

# Maximum Permissible Exposure

**Equipment** : AC1900 Wireless Dual Band Gigabit Router  
**Brand Name** : TP-LINK  
**Model No.** : Archer C9  
**FCC ID** : TE7C9V2  
**Standard** : ANSI/IEEE C95.1  
**Applicant** : TP-LINK TECHNOLOGIES CO., LTD.  
**Manufacturer** : Building 24 (floors 1,3,4,5) and 28 (floors1-4)  
Central Science and Technology Park,Shennan Rd,  
Nanshan, Shenzhen,China

The product sample received on Aug. 05, 2015 and completely tested on Sep. 15, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/IEEE C95.1 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

  
Kevin Liang / Assistant Manager





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### Revision History

Report No.	Version	Description	Issued Date
FA580516	Rev. 01	Initial issue of report	Nov. 12, 2015

# 1 Human Exposure Assessment

## 1.1 Maximum Permissible Exposure

### 1.1.1 Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6
Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	F/1500	30
1500-100,000	-	-	1.0	30
Note 1: f = frequency in MHz ; *Plane-wave equivalent power density				
Note 2: For the applicable limit, see FCC 1.1310				

### 1.1.2 MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

**E** = Electric field (V/m)

**G** = EUT Antenna numeric gain (numeric)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**P** = RF output power (W)

**d** = Separation distance between radiator and human body (m)



1.1.3 Result of Maximum Permissible Exposure

RF General Information 2400 MHz – 2483.5 MHz						
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)	Co-location
2400-2483.5	b	2412-2462	1-11 [11]	3	29.95	Yes
2400-2483.5	g	2412-2462	1-11 [11]	3	29.72	Yes
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	3	29.36	Yes
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	3	22.98	Yes

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.  
 Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

RF General Information 5150~5250MHz (non-beamforming)						
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)	Co-location
5150-5250	a	5180-5240	36-48 [4]	3	25.45	Yes
5150-5250	n (HT20)	5180-5240	36-48 [4]	3	26.16	Yes
5150-5250	n (HT40)	5190-5230	38-46 [2]	3	26.51	Yes
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	3	26.11	Yes
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	3	26.59	Yes
5150-5250	ac (VHT80)	5210	42 [1]	3	18.80	Yes

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.  
 Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

RF General Information 5725 MHz – 5850 MHz (non-beamforming)						
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)	Co-location
5725-5850	a	5745-5825	149-165 [5]	3	29.95	Yes
5725-5850	n(HT20)	5745-5825	149-165 [5]	3	29.94	Yes
5725-5850	n(HT40)	5755-5795	151-159 [2]	3	29.73	Yes
5725-5850	ac(VHT20)	5745-5825	149-165 [5]	3	29.91	Yes
5725-5850	ac(VHT40)	5755-5795	151-159 [2]	3	29.77	Yes
5725-5850	ac(VHT80)	5775	155 [1]	3	27.45	Yes

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.  
 Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)



RF General Information 5150~5250MHz (beamforming)					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)
5150-5250	ac (VHT20)	5180-5240	36-48 [4]	3	26.67
5150-5250	ac (VHT40)	5190-5230	38-46 [2]	3	26.51
5150-5250	ac (VHT80)	5210	42 [1]	3	17.83

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.

RF General Information 5725 MHz – 5850 MHz (beamforming)					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N <sub>TX</sub> )	RF Output Power (dBm)
5725-5850	ac(VHT20)	5745-5825	149-165 [5]	3	29.34
5725-5850	ac(VHT40)	5755-5795	151-159 [2]	3	<b>29.42</b>
5725-5850	ac(VHT80)	5775	155 [1]	3	26.72

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.

Worst Maximum RF Output Power Result (non-beamforming)								
Exposure Environment		General Population / Uncontrolled Exposure						
Separation Distance (cm)		21						
Condition		RF Output Power (dBm)						
Modulation Mode	N <sub>TX</sub>	Chain port 1	Chain port 2	Chain port 3	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm <sup>2</sup> )
2.4GHz (11b)	3	25.13	25.15	25.27	29.95	2.09	32.04	0.28878
5GHz ac(VHT40) (5725 MHz – 5850 MHz) (beamforming)	3	24.98	24.41	24.56	29.42	6.39	35.81	0.68797
<b>Co-location Total</b>								0.9768
<b>Maximum Permissible Exposure Limit (mW/cm<sup>2</sup>)</b>								1

Note 1: N<sub>TX</sub> = Number of Transmit Chains