

Product Name: Set Top Box	Report No: FCC022022-05669RF2A
Product Model: UIW4054MIL	Security Classification: Open
Version: V1.0	Total Page:14

TIRT Testing Report



Prepared By:	Checked By:	Approved By:	
Stone Tang	Randy Lv	Daniel Chen	
<i>Stone Tang</i>	<i>Randy Lv</i>	<i>Daniel Chen</i>	

FCC DFS Test Report

FCC ID: G95UIW4054

This report concerns: Original Grant

Equipment : Set Top Box
Brand Name : Technicolor
Test Model : UIW4054MIL
Series Model : N/A
Applicant : Technicolor Connected Home USA LLC
Address : 4855 Peachtree Industrial Blvd, Suite 200, Norcross, GA 30092, USA
Manufacturer : Technicolor Connected Home USA LLC
Address : 4855 Peachtree Industrial Blvd, Suite 200, Norcross, GA 30092, USA
Date of Receipt : 2022.08.08
Date of Test : 2022.08.10 ~ 2022.10.29
Issued Date : 2022.11.02
Report Version : V1.0
Test Sample : Engineering Sample No.: 20220808019075
Standard(s) : FCC CFR Title 47, Part 15, Subpart E
FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
FCC KDB 905462 D03 UNII Clients Without Radar Detection New Rules
v01r02

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen
Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi
Street, Pingshan District, Shenzhen , China

TEL: +86-0755-27087573

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
FCC022022-05669RF2A	V1.0	Compared with original report(BTL-FCCP-5-2104C150A), PCB Layout changes from LAB3D version to LAB3E version. Please see the following table for details. So, the AC Power Line Conducted Emissions, Radiated Emissions the worst case have been re-evaluated. In this report only updated the test results, Maximum Output Power, other are kept the same.	2022.11.02	Valid

Change ID	PCB Layout changes from LAB3D version to LAB3E version
1	Due to UP06(RT9041B-10GE_SOT23-6) shortage, co-layout SOT23-5 part. Add RP98 and RP99 for SWAP.
2	Improved +5V_SW Power plan below HDMI connector in Layer 3. Replace power ground with track to reduce coupling from this power to HDMI signal.

1. TEST LOCATION

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101,3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number	6049.01
Telephone:	+86-0755-27087573

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart E				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
FCC 15.407(h)	Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)	-----	PASS	NOTE (1)

- (1) For test item: Dynamic Frequency Selection (DFS), please refer to original report (BTL-FCCP-5-2104C150A)

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Set Top Box
Brand Name	Technicolor
Test Model	UIW4054MIL
Series Model	N/A
Model Difference(s)	N/A
Software Version	UIW4054MIL_HC_1.0
Hardware Version	LAB3E
Power Source	DC voltage supplied from AC adapter. 1#Brand / Model: MASS POWER / E012-1O120100VU 2#Brand / Model: HONOTO / ADS-12HG-12 12012EPCU
Power Rating	1# I/P: 100-240V~ 50/60Hz 0.4A O/P: 12.0V $\overline{=}$ 1.0A 2# I/P: 100-240V~ 50/60Hz Max. 0.4A O/P: 12V $\overline{=}$ 1.0A
Operation Frequency Band(s)	UNII-2A: 5250 MHz ~ 5350 MHz UNII-2C: 5470 MHz ~ 5725 MHz
Modulation Type	IEEE 802.11a/n/ac: OFDM IEEE 802.11ax: OFDMA
Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps IEEE 802.11ac: up to 866.7 Mbps IEEE 802.11ax: up to 1201 Mbps
Operating Mode(s)	<input type="checkbox"/> Master <input checked="" type="checkbox"/> Client device without radar detection <input type="checkbox"/> Client device with radar detection
Maximum Output Power _UNII-2A Non Beamforming	IEEE 802.11ax(HE40): 23.54 dBm (0.2259 W)
Maximum Output Power _UNII-2A Beamforming	IEEE 802.11ax(HE40): 23.26 dBm (0.2118 W)
Maximum Output Power _UNII-2C Non Beamforming	IEEE 802.11ac(VHT80): 23.92 dBm (0.2466 W)
Maximum Output Power _UNII-2C Beamforming	IEEE 802.11ac(VHT80): 23.75 dBm (0.2371 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-2A		UNII-2A		UNII-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-2C		UNII-2C		UNII-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590		
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	N/A	N/A	Internal	N/A	5.83	UNII-1
2	N/A	N/A	Internal	N/A	5.61	
1	N/A	N/A	Internal	N/A	5.83	UNII-2A
2	N/A	N/A	Internal	N/A	5.61	
1	N/A	N/A	Internal	N/A	5.29	UNII-2C
2	N/A	N/A	Internal	N/A	5.26	
1	N/A	N/A	Internal	N/A	5.61	UNII-3
2	N/A	N/A	Internal	N/A	5.67	

Note:

- 1) For CDD: UNII-1 Directional Gain=3.25 dBi, UNII-2A Directional Gain=3.25 dBi
 UNII-2C Directional Gain=2.95 dBi, UNII-3 Directional Gain=2.95 dBi

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

- 2) For TXBF: Directional Gain= $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$ dBi.
 Then, UNII-1 Directional Gain=5.66 dBi, UNII-2A Directional Gain=5.66 dBi
 UNII-2C Directional Gain=5.10 dBi, UNII-3 Directional Gain=5.39 dBi
- 3) The antenna gain is provided by the manufacturer.

4. Table for Antenna Configuration:

For Non Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11a		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT80)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE80)		V (Ant. 1 + Ant. 2)

For Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11n(HT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT80)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ax(HE80)		V (Ant. 1 + Ant. 2)

3.2 MAXIMUM OUTPUT POWER AND E.I.R.P.

Non Beamforming				
Frequency Band (MHz)	Max Output Power (dBm)	Directionl Gain (dBi)	Max. e.i.r.p. (dBm)	Max. e.i.r.p. (mW)
5250~5350	23.54	3.25	26.79	477.529
5470~5725	23.92	2.95	26.87	486.407

Beamforming				
Frequency Band (MHz)	Max Output Power (dBm)	Directionl Gain (dBi)	Max. e.i.r.p. (dBm)	Max. e.i.r.p. (mW)
5250~5350	23.26	5.66	28.92	779.830
5470~5725	23.75	5.10	28.85	767.361

Note:

- 1) U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

3.3 TRANSMIT POWER CONTROL (TPC)

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

Test Mode: UNII-2A / IEEE 802.11a Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
52	5260	22.47	16.47
60	5300	22.48	16.48
64	5320	22.50	16.50

Test Mode: UNII-2A / IEEE 802.11n(HT20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
52	5260	22.07	16.07
60	5300	22.00	16.00
64	5320	22.19	16.19

Test Mode: UNII-2A / IEEE 802.11n(HT40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
54	5270	23.11	17.11
62	5310	19.64	13.64

Test Mode: UNII-2A / IEEE 802.11ac(VHT20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
52	5260	22.52	16.52
60	5300	22.66	16.66
64	5320	22.32	16.32

Test Mode: UNII-2A / IEEE 802.11ac(VHT40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
54	5270	23.50	17.50
62	5310	19.66	13.66

Test Mode: UNII-2A / IEEE 802.11ac(VHT80) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
58	5290	18.16	12.16

Test Mode: UNII-2A / IEEE 802.11ax(HE20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
52	5260	22.40	16.40
60	5300	22.53	16.53
64	5320	22.00	16.00

Test Mode: UNII-2A / IEEE 802.11ax(HE40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
54	5270	23.54	17.54
62	5310	18.90	12.90

Test Mode: UNII-2A / IEEE 802.11ax(HE80) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
58	5290	17.48	11.48

Test Mode: UNII-2C / IEEE 802.11a Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
100	5500	22.34	16.34
116	5580	22.76	16.76
140	5700	22.83	16.83

Test Mode: UNII-2C / IEEE 802.11n(HT20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
100	5500	21.89	15.89
116	5580	22.56	16.56
140	5700	22.50	16.50

Test Mode: UNII-2C / IEEE 802.11n(HT40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
102	5510	21.17	15.17
110	5550	23.54	17.54
134	5670	23.52	17.52

Test Mode: UNII-2C / IEEE 802.11ac(VHT20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
100	5500	22.11	16.11
116	5580	22.69	16.69
140	5700	22.61	16.61

Test Mode: UNII-2C / IEEE 802.11ac(VHT40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
102	5510	21.24	15.24
110	5550	23.64	17.64
134	5670	23.52	17.52

Test Mode: UNII-2C / IEEE 802.11ac(VHT80) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
106	5530	20.15	14.15
122	5610	23.92	17.92

Test Mode: UNII-2C / IEEE 802.11ax(HE20) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
100	5500	22.82	16.82
116	5580	22.92	16.92
140	5700	22.55	16.55

Test Mode: UNII-2C / IEEE 802.11ax(HE40) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
102	5510	21.38	15.38
110	5550	23.91	17.91
134	5670	23.10	17.10

Test Mode: UNII-2C / IEEE 802.11ax(HE80) Mode			
Channel	Frequency (MHz)	Output Power (TPC High) (dBm)	Output Power (TPC Low) (dBm)
106	5530	19.91	13.91
122	5610	23.87	17.87

End of Test Report