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Report No.: 2205RSU024-U2
Report Version: V01
Issue Date: 2022-07-21

RF Exposure Evaluation Declaration

FCC ID: LNQGT784AWN

Applicant: Actiontec Electronics Inc

Product: Wi-Fi DSL Modem Gateway

Model No.: GT784AWNV

Brand Name: Actiontec

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 2.1091

Result: Complies

Reviewed By:

Kevin Guo

Approved By:

Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2205RSU024-U2	Rev. 01	Initial Report	2022-07-21	Valid

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1. General Information

1.1. Applicant

Actiontec Electronics Inc

2445 Augustine Drive Suite 501, Santa Clara, California 95054, United States

1.2. Manufacturer

Actiontec Electronics Inc

2445 Augustine Drive Suite 501, Santa Clara, California 95054, United States

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**			
	Laboratory Location (Suzhou - Wuzhong)			
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China			
	Laboratory Location (Suzhou - SIP)			
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China			
	Laboratory Accreditations			
	A2LA: 3628.01		CNAS: L10551	
	FCC: CN1166		ISED: CN0001	
	VCCI:	☐R-20025　☐G-20034	☐C-20020	☐T-20020
		☐R-20141　☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**			
	Laboratory Location (Shenzhen)			
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China			
	Laboratory Accreditations			
	A2LA: 3628.02		CNAS: L10551	
	FCC: CN1284		ISED: CN0105	
☐	**Test Site – MRT Taiwan Laboratory**			
	Laboratory Location (Taiwan)			
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)			
	Laboratory Accreditations			
	TAF: L3261-190725			
	FCC: 291082, TW3261		ISED: TW3261	

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1.4. Product Information

Product Name	Wi-Fi DSL Modem Gateway
Model No.	GT784AWNV
EUT Identification No.	20220512Sample#15 for conducted testing
	20220512Sample#13 for radiated testing
Wi-Fi Specification	802.11b/g/n & VHT
Antenna Information	Refer to section 1.5
Power Supply	By Adapter
Accessory	
Adapter	Model: MT12-Y120100-A1
	INPYUT: 100-120~60Hz 0.3A
	OUTPUT: DC12.0V, 1A
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Antenna Details

Antenna Type	Frequency Band (GHz)	Tx Path(s)	Peak Gain (dBi)		CDD Directional Gain (dBi)	
			Ant 0	Ant 1	For Power	For PSD
PIFA	2.4 ~ 2.5	2	3.51	3.51	3.51	6.52

Note: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

    Array Gain = $10 \log (N_{ANT}/ N_{SS})$ dB = 3.01;

- For power measurements on IEEE 802.11 devices,

    Array Gain = 0 dB for $N_{ANT} \leq 4$;

1.6. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01

2. RF Exposure Evaluation

2.1. Test 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				
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
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
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
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f= frequency in MHz. * = Plane-wave equivalent power density.

2.2. MPE Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P\,th(mW) = \{ERP_{20cm}(d\,/\,20cm)^x \quad d \le 20cm$$

$$P\,th(mW) = \{ERP_{20cm} \quad 20cm < d \le 40cm$$

Where

$$x = -log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right) \text{ and f is in GHz;}$$

and

$$ERP_{20cm}(mW) = \{2040f \quad 0.3GHz \le f < 1.5GHz$$

$$ERP_{20cm}(mW) = \{3060 \quad 1.5GHz \le f \le 6GHz$$

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1920R^2$
1.34-30	$3450R^2/f^2$
30-300	$3.83R^2$
300-1,500	$0.0128R^2/f$
1,500-100,000	$19.2R^2$

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th}, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERP_j = the ERP of fixed, mobile, or portable RF source j.

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure\ Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310 of this chapter.

2.3. Test Result

Product	Wi-Fi DSL Modem Gateway
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.5.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Tune-up Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)
802.11b/g/n & VHT	2412 ~ 2462	22.79	23.0	3.51	26.51

For single RF source, Option B

Test Mode	$\lambda / 2\pi$ (m)	R (m)	Turn-up ERP (mW)	Threshold ERP (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)
Wi-Fi (DTS)	0.0198	0.20	272.9	3060	0.0891	< 1

Therefore, the device qualifies for RF exposure test exemption.

Appendix A - EUT Photograph

Refer to "2205RSU024-UE" file.

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