

TEST REPORT
On behalf of
TRISPORT AG

Product Name:	HOI CROSS PRO	HOI TOUR+
Model No.:	CT1063-400US, CT1063-900US	EM1060-400US, EM1060-900US

FCC ID: 2BB2MCT1063-400US

Prepared For: TRISPORT AG
Boesch 67 CH-6331 Huenenberg

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Report No. : ACI-F24099
Date of Test : 2024.04.15
Date of Report : 2024.06.24

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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TEST REPORT

Applicant : TRISPORT AG
 EUT Description : HOI CROSS PRO, HOI TOUR+
 (A) Model No. : Refer to Sec.2.1
 (B) Power Supply : AC 120V/60Hz
 (C) Test Voltage : AC 120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART E
 AND KDB 905462 D02*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

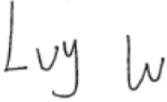
The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.


The test results for EUT's BLE/BREDR/WIFI (2.4G)/WIFI (5G) function are contained in No.ACI-F24095, ACI-F24096, ACI-F24097, ACI-F24098 report.

Date of Test : 2024.04.15 Date of Report : 2024.06.24

Producer : 
 JAREY LU / Deputy Assistant Manager

Review : 
 LVY LV / Deputy Assistant Manager

 For and on behalf of
 Audix Technology (Shanghai) Co., Ltd.

Signatory : 
 Authorized Signature(s) KAMP CHEN / Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The result is determined according to the decision rules of customer selection in the ASC-403 application service form.

1. According to IEC GUIDE 115 Procedure 2 and ILAC-G8, the uncertainties value is not used in determining the PASS/FAIL results.
2. If the required specification or standard already contains the decision rules, it will be carried out in accordance with the regulations or standard documents or the requirements of the competent units. If the required specification or standard does not contain a decision rule, the same paragraph 1.
3. If your company has a required decision rule, it will be implemented in accordance with the requirements and ISO/IEC Guide 98-4 specifications.

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item		Test Standard	Results	Meets Limit
EMISSION				
DFS	Non-Occupancy Period	FCC RULES AND REGULATIONS PART 15 SUBPART E AND KDB 905462 D02	N/A	15.407(h)(2)
	DFS Detection Threshold		N/A	
	Channel Availability Check Time		N/A	
	U-NII Detection Bandwidth		N/A	
	DFS Detection Threshold		N/A	
	Channel Closing Transmission Time		Pass	
	Channel Move Time		Pass	
	U-NII Detection Bandwidth		N/A	
N/A is an abbreviation for Not Applicable.				

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Type of EUT : Production Pre-product Pro-type

Product Name	HOI CROSS PRO	HOI TOUR+
Model Number	CT1063-400US, CT1063-900US	EM1060-400US, EM1060-900US

Note#1 : The difference between Models as below:

Model	CT1063-400US	CT1063-900US
Difference	Just the color is different.	

Model	EM1060-400US	EM1060-900US
Difference	Just the color is different.	

Model	CT1063-400US, CT1063-900US	EM1060-400US, EM1060-900US
Difference	The electronic part are all the same except the mechanical structures were different	

Note#2 : According the difference as above, we selected Model CT1063-400US for main test and model EM1060-400US, for differential test in current report.

Test Model : CT1063-400US, EM1060-400US

Note#3 : The EUT shipped with RF module that listed as below:

Module	Radio Technology	Condition	Modular or not
WLT5283M	BLE	In use	N/A
ICT-M	BLE	In use	Single Modular
	Wifi2.4G	In use	
SKI.WB668BS.3	BLE	No use	N/A
	BREDR	In use	
	WIFI2.4G	In use	
	WIFI5G	In use	
GEM3NFC	NFC	In use	Single Modular
Note: The EUT shipped with two Single Modular. The first one is "ICT-M", which the FCC ID is "2AC7Z-ESPS3WROOM1". And the second one is "GEM3NFC", which the FCC ID is "XRH-NPE109".			

Note#4 : According to the information as above, we test module "WLT5283M" and "SKI.WB668BS.3" to report.

Radio Tech. in : Listed as below:
current report

Item	SKI.WB668BS.3
Radio Technology	WIFI5G
Chanel Frequency	802.11a/n20/ac20: 5180-5240MHz, 5260-5320MHz, 5500-5700MHz; 5745-5825MHz; 802.11n40/ac40: 5190-5230MHz, 5270-5310MHz, 5510-5670MHz; 5755-5795MHz; 802.11ac80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5775MHz.
Modulation	IEEE 802.11a/n: OFDM (64QAM, 16QAM, QPSK,BPSK); IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK);
TPC Function	Without TPC
DFS Function	Client without Radar Detection

Antenna Info. in : The Module “SKI.WB668BS.3” shipped with three ANT port,
current report the usage details listed as below:

ANT port:	CNF1	CNF2	CNF3
Connector:	IPEX	IPEX	IPEX
Condition:	In used for Bluetooth	In used for WIFI	In used for WIFI
Transmit Type:	SISO	For 802.11a: SISO For 802.11n/ac: MIMO	
Antenna Type:	PIFA	PIFA	PIFA
Antenna Gain:	3 dBi	3 dBi	3 dBi

Applicant : TRISPORT AG
Boesch 67 CH-6331 Huenenberg

Manufacturer : Same as Applicant.

2.2 EUT Specifications Assessed in Current Report

Mode	Modulation	Data Rate(Mbps)
802.11a	OFDM (64QAM, 16QAM, QPSK, BPSK)	Up to 54
802.11n-HT 20	OFDM (64QAM, 16QAM, QPSK, BPSK)	Up to 144.4
802.11n-HT 40	OFDM (64QAM, 16QAM, QPSK, BPSK)	Up to 300
802.11ac-V HT20	OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)	Up to 144.4
802.11ac-V HT40	OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)	Up to 300
802.11ac-V HT80	OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)	Up to 650

Channel List for 11a/11n-HT20/11ac-VHT20			
UNII-1		UNII-2A	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
36	5180	52	5260
40	5200	56	5280
44	5220	60	5300
48	5240	64	5320
UNII-2C		UNII-3	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
100	5500	149	5745
104	5520	153	5765
108	5540	157	5785
112	5560	161	5805
116	5580	165	5825
120	5600		
124	5620		
128	5640		
132	5660		
136	5680		
140	5700		

Channel List for 11n-HT40/11ac-VHT40			
UNII-1		UNII-2A	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
38	5190	54	5270
46	5230	62	5310
UNII-2C		UNII-3	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
102	5510	151	5755
110	5550	159	5795
118	5590		
126	5630		
134	5670		

Channel List for 11ac-VHT40			
UNII-1		UNII-2A	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
42	5210	58	5290
UNII-2C		UNII-3	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
106	5530	155	5775
122	5610		

2.3 Test Information

The EUT was operation at client mode, the modulation and channel was selected by a Wi-Fi Router.

Modulation	Test Channel	Frequency (MHz)
802.11ac-VHT80	58	5290
	106	5530

2.4 Sample Description

Test Item	Model Number	Sample Number	Date of receipted
DFS	CT1063-400US	E20231017179a-03/03	2023.10.17

2.5 Supported equipment

Brand : Acer
 Product Name: : Notebook PC
 Model Name : TravelMate P238 series
 Model Number : N15W8

Brand : ASUS
 Product Name: : AX6000 Dual-band Wi-Fi Router
 Model Name : RT-AX88U
 Model Number : K8ITHP000036
 FCC ID : MSQ-RTAXHP00
 IC: : 3568A-RTAXHP00

2.6 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.
 Site Location : 3F, Building 34, No. 680 Guiping Rd.,
 Caohejing, Hi-Tech Park,
 Shanghai 200233, China
 Accredited by NVLAP, Lab Code : 200371-0
 FCC Designation Number : CN5027
 Test Firm Registration Number : 954668

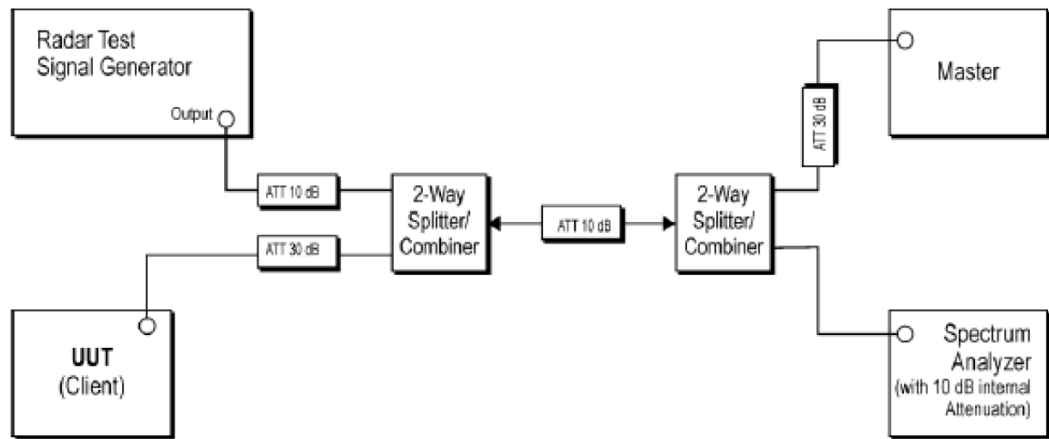
3 DFS MEASUREMENT

3.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2023.08.09	1 Year
2.	MXG Vector Signal Generator	KEYSIGHT	N5182B+N5182BX07	MY53051937+MY61500126	2024.02.22	1 Year
3.	DFS Radar Profiles	KEYSIGHT	N7607B Signal Studio	V3.2.0.0	--	--

3.2 Block Diagram of Test Setup



3.3 Specification Limits

§15.407(h)(2)(iii):

Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

KDB 905462 D02:

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

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

Table 2: Applicability of DFS requirements during normal operation

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

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

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

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 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>	

Table 4: DFS Response Requirement Values

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
<p>Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p>Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</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>	

3.4 Operating Condition of EUT

The EUT operate as client, connect to the Wi-Fi Router.

3.5 Test Procedure

The conducted setup shown on Section 3.2 was used to measure the Channel Closing Transmission Time and Channel Move Time.

For a Client Device without DFS, the Channel Move Time and Channel Closing Transmission Time requirements will be verified with one Short Pulse Radar Type defined in Table 5 of KDB 905462 D02.

The Client Device (EUT) is associated with the Master Device (Wi-Fi Router). The Data Traffic is streamed from the Master Device to the Client Device. Radar waveforms generated with the Vector Signal Generator are injected into the Master Device on the operating channel.

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 UUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

3.6 Threshold Level

Threshold Level = -62dBm + Antenna Gain.

3.7 Test Results

PASSED.

All the test results are attached in next pages.

(Test Date: 2024.04.15 Temperature: 23°C Humidity: 51 %)

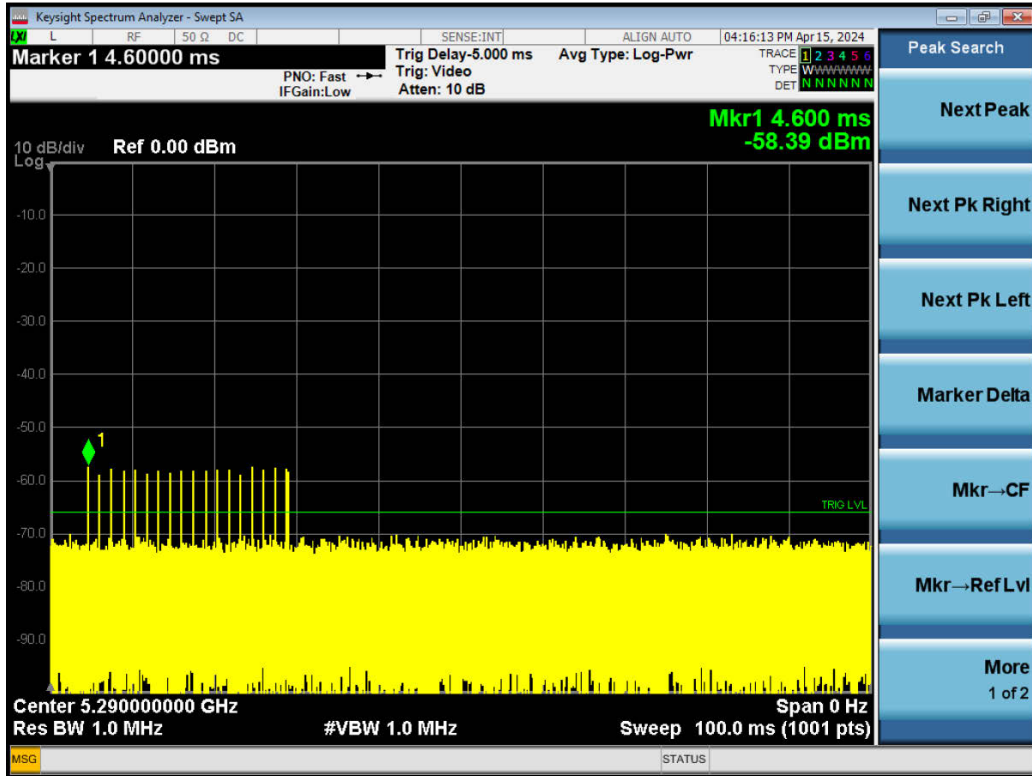
Modulation	Channel	Frequency (MHz)	Antenna Gain (dBi)	Threshold Level (dBm)
802.11n-HT40	58	5290	3	-59
	106	5530	3	-59

Modulation	Channel	Frequency (MHz)	Channel Move Time (s)	Limit (s)
802.11n-HT40	58	5290	0.6270627	10
	106	5530	0.5010501	10

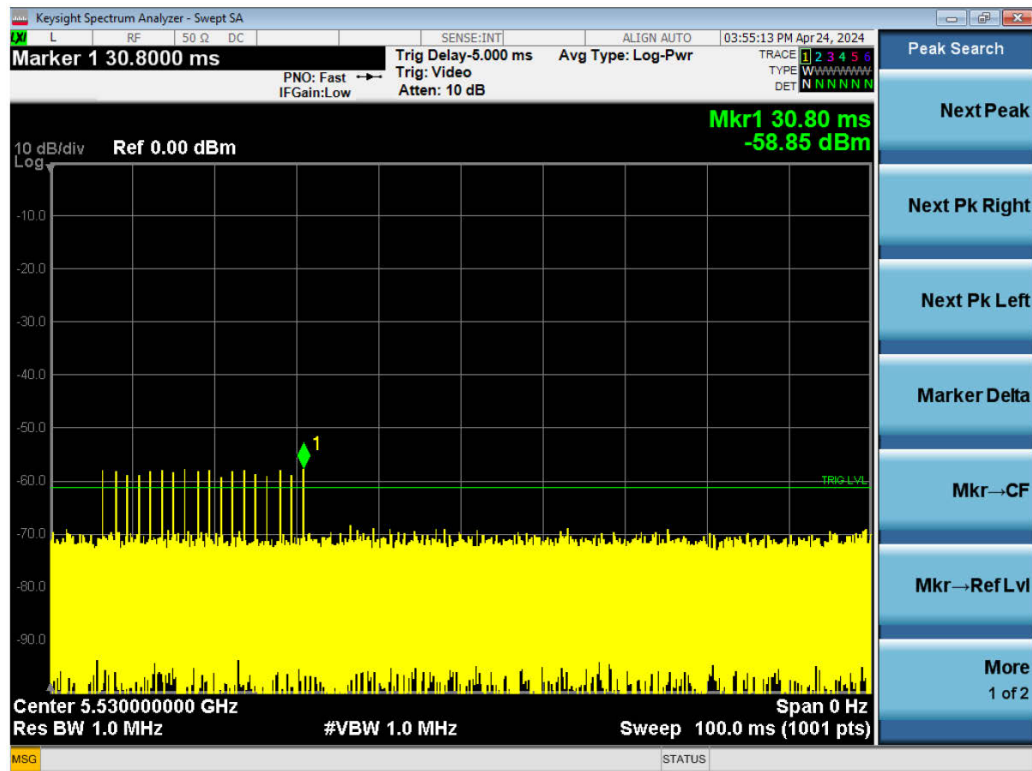
Modulation	Channel	Frequency (MHz)	Channel Closing Transmission Time (s)	Limit (s)
802.11n-HT40	58	5290	0.0065007	0.2
	106	5530	0.0020002	0.2

Threshold Level:

802.11ac-VHT80 CH5290MHz:

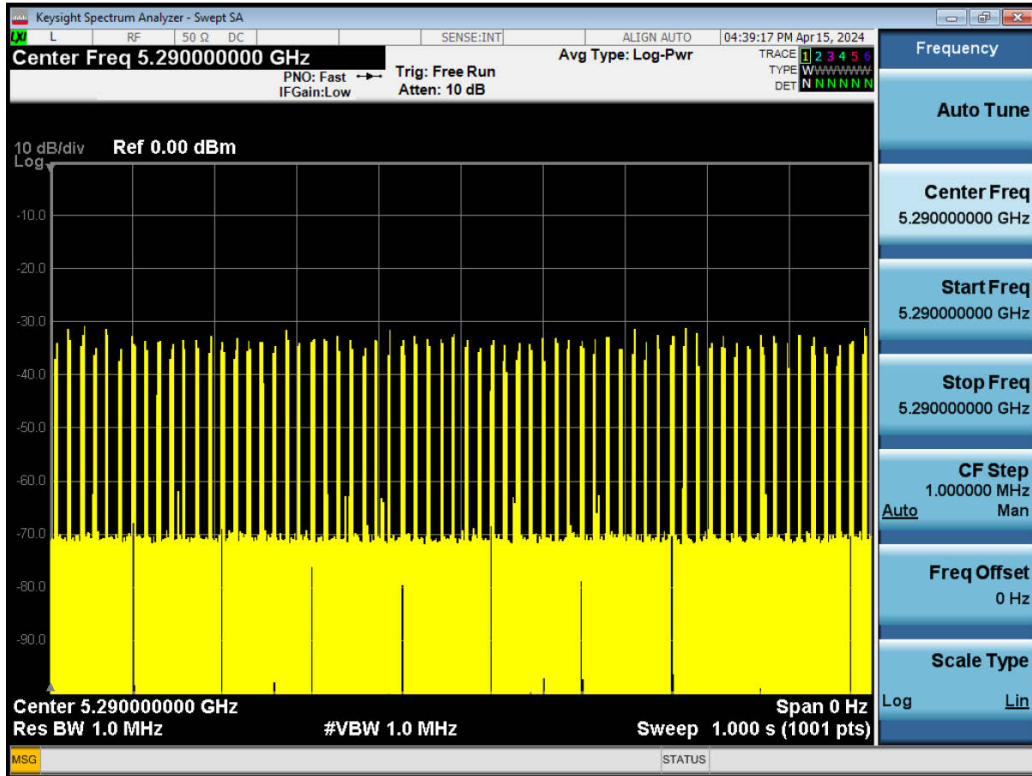


802.11ac-VHT80 CH5300MHz:

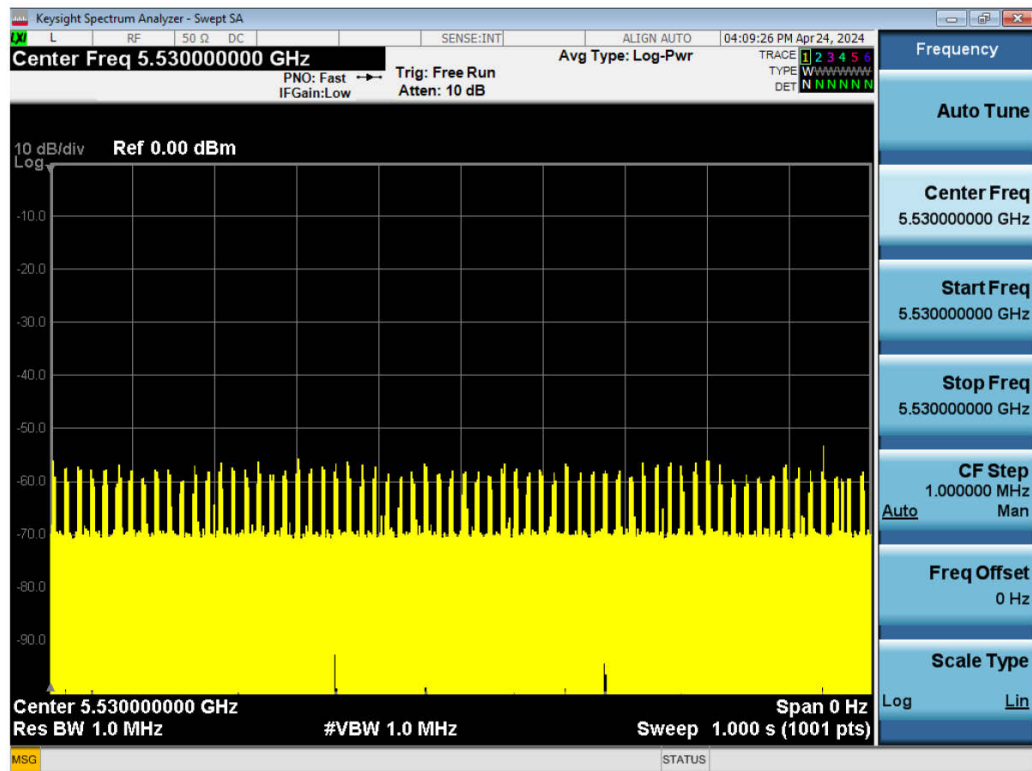


Data Traffic Plot:

802.11ac-VHT80 CH5290MHz:

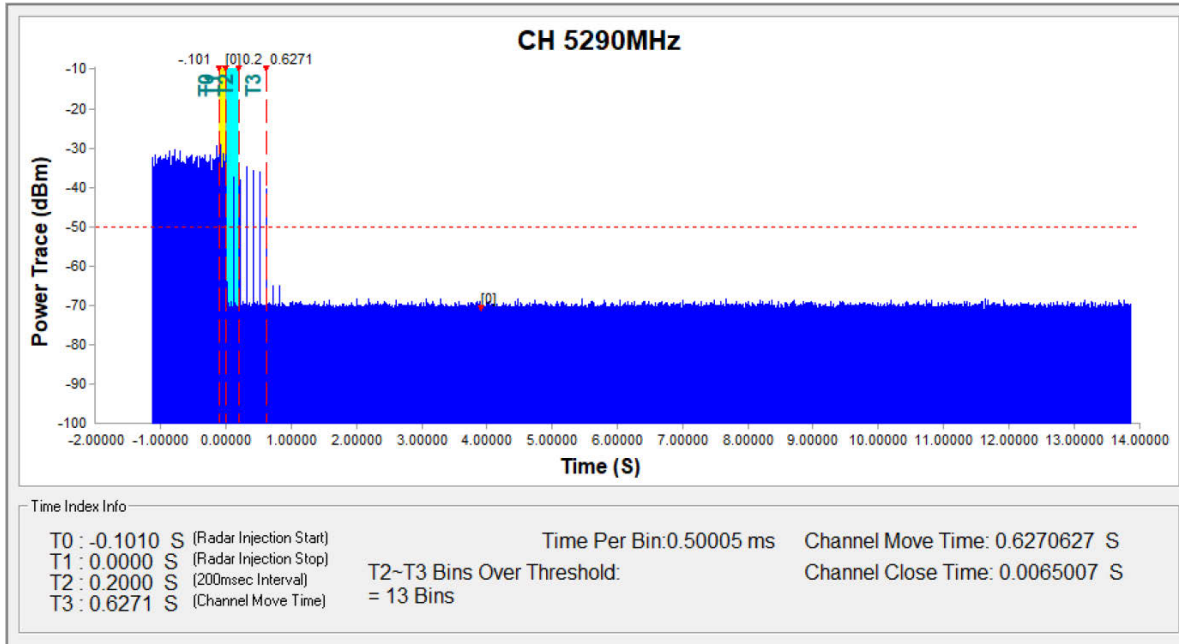


802.11ac-VHT80 CH5300MHz:

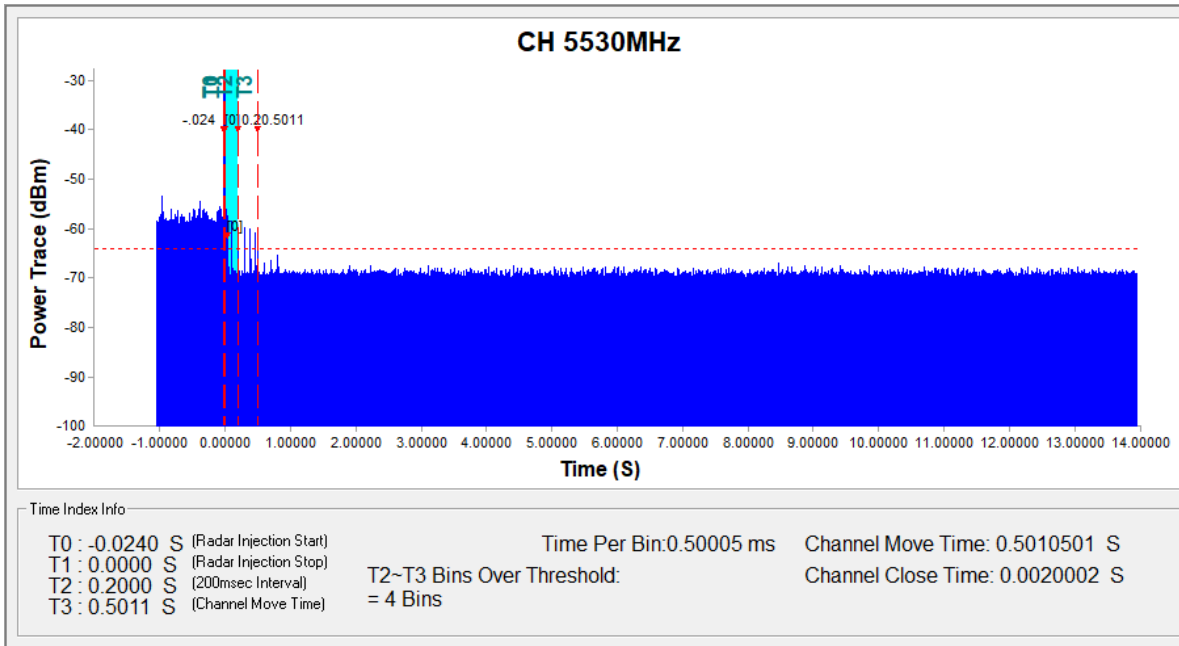


Channel Move Time & Channel Closing Transmission Time:

802.11ac-VHT80 CH5290MHz:



802.11ac-VHT80 CH5300MHz:



4 DEVIATION TO TEST SPECIFICATIONS

None.

5 MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted Emission No.1 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Conducted Emission No.3 Shielded Room	9kHz~150kHz	±3.1 dB
	150kHz~30MHz	±2.6 dB
Radiated Emission	30MHz~200MHz, Horizontal	±3.8 dB
	30MHz~200MHz, Vertical	±4.1 dB
	200MHz~1000MHz, Horizontal	±3.6 dB
	200MHz~1000MHz, Vertical	±5.1 dB
	1GHz~6GHz	±5.3 dB
	6GHz~18GHz	±5.3 dB
	18GHz~40GHz	±3.5 dB
Output Power Test	50MHz~18GHz	0.77 dB
Power Density Test	9kHz~6GHz	1.08 dB
RF Frequency Test	9kHz~40GHz	6×10^{-4}
Bandwidth Test	9kHz~6GHz	1.5×10^{-3}
RF Radiated Power Test	30MHz~1000MHz	3.06 dB
Conducted Output Power Test	50MHz~18GHz	0.83 dB
AC Voltage(<10kHz) Test	120V~230V	0.04 %
DC Power Test	0V~30V	0.4 %
Temperature	-40°C~+100°C	0.52 °C
Humidity	30%~95%	2.6 %