# DFS TEST REPORT FOR CERTIFICATION
## On Behalf of

### TCL OVERSEAS MARKETING LTD

5.1.2 Channel Dolby Atmos Sound Bar with Wireless Subwoofer

Model Number: Q75H

Additional Model: Q70H, Q78H, Q79H, Q75HE, Q75HK, Q7*****, Q75H-S, Q70H-S, Q78H-S, Q79H-S, Q75H-J, Q70H-J, Q78H-J, Q79H-J, Q75H-CA, Q70H-CA, Q78H-CA, Q79H-CA, R50C, R55C, R58C, R50D, R55D, R58D, R5*** (*can be any numerica number"0~9" or alphebtical number "A~Z")

FCC ID: 2BEHEQ75H

| | |
|---|---|
| Applicant : | TCL OVERSEAS MARKETING LTD |
| Address: | 5/F, Building 22E, 22 Science Park East Avenue HongKong |
| | Science Park Shatin Hong Kong |
| | |
| Prepared By: | EST Technology Co., Ltd. |
| | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| Tel: 86-769-83081888-808 | |

| | |
|---|---|
| Report Number: | ESTE-R2405225 |
| Date of Test: | Apr. 15, 2024~ May. 15, 2024 |
| Date of Report: | May. 21, 2024 |

# TABLE OF CONTENTS

| Applicant:<br>Address: | TCL OVERSEAS MARKETING LTD<br>5/F, Building 22E, 22 Science Park East Avenue HongKong Science Park Shatin Hong Kong |
|---|---|
| Manufacturer:<br>Address: | TCL OVERSEAS MARKETING LTD<br>5/F, Building 22E, 22 Science Park East Avenue HongKong Science Park Shatin Hong Kong |
| Factory:<br>Address: | Tonly Technology Co., Ltd. Tongqiao Factory<br>A&B Building, NO. 88, North Of Luen Fat Road, Tongqiao Industrial Base, Zhongkai High-tech Development Zone, Huizhou City, Guangdong Province, P.R.China |
| E.U.T: | 5.1.2 Channel Dolby Atmos Sound Bar with Wireless Subwoofer |
| Model Number: | Q75H |
| Additional Model: | Q70H, Q78H, Q79H, Q75HE, Q75HK, Q7*****, Q75H-S, Q70H-S, Q78H-S, Q79H-S, Q75H-J, Q70H-J, Q78H-J, Q79H-J, Q75H-CA, Q70H-CA, Q78H-CA, Q79H-CA, R50C, R55C, R58C, R50D, R55D, R58D, R5*** (*can be any numerica number"0~9" or alphebtical number "A~Z")<br>Note: They are identical except model name. |
| Power Supply: | AC 100-240V, 50/60Hz |
| Trade Name: | TCL, FFALCON     Serial No.:    ------ |
| Date of Receipt: | Apr. 15, 2024    Date of Test:    Apr. 15, 2024~ May. 15, 2024 |
| Test Specification: | FCC Part 15 Subpart E 15.407<br>KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02<br>KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02 |
| Test Result: | The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the Dynamic Frequency Selection (DFS) tests under FCC Rules and Regulations Part 15 Subpart E requirements.<br><br>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.<br>Date: May. 21, 2024 |
| Prepared by:<br><br>Ring Yang / Assistant | Reviewed by:<br><br>Seven Wang / Engineer     Approved by:<br><br>Iceman Hu / Manager |
| Other Aspects: None. | |
| Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested | |
| This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. | |

# 1.GENERAL INFORMATION

## 1.1.Description of Device (EUT)

| | | |
|---|---|---|
| FCC ID | : | 2BEHEQ75H |
| Product Name | : | 5.1.2 Channel Dolby Atmos Sound Bar with Wireless Subwoofer |
| Model Number | : | Q75H |
| Software Version | : | V06 |
| Hardware Version | : | V02 |
| Number of channel | : | U-NII-2A(5250 MHz~5350 MHz ): IEEE 802.11a / n HT20 / ac VHT20: 4 Channels; IEEE 802.11n HT40 / ac VHT40: 2 Channels; IEEE 802.11ac VHT80: 1 Channel. U-NII-2C(5470 MHz~5725 MHz): IEEE 802.11a / n HT20 / ac VHT20: 11 Channels; IEEE 802.11n HT40 / ac VHT40: 5 Channels; IEEE 802.11ac VHT80: 2 Channel. |
| Modulation | : | OFDM |
| Transmit Data Rate | : | IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6Mbps; IEEE 802.11n: up 300Mbps; IEEE 802.11ac: up to 867Mbps; |
| Channels Spacing | : | IEEE 802.11a: 20MHz; IEEE 802.11n HT20: 20MHz; IEEE 802.11n HT40: 40MHz; IEEE 802.11ac VHT20: 20MHz; IEEE 802.11ac VHT40: 40MHz; IEEE 802.11ac VHT80: 80MHz; |
| TPC Function | : | ☒ Without TPC            ☐ With TPC |
| DFS Mode(s) | : | ☐ Master ☐ Slave with radar detection ☒ Slave without radar detection |
| Other Function | : | ☐ Ad-hoc            ☐ Hotspot |
| Sample Type | : | Prototype production |

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

## 1.2.The antenna information for EUT

| Ant No. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---------|-------|------------|--------------|-----------|------------|
| 1 | - | - | Internal | - | 4.4 |
| 2 | - | - | Internal | - | 4.1 |

Note:
1.The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.
2.The test results of this report only apply to the sample as received.

## 1.3.Information of RF Cable

| Cable Loss(dB) | Provided by |
|----------------|-------------|
| 1.0 | TCL OVERSEAS MARKETING LTD |

Note:
1.The customer declared the loss value of the RF Cable. and the test results of thisreport only apply to the sample as received.
2.The laboratory is not responsible for the accuracy of the cable loss.

## 2.SUMMARY OF TEST

## 2.1.Summary of test result

| Description of Test Item | Test Mode | FCC Standard Section | Results |
|---|---|---|---|
| Channel Closing Transmission Time | IEEE 802.11n HT20 5260/5500MHz IEEE 802.11n HT40 5270/5510MHz IEEE 802.11ac VHT80 5290/5530MHz | 15.407(h) | PASS |
| Channel Move Time | | 15.407(h) | PASS |
| Non-Occupancy Period | | 15.407(h) | PASS |

## 2.2.Test Facilities

EMC Lab        **:**    Accredited by CNAS, CHINA
Registration No.: L5288
This Accreditation is valid until: November 12, 2029

Recognized by FCC, USA
Designation Number: CN1215
This Recognition is valid until: January 31, 2026

Accredited by A2LA, USA
Registration No.: 4366.01
This Accreditation is valid until: January 31, 2026

Recognized by Industry Canada
CAB identifier No.: CN0035
This Recognition is valid until: January 31, 2026

Recognized by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Recognition is valid until: Apr. 19, 2026

Recognized by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Recognized by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm    **:**    EST Technology Co., Ltd.

Site Location    **:**    Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

## 2.3.Measurement uncertainty for EST Technology Co., Ltd.

| Test Item | Uncertainty |
|---|---|
| Uncertainty for Conduction emission test | 2.54dB |
| Uncertainty for spurious emissions test (Below 30MHz) | ±1.62 dB |
| Uncertainty for Radiation Emission test (30MHz-1GHz) | 3.62 |
| Uncertainty for Radiation Emission test (1GHz to 18GHz) | 4.86 |
| Uncertainty for spurious emissions test (18GHz to 40GHz) | 4.67 |
| Uncertainty for radio frequency | $7\times10^{-8}$ |
| Uncertainty for conducted RF Power | 1.08dB |
| Uncertainty for Power density test | 0.26dB |
| Temperature | ±0.6°C |
| Humidity | ±4.0 % |
| Volatage DC | ±1.0% |
| Volatage (AC, <10KHz) | ±1.5% |

Note: This uncertainty represents an expanded uncertainty expressed at approximately The 95% confidence level using a coverage factor of k=2.

## 2.4.Test Equipment List

| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
|---|---|---|---|---|---|---|
| TS 8997 | Rohde &Schwarz | / | / | / | / | / |
| Open Switch and Control Unit | Rohde &Schwarz | OSP-B157WB | EST-E036 | LISAI | June 12,23 | 1Year |
| Signal and Spectrum Analyzer | Rohde &Schwarz | FSV | EST-E037 | LISAI | June 12,23 | 1 Year |
| Signal Generator | Rohde &Schwarz | SMB100A | EST-E038 | LISAI | June 12,23 | 1 Year |
| Vector Signal Generator | Rohde &Schwarz | SMBV100A | EST-E039 | LISAI | June 12,23 | 1Year |
| Test Software | Rohde &Schwarz | WMS32 | 10.50.40 | N/A | N/A | N/A |
| Master AP | LINKSYS | WRT3200ACM | 1981060A621419 | N/A | N/A | N/A |
| Notebook | DELL | Laititude E6420 | N/A | N/A | N/A | N/A |

Note: The FCC ID of Master AP is Q87-WRT3200ACM.

# 3. DYNAMIC FREQUENCY SELECTION REQUIREMENTS

## 3.1. DFS Overview

**Table 1: 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 | Not required | 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 |

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

| Requirement | Operational Mode | |
|---|---|---|
| | **Master Device 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 | Master Device or Client with Radar Detection | Client Without Radar Detection |
|---|---|---|
| U-NII Detection Bandwidth and Statistical Performance Check | All BW modes must be tested | Not required |
| Channel Move Time and Channel Closing Transmission Time | Test using widest BW mode available | Test using the widest BW mode available for the link |
| All other tests | Any single BW mode | Not required |
| **Note:** Frequencies selected for statistical performance check (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. | | |

## 3.2.DFS Detection Thresholds

**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 ≥ 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.
**Note 3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

## 3.3.Response Requirements

**Table 4: 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.
**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

## 3.4.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.

### 3.4.1.Short Pulse Radar 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 | $\text{Roundup}\left\{ \left(\dfrac{1}{360}\right) \cdot \left(\dfrac{19 \cdot 10^6}{\text{PRI}_{\mu sec}}\right) \right\}$ | 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 |
| **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.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 μsec is selected, the number of pulses would be Roundup $\{(1/360)(19{\times}10^{6}/3066)\}$ = Round up {17.2} = 18.

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

| 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% | | | |

## 3.4.2. Long Pulse Radar Test Waveform

**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 |

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 / *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 / *Burst Count*) – (Total *Burst* Length) + (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).

### 3.4.3. Frequency Hopping Radar Test Waveform

**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.
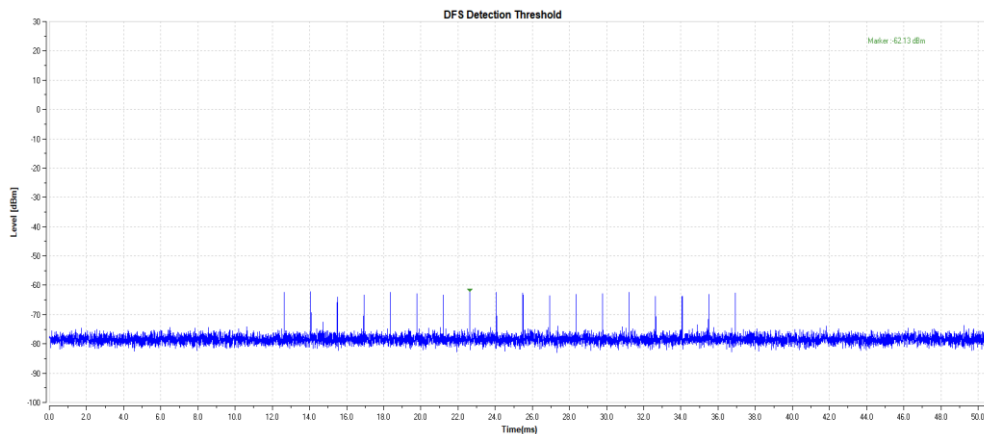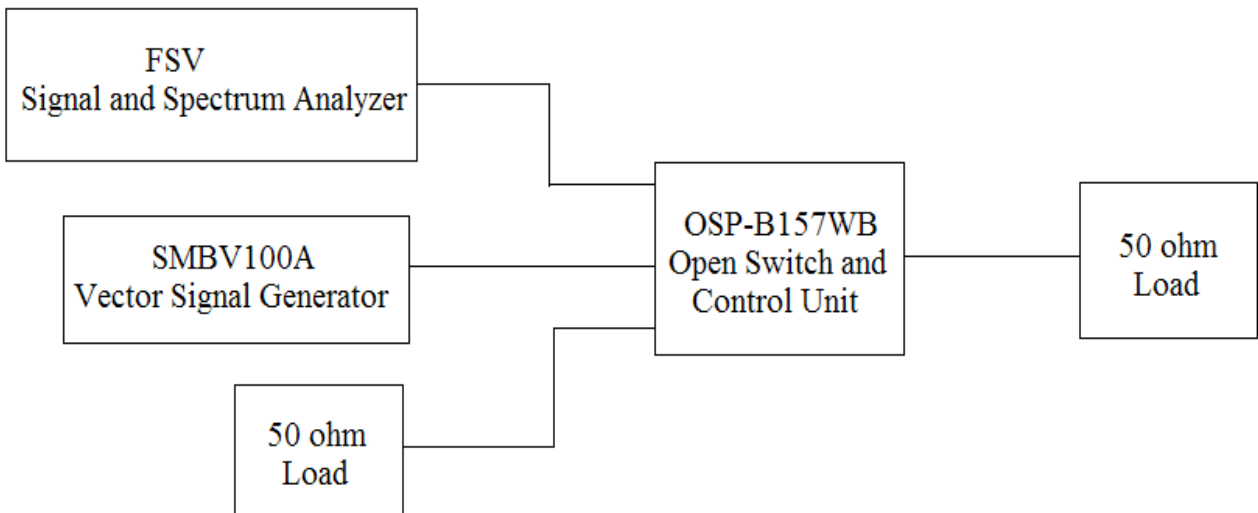
# 4.TEST SETUP

## 4.1.Setup Configuration of EUT and TS8997 System
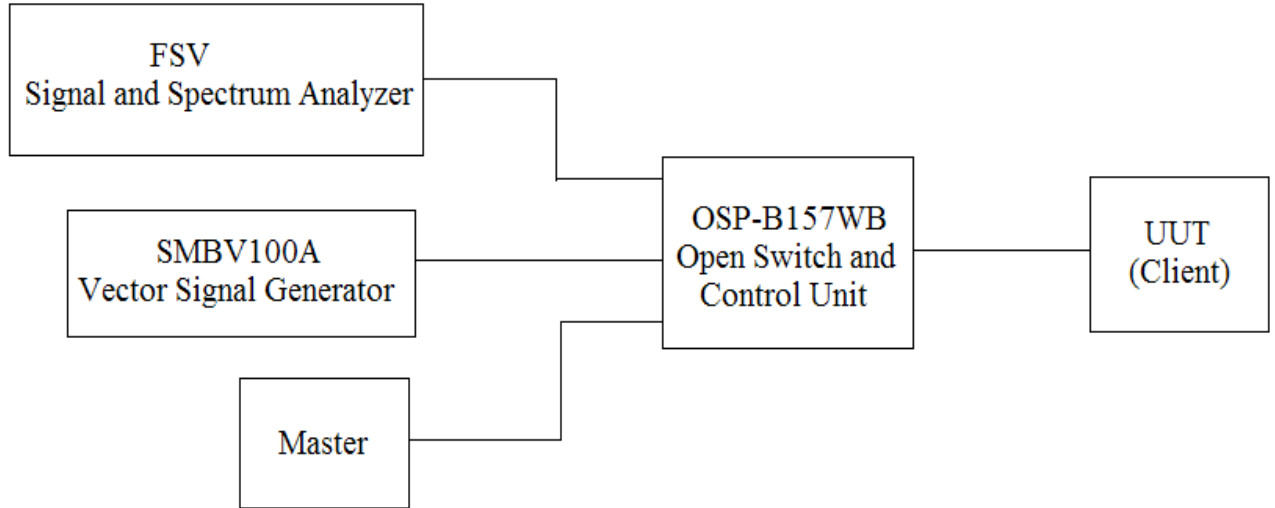


## 4.2.Radar Waveform Calibration

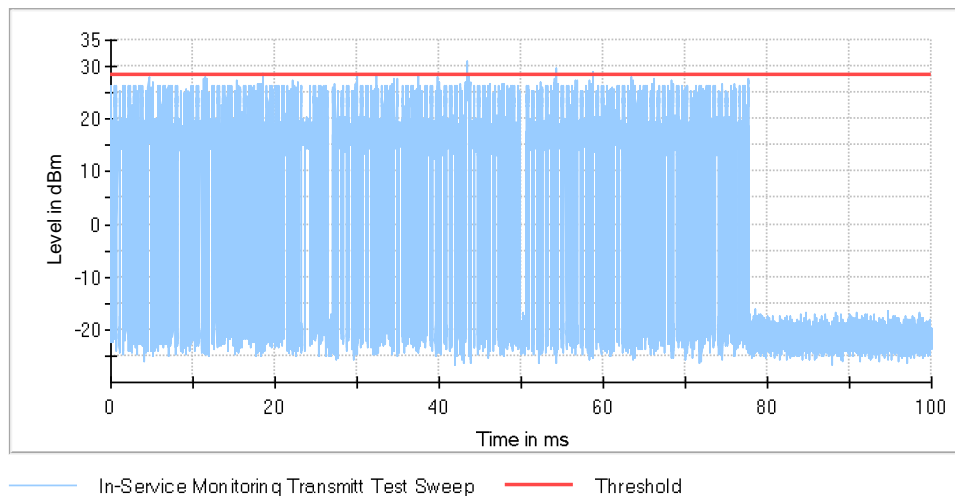The conducted radar waveform calibration diagram of TS8997 is shown below.

## 4.2.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| IF((<br>{DFS Mode(0/1/2)}=0)or(<br>{DFS Mode(0/1/2)}=1) , IF((dBm2W(<br>{Nominal Power[dBm]})>0.2) , -64 , IF((<br>{Configured PSD[dBm]}<10) , -62 , -64))+<br>{Attenuation Vector Generator to DUT[dB]} , -50+<br>{Attenuation Vector Generator to COMP[dB]})+<br>{Radar Signal Level Offset[dB]} | Given setting / formula<br>to calculate<br>Vector Generator level | -- |
| Configured DUT EIRP: | 19.95 | mW |
| Configured DUT PSD: | -3.02 | dBm/MHz |
| Requirement of the Detection threshold value<br>for this given values acc. to FCC clause 5.2 / Table 3 | -62 | dBm |
| Vector Generator level setting | 1.75 | dBm |
| Configured overall pathloss from Vector Generator<br>RF out to DUT connector of 'DUT to OSP'-cable | 58.84 | dB |
| Given additional level added to the amplitude of<br>the waveform to account for variations in measurement<br>equipment acc. to FCC clause 5.2 / Table 3 / Note 2 | 1.00 | dB |
| This results in the following radar signal<br>level at the DUT | -57.10 | dBm |

## 4.3.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5260.000000 | 78.236 | >=17 % | 280 | PASS |

### IEEE 802.11n HT20 5260MHz

## 4.3.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| IF((<br>  {DFS Mode(0/1/2)}=0)or(<br>  {DFS Mode(0/1/2)}=1) , IF((dBm2W(<br>  {Nominal Power[dBm]})>0.2) , -64 , IF((<br>  {Configured PSD[dBm]}<10) , -62 , -64))+<br>  {Attenuation Vector Generator to DUT[dB]} , -50+<br>  {Attenuation Vector Generator to COMP[dB]})+<br>  {Radar Signal Level Offset[dB]} | Given setting / formula to calculate Vector Generator level | -- |
| Configured DUT EIRP: | 19.95 | mW |
| Configured DUT PSD: | -1.03 | dBm/MHz |
| Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3 | -62 | dBm |
| Vector Generator level setting | 4.61 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 59.23 | dB |
| Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2 | 1.00 | dB |
| This results in the following radar signal level at the DUT | -54.62 | dBm |

## 4.4.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5500.000000 | 86.103 | >=17 % | 291 | PASS |

### IEEE 802.11n HT20 5500MHz

## 4.4.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| **IF((**<br>**{DFS Mode(0/1/2)}=0)or(**<br>**{DFS Mode(0/1/2)}=1) , IF((dBm2W(**<br>**{Nominal Power[dBm]})>0.2) , -64 , IF((**<br>**{Configured PSD[dBm]}<10) , -62 , -64))+**<br>**{Attenuation Vector Generator to DUT[dB]} , -50+**<br>**{Attenuation Vector Generator to COMP[dB]})+**<br>**{Radar Signal Level Offset[dB]}** | **Given setting / formula to calculate Vector Generator level** | **--** |
| **Configured DUT EIRP:** | **19.95** | **mW** |
| **Configured DUT PSD:** | **-3.02** | **dBm/MHz** |
| **Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3** | **-62** | **dBm** |
| **Vector Generator level setting** | **2.02** | **dBm** |
| **Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable** | **58.76** | **dB** |
| **Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2** | **1.00** | **dB** |
| **This results in the following radar signal level at the DUT** | **-56.74** | **dBm** |

## 4.5.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5270.000000 | 68.211 | >=17 % | 272 | PASS |

### IEEE 802.11n HT40 5270MHz

## 4.5.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| **IF((**<br>**{DFS Mode(0/1/2)}=0)or(**<br>**{DFS Mode(0/1/2)}=1) , IF((dBm2W(**<br>**{Nominal Power[dBm]})>0.2) , -64 , IF((**<br>**{Configured PSD[dBm]}<10) , -62 , -64))+**<br>**{Attenuation Vector Generator to DUT[dB]} , -50+**<br>**{Attenuation Vector Generator to COMP[dB]})+**<br>**{Radar Signal Level Offset[dB]}** | **Given setting / formula**<br>**to calculate**<br>**Vector Generator level** | **--** |
| **Configured DUT EIRP:** | **19.95** | **mW** |
| **Configured DUT PSD:** | **-3.02** | **dBm/MHz** |
| **Requirement of the Detection threshold value**<br>**for this given values acc. to FCC clause 5.2 / Table 3** | **-62** | **dBm** |
| **Vector Generator level setting** | **4.45** | **dBm** |
| **Configured overall pathloss from Vector Generator**<br>**RF out to DUT connector of 'DUT to OSP'-cable** | **59.31** | **dB** |
| **Given additional level added to the amplitude of**<br>**the waveform to account for variations in measurement**<br>**equipment acc. to FCC clause 5.2 / Table 3 / Note 2** | **1.00** | **dB** |
| **This results in the following radar signal**<br>**level at the DUT** | **-54.86** | **dBm** |

## 4.6.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5510.000000 | 17.459 | >=17 % | 153 | PASS |

### IEEE 802.11n HT40 5510MHz

## 4.6.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| **IF((**<br>  **{DFS Mode(0/1/2)}=0)or(**<br>  **{DFS Mode(0/1/2)}=1) , IF((dBm2W(**<br>  **{Nominal Power[dBm]})>0.2) , -64 , IF((**<br>  **{Configured PSD[dBm]}<10) , -62 , -64))+**<br>**{Attenuation Vector Generator to DUT[dB]} , -50+**<br>**{Attenuation Vector Generator to COMP[dB]})+**<br>**{Radar Signal Level Offset[dB]}** | **Given setting / formula to calculate Vector Generator level** | **--** |
| **Configured DUT EIRP:** | **19.95** | **mW** |
| **Configured DUT PSD:** | **-3.02** | **dBm/MHz** |
| **Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3** | **-62** | **dBm** |
| **Vector Generator level setting** | **2.57** | **dBm** |
| **Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable** | **58.59** | **dB** |
| **Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2** | **1.00** | **dB** |
| **This results in the following radar signal level at the DUT** | **-56.02** | **dBm** |

## 4.7.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5290.000000 | 59.021 | >=17 % | 251 | PASS |

### IEEE 802.11ac VHT80 5290MHz

## 4.7.1.Radar Waveform Calibration Result

| Description | Value | Unit |
|---|---|---|
| IF((<br>　{DFS Mode(0/1/2)}=0)or(<br>　{DFS Mode(0/1/2)}=1) , IF((dBm2W(<br>　{Nominal Power[dBm]})>0.2) , -64 , IF((<br>　{Configured PSD[dBm]}<10) , -62 , -64))+<br>　{Attenuation Vector Generator to DUT[dB]} , -50+<br>　{Attenuation Vector Generator to COMP[dB]})+<br>　{Radar Signal Level Offset[dB]} | Given setting / formula to calculate Vector Generator level | -- |
| Configured DUT EIRP: | 19.95 | mW |
| Configured DUT PSD: | -3.02 | dBm/MHz |
| Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3 | -62 | dBm |
| Vector Generator level setting | 4.03 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 59.38 | dB |
| Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2 | 1.00 | dB |
| This results in the following radar signal level at the DUT | -55.36 | dBm |

## 4.8.Chanel Loading

| DUT Frequency (MHz) | Tx-Test Duty Cycle (%) | Tx-Test Duty Cycle Limit | Tx-Test No. of Pulses found | Tx-Test Result |
|---|---|---|---|---|
| 5530.000000 | 51.048 | >=17 % | 201 | PASS |

### IEEE 802.11ac VHT80 5530MHz
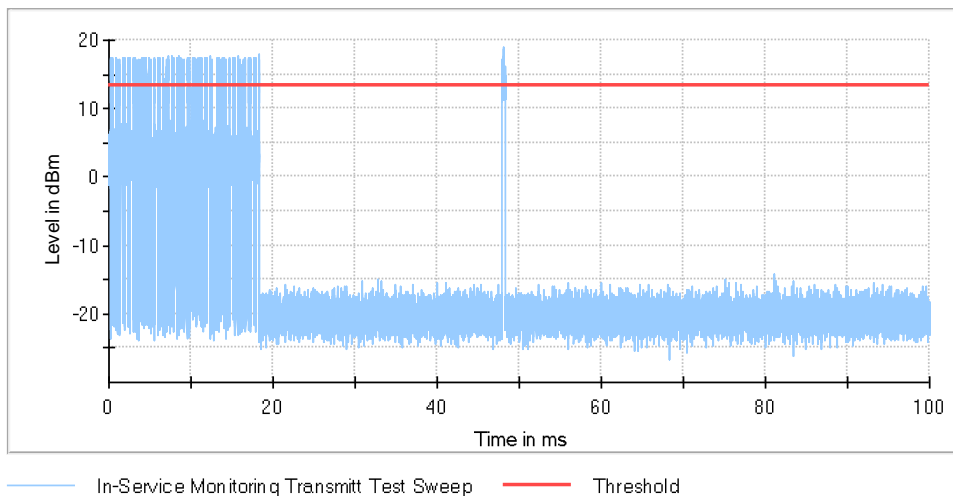
# 5.IN-SERVICE MONITORING FOR CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD

## 5.1.Test Procedure

The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U-NII device (In- Service Monitoring).

a) One frequency will be chosen from the Operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

b) In case the UUT is a U-NII device operating as a Client Device (with or without DFS), a U-NII device operating as a Master Device will be used to allow the UUT (Client device) to Associate with the Master Device. In case the UUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will Associate with the UUT (Master). In both cases for conducted tests, the Radar Waveform generator will be connected to the Master Device. For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) Stream the channel loading test file from the Master Device to the Client Device on the test Channel for the entire period of the test.

d) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Radar Type 0 in **Table 5** at levels defined in **Table 3**, on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

e) Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs. f) When operating as a Master Device, monitor the UUT for more than 30 minutes following instant T2 to verify that the UUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.

g) In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f).

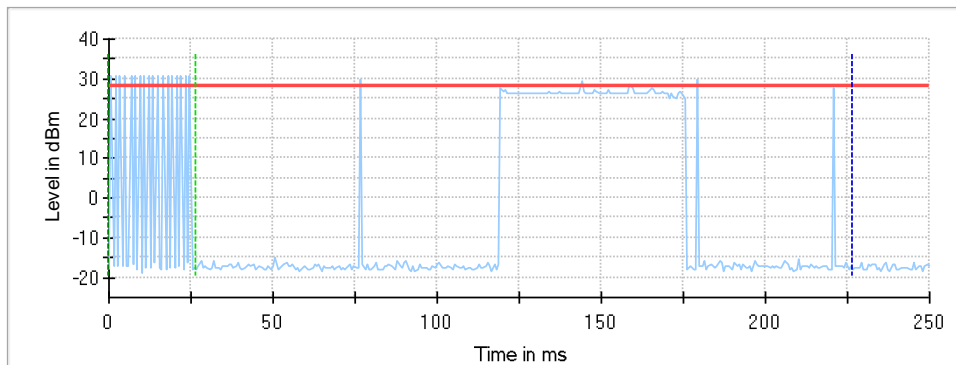## 5.2.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5260.000000 | 0 | 0.000 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5260.000000 | 0 | first 200 ms | 4 | 0.032 | 200 | PASS |
| 5260.000000 | 0 | remaining 10.0 second(s) period | 0 | 0.000 | 60 | PASS |
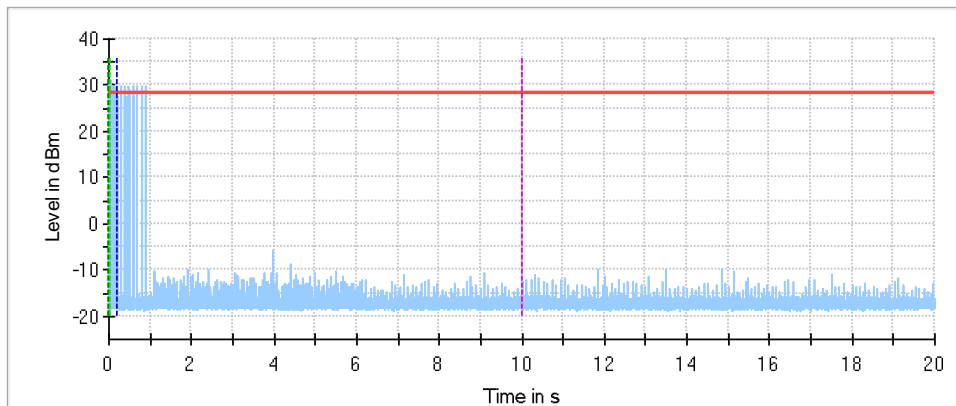
**IEEE 802.11n HT20 5260MHz**



In-Service Monitoring Channel Move Time
Start of Radar
First 200ms of Channel Closing Tx Time
Threshold
Trigger at end of Radar
10sec Channel Move Time Limit



In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time

## 5.3.Non-Occupancy Period Test Result

| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5260.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

**IEEE 802.11n HT20 5260MHz**
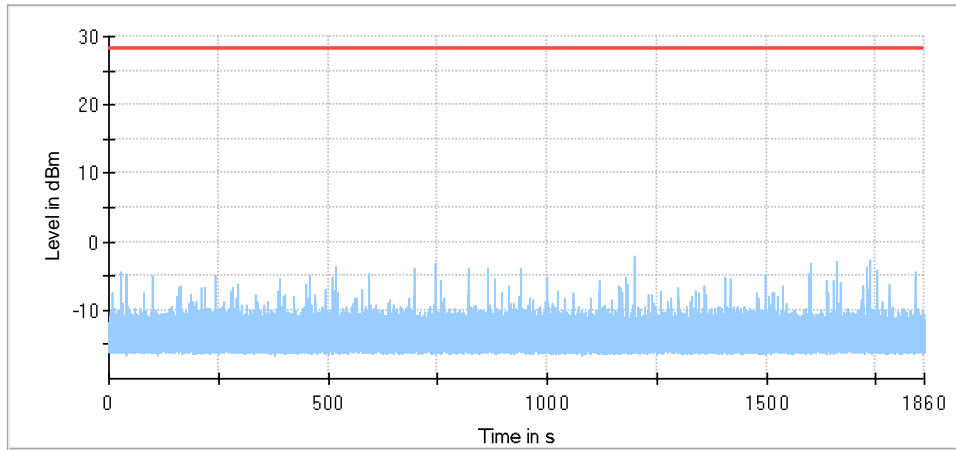


In-Service Monitoring Non-occupancy period — Threshold

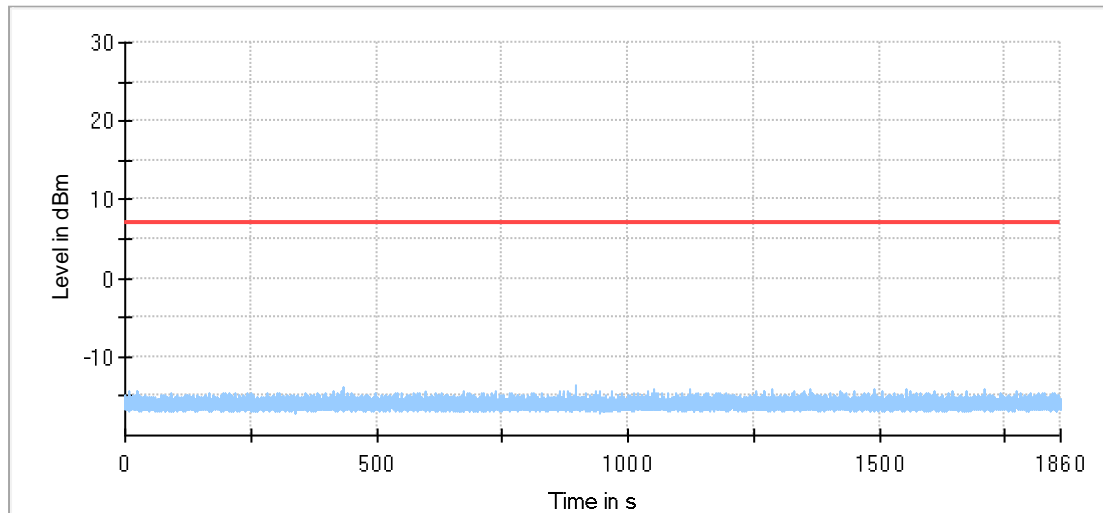## 5.4.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5500.000000 | 0 | 0.744 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5500.000000 | 0 | first 200 ms | 16 | 2.392 | 200 | PASS |
| 5500.000000 | 0 | remaining 10.0 second(s) period | 14 | 2.912 | 60 | PASS |

**IEEE 802.11n HT20 5500MHz**
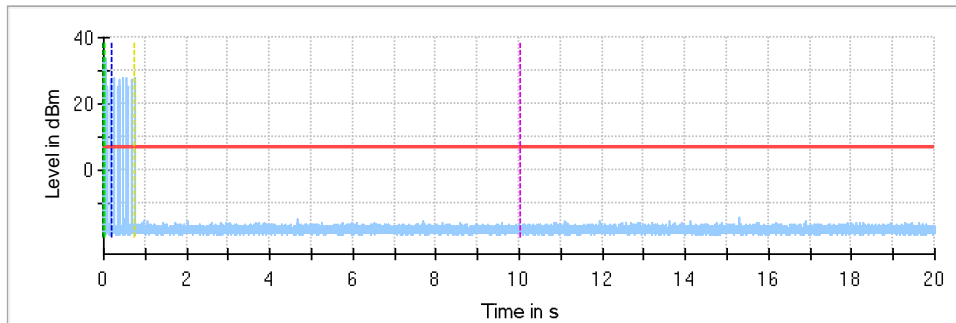


In-Service Monitoring Channel Move Time
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time
10sec Channel Move Time Limit
Last measured edge of Channel Closing Tx Time
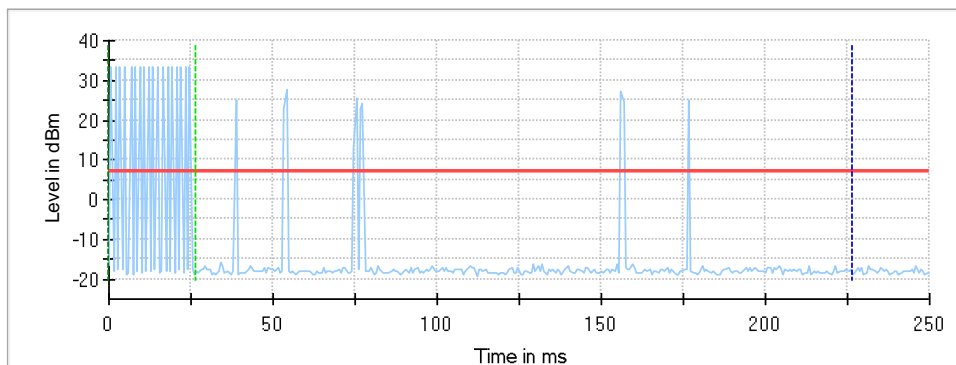


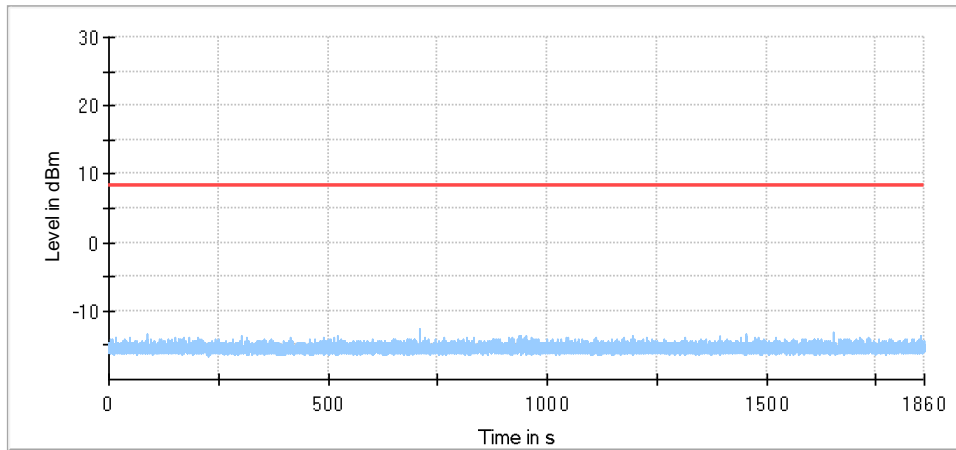In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time

## 5.5.Non-Occupancy Period Test Result

| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5500.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

### IEEE 802.11n HT20 5500MHz



In-Service Monitoring Non-occupancy period　　　Threshold

## 5.6.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5270.000000 | 0 | 0.863 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5270.000000 | 0 | first 200 ms | 427 | 14.396 | 200 | PASS |
| 5270.000000 | 0 | remaining 10.0 second(s) period | 13 | 3.124 | 60 | PASS |

### IEEE 802.11n HT40 5270MHz
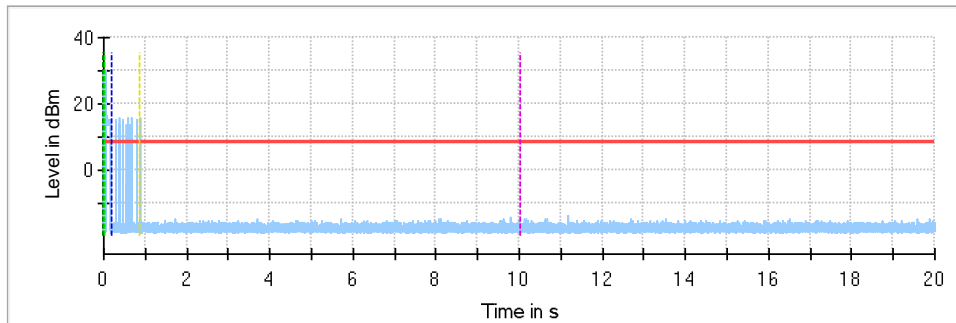


In-Service Monitoring Channel Move Time
Threshold
Start of Radar
Trigger at end of Radar
First 200 ms of Channel Closing Tx Time
10sec Channel Move Time Limit
Last measured edge of Channel Closing Tx Time
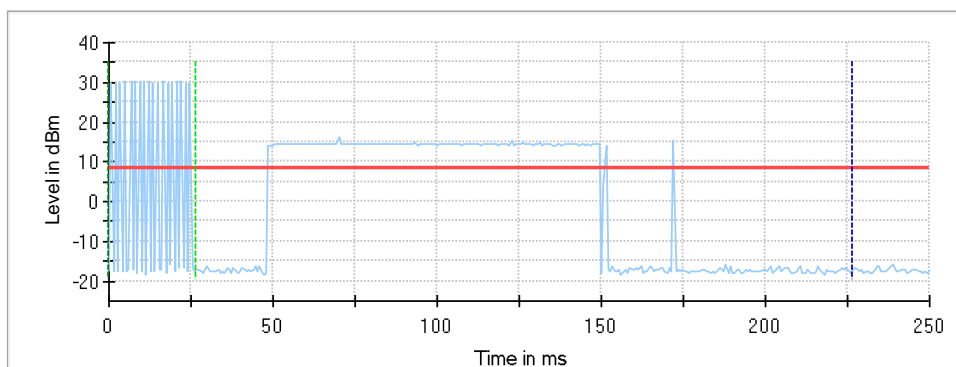


In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200 ms of Channel Closing Tx Time

## 5.7.Non-Occupancy Period Test Result

| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5270.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

**IEEE 802.11n HT40 5270MHz**

## 5.8.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5510.000000 | 0 | 0.000 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5510.000000 | 0 | first 200 ms | 0 | 0.000 | 200 | PASS |
| 5510.000000 | 0 | remaining 10.0 second(s) period | 0 | 0.000 | 60 | PASS |
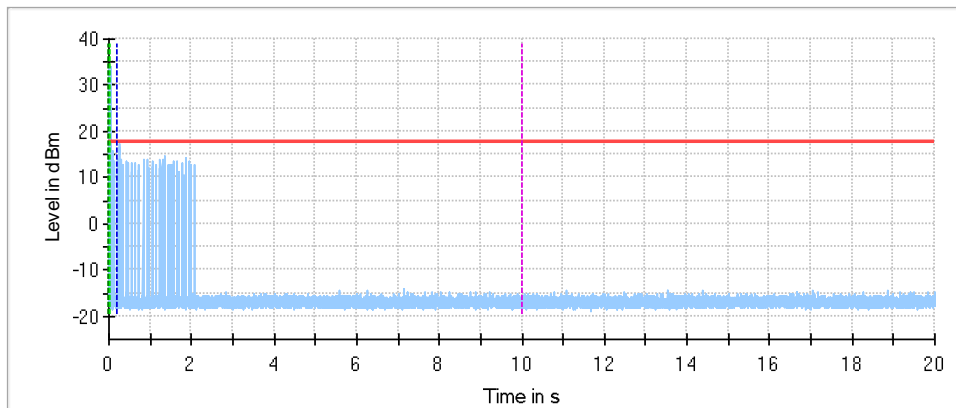
**IEEE 802.11n HT40 5510MHz**



In-Service Monitoring Channel Move Time — Threshold
Start of Radar — Trigger at end of Radar
First 200ms of Channel Closing Tx Time — 10sec Channel Move Time Limit
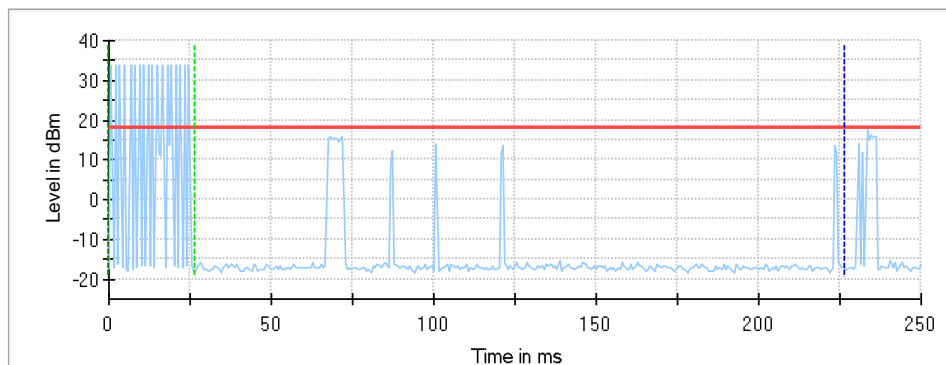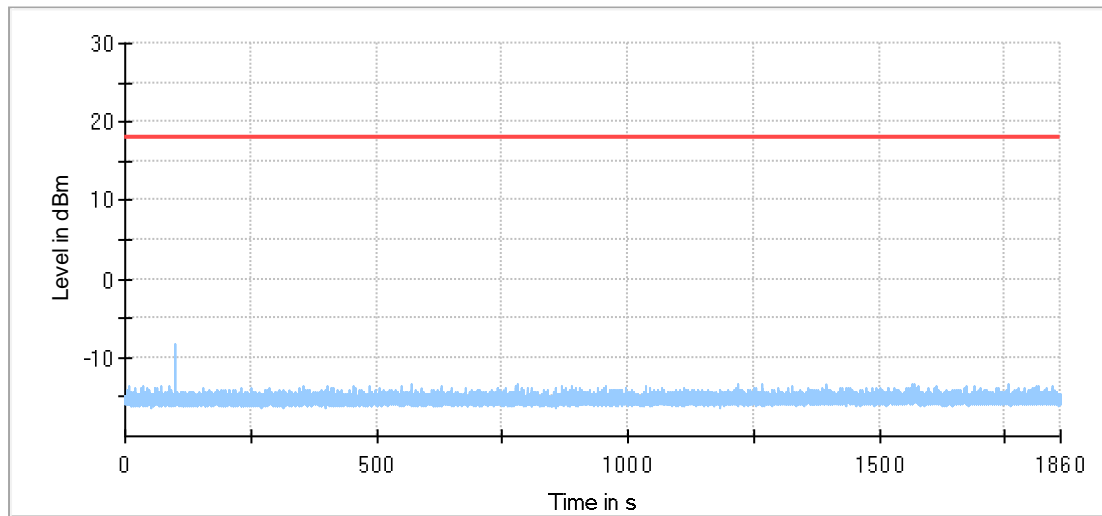


In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time

## 5.9.Non-Occupancy Period Test Result

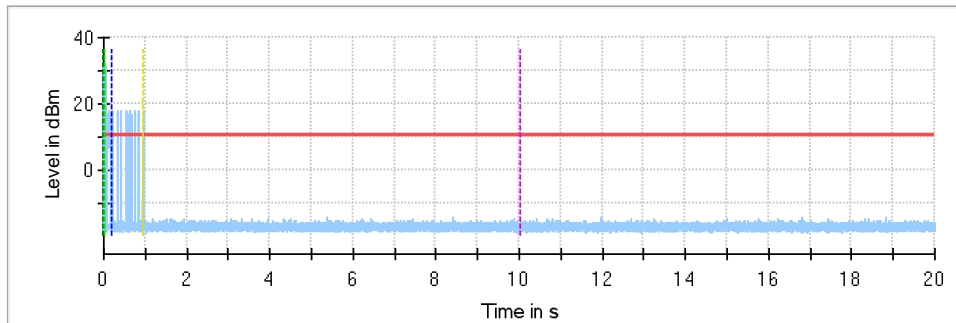| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5510.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

### IEEE 802.11n HT40 5510MHz



In-Service Monitoring Non-occupancy period　　　Threshold

## 5.10.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5290.000000 | 0 | 0.920 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5290.000000 | 0 | first 200 ms | 289 | 11.116 | 200 | PASS |
| 5290.000000 | 0 | remaining 10.0 second(s) period | 14 | 3.196 | 60 | PASS |

**IEEE 802.11ac VHT80 5290MHz**



In-Service Monitoring Channel Move Time
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time
10sec Channel Move Time Limit
Last measured edge of Channel Closing Tx Time
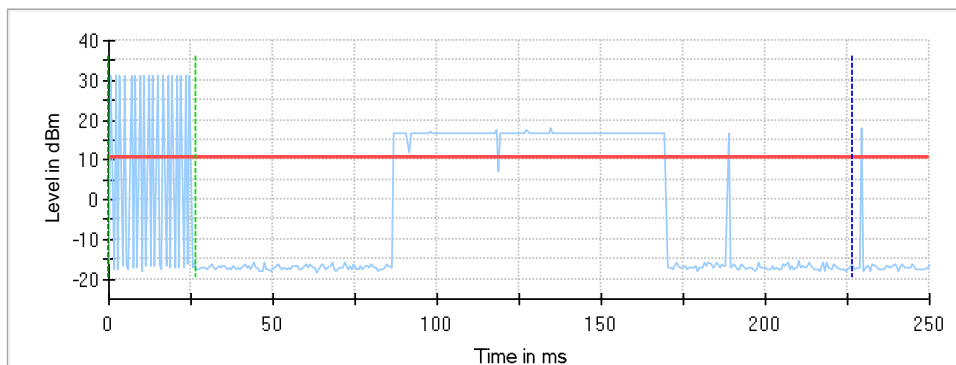


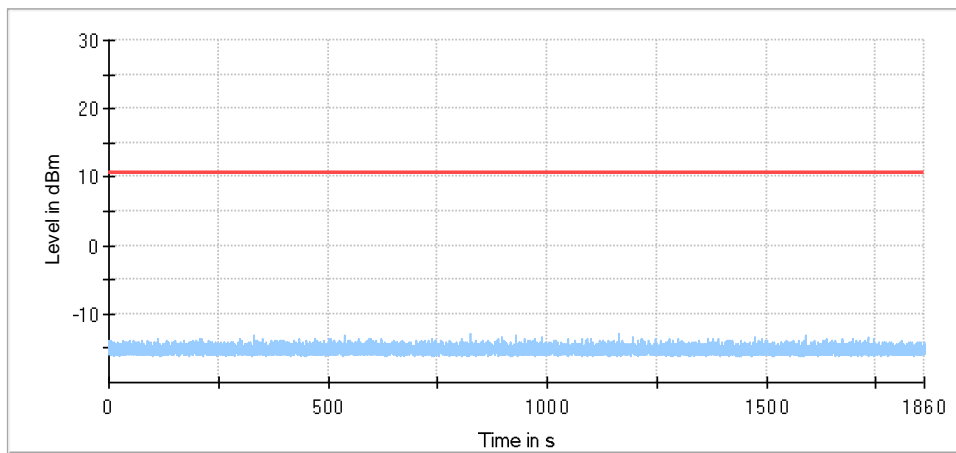In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time

## 5.11.Non-Occupancy Period Test Result

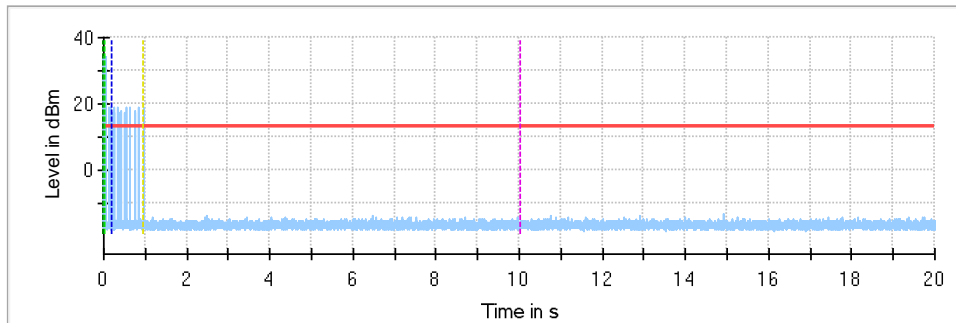| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5290.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

### IEEE 802.11ac VHT80 5290MHz



In-Service Monitoring Non-occupancy period　　　Threshold

## 5.12.Channel Move Time&Channel Close Transmission Time Test Result

| Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | Result |
|---|---|---|---|---|
| 5530.000000 | 0 | 0.923 | 10.000 | PASS |

| Frequency (MHz) | Radar Type No. | CCTT Type of Value | CCTT No. of Pulses found | CCTT Tx Time (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| 5530.000000 | 0 | first 200 ms | 215 | 8.344 | 200 | PASS |
| 5530.000000 | 0 | remaining 10.0 second(s) period | 14 | 3.192 | 60 | PASS |

### IEEE 802.11ac VHT80 5530MHz



In-Service Monitoring Channel Move Time
Threshold
Start of Radar
Trigger at end of Radar
First 200 ms of Channel Closing Tx Time
10sec Channel Move Time Limit
Last measured edge of Channel Closing Tx Time
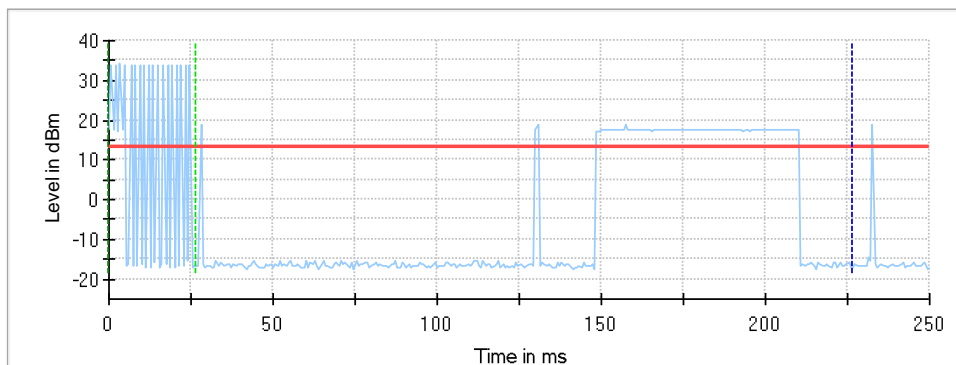


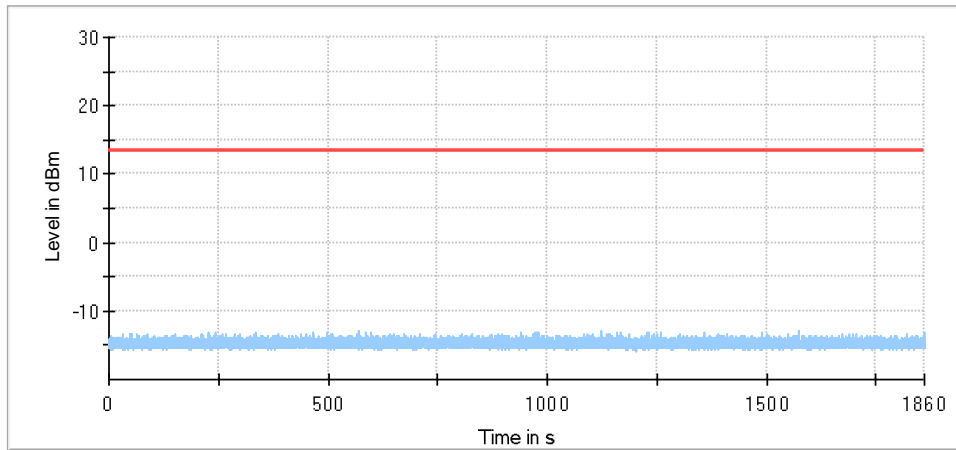In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200 ms of Channel Closing Tx Time
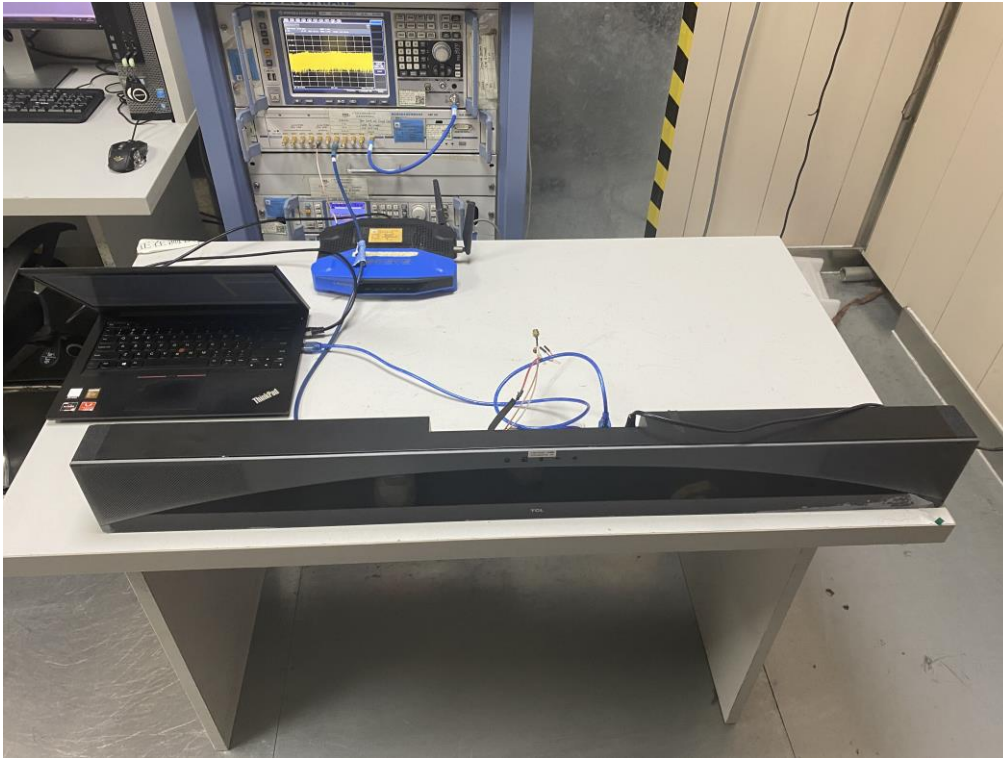
## 5.13.Non-Occupancy Period Test Result

| Frequency (MHz) | Radar Type No. | NOP No. of Pulses found | NOP No. of Pulses Limit | NOP Tx Time (s) | NOP Tx Time Limit (s) | Result |
|---|---|---|---|---|---|---|
| 5530.000000 | 0 | 0 | 0 | 0.000 | 0.000 | PASS |

### IEEE 802.11ac VHT80 5530MHz



In-Service Monitoring Non-occupancy period　　　Threshold

# 6.TEST SETUP PHOTO



**End of Test Report**