

RF EXPOSURE REPORT

REPORT NO.: SA140626C16A

MODEL NO.: C9

FCC ID: TE7C9

RECEIVED: Sep. 03, 2014

TESTED: Sep. 18, 2014

ISSUED: Oct. 09, 2014

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140626C16A	Original release	Oct. 09, 2014



1. CERTIFICATION

PRODUCT: AC1900 Wireless Dual Band Gigabit Router

BRAND NAME: TP-LINK

MODEL NO.: C9

TEST SAMPLE: PROTOTYPE

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

TESTED DATE: Sep. 18, 2014

STANDARDS: FCC Part 2 (Section 2.1091)

KDB 447498 D03

IEEE C95.1

The above equipment (Model: C9) 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. 09, 2014

(Elsie Hsu, Specialist)

APPROVED BY : , **DATE**: Oct. 09, 2014

(May Chen, Manager)



2. RF EXPOSURE LIMIT

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm²)	AVERAGE TIME (minutes)				
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE								
300-1500			F/1500	30				
1500-100,000			1.0	30				

F = Frequency in MHz

3. MPE CALCULATION FORMULA

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

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

4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 27cm away from the body of the user. So, this device is classified as **Mobile Device**.



5. ANTENNA GAIN

1. The antennas provided to the EUT, please refer to the following table:

1. The antennae previded to the Lett, please felor to the lenewing table.					
		Frequency			
Transmitter Circuit	Peak Gain (dBi)	range	Ant. Type	Connecter Type	
		(MHz to MHz)			
Chain 0	ain 1 2.4GHz: 2.1 5GHz:1.7	2400~2483.5			
S.Iaiii S		5150~5250			
Chain 1		5250~5350	Omni directional	R-SMA	
		5470~5725			
Chain 2		5725~585			



6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For WLAN 2.4GHz (15.247)

802.11b

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm²)	LIMIT (mW/cm²)
2412 - 2462	563.777	6.87	27	0.29934	1

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi

802.11g

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm²)	LIMIT (mW/cm²)
2412 - 2462	980.641	6.87	27	0.52068	1

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi

802.11n (HT20)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
2412 - 2462	880.076	6.87	27	0.46728	1

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi

802.11n (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm²)	LIMIT (mW/cm²)
2422 - 2452	352.236	6.87	27	0.18702	1

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi



For WLAN 5GHz (15.247)

802.11a

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5745 - 5825	894.156	6.47	27	0.43299	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT20)

FREQUENCY (MHz)	MAX POWER (mW))	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5745 - 5825	888.31	6.47	27	0.43016	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT40)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm²)	LIMIT (mW/cm²)
5755 - 5795	866.479	6.47	27	0.41958	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT80)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5775	426.245	6.47	27	0.20641	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi



For WLAN 5GHz (15.407)

802.11a

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5180 – 5240	183.92	6.47	27	0.08906	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT20)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5180 – 5240	178.434	6.47	27	0.08641	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT40)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5190 – 5230	108.435	6.47	27	0.05251	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi

802.11ac (VHT80)

FREQUENCY (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm²)
5210	91.922	6.47	27	0.04451	1

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi



CONCLUSION:

Both of the 2.4GHz and 5GHz can transmit simultaneously, the formula of calculated the MPE is:

 $CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots etc. < 1$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.52068 / 1 + 0.43299 / 1 = 0.954, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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