ACCREDITED
Certificate # 2861.01

GRGTEST

TEST REPORT

Verified Code: 748022

Report No.:	E202101295124-7	**Application No.:**	E202101295124
Client:	DMAI,Inc.		
Address:	10940 Wilshire Blvd #1100, Los Angeles, CA 90024, USA		
Sample Description:	Education tablet,a preschool learning system		
Model:	X4C-US21		
Test Specification:	CFR 47, FCC Parts Subpart E Unlicensed National Information Infrastructure Devices		
Receipt Date:	2021-02-20		
Test Date:	2021-03-13 to 2021-03-24		
Issue Date:	2021-05-17		
Test Result:	Pass		

Prepared By:	**Reviewed By:**	**Approved By:**
Test Engineer	Technical Manager	Manager
Xie Fang	Wu Haoting	GUANGZHOU GRG METROLOGY & TEST CO.,LTD. GRGTEST APPROVED(03)

Other Aspects:

Note: Note

Abbreviations: *ok / P = passed; fail / F = failed; n.a. / N = not applicable;*

The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.

DIRECTIONS OF TEST

1. **This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**

2. **The 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.**

3. **If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

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1. TEST RESULT SUMMARY

CFR 47, FCC Parts Subpart E (§15.407)			
Item	**Test Mode**	**FCC Standard Section**	**Result**
Channel Closing Transmission Time	IEEE 802.11n HT20 5320MHz/5500MHz IEEE 802.11ac VHT80 5290MHz/5530MHz	15.407(h)	PASS
Channel Move Time	IEEE 802.11n HT20 5320MHz/5500MHz IEEE 802.11ac VHT80 5290MHz/5530MHz	15.407(h)	PASS
Non-Occupancy Period	IEEE 802.11n HT20 5320MHz/5500MHz IEEE 802.11ac VHT80 5290MHz/5530MHz	15.407(h)	PASS

Note: Recorded the worst case results in this report

2. GENERAL DESCRIPTION OF EUT

2.1. APPLICANT

Name:	DMAI,Inc.
Address:	10940 Wilshire Blvd #1100, Los Angeles, CA 90024, USA

2.2. MANUFACTURER

Name:	DMAI,Inc.
Address:	10940 Wilshire Blvd #1100, Los Angeles, CA 90024, USA

2.3. FACTORY

Name:	Shenzhen Valley Ventures Inc
Address:	9F-10F, Block 4, Cloud Park, Xuegang North Road, Bantian Street, Longgang district Shenzhen, 518129, China

2.4. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Education tablet,a preschool learning system
Model No.:	X4C-US21
Adding Model:	/
Trade Name:	AILA Sit & Play™ Animal Island Learning Adventure™ DMAI™
FCC ID:	2AYDJ-X4C-US21
Power Supply:	DC5V power supplied by adapter
Adapter Specification:	Model: AS1201A-0502000USU Input: 100-240V~50/60Hz 0.35A Max Output: 5V ⎓ 2000mA
Operation Frequency:	U-NII-2A: 5250 MHz~5350 MHz U-NII-2C: 5470 MHz~5725 MHz
Modulation type:	OFDM
Number Of Channel	U-NII-2A: IEEE 802.11a / n HT20 / ac VHT20: 4 Channels IEEE 802.11n HT40 / ac VHT40: 2 Channels IEEE 802.11ac VHT80: 1 Channel U-NII-2C: IEEE 802.11a / n HT20 / ac VHT20: 11 Channels IEEE 802.11n HT40 / ac VHT40: 5 Channels IEEE 802.11ac VHT80: 2 Channel
Channels	IEEE 802.11a: 20MHz

Spacing:	IEEE 802.11n HT20: 20MHz IEEE 802.11n HT40: 40MHz IEEE 802.11ac VHT20: 20MHz IEEE 802.11ac VHT40: 40MHz IEEE 802.11ac VHT80: 80MHz
Antenna Specification:	FPC antenna 1.9dBi gain (Max.)
Temperature Range:	0 ℃ ~ +40 ℃
Hardware Version:	MT8168-P71-V1.1
Software Version:	ys_mssi_t_64_userdebug_10_QP1A.190711.020mp3v4104 test-keys
Sample No:	E202101295124-0002
Note:	1. The adapter have two color of appearance: White, Green. 2. The produt have no transmit Power Control function

2.5. TEST OPERATION MODE

Mode No.	Description of the modes
1	IEEE 802.11n HT20 mode (5320MHz, 5500MHz)
2	IEEE 802.11ac VHT80 mode (5290MHz, 5530MHz)

DFS Operation Mode Information

□	Master
□	Slave with radar detection
■	Slave without radar detection

Description of EUT

Overview of EUT with respect to §15.407 (H) requirements

The EUT uses one transmitter connected to 50-ohm coaxial antenna ports via a diversity switch. Only one antennas port is connected to the test system since the EUT has one antenna only.

The Slave device associated with the EUT during these tests does not have radar detection +capability.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

The Master Device is a Alcatel.Lucent 802.11a/b/g Access Point, FCC ID: 2ADZRG240WB.

3. LABORATORY AND ACCREDITATIONS

3.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co,. Ltd.

Add : No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China

P.C. : 518000

Tel : 0755-61180008

Fax : 0755-61180008

3.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

USA A2LA(Certificate #:2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada Industry Canada
USA FCC

Copies of granted accreditation certificates are available for downloading from our web site, http://www.grgtest.com

3.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz～1000MHz	4.3dB
		1GHz～18GHz	5.6dB
	Vertical	30MHz～1000MHz	4.3dB
		1GHz～18GHz	5.6dB
Conduction Emission		9 kHz ~ 150 kHz	2.8 dB
		150 kHz ~ 10 MHz	2.8 dB
		10 MHz ~ 30 MHz	2.2 dB

This uncertainty represents an expanded uncertainty factor of k=2.

4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021-05-16
Vector signal generator	Agilent	N5182A	MY50142870	2021-10-08
Simultaneous sampling DAQ	Tonscend	JS0806-2	186060020	2021-10-08

Note: The calibration interval of the above test instruments is 12 months.

5. EIRP POWER

Band	Test Mode	Maximum Conducted Power(dBm)	Antenna Gain	Total EIRP Power (mW)
UNII-2A (5250MHz~ 5350 MHz)	IEEE 802.11 a	9.81	1.90	11.71
	IEEE 802.11n HT20	9.69		11.59
	IEEE 802.11ac VHT20	9.61		11.51
	IEEE 802.11n HT40	9.58		11.48
	IEEE 802.11ac VHT40	9.57		11.47
	IEEE 802.11ac VHT80	9.49		11.39
UNII-2C (5470 MHz~ 5725 MHz)	IEEE 802.11 a	10.63	1.90	12.53
	IEEE 802.11n HT20	9.69		11.59
	IEEE 802.11ac VHT20	10.36		12.26
	IEEE 802.11n HT40	10.33		12.23
	IEEE 802.11ac VHT40	10.37		12.27
	IEEE 802.11ac VHT80	10.45		12.35

6. DYNAMIC FREQUENCY SELECTION REQUIREMENTS

6.1. DFS OVERVIEW

The manufacturer shall state whether the UUT is capable of operating as a Master and/or a Client. If the UUT is capable of operating in more than one operating mode then each operating mode shall be tested separately. See tables 1 and 2 for the applicability of DFS requirements for each of the operational modes.

Table 5: Applicability of DFS requirements prior to use 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

Table 6: 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

6.2. TEST LIMITS AND RADAR SIGNAL PARAMETERS

DETECTION THRESHOLD VALUES

Table 7: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection.

Maximum Transmit Power	Value (See Notes 1 and 2)
EIRP≥ 200 milliwatt	-64 dBm
EIRP< 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectraldensity requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the testtransmission waveforms to account for variations in measurement equipment. This will ensure that thetest signal is at or above the detection threshold level to trigger a DFS response.
Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911D01

Table 8: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the UNII 99% transmissionpower bandwidth. SeeNote 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed withRadar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

PARAMETERS OF DFS TEST SIGNALS

Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Table 9: Short Pulse Radar Test Waveforms.

Radar Type	Pulse Width (μsec)	PRI(μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number ofTrials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^{6}}{PRI_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. Ifmore than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additionalwaveform must also be unique and not repeated from the previous waveforms. If more than 30waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with TestB and must also be unique and not repeated from the previous waveforms in Tests A or B.

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

Table 10: Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulsesper Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen（The center frequency for each of the 30 trials of the Bin 5 radar shall be randomly selected within 80% of the Occupied Bandwidth.）Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

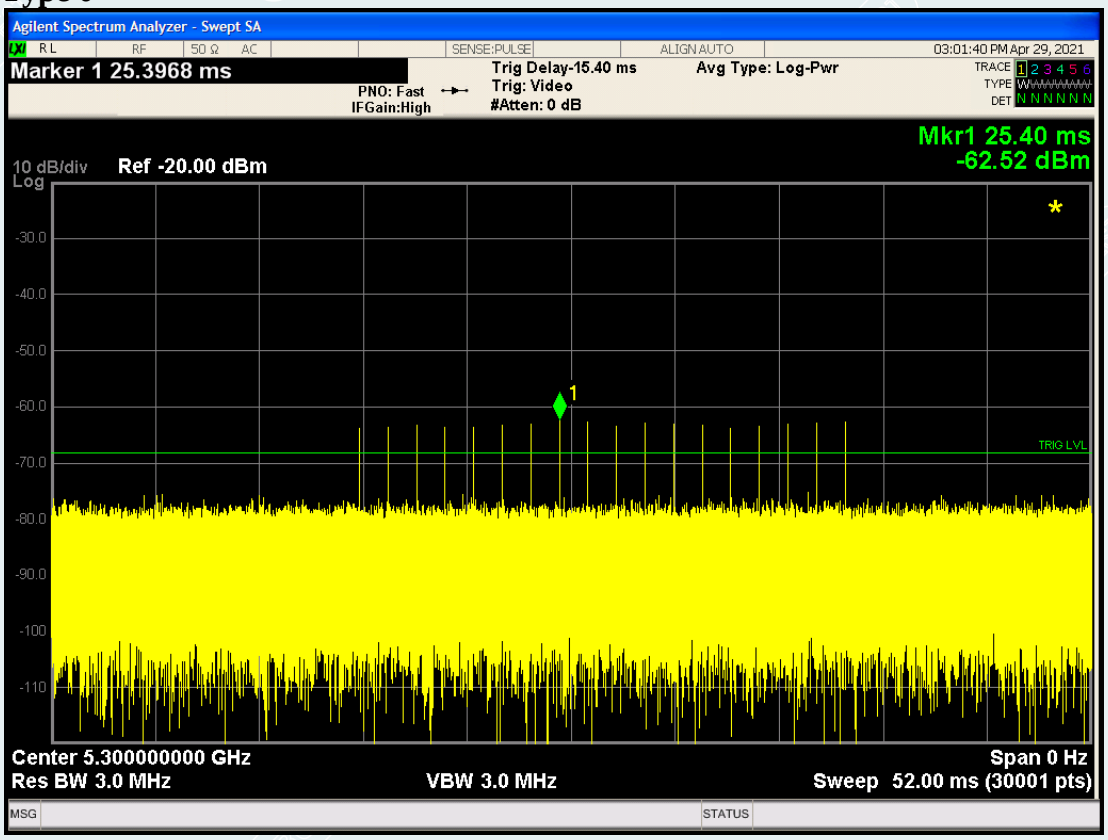
Table 11: Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulsesper Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

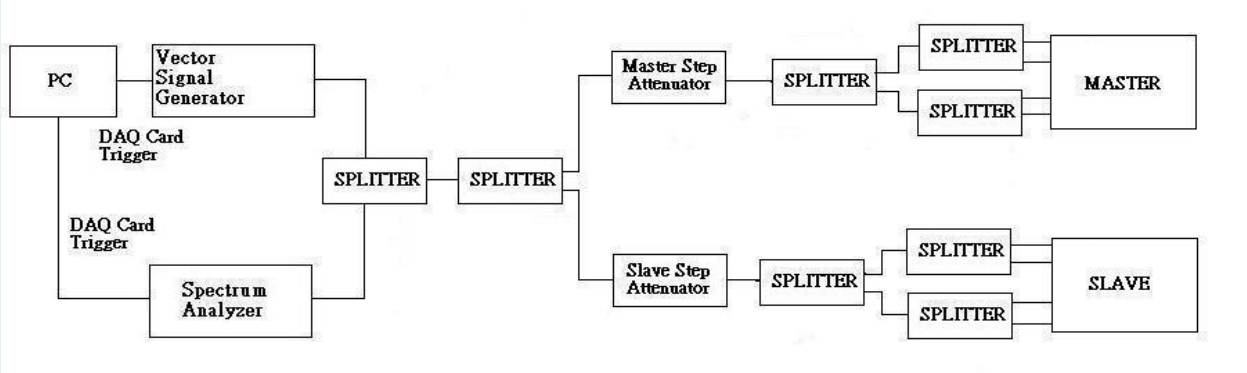
TEST PLOTS

IEEE 802.11n HT20 5300MHz

Type 0



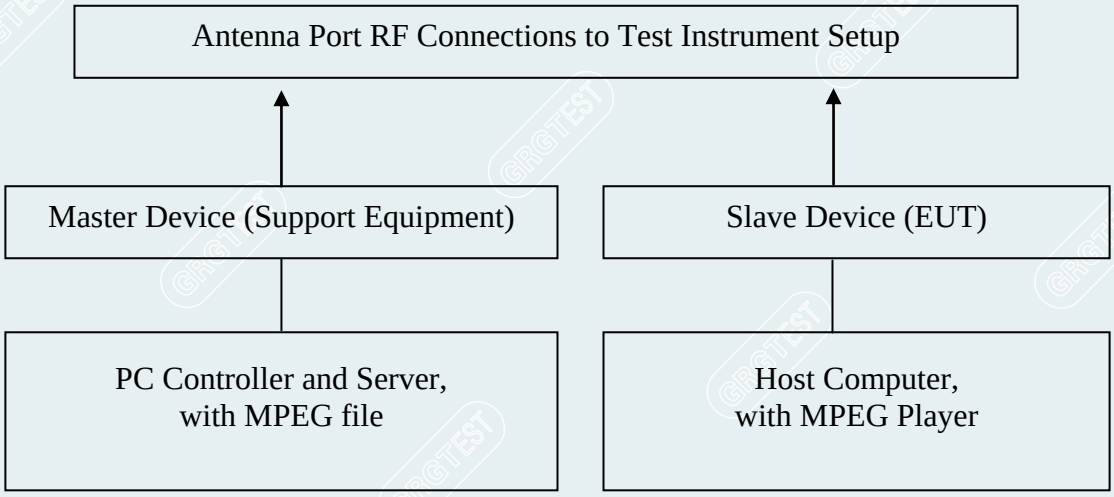
6.3. CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



6.4. 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 analyer 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.

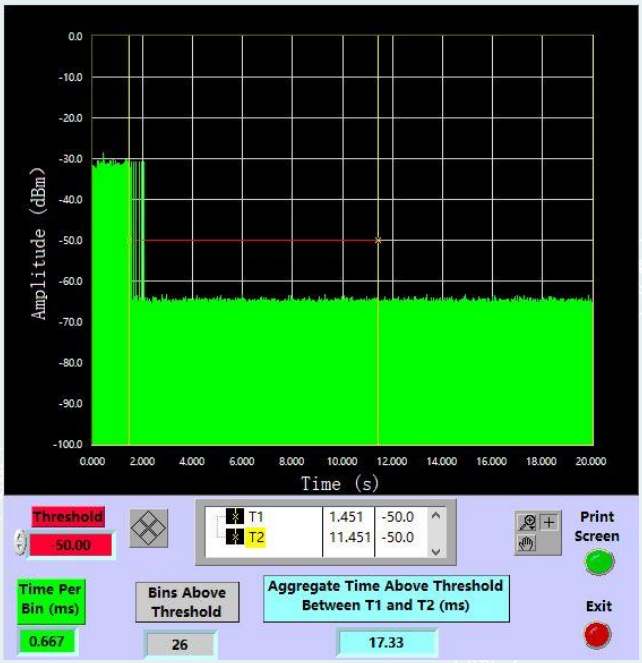


6.5. DEVIATION FROM TEST STANDARD

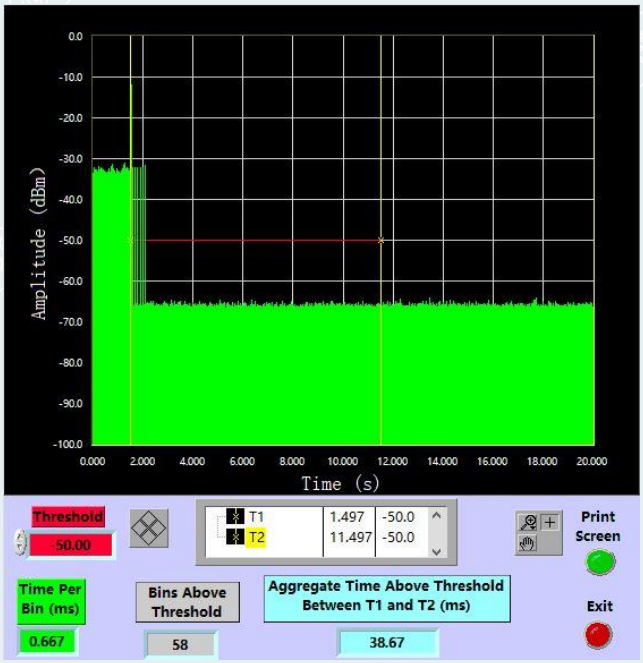
No deviation.

6.6. TEST RESULTS

Test Mode	Test frequency (MHz)	Channel Move Time (s)	Limit (s)	Result
IEEE 802.11n HT20	5300	0.01733	10	Pass
	5500	0.03867	10	Pass

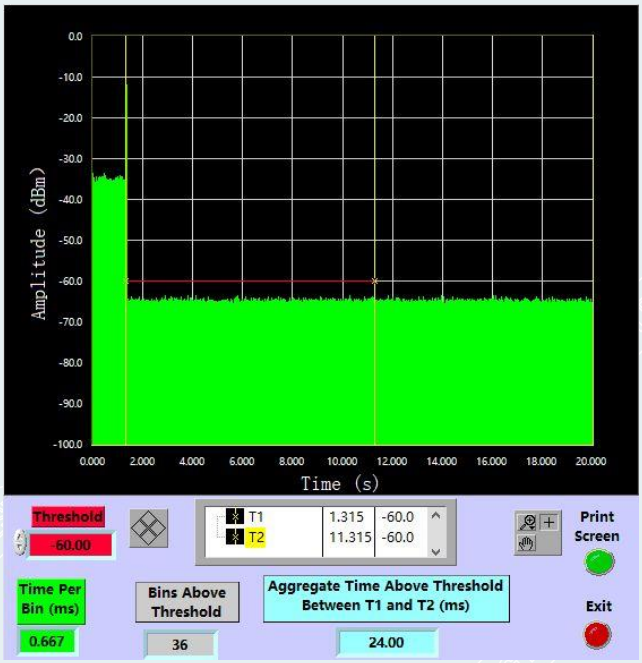


5300 MHz

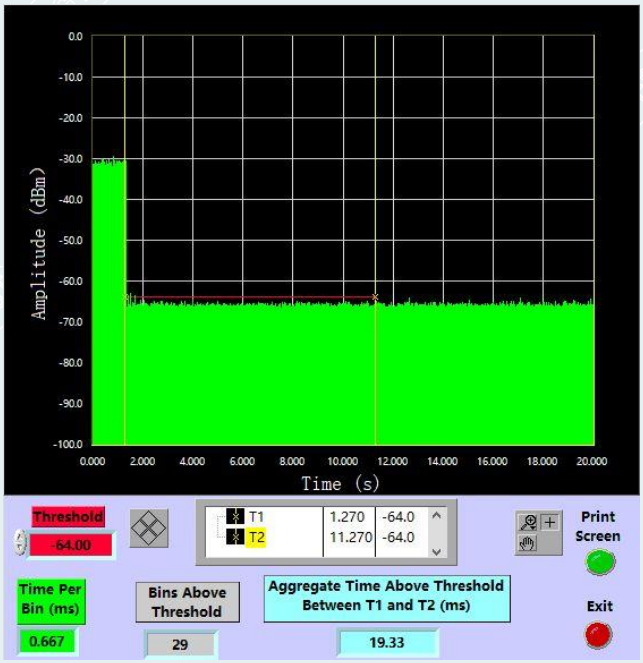


5500 MHz

Test Mode	Test frequency (MHz)	Channel Move Time (s)	Limit (s)	Result
IEEE 802.11ac 80	5290	0.02400	10	Pass
	5530	0.01933	10	Pass



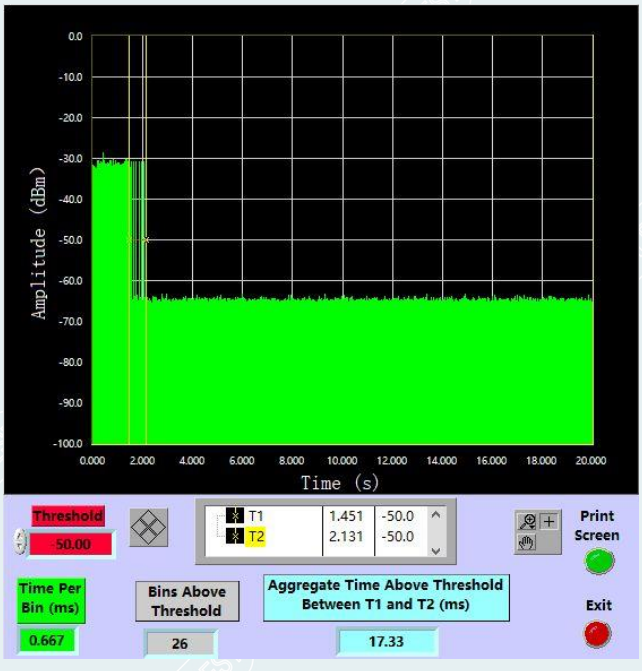
5290 MHz



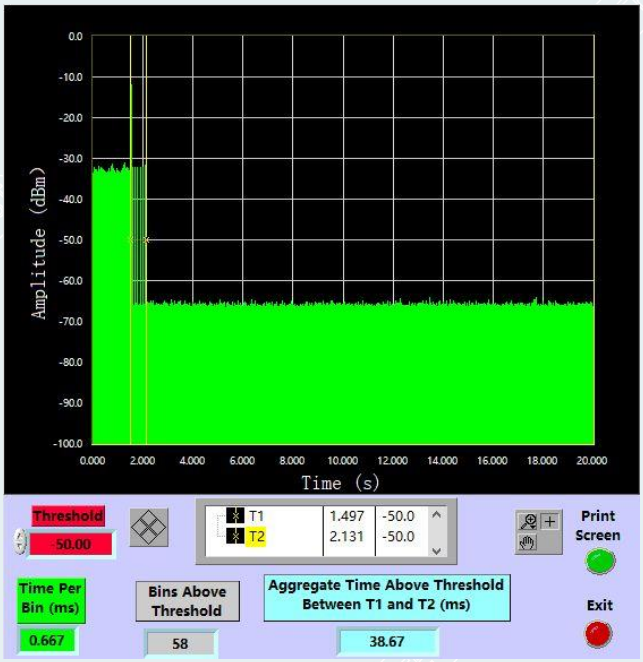
5530 MHz

Reference Channel Closing Time

Test Mode	Test frequency (MHz)	Channel Closing Transmission Time (s)	Limit (s)	Result
IEEE 802.11n HT20	5320	0.01733	1	Pass
	5500	0.03867	1	Pass

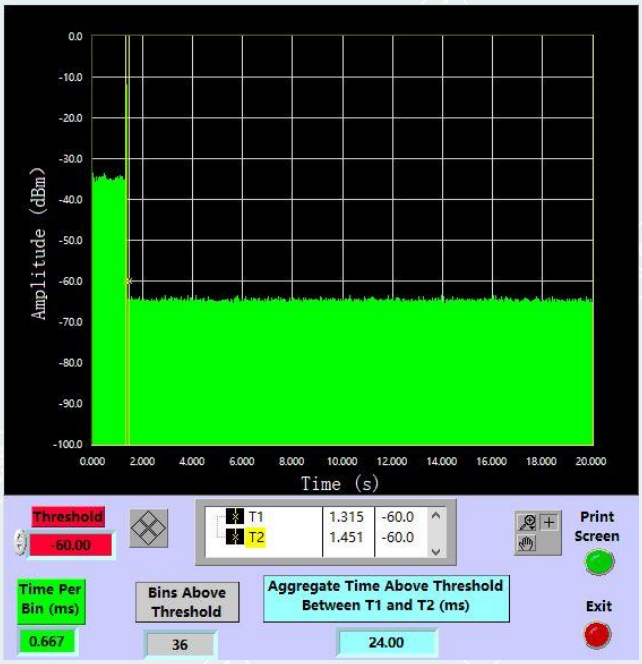


5300 MHz

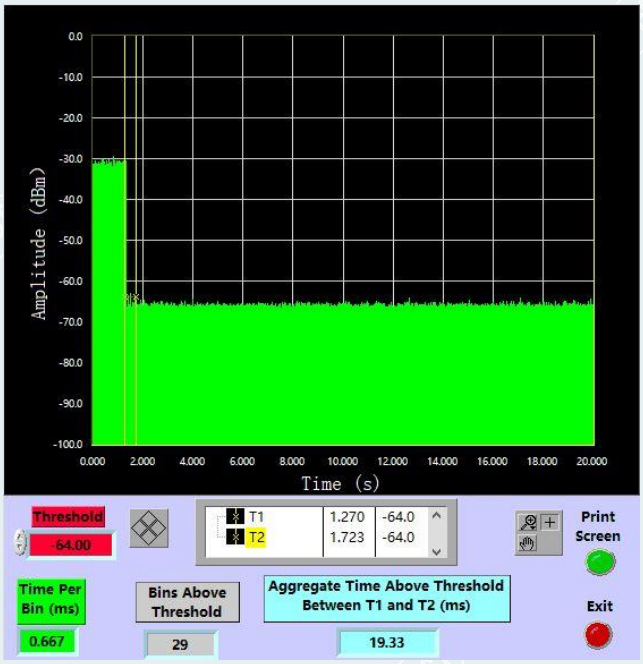


5500 MHz

Test Mode	Test frequency (MHz)	Channel Closing Transmission Time (s)	Limit (s)	Result
IEEE 802.11ac 80	5290	0.02400	1	Pass
	5530	0.01933	1	Pass



5290 MHz



5530 MHz

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