

TEST REPORT

Product Name : Smart Access Control Terminal
Model Number : Horus E2, Horus E2-FP,
Horus E2-QR, Horus E2-B
FCC ID : 2AJ9T-21013

Prepared for : ZKTECO CO., LTD.
Address : No.32, Pingshan Industrial Avenue, Tangxia Town,
Dongguan City, Guangdong Province, China 523728

Prepared by : EMTEK (SHENZHEN) CO., LTD.
Address : Building 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

Tel: (0755) 26954280
Fax: (0755) 26954282

Report Number : ENS2503070228W00405R
Date(s) of Tests : March 14, 2025 to April 28, 2025
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Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2503070228W00405R	/	Original Report

1. TEST RESULT CERTIFICATION




Applicant : ZKTECO CO., LTD.
Address : No.32, Pingshan Industrial Avenue, Tangxia Town, Dongguan City, Guangdong Province, China 523728
Manufacturer : ZKTECO CO., LTD.
Address : No.32, Pingshan Industrial Avenue, Tangxia Town, Dongguan City, Guangdong Province, China 523728
EUT : Smart Access Control Terminal
Model Name : Horus E2, Horus E2-FP, Horus E2-QR, Horus E2-B
Trademark : N/A

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15, Subpart E	PASS

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the above table standards requirement.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : March 14, 2025 to April 28, 2025
Prepared by : 
Guangjun Zhu/Editor
Reviewer : 
Joe Xia/Supervisor
Approved & Authorized Signer : 
Lisa Wang/Manager

2. EUT DESCRIPTION

Characteristics	Description
Product	Smart Access Control Terminal
Model Number	Horus E2, Horus E2-FP, Horus E2-QR, Horus E2-B
Sample number	2#
Wifi Type	UNII-1: 5150MHz-5250MHz Band UNII-2A: 5250MHz-5350MHz Band UNII-3: 5725MHz-5850MHz Band
WLAN Supported	IEEE 802.11a IEEE 802.11n(20MHz channel bandwidth) IEEE 802.11n(40MHz channel bandwidth) IEEE 802.11ac(20MHz channel bandwidth) IEEE 802.11ac(40MHz channel bandwidth) IEEE 802.11ac(80MHz channel bandwidth)
Modulation	OFDM/OFDMA
Frequency Range:	5150MHz-5250MHz Band: 5180-5240MHz for 802.11a 5180-5240MHz for 802.11n(20) 5190-5230MHz for 802.11n(40) 5180-5240MHz for 802.11ac(20) 5190-5230MHz for 802.11ac(40) 5210MHz for 802.11ac(80)
	5250MHz-5350MHz Band: 5260-5320MHz for 802.11a 5260-5320MHz for 802.11n(20) 5270-5310MHz for 802.11n(40) 5260-5320MHz for 802.11ac(20) 5270-5310MHz for 802.11ac(40) 5290MHz for 802.11ac(80)
	5725MHz-5850MHz Band: 5745-5825MHz for 802.11a 5745-5825MHz for 802.11n(20) 5755-5795MHz for 802.11n(40) 5745-5825MHz for 802.11ac(20) 5755-5795MHz for 802.11ac(40) 5775MHz for 802.11ac(80)
TPC Function	<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not Applicable
Antenna Type	FPC Antenna
Antenna Gain	0.91 dBi Note: The antenna information provided by the manufacturer will have a certain impact on the test results.
Power Supply	DC 12V from adapter

Adapter	MODEL:ADS-40SI-12-3 12036E INPUT: AC100-240V, 50Hz/60Hz,Max.1.0A OUTPUT:12.0V,3.0A,.36.0W
Temperature Range	0°C ~ +45°C

Note: for more details, please refer to the user's manual of the EUT.



3. Summary of test result

FCC Part Clause	Test Parameter	Verdict	Remarks
15.407(h)	Dynamic Frequency Selection	PASS	

NOTE: The results of this report do not take into account the uncertainty.

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AJ9T-21013 filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.



4. TEST METHODOLOGY

4.1 General description of applied standards

According to its specifications, the EUT must comply with the requirements of the following standards:
 FCC 06-96
 FCC 47 CFR Parts 15, Subpart E
 FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
 IC RSS-247 Issue 2(02-2017)

4.2 Measurement equipment used

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Wideband Radio Communication Tester	R&S	CMW500	147366	2024/5/10	1Year
Frequency Extender	R&S	CMW-Z800A	100430	2024/5/10	1Year
Spectrum Analyzer	R&S	FSV3044	101289	2024/5/10	1Year
Analog Signal Generator	R&S	SMB100A	183237	2024/5/10	1Year
Vector Signal Generator	R&S	SMM100A	101808	2024/5/10	1Year
RF Control Unit(Power Meter)	Tonscend	JS0806-2	22C8060567	2024/5/10	1Year
Temperature&Humidity Chamber	ESPEC	EL-02KA	12107166	2024/5/10	1Year

Remark: Each piece of equipment is scheduled for calibration once a year.

4.3 Description of test modes

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

WIFI 5G with 5250-5350MHz

Frequency and Channels list for 802.11a/n(20)/ac(20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300	-	-
56	5280	64	5320	-	-

Frequency and Channels list for 802.11n (40)/ac(40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	-	-	-	-
62	5310	-	-	-	-

Frequency and Channels list for 802.11ac(80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290	-	-	-	-

Test Frequency and Channels for 802.11a/n(20)/ac(20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	56	5280	64	5320

Test Frequency and channels for 802.11n (40)/ac(40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	-	-	62	5310

Test Frequency and channels for 802.11ac(80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290	-	-	-	-

4.4 TEST SOFTWARE

Item	Software
RF Conducted	ETSI Certification of Regulations Test Solution(V1.04.01)
	N7607B Signal Studio for DFS Radar Profiles



5. FACILITIES AND ACCREDITATIONS

5.1 Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2 Description of Test Facility

Site Description

EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L2291
The Laboratory has been assessed and proved to be in compliance with
CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA
The Certificate Number is 4321.01

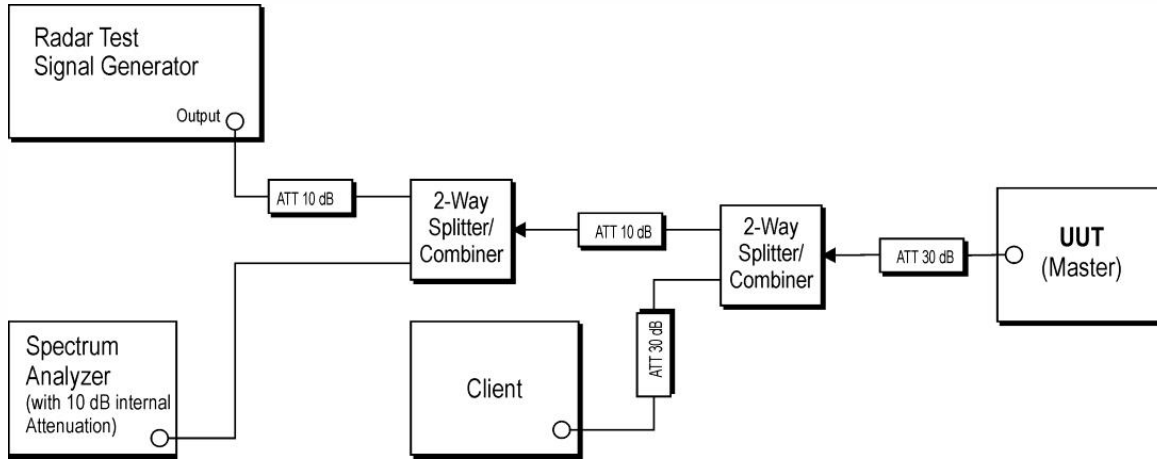
Accredited by Industry Canada
The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen,
Guangdong, China

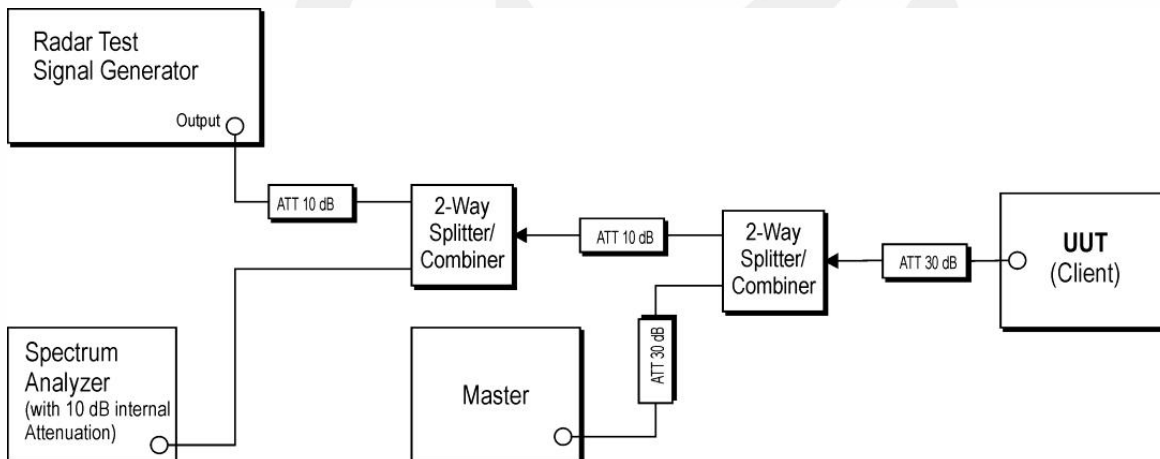
6. SETUP OF EQUIPMENT UNDER TEST

6.1 Setup configuration of EUT

Master Modes



Slave Mode



6.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and 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. Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from -62 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of -62 dBm and the spectrum analyzer will still indicate the level as received by the Master Device. Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

6.3 Support equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	FCC ID/IC
1	Wireless Access Point	Cisco	AIR-CAP3702E-A-K9	FTX182276QD	FCC ID: LDK102087 IC:2461B-102087

Note: Software for transferring data between master and slave devices is TFGEN-1.00 (transmission rate > 80%)

Notes:

- 1.All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2.Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7. Dynamic Frequency Selection requirements

7.1 Applicable standard

According to 15.407(h) and RSS-247 6.3.

7.2 Conformance Limit

The dynamic frequency selection requirement.

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 periods. See Notes 1 and 2.
U-NII Detection Bandwidth	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</i> 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.</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>	

The following table lists the DFS The detection threshold values.

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

7.3 Test Configuration

Conducted measurements shall be used for DFS test.

7.4 Test parameters of DFS test signal

The following table lists the parameters of radar test signals.

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.					

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

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

7.5 Operation modes and requirement test items

The manufacture shall state whether the EUT is capable of operating as a Master or a Slave modes, if the EUT is capable of operating in more than one operational mode then every operating mode shall be assessed separately.

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

Applicability of DFS requirements during normal operation.

Requirement	Operational 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

7.6 Test procedure

According to KDB 905462 D02v02 Section 7.

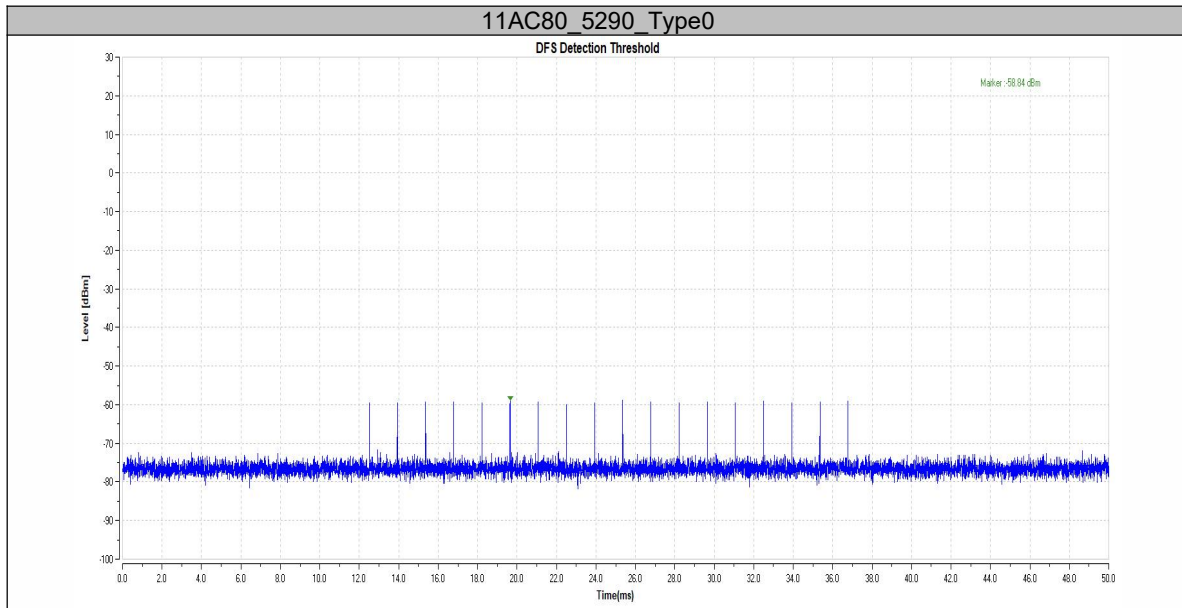
8. Test result

8.1 DETAILED TEST RESULTS

MODES	Test Parameter	Remark	Verdict
<input type="checkbox"/> Master	DFS Detection Threshold	N/A	N/A
	Channel Availability Check Time	N/A	N/A
	Channel Move Time	N/A	N/A
	Channel Closing Transmission Time	N/A	N/A
	Non-Occupancy Period	N/A	N/A
	Uniform Spreading	N/A	N/A
	U-NII Detection Bandwidth	N/A	N/A
<input checked="" type="checkbox"/> Slave	Radar Detection Threshold	Applicable	PASS
	Channel Move Time	Applicable	PASS
	Channel Closing Transmission Time	Applicable	PASS
	Non-Occupancy Period	Applicable	PASS
	U-NII Detection Bandwidth	N/A	N/A

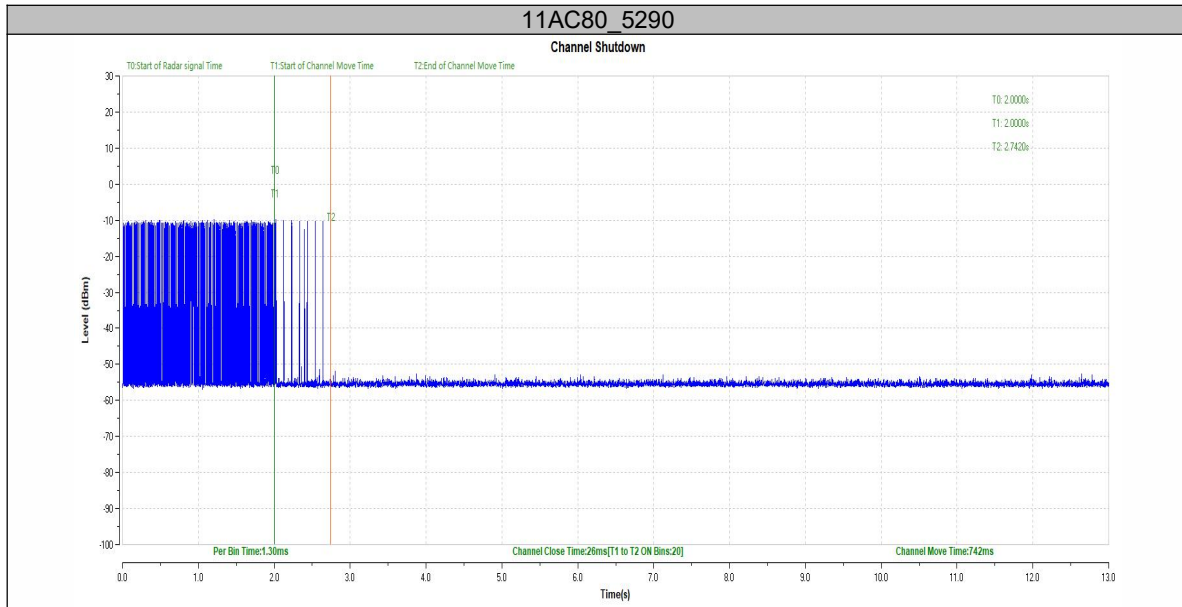
8.2 Radar Waveform

TestMode	Frequency[MHz]	Radar Type	Result	Limit[dbm]	Verdict
11AC80	5290	Type0	-58.84	-58.73	PASS



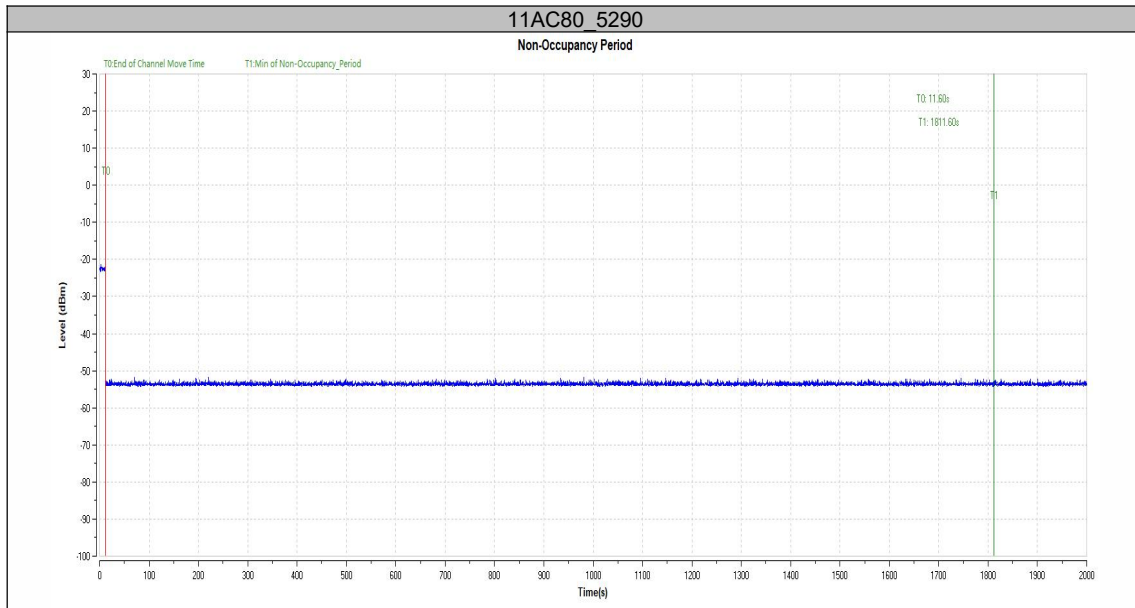
8.3 Channel Move Time and Channel Closing

TestMode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC80	5290	200+26	200+60	742	10000	PASS



8.4 Non-Occupancy Period

TestMode	Frequency[MHz]	Result	Limit[s]	Verdict
11AC80	5290	see test graph	≥1800	PASS



8.5 In-Service Monitoring

U-NII-Band II-A

Radar test singal type 0					Detection(Y/N)
Trial ID	Pulse Width(us)	PRI(us)	Number of Pulses	Waveform Length(us)	
0	1.0	1428.0	18	25704.0	Y
1	1.0	1428.0	18	25704.0	Y
2	1.0	1428.0	18	25704.0	Y
3	1.0	1428.0	18	25704.0	Y
4	1.0	1428.0	18	25704.0	Y
5	1.0	1428.0	18	25704.0	N
6	1.0	1428.0	18	25704.0	Y
7	1.0	1428.0	18	25704.0	Y
8	1.0	1428.0	18	25704.0	Y
9	1.0	1428.0	18	25704.0	Y
10	1.0	1428.0	18	25704.0	Y
11	1.0	1428.0	18	25704.0	N
12	1.0	1428.0	18	25704.0	Y
13	1.0	1428.0	18	25704.0	Y
14	1.0	1428.0	18	25704.0	Y
15	1.0	1428.0	18	25704.0	Y
16	1.0	1428.0	18	25704.0	Y
17	1.0	1428.0	18	25704.0	Y
18	1.0	1428.0	18	25704.0	Y
19	1.0	1428.0	18	25704.0	Y
20	1.0	1428.0	18	25704.0	Y
21	1.0	1428.0	18	25704.0	Y
22	1.0	1428.0	18	25704.0	Y
23	1.0	1428.0	18	25704.0	Y
24	1.0	1428.0	18	25704.0	Y
25	1.0	1428.0	18	25704.0	N
26	1.0	1428.0	18	25704.0	Y
27	1.0	1428.0	18	25704.0	Y
28	1.0	1428.0	18	25704.0	Y
29	1.0	1428.0	18	25704.0	Y
Detection Rate					90%

--- End of Report ---

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