



RF Exposure Evaluation Declaration

FCC ID: LNQWXB6X00Q

APPLICANT: Actiontec Electronics, Inc.

Application Type: Certification

Product: WCB6200Q - 802.11ac Wireless Ethernet Bridge with Bonded LAN MoCA

WCB6000Q - 802.11ac Wireless Ethernet Bridge with LAN MoCA

WEB6000Q - 802.11ac Wireless Ethernet Bridge

Model No.: WCB6200Q, WCB6000Q, WEB6000Q

Trademark: Actiontec

FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (UNII)

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The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date
1411RSU02903	Rev. 01	Initial report	12-15-2014

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	WCB6200Q - 802.11ac Wireless Ethernet Bridge with Bonded LAN MoCA WCB6000Q - 802.11ac Wireless Ethernet Bridge with LAN MoCA WEB6000Q - 802.11ac Wireless Ethernet Bridge
Model No.	WCB6200Q, WCB6000Q, WEB6000Q
Model Difference	WCB6200Q with LAN MoCA "BCM6802" WCB6000Q with LAN MoCA "BCM6803" WEB6000Q without LAN MoCA
Frequency Range	<u>For 2.4G Band:</u> 802.11b/g/n-HT20: 2412 ~ 2462MHz 802.11n-HT40: 2422 ~ 2452MHz <u>For 5.0G Band:</u> For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5775MHz
Type of Modulation	802.11b: DSSS 802.11g/a/n/ac: OFDM
Maximum Average Output Power	<u>For 2.4G Band:</u> 802.11b: 22.13dBm 802.11g: 19.54dBm 802.11n-HT20: 23.26dBm 802.11n-HT40: 23.51dBm <u>For 5.0G Band:</u> 802.11a: 27.34dBm 802.11n-HT20: 27.02dBm 802.11n-HT40: 27.37dBm 802.11ac-VHT20: 27.29dBm 802.11ac-VHT40: 27.70dBm 802.11ac-VHT80: 25.89dBm

1.2. Antenna Description

Antenna Type	Frequency Band (GHz)	T _x Paths	Directional Gain (dBi)	
			Non Beam Forming	Beam Forming
PCB Antenna	2.4	2	5.22	--
	5.2	4	--	6.92
	5.8	4	--	7.39

Note:

1. Transmit at 2.4GHz support two antennas, transmit at 5GHz support four antennas.
2. The EUT supports the Beam Forming technology at 5GHz band.

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

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

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	WCB6200Q - 802.11ac Wireless Ethernet Bridge with Bonded LAN MoCA
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 5.22dBi for 2.4GHz, 6.92dBi for 5.2GHz, and 7.39dBi for 5.8GHz in logarithm scale.

For 2.4G ISM Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
802.11b	2412 ~ 2462	23.39	0.1445	1
802.11g	2412 ~ 2462	23.41	0.1451	1
802.11n-HT20	2412 ~ 2462	26.08	0.2684	1
802.11n-HT40	2422 ~ 2452	23.51	0.1485	1

For 5G UNII Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
802.11a	5180 ~ 5240	27.34	0.5306	1
	5745 ~ 5825	26.11	0.4454	1
802.11n-HT20	5180 ~ 5240	27.02	0.4929	1
	5745 ~ 5825	26.01	0.4352	1
802.11n-HT40	5190 ~ 5230	27.37	0.5342	1
	5755 ~ 5795	26.36	0.4718	1
802.11ac-VHT20	5180 ~ 5240	27.29	0.5245	1
	5745 ~ 5825	26.17	0.4516	1
802.11ac-VHT40	5190 ~ 5230	27.70	0.5764	1
	5755 ~ 5795	26.34	0.4696	1
802.11ac-VHT80	5210	23.40	0.2142	1
	5775	25.89	0.4234	1

CONCLUSION:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously. Therefore, the Max Power Density at R (20 cm) = $0.2684\text{mW}/\text{cm}^2 + 0.5764\text{mW}/\text{cm}^2 = 0.8448\text{mW}/\text{cm}^2 < 1\text{mW}/\text{cm}^2$.

So the EUT complies with the requirement.