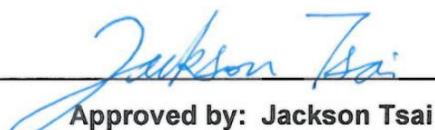


# FCC DFS Test Report

**FCC ID** : G95-CGA437A  
**Equipment** : DOCSIS 3.1 Residential Voice Gateway  
**Brand Name** : Technicolor  
**Model Name** : CGA437ATCH5 ; CGA437AXXXX (where X can be alphanumeric, -, or blank)  
**Applicant** : Technicolor Connected Home USA LLC  
4855 Peachtree Industrial Blvd.  
Suite 200  
Norcross, Georgia 30092  
**Manufacturer** : Technicolor Connected Home USA LLC  
4855 Peachtree Industrial Blvd.  
Suite 200  
Norcross, Georgia 30092  
**Standard** : 47 CFR FCC Part 15.407

The product was received on Nov. 18, 2022, and testing was started from Mar. 22, 2023 and completed on Mar. 22, 2023. 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

**SPORTON INTERNATIONAL INC. Hsinhua Laboratory**  
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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## Photographs of EUT V01





### Summary of Test Result

| Report Clause | Ref. Std. Clause   | Test Items   | Result (PASS/FAIL) | Remark         |
|---------------|--------------------|--|--------------------|----------------|
| -             | KDB 905462 7.8.1   | DFS: UNII Detection Bandwidth Measurement                                | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.2.1 | DFS: Initial Channel Availability Check Time                             | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.2.2 | DFS: Radar Burst at the Beginning of the Channel Availability Check Time | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.2.3 | DFS: Radar Burst at the End of the Channel Availability Check Time       | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.3   | DFS: In-Service Monitoring for Channel Move Time (CMT)                   | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.3   | DFS: In-Service Monitoring for Channel Closing Transmission Time (CCTT)  | Not Required       | Refer as 1.1.5 |
| -             | KDB 905462 7.8.3   | DFS: In-Service Monitoring for Non-Occupancy Period (NOP)                | Not Required       | Refer as 1.1.5 |
| 3.1           | KDB 905462 7.8.4   | DFS: Statistical Performance Check                                       | PASS               | -              |
| -             | KDB 905462 8.1     | User Access Restrictions   | PASS               | DFS controls   |

|  |
|--|
| <b>Declaration of Conformity:</b>  |
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| <b>Comments and explanations:</b>  |
| None   |

Reviewed by: Ben Tseng

Report Producer: Debby Hung



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| Specification Items  | Description   |
|--|---|
| Product Type   | WLAN (4TX, 4RX)   |
| Radio Type   | Intentional Transceiver   |
| Power Type   | From AC Adapter   |
| Modulation   | IEEE 802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>IEEE 802.11n/ac/ax: see the below table         |
| Data Rate (Mbps)   | IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54)<br>IEEE 802.11n/ac/ax: see the below table               |
| Channel Bandwidth  | 20/40/80/160 MHz operating channel bandwidth  |
| Operating Mode   | <input checked="" type="checkbox"/> Master  |
|  | <input type="checkbox"/> Bridge   |
|  | <input type="checkbox"/> Mesh   |
|  | <input type="checkbox"/> Client with radar detection  |
|  | <input type="checkbox"/> Client without radar detection   |
| Communication Mode   | <input checked="" type="checkbox"/> IP Based (Load Based) <input type="checkbox"/> Frame Based      |
| TPC Function   | <input checked="" type="checkbox"/> With TPC <input type="checkbox"/> Without TPC                   |
| Weather Band (5600~5650MHz)  | <input checked="" type="checkbox"/> With 5600~5650MHz <input type="checkbox"/> Without 5600~5650MHz |
| Software / Firmware Version  | CGA437ATCH2-TCH5-21.3-72-6.0-RQ-EM-TEST   |
| 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                         |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Stand-alone   |
| <input type="checkbox"/>            | Combined (EUT where the radio part is fully integrated within another device) |
|                                     | Combined Equipment - Brand Name / Model No.: ...                              |
| <input type="checkbox"/>            | Plug-in radio (EUT intended for a variety of host systems)                    |
|                                     | Host System - Brand Name / Model No.:   |
| <input type="checkbox"/>            | Other:  |



**Antenna & Bandwidth**

| Antenna         | Four (TX) |        |        |         |
|-----------------|-----------|--------|--------|---------|
|                 | 20 MHz    | 40 MHz | 80 MHz | 160 MHz |
| Band width Mode |           |        |        |         |
| IEEE 802.11a    | V         | X      | X      | X       |
| IEEE 802.11n    | V         | V      | X      | X       |
| IEEE 802.11ac   | V         | V      | X      | X       |
| IEEE 802.11ax   | V         | V      | V      | V       |

**IEEE 11n/ac/ax Spec.**

| Protocol           | Number of Transmit Chains (NTX) | Data Rate / MCS |
|--------------------|---------------------------------|-----------------|
| 802.11n (HT20)     | 4                               | MCS 0-31        |
| 802.11n (HT40)     | 4                               | MCS 0-31        |
| 802.11ac (VHT20)   | 4                               | MCS0-8/Nss1-4   |
| 802.11ac (VHT40)   | 4                               | MCS0-9/Nss1-4   |
| 802.11ax (HEW20)   | 4                               | MCS0-11/Nss1-4  |
| 802.11 ax (HEW40)  | 4                               | MCS0-11/Nss1-4  |
| 802.11 ax (HEW80)  | 4                               | MCS0-11/Nss1-4  |
| 802.11 ax (HEW160) | 4                               | MCS0-11/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 (VHT: Very High Throughput). Then EUT support VHT20, VHT40.

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

Note 5: HEW20, HEW40, HEW80 and HEW160 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: IEEE 802.11ac, HEW20/HEW40/HEW80/HEW160: IEEE 802.11ax.



## 1.1.2 Antenna Information

| Ant. | Brand       | Model Name     | Antenna Type | Connector |
|------|-------------|----------------|--------------|-----------|
| 1    | Technicolor | 2G1 - PerpTall | Murphy       | N/A       |
| 2    | Technicolor | 2G2 - Dumbo2   | Murphy       | N/A       |
| 3    | Technicolor | 2G3 - PerpFold | Murphy       | N/A       |
| 4    | Technicolor | 5G1 - Para2    | Murphy       | N/A       |
| 5    | Technicolor | 5G2 - Perp2    | Murphy       | N/A       |
| 6    | Technicolor | 5G3 - Para2    | Murphy       | N/A       |
| 7    | Technicolor | 5G4 - Perp2    | Murphy       | N/A       |

| Ant. | Port | Gain (dBi) |         |          |          |         |
|------|------|------------|---------|----------|----------|---------|
|      |      | 2.4G       | U-NII-1 | U-NII-2A | U-NII-2C | U-NII-3 |
| 1    | 1    | 3.61       | -       | -        | -        | -       |
| 2    | 2    | 4.70       | -       | -        | -        | -       |
| 3    | 3    | 2.81       | -       | -        | -        | -       |
| 4    | 1    | -          | 2.52    | 2.34     | 2.20     | 2.37    |
| 5    | 2    | -          | 2.87    | 2.38     | 2.89     | 2.43    |
| 6    | 3    | -          | 2.08    | 2.58     | 2.44     | 2.26    |
| 7    | 4    | -          | 2.14    | 2.75     | 2.13     | 2.10    |

| Composite Gain (dBi) |         |          |          |         |
|----------------------|---------|----------|----------|---------|
| 2.4G                 | U-NII-1 | U-NII-2A | U-NII-2C | U-NII-3 |
| 4.49                 | 3.77    | 3.36     | 5.16     | 3.85    |

Note 1: The EUT has seven antennas.

**For 2.4GHz function:**

For IEEE 802.11 b/g/n/VHT/ax mode (3TX/3RX)

Ant. 1 (port 1) ~ Ant. 3 (port 3) could transmit/receive simultaneously.

**For 5GHz function:**

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

Ant. 4 (port 1) ~ Ant. 7 (port 4) could transmit/receive simultaneously.



### 1.1.3 DFS Band Carrier Frequencies

There are four 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.

For 160MHz bandwidth systems, use Channel 50, 114

| Frequency Band            | Channel No. | Frequency | Channel No. | Frequency |
|---------------------------|-------------|-----------|-------------|-----------|
| 5250~5350 MHz<br>U-NII-2A | 50          | 5250 MHz  | 58          | 5290 MHz  |
|                           | 52          | 5260 MHz  | 60          | 5300 MHz  |
|                           | 54          | 5270 MHz  | 62          | 5310 MHz  |
|                           | 56          | 5280 MHz  | 64          | 5320 MHz  |
| 5470~5725 MHz<br>U-NII-2C | 100         | 5500 MHz  | 122         | 5610 MHz  |
|                           | 102         | 5510 MHz  | 124         | 5620 MHz  |
|                           | 104         | 5520 MHz  | 126         | 5630 MHz  |
|                           | 106         | 5530 MHz  | 128         | 5640 MHz  |
|                           | 108         | 5540 MHz  | 132         | 5660 MHz  |
|                           | 110         | 5550 MHz  | 134         | 5670 MHz  |
|                           | 112         | 5560 MHz  | 136         | 5680 MHz  |
|                           | 114         | 5570 MHz  | 138         | 5690 MHz  |
|                           | 116         | 5580 MHz  | 140         | 5700 MHz  |
|                           | 118         | 5590 MHz  | 142         | 5710 MHz  |
|                           | 120         | 5600 MHz  | 144         | 5720 MHz  |





### 1.1.4 Table for Multiple Listing

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

| Brand Name  | Model Name  | Description  |
|-------------|---|--|
| Technicolor | CGA437ATCH5   | All the models are identical, the difference model served as marketing strategy. |
| Technicolor | CGA437AXXXXX (where X can be alphanumeric, -, or blank) |  |

### 1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FZ232914-01.

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

| Modifications  | Performance Checking  |
|--|---|
| (1) 5G FEM chip:<br>Brand:Richwave/Model:RTC7676D→<br>Brand:Skyworks/Model:SKY85755-11 | 1. Statistical performance testing of Radar Type 0 was evaluated. |
| (2) LAN:<br>3x1Gb+1x2.5Gb(Brand:TNK/Model:QT24A<br>155→4x1Gb(Brand:TNK/Model:QT48A17)  |   |
| (3) adding Reset IC  | 2. Photographs of EUT.  |

## 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

The following reference test guidance is not within the scope of accreditation of TAF:

## 1.3 Testing Location Information

|  |                        |  |                         |                  |
|--|------------------------|--|-------------------------|------------------|
| <b>Test Lab. : Sporton International Inc. Hsinhua Laboratory</b> |                        |  |                         |                  |
| <input checked="" type="checkbox"/>                              | Hsinhua<br>(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.                       |                        |  |                         |                  |
| <b>Test Condition</b>  | <b>Test Site No.</b>   | <b>Test Engineer</b>   | <b>Test Environment</b> | <b>Test Date</b> |
| DFS  | DFS01-HY               | Peng Huang   | 22.6~23.5°C / 50~52%    | 22/Mar/2023      |

## 2 Test Configuration of EUT

### 2.1 Test Channel Frequencies Configuration

| Test Channel Frequencies Configuration |                          |
|--|--------------------------|
| IEEE Std.                              | Test Channel Freq. (MHz) |
| 802.11ax (HEW160)                      | 5570 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<br>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 (HEW160)  |

### 2.3 Accessories

| Accessories |              |   |            |                        |
|-------------|--------------|---|------------|------------------------|
| AC Adapter  | Brand Name   | SHENZHEN HONOR                                  | Model Name | ADS-36FKJ-12 12036EPCU |
|             | Power Rating | I/P: 100 - 240Vac, 1.0 A, O/P: 12 Vdc, 3.0A     |            |                        |
|             | 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                 | Notebook  | DELL       | Latitude E5540 | PD9AX200NG | -                    |
| 2                 | Notebook  | DELL       | Latitude E5550 | -          | -                    |
| 3                 | Fixture   | -          | -              | -          | Provided by Customer |

### 3 Dynamic Frequency Selection (DFS) Test Result

#### 3.1 Statistical Performance Check

##### 3.1.1 Statistical Performance Check Limit

| Radar Type                  | Minimum Percentage of Successful Detection (Pd) | Minimum Trials |
|-----------------------------|---|----------------|
| 1                           | 60%   | 30             |
| 2                           | 60%   | 30             |
| 3                           | 60%   | 30             |
| 4                           | 60%   | 30             |
| Aggregate (Radar Types 1-4) | 80%   | 120            |
| 5                           | 80%   | 30             |
| 6                           | 70%   | 30             |

The percentage of successful detection is calculated by:

$$\frac{\text{TotalWaveformDetections}}{\text{TotalWaveformTrials}} \times 100 = \text{Probability of Detection Radar Waveform}$$

In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is required and is calculated as follows:

$$\frac{Pd1 + Pd2 + Pd3 + Pd4}{4}$$

##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

| Test Method   |
|---|
| <input checked="" type="checkbox"/> For Statistical Performance Check test. Demonstrating a minimum channel loading of approximately 17% or greater of the test. Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 10 seconds for Short Pulse Radar Types 1-4 and 6 to ensure detection occurs. Then Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 22 seconds for Long Pulse Radar Type 5 to ensure detection occurs. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. |



3.1.4 Test Result of Statistical Performance Check

Modulation Mode: 802.11ax (HEW160)

Type 0 Radar Statistical Performance

| Trial #                  | Test Freq. (MHz) | Pulse Repetition Frequency Number | Pulse Repetition Frequency (Pulse Per Second) | PRI (us) | 1=Detection<br>0=No Detection |
|--------------------------|------------------|-----------------------------------|---|----------|-------------------------------|
| 1                        | 5516             | 1                                 | 1428  | 18       | 0                             |
| 2                        | 5517             | 1                                 | 1428  | 18       | 1                             |
| 3                        | 5518             | 1                                 | 1428  | 18       | 1                             |
| 4                        | 5519             | 1                                 | 1428  | 18       | 1                             |
| 5                        | 5520             | 1                                 | 1428  | 18       | 1                             |
| 6                        | 5521             | 1                                 | 1428  | 18       | 1                             |
| 7                        | 5522             | 1                                 | 1428  | 18       | 1                             |
| 8                        | 5523             | 1                                 | 1428  | 18       | 0                             |
| 9                        | 5524             | 1                                 | 1428  | 18       | 1                             |
| 10                       | 5525             | 1                                 | 1428  | 18       | 1                             |
| 11                       | 5526             | 1                                 | 1428  | 18       | 1                             |
| 12                       | 5527             | 1                                 | 1428  | 18       | 1                             |
| 13                       | 5528             | 1                                 | 1428  | 18       | 1                             |
| 14                       | 5529             | 1                                 | 1428  | 18       | 1                             |
| 15                       | 5530             | 1                                 | 1428  | 18       | 0                             |
| 16                       | 5531             | 1                                 | 1428  | 18       | 1                             |
| 17                       | 5532             | 1                                 | 1428  | 18       | 1                             |
| 18                       | 5533             | 1                                 | 1428  | 18       | 1                             |
| 19                       | 5534             | 1                                 | 1428  | 18       | 0                             |
| 20                       | 5535             | 1                                 | 1428  | 18       | 1                             |
| 21                       | 5536             | 1                                 | 1428  | 18       | 1                             |
| 22                       | 5537             | 1                                 | 1428  | 18       | 1                             |
| 23                       | 5538             | 1                                 | 1428  | 18       | 1                             |
| 24                       | 5539             | 1                                 | 1428  | 18       | 1                             |
| 25                       | 5540             | 1                                 | 1428  | 18       | 1                             |
| 26                       | 5541             | 1                                 | 1428  | 18       | 0                             |
| 27                       | 5542             | 1                                 | 1428  | 18       | 1                             |
| 28                       | 5543             | 1                                 | 1428  | 18       | 1                             |
| 29                       | 5544             | 1                                 | 1428  | 18       | 1                             |
| 30                       | 5545             | 1                                 | 1428  | 18       | 1                             |
| Detection Percentage (%) |                  |                                   |   |          | 83.33                         |
| Limit                    |                  |                                   |   |          | 60%                           |
| <b>Test Result</b>       |                  |                                   |   |          | <b>Complied</b>               |



### 4 Test Equipment and Calibration Data

| Instrument                                    | Manufacturer/<br>Brand Name | Model No.    | Serial No. | Spec.         | Calibration Date | Calibration Due Date |
|---|-----------------------------|--------------|------------|---------------|------------------|----------------------|
| Spectrum Analyzer                             | R&S                         | FSP30        | 100793     | 9 kHz ~ 30GHz | 13/Jun/2022      | 12/Jun/2023          |
| Vector Signal Generator                       | Keysight                    | N5182B       | MY53052408 | 9kHz~6GHz     | 06/Jan/2023      | 05/Jan/2024          |
| Horn Antenna                                  | COM-POWER                   | AH-118       | 10091      | 1GHz~18GHz    | 23/Jun/2022      | 22/Jun/2023          |
| RF Cable-high 8m                              | HUBER+SUHNER                | SUCOFLEX 104 | CB222      | 1GHz~40GHz    | 14/Apr/2022      | 13/Apr/2023          |
| RF Cable-high 10m                             | HUBER+SUHNER                | SUCOFLEX 104 | 302338/4   | 1GHz~40GHz    | 14/Apr/2022      | 13/Apr/2023          |
| Horn Antenna                                  | COM-POWER                   | AHA-118      | 711064     | 1GHz~18GHz    | 23/Dec/2022      | 22/Dec/2023          |
| DFS-Adaptivity                                | Sporton                     | Ver 2.7      | N/A        | N/A           | N/A              | N/A                  |
| Keysight Signal Studio for DFS Radar Profiles | Keysight                    | 2.0.0.0      | N/A        | N/A           | N/A              | N/A                  |
| InServiceMonitor Utility                      | Sporton                     | N/A          | N/A        | N/A           | N/A              | N/A                  |



## 5 Measurement Uncertainty

| Test Items                    | Uncertainty | Remark                   |
|-------------------------------|-------------|--------------------------|
| Statistical Performance Check | 3.33 %      | Confidence levels of 95% |
| Temperature                   | 0.41 °C     | Confidence levels of 95% |
| Humidity                      | 3.4 %       | Confidence levels of 95% |