

RF Exposure Report

Report No.: SA180903E04A

FCC ID: G95TCHT2AA0

Test Model: TCHT2AA0

Received Date: Apr. 23, 2019

Test Date: May 02, 2019

Issued Date: May 17, 2019

Applicant: Technicolor Connected Home USA LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits for Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	6
2.5 Calculation Result	8
Appendix	9

Release Control Record

Issue No.	Description	Date Issued
SA180903E04A	Original release.	May 17, 2019

1 Certificate of Conformity

Product: Integrated Device

Brand: Technicolor

Test Model: TCHT2AA0

Sample Status: FGR1

Applicant: Technicolor Connected Home USA LLC

Test Date: May 02, 2019

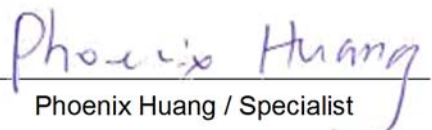
Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :


Phoenix Huang / Specialist

Date:

May 17, 2019

Approved by :


May Chen / Manager

Date:

May 17, 2019

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
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

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

WLAN & BT Antenna Spec.

Antenna No.	Gain(dBi) Including cable loss	Frequency range (MHz)	Antenna Type	Antenna Connector	Cable Length (mm)
WiFi 1 & BT (Ant 2)	3.79 (BT)	2400~2500	PCB	i-pex(MHF)	130 +/-2
	Refer to below table	2400~2500 5150~5250 5250~5350 5470~5725 5725~5850			
WiFi 2 (Ant 1)	Refer to below able	2400~2500 5150~5250 5250~5350 5470~5725 5725~5850	PCB	i-pex(MHF)	115 +/-2

Zigbee Antenna Spec.

Antenna No.	Gain(dBi) Including cable loss	Frequency range (MHz)	Antenna Type	Antenna Connector	Cable Length (mm)
Zigbee	4.50	2400~2500	PCB	i-pex(MHF)	60 +/-2

LTE Antenna Spec.

Antenna No.	Gain(dBi) Including cable loss	Frequency range (MHz)	Antenna Type	Antenna Connector	Cable Length (mm)
LTE	1.10 2.4	700~900 1700~2150	PCB	i-pex(MHF)	85 +/-2

2.4GHz				
Channel (MHz)	SISO 1S1T Ant 1 (dBi)	SISO 1S1T Ant 2 (dBi)	CCD mode for power gain 1S2T (1&2) (dBi)	CCD mode for PSD gain 1S2T (1&2) (dBi)
2412	2.37	3.79	3.79	5.75
2422	2.48	3.63	3.63	5.64
2437	2.44	3.56	3.56	5.62
2452	2.49	3.42	3.42	5.52
2462	2.50	3.33	3.33	5.35
5GHz				
Channel (MHz)	SISO 1S1T Ant 1 (dBi)	SISO 1S1T Ant 2 (dBi)	CCD mode for power gain 1S2T (1&2) (dBi)	CCD mode for PSD gain 1S2T (1&2) (dBi)
5180	3.21	4.23	4.23	5.82
5190	3.20	4.07	4.07	5.80
5200	3.10	4.00	4.00	5.74
5210	3.15	3.72	3.72	5.62
5230	2.98	3.72	3.72	5.55
5240	3.01	3.74	3.74	5.56
5250	3.00	3.57	3.57	5.48
5260	2.85	3.54	3.54	5.45
5270	2.98	3.45	3.45	5.45
5290	2.89	3.24	3.24	5.31
5300	2.95	3.20	3.20	5.24
5310	2.97	3.09	3.09	5.32
5320	3.17	3.20	3.20	5.54
5500	2.75	2.55	2.75	5.06
5510	2.80	2.53	2.80	4.99
5530	2.70	2.73	2.73	5.17
5550	2.66	2.87	2.87	5.10
5570	2.23	2.38	2.38	4.71
5580	2.16	2.45	2.45	4.73
5590	2.16	2.54	2.54	4.68
5600	2.38	2.49	2.49	4.58
5610	2.46	2.40	2.46	4.60
5620	2.44	2.42	2.44	4.71
5630	2.36	2.46	2.46	4.77
5670	2.52	2.49	2.52	5.12
5690	2.55	2.60	2.60	5.28
5700	2.54	2.57	2.57	5.24
5710	2.67	2.59	2.67	5.26
5720	2.71	2.70	2.71	5.28
5745	2.79	2.78	2.79	5.27
5755	2.95	2.87	2.95	5.28
5775	3.00	3.08	3.08	5.33
5785	2.86	2.96	2.96	5.10
5795	2.89	2.94	2.94	5.10
5825	3.13	3.22	3.22	5.24

2.5 Calculation Result

For WLAN and Bluetooth data was copied from the original test report (Report No.: SA180903E04)

For WLAN, Zigbee, Bluetooth

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2437	303.119	5.62	20	0.21996	1
WLAN U-NII-1	5230	249.626	5.55	20	0.17825	1
WLAN U-NII-2A	5260	250.195	5.45	20	0.17459	1
WLAN U-NII-2C	5550	250.201	5.10	20	0.16107	1
WLAN U-NII-3	5755	313.358	5.28	20	0.21027	1
Bluetooth	2440	8.147	3.79	20	0.00388	1
Zigbee (newly chipset: EM358X)	2440	115.878	4.50	20	0.06497	1

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For 3G/LTE <Worst case> (FCC ID: QIPEMS31-X)

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
CAT M1 B12	715.3	214.783	1.10	20	0.05505	0.4769*

Note: *Limit of Power Density = F/1500

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + Zigbee + LTE = $0.21996 / 1 + 0.06497 / 1 + 0.05505 / 0.4769 = 0.40037$

WLAN 5GHz + Zigbee + LTE = $0.21027 / 1 + 0.06497 / 1 + 0.05505 / 0.4769 = 0.39068$

Bluetooth + Zigbee + LTE = $0.00388 / 1 + 0.06497 / 1 + 0.05505 / 0.4769 = 0.18429$

Therefore the maximum calculations of above situations are less than the “1” limit.

Appendix

3G/LTE module

MPE Evaluation for FCC ID: QIPEMS31-X Module

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio
CAT M1 B2	1850.7	218.273	2.40	20	0.07546	1	0.07546
CAT M1 B4	1710.7	230.675	2.40	20	0.07975	1	0.07975
CAT M1 B12	715.3	214.783	1.10	20	0.05505	0.4769*	0.11544
CAT M1 B13	782	195.884	1.10	20	0.05020	0.5213*	0.09629

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