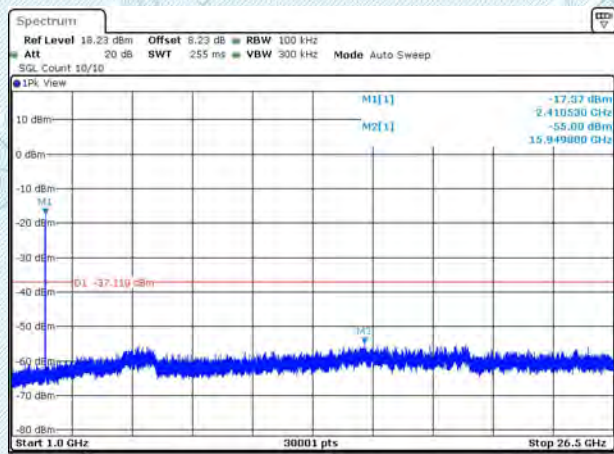


## 802.11n(HT20)

## CH01-SE

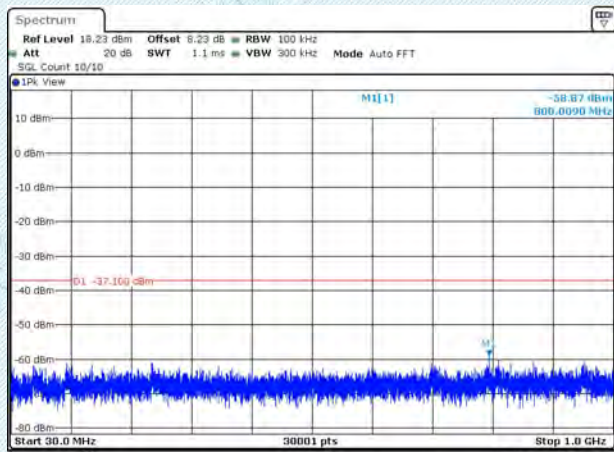


Date: 8/18/2022 14:39:13

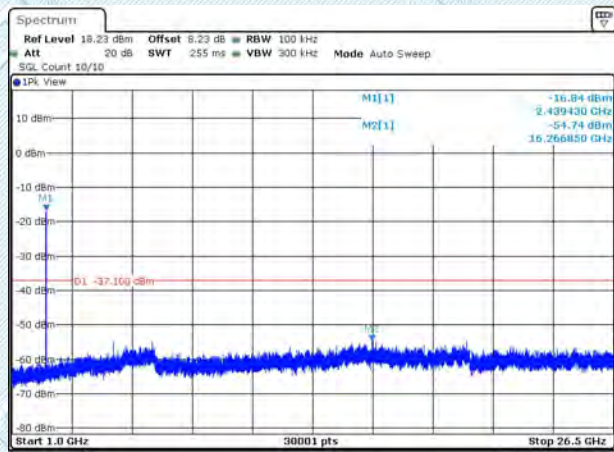


Date: 8/18/2022 14:40:18

## CH06-SE

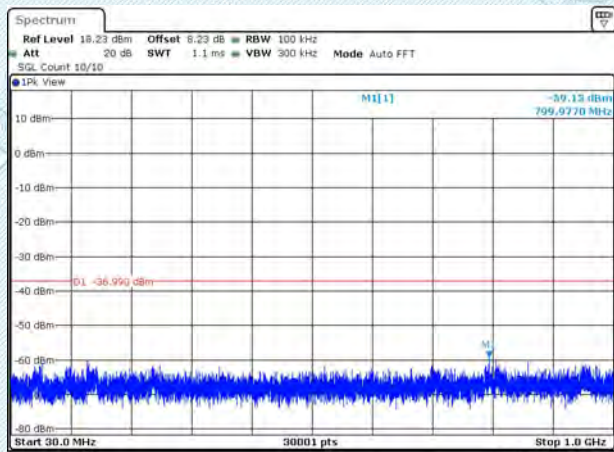


Date: 8/18/2022 14:41:08

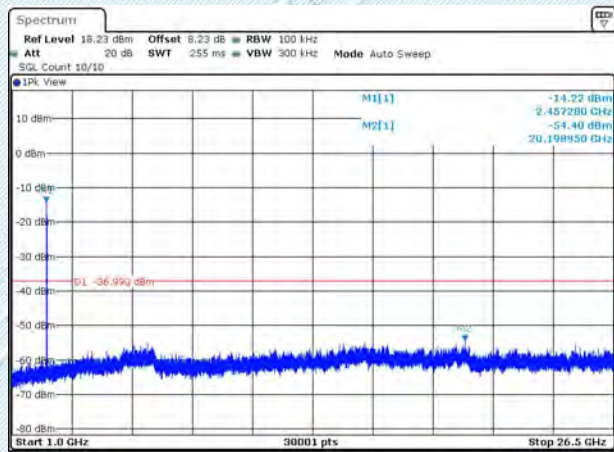


Date: 8/18/2022 14:42:01

## CH11-SE



Date: 8/18/2022 14:44:29



Date: 8/18/2022 14:44:52

TRF No. FCC 15.247\_R1

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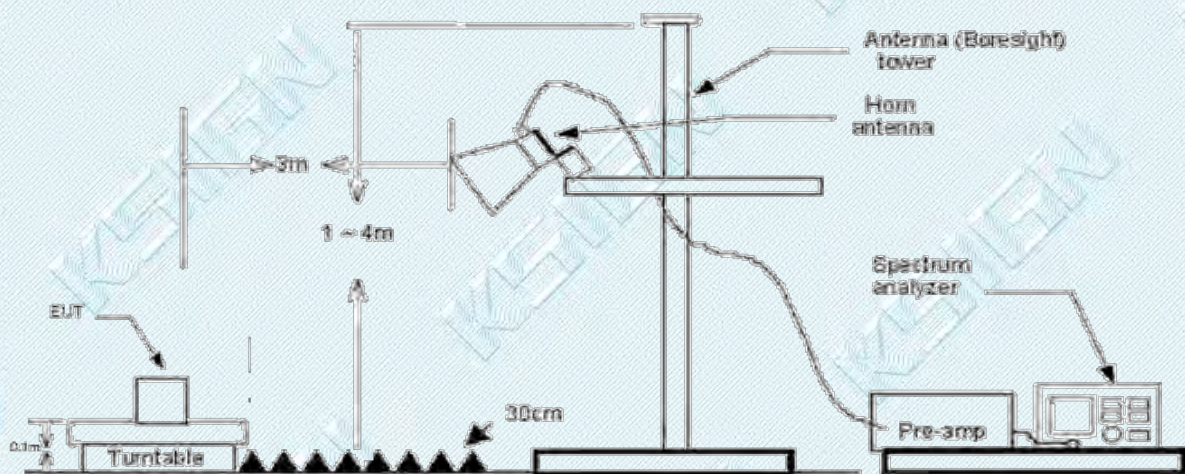
### 3.6. Band Edge Emissions(Radiated)

#### Limit

Restricted Frequency Band (MHz)	(dBuV/m)(at 3m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

**Note: All restriction bands have been tested, only the worst case is reported.**

#### Test Configuration



#### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
RBW=1MHz, VBW=3MHz PEAK detector for Peak value.  
RBW=1MHz, VBW=10Hz with PEAK detector for Average Value.

#### Test Mode

Please refer to the clause 2.2.

#### Test Results

Note:

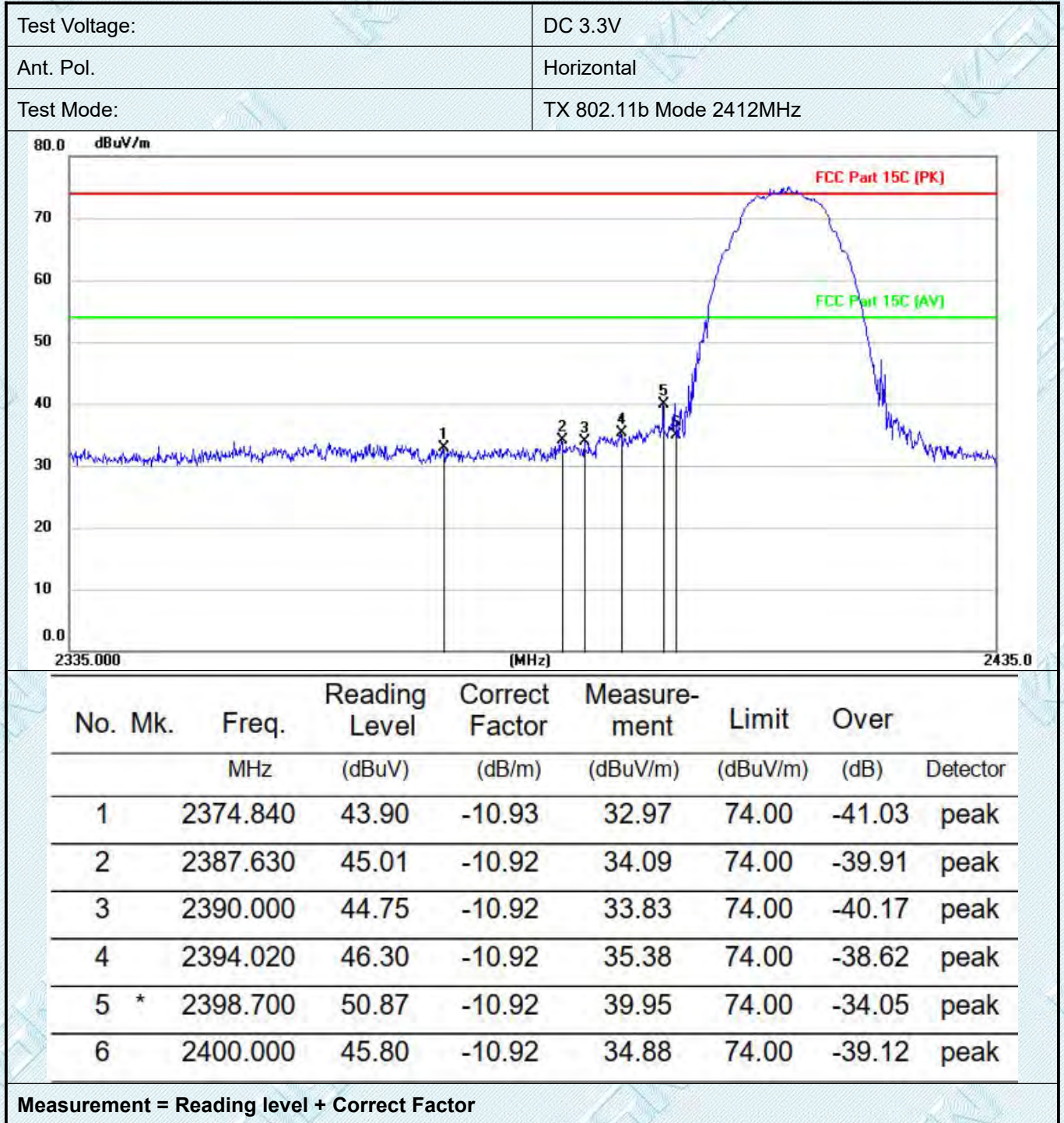
1. Measurement = Reading level + Correct Factor  
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
2. Pre-scan 802.11b, 802.11g and 802.11n(HT20) mode, and found the 802.11n20 mode which it is worse case, so only show the test data for worse case.

TRF No. FCC 15.247\_R1

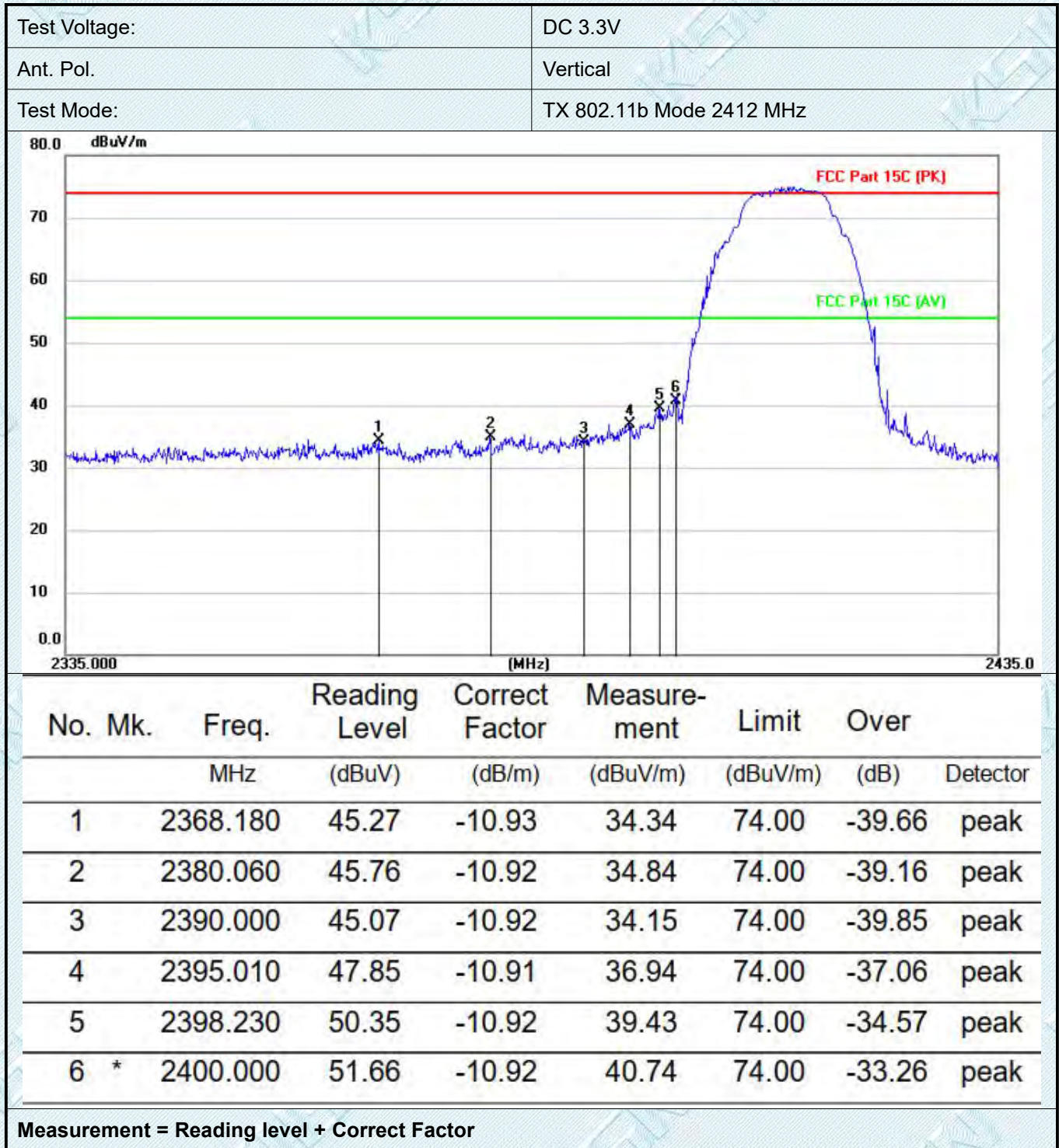
Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

Tel : +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail : info@gdksign.cn Web: www.gdksign.com



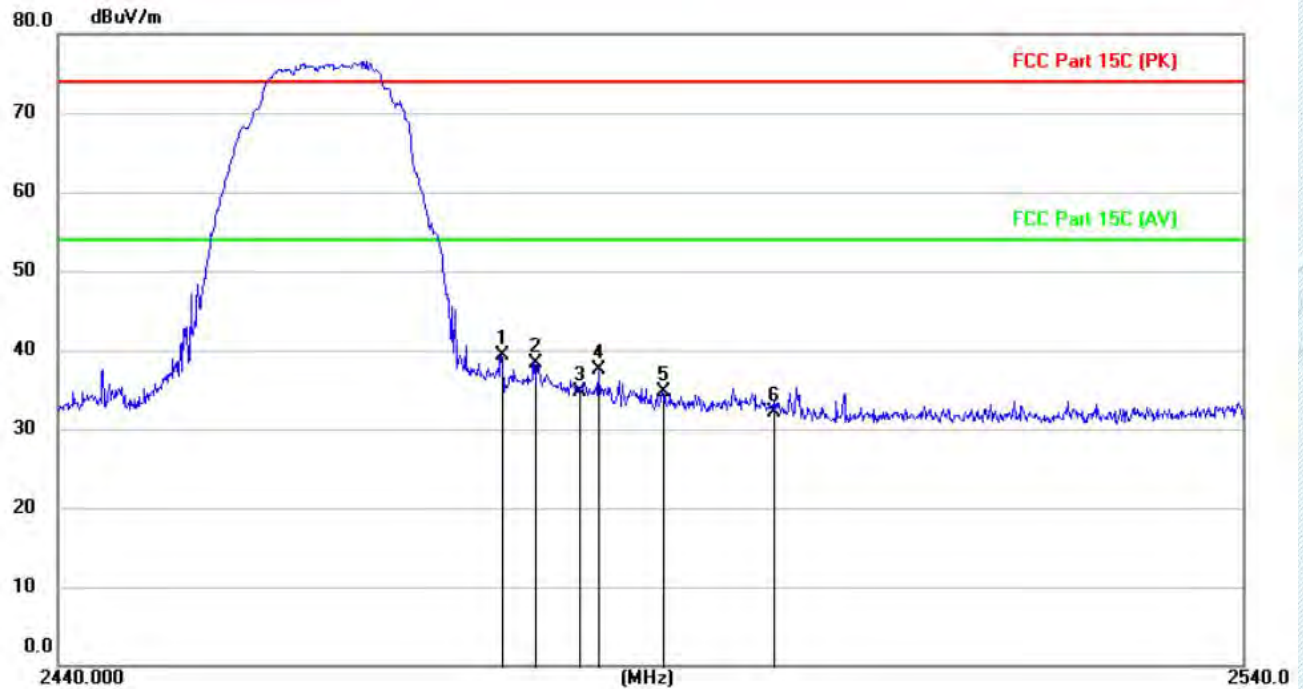








Test Voltage:	DC 3.3V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2462MHz

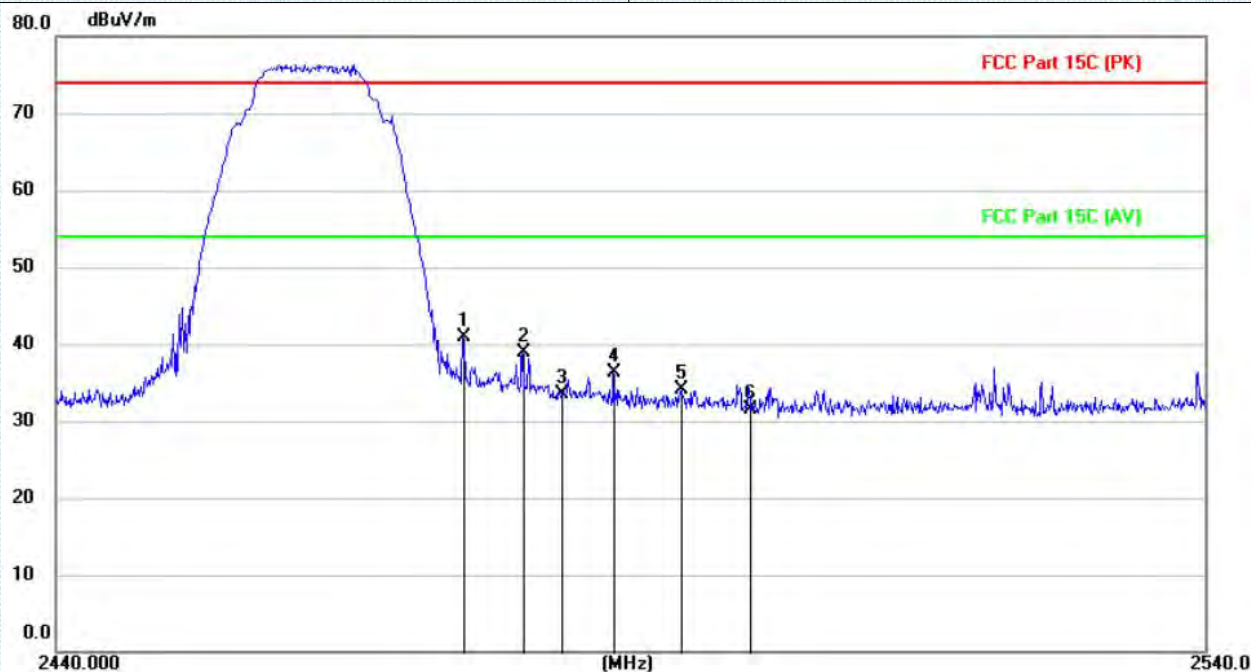


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2476.970	50.23	-10.89	39.34	74.00	-34.66	peak
2		2479.750	49.28	-10.89	38.39	74.00	-35.61	peak
3		2483.500	45.68	-10.88	34.80	74.00	-39.20	peak
4		2485.200	48.29	-10.88	37.41	74.00	-36.59	peak
5		2490.540	45.67	-10.89	34.78	74.00	-39.22	peak
6		2500.000	43.05	-10.88	32.17	74.00	-41.83	peak

Measurement = Reading level + Correct Factor



Test Voltage:	DC 3.3V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2475.020	51.89	-10.89	41.00	74.00	-33.00	peak
2		2480.160	49.78	-10.89	38.89	74.00	-35.11	peak
3		2483.500	44.41	-10.88	33.53	74.00	-40.47	peak
4		2488.020	47.19	-10.88	36.31	74.00	-37.69	peak
5		2493.960	45.05	-10.89	34.16	74.00	-39.84	peak
6		2500.000	42.37	-10.88	31.49	74.00	-42.51	peak

Measurement = Reading level + Correct Factor

TRF No. FCC 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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### 3.7. Spurious Emission (Radiated)

#### Limit

**Radiated Emission Limits (9 kHz~1000 MHz)**

Frequency (MHz)	Field Strength (microvolt/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

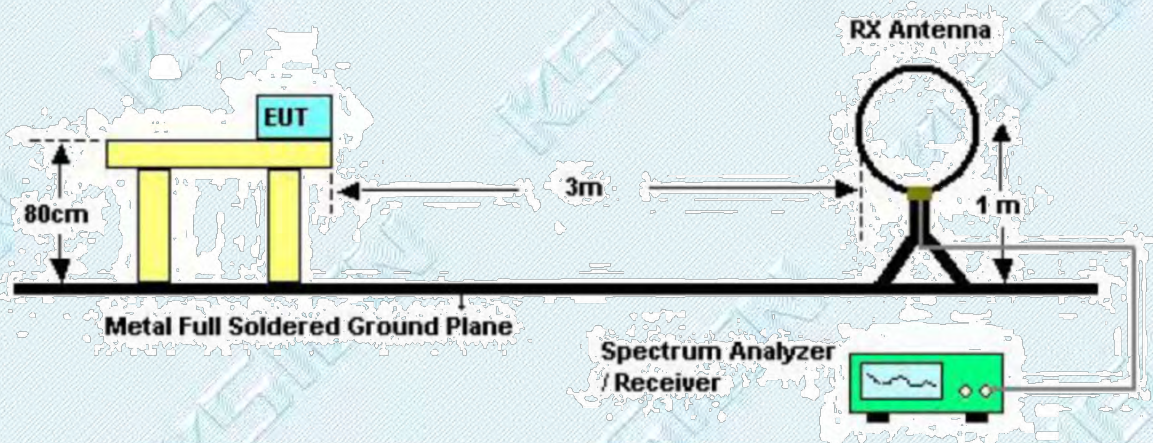
**Radiated Emission Limit (Above 1000MHz)**

Frequency (MHz)	Distance Meters(at 3m)	
	Peak	Average
Above 1000	74	54

#### Note:

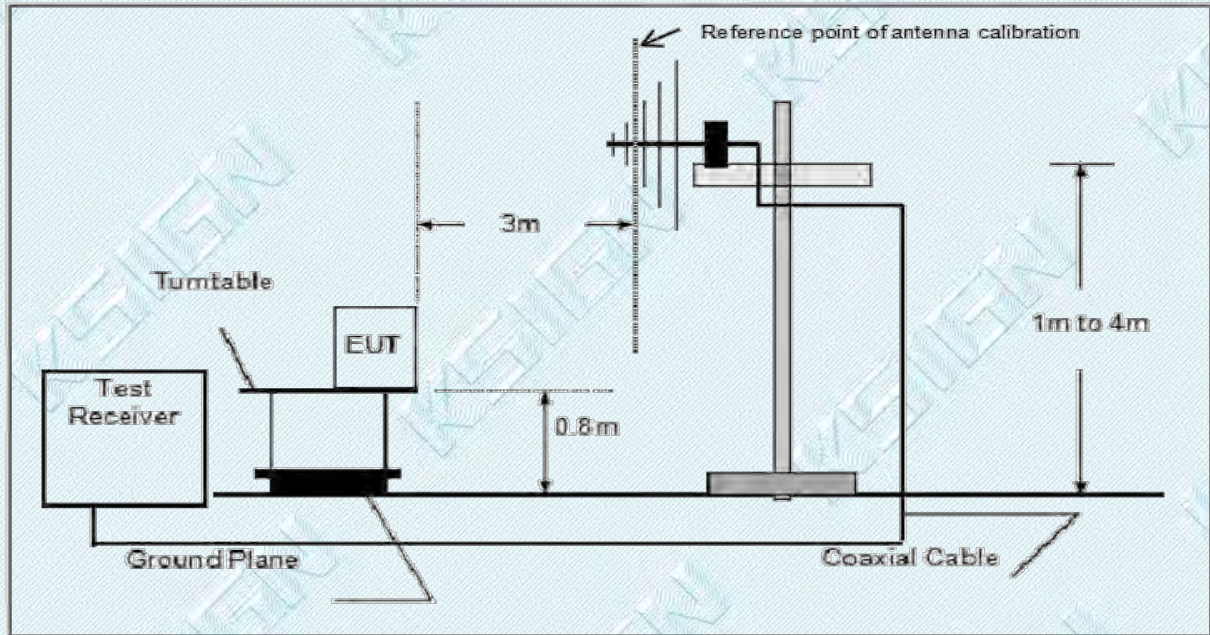
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

#### Test Configuration

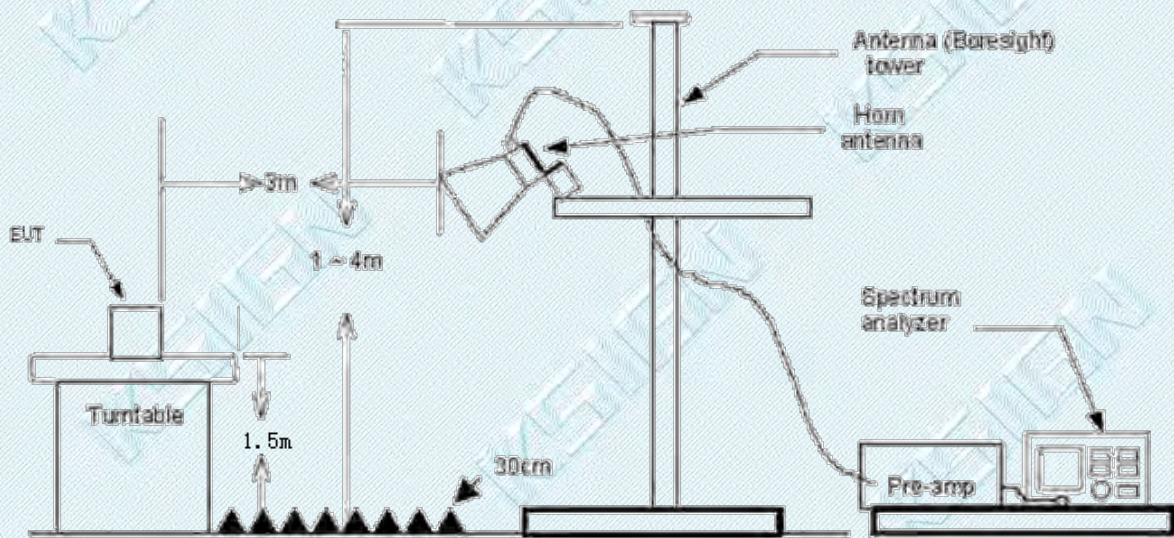


Below 30MHz Test Setup





Below 1000MHz Test Setup



Above 1GHz Test Setup



### **Test Procedure**

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz:  
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
  - (3) From 1 GHz to 10<sup>th</sup> harmonic:  
RBW=1MHz, VBW=1MHz Peak detector for Peak value.  
RBW=1MHz, VBW=10Hz Peak detector for Average value.

### **Test Mode**

Please refer to the clause 2.2

### **Test Result**

#### **9 KHz~30 MHz and 18GHz~25GHz**

From 9 KHz~30 MHz and 18GHz~25GHz: Conclusion: PASS

Note:

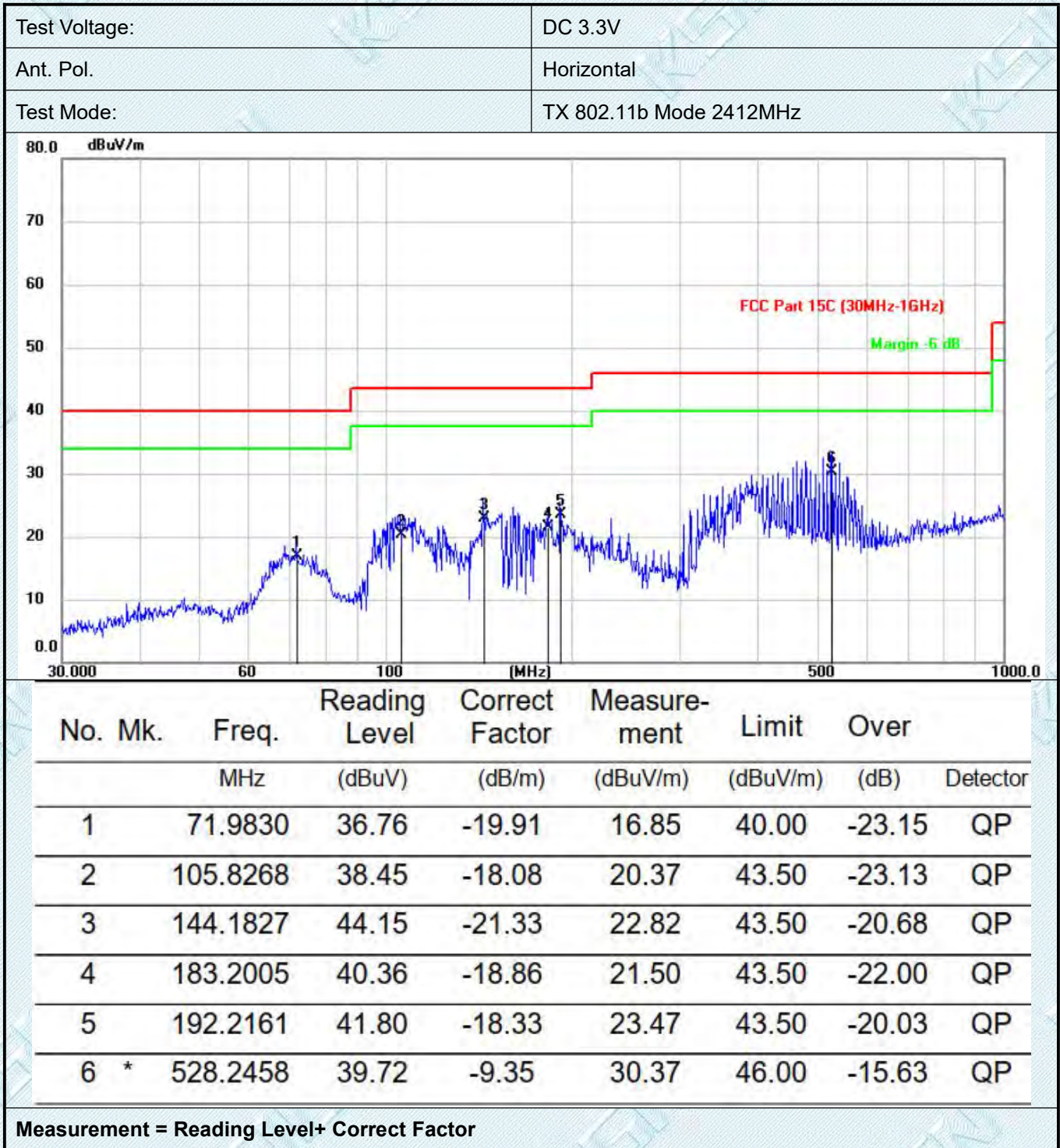
- 1) Measurement = Reading level + Correct Factor  
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- 2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5) Pre-scan 802.11b/g/n(HT20) modulation, found 802.11n20\_2412MHz which it is worse case for 30MHz-1GHz, the 802.11n20 modulation which it is worse case for above 1GHz, so only show the test data for worse case.

### **BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.



### 30MHz-1GHz



TRF No. FCC 15.247\_R1

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Test Voltage:	DC 3.3V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		39.9941	42.37	-17.11	25.26	40.00	-14.74	QP
2		75.8442	46.50	-20.41	26.09	40.00	-13.91	QP
3		96.1320	43.95	-18.27	25.68	43.50	-17.82	QP
4	*	144.1827	54.01	-21.33	32.68	43.50	-10.82	QP
5		192.1484	49.11	-18.33	30.78	43.50	-12.72	QP
6		384.2010	34.48	-11.43	23.05	46.00	-22.95	QP

Measurement = Reading Level+ Correct Factor

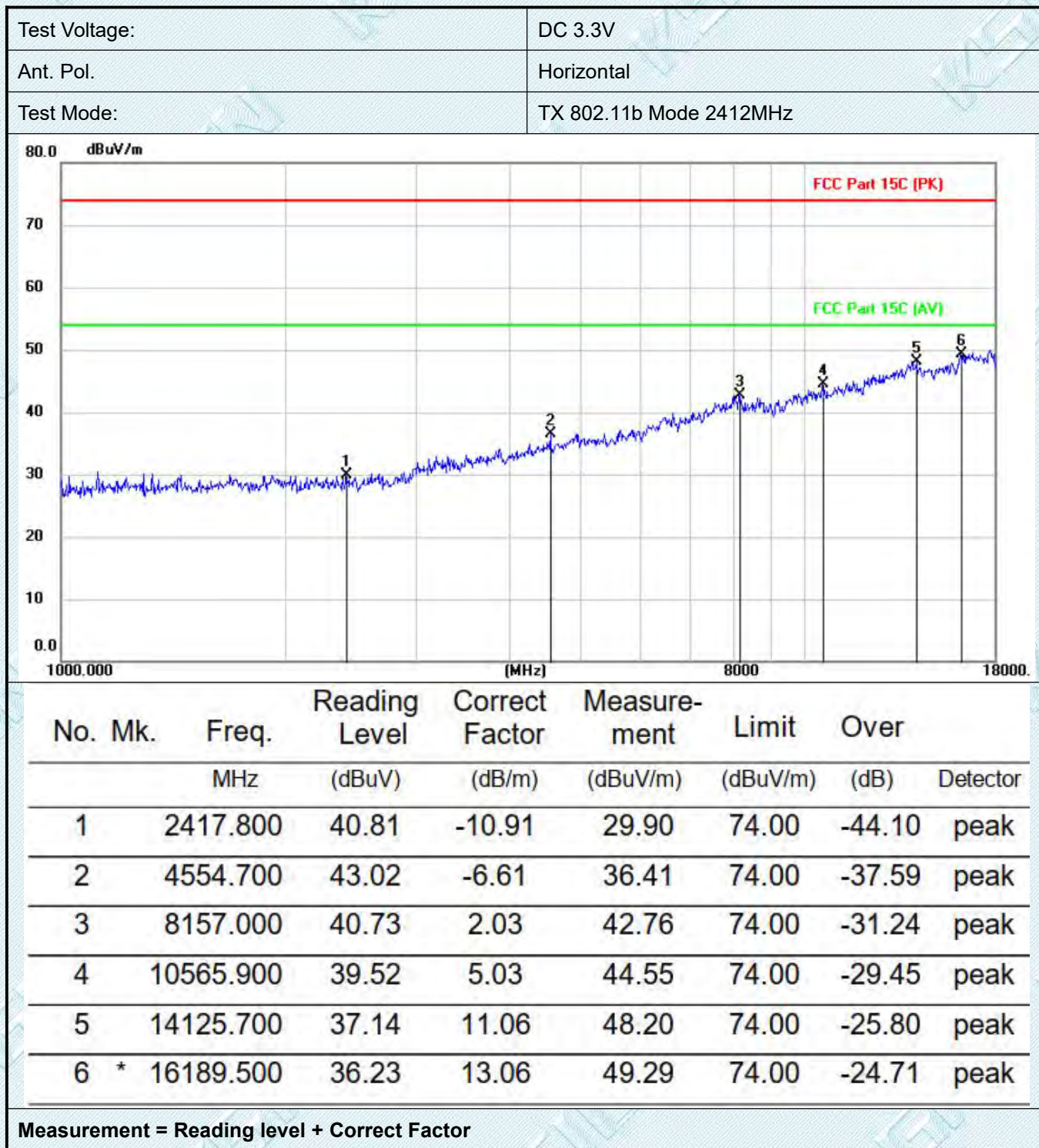
TRF No. FCC 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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Adobe 1GHz



TRF No. FCC 15.247\_R1

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Test Voltage:	DC 3.3V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2412.700	42.51	-10.92	31.59	74.00	-42.41	peak
2		4666.900	43.67	-6.30	37.37	74.00	-36.63	peak
3		5989.500	45.86	-3.82	42.04	74.00	-31.96	peak
4		8056.700	40.87	2.05	42.92	74.00	-31.08	peak
5		13928.500	37.47	11.14	48.61	74.00	-25.39	peak
6	*	17241.800	37.52	13.21	50.73	74.00	-23.27	peak

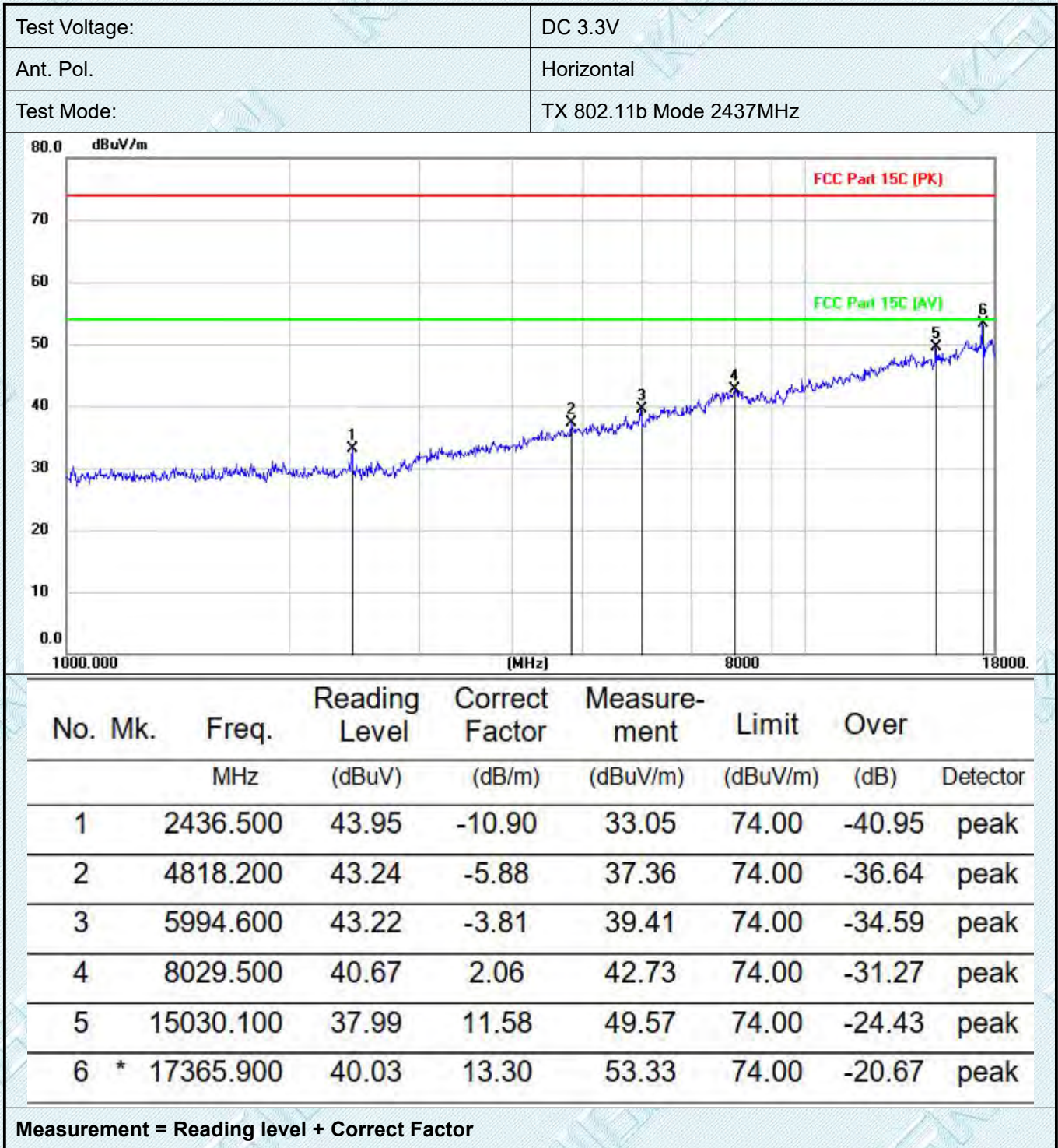
Measurement = Reading level + Correct Factor

TRF No. FCC 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

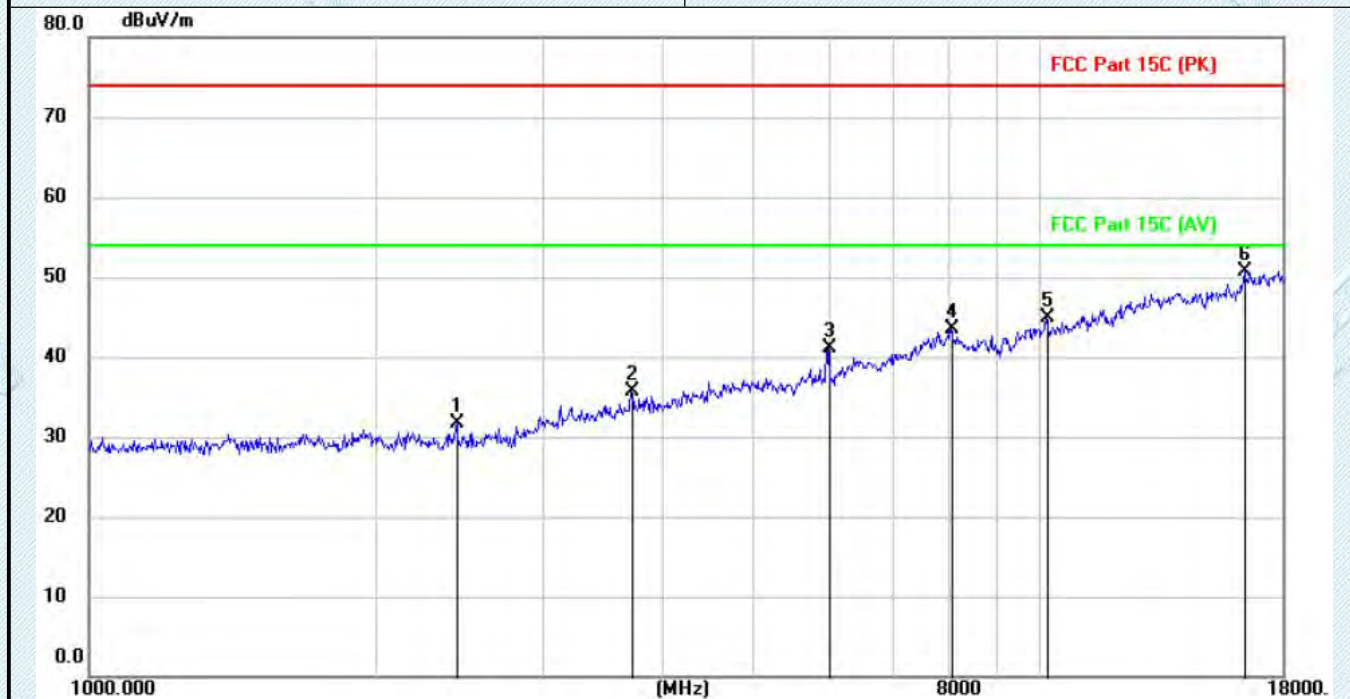
Tel : +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail : info@gdksign.cn Web: www.gdksign.com







Test Voltage:	DC 3.3V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2437MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2436.500	42.68	-10.90	31.78	74.00	-42.22	peak
2		3721.700	44.81	-9.12	35.69	74.00	-38.31	peak
3		5996.300	44.92	-3.81	41.11	74.00	-32.89	peak
4		8061.800	41.39	2.06	43.45	74.00	-30.55	peak
5		10173.200	40.59	4.36	44.95	74.00	-29.05	peak
6	*	16446.200	37.07	13.68	50.75	74.00	-23.25	peak

Measurement = Reading level + Correct Factor

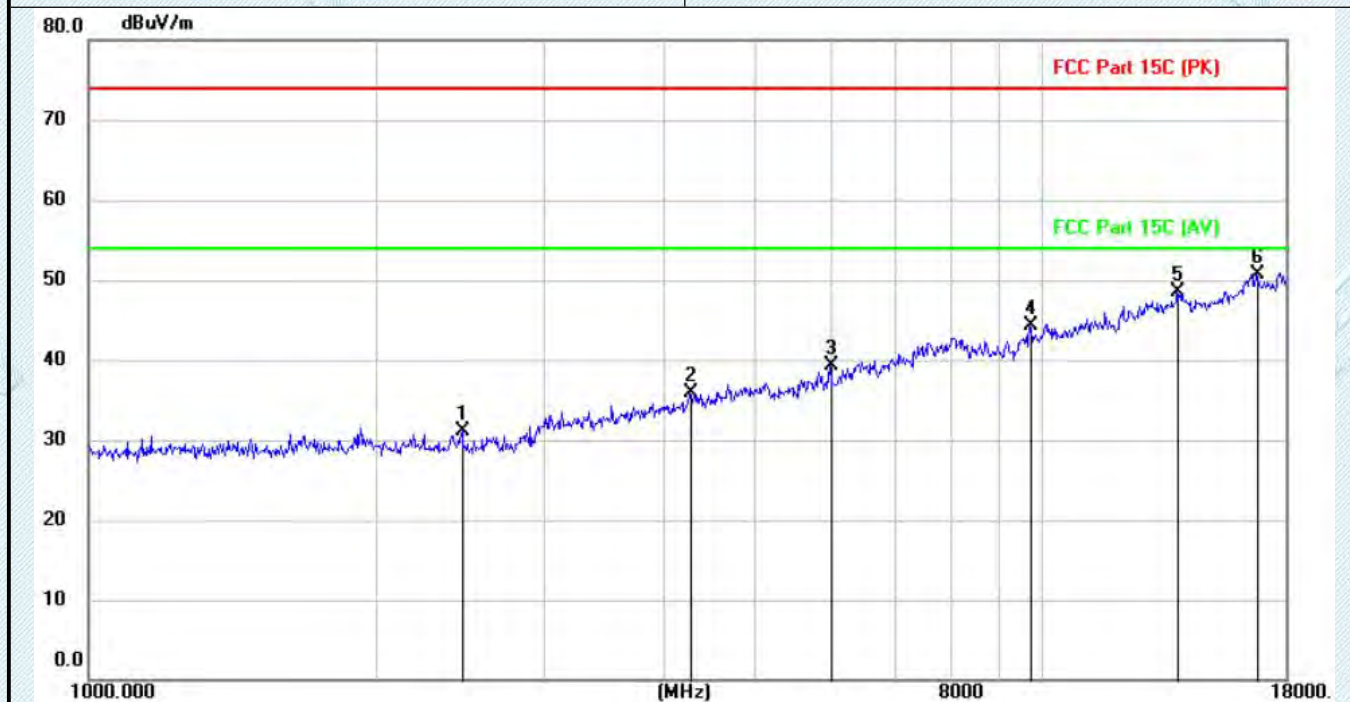
TRF No. FCC 15.247\_R1

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Test Voltage:	DC 3.3V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2465.400	41.92	-10.89	31.03	74.00	-42.97	peak
2		4275.900	43.36	-7.51	35.85	74.00	-38.15	peak
3		5992.900	43.03	-3.81	39.22	74.00	-34.78	peak
4		9712.500	40.89	3.44	44.33	74.00	-29.67	peak
5		13867.300	37.38	11.06	48.44	74.00	-25.56	peak
6	*	16784.500	37.36	13.37	50.73	74.00	-23.27	peak

Measurement = Reading level + Correct Factor

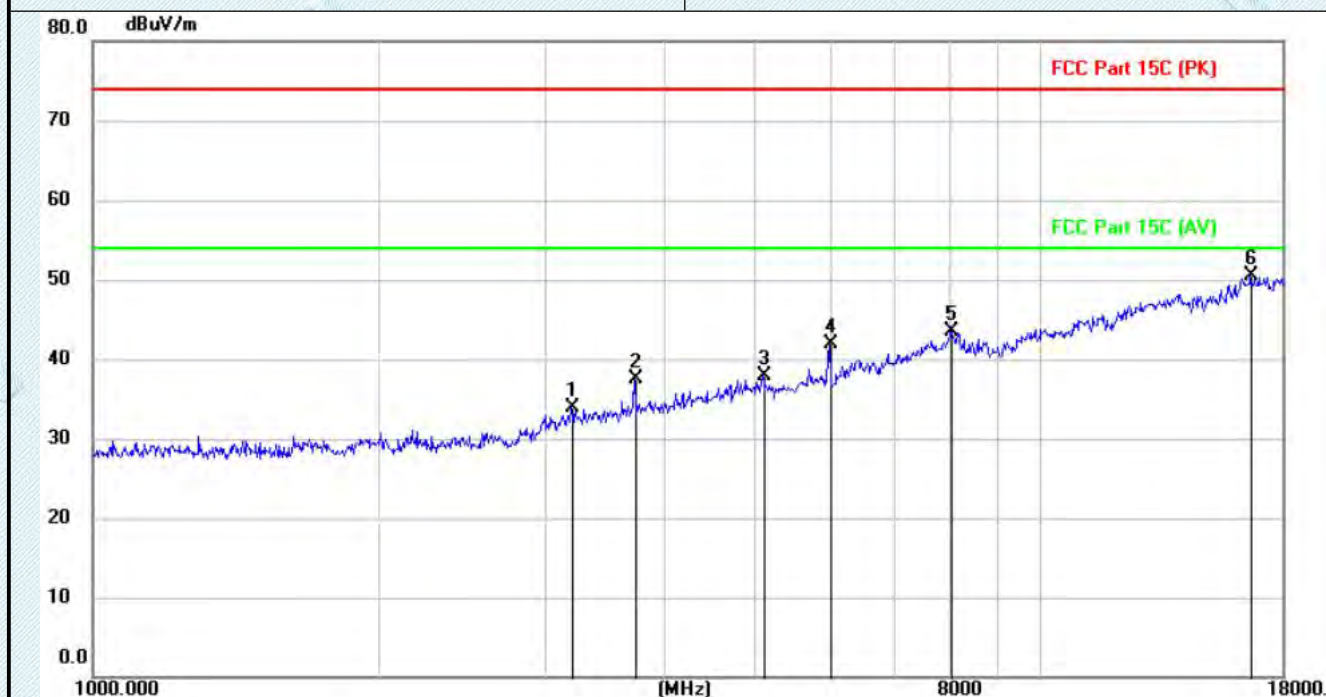
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Test Voltage:	DC 3.3V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3196.400	44.19	-10.23	33.96	74.00	-40.04	peak
2		3731.900	46.57	-9.09	37.48	74.00	-36.52	peak
3		5091.900	43.23	-5.30	37.93	74.00	-36.07	peak
4		5989.500	45.80	-3.82	41.98	74.00	-32.02	peak
5		8048.200	41.45	2.06	43.51	74.00	-30.49	peak
6	*	16674.000	37.04	13.54	50.58	74.00	-23.42	peak

Measurement = Reading level + Correct Factor

Note:

1. All test modes had been tested. The 802.11b modulation is the worst case and recorded in the report.
2. 18GHz-26.5GHz is the background of the site, there is no radiated spurious.

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### 3.8. Conducted Emission

#### Limit

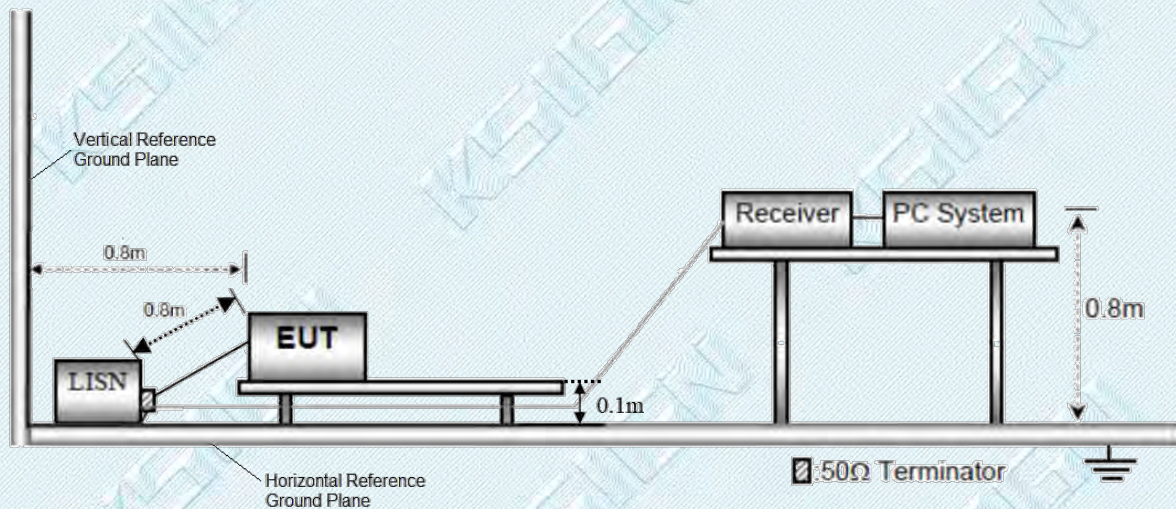
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### Test Configuration



#### Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 0.1m above the conducting ground plane. The vertical conducting plane was located 80 cm to the rear of the EUT. All other surfaces of EUT were at least 0.8m from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment.  
The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

#### Test Mode:

Please refer to the clause 2.2.

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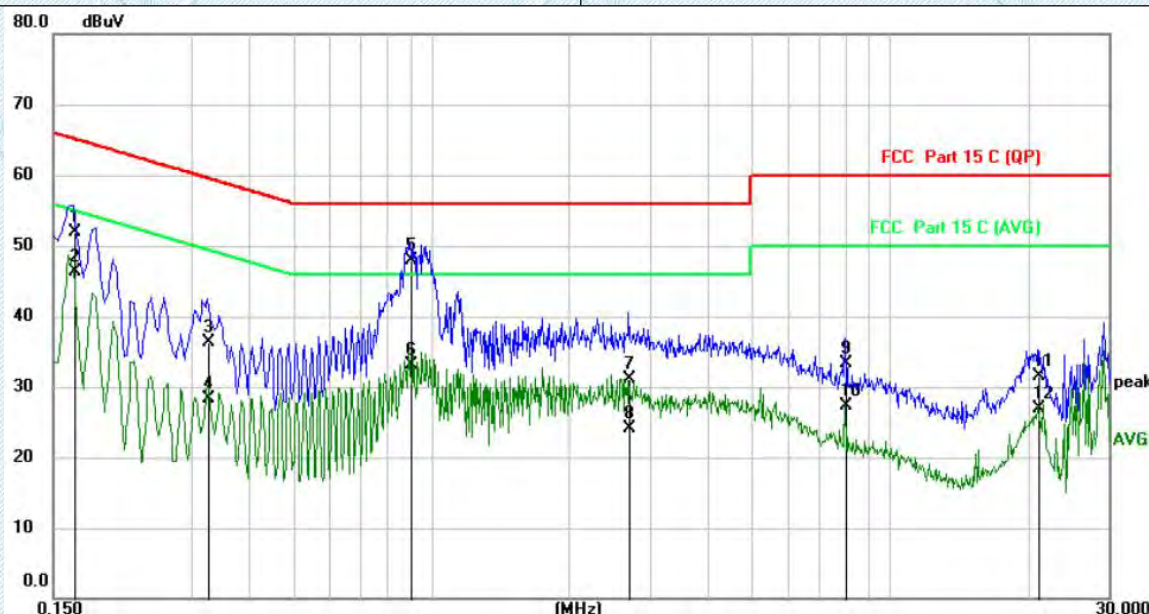
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## Test Results

Pre-scan 802.11b/g/n(HT20) modulation, and found the 802.11b modulation 2412MHz which it is worse case, so only show the test data for worse case.

Test Voltage:	AC 120V/60Hz
Terminal:	Line
Test Mode:	2.4G WIFI



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1660	40.94	10.87	51.81	65.16	-13.35	QP
2		0.1660	35.34	10.87	46.21	55.16	-8.95	AVG
3		0.3260	25.31	10.97	36.28	59.55	-23.27	QP
4		0.3260	17.25	10.97	28.22	49.55	-21.33	AVG
5	*	0.9020	36.87	11.06	47.93	56.00	-8.07	QP
6		0.9020	21.99	11.06	33.05	46.00	-12.95	AVG
7		2.7060	19.91	11.13	31.04	56.00	-24.96	QP
8		2.7060	13.05	11.13	24.18	46.00	-21.82	AVG
9		8.0140	22.19	11.12	33.31	60.00	-26.69	QP
10		8.0140	16.27	11.12	27.39	50.00	-22.61	AVG
11		21.0500	19.99	11.50	31.49	60.00	-28.51	QP
12		21.0500	15.31	11.50	26.81	50.00	-23.19	AVG

Remarks:  
1.Measurement = Reading Level+ Correct Factor  
2.Over = Measurement -Limit

Remarks:

1.Measurement = Reading Level+ Correct Factor

2.Over = Measurement -Limit

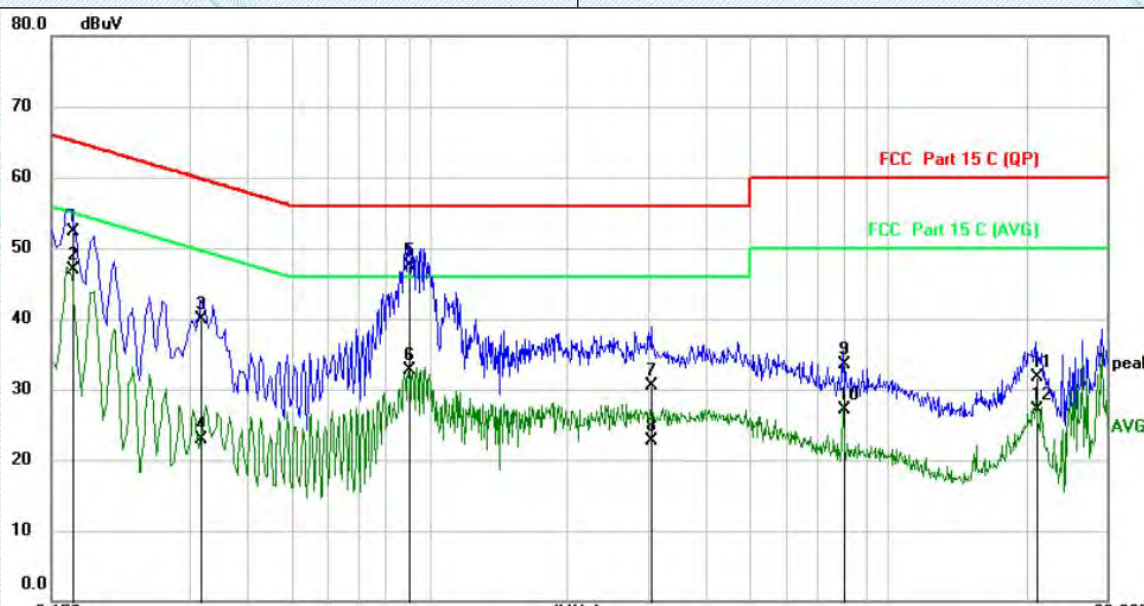
TRF No. FCC 15.247\_R1

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Test Voltage:	AC 120V/60Hz
Terminal:	Neutral
Test Mode:	2.4G WIFI



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	
1		0.1660	41.88	10.48	52.36	65.16	-12.80	QP
2	*	0.1660	36.45	10.48	46.93	55.16	-8.23	AVG
3		0.3180	29.30	10.54	39.84	59.76	-19.92	QP
4		0.3180	12.35	10.54	22.89	49.76	-26.87	AVG
5		0.9020	36.71	10.78	47.49	56.00	-8.51	QP
6		0.9020	21.95	10.78	32.73	46.00	-13.27	AVG
7		3.0420	19.52	10.99	30.51	56.00	-25.49	QP
8		3.0420	11.68	10.99	22.67	46.00	-23.33	AVG
9		8.0140	22.36	11.07	33.43	60.00	-26.57	QP
10		8.0140	15.95	11.07	27.02	50.00	-22.98	AVG
11		21.1140	20.03	11.69	31.72	60.00	-28.28	QP
12		21.1140	15.40	11.69	27.09	50.00	-22.91	AVG

Remarks:  
1.Measurement = Reading Level+ Correct Factor  
2.Over = Measurement -Limit

TRF No. FCC 15.247\_R1

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## 4.EUT TEST PHOTOS

Radiated Measurement (Below 1GHz)



Radiated Measurement (Above 1GHz)





## Conducted Emission



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## 5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

### External Photographs

Photo 1

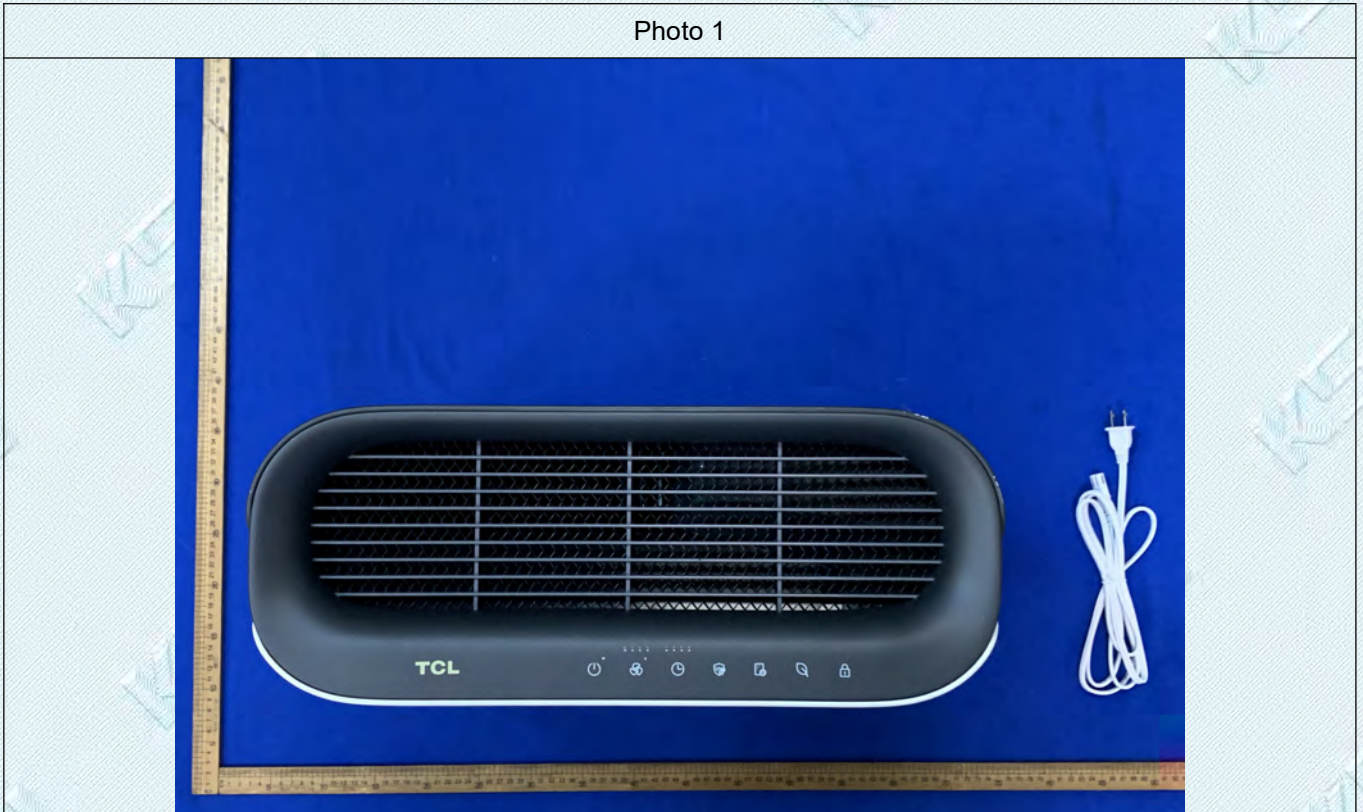


Photo 2





Photo 3

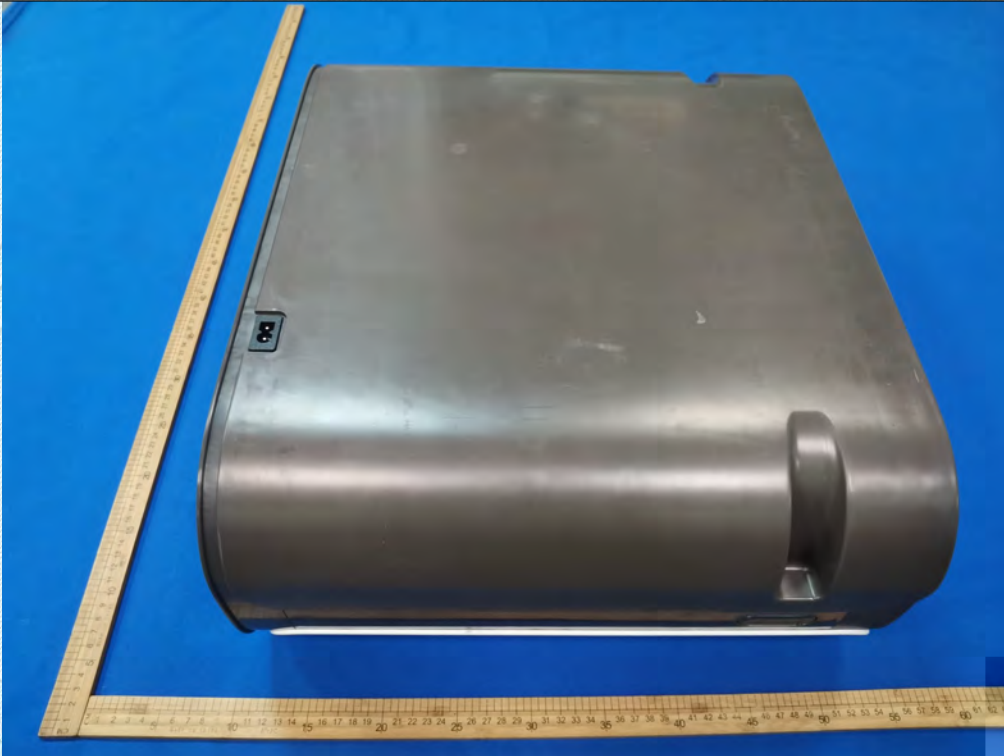


Photo 4

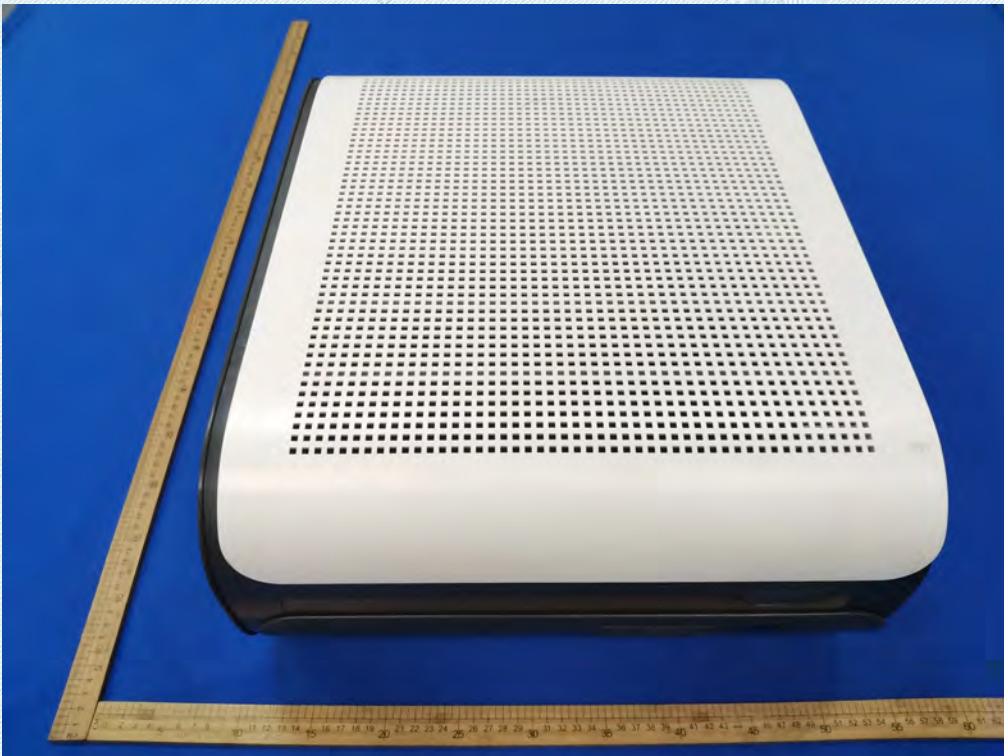




Photo 5



Photo 6

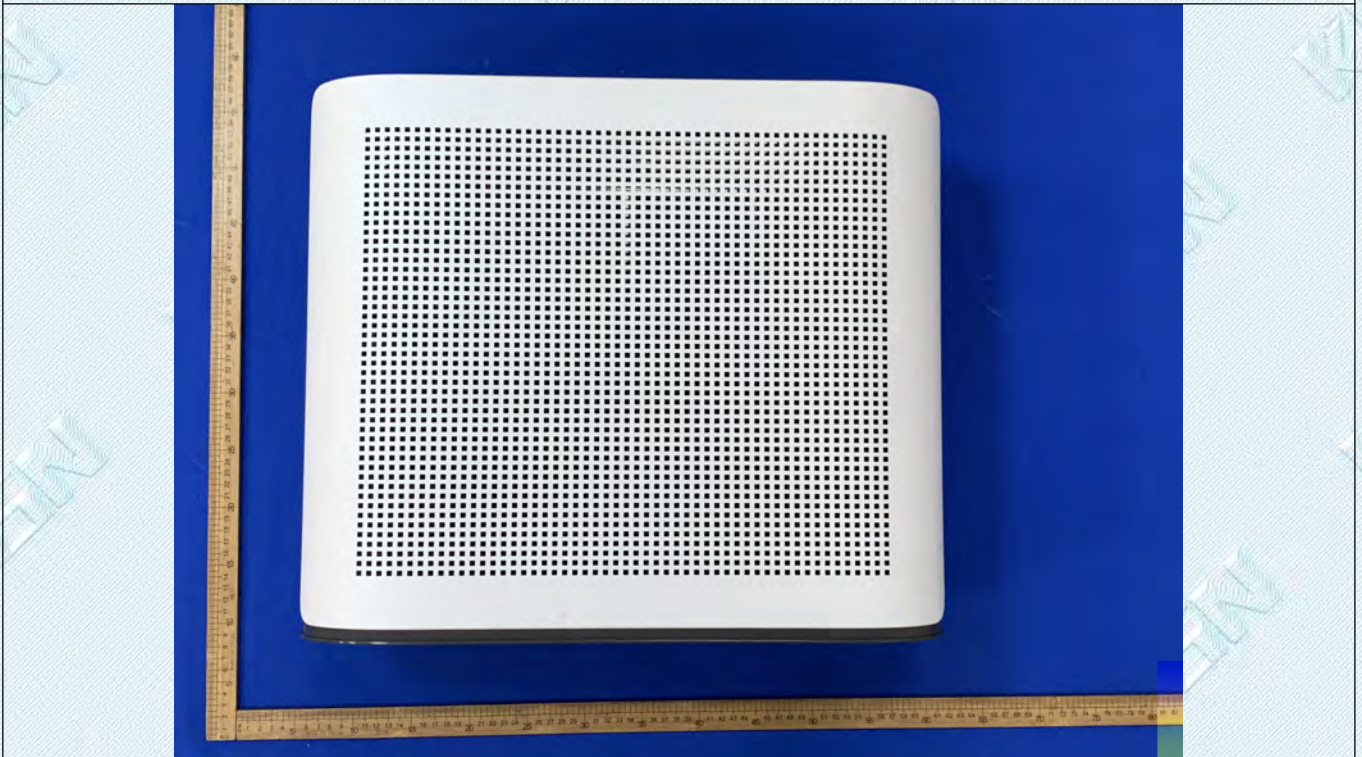




Photo 7



Photo 8





### Internal Photographs

Photo 1

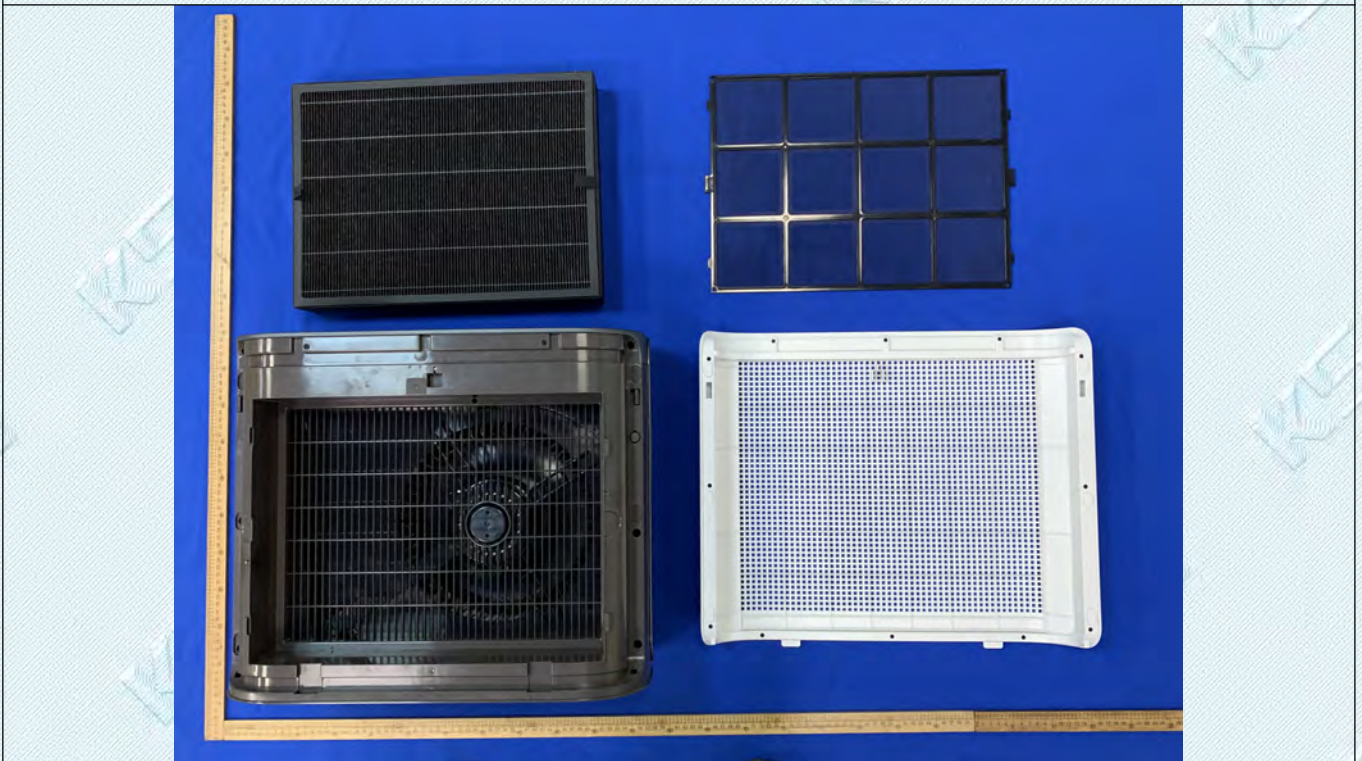
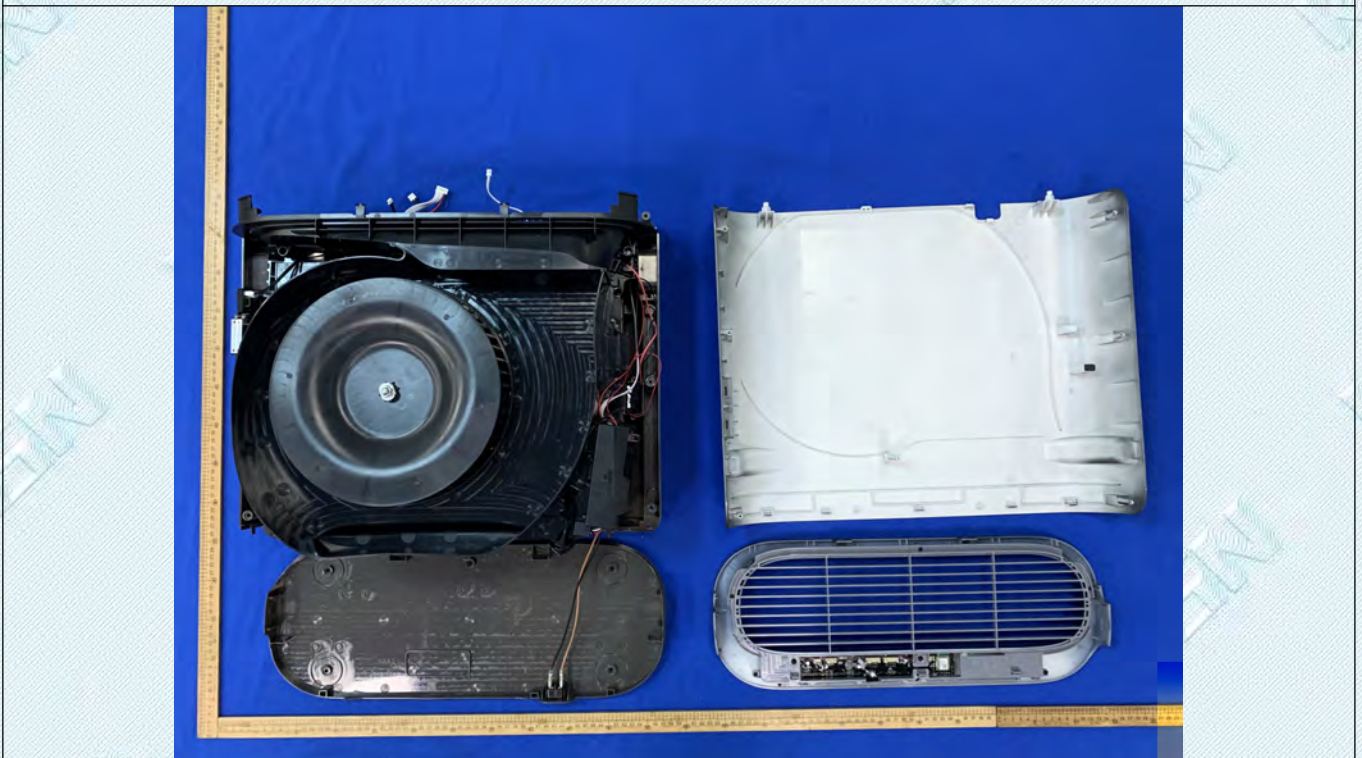


Photo 2



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Photo 3



Photo 4



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Photo 5

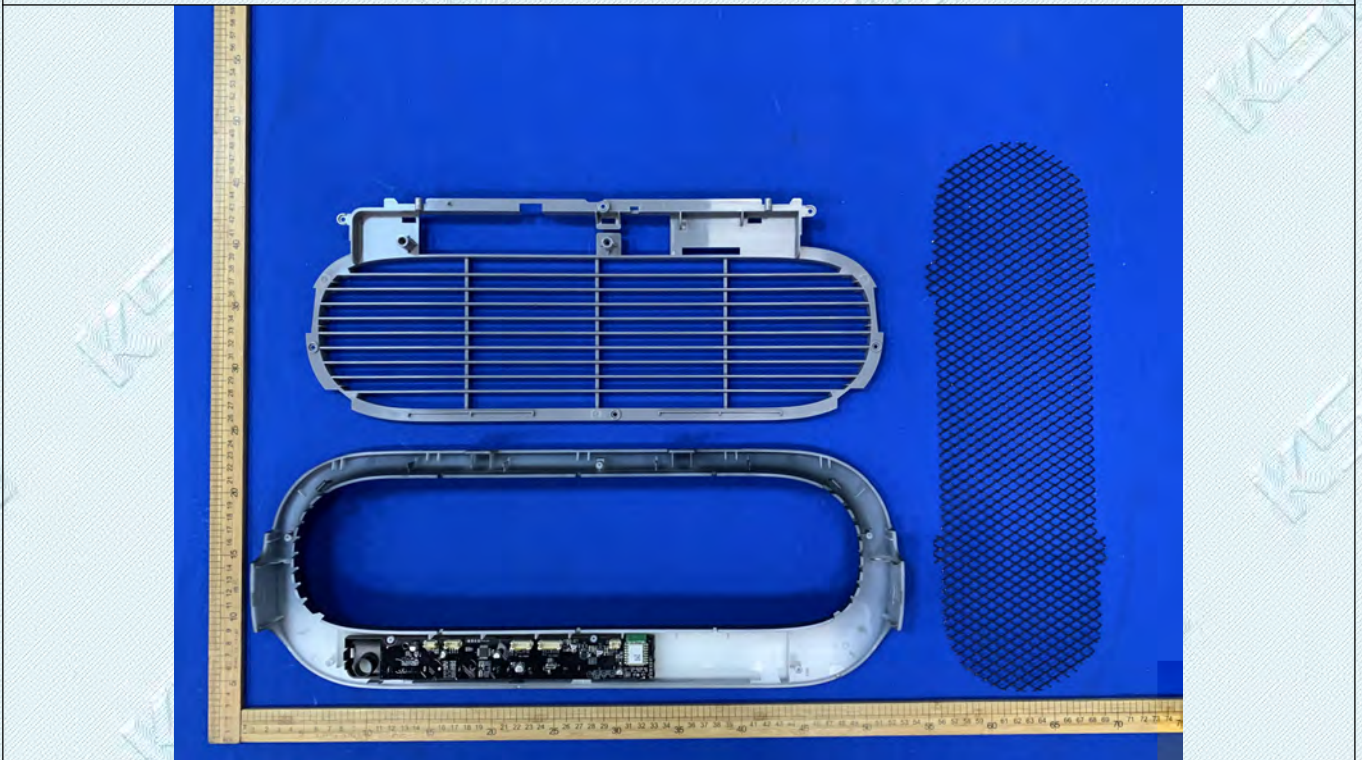
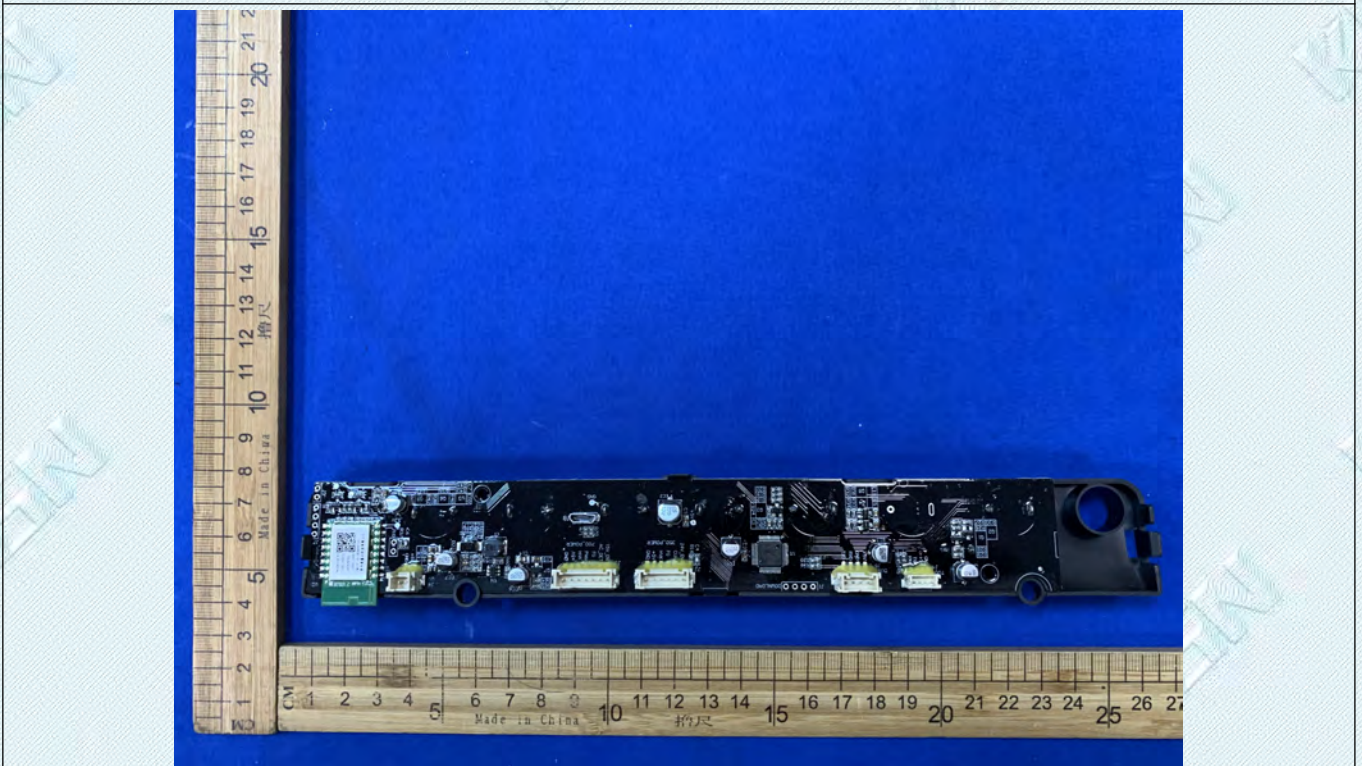


Photo 6



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Photo 7



Photo 8



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Photo 9



Photo 10

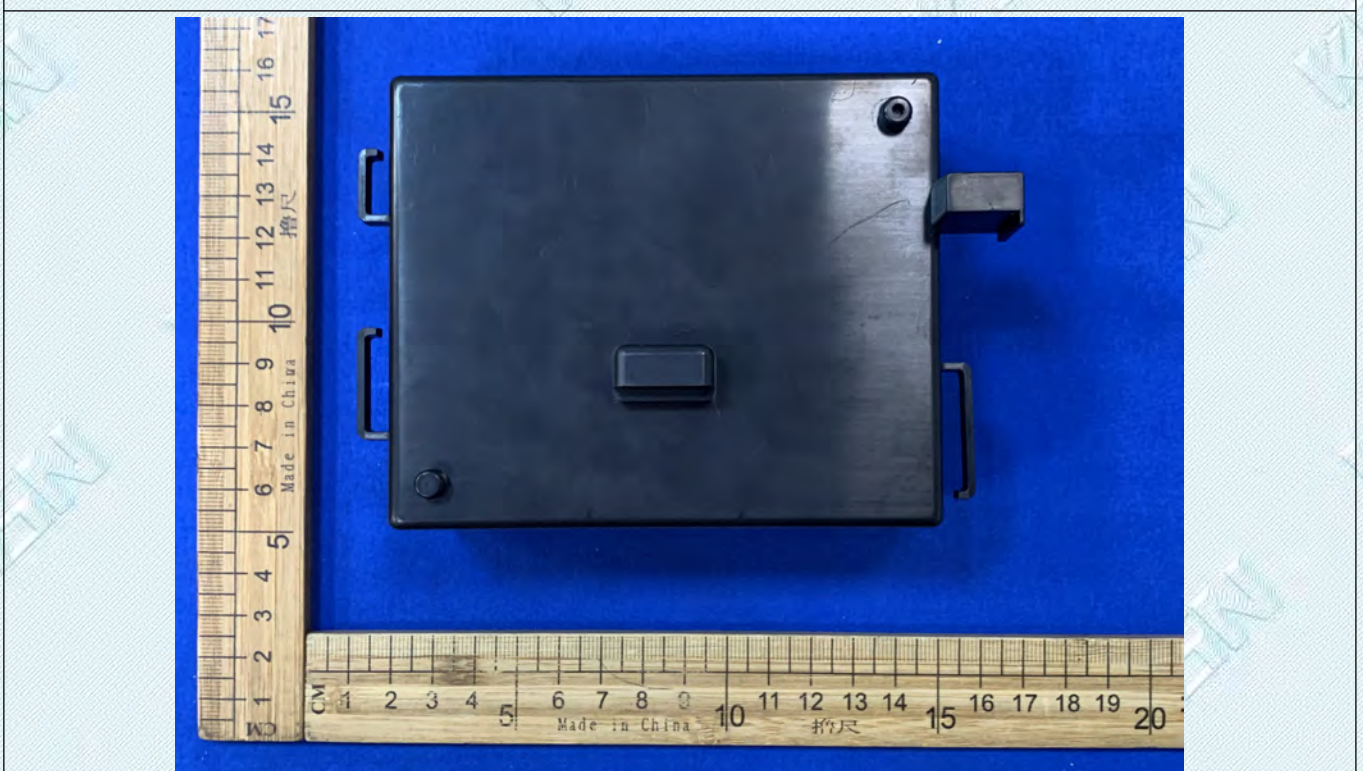




Photo 11



Photo 12



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Photo 13

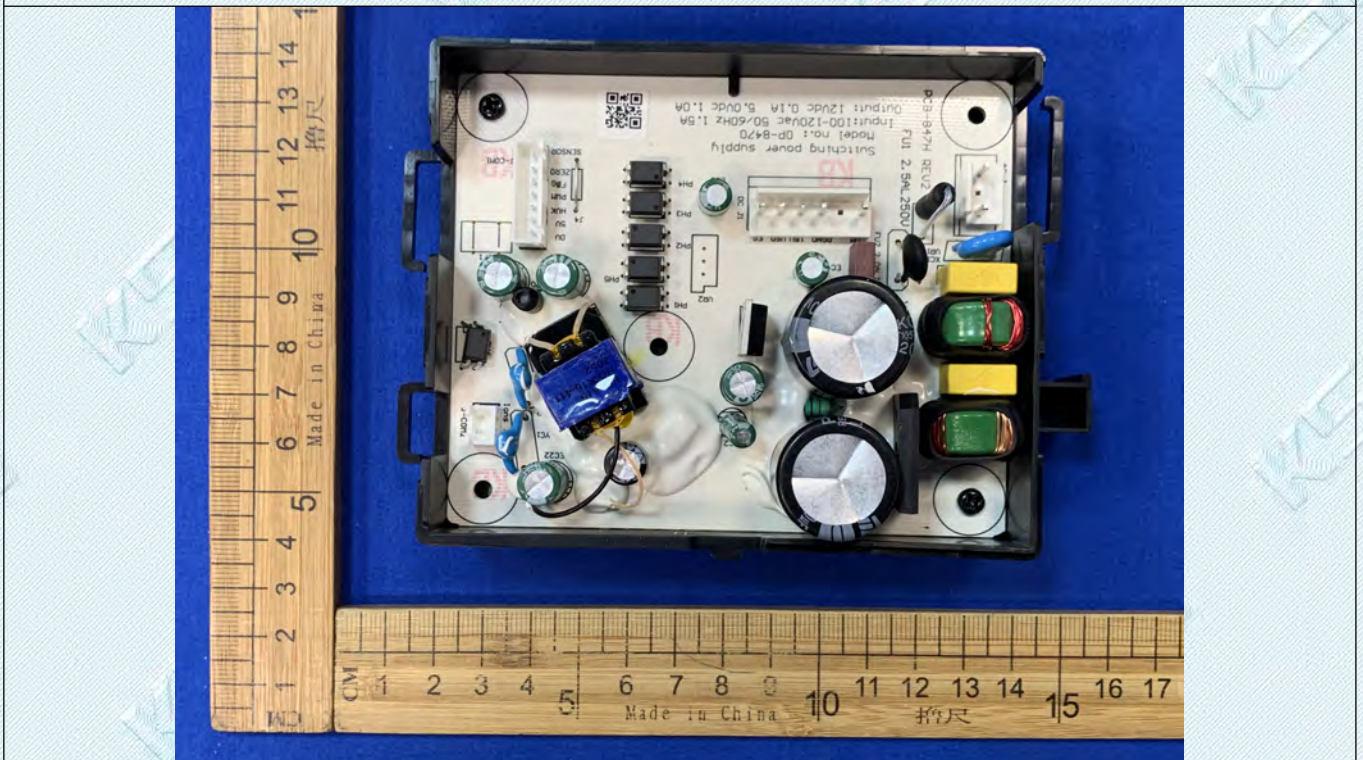


Photo 14

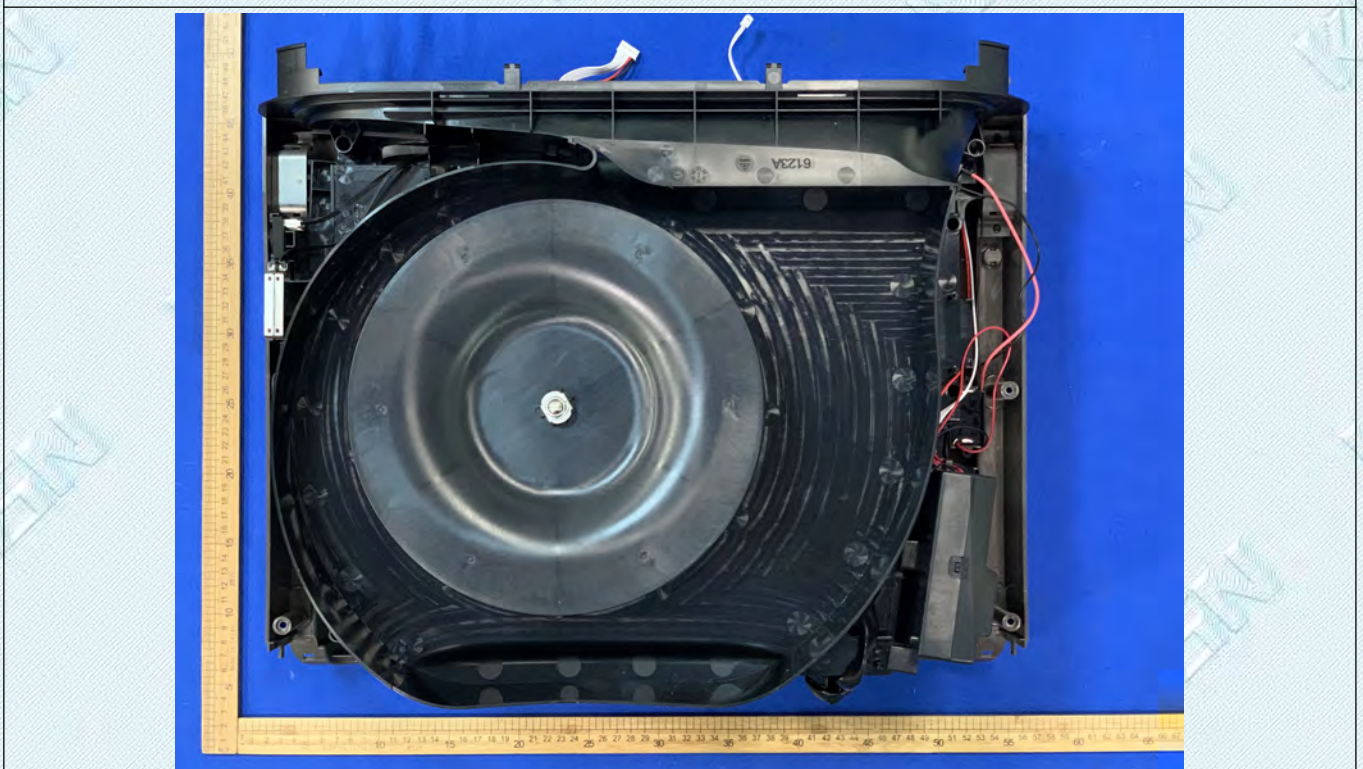




Photo 15

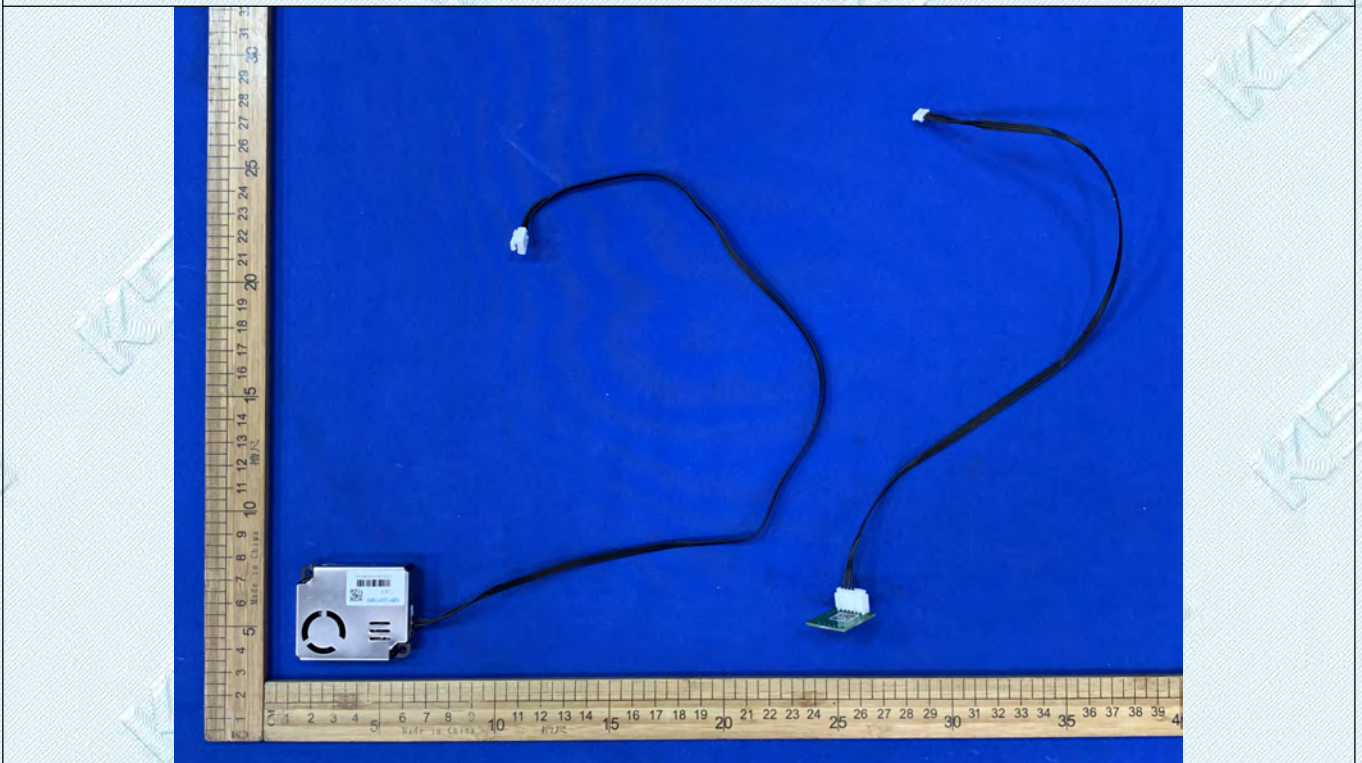


Photo 16



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Photo 17

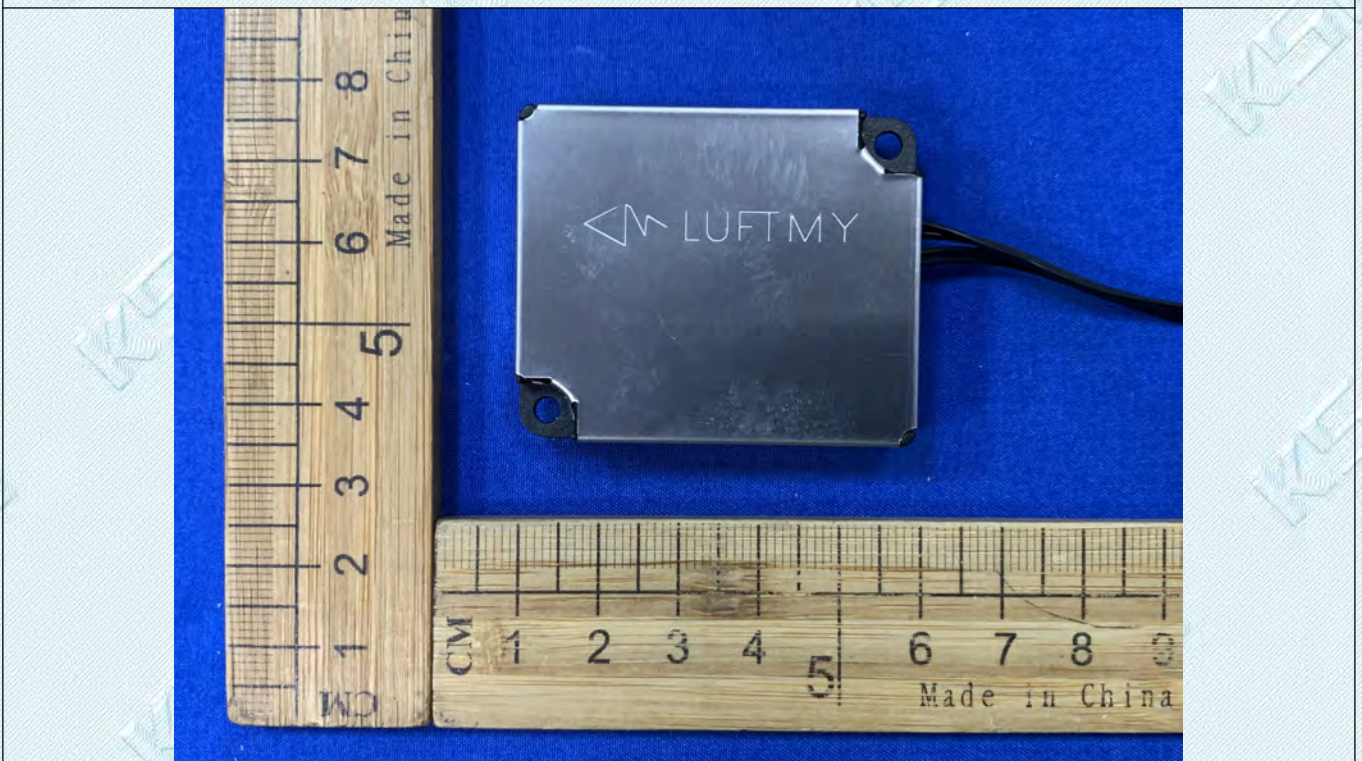


Photo 18

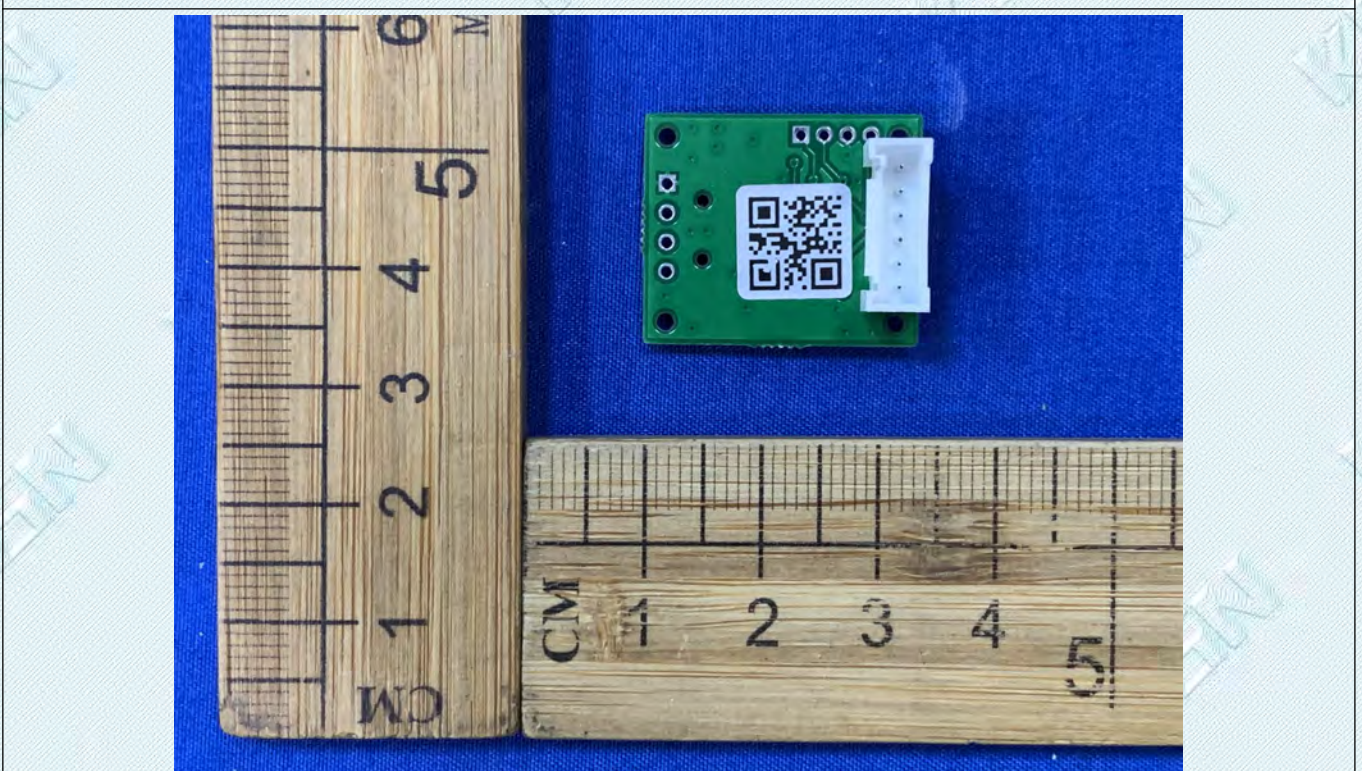




Photo 19

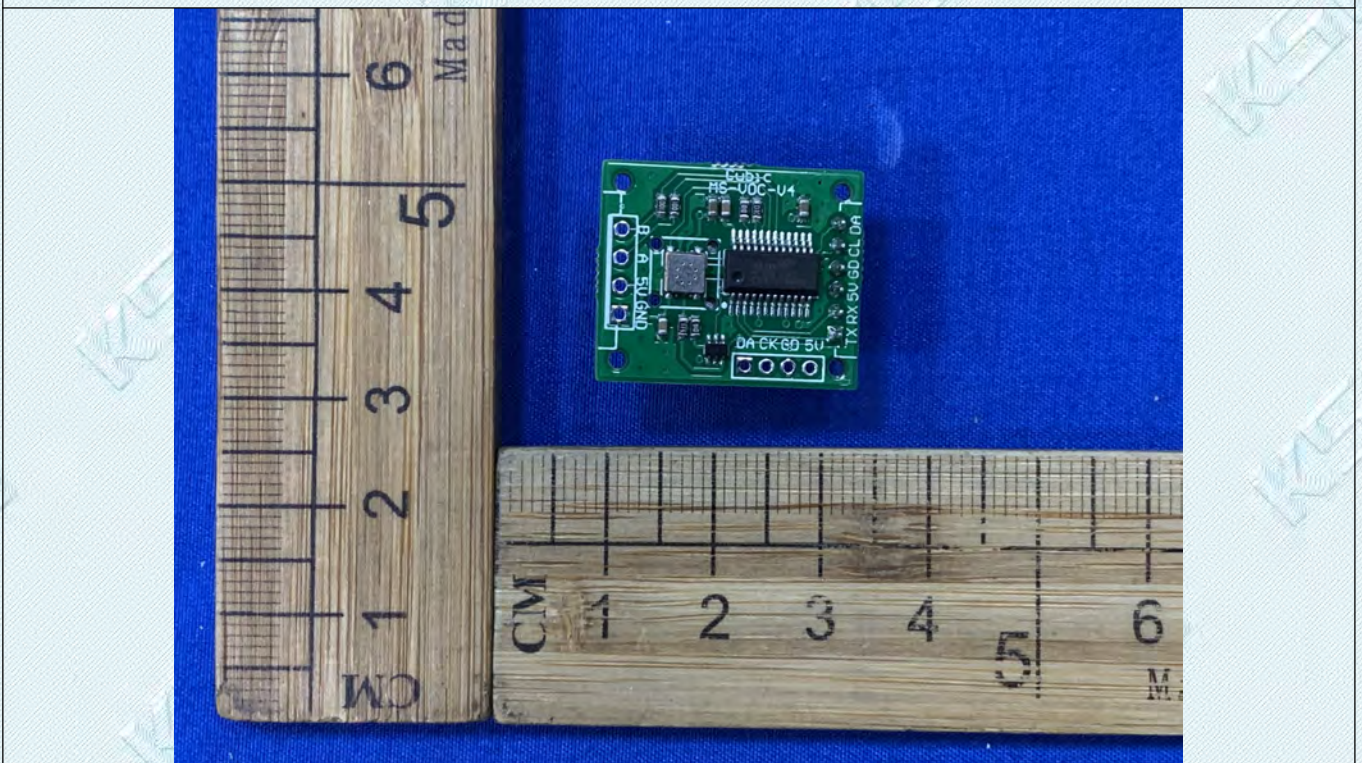


Photo 20

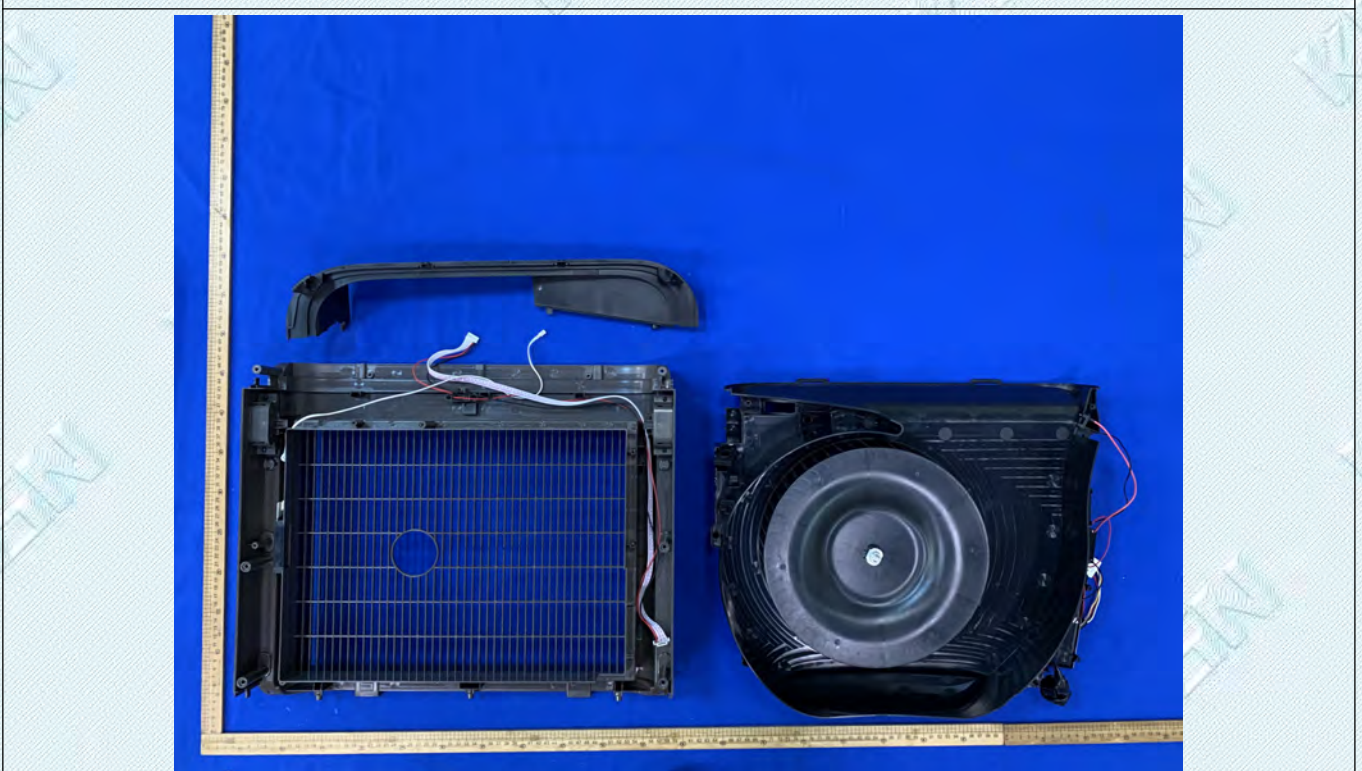




Photo 21



Photo 22

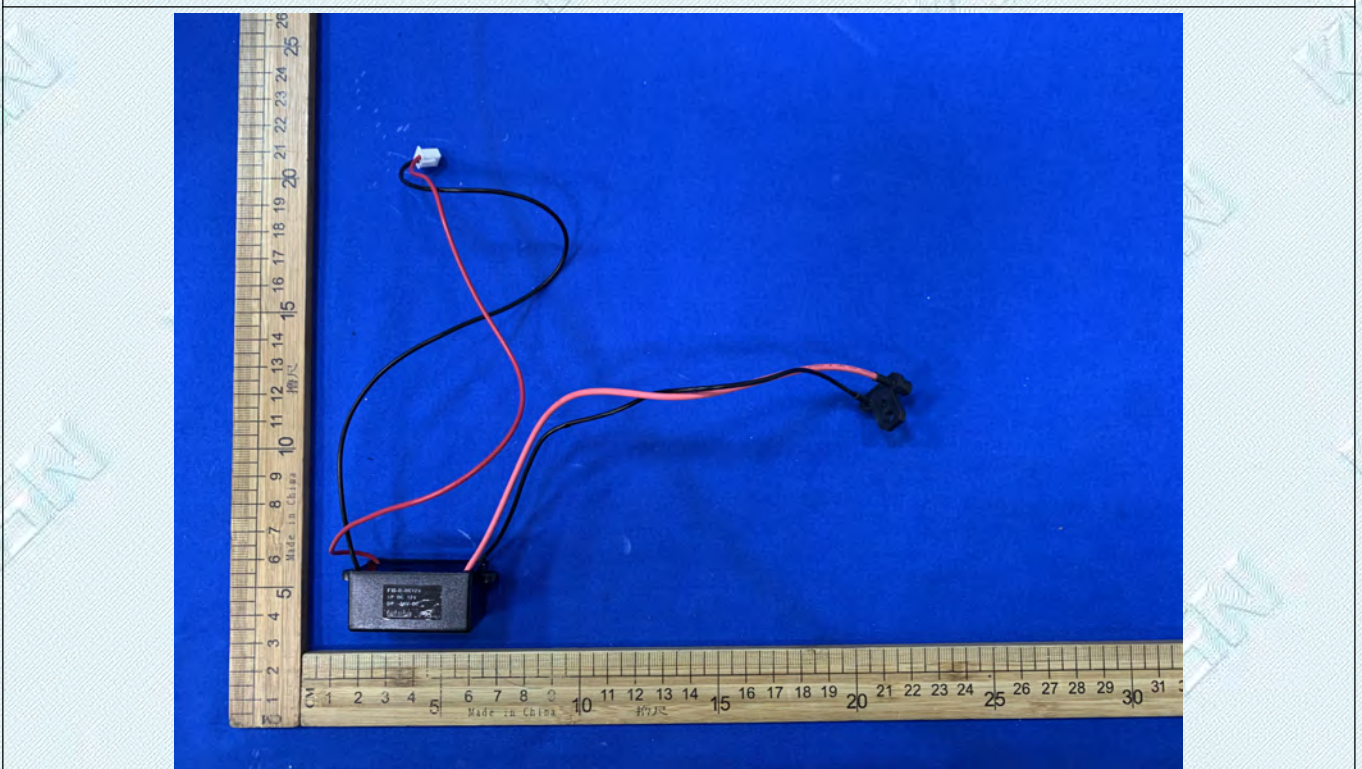
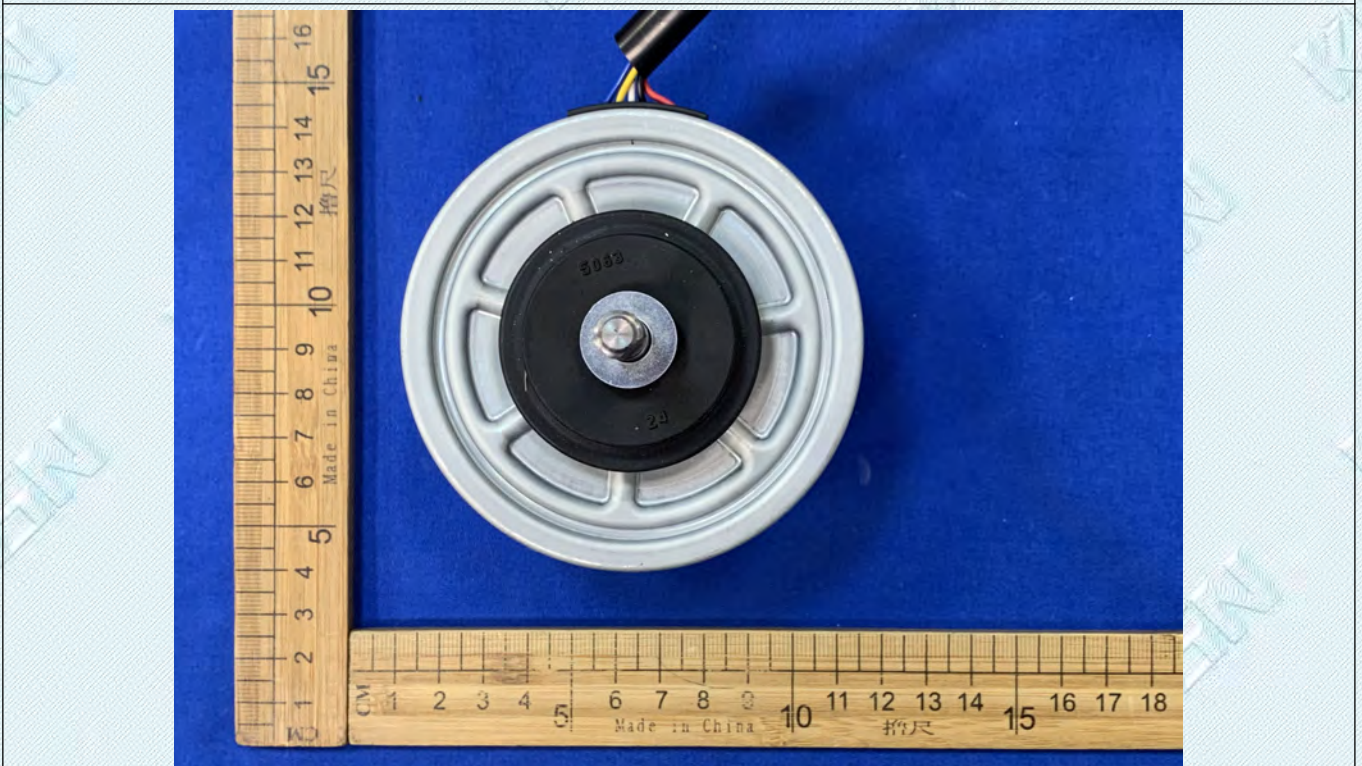




Photo 23



Photo 24



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Photo 25

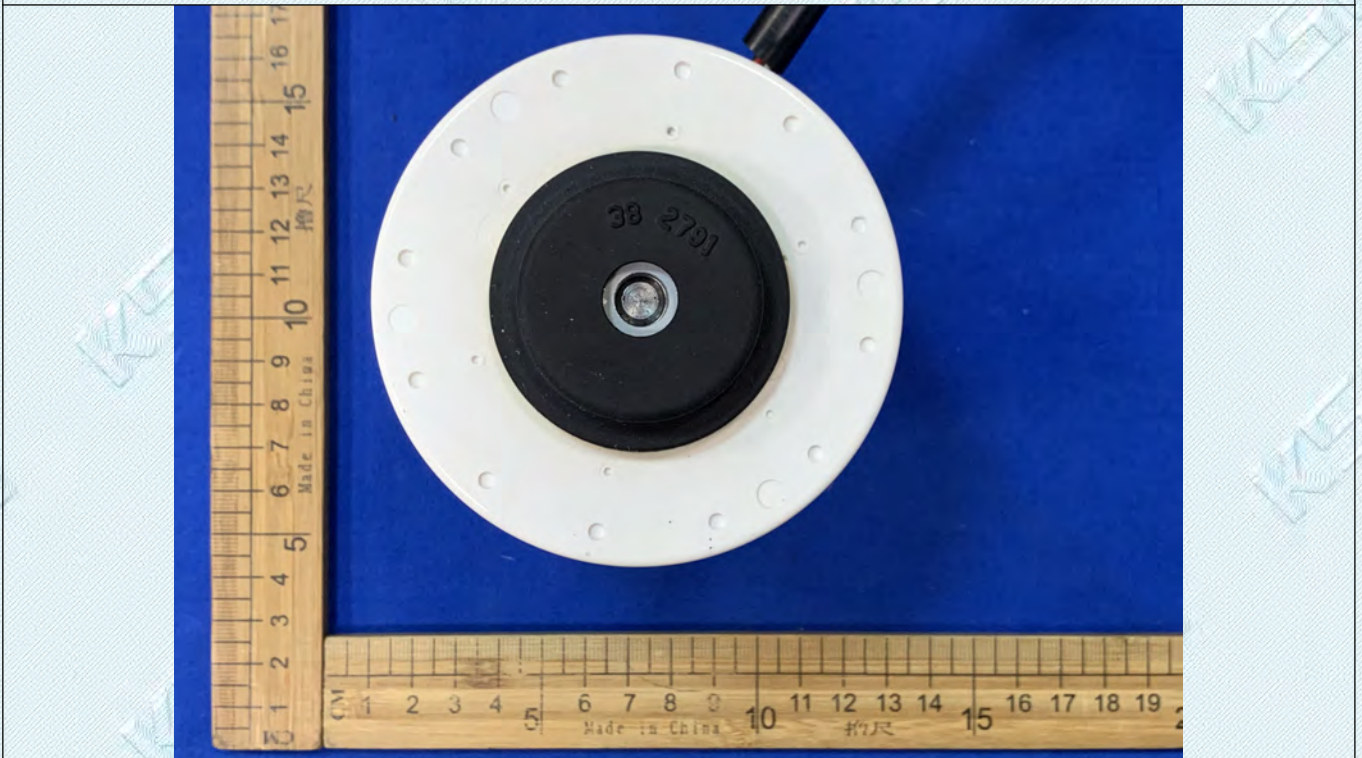


Photo 26





Photo 27

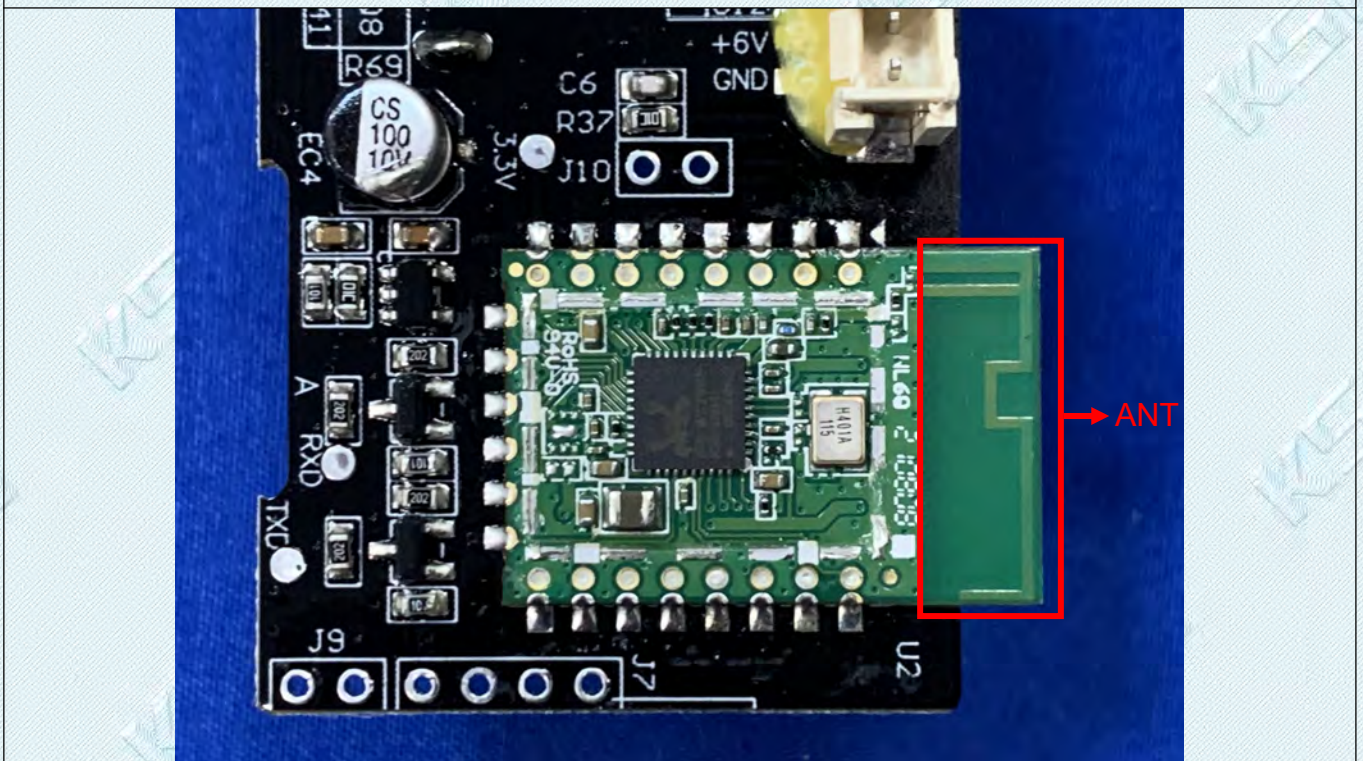


Photo 28



--THE END--