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Issued date : 2022/1/6  
FCC ID : RYK-WNFQ268AXB

## **DFS TEST REPORT**

**Product** : Wi-Fi 6E BT M.2 Module

**Model Name** : WNFQ-268AXI(BT)

**Series Model** : WNFQ-268AX(BT)

**FCC ID** : RYK-WNFQ268AXB

**Test Regulation** : FCC 47 CFR Part 15 Subpart E (Section 15.407)

**Received Date** : 2021/9/3

**Test Date** : 2021/9/30 ~ 2021/11/10

**Issued Date** : 2022/1/6

**Applicant** : SparkLAN Communications, Inc.  
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City  
11493, Taiwan (R.O.C.)

**Issued By** : Underwriters Laboratories Taiwan Co., Ltd.  
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,  
Zhudong Township, Hsinchu County, Taiwan



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Doc No: 17-EM-F0886 / 5.0



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## REVISION HISTORY

**Original Test Report No.: 4790042400-US-R3-V0**

[illegible]

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## 1. Attestation of Test Results

**APPLICANT:** SparkLAN Communications, Inc.  
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493,  
Taiwan (R.O.C.)

**MANUFACTURER:** SparkLAN Communications, Inc.  
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City  
11493, Taiwan (R.O.C.)

**EUT DESCRIPTION:** Wi-Fi 6E BT M.2 Module

**BRAND:** SparkLAN

**MODEL:** WNFQ-268AXI(BT)

**SERIES MODEL:** WNFQ-268AX(BT)

**SAMPLE STAGE:** Engineering Verification Test sample

**DATE of TESTED:** 2021/9/6 ~ 2021/11/10

### APPLICABLE STANDARDS

| STANDARD                                      | Test Results |
|-----------------------------------------------|--------------|
| FCC 47 CFR PART 15 Subpart E (Section 15.407) | PASS         |

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Sally Lu  
Project Handler

Date : 2022/1/6

Approved and Authorized By:

Waternil Guan  
Engineer

Date : 2022/1/6

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## 2. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, FCC KDB 905462 D06 802 11 Channel Plans v02, KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02.

## 3. Facilities and Accreditation

|                                  |                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Test Location</b>             | Underwriters Laboratories Taiwan Co., Ltd.                                                            |
| <b>Address</b>                   | Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan |
| <b>Accreditation Certificate</b> | Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.                |

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## 4. Equipment under Test

### 4.1 Description of EUT

|                                  |                                                                    |
|----------------------------------|--------------------------------------------------------------------|
| <b>Product</b>                   | Wi-Fi 6E BT M.2 Module                                             |
| <b>Brand Name</b>                | SparkLAN                                                           |
| <b>Model Name</b>                | WNFQ-268AXI(BT)                                                    |
| <b>Series Model</b>              | WNFQ-268AX(BT)                                                     |
| <b>Normal Voltage</b>            | 3.3 Vdc                                                            |
| <b>S/N</b>                       | 21765J2100036                                                      |
| <b>Sample ID</b>                 | 4158081                                                            |
| <b>Operating Frequency Range</b> | 5250~5350MHz<br>5470~5725MHz                                       |
| <b>Operational Mode</b>          | <input type="checkbox"/> Client with radar detection               |
|                                  | <input checked="" type="checkbox"/> Client without radar detection |
| <b>TPC Function</b>              | <input checked="" type="checkbox"/> with TPC                       |
|                                  | <input type="checkbox"/> without TPC                               |
| <b>Weather Band</b>              | <input checked="" type="checkbox"/> with 5600 ~ 5650MHz            |
|                                  | <input type="checkbox"/> without 5600 ~ 5650MHz                    |

Note:

1. The models difference table as below:

| Model           | Difference                                                                                   |
|-----------------|----------------------------------------------------------------------------------------------|
| WNFQ-268AXI(BT) | WNFQ-268AXI(BT) Operating Temp -40~+75;<br>WNFQ-268AX(BT) Operating Temp -10~+65             |
| WNFQ-268AX(BT)  | In addition, the sample has A-E key and E key versions. Only the golden finger is different. |

\*Except above change, there is no change to technical construction that is included circuit diagram, PCB Layout, components and component layout, all electrical construction, and mechanical construction.

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## 4.2 EUT Software and Firmware Version

| Software/Firmware Version |
|---------------------------|
| Driver Version: 1.0.0.827 |

## 4.3 Support Equipment

| No. | Equipment | Brand Name | Model Name | FCC ID       | Remark         |
|-----|-----------|------------|------------|--------------|----------------|
| A   | AP        | ASUS       | RT-AX88U   | MSQ-RTAXHP00 | Provide by lab |

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#### 4.4 Description of Available Antennas

| Ant. No. | Transmitter Circuit | Brand Name | Model Name    | Ant. Type | Frequency Band (MHz) | Maximum Gain (dBi) | Remark |
|----------|---------------------|------------|---------------|-----------|----------------------|--------------------|--------|
| 1        | Chain (0)+(1)       | SparkLAN   | AD-500AX      | Dipole    | 2400~2483            | 2.65               | RP-SMA |
|          |                     |            |               |           | 5150~5250            | 4.35               |        |
|          |                     |            |               |           | 5250~5350            | 4.35               |        |
|          |                     |            |               |           | 5470~5725            | 4.35               |        |
|          |                     |            |               |           | 5725~5850            | 4.81               |        |
|          |                     |            |               |           | 5925~6425            | 4.98               |        |
|          |                     |            |               |           | 6425~6525            | 4.85               |        |
|          |                     |            |               |           | 6525~6875            | 4.79               |        |
| 2        | Chain (0)+(1)       | SparkLAN   | AD-501AX      | Dipole    | 6875~7125            | 4.82               | RP-SMA |
|          |                     |            |               |           | 2400~2483            | 3.7                |        |
|          |                     |            |               |           | 5150~5850            | 5                  |        |
| 3        | Chain (0)+(1)       | SparkLAN   | AD-502AX      | PIFA      | 5925~7125            | 5                  | IPEX   |
|          |                     |            |               |           | 2400~2483            | 3.5                |        |
|          |                     |            |               |           | 5150~5850            | 5                  |        |
| 4        | Chain (0)+(1)       | SparkLAN   | AD-503AX      | Dipole    | 5925~7125            | 3.9                | RP-SMA |
|          |                     |            |               |           | 2400~2483            | 3.7                |        |
|          |                     |            |               |           | 5150~5850            | 5                  |        |
| 5        | Chain (0)+(1)       | JOHANSON   | 2450AD18A6050 | CHIP      | 5925~7125            | 5                  | NA     |
|          |                     |            |               |           | 2400~2483            | 2                  |        |
|          |                     |            |               |           | 5150~5850            | 1.5                |        |
| 6        | Chain (0)+(1)       | SparkLAN   | AD-504AX      | Dipole    | 5925~7125            | 2.7                | I-PEX  |
|          |                     |            |               |           | 2400~2483            | 2.67               |        |
|          |                     |            |               |           | 5150~5250            | 4.35               |        |
|          |                     |            |               |           | 5250~5350            | 3.83               |        |
|          |                     |            |               |           | 5470~5725            | 4.7                |        |
|          |                     |            |               |           | 5725~5850            | 4.87               |        |
|          |                     |            |               |           | 5925~6425            | 4.91               |        |
|          |                     |            |               |           | 6425~6525            | 4.85               |        |
| 7        | Chain (0)+(1)       | SparkLAN   | AD-505AX      | Dipole    | 6525~6875            | 4.94               | I-PEX  |
|          |                     |            |               |           | 6875~7125            | 4.94               |        |
|          |                     |            |               |           | 2400~2483            | 2.67               |        |
|          |                     |            |               |           | 5150~5250            | 4.35               |        |
|          |                     |            |               |           | 5250~5350            | 3.83               |        |
|          |                     |            |               |           | 5470~5725            | 4.7                |        |
|          |                     |            |               |           | 5725~5850            | 4.87               |        |
|          |                     |            |               |           | 5925~6425            | 4.91               |        |
|          |                     |            |               |           | 6425~6525            | 4.85               |        |
|          |                     |            |               |           | 6525~6875            | 4.94               |        |
|          |                     |            |               |           | 6875~7125            | 4.94               |        |

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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## 4.5 EUT Maximum Conducted Power

### Non-Beamforming Mode

#### 802.11a

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 19.98             | 99.54            |
| 2       | 5470~5725            | 19.92             | 98.18            |

#### 802.11ax (HE20)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 19.82             | 95.94            |
| 2       | 5470~5725            | 19.73             | 93.97            |

#### 802.11ax (HE40)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 17.60             | 57.54            |
| 2       | 5470~5725            | 22.95             | 197.24           |

#### 802.11ax (HE80)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 12.33             | 17.10            |
| 2       | 5470~5725            | 22.09             | 161.81           |

#### 802.11ax (HE160)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 11.51             | 14.16            |
| 2       | 5470~5725            | 11.83             | 15.24            |

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## Beamforming Mode

### 802.11ax (HE20)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 19.36             | 86.30            |
| 2       | 5470~5725            | 19.41             | 87.30            |

### 802.11ax (HE40)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 17.25             | 53.09            |
| 2       | 5470~5725            | 22.54             | 179.47           |

### 802.11ax (HE80)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 11.90             | 15.49            |
| 2       | 5470~5725            | 21.66             | 146.56           |

### 802.11ax (HE160)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 11.22             | 13.24            |
| 2       | 5470~5725            | 11.45             | 13.96            |

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#### 4.6 EUT Maximum E.I.R.P. Power

##### Non-Beamforming Mode

###### 802.11a

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 24.98             | 314.78           |
| 2       | 5470~5725            | 24.92             | 310.46           |

###### 802.11ax (HE20)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 24.82             | 303.39           |
| 2       | 5470~5725            | 24.73             | 297.17           |

###### 802.11ax (HE40)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 22.60             | 181.97           |
| 2       | 5470~5725            | 27.95             | 623.74           |

###### 802.11ax (HE80)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 17.33             | 54.08            |
| 2       | 5470~5725            | 27.09             | 511.68           |

###### 802.11ax (HE160)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 16.51             | 44.77            |
| 2       | 5470~5725            | 16.83             | 48.20            |

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## Beamforming Mode

### 802.11ax (HE20)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 24.36             | 272.90           |
| 2       | 5470~5725            | 24.41             | 276.06           |

### 802.11ax (HE40)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 22.25             | 167.88           |
| 2       | 5470~5725            | 27.54             | 567.55           |

### 802.11ax (HE80)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 16.90             | 48.98            |
| 2       | 5470~5725            | 26.66             | 463.45           |

### 802.11ax (HE160)

| Ant No. | Frequency Band (MHz) | MAX. Power        |                  |
|---------|----------------------|-------------------|------------------|
|         |                      | Output Power(dBm) | Output Power(mW) |
| 2       | 5250~5350            | 16.22             | 41.88            |
| 2       | 5470~5725            | 16.45             | 44.16            |

## 4.7 Test Condition

| Test Item | Test Site No. | Environmental Condition | Input Power | Test Date                 | Tested by |
|-----------|---------------|-------------------------|-------------|---------------------------|-----------|
| DFS       | SR4           | 23~26°C/<br>60~65%RH    | 3.3Vdc      | 2021/09/30~<br>2021/11/10 | Mike Cai  |

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## 5. Test Equipment

| Test Equipment List                |              |           |            |            |              |
|------------------------------------|--------------|-----------|------------|------------|--------------|
| Equipment                          | Manufacturer | Model No. | Serial No. | Cal. Date  | Expired date |
| Antenna Port Conducted Measurement |              |           |            |            |              |
| Spectrum Analyzer                  | Keysight     | N9010A    | MY56070834 | 2020/11/6  | 2021/11/5    |
|                                    |              |           |            | 2021/10/29 | 2022/10/28   |
| Signal Generator                   | Keysight     | N5182B    | MY57300028 | 2020/11/18 | 2021/11/17   |
|                                    |              |           |            | 2021/11/14 | 2022/11/13   |

### UL Software

| Software             | Test Item          | Version  |
|----------------------|--------------------|----------|
| N7607B Signal Studio | DFS Radar Profiles | 3.0.0.0  |
| ISMointor10          | DFS measurement    | 10.0.0.0 |

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## 6. Test Result

### 6.1 Transmit Power Control (TPC)

#### Requirements

U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

#### Test Data

| Applicable | EIRP   | FCC 15.407 (h)(1)                                                       |
|------------|--------|-------------------------------------------------------------------------|
| √          | >500mW | The TPC mechanism is required for system with an EIRP of above 500mW    |
|            | <500mW | The TPC mechanism is not required for system with an EIRP of less 500mW |

The UUT can adjust a transmitter's output power based on the signal level present at the receiver is auto controlled by software.

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## 6.2 Dynamic Frequency Selection (DFS)

### 6.2.1 Applicability of DFS Requirements

Applicability of DFS Requirements Prior to use of a Channel :

| Requirement                                                                                                                                                                                                                                                                                                                                                                                               | Operational Mode |                                |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------|-----------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                           | Master           | Client Without Radar Detection | Client with Radar Detection |
| Non-Occupancy Period                                                                                                                                                                                                                                                                                                                                                                                      | Yes              | Yes <small>note</small>        | Yes                         |
| DFS Detection Threshold                                                                                                                                                                                                                                                                                                                                                                                   | Yes              | Not required                   | Yes                         |
| Channel Availability Check Time                                                                                                                                                                                                                                                                                                                                                                           | Yes              | Not required                   | Not required                |
| U-NII Detection Bandwidth                                                                                                                                                                                                                                                                                                                                                                                 | Yes              | Not required                   | Yes                         |
| Note: Per KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02 section (b)(5/6), If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear. An analyzer plot that contains a single 30-minute sweep on the original channel. |                  |                                |                             |

Applicability of DFS Requirements during Normal Operation :

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

| Additional requirements for devices with multiple bandwidth modes | Operational Mode                      |                                                      |
|-------------------------------------------------------------------|---------------------------------------|------------------------------------------------------|
|                                                                   | Master 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 all 20 MHz channel blocks and a null frequencies between the bonded 20 MHz channel blocks.

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## 6.2.2 DFS Detection Thresholds and Response Requirement

Below table provides the DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring.

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 and 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.<br>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.<br>Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01. |                               |

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 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.<br>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.<br>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. |                                                                                                          |

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### 6.2.3 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.

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 Note1                                  | See Note1                |
| 1                                                                                                                                    |                    | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a<br>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 | $\text{Roundup} \left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$ | 60%                                        | 30                       |
| 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                      |
| Note 1: 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.

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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                       |

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.

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

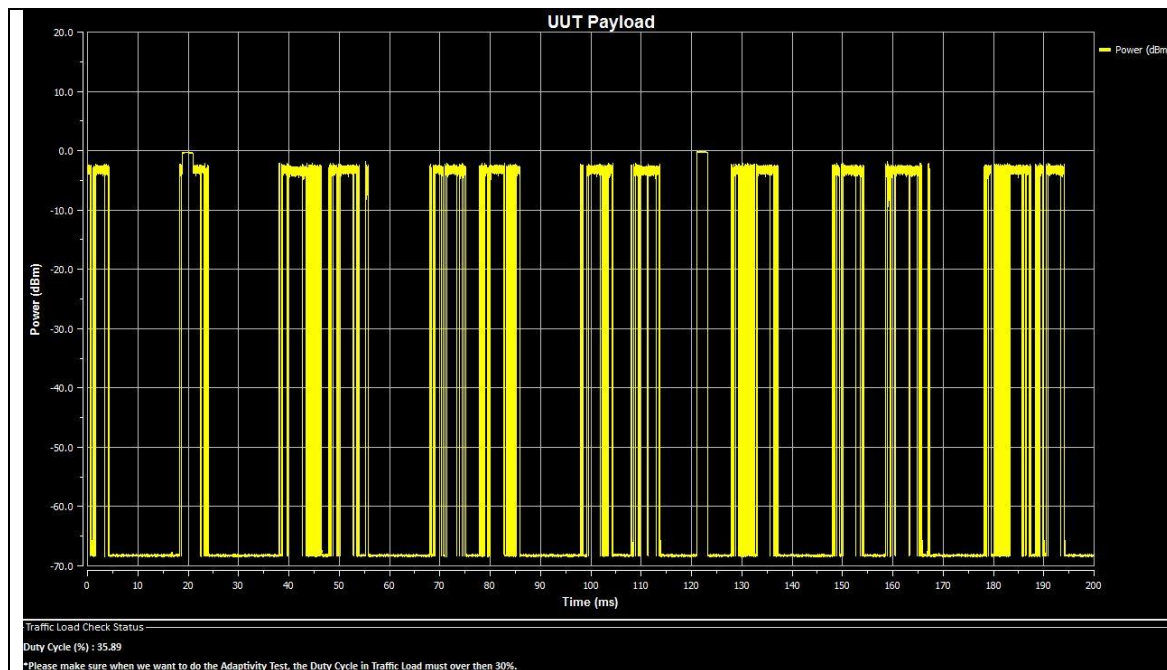
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## 6.2.4 Channel Loading / Data Streaming

|   |                                                                                                                                                                            |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | 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. |
|   | b) Software to ping the client is permitted to simulate data transfer but must have random ping intervals.                                                                 |
| V | c) Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17% or greater.                                                    |
|   | d) Unicast or Multicast protocols are preferable but other protocols may be used. The appropriate protocol used must be described in the test procedures.                  |

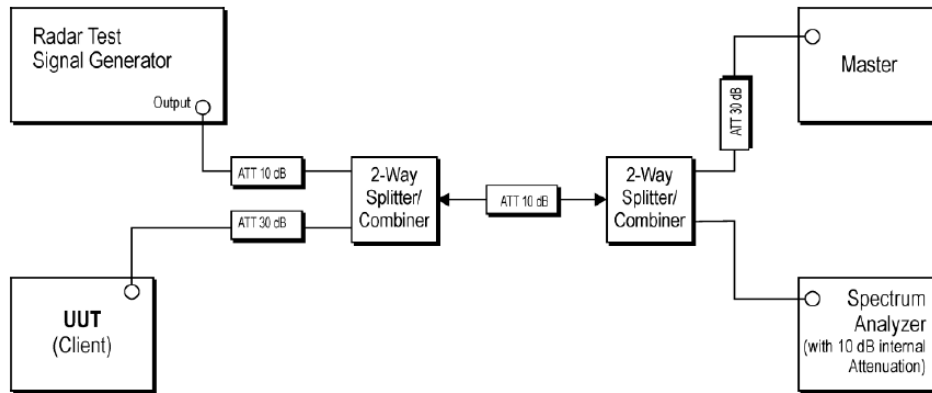


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### 6.2.5 Test Setup



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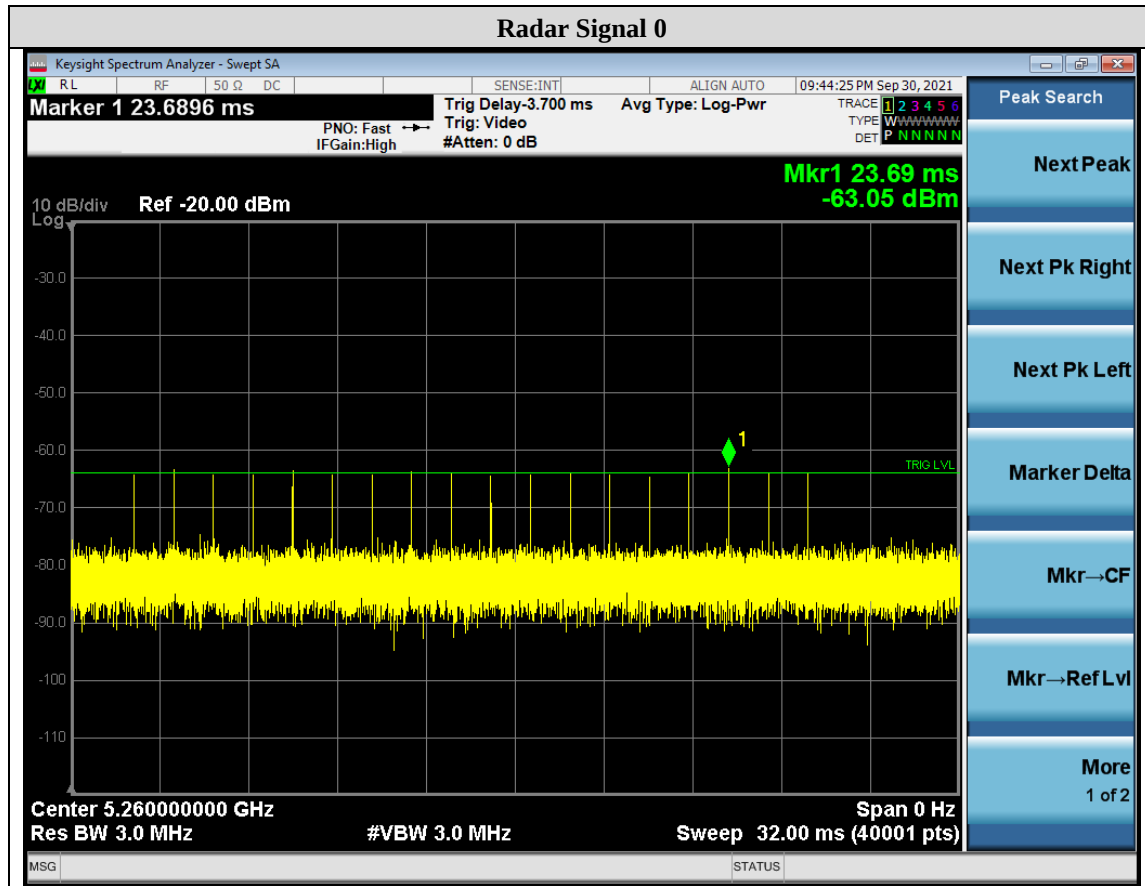
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## 6.2.6 Test Result

### DFS Detection Threshold

For detection threshold level of -64dBm, the required Radar Signal at antenna port was set to -64dBm + Ant Gain (0 dBi) + 1dB = -63 dBm. That had been taken into account the output power range and antenna gain.



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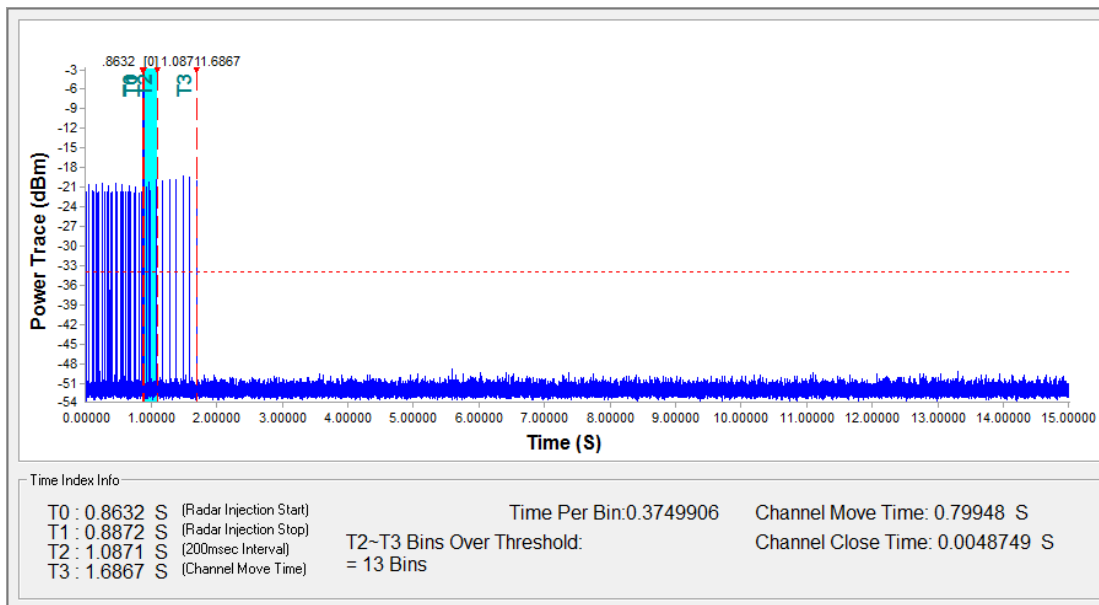


## Channel Move Time & Channel Closing Transmission Time

802.11ax (HE20)

CH52

| Channel Move Time(s)                  | Limit(s)  | Result |
|---------------------------------------|-----------|--------|
| 0.8                                   | 10        | PASS   |
| Channel Closing Transmission Time(ms) | Limit(ms) | Result |
| 4.87                                  | 60        | PASS   |



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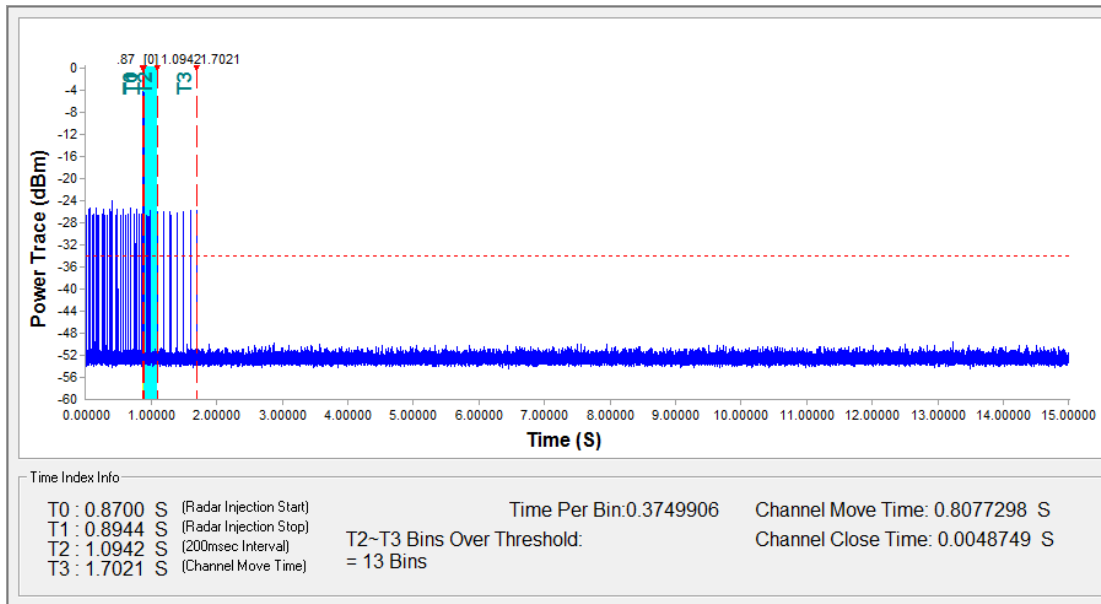
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802.11ax (HE80)

Ch58

| Channel Move Time(s)                  | Limit(s)  | Result |
|---------------------------------------|-----------|--------|
| 0.81                                  | 10        | PASS   |
| Channel Closing Transmission Time(ms) | Limit(ms) | Result |
| 4.87                                  | 60        | PASS   |



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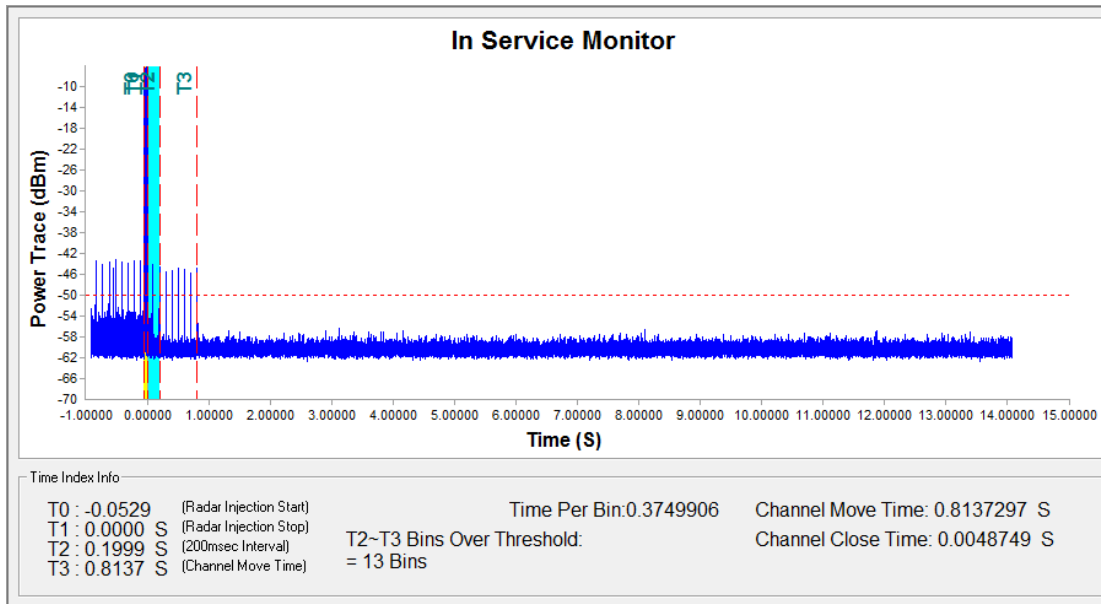
Doc No: 17-EM-F0886 / 5.0



802.11ax (HE160)

Ch50

| Channel Move Time(s)                  | Limit(s)  | Result |
|---------------------------------------|-----------|--------|
| 0.81                                  | 10        | PASS   |
| Channel Closing Transmission Time(ms) | Limit(ms) | Result |
| 4.87                                  | 60        | PASS   |



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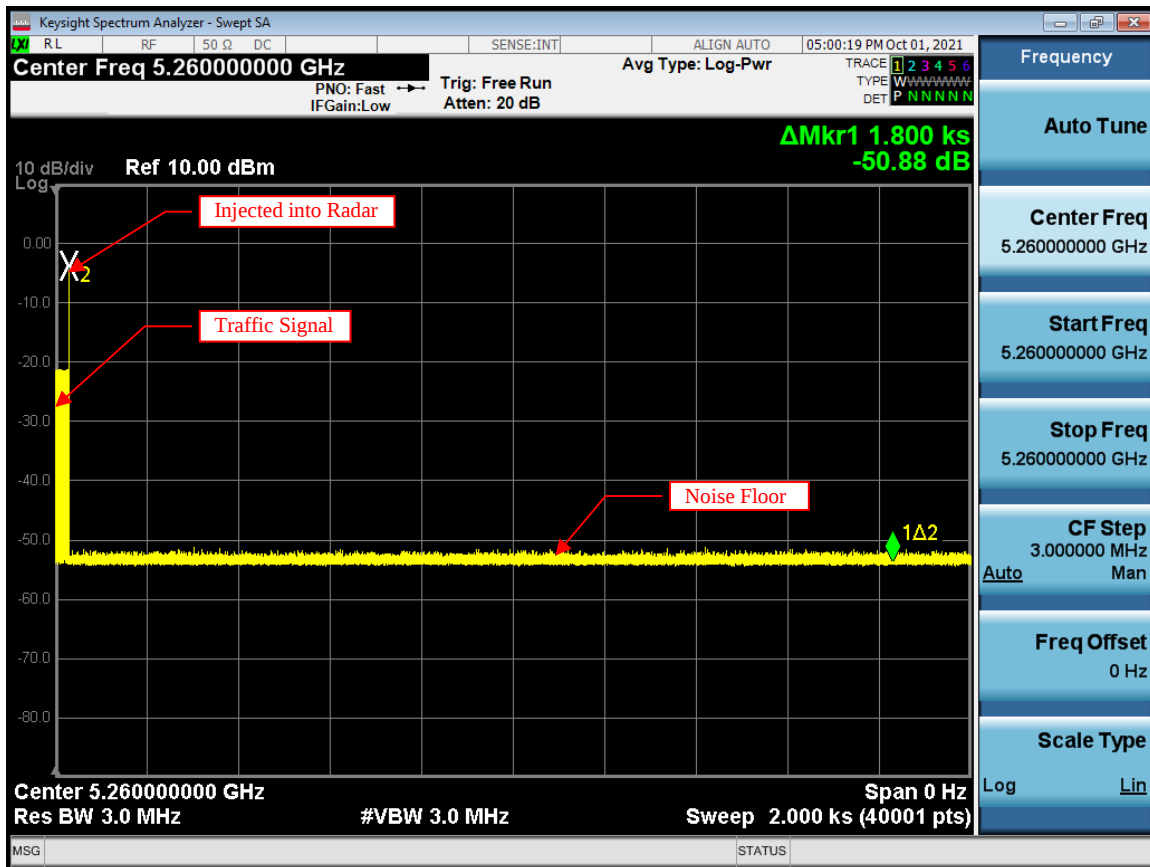


### Non-Occupancy Period

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

### 802.11ax (HE20)

### Ch52



Note:

- 5260MHz has been monitored in 30 minutes period. In this period, no any transmission occurs.

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## 802.11ax (HE80)

### Ch58



Note:

1. 5290MHz has been monitored in 30 minutes period. In this period, no any transmission occurs.

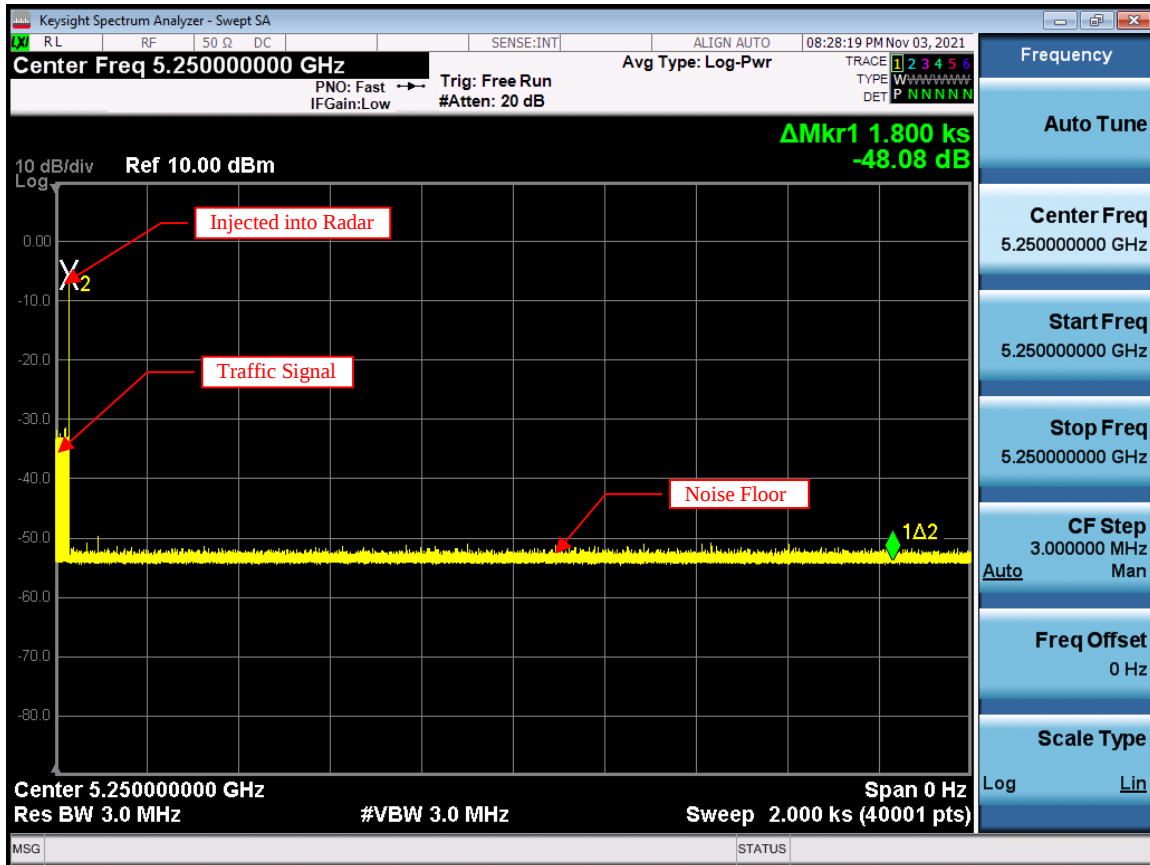
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## 802.11ax (HE160)

### Ch50



Note:

- 5250MHz has been monitored in 30 minutes period. In this period, no any transmission occurs.

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