



RADIO EXPOSURE TEST REPORT

FCC ID : G954981X

Equipment : DOCSIS Cable Gateway

Brand Name : Technicolor

Model Name : CGM4981COM, CGM4981COX

Applicant : Technicolor Connected Home USA LLC
4855 Peachtree Industrial Blvd. Norcross, GA
30092

Manufacturer : Technicolor Connected Home USA LLC
4855 Peachtree Industrial Blvd. Norcross, GA
30092

Standard : 47 CFR Part 2.1091

The product was received on Jul. 14, 2021, and testing was started from Aug. 30, 2021 and completed on Sep. 17, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

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History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

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Report Version : 02



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM,) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Zigbee	2400-2483.5	2405-2475	O-QPSK (250kbps)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK

1.2 Antenna Information

Ant.	Port					Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4 GHz	WLAN 5 GHz	WLAN 6E	Zigbee	Bluetooth					
1	1	4	-	-	-	Airgain	N03TCAFB-PK1-B165U	PCB	I-PEX	Note 1
2	2	3	-	-	-	Airgain	N03TCAFE-PK1-G140U	PCB	I-PEX	
3	3	2	-	-	-	Airgain	N03TCAFN-PK1-R150U	PCB	I-PEX	
4	4	1	-	-	-	Airgain	N03TCAFG-PK1-A230U	PCB	I-PEX	
5	-	-	1	-	-	Airgain	N06TCAFC-PK1-B105U	PCB	I-PEX	
6	-	-	2	-	-	Airgain	N06TCAFH-PK1-G200U	PCB	I-PEX	
7	-	-	3	-	-	Airgain	N06TCAFJ-PK1-R150U	PCB	I-PEX	
8	-	-	4	1	-	Airgain	N04TCAFD-PK1-A150U	PCB	I-PEX	
9	-	-	-	2	-	Airgain	N01TCAFM-PK1-W230U	PCB	I-PEX	
10	-	-	-	-	1	Airgain	N01TCAFM-PK1-W190U	PCB	I-PEX	

Note1:

Ant.	Port					Antenna Gain (dBi)							
	WLAN 2.4 GHz	WLAN 5GHz	WLAN 6E	Zigbee	Bluetooth	WLAN 2.4 GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6E	Zigbee	Bluetooth
1	1	4	-	-	-	2.7	2.59	2.85	2.34	3.5	-	-	-
2	2	3	-	-	-	3.12	2.05	2.62	2.3	3.12	-	-	-
3	3	2	-	-	-	2.57	2.71	1.98	1.87	3.08	-	-	-
4	4	1	-	-	-	2.2	2.18	2.7	2.08	2.02	-	-	-
5	-	-	1	-	-	-	-	-	-	-	3.7	-	-
6	-	-	2	-	-	-	-	-	-	-	4.1	-	-
7	-	-	3	-	-	-	-	-	-	-	3.7	-	-
8	-	-	4	1	-	-	-	-	-	-	5.5	4.8	-
9	-	-	-	2	-	-	-	-	-	-	-	2.5	-
10	-	-	-	-	1	-	-	-	-	-	-	-	4.1



Directional Gain (dBi)					
Band (MHz)	2400-2483.5	5150-5250	5250-5350	5470-5725	5725-5850
Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.7	2.59	2.85	2.34	3.5
Ant. 2 Max Gain (dBi)	3.12	2.05	2.62	2.3	3.12
Ant. 3 Max Gain (dBi)	2.57	2.71	1.98	1.87	3.08
Ant. 4 Max Gain (dBi)	2.2	2.18	2.7	2.08	2.02
Max Gain (dBi)	3.12	2.71	2.85	2.34	3.5
DG [1SS] (dBi)	5.45	4.96	3.99	4.1	4.82
DG [2SS] (dBi)	3.12	2.71	2.85	2.34	3.5
DG [4SS] (dBi)	0.1	-0.52	-0.64	-1.23	-0.43

Note2: The above information was declared by manufacturer.

The antenna report is provided in the operational description for this application.

The EUT enables WLAN 2.4GHz, 5GHz UNII 1, UNII 3, Zigbee and Bluetooth function only.

For WLAN 2.4GHz function:

For IEEE 802.11b/g/n/VHT/ax mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For WLAN 5GHz function:

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

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For WLAN 6E function:

For IEEE 802.11ax mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Zigbee function (1TX/1RX):

The EUT supports the Ant.8 and Ant.9 with TX and RX diversity functions.

Both Ant.8 (Port 1) and Ant.9 (Port 2) support transmit and receive functions, but only one of them will be used at one time.

All test results will be recorded in the report.

For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.



1.3 Table for Multiple Listing

Model Name	Description
CGM4981COM	All the models are identical, the difference model served as marketing strategy.
CGM4981COX	

Note 1: From the above models, model: CGM4981COM was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

1.4 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter 1	AcBel	ADK002	INPUT: 100-120V~50/60Hz, 1.5A OUTPUT: 12.0V, 4.6A
Adapter 2	Delta	ADH-55AW BK	INPUT: 100-120V~50/60Hz, 1.2A OUTPUT: 12.0V, 4.6A
Adapter 3	Netbit	NBC56A120460VU	INPUT: 100-120V~50/60Hz, 1.5A OUTPUT: 12.0V, 4.6A

1.5 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISCED.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1500	-	-	f/1500	<30
1500-100,000	-	-	1.0	<30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 25 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;D1D	5.45	29.97	35.42	0.50	35.92	3.90841	25	0.49763	1.00000
5.2G;D1D	4.96	29.93	34.89	0.50	35.39	3.45939	25	0.44046	1.00000
5.8G;D1D	4.82	29.92	34.74	0.50	35.24	3.34195	25	0.42551	1.00000
2.4G;G1D (Ant. 9)	2.50	19.78	22.28	0.50	22.78	0.18967	25	0.02415	1.00000
2.4G;G1D (Ant. 8)	4.80	18.56	23.36	0.50	23.86	0.24322	25	0.03097	1.00000
2.4G;BT-LE	4.10	9.78	13.88	0.50	14.38	0.02742	25	0.00349	1.00000

Simultaneous Transmission Analysis Mode 1: WLAN 2.4GHz+WLAN 5GHz+Zigbee(Ant. 9)+Bluetooth

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	5.45	29.97	35.42	0.50	35.92	3.90841	25	0.49763	1.00000	0.49763
5.2G;D1D	4.96	29.93	34.89	0.50	35.39	3.45939	25	0.44046	1.00000	0.44046
2.4G;G1D	2.50	19.78	22.28	0.50	22.78	0.18967	25	0.02415	1.00000	0.02415
2.4G;BT-LE	4.10	9.78	13.88	0.50	14.38	0.02742	25	0.00349	1.00000	0.00349
									Sum Ratio	0.96573
									Ratio Limit	1

Simultaneous Transmission Analysis Mode 2: WLAN 2.4GHz+WLAN 5GHz+Zigbee(Ant. 8)+Bluetooth

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	5.45	29.97	35.42	0.50	35.92	3.90841	25	0.49763	1.00000	0.49763
5.2G;D1D	4.96	29.93	34.89	0.50	35.39	3.45939	25	0.44046	1.00000	0.44046
2.4G;G1D	4.80	18.56	23.36	0.50	23.86	0.24322	25	0.03097	1.00000	0.03097
2.4G;BT-LE	4.10	9.78	13.88	0.50	14.38	0.02742	25	0.00349	1.00000	0.00349
									Sum Ratio	0.97255
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————