RF Exposure Report

Report No.:	SA170526E11B
FCC ID:	RSE-OWA0130
Equipment Name:	Technicolor Wi-Fi Video Bridge & Extender
Trade Name:	technicolor
Model Number:	OWA0130
Received Date:	June 05, 2018
Test Date:	June 21 to Aug. 15, 2018
Issued Date:	Oct. 01, 2018
Applicant:	Technicolor Delivery Technologies Belgium
Address:	Prins Boudewijnlaan 47, 2650 Edegem Belgium
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
SA170526E11B	Original release.	Oct. 01, 2018

1 Certificate of Conformity

Product:	Technicolor Wi-Fi Video Bridge & Extender
Brand:	technicolor
Test Model:	OWA0130
Sample Status:	Product Unit
Applicant:	Technicolor Delivery Technologies Belgium
Test Date:	June 21 to Aug. 15, 2018
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 : _____ , **Date:** Oct. 01, 2018

Wendy Wu / Specialist

Approved by : _____ , **Date:** Oct. 01, 2018

May Chen / Manager

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				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

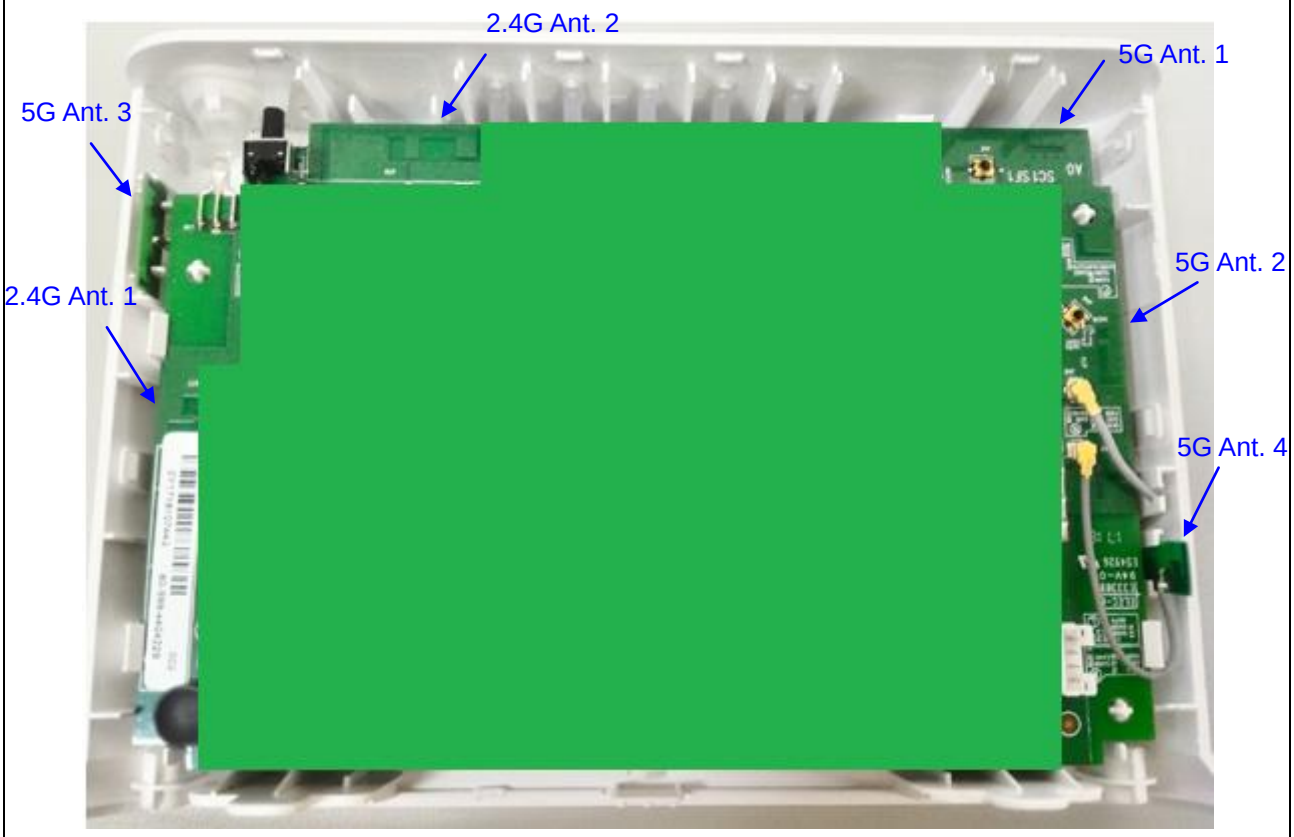
Pi = 3.1416

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 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna location


Antenna & Bandwidth for 2400~2483.5MHz

Ant.	Brand	Model Name	Antenna Type	Connector
1	technicolor	--	Printed Antenna	Murata
2	technicolor	--	Printed Antenna	Murata

Antenna	1st (TX)		2nd (TX)	
Bandwidth Mode	20 MHz	40 MHz	20 MHz	40 MHz
802.11b	V	X	X	X
802.11g	V	X	X	X
802.11n	V	V	V	V

For 2400~2483.5MHz

Frequency	Antenna Gain (dBi)			
	Ant. 1 (W1)		Ant. 2 (W2)	
	20 MHz	40 MHz	20 MHz	40 MHz
2412MHz	2.60	-	3.70	-
2422MHz	-	2.70	-	3.60
2437MHz	2.70	2.70	3.00	3.00
2452MHz	-	2.60	-	3.00
2462MHz	2.60	-	3.10	-

Frequency	Maximum Gain (dBi) for CDD mode SDM mode (2 Stream 2 TX) for Power & PSD Gain (KDB 662911 Option 2)	
	20 MHz	40 MHz
2412MHz	4.78	-
2422MHz	-	4.68
2437MHz	4.63	4.63
2452MHz	-	4.73
2462MHz	4.69	-

Note:
1. Antenna Gain refer to antenna report.
2. Maximum Correlated Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi
3. Maximum Uncorrelated Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N_{ANT}]$ dBi

Frequency	Maximum Gain (dBi) for SDM mode SDM mode (2 Stream 2 TX) for Power & PSD Gain (KDB 662911 Option 2)	
	20 MHz	40 MHz
2412MHz	2.00	-
2422MHz	-	1.89
2437MHz	1.71	1.71
2452MHz	-	1.76
2462MHz	1.72	-

Note:
1. Antenna Gain refer to antenna report.
2. Maximum Correlated Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi
3. Maximum Uncorrelated Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N_{ANT}]$ dBi

Antenna & Bandwidth for 5150~5850MHz

Ant.	Brand	Model Name	Antenna Type	Connector	Cable Length
1	technicolor	--	Printed Antenna	Murata	--
2	technicolor	--	Printed Antenna	Murata	--
3	technicolor	--	Printed Antenna	I-pex	340mm
4	technicolor	--	Printed Antenna	I-pex	150mm

Antenna	1st (TX)			2nd (TX)			3rd (TX)			4th (TX)		
Bandwidth Mode	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz
802.11a	V	X	X	V	X	X	V	X	X	V	X	X
802.11n	V	V	X	V	V	X	V	V	X	V	V	X
802.11ac	V	V	V	V	V	V	V	V	V	V	V	V

Frequency	Antenna Gain (dBi) for CDD/TxBF/SDM mode											
	1 Stream 4 TX for CDD/TxBF mode			2 Stream 4 TX for CDD/TxBF mode			3 Stream 4 TX for TxBF mode			4 Stream 4 TX for SDM mode		
	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz
5180MHz	7.01	-	-	4.04	-	-	2.32	-	-	1.07	-	-
5190MHz	-	7.25	-	-	4.35	-	-	2.64	-	-	1.39	-
5200MHz	6.49	-	-	3.61	-	-	1.92	-	-	0.67	-	-
5210MHz	-	-	6.74	-	-	3.86	-	-	2.16	-	-	0.92
5230MHz	-	7.29	-	-	4.42	-	-	2.71	-	-	1.46	-
5240MHz	6.65	-	-	3.83	-	-	2.23	-	-	1	-	-
5260MHz	6.81	-	-	3.88	-	-	2.2	-	-	0.95	-	-
5270MHz	-	7.89	-	-	5	-	-	3.33	-	-	2.09	-
5290MHz	-	-	7.31	-	-	4.4	-	-	2.72	-	-	1.47
5300MHz	7.75	-	-	4.83	-	-	3.15	-	-	1.9	-	-
5310MHz	-	7.32	-	-	4.47	-	-	2.76	-	-	1.52	-
5320MHz	6.85	-	-	3.94	-	-	2.23	-	-	0.99	-	-
5500MHz	6.74	-	-	4.03	-	-	2.28	-	-	1.03	-	-
5510MHz	-	6.74	-	-	3.99	-	-	2.25	-	-	1.01	-
5530MHz	-	-	6.99	-	-	4.03	-	-	2.29	-	-	1.05
5550MHz	-	7.07	-	-	4.11	-	-	2.35	-	-	1.1	-
5580MHz	8.04	-	-	5.27	-	-	3.54	-	-	2.29	-	-
5670MHz	-	6.49	-	-	3.59	-	-	2.63	-	-	0.72	-
5700MHz	6.87	-	-	4.05	-	-	2.32	-	-	1.07	-	-
5745MHz	7.06	-	-	4.17	-	-	2.5	-	-	1.25	-	-
5755MHz	-	7.87	-	-	5.06	-	-	3.31	-	-	2.06	-
5775MHz	-	-	7.36	-	-	4.48	-	-	3.31	-	-	2.06
5785MHz	6.83	-	-	4.02	-	-	2.29	-	-	1.05	-	-
5795MHz	-	6.43	-	-	3.6	-	-	1.86	-	-	0.61	-
5825MHz	6.45	-	-	3.62	-	-	1.92	-	-	0.7	-	-

Note:

1. Antenna Gain refer to “OWA0130 with shielding antenna table_20161012.xls” files
2. Maximum Correlated Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi
3. Maximum Uncorrelated Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N_{ANT}]$ dBi

2.5 Calculation Result of Maximum Conducted Power

For WLAN – 2.4GHz Worst Condition: 802.11n (20MHz) 2Tx CDD

Frequency (MHz)	Conducted Power		Directional Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	(dBm)	(mW)				
2437	19.61	91.419	4.63	20	0.05282	1

Note:

1. Pout*G = EIRP Power = Conducted Power(mW) * Gain(numeric)
2. Gain(dBi) to Gain(numeric) = $10^{(4.63/10)}$ = 2.904023
3. Distance (cm) = r = declare by manufacture = 20 cm
4. Pd = (Pout*G) / ($4*pi*r^2$) = (91.419 * 2.904023) / (4 * 3.1416 * 20^2) = 0.05282 (mW/cm^2)

For WLAN – 5GHz_U_NII 1 Worst Condition: 11ac (40MHz) 1S4T TxBF

Frequency (MHz)	Conducted Power		Directional Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	(dBm)	(mW)				
5230	26.40	436.251	7.29	20	0.46501	1

Note:

1. Pout*G = EIRP Power = Conducted Power(mW) * Gain(numeric)
2. Gain(dBi) to Gain(numeric) = $10^{(7.29/10)}$ = 5.357967
3. Distance (cm) = r = declare by manufacture = 20 cm
4. Pd = (Pout*G) / ($4*pi*r^2$) = (436.251 * 5.357967) / (4 * 3.1416 * 20^2) = 0.46501 (mW/cm^2)

For WLAN – 5GHz_U_NII 3 Worst Condition: 11ac (40MHz) 1S4T TxBF

Frequency (MHz)	Conducted Power		Directional Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
	(dBm)	(mW)				
5755	26.46	442.505	7.87	20	0.53907	1

Note:

1. Pout*G = EIRP Power = Conducted Power(mW) * Gain(numeric)
2. Gain(dBi) to Gain(numeric) = $10^{(7.87/10)}$ = 6.123504
3. Distance (cm) = r = declare by manufacture = 20 cm
4. Pd = (Pout*G) / ($4*pi*r^2$) = (442.505 * 6.123504) / (4 * 3.1416 * 20^2) = 0.53907 (mW/cm^2)

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = (0.05282 / 1) + (0.53907 / 1) = 0.59189

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

--- END ---