

# TEST REPORT

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Report Number: 2501U63859E-RFE  
FCC ID: 2AOWK-3103  
IC: 12564A-3103RH

**Test Standard (s)**

FCC PART 15.407; RSS-247 ISSUE 3, AUGUST 2023

**Sample Description**

Product Type: Smart Phone  
Model No.: FCC/IC: RugKing  
Multiple Model(s) No.: FCC: GQ3103, RugKing 1 Pro, Power Armor 16S,  
Power Armor 16 Pro

Trade Mark:

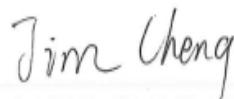


Date Received: 2025-06-10

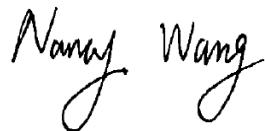
Issue Date: 2025-08-26

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

**Prepared and Checked By:**

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**Approved By:**

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Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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## **TABLE OF CONTENTS**

<b>DOCUMENT REVISION HISTORY .....</b>	<b>3</b>
<b>GENERAL INFORMATION .....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE .....	4
TEST METHODOLOGY.....	4
MEASUREMENT UNCERTAINTY .....	5
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EUT EXERCISE SOFTWARE .....	6
EQUIPMENT MODIFICATIONS .....	6
SUPPORT EQUIPMENT LIST AND DETAILS .....	6
EXTERNAL I/O CABLE.....	6
<b>SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
<b>TEST EQUIPMENT LIST .....</b>	<b>8</b>
<b>APPLICABLE STANDARDS.....</b>	<b>9</b>
DFS REQUIREMENT .....	9
DFS MEASUREMENT SYSTEM.....	13
SYSTEM BLOCK DIAGRAM .....	13
CONDUCTED METHOD.....	14
RADIATED METHOD .....	15
TEST PROCEDURE.....	15
<b>TEST RESULTS .....</b>	<b>16</b>
DESCRIPTION OF EUT .....	16
RADAR WAVEFORM CALIBRATION .....	16
TEST DATA.....	16
<b>CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME.....</b>	<b>17</b>
TEST PROCEDURE.....	17
TEST DATA.....	17
<b>NON-OCCUPANCY PERIOD .....</b>	<b>18</b>
TEST PROCEDURE.....	18
TEST DATA.....	18
<b>EUT PHOTOGRAPHS .....</b>	<b>19</b>
<b>TEST SETUP PHOTOGRAPHS .....</b>	<b>20</b>
<b>APPENDIX.....</b>	<b>21</b>
APPENDIX A: DFS DETECTION THRESHOLDS .....	21
APPENDIX B: CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME .....	23
APPENDIX C: NON-OCCUPANCY PERIOD .....	25

## **DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	2501U63859E-RFE	Original Report	2025-08-26

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

HVIN	GQ3103RH2
FVIN	N/A
Product	Smart Phone
Tested Model	FCC/IC: RugKing
Multiple Model(s)	FCC:GQ3103, RugKing 1 Pro, Power Armor 16S,Power Armor 16 Pro
Frequency Range	5GHz Wi-Fi: 5250-5350 MHz; 5470-5725MHz Note: frequency range 5600-5650MHz can't be use in Canada
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Output Power	5250-5350MHz: 10.37dBm 5470-5725MHz: 9.55dBm
Modulation Technique	OFDM
Antenna Specification <sup>#</sup>	5250-5350MHz: 1.8dBi 5470-5725MHz: 1.3dBi (It is provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5V/9V from Adapter
Sample serial number	34AK-1 (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model: HJ-PD18W-US Input: 100-240V, 50/60Hz, 0.8A Output: DC 5.0V, 3.0A, 15.0W or 9.0V, 2.0A, 18.0W or 12.0V, 1.5A, 18.0W
Note: The Multiple models are electrically identical with the test model except for model name and sales channel. Please refer to the declaration letter <sup>#</sup> for more detail, which was provided by manufacturer.	

### Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts E of the Federal Communications Commission's rules, and RSS-247 Issue 3, August 2023 of the Innovation, Science and Economic Development Canada..

The objective is to determine compliance with FCC Part 15, Subpart E, section 15.407 Dynamic Frequency Selection (DFS) for devices operating in the bands 5250-5350 MHz, 5470-5725 MHz.

The objective is to determine compliance with Dynamic Frequency Selection (DFS) of the RSS-247 Issue 3, August 2023 of the Innovation, Science and Economic Development Canada for devices operating in the bands 5250-5350 MHz, 5470-5600MHz and 5650-5725 MHz.

### Test Methodology

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02.

FCC KDB 905462 D03 Client Without DFS New Rules v01r02.

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

Parameter	Uncertainty
Time	$\pm 1\% (k=2, 95\% \text{ level of confidence})$
Temperature	$\pm 1^\circ\text{C}$
Humidity	$\pm 1\%$
Supply voltages	$\pm 0.4\%$

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0023.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

### EUT Exercise Software

N/A

### Equipment Modifications

N/A

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	PC	TIANYI510Pro-18ICB	R3NO28B21001
Lenovo	LED display	L2364A	U310FZR9
Lenovo	Keyboard	EKB-536A	811A19A5
DELL	Mouse	Ms116P	Ms116P
Grandstream	Router	GWN7665 (FCC ID:YZZGWN7665) (IC ID: 11964A-GWN7665)	C074AD251F0A
DELL	Notebook	Latitude E6410	11429208685
TP-LINK	POE	TL-POE2412G	T240050-2-PoE
OUPU	Receptacle	PDU-OP1606K	6971041358020

### External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielded Un-detachable AC Cable	1.2	Receptacle	AC Mains
Un-shielding Detachable AC Cable	1.0	Receptacle	POE
Un-shielding Detachable RJ45 Cable	1.0	POE	Router
Un-shielding Detachable RJ45 Cable	2.0	POE	Notebook

## SUMMARY OF TEST RESULTS

The following result table represents the list of measurements required under the CFR §47 Part 15.407(h), RSS-247 Issue 3 §6.3 and KDB: 905462 D02 UNII DFS Compliance Procedures New Rules v02

Items	Description of Test	Result
Detection Bandwidth	UNII Detection Bandwidth	Not Applicable
Performance Requirements Check	Initial Channel Availability Check Time (CAC)	Not Applicable
	Radar Burst at the Beginning of the CAC	Not Applicable
	Radar Burst at the End of the CAC	Not Applicable
In-Service Monitoring	Channel Move Time	Compliant
	Channel Closing Transmission Time	Compliant
	Non-Occupancy Period	Compliant
Radar Detection	Statistical Performance Check	Not Applicable

Note: EUT is a client without radar detection.

## TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Tonscend	RF control Unit	JS0806-2	19D8060154	2024/08/06	2025/08/05
Rohde & Schwarz	Spectrum Analyzer	FSV40	101473	2024/12/04	2025/12/03
Keysight	MXG Vector Signal Generator	N5182B	MY53051503	2024/12/04	2025/12/03
Unknown	10dB Attenuator	Unknown	F-03-EM014	2025/06/26	2026/06/25
Narda	20dB Attenuator	99899	0107	2025/06/26	2026/06/25
Unknown	Power Splitter	PD2	2000-600	2025/06/26	2026/06/25

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## APPLICABLE STANDARDS

### DFS Requirement

CFR §47 Part 15.407(h) & RSS-247 Issue 3, August 2023 section 6.3

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

**Table 1: Applicability of DFS Requirements Prior to Use of a Channel**

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

**Table 2: Applicability of DFS requirements during normal operation**

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	Any single BW mode	Not required
<b>Note:</b> Frequencies selected for statistical performance check (Section 7.8.4) 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.		

**Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection**

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 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.

**Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

**Table 4: DFS Response Requirement Values**

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

**Table 5 – Short Pulse Radar Test Waveforms**

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
<b>Aggregate (Radar Types 1-4)</b>				80%	120
<b>Note 1:</b> Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 usec is selected, the number of pulses would be Roundup  $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{3066} \right) \right\} = \text{Roundup}\{17.2\} = 18$ .

**Table 5a - Pulse Repetition Intervals Values for Test A**

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60%
3	30	27	90%
4	50	44	88%
Aggregate $(82.9\% + 60\% + 90\% + 88\%)/4 = 80.2\%$			

**Table 6 – Long Pulse Radar Test Waveform**

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

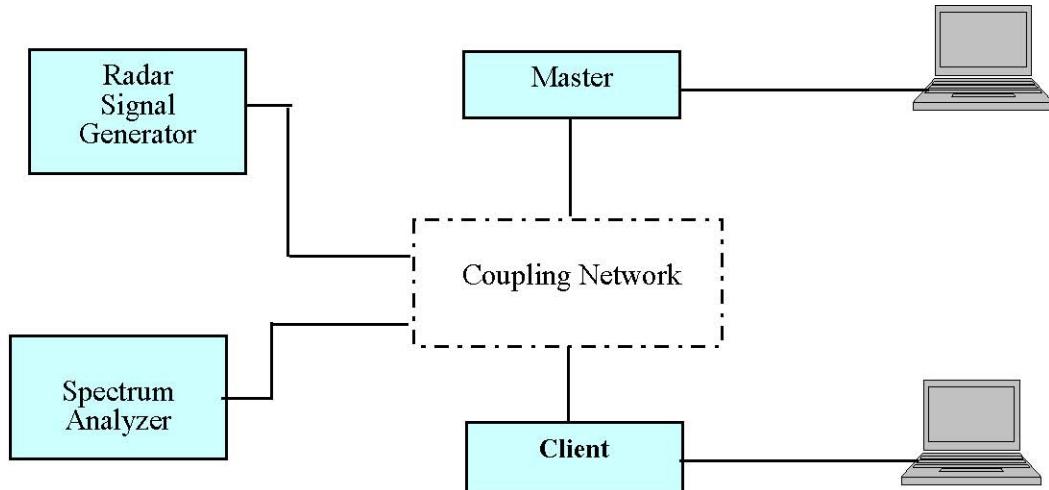
**Table 7 – Frequency Hopping Radar Test Waveform**

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

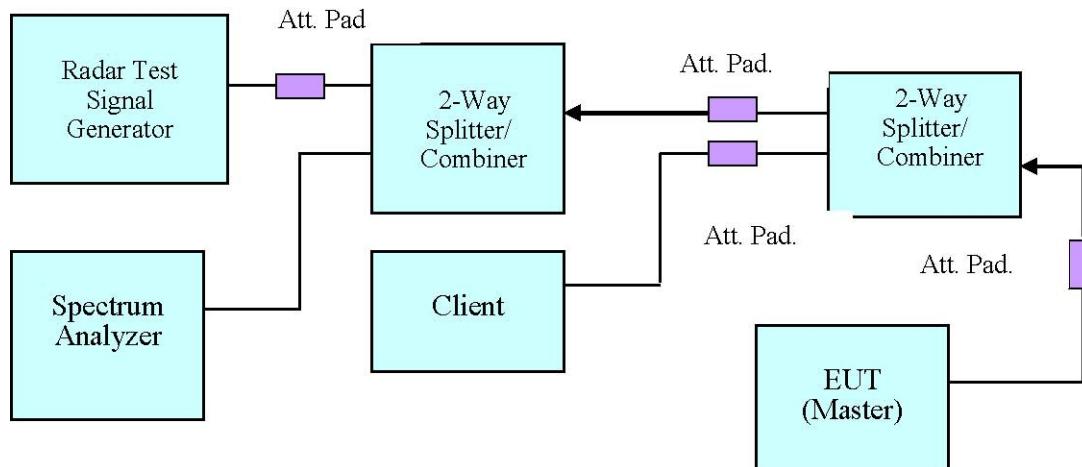
## DFS Measurement System

DFS measurement system consists of two subsystems: (1) The radar signal generating subsystem and (2) the traffic monitoring subsystem.

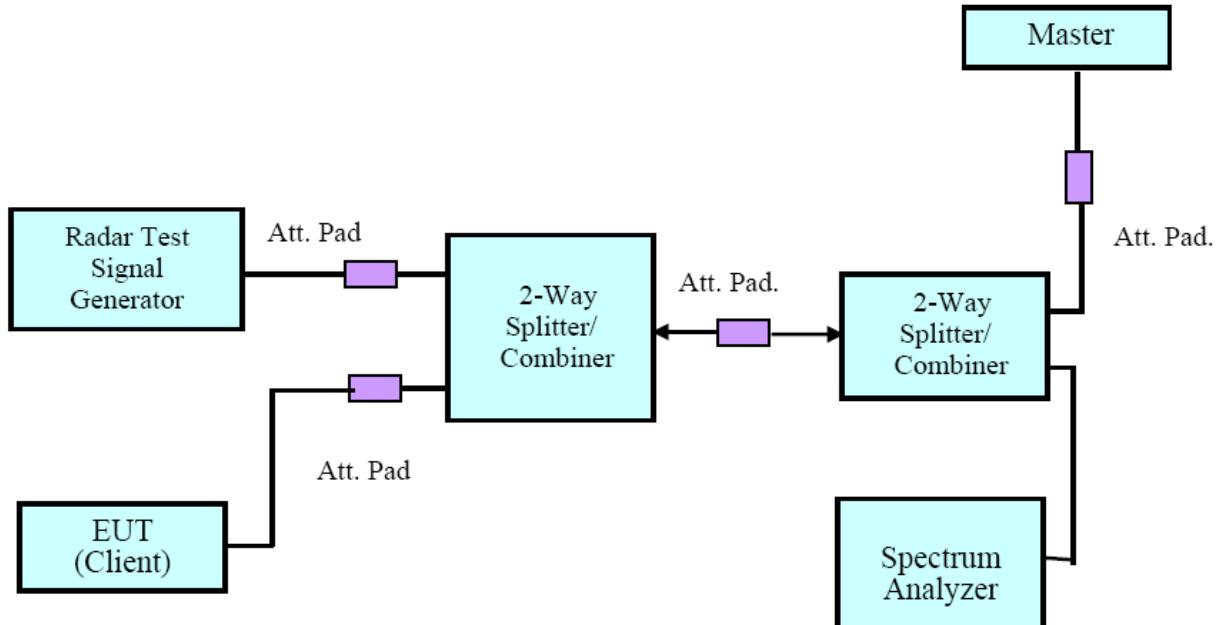
### System Block Diagram



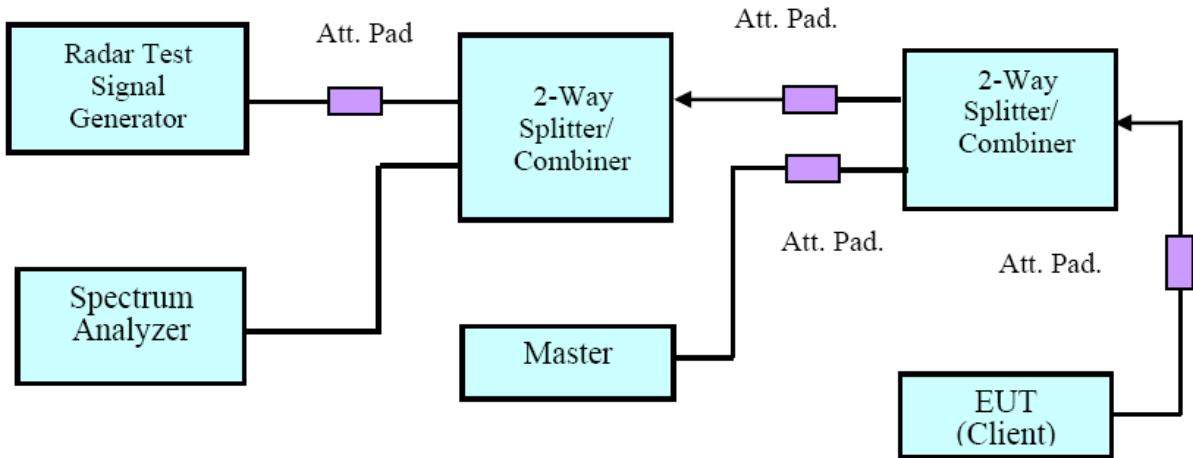
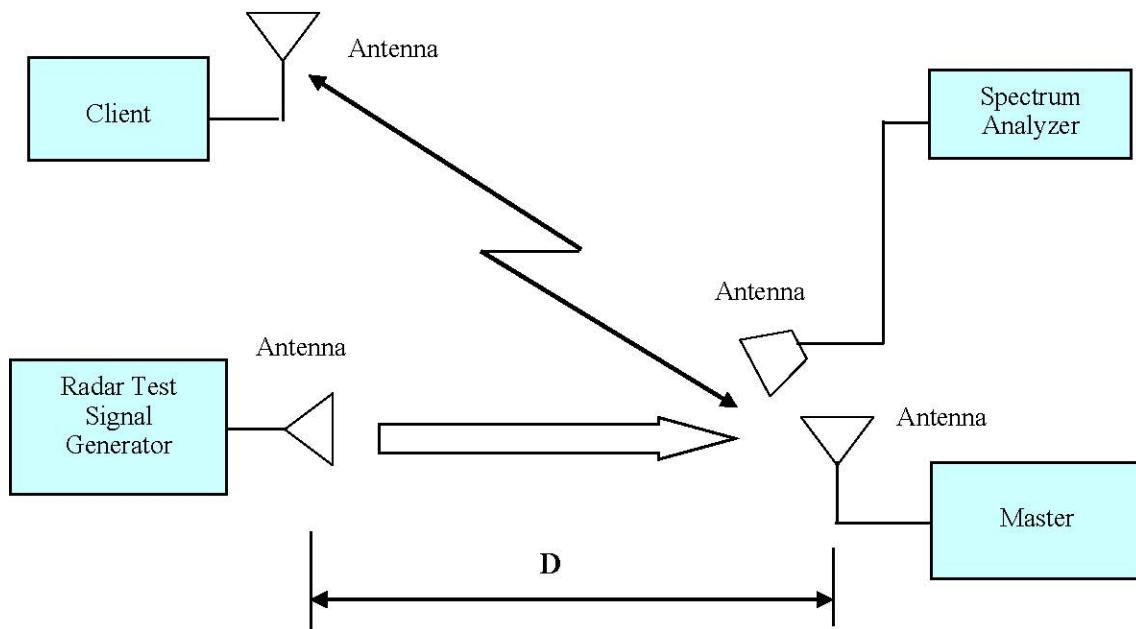
## Conducted Method



Setup for Master with injection at the Master



Setup for Client with injection at the Master

**Setup for Client with injection at the Client****Radiated Method****Test Procedure**

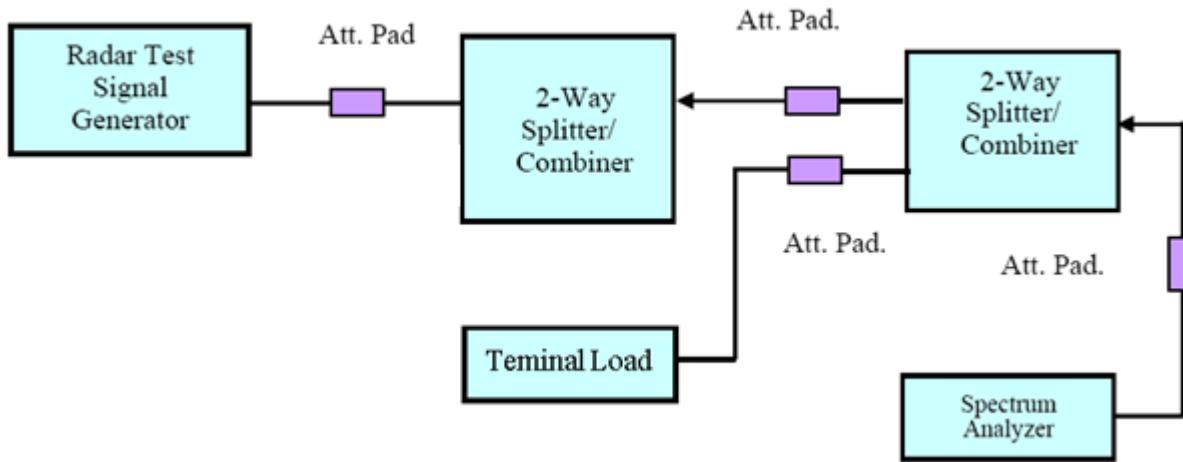
A spectrum analyzer is used as a monitor verifies that the EUT status including Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the diction.

## TEST RESULTS

### Description of EUT

The calibrated radiated DFS detection threshold level is set to -62 dBm.

### Radar Waveform Calibration



### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	100.2 kPa

*The testing was performed by Lee Li on 2025-07-11.*

*EUT operation mode: Transmitting*

**Test Result: Compliant**

*Please refer to the Appendix.*

## CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

### Test Procedure

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.

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.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =  $N \times \text{Dwell Time}$

$N$  is the number of spectrum analyzer bins showing a device transmission Dwell Time is the dwell time per bin (i.e. Dwell Time =  $S/B$ ,  $S$  is the sweep time and  $B$  is the number of bin, i.e. 8192)

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	100.2 kPa

*The testing was performed by Lee Li on 2025-07-11.*

*EUT operation mode: Transmitting*

**Test Result: Compliant**

*Please refer to the Appendix.*

## NON-OCCUPANCY PERIOD

### Test Procedure

Measure the EUT for more than 30 minutes following the channel close/move time to verify that the EUT does not resume any transmissions on this channel. Provide one plot to demonstrate no transmission on the channel for the non-occupancy period (30 minutes observation time)

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	100.2 kPa

*The testing was performed by Lee Li on 2025-07-11.*

*EUT operation mode: Transmitting*

**Test Result: Compliant**

*Please refer to the Appendix.*

## **EUT PHOTOGRAPHS**

Please refer to the attachment 2501U63859E-RF External photo and 2501U63859E-RF Internal photo.

## **TEST SETUP PHOTOGRAPHS**

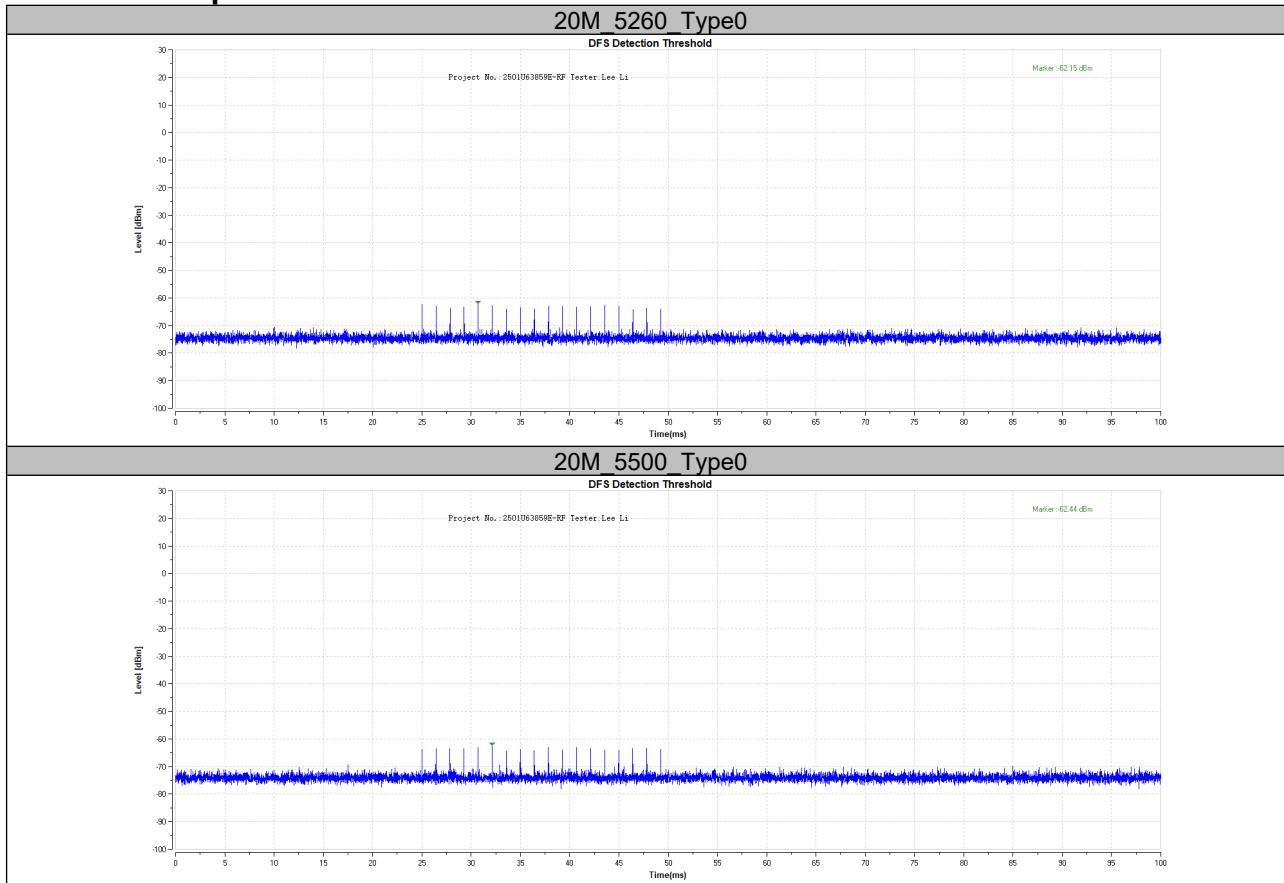
Please refer to the attachment 2501U63859E-RFB Test Setup photo.

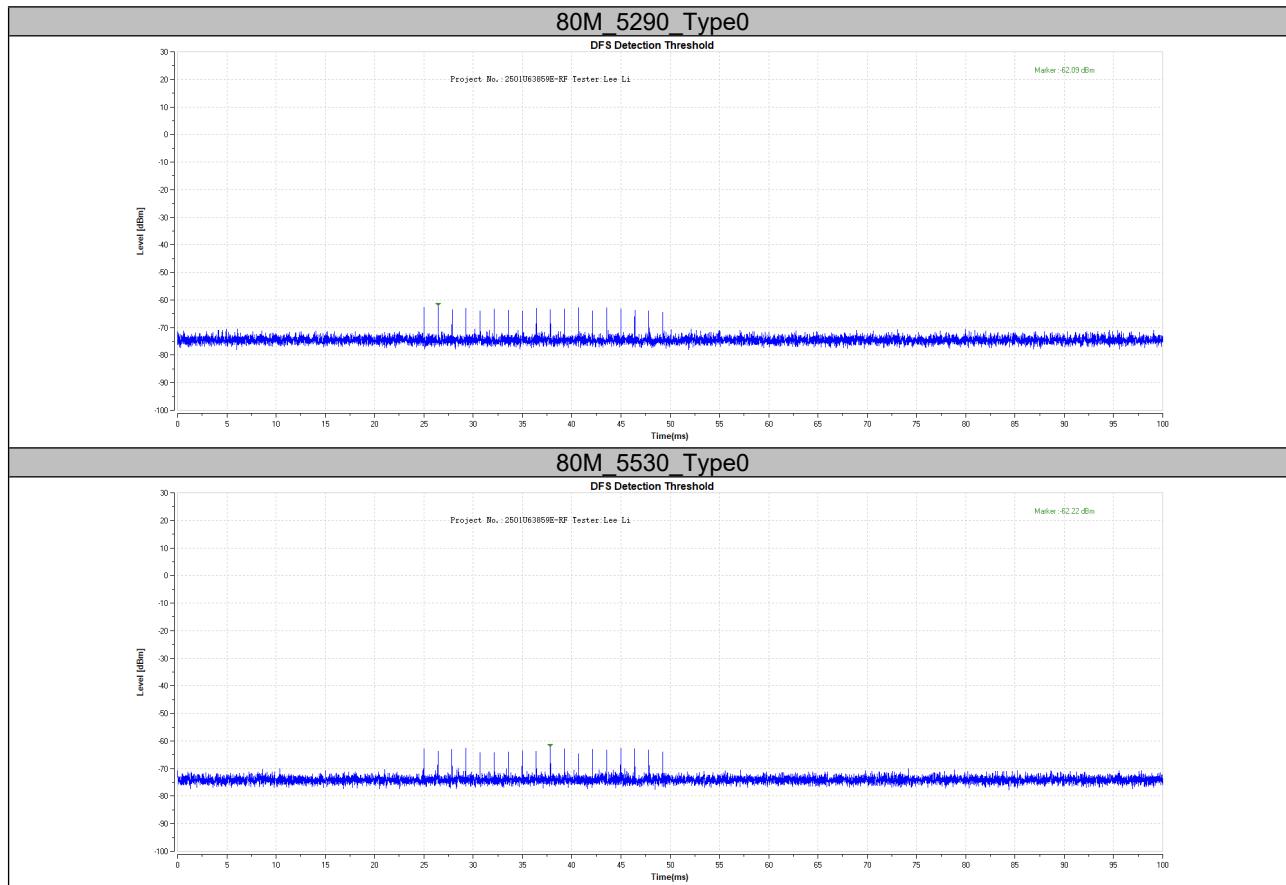
## APPENDIX

### Appendix A: DFS Detection Thresholds Test Result

Test BW	Frequency[MHz]	Radar Type	Result[dBm]	Limit[dBm]	Verdict
20M	5260	Type0	-62.15	-62.00	PASS
	5500	Type0	-62.44	-62.00	PASS
80M	5290	Type0	-62.09	-62.00	PASS
	5530	Type0	-62.22	-62.00	PASS

### Test Graphs

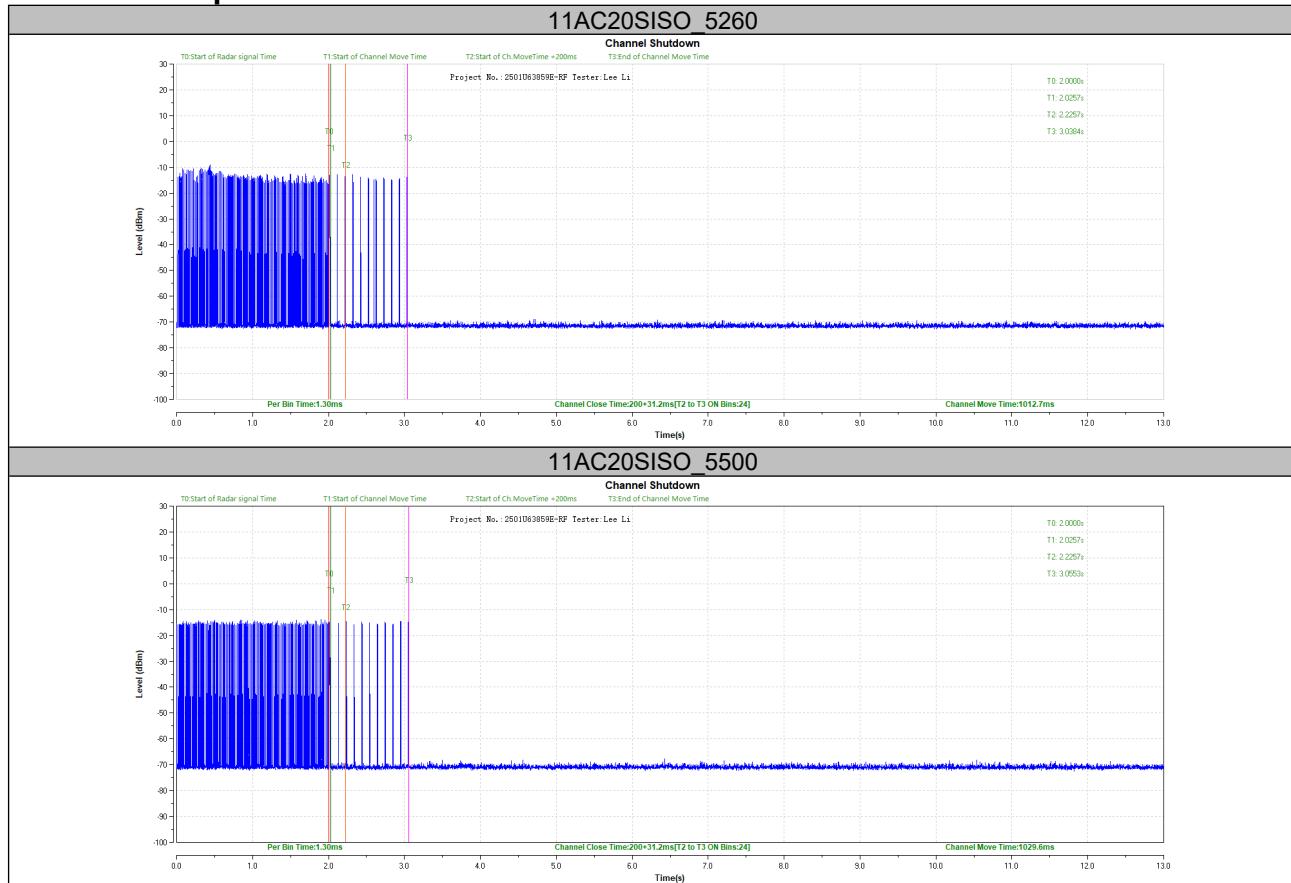


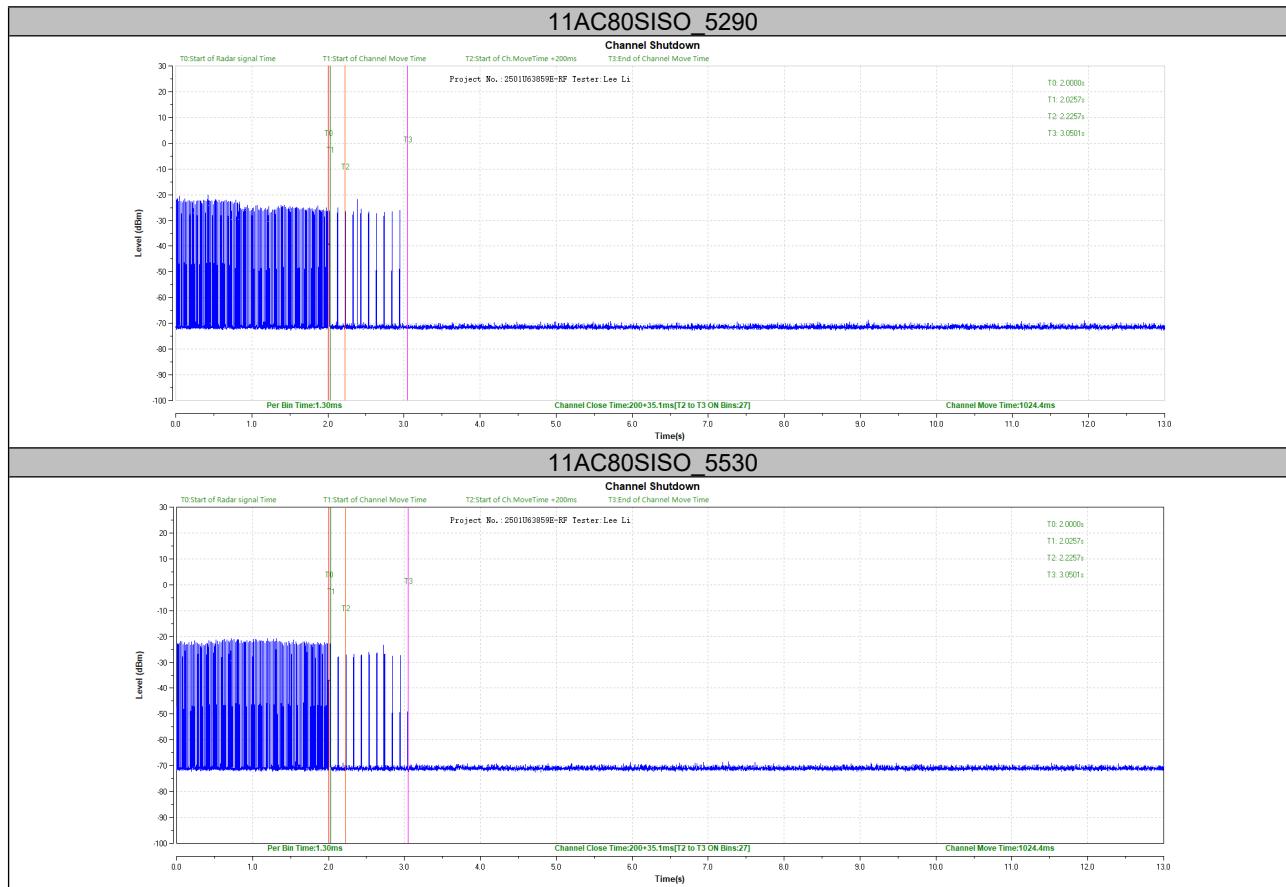


## Appendix B: Channel Move Time and Channel Closing Transmission Time Test Result

Test Mode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC20SISO	5260	200+31.2	200+60	1012.7	10000	PASS
	5500	200+31.2	200+60	1029.6	10000	PASS
11AC80SISO	5290	200+35.1	200+60	1024.4	10000	PASS
	5530	200+35.1	200+60	1024.4	10000	PASS

### Test Graphs



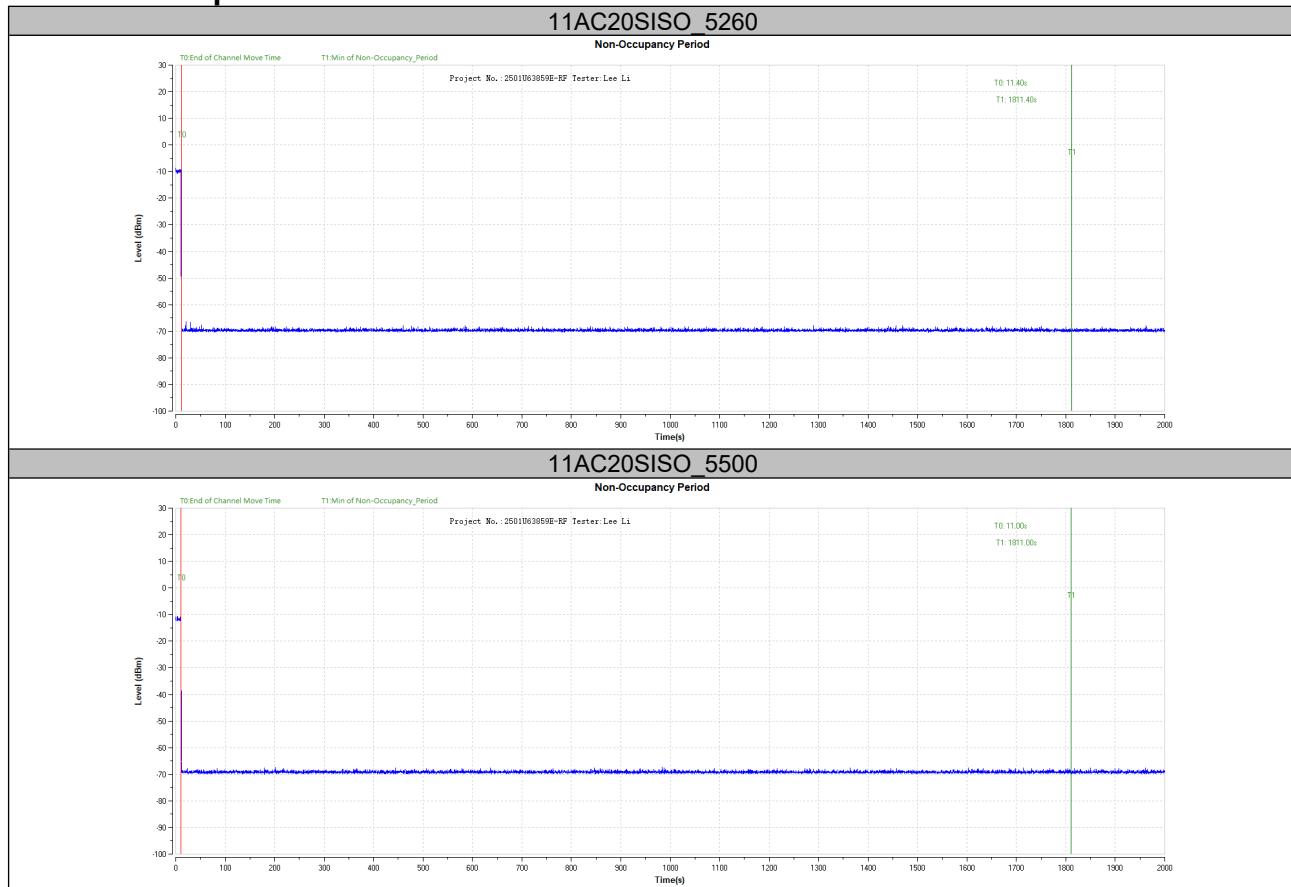


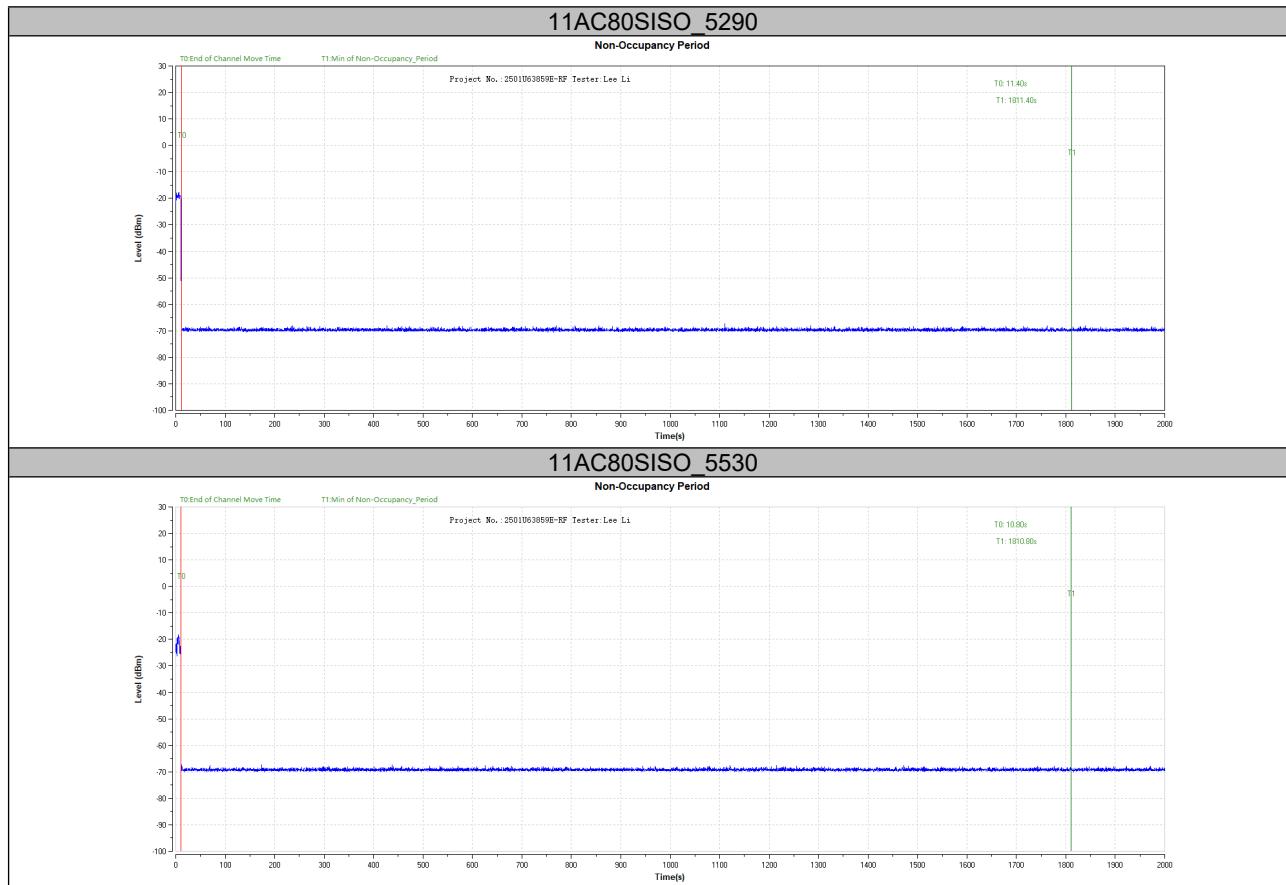
## Appendix C: Non-Occupancy Period

### Test Result

Test Mode	Frequency[MHz]	Result	Limit[s]	Verdict
11AC20SISO	5260	see test graph	≥1800	PASS
	5500	see test graph	≥1800	PASS
11AC80SISO	5290	see test graph	≥1800	PASS
	5530	see test graph	≥1800	PASS

### Test Graphs





\*\*\*\*\* END OF REPORT \*\*\*\*\*