

**FCC - TEST REPORT**Report Number : **709502405776-00E** Date of Issue: November 19, 2024Model : Refer to page 4Product Type : Acoustic Thermal ImagerApplicant : FOTRIC INC.Address : No. 14, Lane 2500, Xiupu Road, Pudong, 201201 Shanghai,  
PEOPLE'S REPUBLIC OF CHINAManufacturer : FOTRIC INC.Address : No. 14, Lane 2500, Xiupu Road, Pudong, 201201 Shanghai,  
PEOPLE'S REPUBLIC OF CHINATest Result : ☒ **Positive** ☐ **Negative**Total pages including Appendices : 27

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## 2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
709502405776-00E	First Issue	11/19/2024

## 3 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

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Designation  
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IC Company  
Number: 25988

CAB identifier: CN0101

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## 4 Description of the Equipment under Test

Product: Acoustic Thermal Imager

Model no.:

Fotric 330MiX	Fotric 340MiX	Fotric 850MiX	Fotric V0MiX	Fotric EE0VM	Fotric EE0IM
Fotric 331MiX	Fotric 341MiX	Fotric 851MiX	Fotric V1MiX	Fotric EE1VM	Fotric EE1IM
Fotric 332MiX	Fotric 342MiX	Fotric 852MiX	Fotric V2MiX	Fotric EE2VM	Fotric EE2IM
Fotric 333MiX	Fotric 343MiX	Fotric 853MiX	Fotric V3MiX	Fotric EE3VM	Fotric EE3IM
Fotric 334MiX	Fotric 344MiX	Fotric 854MiX	Fotric V4MiX	Fotric EE4VM	Fotric EE4IM
Fotric 335MiX	Fotric 345MiX	Fotric 855MiX	Fotric V5MiX	Fotric EE5VM	Fotric EE5IM
Fotric 336MiX	Fotric 346MiX	Fotric 856MiX	Fotric V6MiX	Fotric EE6VM	Fotric EE6IM
Fotric 337MiX	Fotric 347MiX	Fotric 857MiX	Fotric V7MiX	Fotric EE7VM	Fotric EE7IM
Fotric 338MiX	Fotric 348MiX	Fotric 858MiX	Fotric V8MiX	Fotric EE8VM	Fotric EE8IM
Fotric 339MiX	Fotric 349MiX	Fotric 859MiX	Fotric V9MiX	Fotric EE9VM	Fotric EE9IM
Fotric 3310MiX	Fotric 3410MiX	Fotric 8510MiX	Fotric V10MiX	Fotric EE10VM	Fotric EE10IM
WWZDH2	WVZDH2	RUZDH2	4ZDH2	LLZ4D	LLZHD
WWYDH2	WVYDH2	RUYDH2	4YDH2	LLY4D	LLYHD
WWXDH2	WVXDH2	RUXDH2	4XDH2	LLX4D	LLXHD
WWWDH2	WVWDH2	RUWDH2	4WDH2	LLW4D	LLWHD
WWVDH2	WVVDH2	RUVDH2	4VDH2	LLV4D	LLVHD
WWUDH2	WVUDH2	RUUDH2	4UDH2	LLU4D	LLUHD
WWTDH2	WVTDH2	RUTDH2	4TDH2	LLT4D	LLTHD
WWSDH2	WVSDH2	RUSDH2	4SDH2	LLS4D	LLSHD
WWRDH2	WVRDH2	RURDH2	4RDH2	LLR4D	LLRHD
WWQDH2	WVQDH2	RUQDH2	4QDH2	LLQ4D	LLQHD
WWYZDH2	WVYZDH2	RUYZDH2	4YZDH2	LLYZ4D	LLYZHD
UniC78Mix	5CHNDH2				

FCC ID: 2AZTCFCAC2IN1F

Options and accessories: NA

Rating: DC 7.4V for Acoustic Thermal Imager  
Input: AC 100-240V, 50/60Hz, Output DC 12V for adapter

RF Transmission For Bluetooth: 2402~2480MHz

Frequency: For 2.4G Wi-Fi: 802.11b/g/n-HT20: 2412~2462 MHz  
802.11n-HT40: 2422~2452 MHz

For 5G Wi-Fi: 5180~5240 MHz (U-NII-1)  
5260~5320 MHz (U-NII-2A)  
5500~5720 MHz (U-NII-2C)  
5745~5825 MHz (U-NII-3)

No. of Operated Channel: 79 channels for Bluetooth EDR

Ch	Fre (MH)	Ch	Fre (MH)	Ch	Fre (MH)	Ch	Fre (MH)	Ch	Fre (MH)
1	2402	17	2418	33	2434	49	2450	65	2466
2	2403	18	2419	34	2435	50	2451	66	2467
3	2404	19	2420	35	2436	51	2452	67	2468
4	2405	20	2421	36	2437	52	2453	68	2469
5	2406	21	2422	37	2438	53	2454	69	2470
6	2407	22	2423	38	2439	54	2455	70	2471
7	2408	23	2424	39	2440	55	2456	71	2472
8	2409	24	2425	40	2441	56	2457	72	2473
9	2410	25	2426	41	2442	57	2458	73	2474
10	2411	26	2427	42	2443	58	2459	74	2475
11	2412	27	2428	43	2444	59	2460	75	2476
12	2413	28	2429	44	2445	60	2461	76	2477
13	2414	29	2430	45	2446	61	2462	77	2478
14	2415	30	2431	46	2447	62	2463	78	2479
15	2416	31	2432	47	2448	63	2464	79	2480
16	2417	32	2433	48	2449	64	2465		

40 channels for Bluetooth 4.2 BLE

Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

2.4GHz WIFI: 11 for 802.11b/802.11g/802.11(H20);  
7 for 802.11n(HT40)

802.11b/g/n(HT20)				802.11n(HT40)			
Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)	Ch	Fre(MHz)
1	2412	7	2442	3	2422	8	2447MHz
2	2417	8	2447	4	2427	9	2452MHz
3	2422	9	2452	5	2432		
4	2427	10	2457	6	2437		
5	2432	11	2462	7	2442		
6	2437						

5180~5240 MHz (U-NII-1):

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

### 5260~5320 MHz (U-NII-2A)

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290		

### 5500~5720 MHz (U-NII-2C)

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600	144	5720

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590	142	5710

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	138	5690
122	5610		

**5745~5825 MHz (U-NII-3): Channel 149 – 165**

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5755

Modulation:	Bluetooth EDR FHSS: GFSK, $\pi/4$ DQPSK, 8DPSK Bluetooth 4.2+BLE DHSS: GFSK For Wi-Fi: Direct Sequence Spread Spectrum (DSSS) for 802.11b Orthogonal Frequency Division Multiplexing (OFDM) for 802.11a/b/g/n/ac
Hardware Version:	V02
Software Version:	V6.4.2
Data speed:	1. Bluetooth EDR FHSS: 1Mbps, 2Mbps, 3Mbps 2. Bluetooth 4.2+BLE DHSS: 1Mbps 3. Wi-Fi: 11b 1 ~ 11Mbps, 11g/a 6 ~ 54Mbps, 11n HT20 6.5 ~ 72.2Mbps, 11n HT 40 13.5 ~ 150Mbps, 11ac VHT40 13.5 ~ 200Mbps, 11ac VHT80 29.3 ~ 433.3Mbps
Antenna Type:	PIFA Antenna
Antenna Gain:	1.76dBi for 2.4GHz; 5.96dBi for 5GHz
Description of the EUT:	The Equipment Under Test (EUT) is an Acoustic Thermal Imager with Bluetooth and Wi-Fi Module. The EUT support Bluetooth EDR, BLE function, Wi-Fi 2.4GHz and Wi-Fi 5GHz. According to the client's declaration, all the models share the same schematic, hardware circuit, PCB layout, including RF parameters, except for the number of enabled microphone modules. We chose model Fotric H6 to perform all the tests and listed the worst data in this report. Only 5GHz DFS testing results were included in this report.
Test sample no.:	SHA-832647-2 (RF Conducted); SHA-832647-3 (RF Radiated)



The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.





## 5 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart E 15.407(h)	PART 15 - RADIO FREQUENCY DEVICES Subpart E - Unlicensed National Information Infrastructure Devices

Test Method:

KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02

KDB 662911 D01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band

ANSI C63.10-2020, American National Standard for Testing Unlicensed Wireless Devices

## 6 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart E; KDB 905462 D02				
Clause	Test	Test Result		
		Pass	Fail	N/A
15.407(h)(2); 6.3; 7.8.1	UNII Detection Bandwidth	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15.407(h)(2); 6.3; 7.8.2  Performance Requirement Check	Initial Channel Availability Check Time (CAC)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Radar Burst at the Beginning of the CAC	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Radar Burst at the End of the CAC	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15.407(h)(2); 6.3; 7.8.3  In-Service Monitoring	Channel Move Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Channel Closing Transmission Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Non-Occupancy Period	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407; 6.3; 7.8.4	Statistical Performance Check	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Remark: The EUT is a Client Device without Radar Detection.



## 7 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2AZTCFCAC2IN1F, complies with DFS requirement in FCC Part 15 Subpart E.

### SUMMARY:

All tests according to the regulations cited on page 6 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: July 12, 2024

Testing Start Date: July 25, 2024

Testing End Date: July 31, 2024

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:



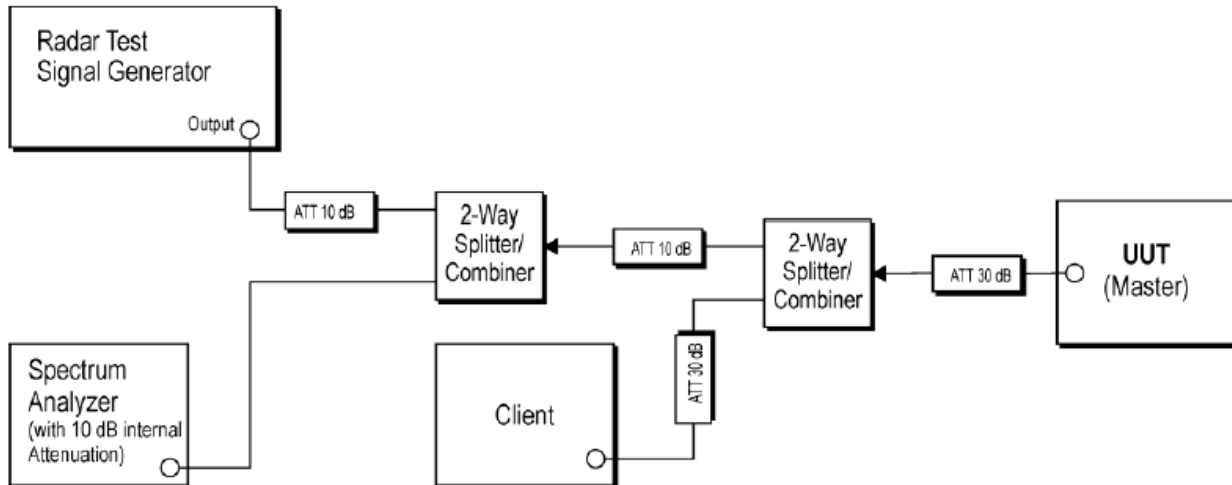
Hui TONG  
Review Engineer

Wenqiang LU  
Project Engineer

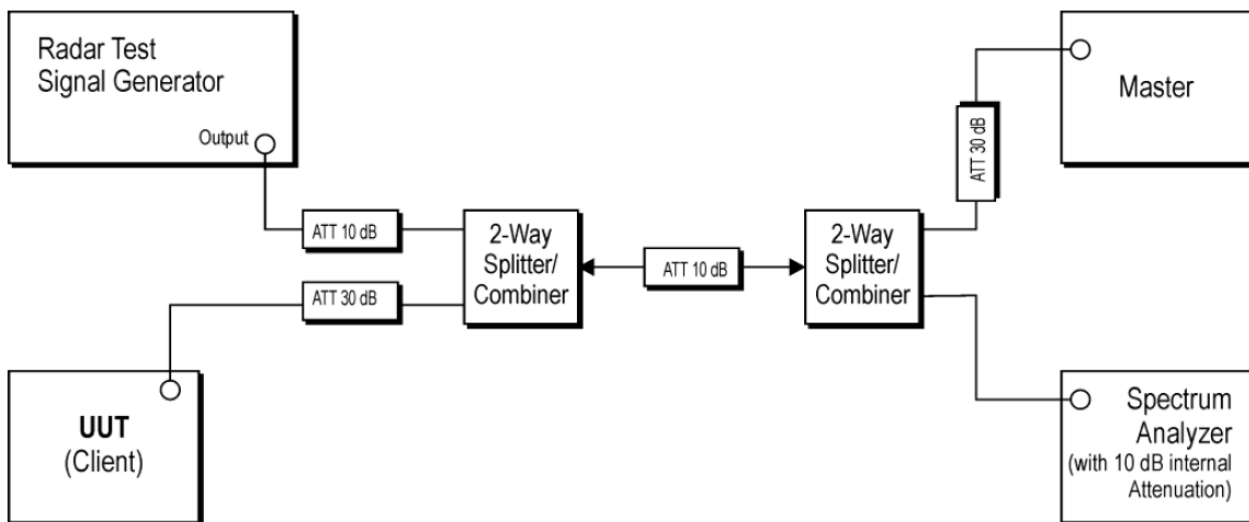
Chengjie GUO  
Test Engineer

## 8 Test Setups

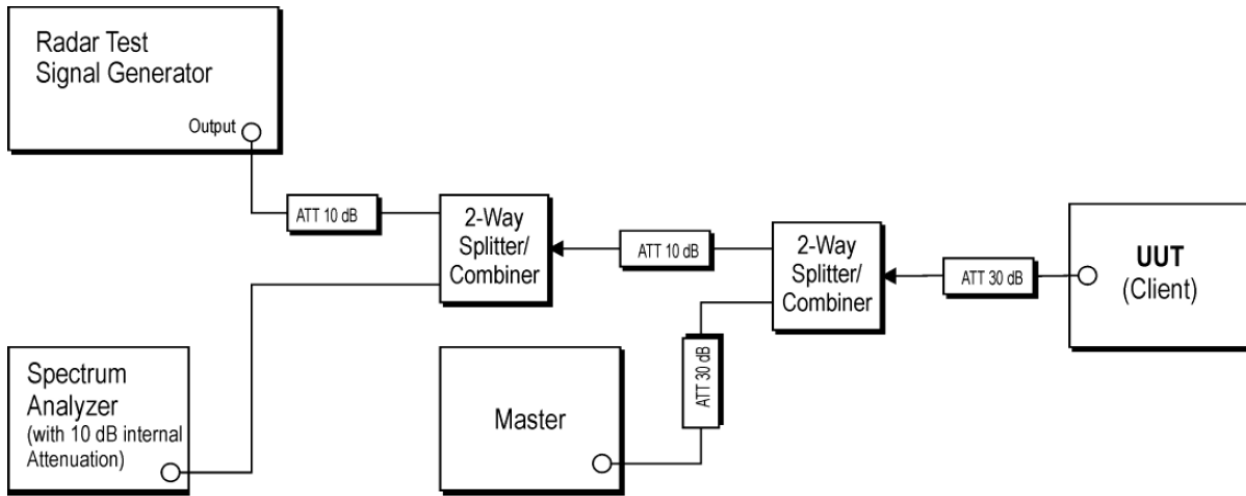
### 8.1 Setup for Master with injection at the Master



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



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



## 9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)
Notebook	Lenovo	X240
Dual Band Wi-Fi Router (FCC ID: MSQ-RTAXJ300)	ASUS	RT-AX82U

Test software: MTS 8310

The system was configured to channel:

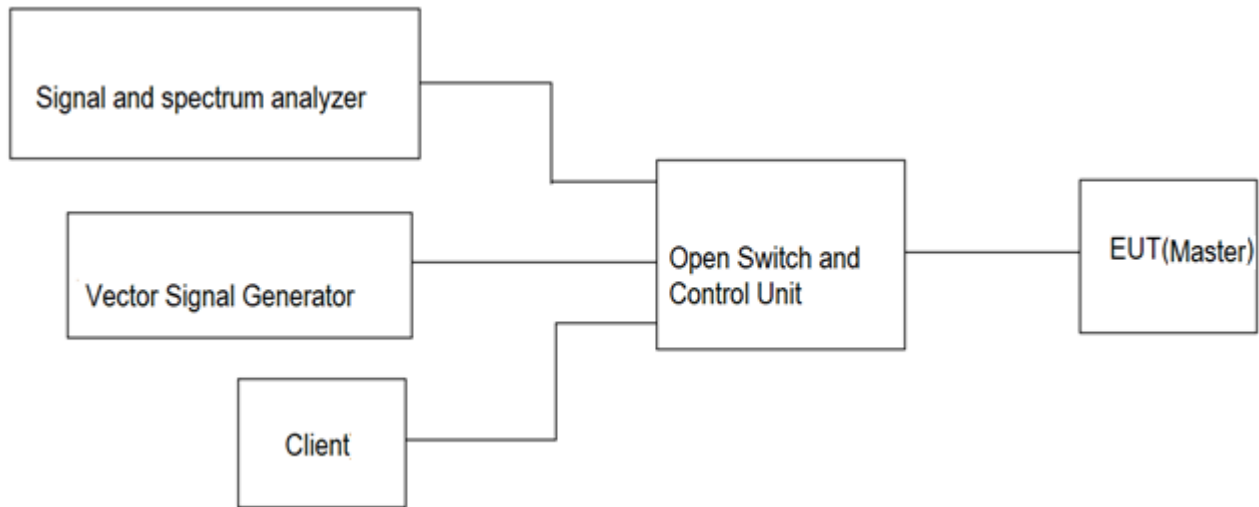
Test Mode	Channel (MHz)
802.11ac VHT80	5G WIFI-Band 2
	CH58 (5290MHz)
	5G WIFI-Band 3
	CH106 (5530MHz)

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Modulation Type	Data Rate
802.11a OFDM	6Mbps
802.11n (HT20): OFDM	MCS0 (6.5Mbps)
802.11n (HT40): OFDM	MCS0 (13.5Mbps)
802.11ac (VHT20): OFDM	11ac 6.5Mbps (20MHz)
802.11ac (VHT40): OFDM	11ac 13.5Mbps (40MHz)
802.11ac (VHT80): OFDM	11ac 29.3Mbps (80MHz)

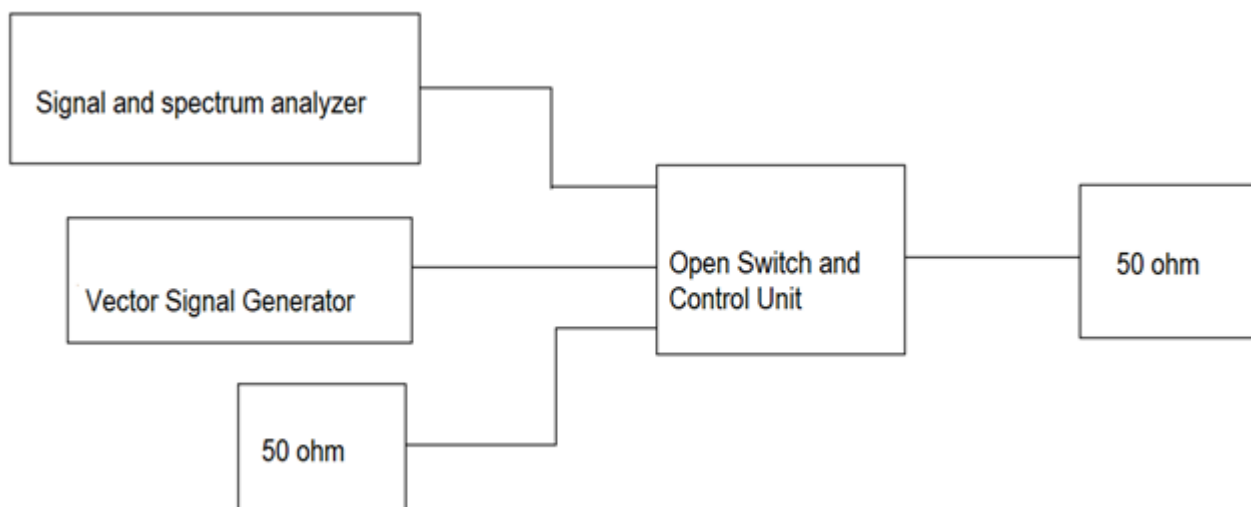
## 9.2 MWRF test system configuration

### Conducted Test



### Conducted Radar waveform calibration

- (1) A 50ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master.
- (2) The interference Radar Detection Threshold Level is  $-62\text{dBm} + 2.9\text{dB} + 1.5\text{dB} = -57.6\text{dBm}$  that had been taken into account the output power range and antenna gain.
- (3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3MHz. The spectrum analyzer had offset -1.5dB to compensate RF cable loss 1.5dB. And antenna cable is supplied with device, so antenna cable loss is 0.4dB.
- (4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was  $-62\text{dBm} + 2.9\text{dB} + 1.5\text{dB} = -57.6\text{dBm}$ . Capture the spectrum analyzer plots on short pulse radar waveform.





### 9.3 Channel Loading

System testing will be performed with channel-loading using means appropriate to the data types that are used by the unlicensed device. The following requirements apply:

<input type="checkbox"/>	a) The data file must be of a type that is typical for the device (i.e., MPEG-2, MPEG-4, WAV, MP3, MP4, AVI, etc.) and must generally be transmitting in a streaming mode.
<input checked="" type="checkbox"/>	b) Software to ping the client is permitted to simulate data transfer but must have random ping intervals.
<input checked="" type="checkbox"/>	c) Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time). This can be done with any appropriate channel BW and modulation type.
<input type="checkbox"/>	d) Unicast or Multicast protocols are preferable but other protocols may be used. The appropriate protocol used must be described in the test procedures.



## 10 Dynamic Frequency Selection (DFS) Requirement

### 10.1 DFS Overview

The following table from KDB 905462 lists the applicable requirements for the DFS testing.

**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.		

## 10.2 DFS Detection Thresholds

**Table 3** below provides the *DFS Detection Thresholds* for *Master Devices* as well as *Client Devices* incorporating *In-Service Monitoring*

**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
<p><b>Note 1:</b> This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p><b>Note 2:</b> 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.</p> <p><b>Note3:</b> EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p>	

## 10.3 Response Requirements

**Table 4** provides the response requirements for *Master* and *Client Devices* incorporating DFS.

**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.
<p><b>Note 1:</b> <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p><b>Note 2:</b> The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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.</p> <p><b>Note 3:</b> During the <i>U-NII Detection Bandwidth</i> 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.</p>	

## 10.5 RADAR TEST WAVEFORMS

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. 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.

**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 $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{PRI_{\mu sec}} \right) \right\}$	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
Aggregate (Radar Types 1-4)				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 μsec is selected, the number of pulses would be

$$\text{Roundup} \left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{3066} \right) \right\} = \text{Round up } \{17.2\} = 18.$$

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

<b>Pulse Repetition Frequency Number</b>	<b>Pulse Repetition Frequency (Pulses Per Second)</b>	<b>Pulse Repetition Interval (Microseconds)</b>
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.

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

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

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

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

- 1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
- 2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
- 3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
- 4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
- 5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
- 6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.
- 7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length  $(12,000,000 / \text{Burst Count})$  microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and  $[(12,000,000 / \text{Burst Count}) - (\text{Total Burst Length}) + (\text{One Random PRI Interval})]$  microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

#### **A representative example of a Long Pulse Radar Type waveform:**

- 1) The total test waveform length is 12 seconds.
- 2) Eight (8) *Bursts* are randomly generated for the *Burst Count*.
- 3) *Burst* 1 has 2 randomly generated pulses.
- 4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
- 5) The PRI is randomly selected to be at 1213 microseconds.
- 6) *Bursts* 2 through 8 are generated using steps 3 – 5.
- 7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

**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

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

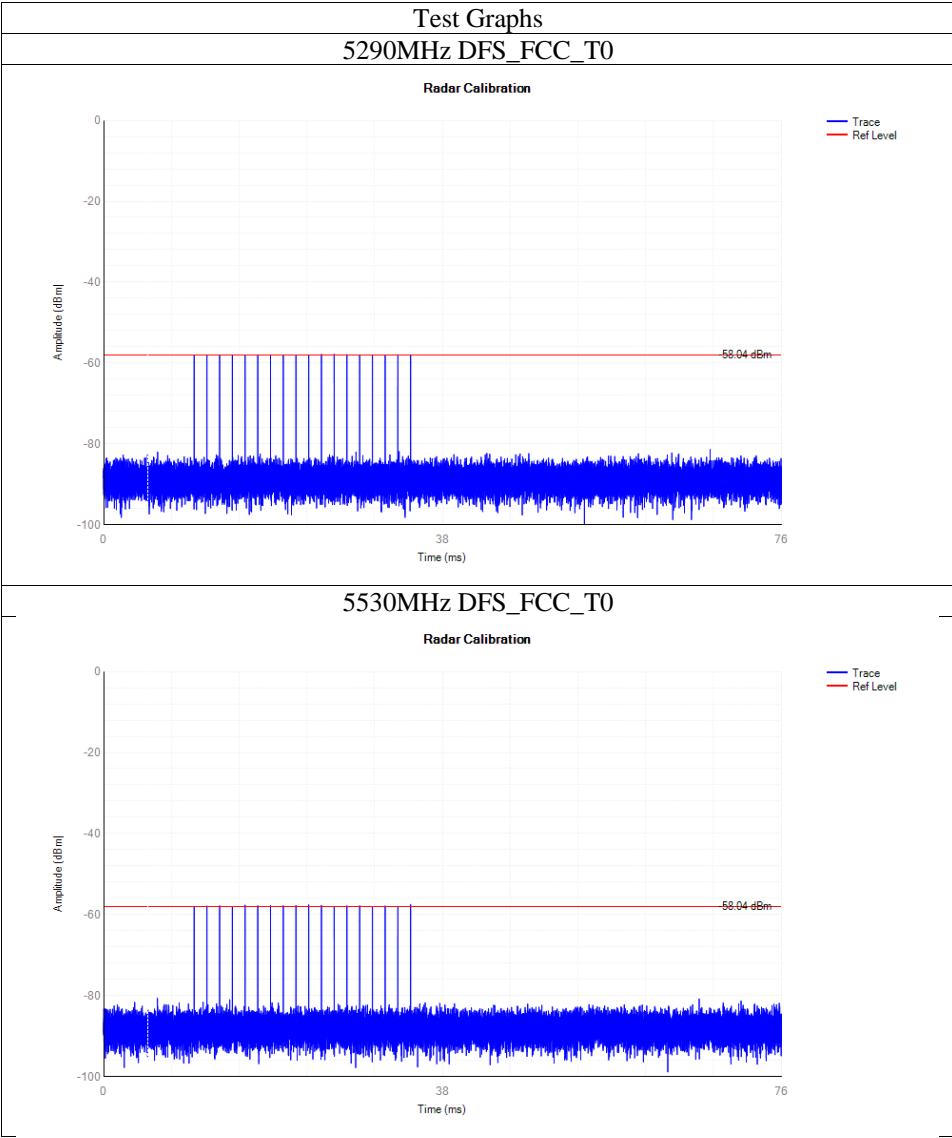
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.





11 Test result

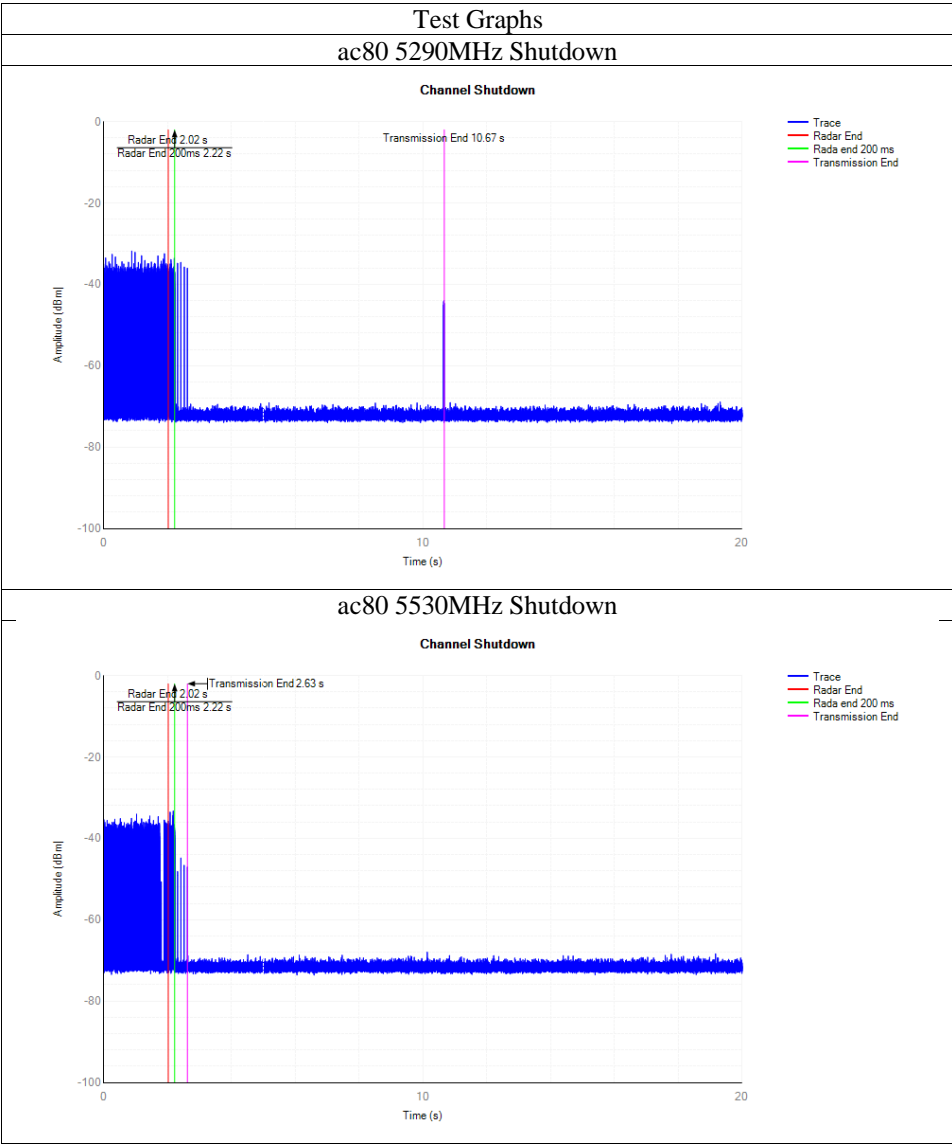
DFS Calibration





Shutdown Time

Mode	Frequency (MHz)	Channel Move Time (s)	Limit Channel Move Time (s)	Close Transmission Time (s)	Limit Close Transmission Time (s)	Close Transmission Time after 200ms(s)	Limit Close Transmission Time after 200ms (s)	Verdict
ac80	5290	8.6464	10	0.141	0.26	0.011	0.06	Pass
ac80	5530	0.6010	10	0.136	0.26	0.009	0.06	Pass



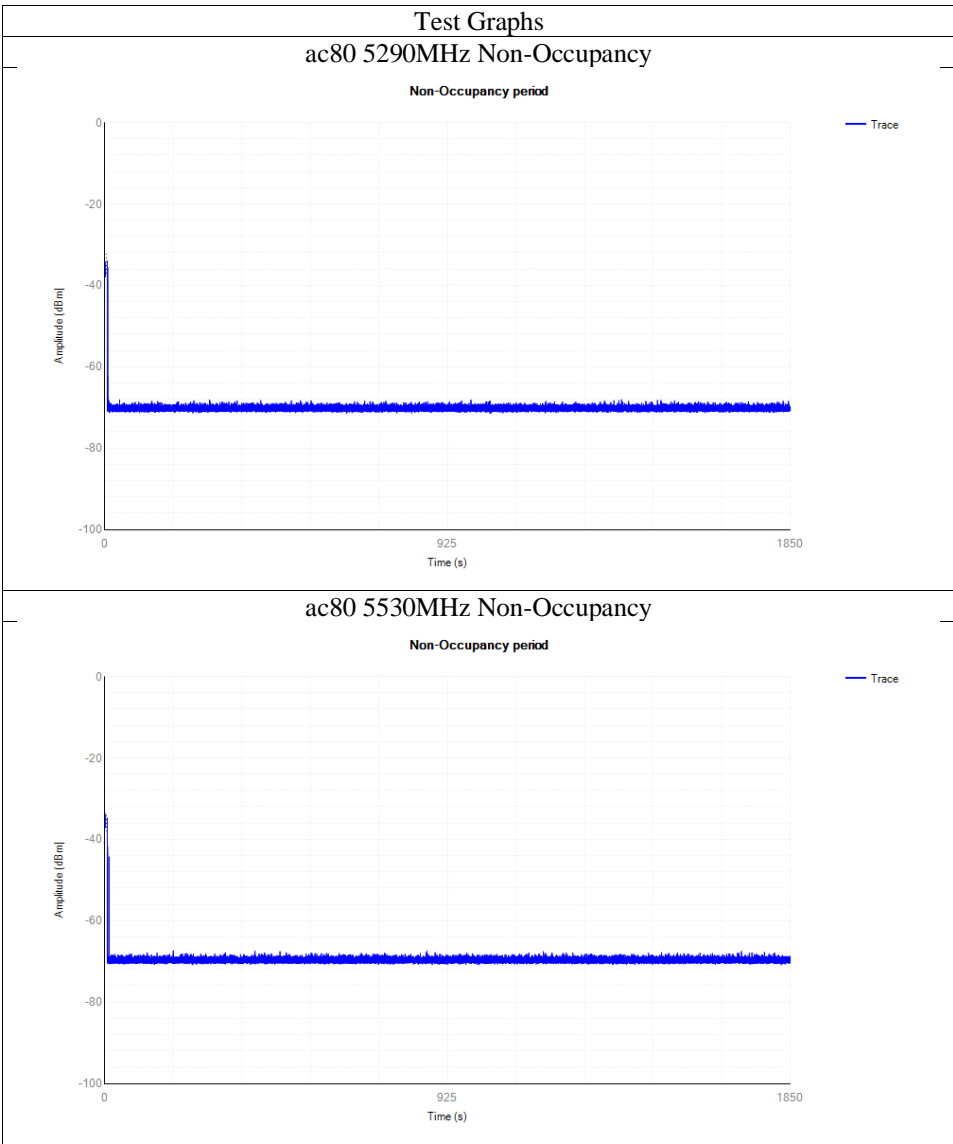




Non-Occupancy

During the 30 minutes observation time, UUT did not make any transmissions on a channel after a radar signal was detected on that channel by either the Channel Availability Check or the In-Service Monitoring.

Mode	Frequency (MHz)	Result	Verdict
ac80	5290	See test Graph	Pass
ac80	5530	See test Graph	Pass



## 12 Test Equipment List

### MWRF Test System

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
C	Vector signal generator	Agilent	N5182A	S2110417b-YQ-EMC	2023-10-11	2024-11-09
	Signal spectrum analyzer	Agilent	N9020B	MY59050168	2024-2-19	2025-2-18
	RF automatic control unit	MWRFtest	MW100-RFCB	S2110418b-YQ-EMC	2023-9-28	2024-9-27
	Signal Analyzer	R & S	FSV40	S1503003-YQ-EMC	2023-8-1	2024-7-31
	Signal Analyzer	R & S	FSV40	S1503003-YQ-EMC	2024-8-1	2025-7-31

Measurement Software Information			
Test Item	Software	Manufacturer	Version
C	MTS 8310	MWRFtest	3.0.0.0



13 System Measurement Uncertainly

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, $\pm 3.16\text{dB}$
Radiated Disturbance	30MHz to 1GHz, $\pm 5.03\text{dB}$ (Horizontal) $\pm 5.12\text{dB}$ (Vertical)
	1GHz to 18GHz, $\pm 5.15\text{dB}$ (Horizontal) $\pm 5.12\text{dB}$ (Vertical)
	18GHz to 25GHz, $\pm 4.76\text{dB}$

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.

-----End of Test Report-----