



中认信通

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)



DFS TEST REPORT

Applicant: Iconnect

Address: No.9, Aly. 58, Ln. 112, Ruiguang Rd., Neihu Dist., Taipei City, Taiwan

FCC ID: 2AB877921

Product Name: 11ax Module

**Standard(s): 47 CFR Part 15, Subpart E(15.407)
FCC KDB 905462 D02 UNII DFS Compliance
Procedures New Rules v02**

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: 2403S73093E-RF-00C

Date Of Issue: 2024/6/13

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “▲”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|--------------------|-------------------------|------------------|
| 1.0 | 2403S73093E-RF-00C | Original Report | 2024/6/13 |

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

| | |
|---|--|
| EUT Name: | 11ax Module |
| EUT Model: | AWM27921EU |
| Multiple Model: | AWM27921U, AWM27921BU, AMLGA7921, AMST7921, AMST7921U, AWSP7921U, AWM27921XX, AMLGA7921XX, AMST7921XX, AWSP7921XX (X:Any alphanumeric character or blank) |
| Operation Frequency: | Band 2: 5260-5320 MHz (802.11a/n ht20/ac vht20/ax hew20) 52700-5310 MHz(802.11n ht40/ac vht40/ax hew40) 5290 MHz(802.11ac vht80/ax hew80) Band 3: 5500-5720 MHz (802.11a/n ht20/ac vht20/ax hew20) 5510-5710 MHz(802.11n ht40/ac vht40/ax hew40) 5530-5690 MHz(802.11ac vht80/ax hew80) |
| Maximum Average Output Power (Conducted): | 13.92 dBm in 5250-5350 MHz Band 14.33 dBm in 5470-5725 MHz Band |
| Modulation Type: | 802.11a/n/ac: OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM 802.11ax: OFDM- BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM |
| Rated Input Voltage: | DC 3.3V |
| Serial Number: | 2KOD-1 |
| EUT Received Date: | 2024/4/28 |
| EUT Received Status: | Good |
| Note: The multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer. | |

1.1.2 Antenna Information Detail ▲:

| Antenna | Antenna Type | input impedance (Ohm) | Frequency Range | Antenna Gain |
|---------------|--------------|-----------------------|-----------------|--------------|
| ANT1(Chain 0) | Dipole | 50 | 5.15~5.85GHz | 1.33 |
| | | | 5.25~5.35 GHz | 1.47 |
| | | | 5.47~5.725 GHz | 1.20 |
| | | | 5.725~5.85 GHz | 0.03 |
| ANT2(Chain 1) | Dipole | 50 | 5.15~5.85GHz | 1.33 |
| | | | 5.25~5.35 GHz | 1.47 |
| | | | 5.47~5.725 GHz | 1.20 |
| | | | 5.725~5.85 GHz | 0.03 |

1.1.3 Accessory Information:

| Accessory Description | Manufacturer | Model |
|-----------------------|--------------|-------|
| / | / | / |

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

| | |
|--|--|
| EUT Operation Mode: | The system was configured for testing in Engineering Mode, which was provided by the manufacturer. |
| Equipment Modifications: | No |
| EUT Exercise Software: | Tfgen.exe |
| WLAN traffic is generated by software “Tfgen”, software is used by IP and Frame based systems for loading the test channel during the In-service compliance testing of the U-NII device. Data package streamed from the Access Point to the Client using the software “Tfgen”. | |

1.2.2 Support Equipment List and Details

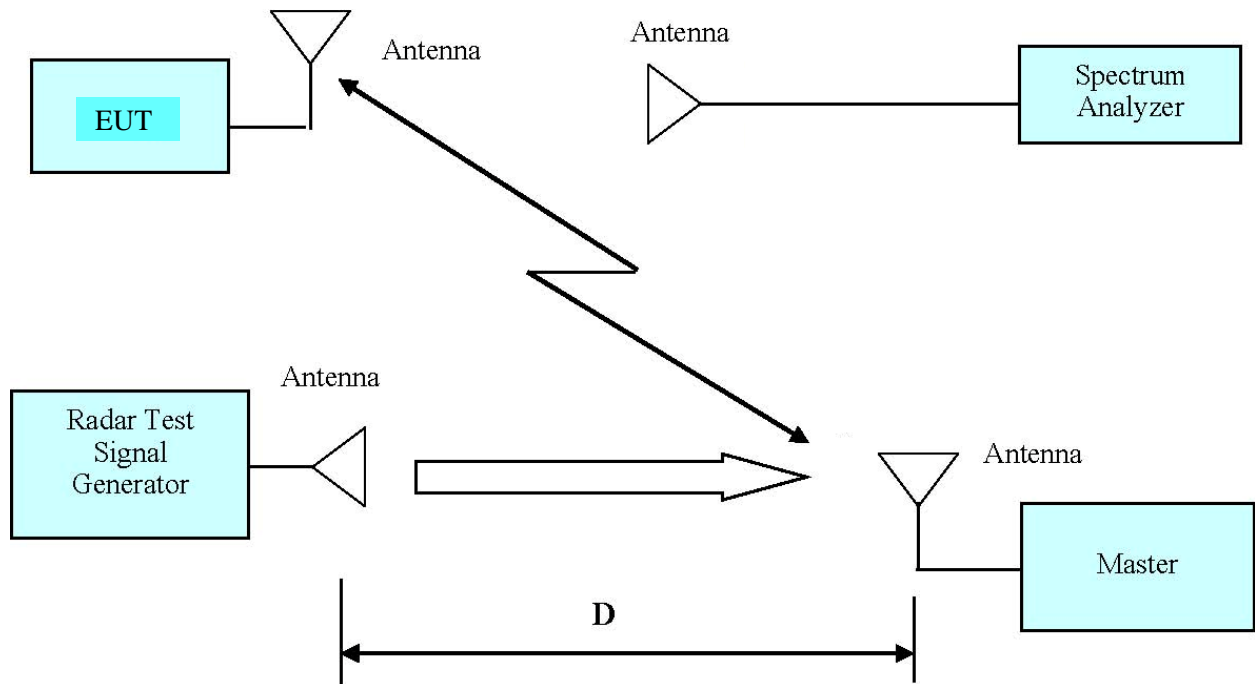
| Manufacturer | Description | Model | Serial Number |
|--------------|-----------------|----------|---------------|
| Lenovo | Laptop | T430 | AA887-03 |
| Huawei | Wireless Router | HG8245Q2 | HG8245-001 |

Note: The mater Wireless Router model: HG8245Q2 Pro, FCC ID: QISHG8245Q2

1.2.3 Support Cable List and Details

| Cable Description | Shielding Type | Ferrite Core | Length (m) | From Port | To |
|-------------------|----------------|--------------|------------|-----------|----|
| / | / | / | / | / | / |

1.2.4 Block Diagram of Test Setup



2. SUMMARY OF TEST RESULTS

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

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

Note:

Not applicable: The EUT is a client unit without radar detection.

3. REQUIREMENTS AND TEST PROCEDURES

3.1 DFS Requirement

CFR §47 Part 15.407(h)

FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

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

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

Table 2: Applicability of DFS requirements during normal operation

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

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

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.

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

| Maximum Transmit Power | Value (See Notes 1, 2, and 3) |
|--|----------------------------------|
| EIRP \geq 200 milliwatt | -64 dBm |
| EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz | -62 dBm |
| EIRP < 200 milliwatt that do not meet the power spectral density requirement | -64 dBm |
| <p>Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p>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.</p> <p>Note 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p> | |

Table 4: DFS Response Requirement Values

| Parameter | Value |
|--|---|
| <i>Non-occupancy period</i> | Minimum 30 minutes |
| <i>Channel Availability Check Time</i> | 60 seconds |
| <i>Channel Move Time</i> | 10 seconds See Note 1. |
| <i>Channel Closing Transmission Time</i> | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2. |
| <i>U-NII Detection Bandwidth</i> | Minimum 100% of the U- NII 99% transmission power bandwidth. See Note 3. |
| <p>Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p>Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel move</i> (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.</p> <p>Note 3: During the <i>U-NII Detection Bandwidth</i> detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.</p> | |

Table 5 – Short Pulse Radar Test Waveforms

| Radar Type | Pulse Width (μsec) | PRI (μsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|--------------------|---|---|--|--------------------------|
| 0 | 1 | 1428 | 18 | See Note 1 | See Note 1 |
| 1 | 1 | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a | Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{SEC}}} \right) \right\}$ | 60% | 30 |
| | | Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A | | | |
| 2 | 1-5 | 150-230 | 23-29 | 60% | 30 |
| 3 | 6-10 | 200-500 | 16-18 | 60% | 30 |
| 4 | 11-20 | 200-500 | 12-16 | 60% | 30 |
| 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 usec is selected, the number of pulses

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

Table 5a - Pulse Repetition Intervals Values for Test A

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

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

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

Table 6 – Long Pulse Radar Test Waveform

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

Table 7 – Frequency Hopping Radar Test Waveform

| Radar Type | Pulse Width (μ sec) | PRI (μ sec) | 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 |

3.2 Test Procedure

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

4. Test DATA AND RESULTS

| | | | |
|----------------|-------------|--------------|--------------|
| Serial Number: | 2KOD-1 | Test Date: | 2024/5/14 |
| Test Site: | 966-2 | Test Mode: | Transmitting |
| Tester: | LingLing Li | Test Result: | Pass |

Environmental Conditions:

| | | | | | |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature: (°C) | 23.4 | Relative Humidity: (%) | 46 | ATM Pressure: (kPa) | 100.8 |
|----------------------|------|---------------------------|----|------------------------|-------|

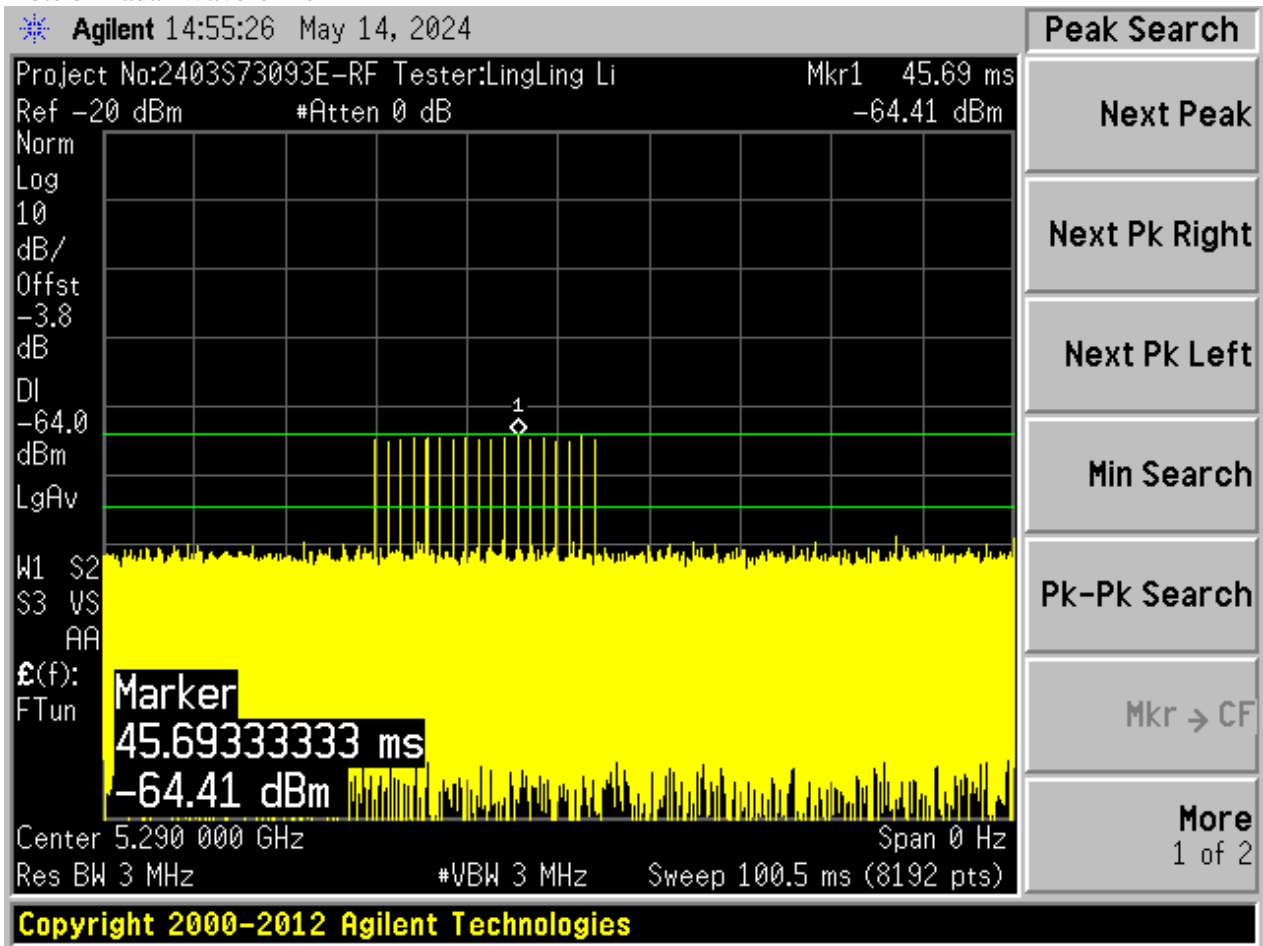
Test Equipment List and Details:

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|----------------------|---------------------------------|----------|---------------|------------------|----------------------|
| National Instruments | NI PXI-1042 8-Slot chassis | PXI-1042 | VOBX40FBD | N/A | N/A |
| National Instruments | Arbitrary Waveform Generator | PXI-5421 | N/A | N/A | N/A |
| National Instruments | RF Upconverter | PXI-5610 | N/A | N/A | N/A |
| ASCOR | Upconverter | AS-7202 | N/A | N/A | N/A |
| Agilent | Spectrum Analyzer | E4440A | SG43360054 | 2024/4/4 | 2025/3/31 |
| Ditorn | Splitter/Combiner | D3C4080 | SN2244 | N/A | N/A |
| AH | Double Ridge Guide Horn Antenna | SAS-571 | 1394 | 2023/2/22 | 2026/2/21 |
| ETS-Lindgren | Horn Antenna | 3115 | 9912-5985 | 2023/12/6 | 2026/12/5 |

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

4.1 Radar Waveform Calibration

Plots of Radar Waveforms



4.2 Channel Move Time and Channel Closing Transmission Time

4.2.1 Test Procedure

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

4.2.2 Test Results

| Frequency (MHz) | Bandwidth (MHz) | Radar Type | Results |
|-----------------|-----------------|------------|-----------|
| 5290 | 80 | Type 0 | Compliant |

Please refer to the following tables and plots.

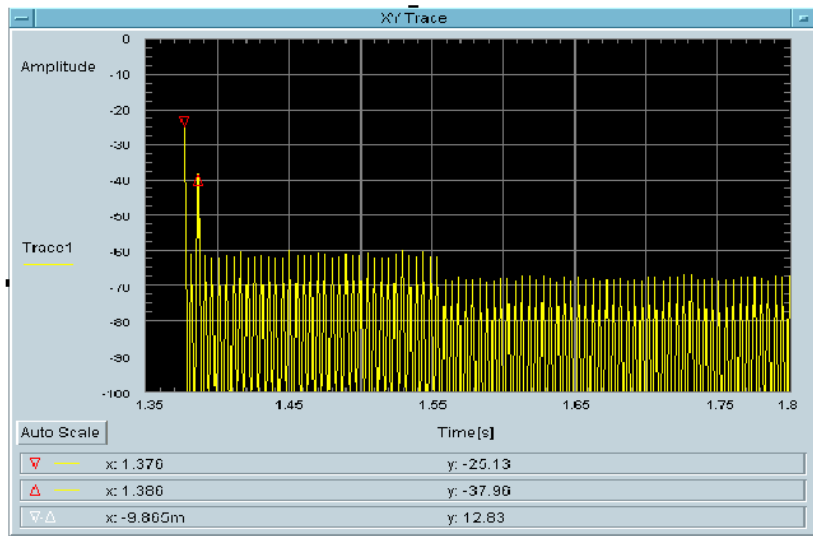
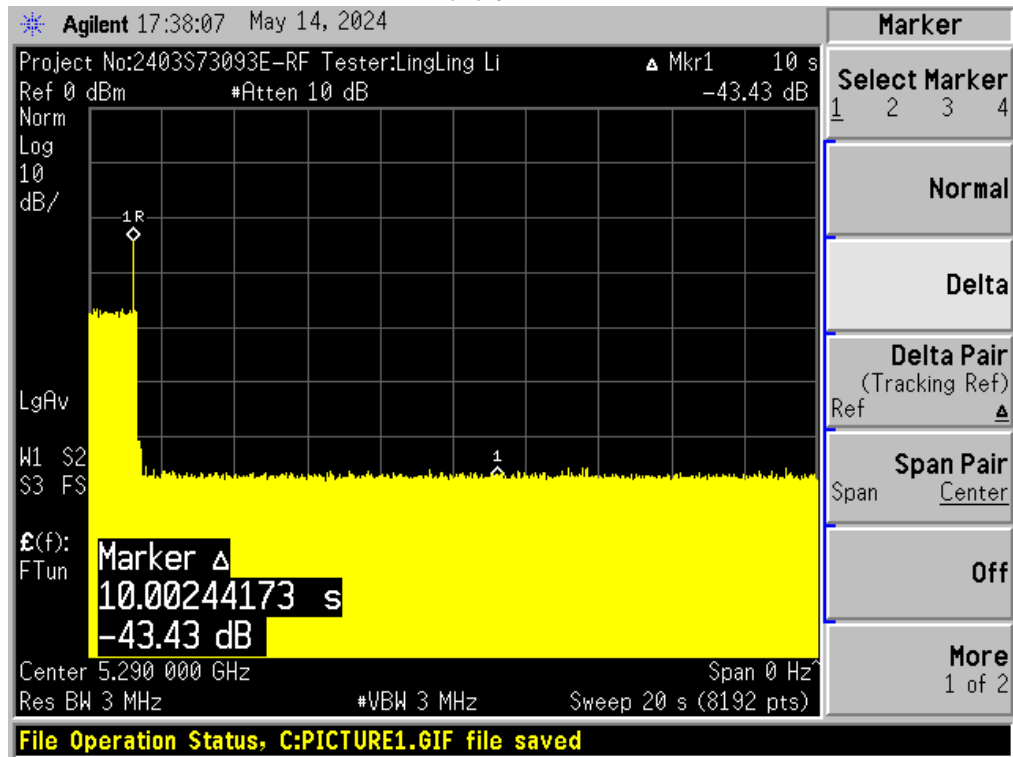
Channel Move Time

| Test Channel | Test Result (s) | Limit (s) | Result |
|--------------|-----------------|-----------|--------|
| 5290MHz | 0.010 | 10 | Pass |

Channel Closing Transmission Time

| Transmission After 200ms | Aggregate Transmission Time After 200ms Delay (ms) | Limit for Aggregate Transmission Time After 200ms Delay (ms) | Result |
|--------------------------|--|--|--------|
| No | 0 | 60 | Pass |

5290 MHz



Total On Time [s]
4.932m

Total On Time After Delay [s]

Project No:2403S73093E-RF

Tester:Lingling Li

4.3 Non-occupancy Period

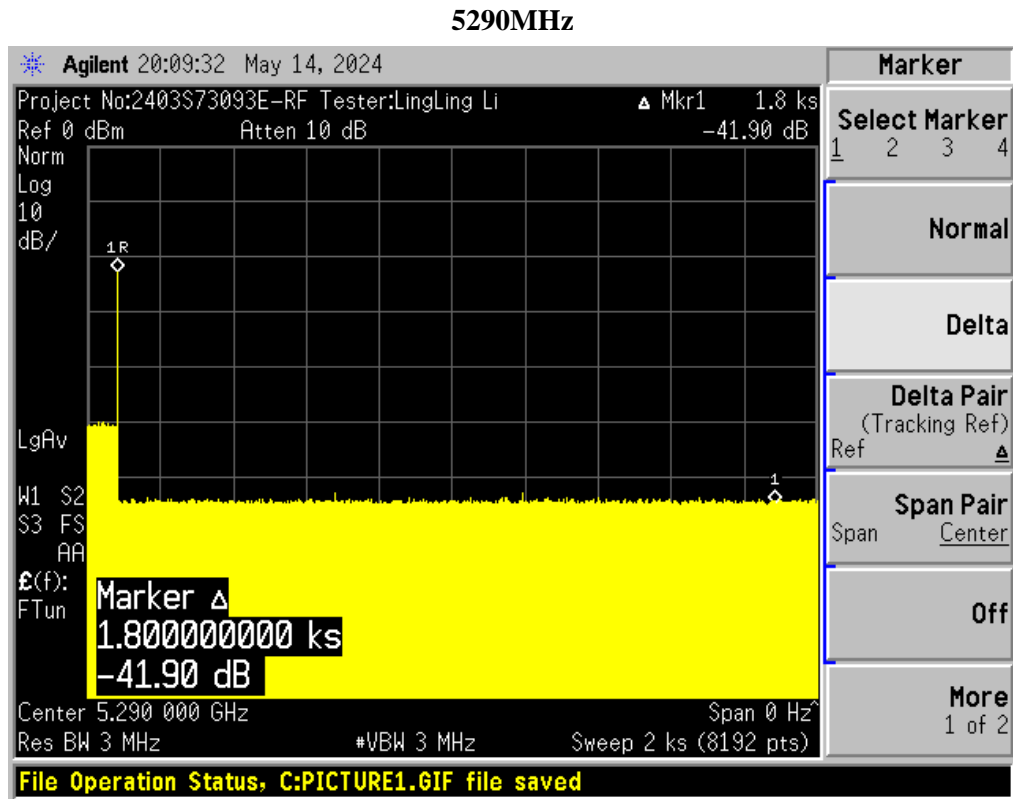
4.3.1 Test Procedure

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

4.3.2 Test Result

| Frequency (MHz) | Bandwidth (MHz) | Spectrum Analyzer Display |
|-----------------|-----------------|-----------------------------------|
| 5290 | 80 | No transmission within 30 minutes |

Please refer to the following plots.



5. EUT PHOTOGRAPHS

Please refer to the attachment 2403S73093E-EXP EUT EXTERNAL PHOTOGRAPHS and 2403S73093E-INP EUT INTERNAL PHOTOGRAPHS

6. TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2403S73093E-RF-00C-TSP TEST SETUP PHOTOGRAPHS.

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