RF Exposure Evaluation Report

Product Name : Gigabit Multi-Service Broadband Router

Model No. : MX-1200

FCC ID : QI3BIL-MX1200

Applicant : Billion Electric Co., Ltd.

Address : 8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

Date of Receipt : Mar. 23, 2018

Date of Declaration : Jun. 07, 2018

Report No. : 1830364R-RFUSP02V00

Report Version : V1.0

Issued Date: Jun. 07, 2018
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Applicant	Billion Electric Co., Ltd.
Address	8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
Manufacturer	Billion Electric Co., Ltd.
Model No.	MX-1200
FCC ID.	QI3BIL-MX1200
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	BEC, Billion
Applicable Standard	FCC 47 CFR 1.1310
Test Result	Complied

Documented By : Leven Huang

(Senior Adm. Specialist / Leven Huang)

Tested By : Anson Lu

(Engineer / Anson Lu)

Approved By :

(Director / Vincent Lin)

1. RF Exposure Evaluation

1.1. 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

Friis Formula

Friis transmission 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

Pd id the limit of MPE, 1 mW/cm^2 . 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.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78％ RH.

1.3. Test Result of RF Exposure Evaluation

Product : Gigabit Multi-Service Broadband Router
Test Item : RF Exposure Evaluation

For 2.4GHz:

Operation Frequency Range	2412-2462MHz, 2422-2452MHz
Maximum Conducted output power	29.65dBm
Antenna gain	1.8dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
922.5714272	0.2778

Power density is lower than the limit (1 mW/cm2).

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5745-5825MHz, 5190-5230MHz, 5755-5795MHz, 5210 MHz, 5775MHz
Maximum Conducted output power	22.75dBm
Antenna gain	5dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
188.3649089	0.1185

Power density is lower than the limit (1 mW/cm2).