

# FCC DFS Test Report

**FCC ID: 2BMR3-DC420**

Test Report No.....: RF240911007-01-003

Product(s) Name.....: MINI PC

Model(s).....: DC420, DC520, DC530, DC540, X1800M, X1900M, X2840M, X4010M, X4125M, X5095M, X59130M, X59140M, X53130M, X53140M, X55130M, X55140M, X57130M, X57140M, X8100M, X8300M, X8350M, X8400M, X8500M, X8600M, X8700M, X9100M, X9300M, X9350M, X9400M, X9500M, X9600M, X9700M, X9900M, X5380M, X5390M, X53100M, X53110M, X53120M, X5580M, X5590M, X55100M, X55110M, X55120M, X5780M, X5790M, X57100M, X57110M, X57120M, X5980M, X5990M, X59100M, X59110M, X59120M

Trade Mark.....: N/A

Applicant.....: Shenzhen Share Technology Co.,Ltd

Address.....: Room301-302 ChuangZhao Industrial Park NO.49 Ziheng West Rd  
Kengzi Town Pingshan New Area, Shenzhen


Receipt Date.....: 2024.12.18

Test Date.....: 2024.12.19~2024.12.27

Issued Date.....: 2024.12.30

Standards.....: FCC CFR Title 47, Part 15, Subpart E  
FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01  
FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02  
FCC KDB 905462 D03 Client Without DFS New Rules v01r02

Testing Laboratory.....: Shenzhen Haiyun Standard Technical Co., Ltd.

Prepared By:	Checked By:	Approved By:	
Jason Huang	Black Ding	Tim Zhang	
<i>Jason Huang</i>	<i>Black Ding</i>	<i>Tim Zhang</i>	

## Table of Contents

<b>1 . TEST LOCATION</b>	<b>4</b>
<b>2 . TEST ENVIRONMENT CONDITIONS</b>	<b>4</b>
<b>3 . SUMMARY OF TEST RESULTS</b>	<b>4</b>
<b>4 . GENERAL INFORMATION</b>	<b>5</b>
<b>4.1 GENERAL DESCRIPTION OF EUT</b>	<b>5</b>
<b>4.2 MAXIMUM OUTPUT POWER AND E.I.R.P.</b>	<b>7</b>
<b>4.3 DESCRIPTION OF TEST MODES</b>	<b>7</b>
<b>4.4 SUPPORT UNITS</b>	<b>7</b>
<b>5 . U-NII DFS RULE REQUIREMENTS</b>	<b>8</b>
<b>5.1 WORKING MODES AND REQUIRED TEST ITEMS</b>	<b>8</b>
<b>5.2 TEST LIMITS AND RADAR SIGNAL PARAMETERS</b>	<b>9</b>
<b>6 . MEASUREMENT INSTRUMENTS LIST</b>	<b>10</b>
<b>7 . DYNAMIC FREQUENCY SELECTION (DFS)</b>	<b>11</b>
<b>7.1 DFS MEASUREMENT SYSTEM</b>	<b>11</b>
<b>7.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL</b>	<b>13</b>
<b>7.3 DEVIATION FROM TEST STANDARD</b>	<b>13</b>
<b>8 . TEST RESULTS</b>	<b>14</b>
<b>8.1 SUMMARY OF DFS TEST RESULT</b>	<b>14</b>
<b>8.2 DFS DETECTION THRESHOLD</b>	<b>15</b>
<b>8.3 CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME</b>	<b>16</b>

## History of this test report

Original Report Issue Date: 2024.12.30

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

Attachment No.	Issue Date	Description

## 1.. TEST LOCATION

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier	CN0145
A2LA Certificate Number	6823.01
Telephone:	0755-26024411

## 2.. TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Dynamic Frequency Selection (DFS)	23.7°C	51%	DC 12V	Albert Fan

## 3.. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart E				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
FCC 15.407(h)	Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)	-----	PASS	-----

## 4.. GENERAL INFORMATION

### 4.1. GENERAL DESCRIPTION OF EUT

Sample No.	POC240911007-S001
Equipment Name	MINI PC
Model Name	DC420, DC520, DC530, DC540, X1800M, X1900M, X2840M, X4010M, X4125M, X5095M, X59130M, X59140M, X53130M, X53140M, X55130M, X55140M, X57130M, X57140M, X8100M, X8300M, X8350M, X8400M, X8500M, X8600M, X8700M, X9100M, X9300M, X9350M, X9400M, X9500M, X9600M, X9700M, X9900M, X5380M, X5390M, X53100M, X53110M, X53120M, X5580M, X5590M, X55100M, X55110M, X55120M, X5780M, X5790M, X57100M, X57110M, X57120M, X5980M, X5990M, X59100M, X59110M, X59120M
Test Model	DC420
Model difference	Only the model name is different
Trade Mark	N/A
Power Supply	DC 12V from adapter
Adapter Information	Model: HKA03612030-7K Input: 100-240V~ 50/60Hz, 1.0A Output: 12V==3.0A, 36.0W Manufacturer: Shenzhen Hangjia Chiyuan Electric Co., Ltd.
Operation Frequency Band(s)	UNII-2A: 5250 MHz ~ 5350 MHz UNII-2C: 5470 MHz ~ 5725 MHz
Modulation Type	OFDM
Antenna gain	3.18dBi
Antenna type	External antenna
Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 150 Mbps IEEE 802.11ac: up to 433.3 Mbps
Operating Mode(s)	<input type="checkbox"/> Master <input checked="" type="checkbox"/> Client device without radar detection <input type="checkbox"/> Client device with radar detection

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40)		IEEE 802.11ac(VHT80)	
UNII-2A		UNII-2A		UNII-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40)		IEEE 802.11ac(VHT80)	
UNII-2C		UNII-2C		UNII-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590		
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

#### 4.2. MAXIMUM OUTPUT POWER AND E.I.R.P.

Frequency Band (MHz)	Max Output Power (dBm)	Max. e.i.r.p. (dBm)	Max. e.i.r.p. (mW)
5250~5350	13.75	16.93	4.93
5470~5725	13.76	16.94	4.94

Note:

- 1) U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725GHz band shall employ a TPC mechanism. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

#### 4.3. DESCRIPTION OF TEST MODES

Test Mode	Description
Mode 1	IEEE 802.11ac80: 5290MHz
Mode 2	IEEE 802.11ac80: 5610MHz

#### 4.4. MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 102\text{kHz}$
RF power conducted	$\pm 0.377\text{dB}$
Time	$\pm 0.19\%$

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

#### 4.5. SUPPORT UNITS

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Wireless Access Point	Nomadix, Inc.	AP 6WA	FCC ID: 2A3WK-AP6WAR1

## 5.. U-NII DFS RULE REQUIREMENTS

### 5.1. WORKING MODES AND REQUIRED TEST ITEMS

The manufacturer shall state whether the UUT is capable of operating as a Master and/or a Client. If the UUT is capable of operating in more than one operating mode then each operating mode shall be tested separately. See tables below for the applicability of DFS requirements for each of the operational modes.

Applicability of DFS requirements prior to use a channel

Requirement	Operational mode		
	Master	Client without radar detection	Client with radar detection
Non-Occupancy Period	√	Not required	√
DFS Detection Threshold	√	Not required	√
Channel Availability Check Time	√	Not required	Not required
U-NII Detection Bandwidth	√	Not required	√

Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client without radar detection	Client with radar detection
DFS Detection Threshold	√	Not required	√
Channel Closing Transmission Time	√	√	√
Channel Move Time	√	√	√
U-NII Detection Bandwidth	√	Not required	√

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.



## 5.2. TEST LIMITS AND RADAR SIGNAL PARAMETERS

### DETECTION THRESHOLD VALUES

DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2 and 3)
e.i.r.p. $\geq$ 200 milliwatt	-64 dBm
e.i.r.p. $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
e.i.r.p. $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

**Note 1:** This is the level at the input of the receiver assuming a 0 dBi receive antenna.

**Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

**Note 3:** e.i.r.p. is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

### TEST LIMIT

DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds. See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the UNII 99% transmission power bandwidth. See Note 3.

**Note 1:** Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

**Note 2:** The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

**Note 3:** During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

### PARAMETERS OF DFS TEST SIGNALS

Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width ( $\mu$ sec)	PRI ( $\mu$ sec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1

**Note 1:** Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

## 6.. MEASUREMENT INSTRUMENTS LIST

DFS						
No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	MXA Signal Analyzer	Keysight	N9021B	MY600801 69	2024/4/20	2025/4/19
2	RF Control Unit	dsusoft	JS0806-2	21G806044 9	2024/4/20	2025/4/19
3	power supply unit	dsusoft	JS0806-4A DC	N/A	2024/4/20	2025/4/19
4	VXG Signal Generator	Keysight	M9384B	MY612707 87	2024/4/20	2025/4/19
5	EXG Analog Signal Generator	Keysight	N5173B	MY591012 82	2024/4/20	2025/4/19
6	Test software	dsusoft	JS1120-3 Ver.3.2.22.0			

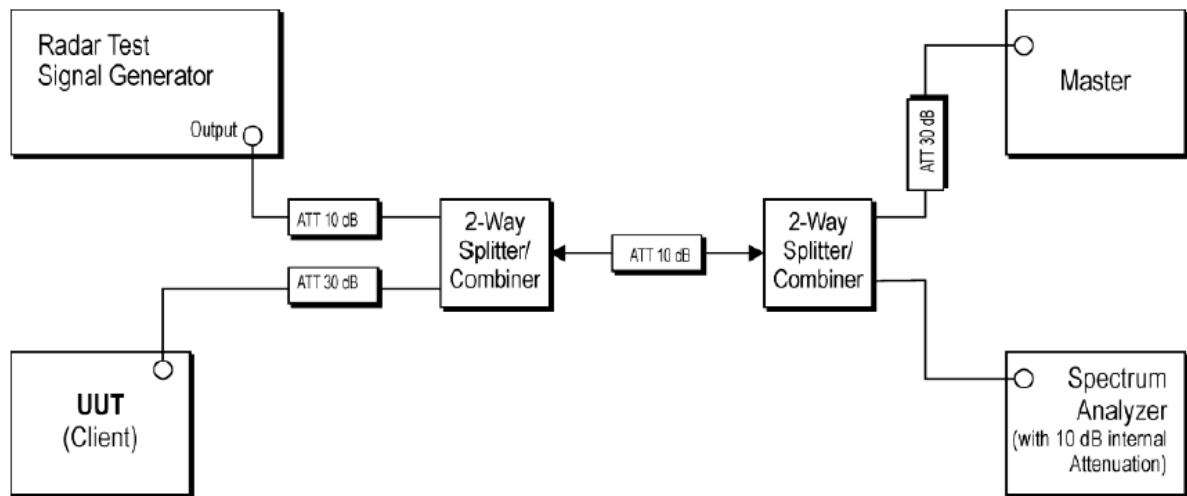
## 7.. DYNAMIC FREQUENCY SELECTION (DFS)

### 7.1. DFS MEASUREMENT SYSTEM

#### Test Procedure

1. Master device and client device are set up by conduction method as the following configuration.
2. The client device is connected to notebook and to access a IP address on wireless connection with the master device.
3. Then the master device is connected to another notebook to access a IP address.
4. Finally, let the two IP addresses run traffic with each other through the Run flow software “Lan test” to reach 17% channel loading as below.

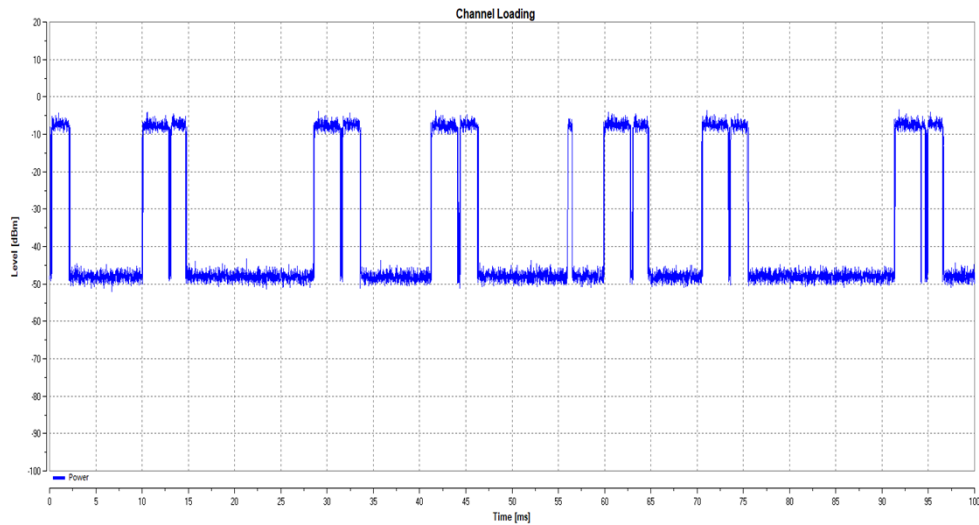
#### Setup for Client with injection at the Master



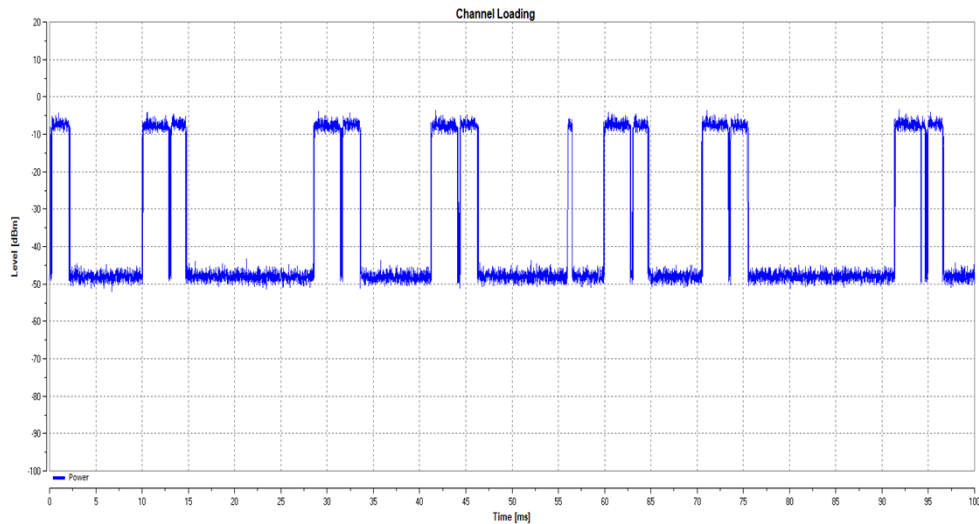
Radar Test Waveforms are injected into the Master.

## Channel Loading

### IEEE 802.11ac80 5290MHz



### IEEE 802.11ac80 5610MHz



Test Mode	Frequency[MHz]	Result	Limit [%]	Verdict
11ac80	5290	30.80	17	PASS
11ac80	5610	30.80	17	PASS

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads are utilized such that there is one pad at each RF port on each EUT.

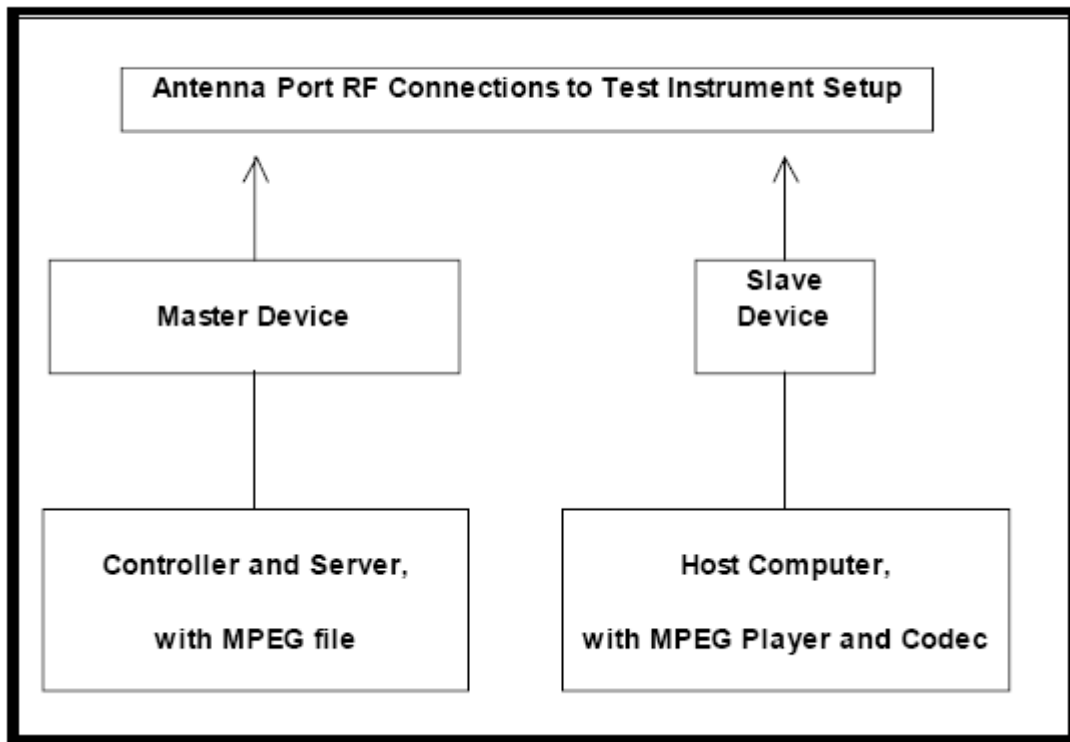
## 7.2. CALIBRATION OF DFS DETECTION THRESHOLD LEVEL

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and the signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of -62dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from -64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of -64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.



## 7.3. DEVIATION FROM TEST STANDARD

No deviation.

## 8.. TEST RESULTS

### 8.1. SUMMARY OF DFS TEST RESULT

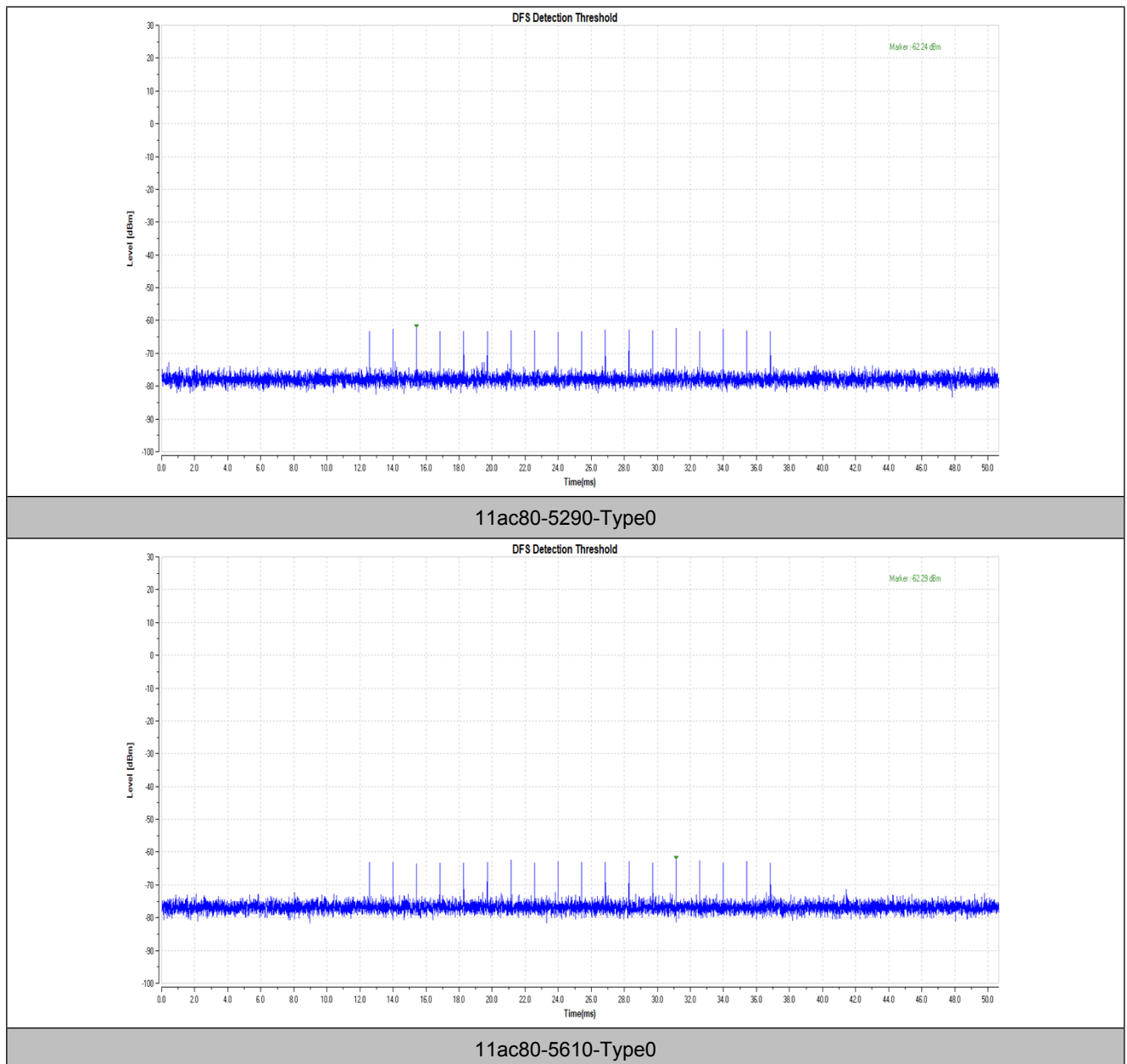
Clause	Test Parameter	Remarks	Result
FCC 15.407	Channel Move Time	Applicable	Pass
	Channel Closing Transmission Time	Applicable	Pass

## 8.2. DFS DETECTION THRESHOLD

Calibration:

Note: Maximum Transmit Power is less than 200 milliwatt in this report, so detection threshold level is -62dBm

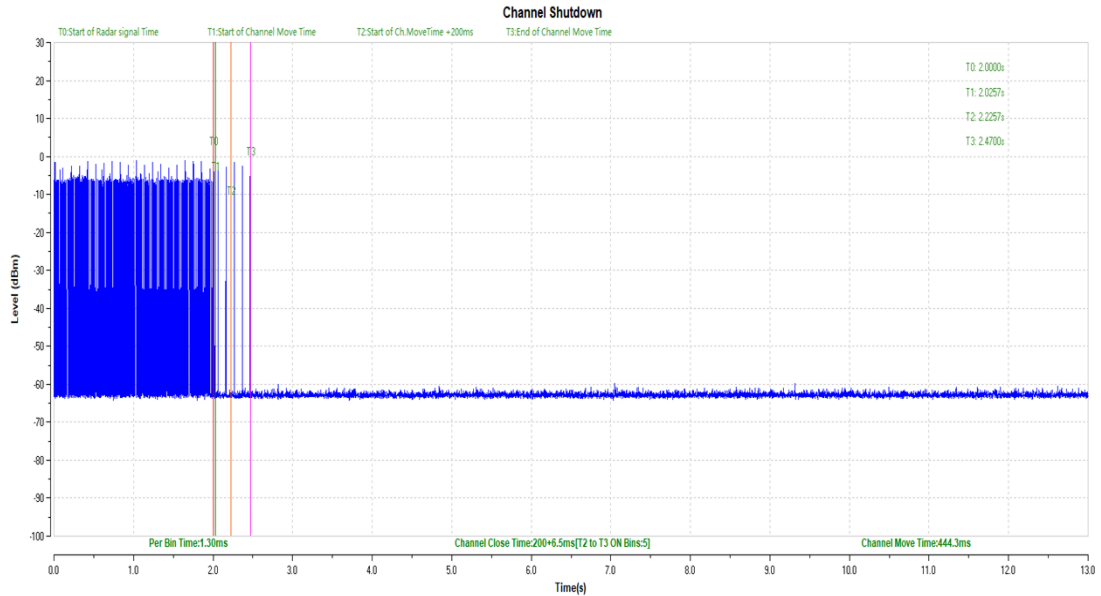
Test Mode	Frequency[dbm]	Radar Type	Result	Limit[dbm]	Verdict
11ac80	5290	Type0	-62.24	-62	PASS
11ac80	5610	Type0	-62.29	-62	PASS



### 8.3. CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

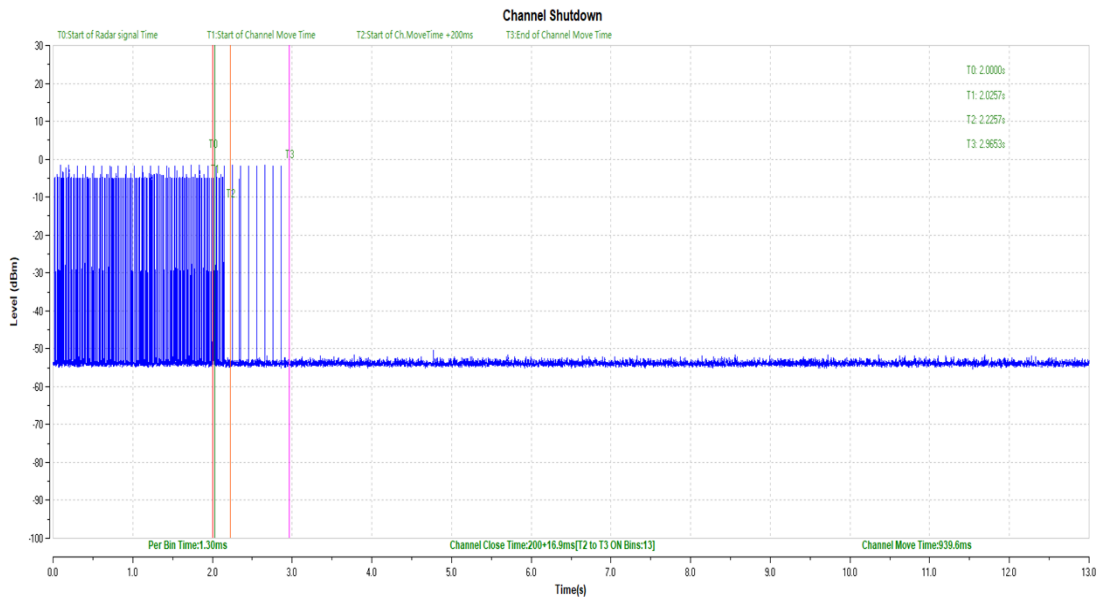
TX (IEEE 802.11ac80 5290MHz)

Radar signal 0



TX (IEEE 802.11ac80 5290MHz)

Radar signal 0



**Note:** T0 denotes the Radar Injection Start.

T1 denotes the start of Channel Move Time upon the end of the last Radar burst.

T2 denotes the data transmission time of 200ms from T1.

T3 denotes the end of Channel Move Time.

TestMode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11ac80	5290	200+6.5	200+60	444.3	10000	PASS
11ac80	5610	200+16.9	200+60	939.6	10000	PASS



## Statement

1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
2. The report is invalid without the signature of the approver.
3. The report is invalid if altered arbitrarily.
4. The report shall not be partially copied without the written approval of the unit.
5. The reported test results are only valid for the tested samples.
6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

## Shenzhen Haiyun Standard Technology Co., Ltd.

Address: Room 110, 111, 112, 113, 115, 116, Block B, Jinyuan Business Building, No. 302, Xixiang Avenue, Labor Community, Xixiang Street, Baoan District, Shenzhen, China

Tel: 0755-26024411

Email: service@hy-lab.cn

**End of Test Report**