

FCC DFS Test Report

FCC ID : HDC-17600030F1
Contains FCC ID : HDC-649B
Equipment : WiFi 6 Mesh AP
Brand Name : **ADTRAN**[®] or **Adtran**
Part Number : 17600030FYYYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#")
Model Name : 841-t6YYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#")
Applicant : Adtran
901 Explorer Blvd., Huntsville, AL 35806, USA
Manufacturer : XAVi Technologies Corporation
22F., No.69, Sec. 2, Guangfu Rd., Sanchong
Dist., New Taipei City 241, Taiwan (R.O.C.)
Standard : 47 CFR FCC Part 15.407

The product was received on Nov. 13, 2024, and testing was started from Apr. 09, 2025 and completed on Apr. 16, 2025. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Jackson Tsai

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Appendix A. Test Photos

Photographs of EUT V01



History of this test report

[illegible]

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	KDB 905462 7.8.3	DFS: In-Service Monitoring for Channel Move Time (CMT)	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Ryan Hsiao

Report Producer: Debby Hung

1 General Description

1.1 Information

The EUT contains certified module FCC ID: HDC-649B for WLAN 5G High Band.

1.1.1 RF General Information

Specification Items	Description			
Product Type	WLAN (2TX, 2RX) (4TX, 4RX)			
Radio Type	Intentional Transceiver			
Power Type	From AC Adapter			
Modulation	IEEE 802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n/ac/ax: see the below table			
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac/ax: see the below table			
Channel Bandwidth	20/40/80 MHz operating channel bandwidth			
Operating Mode	☒	Master		
	☐	Client with radar detection		
	☐	Client without radar detection		
Communication Mode	☒	IP Based (Load Based)	☐	Frame Based
TPC Function	☒	With TPC	☐	Without TPC
Weather Band (5600~5650MHz)	☒	With 5600~5650MHz	☐	Without 5600~5650MHz
Resource Unit	☒	Full RU	☐	Partial RU
	☐	MRU (static preamble puncturing)	☐	MRU (dynamic preamble puncturing)
Software / Firmware Version	LEDE Reboot 17.01-SNAPSHOT (2021/12/07 02:20) / LuCI (unknown)			
Note: EUT employ a TPC mechanism and TPC have the capability to operate at least 6 dB below highest RF output power.				

Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device)
	Combined Equipment - Brand Name / Model No.: ...
☐	Plug-in radio (EUT intended for a variety of host systems)
	Host System - Brand Name / Model No.:
☐	Other:

Antenna & Bandwidth

Antenna	Two / Four (TX)		
Band width Mode	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V
IEEE 802.11ax	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2 / 4	MCS 0-15/ MCS 0-31
802.11n (HT40)	2 / 4	MCS 0-15/ MCS 0-31
802.11ac (VHT20)	2 / 4	MCS 0-8/Nss1-2 MCS 0-8/Nss1-4
802.11ac (VHT40)	2 / 4	MCS 0-9/Nss1-2 MCS 0-9/Nss1-4
802.11ac (VHT80)	2 / 4	MCS 0-9/Nss1-2 MCS 0-9/Nss1-4
802.11ax (HEW20)	2 / 4	MCS 0-8/Nss1-2 MCS 0-11/Nss1-4
802.11 ax (HEW40)	2 / 4	MCS 0-9/Nss1-2 MCS 0-11/Nss1-4
802.11 ax (HEW80)	2 / 4	MCS 0-9/Nss1-2 MCS 0-11/Nss1-4

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).
Then EUT support HT20 and HT40.

Note 2: HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

Note 3: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 (VHT: Very High Throughput).
Then EUT support VHT20, VHT40, VHT80.

Note 4: VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

Note 5: HEW20, HEW40, HEW80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

Note 6: Modulation modes consist of below configuration:
11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac,
HEW20/HEW40/HEW80: IEEE 802.11ax.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Support
1	Galtronics	02036142-07357-1	PIFA	N/A	5G DFS RX
2	Galtronics	02036073-07357-3	PIFA	N/A	BT
3	Galtronics	60-2962-03-4	PCB	U.FL	2.4G+5G
4	Galtronics	60-2962-03-3	PCB	U.FL	2.4G+5G
5	Galtronics	60-2888-03-1	PCB	U.FL	5G
6	Galtronics	60-2791-03	PCB	U.FL	5G
7	Galtronics	60-2791-03	PCB	U.FL	5G
8	Galtronics	60-2888-03-1	PCB	U.FL	5G

Non-Beamforming

Ant.	Port	Gain (dBi)		
		2.4G	5G	BT
1	1	-	4.7	-
2	1	-	-	5.3
3	1	2.7	3.7	-
4	2	2.7	3.7	-
5	1	-	3.9	-
6	2	-	2.1	-
7	3	-	2.1	-
8	4	-	3.9	-

Note 1: The EUT has eight antennas.

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Only Ant. 2 (port 1) can be used as transmitting/receiving.

For 5GHz function (Low Band):

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

For 5GHz function (High Band):

For IEEE 802.11 a/n/ac/ax mode (4TX/4RX)

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3) and Ant. 8 (port 4) could transmit/receive simultaneously.

Note 2: Directional gain information

	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{in}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{in}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{in}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$

1.1.3 DFS Band Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144.

For 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 118, 126, 134, 142.

For 80MHz bandwidth systems, use Channel 58, 106, 122, 138.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz U-NII-2A	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
	58	5290 MHz	-	-
5470~5725 MHz U-NII-2C	100	5500 MHz	124	5620 MHz
	102	5510 MHz	126	5630 MHz
	104	5520 MHz	128	5640 MHz
	106	5530 MHz	132	5660 MHz
	108	5540 MHz	134	5670 MHz
	110	5550 MHz	136	5680 MHz
	112	5560 MHz	138	5690 MHz
	116	5580 MHz	140	5700 MHz
	118	5590 MHz	142	5710 MHz
	120	5600 MHz	144	5720 MHz
	122	5610 MHz	-	-

1.1.4 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Color	Description
841-t6YYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#")	White	All the models are identical, the difference model served as marketing strategy.
	Black	

Note: The information is provided by manufacturer.

1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FZ182051-04

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
The 841 motherboard 5G filter and 5G module filter were replaced with Qorvo alternative materials.	Channel Move Time was evaluated

Note : The information is provided by manufacturer.

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
DFS	DFS03-HY	CHUN-YI WU	22.7~24.2°C / 55~61%	09/Apr/2025~16/Apr/2025

2 Test Configuration of EUT

2.1 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
IEEE Std.	Test Channel Freq. (MHz)
802.11ax (HEW80)	5290 MHz / 5530 MHz

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Dynamic Frequency Selection (DFS)
Test Condition	Conducted measurement at transmit chains The EUT shall be configured to operate at the highest transmitter output power setting. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the lowest gain shall be used.
Modulation Mode	802.11ax (HEW80)

2.3 Accessories

Accessories				
AC Adapter 1 (US Plug)	Brand Name	MASS POWER	Model Name	S030-1A120250VU
	Power Rating	I/P: 100 - 240 Vac, 0.8 A, O/P: 12.0 Vdc, 2.5 A		
	Power Cord	1.45 meter, non-shielded cable, w/o ferrite core		
AC Adapter 2 (US Plug)	Brand Name	KLEC	Model Name	KL-WA120250-Z
	Power Rating	I/P: 100 - 240 Vac, 1.2 A, O/P: 12.0 Vdc, 2.5 A		
	Power Cord	1.5 meter, non-shielded cable, w/o ferrite core		

Reminder: Regarding to more detail and other information, please refer to user manual.

2.4 Support Equipment

Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Client(slave)	HP	HSTNN-I42C	-	-
2	Shielding Box	EMEC	EM-SHB-650550300-M	-	-
3	Notebook	DELL	Latitude E5550	-	-
4	AC Adapter	KLEC	KL-WA120250-Z	-	Provided by Customer

3 Dynamic Frequency Selection (DFS) Test Result

3.1 In-service Monitoring

3.1.1 In-service Monitoring Limit

In-service Monitoring Limit	
Channel Move Time	10 sec

3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
☒	Verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time. Client Device will associate with the EUT. 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). Compare the Channel Move Time and Channel Closing Transmission Time limits.
☒	Verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time. One 12 sec plot needs to be reported for the Short Pulse Radar Types 0. And zoom-in a 60 ms plot verified channel closing time for the aggregate transmission time starting from 200ms after the end of the radar signal to the completion of the channel move.
☒	Verified during In-Service Monitoring; Non-Occupancy Period. Client Device will associate with the EUT. 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 (Non-Occupancy Period). Compare the Non-Occupancy Period limits.

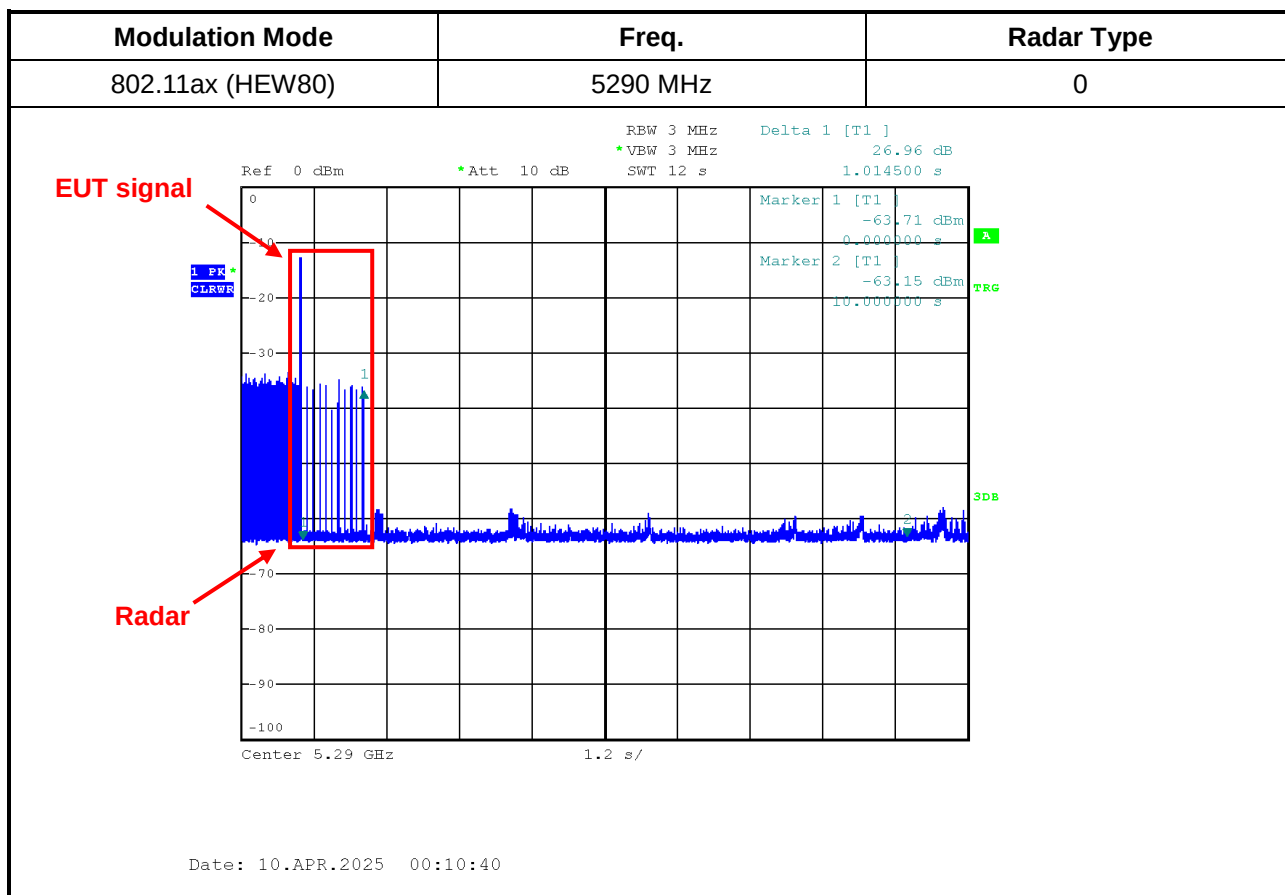
3.1.4 Test Result of In-service Monitoring

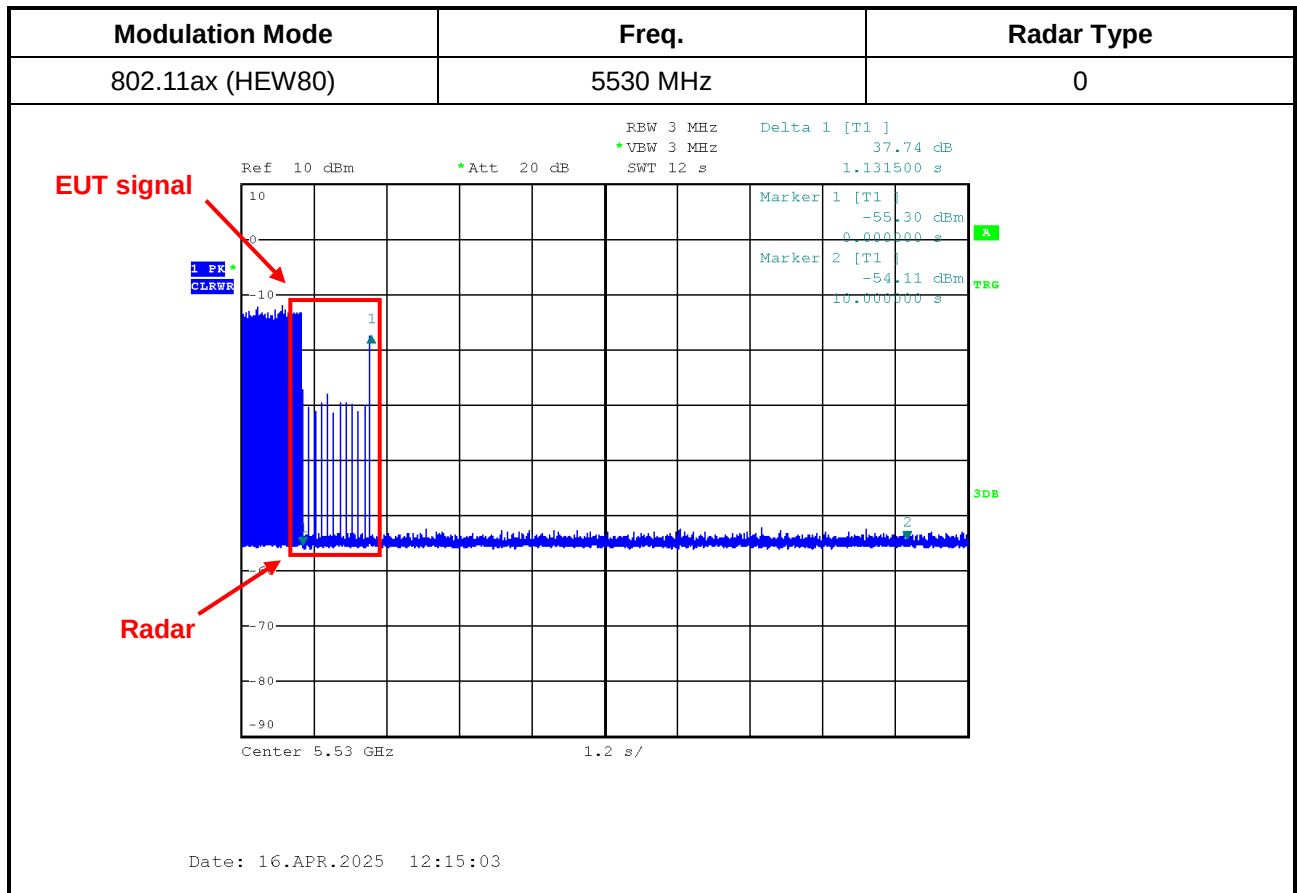
Modulation Mode: 802.11ax (HEW80)

Parameter	Test Result		Limit
	Type 0	Type 0	
Test Channel (MHz)	5290 MHz	5530 MHz	-
Channel Move Time (sec.)	1.0145	1.1315	< 10s

Note: 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 seconds period. The aggregate duration of control signals will not count quiet periods in between transmissions.

3.1.5 Test Plot of In-Service Monitoring for Channel Move Time





4 Test Equipment and Calibration Data

Instrument	Manufacturer/ Brand Name	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSP 40	100305	9kHz~40GHz	18/Mar/2025	17/Mar/2026
Vector Signal Generator	R&S	SMW200A	111529	100kHz~7.5GHz	20/Mar/2025	19/Mar/2026
DFS Test	Sporton	V1.1	N/A	N/A	N/A	N/A
DFS-Adaptivity	Sporton	Ver 2.10	N/A	N/A	N/A	N/A

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Threshold Level	1.2 dB	Confidence levels of 95%
Statistical Performance Check	3.33 %	Confidence levels of 95%
CMT	36.52 ms	Confidence levels of 95%
CCTT	8 ms	Confidence levels of 95%
NOP	0 min	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%