

TEST REPORT

Product Name : KP04 controller
Brand Name : N/A
Model : KP04
Series Model : N/A
FCC ID : YMX-KP04
IC : 7284A-KP04
Applicant : **XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO.,LTD.**
Address : (5/F) NO.168, QIANPU ROAD,SIMING DISTRICT,XIAMEN, Fujian CHINA
Manufacturer : **XIAMEN HEALTHCARE ELECTRONIC CO.,LTD.**
Address : 65-66#, 62-63# BUILDING, SIMING ZONE, TONGAN INDUSTRIAL DISTRICT, XIAMEN CITY, FUJIAN PROVINCE, P.R.CHINA
Standard(s) : 47 CFR FCC Part 15 Subpart E 15.407
RSS-247 issue 3, RSS-Gen Issue 5
Date of Receipt : Oct. 17, 2024
Date of Test : Dec. 12, 2024~ Dec. 13, 2024
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Issued By: **Guangdong Asia Hongke Test Technology Limited**
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Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.



Report Revise Record

Report Version	Issued Date	Notes
M1	Dec. 16, 2024	Initial Release

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15 Subpart E](#)—Unlicensed National Information Infrastructure Devices

[RSS-247-Issue 3](#): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

[KDB 905462 D02](#) UNII DFS Compliance Procedures New Rules v02

[KDB 905462 D03](#) UNII Clients Without Radar Detection New Rules v01r02

[KDB 905462 D04](#) Operational Modes for DFS Testing New Rules v01

1.2 Test Summary

Test Description	FCC CFR 47/ ISED Rule Part	Limit	Test Result
In-Service Monitoring	15.407(h)(2)(iv) RSS-247 [6.3]	Monitor Co-channel Radar	N/A*
Channel Availability Check	15.407 (h)(2)(ii) RSS-247 [6.3]	60s Detection	N/A*
Channel Move Time	15.407 (h)(2)(iii) RSS-247 [6.3]	10s	Pass
Channel Closing Transmission Time	15.407 (h)(2)(iii) RSS-247 [6.3]	200ms + Aggregate 60ms over remaining 10s period	Pass
Non-Occupancy Period	15.407 (h)(2)(iv) RSS-247 [6.3]	30 minutes	Pass

*Note: The EUT is a client device without radar detection.

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified or accredited by the following organizations:

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Guangdong Asia Hongke Test Technology Limited’s quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	150KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30Hz ± 3.10dB	(1)
Radiated Emission	9KHz~1GHz ± 3.75dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz-40GHz ± 3.88dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16dB	(1)
RF power density, conducted	± 0.24dB	(1)
Spurious emissions, conducted	± 0.21dB	(1)
Temperature	± 1°C	(1)
Humidity	± 3%	(1)
DC and low frequency voltages	± 1.5%	(1)
Time	± 2%	(1)
Duty cycle	± 2%	(1)

The report uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%

2 GENGGENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	KP04 controller			
Model/Type reference:	KP04			
Serial Model:	N/A			
Power Rating	DC 24V			
Hardware Version:	N/A			
Software Version:	N/A			
Sample(s) Status:	AiTSZ-241017026-1(Engineer sample)			
5G WIFI:				
	20MHz system	40MHz system	80MHz system	160MHz system
Supported type:	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11n 802.11ac	N/A
Operation frequency:	5180 - 5240MHz 5260 - 5320MHz 5500 - 5700MHz 5745 - 5825MHz	5190-5230MHz 5270-5310MHz 5510-5670MHz 5755-5795MHz	5210MHz 5290MHz 5530MHz 5775MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	21	9	4	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type:	FPC antenna			
Remark: The above DUT's information was declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.				

2.4 Measurement Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Spectrum Analyzer	Agilent	N9020A	MY51289843	2024.09.25	2025.09.24
Vector Signal Generator	Agilent	N5182A	MY50143009	2024.09.25	2025.09.24
RF Automatic Test system	TST	TSTPASS	21033016	2024.09.25	2025.09.24
Test Software					
Name of Software			Version		
TSTPASS			Version 2.0		

2.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Manufacturer	Model	Certification
1	Router	Tenda	RX9 Pro	FCC ID: V7TRX9P

3 TEST CONDITIONS AND RESULTS

3.1 APPLICABILITY

The following table from KDB905462 D02 v02 lists the applicable requirements for the DFS testing. The device evaluated in this report is considered a client device without radar detection capability.

Table 3-1. DFS Applicability

Requirement	Operation 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
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 3-2. DFS Applicability during Normal Operation

Requirement	Operation Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

3.2 REQUIREMENTS

Per KDB905462 D02 v02 the following are the requirements for Client Devices:

- a) A Client Device will not transmit before having received appropriate control signals from a Master Device.
- b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.
- c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.
- d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.
- e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

Channel Move Time and Channel Closing Transmission Time requirements are listed following table.

Table 3-3: DFS Response requirements

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds ^{Note 1}
Channel Closing Transmission Time	200 milliseconds + an Aggregate of 60 milliseconds over Remaining 10 second period ^{Notes1 and 2}
U-NII Detection Bandwidth	Minimum 100 % of the U-NII99 % transmission Power bandwidth ^{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.

Note3: 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.

3.3 DFS DETECTION THRESHOLD VALUES

The DFS detection thresholds are defined for Master devices and Client Devices with In-service monitoring. These detection thresholds are listed in the following table.

Table 3-4: Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.

3.4 PARAMETERS OF DFS TEST SIGNALS

As the EUT is a Client Device with no Radar Detection only one type radar pulse is required for the testing. Radar Pulse type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time. Table 3-5 lists the parameters for the Short Pulse Radar Waveforms. A plot of the Radar pulse Type 0 used for testing is included in Section 3.6 of this report.

Table 3-5: Parameters for Short Pulse Radar Waveforms

Radar Type	Pulse Width (μ sec)	PRI (μ sec)	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 $\left\{ \begin{array}{l} \frac{1}{360} \\ \frac{19 \cdot 10^6}{\text{PRI } \mu\text{sec}} \end{array} \right\}$	60%	30
		Test B: 15 unique PRI values Randomly selected within the range of 518-3066 μ sec, with a minimum increment of 1 μ sec, 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
				80%	120

Note1: Short pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

3.5 TEST PROCEDURE

Test set-up

The KDB905462 D02 v02 describes a radiated test setup and a conducted test setup. A conducted test setup was used for this testing. Figure 3-1 shows the typical test setup. Each one channel selected between 5260 and 5320 MHz, 5500 and 5700 is chosen for the testing.

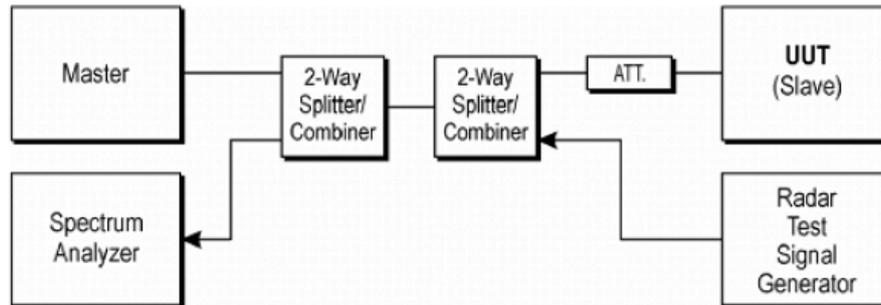


Figure 3-1. Conducted Test Setup for DFS

Test Procedure

1. The radar pulse generator is setup to provide a pulse at the frequency that the Master and Client are operating. A Type 0 radar pulse with a 1 μ s pulse width and a 1428 μ s PRI is used for the testing.
2. The vector signal generator is adjusted to provide the radar burst (18 pulses) at a level of approximately -62 dBm at the antenna of the Master device.
3. The Client Device (EUT) is set up per the diagram in Figure 3-1 and communications between the Master device and the Client is established.
4. Adjust the data rate for the Master AP, and monitor the channel loading during transfer until the channel loading is as close to 20 % as possible.
5. The spectrum analyzer is set to record about 15 sec window to any transmissions occurring up to and after 10 sec.
6. The system is again setup and the monitoring time is shortened in order to capture the Channel Closing Transmission Time. This time is measured to insure that the Client ceases transmission within 200 ms and the aggregate of emissions occurring after 200 ms up to 10 sec do not exceed 60 ms.

(Note: the channel may be different since the Master and Client have changed channels due to the detection of the initial radar pulse.)

7. After the initial radar burst the channel is monitored for 30 minutes to insure no transmissions or beacons occur. A second monitoring setup is used to verify that the Master and Client have both moved to different channels.

3.6 Radar Waveform Verification

A-50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a coaxial cable. The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of -62 dBm as measured on the spectrum analyzer.

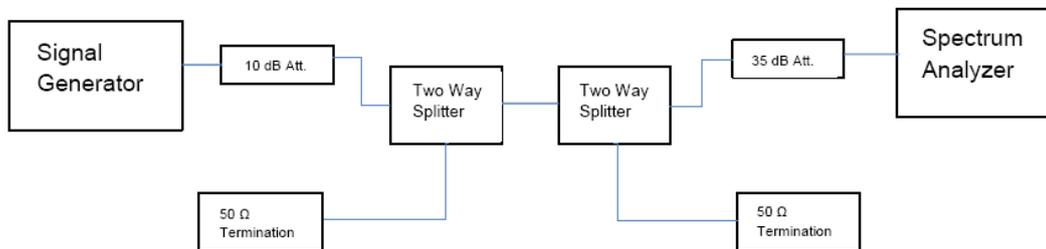
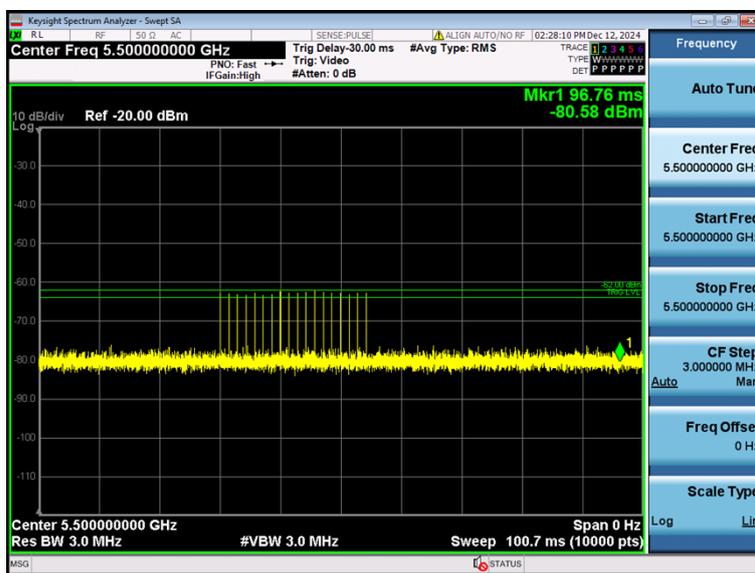


Figure 3-2 Test Setup for Conducted Measurement Radar Verification



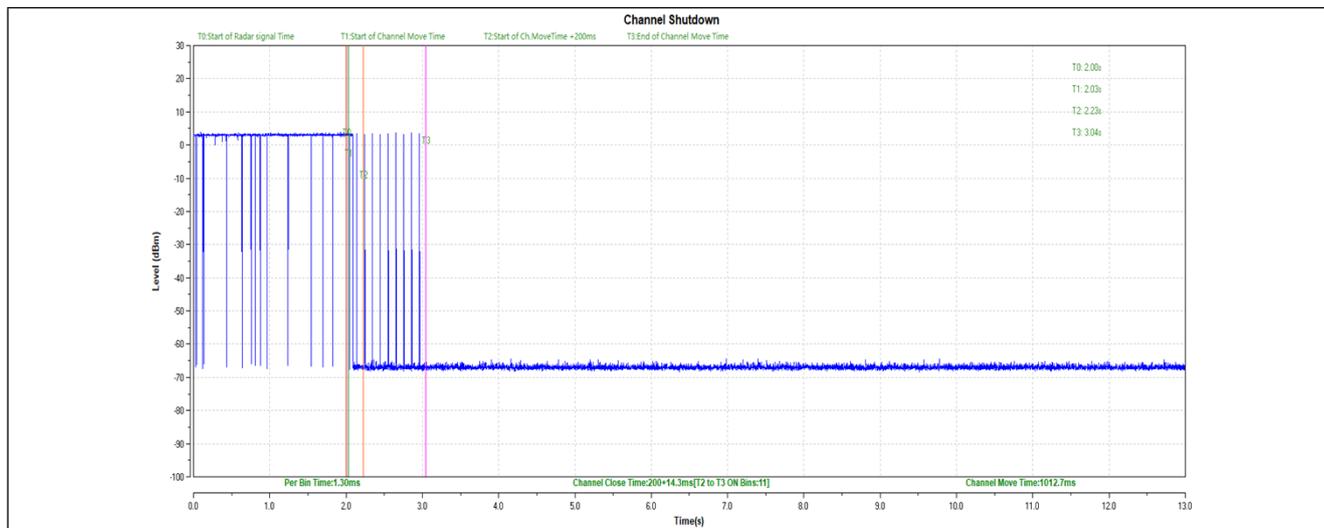
Radar Burst Level at -62dBm: Radar Type 0

3.7 TEST RESULT

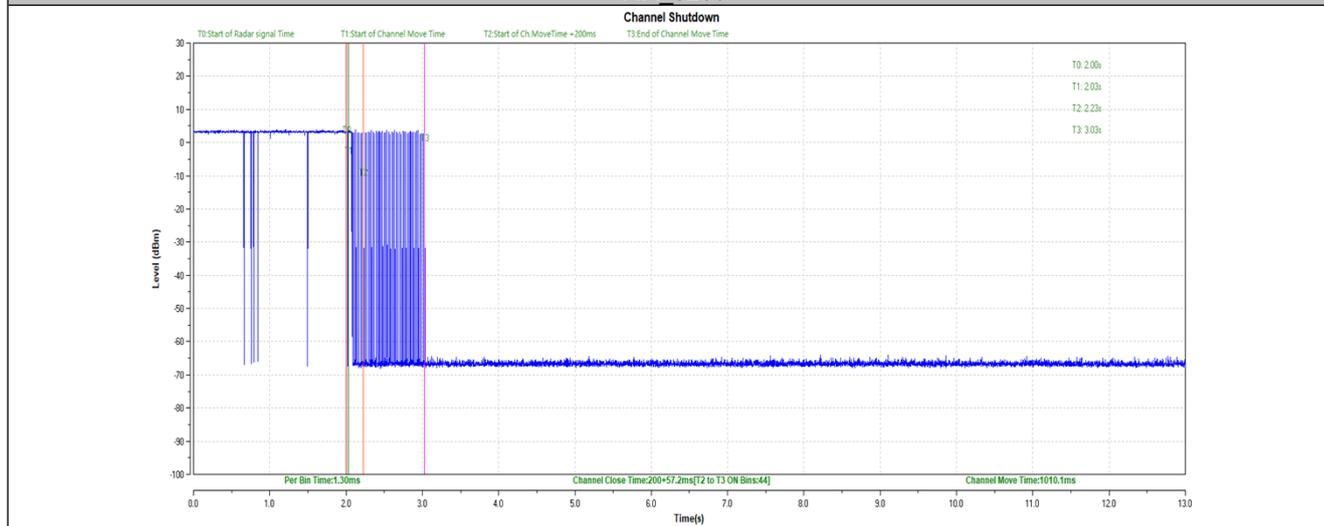
According to 905462 D02V02, Channel Move Time and Channel Closing Transmission Time Test using the widest BW mode for each WIFI operation modes.

Channel Move Time and Channel Closing Transmission Time

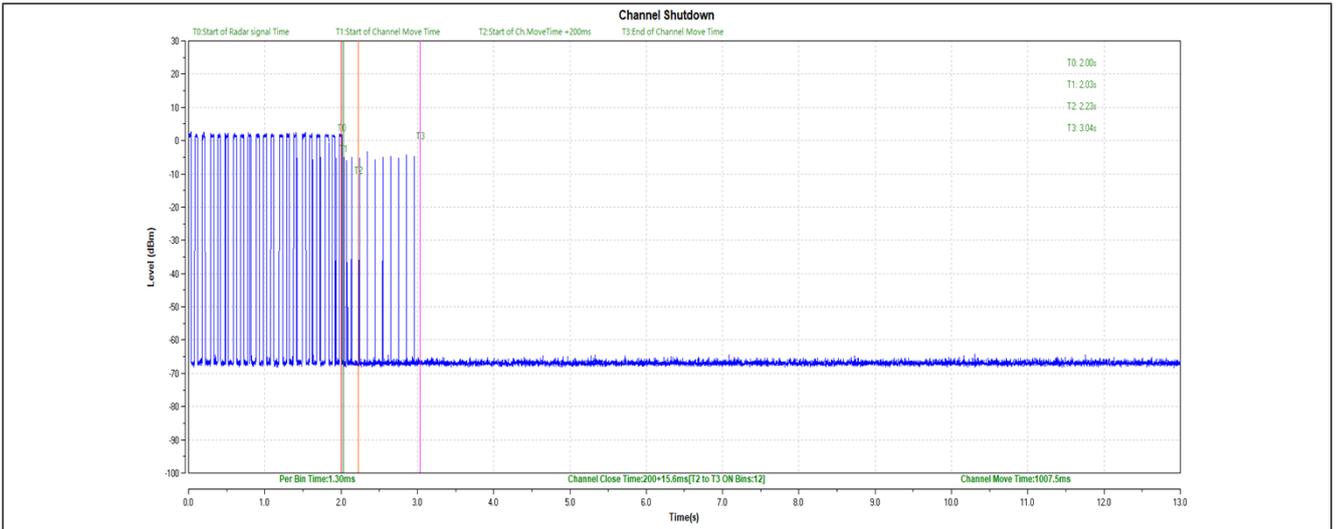
Test Mode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11A	5260	200+14.7	200+60	1012.7	10000	PASS
	5500	200+56.4	200+60	1010.1	10000	PASS
11N40	5270	200+15.6	200+60	1007.5	10000	PASS
	5510	200+55.3	200+60	963.3	10000	PASS
11AC80	5290	200+16.9	200+60	1032.2	10000	PASS
	5530	200+19.5	200+60	1054.3	10000	PASS



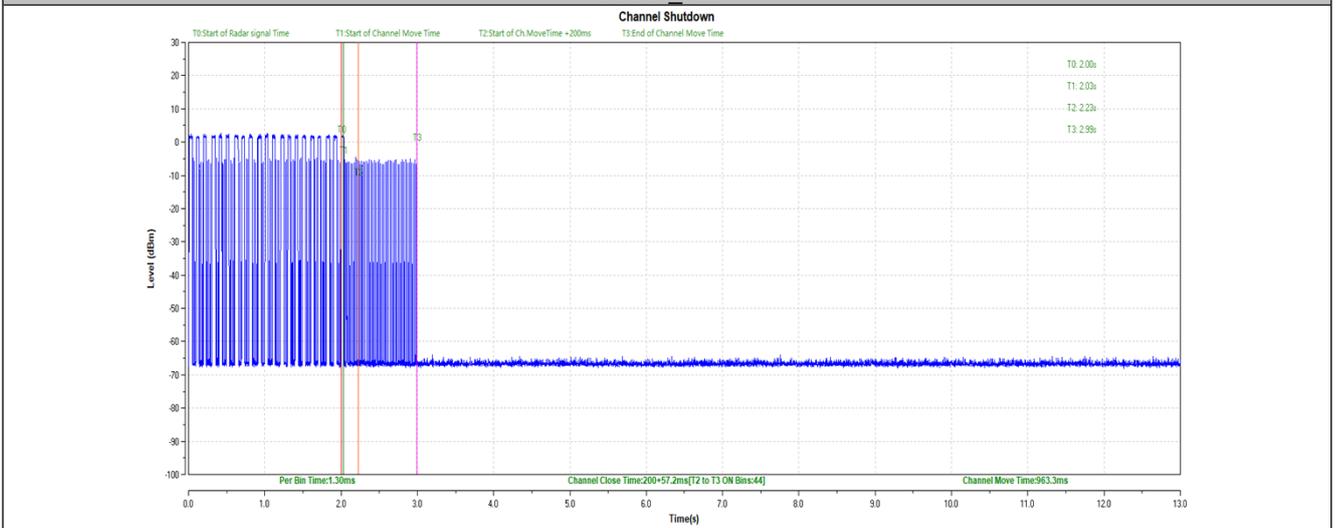
11A 5260



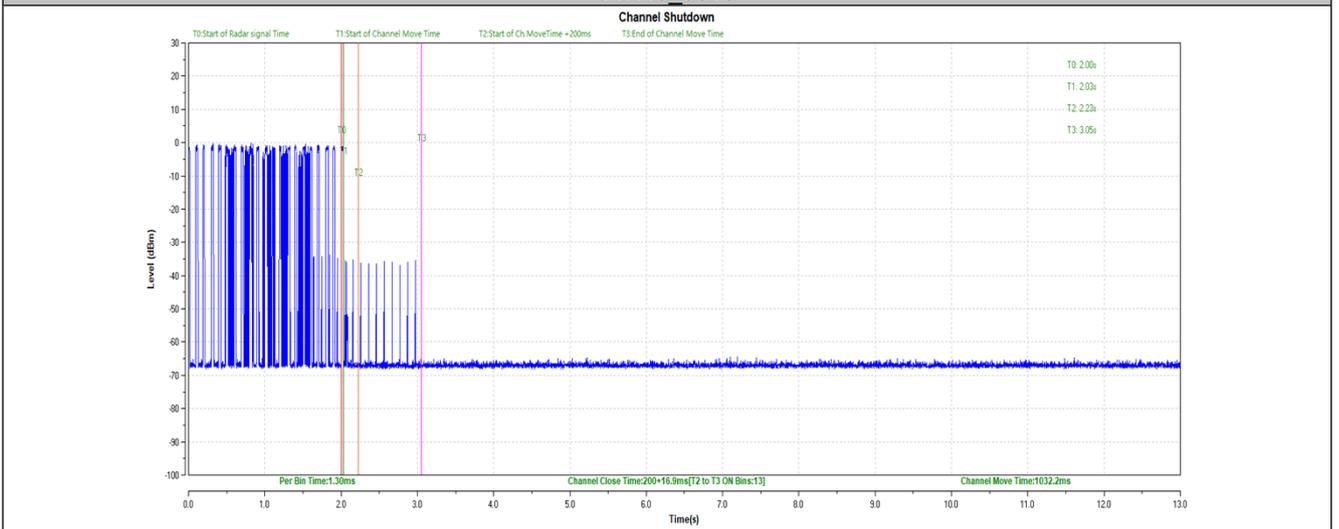
11A 5500



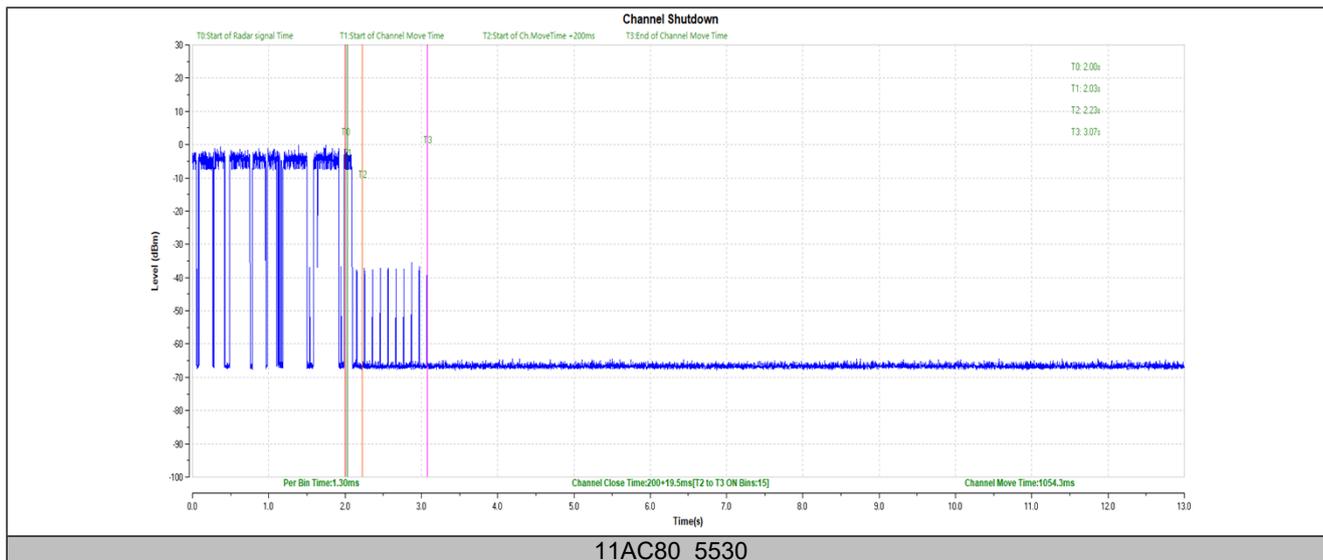
11N40_5270



11N40_5510

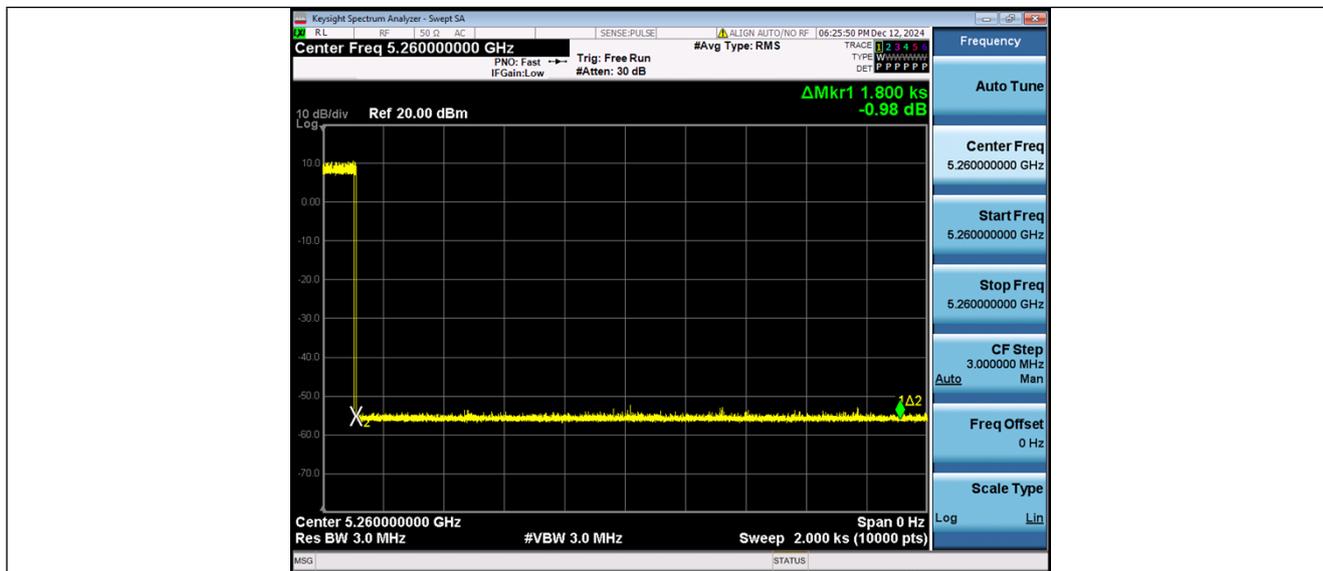


11AC80_5290

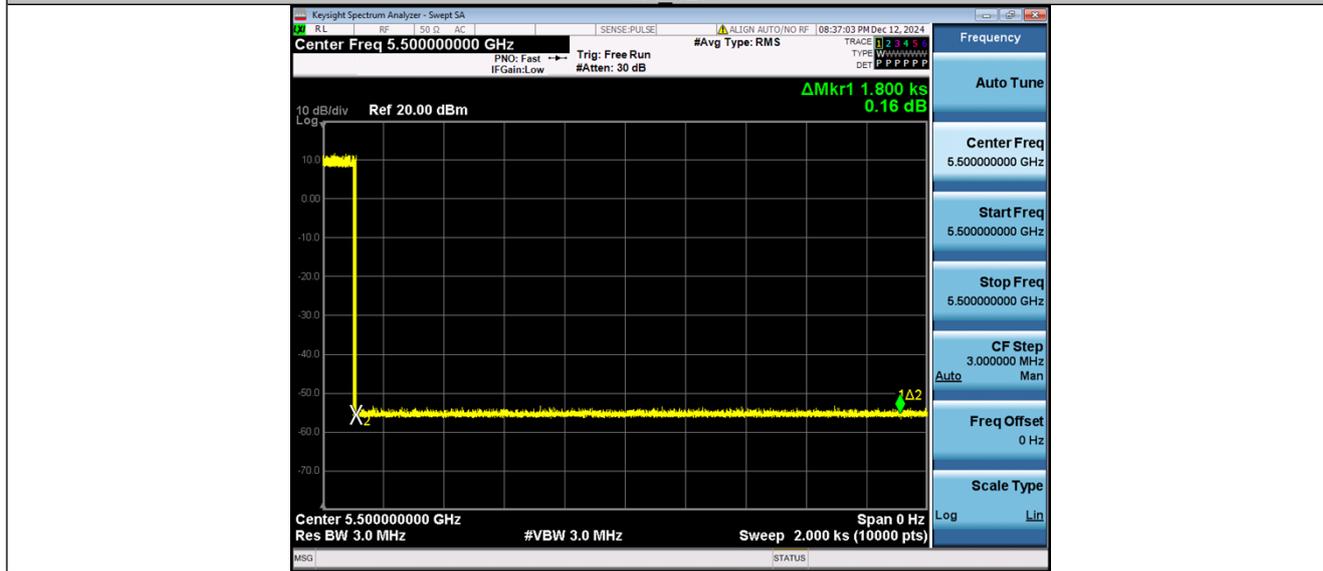


Non-Occupancy Period

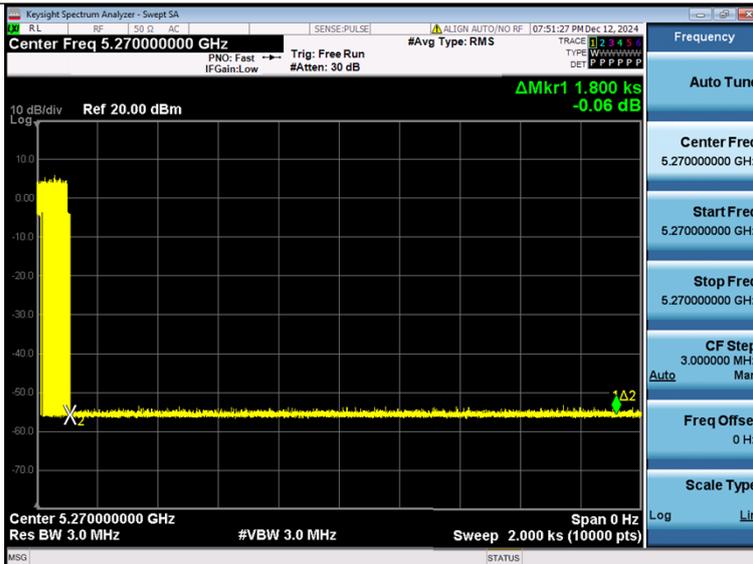
TestMode	Channel	Result	Limit[s]	Verdict
11A	5260	see test graph	≥1800	Pass
	5500	see test graph	≥1800	Pass
11N40	5270	see test graph	≥1800	Pass
	5510	see test graph	≥1800	Pass
11AC80	5290	see test graph	≥1800	Pass
	5530	see test graph	≥1800	Pass



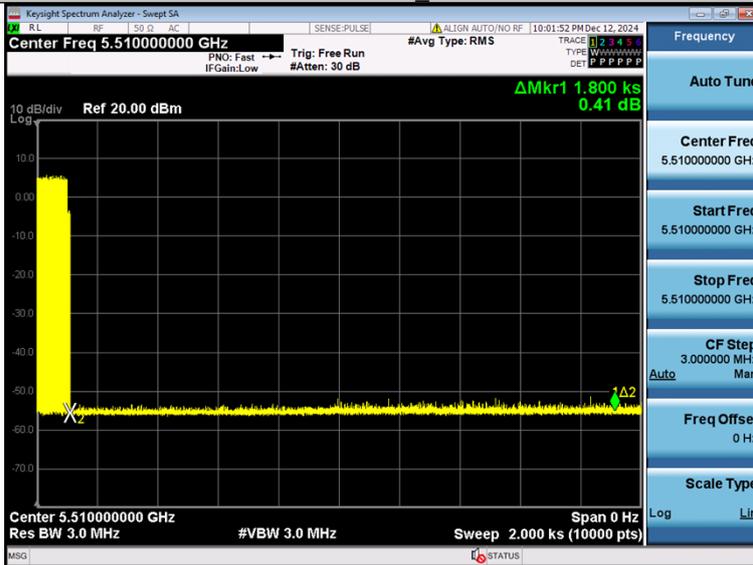
11A_5260



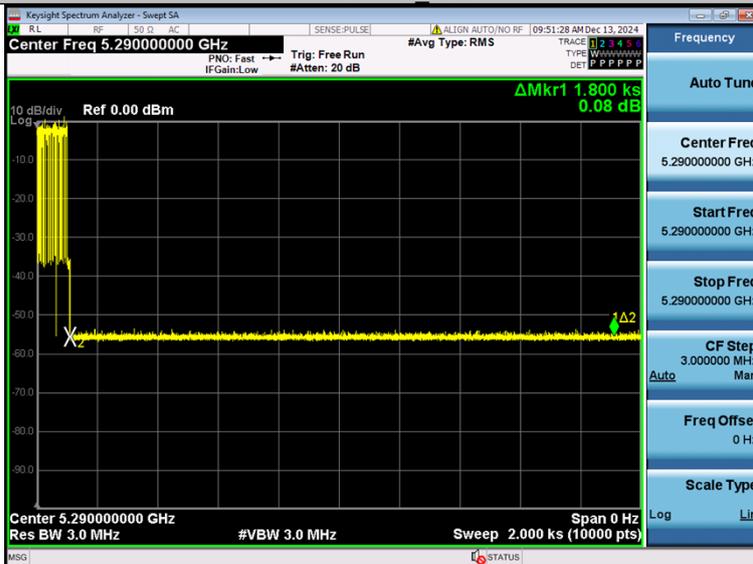
11A_5500



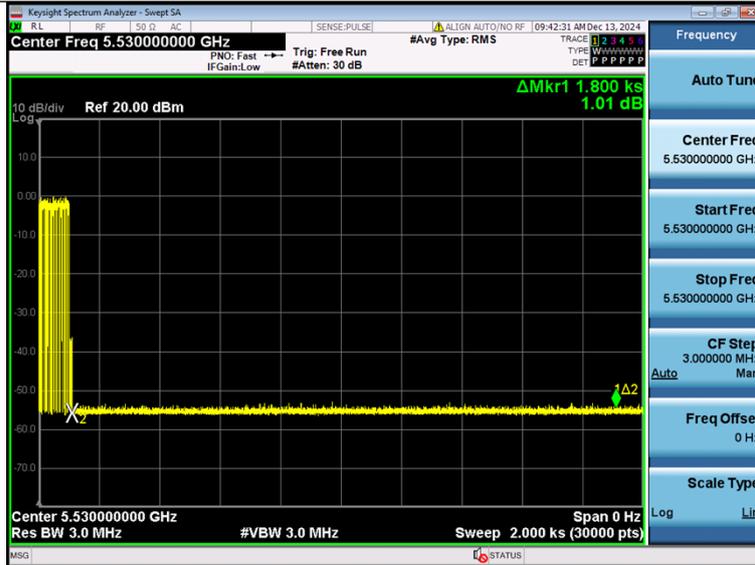
11N40SISO 5270



11N40SISO 5510



11AC80SISO 5290



11AC80SISO_5530

5 Test Setup Photographs of EUT



6 External Photographs of EUT

Please refer to separated files for External Photos of the EUT.

7 Internal Photographs of EUT

Please refer to separated files for Internal Photos of the EUT.

******* End of Report *******