

Product Name: Set Top Box	Report No: FCC022022-05669RF14
Product Model: UIW4054MIL	Security Classification: Open
Version: V1.0	Total Page:7

TIRT Testing Report



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FCC RF EXPOSURE REPORT

FCC ID: G95UIW4054

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 Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091
FCC Title 47 Part 2.1091

- 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.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
FCC022022-05669RF14	V1.0	Compared with original report (BTL-FCCP-6-2104C150A), PCB Layout changes from LAB3D version to LAB3E version. Please see the following table for details. In this report only updated the 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 FACILITY

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. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

where:

S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Table for Filed Antenna:

For BT / LE:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.20

Note: The antenna gain is provided by the manufacturer.

For 2.4GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.94
2	N/A	N/A	Internal	N/A	2.78

Note:

1) For CDD: Directional Gain=2.33 dBi

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

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= $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 4.98 \text{dBi}$.

3) The antenna gain is provided by the manufacturer.

For 5GHz:

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= $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_{N_{ANT}}/20})^2 / N_{ANT}]$ 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.

Table for Antenna Configuration:

For 2.4GHz:

For Non Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11b		V(Ant. 1 + Ant. 2)
IEEE 802.11g		V(Ant. 1 + Ant. 2)
IEEE 802.11n(HT20)		V(Ant. 1 + Ant. 2)
IEEE 802.11ax(HE20)		V(Ant. 1 + Ant. 2)

For Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11n(HT20)		V(Ant. 1 + Ant. 2)
IEEE 802.11ax(HE20)		V(Ant. 1 + Ant. 2)

For 5GHz:

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. TEST RESULTS

For BT EDR:

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
3.20	2.0893	5.07	3.2137	0.00134	1	Complies

For BT LE:

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
3.20	2.0893	4.73	2.9717	0.00124	1	Complies

For 2.4GHz Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2.33	1.7100	21.62	145.2112	0.04943	1	Complies

For 2.4GHz Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.98	3.1477	21.39	137.7209	0.08629	1	Complies

For 5GHz Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2.95	1.9724	24.68	293.7650	0.11533	1	Complies

For 5GHz Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5.39	3.4594	24.38	274.1574	0.18878	1	Complies

For the max simultaneous transmission MPE:

Ratio		Total	Limit of Ratio	Test Result
BT EDR	5GHz			
0.00134	0.18878	0.19012	1	Complies

Note: The calculated distance is 20 cm.

End of Test Report