



# TEST REPORT

Report Number: C21T00273-SRD07-V03

|              |                         |
|--------------|-------------------------|
| Applicant    | FOTRIC INC.             |
| Product Name | Infrared Thermal Camera |
| Model Name   | FOTRIC 348A             |
| Brand Name   | FOTRIC                  |
| FCC ID       | 2AZTCFALCON             |

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC CFR47 Part 15E (2019).

Huang Zhicheng  
(Prepared this report)

Wang Changqing  
(Reviewed this report)

Liu Long  
(Approved this report)

Issue Date

2021-11-03

**Industrial Internet Innovation Center (Shanghai) Co., Ltd.**

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### **Test Laboratory:**

Industrial Internet Innovation Center (Shanghai) Co., Ltd.

Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China

Tel: +86 21 68866880

### Revision Version

| Report Number       | Revision | Date       | Memo                                                                                                                                                                   |
|---------------------|----------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D21T00273-SRD07-V00 | 00       | 2021-09-13 | Initial creation of test report                                                                                                                                        |
| D21T00273-SRD07-V01 | 01       | 2021-10-25 | 1. Printed name added<br>2. Has Been described in section 7.2 of the report.(Note3)<br>3. The setup photo has been added in section 6.2 .<br>4. External photo removed |
| D21T00273-SRD07-V02 | 02       | 2021-11-01 | The test diagram has been extracted as a separate document.                                                                                                            |
| D21T00273-SRD07-V03 | 03       | 2021-11-03 | Test date has been modified.                                                                                                                                           |

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## 1. Test Laboratory

### 1.1. Testing Location

Primary Lab:

|                      |                                                            |
|----------------------|------------------------------------------------------------|
| Company Name         | Industrial Internet Innovation Center (Shanghai) Co., Ltd. |
| Address              | Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China    |
| FCC Registration No. | 958356                                                     |
| FCC Designation No.  | CN1177                                                     |

Subcontracting Lab #1:

|              |     |
|--------------|-----|
| Company Name | N/A |
| Address      | N/A |

### 1.2. Testing Environment

|                    |             |
|--------------------|-------------|
| Normal Temperature | 15°C~35°C   |
| Relative Humidity  | 30%RH~60%RH |
| Supply Voltage     | 120V/60Hz   |

### 1.3. Project Information

|                    |            |
|--------------------|------------|
| Project Leader     | Xu Yuting  |
| Testing Start Date | 2021-06-30 |
| Testing End Date   | 2021-08-20 |



## 2. Client Information

### 2.1. Applicant Information

|              |                                                        |
|--------------|--------------------------------------------------------|
| Company Name | FOTRIC INC.                                            |
| Address      | No. 14,Lane 2500,Xiupu Road, Pudong District, Shanghai |
| Telephone    | 18721506267                                            |

### 2.2. Manufacturer Information

|              |                                                        |
|--------------|--------------------------------------------------------|
| Company Name | FOTRIC INC.                                            |
| Address      | No. 14,Lane 2500,Xiupu Road, Pudong District, Shanghai |
| Telephone    | 18721506267                                            |

### 3. Equipment under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

|                                      |                                                         |
|--------------------------------------|---------------------------------------------------------|
| Product Name                         | Infrared Thermal Camera                                 |
| Model name                           | FOTRIC 348A                                             |
| Supported Radio Technology and Bands | WLAN 802.11a/b/g/n/ac<br>GNSS GLONASS G1/GPS L1/BDS B1I |
| Hardware Version                     | V02A                                                    |
| Software Version                     | 2.0.4                                                   |
| FCC ID                               | 2AZTCFALCON                                             |

Note: Photographs of EUT are shown in ANNEX B of this test report.

#### 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of Receipt |
|---------|------------|------------|------------|-----------------|
| N01     | N/A        | V00A       | 2.0.4      | 2021-06-30      |
| N02     | N/A        | V00A       | 2.0.4      | 2021-06-30      |

\*EUT ID: is internally used to identify the test sample in the lab.

#### 3.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN/Remark |
|--------|-------------|-------|-----------|
| AE1    | RF cable    | N/A   | N/A       |

\*AE ID: is internally used to identify the test sample in the lab.

\*The AE is provided by the client.

## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference      | Title                                                                     | Version |
|----------------|---------------------------------------------------------------------------|---------|
| FCC Part15     | FCC CFR47 Part 15E Unlicensed National Information Infrastructure Devices | 2019    |
| KDB 905462     | UNII DFS Compliance Procedures New Rules                                  | v02     |
| FCC KDB 905462 | Client Without DFS New Rules                                              | v01r02  |

### 4.2. Reference Information from client

Information of the test sample provided by the client.

## 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

| SUMMARY OF MEASUREMENT RESULTS | Sub-clause of Part15E | Verdict |
|--------------------------------|-----------------------|---------|
| DFS                            | 15.407                | P       |

Please refer to section 6 for detail.

Terms used in Verdict column

|    |                                                                                |
|----|--------------------------------------------------------------------------------|
| P  | Pass, the EUT complies with the essential requirements in the standard.        |
| NP | Not Perform, the test was not performed by ECIT.                               |
| NA | Not Applicable, the test was not applicable.                                   |
| F  | Fail, the EUT does not comply with the essential requirements in the standard. |

Test Conditions

|      |                    |
|------|--------------------|
| Tnom | Normal temperature |
| Tmin | Low Temperature    |
| Tmax | High Temperature   |
| Vnom | Normal Voltage     |
| Vmin | Low Voltage        |
| Vmax | High Voltage       |
| Hnom | Norm Humidity      |
| Anom | Norm Air Pressure  |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

|             |      |      |
|-------------|------|------|
| Temperature | Tnom | 25°C |
| Voltage     | Vnom | 3.8V |
| Humidity    | Hnom | 47%  |

### Statements

The Infrared Thermal Camera, manufactured by FOTRIC INC is a new product for testing.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which

identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

Derived model:

FOTRIC 343G,FOTRIC 343P,FOTRIC 343A,FOTRIC 343M,FOTRIC 343E,FOTRIC 343X,FOTRIC 343T,FOTRIC 343B,FOTRIC 343G+,FOTRIC 343P+,FOTRIC 343A+,FOTRIC 343M+,FOTRIC 343E+,FOTRIC 343X+,FOTRIC 343T+,FOTRIC 343B+,FOTRIC 344G,FOTRIC 344P,FOTRIC 344A,FOTRIC 344M,FOTRIC 344E,FOTRIC 344X,FOTRIC 344T,FOTRIC 344B,FOTRIC 344G+,FOTRIC 344P+,FOTRIC 344A+,FOTRIC 344M+,FOTRIC 344E+,FOTRIC 344X+

FOTRIC 344T+,FOTRIC 344B+,FOTRIC 345G,FOTRIC 345P,FOTRIC 345A,FOTRIC 345M,FOTRIC 345E,FOTRIC 345X,FOTRIC 345T,FOTRIC 345B,FOTRIC 345G+,FOTRIC 345P+,FOTRIC 345A+,FOTRIC 345M+,FOTRIC 345E+,FOTRIC 345X+,FOTRIC 345T+,FOTRIC 345B+,FOTRIC 346G,FOTRIC 346P,FOTRIC 346A,FOTRIC 346M,FOTRIC 346E,FOTRIC 346X,FOTRIC 346T,FOTRIC 346B,FOTRIC 346G+,FOTRIC 346P+,FOTRIC 346A+,FOTRIC 346M+,FOTRIC 346E+,FOTRIC 346X+,FOTRIC 346T+,FOTRIC 346B+,FOTRIC 347G,FOTRIC 347P,FOTRIC 347A,FOTRIC 347M,FOTRIC 347E,FOTRIC 347X,FOTRIC 347T,FOTRIC 347B,FOTRIC 347G+,FOTRIC 347P+,FOTRIC 347A+,FOTRIC 347M+,FOTRIC 347E+,FOTRIC 347X+,FOTRIC 347T+,FOTRIC 347B+,FOTRIC 348G,FOTRIC 348P,FOTRIC 348A,FOTRIC 348M,FOTRIC 348E,FOTRIC 348X,FOTRIC 348T,FOTRIC 348B,FOTRIC 348G+,FOTRIC 348P+,FOTRIC 348A+,FOTRIC 348M+,FOTRIC 348E+,FOTRIC 348X+,FOTRIC 348T+,FOTRIC 348B+

## 6. Measurement Requirements

### 6.1. DFS Technical Requirements and Radar Test Waveforms

#### 6.1.1 DFS Overview

Applicability of DFS requirements Prior to Use of a Channel

| Requirement                  | DFS Operational mode |                               |                            |
|------------------------------|----------------------|-------------------------------|----------------------------|
|                              | Master               | Slave without radar detection | Slave with radar detection |
| Channel Availability Check   | Required             | Not required                  | Required (see note 2)      |
| Off-Channel CAC (see note 1) | Required             | Not required                  | Required (see note 2)      |
| In-Service Monitoring        | Required             | Not required                  | Required                   |
| Channel Shutdown             | Required             | Required                      | Required                   |
| Non-Occupancy Period         | Required             | Not required                  | Required                   |
| Uniform Spreading            | Required             | Not required                  | Not required               |

NOTE 1: Where implemented by the manufacturer.

NOTE 2: A slave with radar detection is not required to perform a CAC or Off-Channel CAC at initial use of the channel but only after the slave has detected a radar signal on the Operating Channel by In-Service Monitoring and the Non-Occupancy Period resulting from this detection has elapsed.

#### 6.1.2 DFS Detection Thresholds

DFS Requirement Values

| Parameter                         | Value                  |
|-----------------------------------|------------------------|
| Channel Availability Check Time   | 60 s (see note 1)      |
| Minimum Off-Channel CAC Time      | 6 minutes (see note 2) |
| Maximum Off-Channel CAC Time      | 4 hours (see note 2)   |
| Channel Move Time                 | 10 s                   |
| Channel Closing Transmission Time | 1 s                    |
| Non-Occupancy Period              | 30 minutes             |

NOTE 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the Channel Availability Check Time shall be 10 minutes.

NOTE 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the Off-Channel CAC Time shall be within the range 1 hour to 24 hours.

| EIRP Spectral Density (dBm/MHz) | Value<br>(see note 1 and note 2) |
|---------------------------------|----------------------------------|
| 10                              | -62 dBm                          |

NOTE 1: This is the level at the input of the receiver of an RLAN device with a maximum EIRP density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different EIRP spectral density and/or a different receive antenna gain G (dBi) the Radar Detection Threshold Level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - EIRP Spectral Density (dBm/MHz) + G (dBi); however the Radar Detection Threshold Level shall not be less than -64 dBm assuming a 0 dBi receive antenna gain.

NOTE 2: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection unless these devices are used in fixed outdoor point to point or fixed outdoor point to multi point applications .

### 6.1.3 Radar Test Waveforms

Parameters of the reference DFS test signal

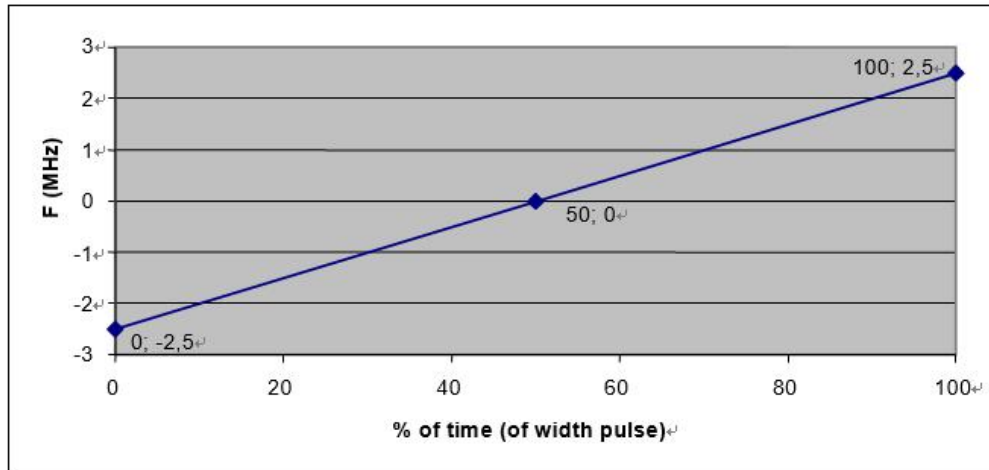
| Pulse width<br>W (μs) | Pulse repetition<br>frequency PRF (PPS) | Pulses per burst<br>(PPB) |
|-----------------------|-----------------------------------------|---------------------------|
| 1                     | 700                                     | 18                        |

Parameters of radar test signals

| Radar test<br>signal #<br>(see note 1<br>to note 3) | Pulse width<br>W (μs) |     | Pulse repetition<br>frequency<br>PRF (PPS) |       | Number of<br>different<br>PRFs | Pulses per<br>burst for<br>each PRF<br>(PPB)<br>(see note 5) |
|-----------------------------------------------------|-----------------------|-----|--------------------------------------------|-------|--------------------------------|--------------------------------------------------------------|
|                                                     | Min                   | Max | Min                                        | Max   |                                |                                                              |
| 1                                                   | 0,5                   | 5   | 200                                        | 1 000 | 1                              | 10<br>(see note 6)                                           |
| 2                                                   | 0,5                   | 15  | 200                                        | 1 600 | 1                              | 15<br>(see note 6)                                           |
| 3                                                   | 0,5                   | 15  | 2 300                                      | 4 000 | 1                              | 25                                                           |
| 4                                                   | 20                    | 30  | 2 000                                      | 4 000 | 1                              | 20                                                           |
| 5                                                   | 0,5                   | 2   | 300                                        | 400   | 2/3                            | 10<br>(see note 6)                                           |
| 6                                                   | 0,5                   | 2   | 400                                        | 1 200 | 2/3                            | 15<br>(see note 6)                                           |

NOTE 1: Radar test signals #1 to #4 are constant PRF based signals. See figure D.1. These radar test signals are intended to simulate also radars using a packet based Staggered PRF. See figure D.2.

NOTE 2: Radar test signal #4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a ±2,5 MHz frequency deviation which is described below.



NOTE 3: Radar test signals #5 and #6 are single pulse based Staggered PRF radar test signals using 2 or 3 different PRF values. For radar test signal #5, the difference between the PRF values chosen shall be between 20 PPS and 50 PPS. For radar test signal #6, the difference between the PRF values chosen shall be between 80 PPS and 400 PPS. See figure D.3.

NOTE 4: Apart for the Off-Channel CAC testing, the radar test signals above shall only contain a single burst of pulses. See figure D.1, figure D.3 and figure D.4.

For the Off-Channel CAC testing, repetitive bursts shall be used for the total duration of the test.

See figure D.2 and figure D.5.

NOTE 5: The total number of pulses in a burst is equal to the number of pulses for a single PRF multiplied by the number of different PRFs used.

NOTE 6: For the CAC and Off-Channel CAC requirements, the minimum number of pulses (for each PRF) for any of the radar test signals to be detected in the band 5 600 MHz to 5 650 MHz shall be 18.

#### Detection probability

| Parameter             | Detection Probability ( $P_d$ )                                                                    |                |
|-----------------------|----------------------------------------------------------------------------------------------------|----------------|
|                       | Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band | Other channels |
| CAC, Off-Channel CAC  | 99,99 %                                                                                            | 60 %           |
| In-Service Monitoring | 60 %                                                                                               | 60 %           |

NOTE:  $P_d$  gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions. Therefore  $P_d$  does not represent the overall detection probability for any particular radar under real life conditions.

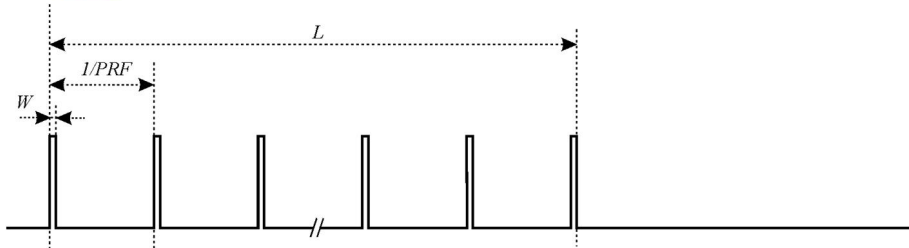


Figure 1: General structure of a single burst/constant PRF based radar test signal

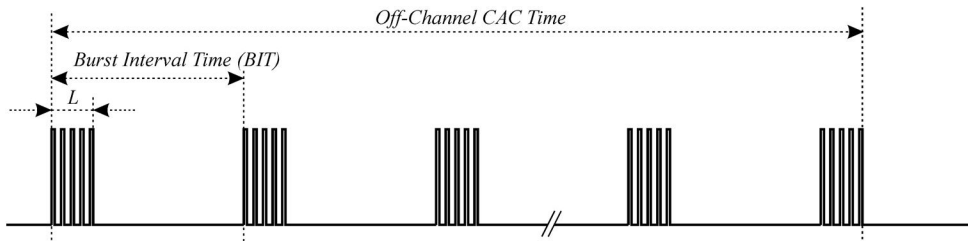


Figure 2: General structure of a multiple burst/constant PRF based radar test signal

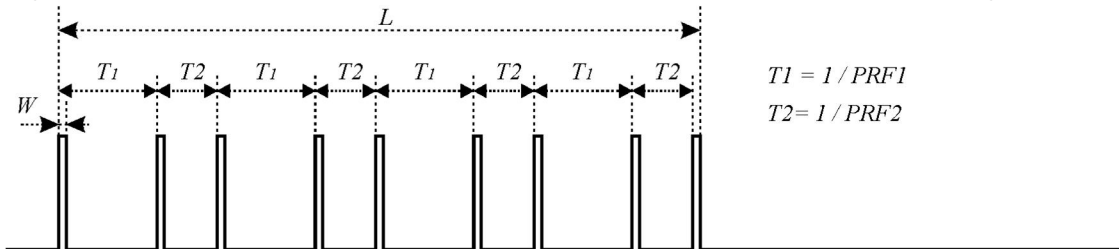


Figure 3: General structure of a single burst/single pulse based staggered PRF radar test signal

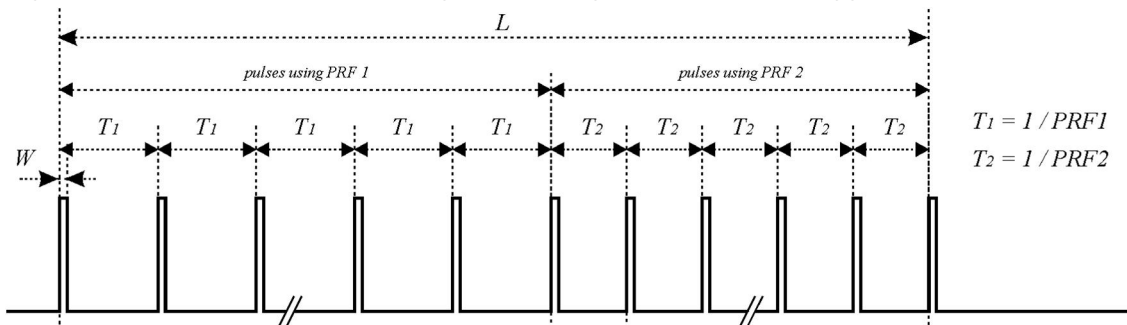


Figure 4: General structure of a single burst/packet based staggered PRF radar test signal

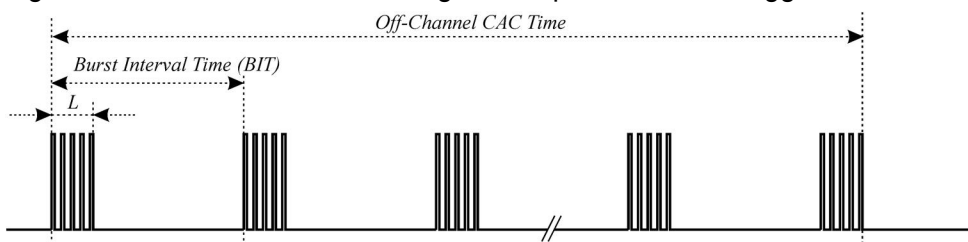


Figure 5: General structure of a multiple burst/packet based staggered PRF based radar test signal

## 6.2. Test Set-up

**6.2.1.** Set-up B is a set-up whereby the UUT is an RLAN device operating in slave mode, with or without Radar Interference Detection function. This set-up also contains an RLAN device operating in master mode. The radar test signals are injected into the master device. The UUT (slave device) is associated with the master device.

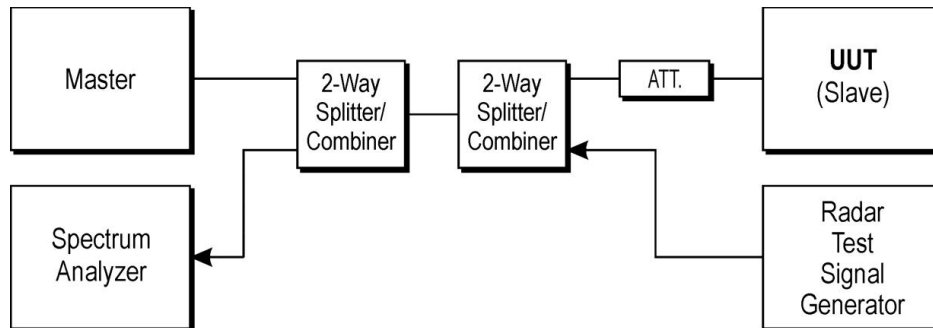


Figure 6: Set-up B

### 6.2.2. Set-up Photo:

The setup photos please refer to document “DFS Set-up Photo” .

## 7. Measurement Results

### 7.1. DFS Detection Thresholds

Radar Detection Threshold during the Channel Availability Check

- a) The signal generator and UUT are connected using Set-up A described. The power of the UUT is switched off.

- b) The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence (T<sub>power\_up</sub>) and is ready to start the radar detection. The Channel Availability Check on Chr is expected to commence at instant T1 and is expected to end no sooner than T1 + T<sub>ch\_avail\_check</sub> unless the radar test signal is detected sooner.

Additional verification may be needed to define T1 in case it is not exactly known or indicated by the UUT.

- c) A single burst radar test signal is generated on Chr using any of the radar test signals defined in table D.4 at a level defined. This single-burst radar test signal may commence at any time within the applicable Channel Availability Check Time.

For the purpose of reducing test time, it is recommended that the single-burst radar test signal starts approximately 10 s after T1.

- d) It shall be recorded if the radar test signal was detected.
- e) Step c) to step d) shall be performed 20 times and each time a unique radar test signal shall be generated from options provided in table D.4. When selecting these 20 unique radar test signals, the radar test signals #1 to #6 from table D.4 shall be included as well as variations of pulse width, pulse repetition frequency and number of different PRFs (if applicable) within the ranges given. The radar test signals used shall be recorded in the report. The radar test signal shall be detected at least 12 times out of the 20 trials in order to comply with the detection probability specified for this frequency range in table D.5.

Where the declared channel plan includes channels whose nominal bandwidth falls completely or partly within the 5 600 MHz to 5 650 MHz band, additional testing as described in the steps below shall be performed on a channel within this band.

- f) A single burst radar test signal is generated on Chr using any of the radar test signals defined in table D.4 (except signals #3 and #4) at a level of 10 dB above the level defined. This single burst radar test signal may commence at any time within the applicable Channel Availability Check Time.

For the purpose of reducing test time, it is recommended that the single burst radar test signal starts approximately 10 s after T1.

- g) Step f) shall be performed 20 times, each time a different radar test signal shall be generated from options provided in table D.4 (except signals #3 and #4). The radar test signals used shall be recorded in the report. The radar test signal shall be detected during each of these tests and this shall be recorded.

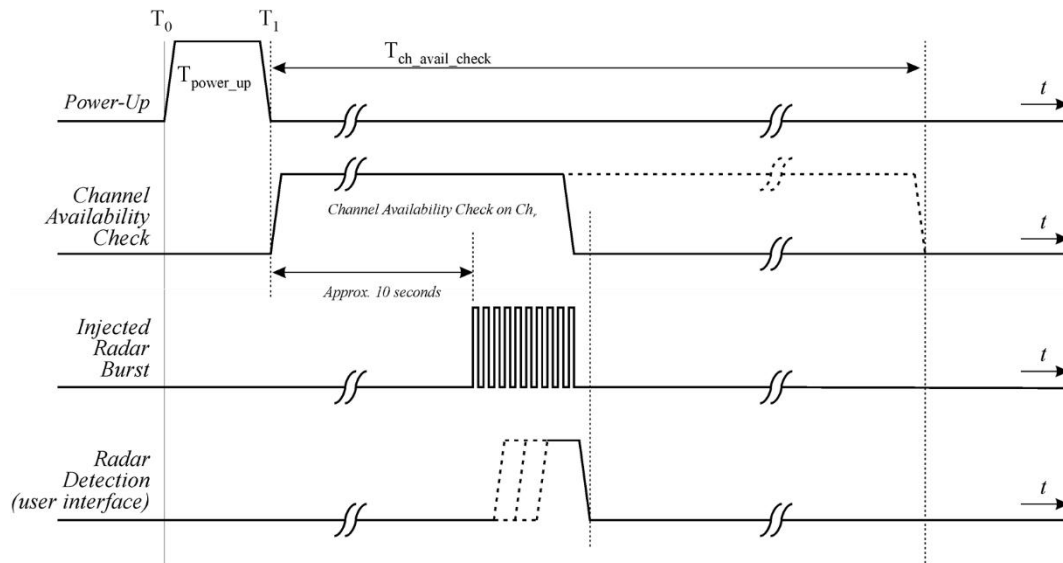


Figure 7: Example of timing for radar testing during the Channel Availability Check

#### Radar Detection Threshold during the In-Service Monitoring

- a) When the UUT is a master device, a slave device will be used that associates with the UUT. The signal generator and the UUT are connected using Set-up A described .  
When the UUT is a slave device with a Radar Interference Detection function, the UUT shall associate with a master device. The signal generator and the UUT are connected using Set-up C described .
- b) The UUT shall transmit a test transmission sequence in accordance with clause 5.3.1.2 on the selected channel Chr. While the testing is performed on Chr, the equipment is allowed to have simultaneous transmissions on other adjacent or non-adjacent Operating Channels.
- c) At a certain time  $T_0$ , a single burst radar test signal is generated on Chr using radar test signal #1 defined in table D.4 and at a level defined.  $T_1$  denotes the end of the radar burst.
- d) It shall be recorded if the radar test signal was detected.
- e) Step b) to step d) shall be performed 20 times, each time a random value shall be chosen for pulse width and pulse repetition frequency from the corresponding ranges provided in table D.4. For radar test signal #5 and radar test signal #6 provided in table D.4 the number of PRF values shall vary between 2 or 3. The radar test signal shall be detected at least 12 times out of the 20 trials in order to comply with the detection probability specified in table D.5.
- f) Step b) to step e) shall be repeated for each of the radar test signals defined in table D.4 and as described .

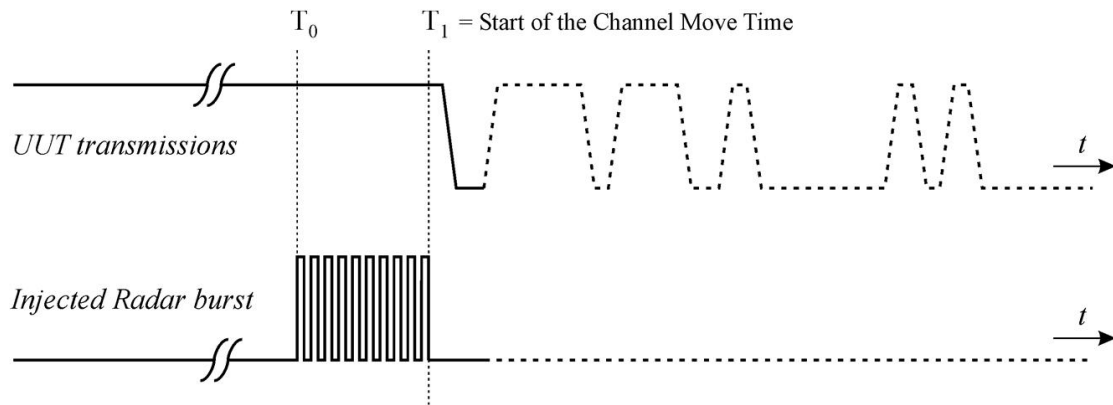


Figure 8: Example of timing for radar testing during the In-Service Monitoring

| Frequency of Calibration |                   |
|--------------------------|-------------------|
| Bandwidth                | Central Frequency |
| 20MHz                    | 5320MHz           |
|                          | 5500MHz           |
| 40MHz                    | 5310MHz           |
|                          | 5510MHz           |
| 80MHz                    | 5290MHz           |
|                          | 5530MHz           |

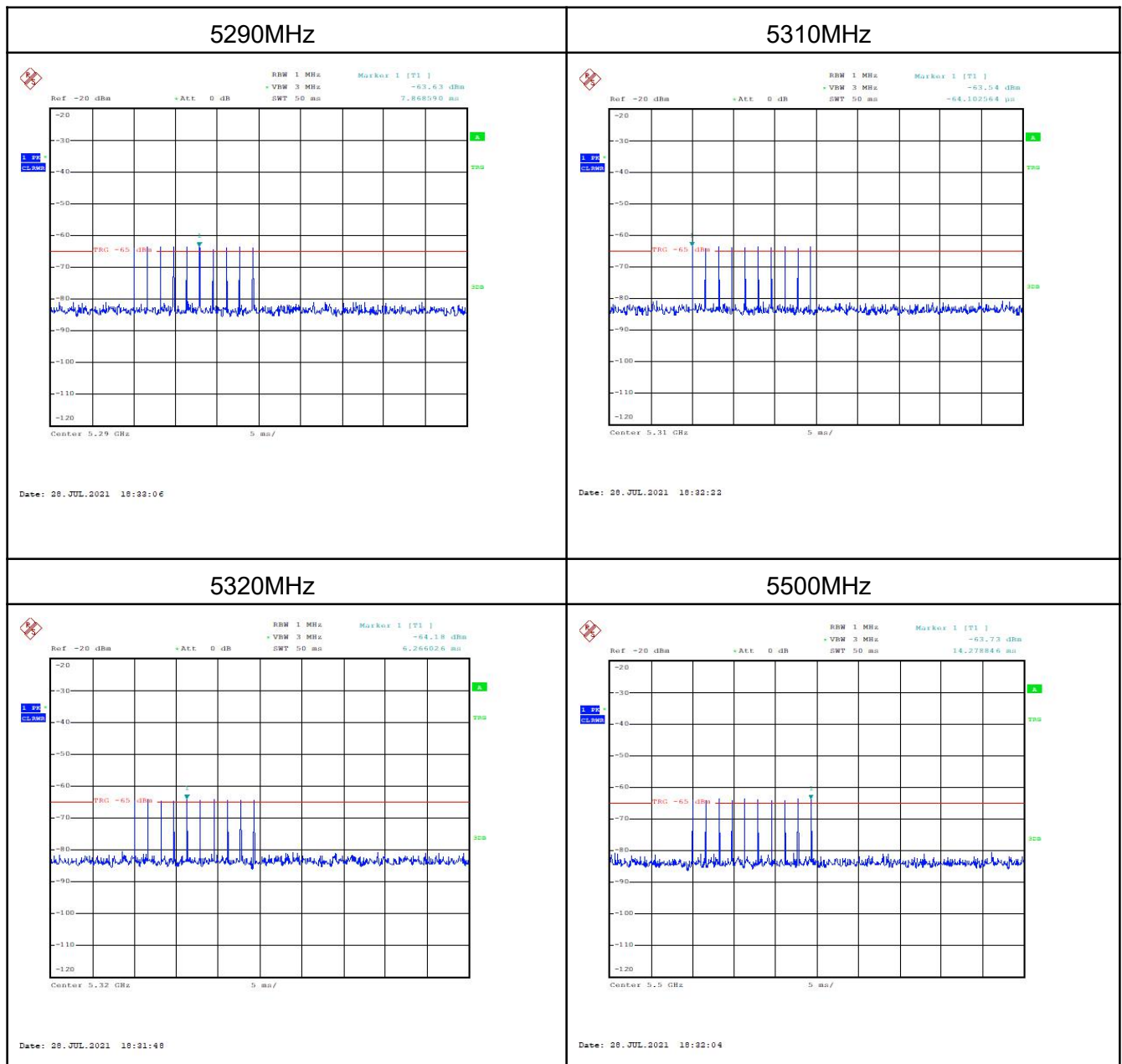


The Calibration is listed below:

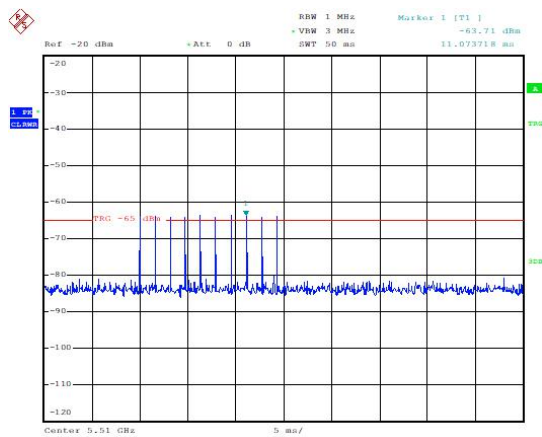
Relative Humidity: 50%~60% at normal and high temperature.

Calibration Measurement Results:

Radar Test Waveforms

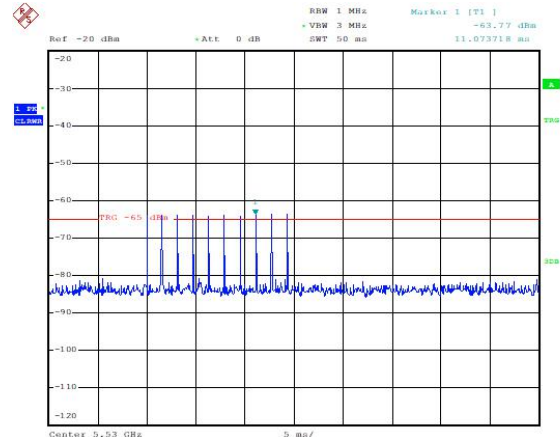


## 5510MHz



Date: 28.JUL.2021 18:32:43

## 5530MHz



Date: 28.JUL.2021 18:33:27

## 7.2. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

### Methods of Measurement

These tests define how the following DFS parameters are verified during In-Service Monitoring;

Channel Closing Transmission Time

Channel Move Time

Non-Occupancy Period

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).

1. One frequency will be chosen from the Operating Channels of the EUT 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.

2. In case the EUT 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 EUT (Client device) to Associate with the Master Device. In case the EUT 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 EUT (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.

3. 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.

4. At time T<sub>0</sub> 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 variation /errors.

5. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs. Figure 17 illustrates Channel Closing Transmission Time.

6. When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T<sub>2</sub> to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.

7. In case the EUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps 1 to 6.

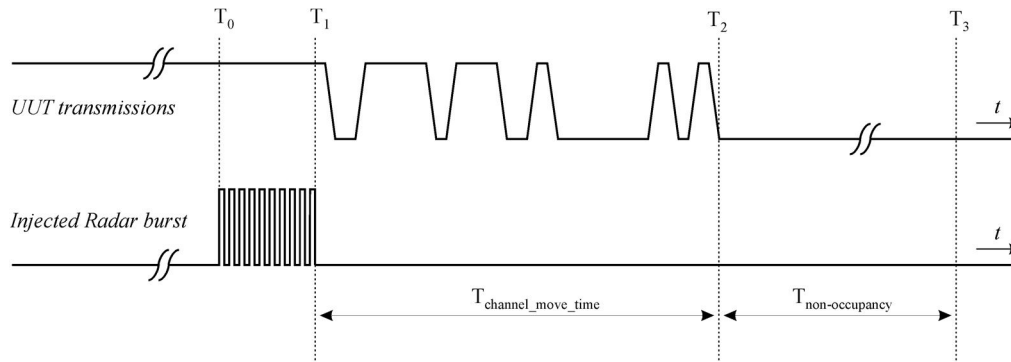


Figure 9: Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period

#### Limits:

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| Channel Move Time                 | $\leq 10s$                                      |
| Channel Closing Transmission Time | $\leq 200ms + 60ms$ (over remaining 10s period) |
| Non-Occupancy Period              | $\geq 30min$                                    |

**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:** The Channel Closing Transmission Time is calculated by The computer .

Method of calculation:

The Channel Closing Transmission Time=

Time to start the test and stop the transfer - The time between the start of the test and the insertion of the jamming signal.

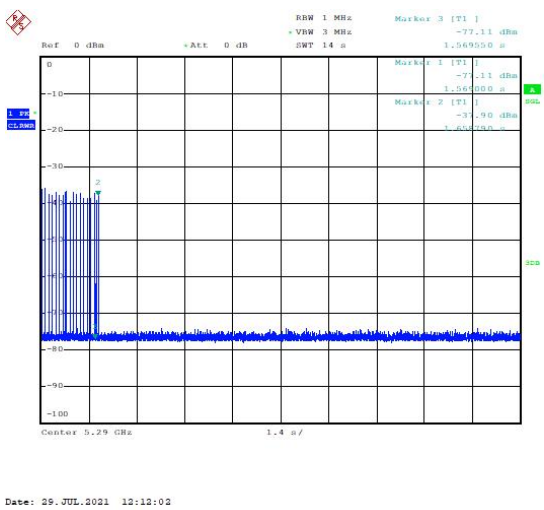
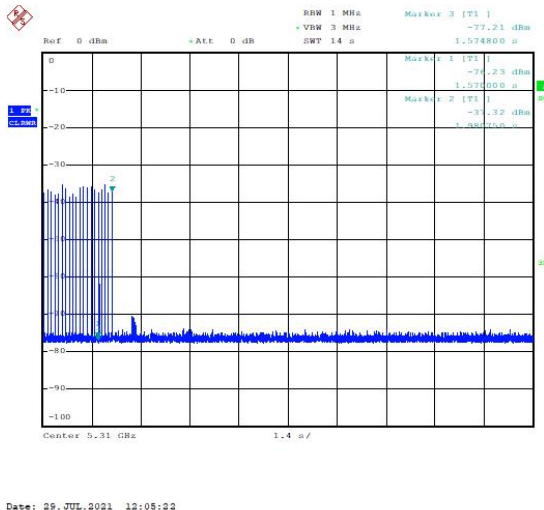
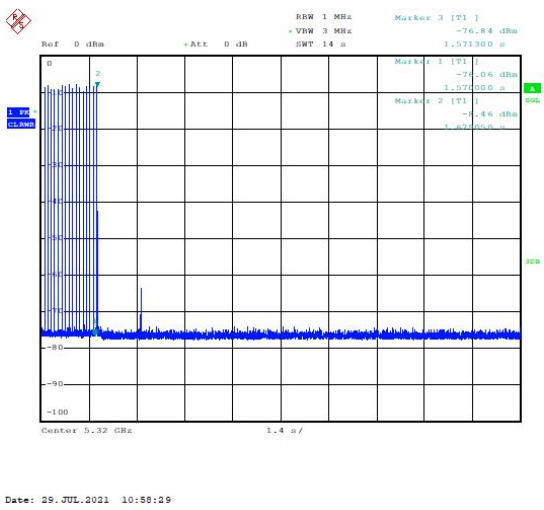
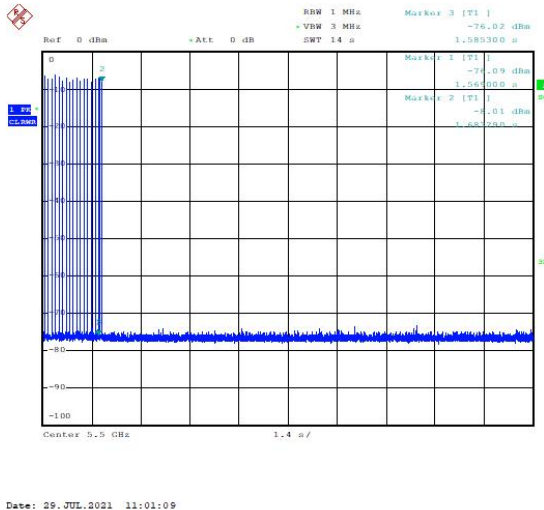
The whole process is controlled and timed by a computer.



## Measurement Results:

### 7.2.1 In-Service Monitoring for Channel Move Time and Channel Closing Transmission Time

#### Slave

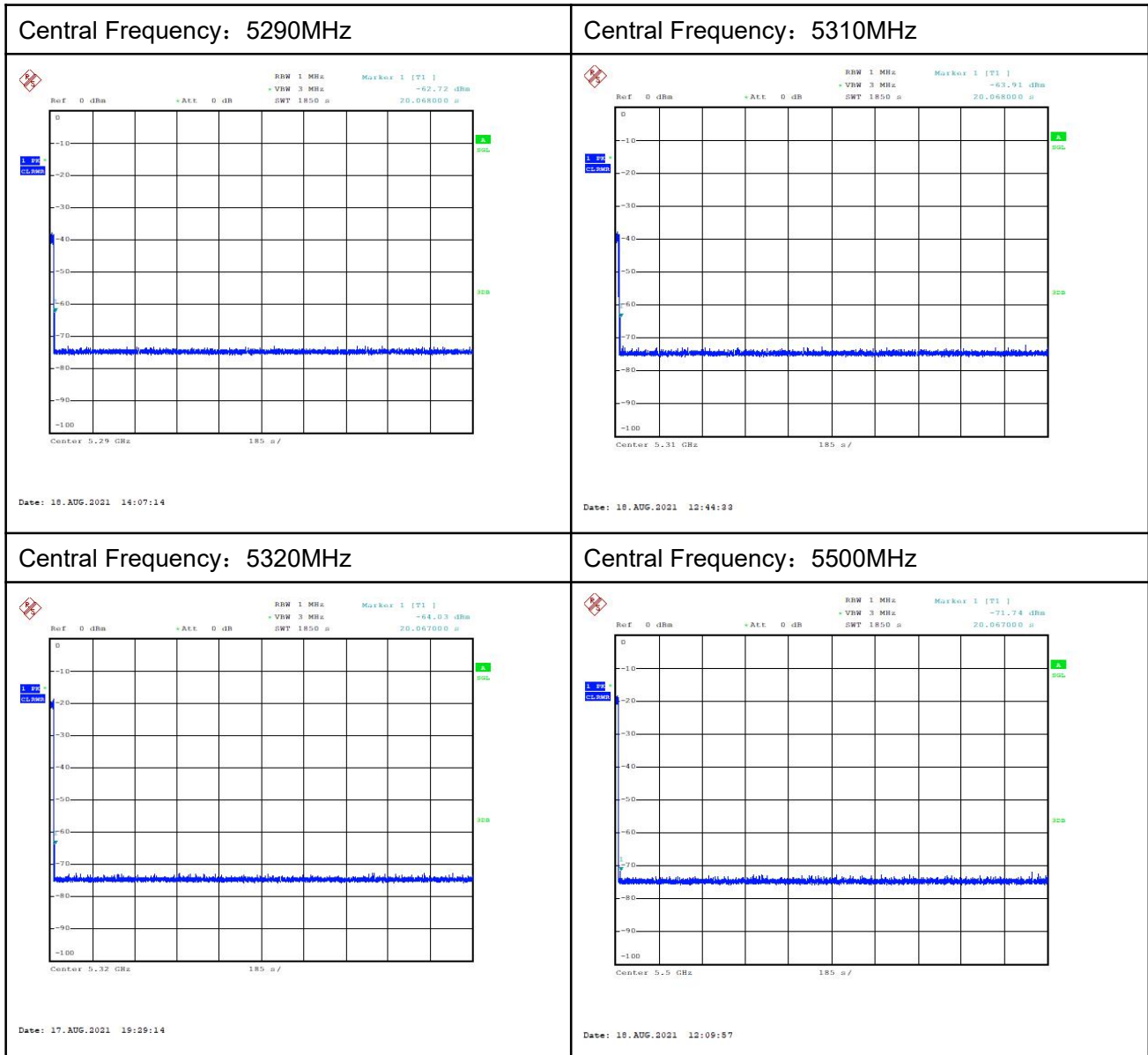
|                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Central Frequency: 5290MHz                                                                                                                                                                                                                                                                                                                                                 | Central Frequency: 5310MHz                                                                                                                                                                                                                                                                                                                                                 |
| Channel Move Time: 0.089s                                                                                                                                                                                                                                                                                                                                                  | Channel Move Time: 0.411s                                                                                                                                                                                                                                                                                                                                                  |
| Channel Closing Transmission Time: 5.24ms                                                                                                                                                                                                                                                                                                                                  | Channel Closing Transmission Time: 13.99ms                                                                                                                                                                                                                                                                                                                                 |
|  <p>Ref: 0 dBm<br/>Att: 0 dB<br/>BW: 1 MHz<br/>VW: 3 MHz<br/>SWT: 14 u<br/>Marker 3 [T1]<br/>-77.11 dBm<br/>1.565500 u<br/>Marker 1 [T1]<br/>-74.11 dBm<br/>1.560000 u<br/>Marker 2 [T1]<br/>-73.90 dBm<br/>1.560000 u<br/>Center 5.29 GHz<br/>1.4 u<br/>Date: 29.JUL.2021 12:12:02</p>  |  <p>Ref: 0 dBm<br/>Att: 0 dB<br/>BW: 1 MHz<br/>VW: 3 MHz<br/>SWT: 14 u<br/>Marker 3 [T1]<br/>-77.23 dBm<br/>1.574000 u<br/>Marker 1 [T1]<br/>-74.23 dBm<br/>1.570000 u<br/>Marker 2 [T1]<br/>-73.32 dBm<br/>1.565500 u<br/>Center 5.31 GHz<br/>1.4 u<br/>Date: 29.JUL.2021 12:05:22</p> |
| Central Frequency: 5320MHz                                                                                                                                                                                                                                                                                                                                                 | Central Frequency: 5500MHz                                                                                                                                                                                                                                                                                                                                                 |
| Channel Move Time: 0.059s                                                                                                                                                                                                                                                                                                                                                  | Channel Move Time: 0.113s                                                                                                                                                                                                                                                                                                                                                  |
| Channel Closing Transmission Time: 6.99 ms                                                                                                                                                                                                                                                                                                                                 | Channel Closing Transmission Time: 20.99ms                                                                                                                                                                                                                                                                                                                                 |
|  <p>Ref: 0 dBm<br/>Att: 0 dB<br/>BW: 1 MHz<br/>VW: 3 MHz<br/>SWT: 14 u<br/>Marker 3 [T1]<br/>-76.84 dBm<br/>1.571300 u<br/>Marker 1 [T1]<br/>-74.06 dBm<br/>1.570000 u<br/>Marker 2 [T1]<br/>-73.46 dBm<br/>1.570000 u<br/>Center 5.32 GHz<br/>1.4 u<br/>Date: 29.JUL.2021 10:58:29</p> |  <p>Ref: 0 dBm<br/>Att: 0 dB<br/>BW: 1 MHz<br/>VW: 3 MHz<br/>SWT: 14 u<br/>Marker 3 [T1]<br/>-76.02 dBm<br/>1.585500 u<br/>Marker 1 [T1]<br/>-74.89 dBm<br/>1.580000 u<br/>Marker 2 [T1]<br/>-73.01 dBm<br/>1.580000 u<br/>Center 5.5 GHz<br/>1.4 u<br/>Date: 29.JUL.2021 11:01:09</p> |



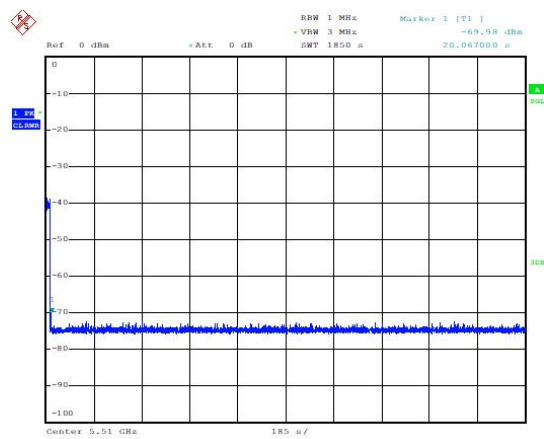
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Tel: +86 21 68866880

## 7.2.2 In-Service Monitoring for Non-Occupancy Period

### Slave

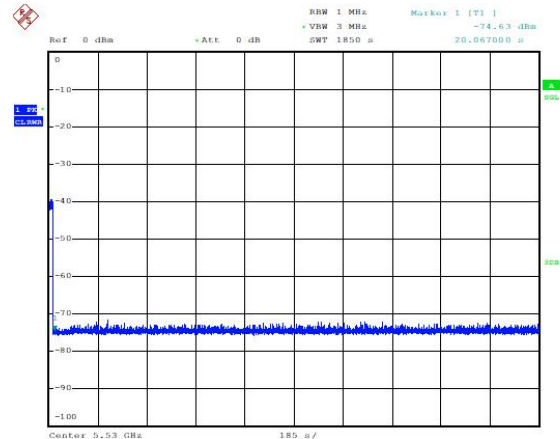


Central Frequency: 5510MHz



Date: 18.AUG.2021 13:31:29

Central Frequency: 5530MHz



Date: 18.AUG.2021 14:41:42

## 8. Test Equipment List

The test equipment and ancillaries used are as follows.

Conducted test system

| Item | Equipment Name         | Type                   | Serial Number | Manufacturer | Cal. Date  | Cal. interval |
|------|------------------------|------------------------|---------------|--------------|------------|---------------|
| 1    | Vector Signal Analyser | FSQ40                  | 200063        | R&S          | 2020-11-11 | 1 year        |
| 2    | Wireless communication | CMW500                 | 148904        | R&S          | 2021-05-10 | 1 year        |
| 3    | Network test unit AP   | R7800                  | 4H4E875F01051 | NETGEAR      | N/A        | N/A           |
| 6    | Eagle Test Software    | Eagle V3.1 FCC BT/WIFI | N/A           | ECIT         | N/A        | N/A           |

Anechoic chamber

Fully anechoic chamber by ETS.

## 9. Test Environment

Shielding Room (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

|                          |                            |
|--------------------------|----------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C |
| Relative humidity        | Min. = 25 %, Max. = 75 %   |
| Shielding effectiveness  | > 100 dB                   |
| Ground system resistance | < 0.5                      |

## Annex A: Measurement Uncertainty

### Measurement Uncertainty of Channel Shutdown:

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $K=1.96$ ,  $U=2.69\text{dB}$ .

### Measurement Uncertainty of Radiation test

| Frequency Range                           | Uncertainty(dB) |
|-------------------------------------------|-----------------|
| $30\text{MHz} \leq f \leq 2\text{GHz}$    | $\pm 4.98$      |
| $2\text{GHz} \leq f \leq 12.75\text{GHz}$ | $\pm 5.06$      |

### Measurement Uncertainty of Conducted test

| Measurement Items           | Range           | Confidence Level | Calculated Uncertainty |
|-----------------------------|-----------------|------------------|------------------------|
| Peak Output Power-Conducted | 2400MHz-2480MHz | 95%              | 0.544dB                |
| Peak Power Spectral Density | 2400MHz-2480MHz | 95%              | 0.088dB/MHz            |
| Occupied Bandwidth          | 2400MHz-2480MHz | 95%              | 69.26kHz               |
| Conducted Emission          | 30MHz-2GHz      | 95%              | 0.90dB                 |
| Conducted Emission          | 2GHz-3.6GHz     | 95%              | 0.88dB                 |
| Conducted Emission          | 3.6GHz-8GHz     | 95%              | 0.96dB                 |
| Conducted Emission          | 8GHz-20GHz      | 95%              | 0.94dB                 |
| Conducted Emission          | 20GHz-22GHz     | 95%              | 0.88dB                 |
| Conducted Emission          | 22GHz-26GHz     | 95%              | 0.86dB                 |

## Annex B: Accreditation Certificate



### Accredited Laboratory

A2LA has accredited

### INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

### Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 12<sup>th</sup> day of April 2021.



Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3682.01  
Valid to February 28, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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