



Test Report No.: RF170912N063-2



# TEST REPORT



Applicant	TP-Link Technologies Co., Ltd.
Address	Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China

Manufacturer or Supplier	TP-Link Technologies Co., Ltd.
Address	Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Product Name	AC1750 Wireless Dual Band Gigabit Router
Brand Name	tp-link
Model	Archer C7
Additional Model & Model Difference	N/A
Date of tests	Sep. 12, 2017 ~ Sep. 26, 2017

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart E, Section 15.407**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Tested by Harry Li Project Engineer/ EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Sep. 26, 2017

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
1612064R-RF-US-P09V01	Original release	May 27, 2016
RF170912N063-2	Based on the original report 1612064R-RF-US-P09V01 renewed product version and updated the software and reduce the power. it need to retest transmit power test item (require by client).	Sep. 26, 2017



## 1. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 UNDER NEW RULE)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emissions	PASS	No test
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	No test
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	No test
15.407(g)	Frequency Stability	PASS	No test
15.203	Antenna Requirement	PASS	No test

**NOTE:**

1. The test items required by the client.
2. Please refer to the original test report from QuieTek with report number 1612064r-rf-us-p09v01.



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT NAME</b>	AC1750 Wireless Dual Band Gigabit Router
<b>MODEL NO.</b>	Archer C7
<b>FCC ID</b>	TE7C7V2
<b>POWER SUPPLY</b>	DC 12V From Adapter
<b>MODULATION TYPE</b>	OFDM: 256QAM, 64QAM, 16QAM, QPSK, BPSK
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n up to 150Mbps 802.11ac up to 433Mbps
<b>OPERATING FREQUENCY</b>	5180 ~ 5240MHz, 5745 ~ 5825MHz
<b>NUMBER OF CHANNEL</b>	Refer to 2.2 section
<b>CONDUCTED OUTPUT POWER</b>	15.21 dBm for 5150 ~ 5250MHz (Maximum AVG Power) 14.91 dBm for 5725 ~ 5850MHz (Maximum AVG Power)
<b>ANTENNA TYPE</b>	5180 ~ 5240MHz: Dipole antenna with 4.1dBi gain 5745 ~ 5825MHz: Dipole antenna with 4.1dBi gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A

#### NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitter and 3 receivers.

MODULATION MODE	TX FUNCTION
802.11a	3TX/3RX
802.11ac 80MHz	3TX/3RX
802. 11n 20MHz	3TX/3RX
802. 11n 40MHz	3TX/3RX

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



4. The EUT can be powered by adapters as list as attach:

Adapter 1 (UK)	
Brand	Ten Pao International Inc.
Model	S040EB1200250
Input Power	100-240V, 50/60Hz, 1.2A Max.
Output Power	12Vdc, 2500mA
Power Line	1.5m cable without core attached on adapter

Adapter 2 (AU)	
Brand	Ten Pao International Inc.
Model	S040ES1200250
Input Power	100-240V, 50/60Hz, 1.2A Max.
Output Power	12Vdc, 2500mA
Power Line	1.5m cable without core attached on adapter

Adapter 3 (EU)	
Brand	Ten Pao International Inc.
Model	S040EV1200250
Input Power	100-240V, 50/60Hz, 1.2A Max.
Output Power	12Vdc, 2500mA
Power Line	1.5m cable without core attached on adapter

Adapter 4 (UK)	
Brand	TP-LINK TECHNOLOGIES CO.,LTD.
Model	T120200-2D1
Input Power	100-240V, 50/60Hz, 0.8A
Output Power	12Vdc, 2A
Power Line	1.45m cable without core attached on adapter

Adapter 5 (AU)	
Brand	TP-LINK TECHNOLOGIES CO.,LTD.
Model	T120200-2E1
Input Power	100-240V, 50/60Hz, 0.8A
Output Power	12Vdc, 2A
Power Line	1.45m cable without core attached on adapter

Adapter 6 (EU)	
Brand	TP-LINK TECHNOLOGIES CO.,LTD.
Model	T120200-2C1
Input Power	100-240V, 50/60Hz, 0.8A
Output Power	12Vdc, 2A
Power Line	1.45m cable without core attached on adapter

\* Adapter 1-3 and 4-6 are different at plug type for different country, therefore adapter 6 was chosen for final test and presented in the test report.



## 2.2 DESCRIPTION OF TEST MODES

### FOR 5150 ~ 5250MHz

3 channels are provided for 802.11a, 802.11a c 20MHz, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11a c 40MHz, 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
42	5210MHz	--	--

### FOR 5725 ~ 5850MHz

5 channels are provided for 802.11a, 802.11a c 20MHz, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	153	5765MHz
157	5785MHz	161	5805MHz
165	5825MHz	--	--

2 channels are provided for 802.11a c 40MHz, 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
155	5775MHz	--	--



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## 2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	-	-	-	√	Powered by AC 120V with wifi(5G) link

Where RE $\geq$ 1G: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

### NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

NOTE: "-" means no effect.

### ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5150-5250	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac 80MHz		42	42	OFDM	BPSK	V0
-	802.11a	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac 80MHz		155	155	OFDM	BPSK	V0

### TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	---	---	---
RE $\geq$ 1G	---	---	---
PLC	---	---	---
APCM	20deg. C, 55%RH	AC 120V 60Hz	Harry Li





## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

## 2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart E (15.407)**

**789033 D02 General UNII Test Procedures New Rules v01r03**

**KDB 662911 D01 v02r01**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.



### 3. TEST TYPES AND RESULTS

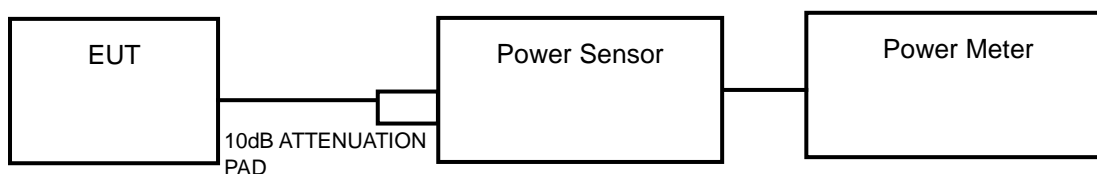
#### 3.1 TRANSMIT POWER MEASUREMENT

##### 3.1.1 LIMITS OF TRANSMIT POWER MEASUREMENT

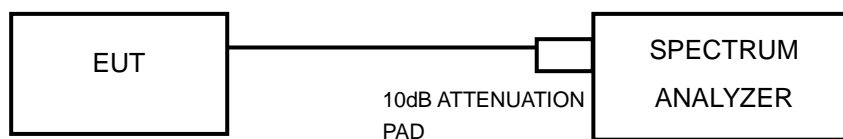
Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	√		250mW(24dBm) or 11 dBm+10LogB*
U-NII-2C	-		250mW(24dBm) or 11 dBm+10LogB*
U-NII-3	-		1 Watt (30 dBm)

**NOTE:** 1. Where B is the 26dB emission bandwidth in MHz.

##### 3.1.2 TEST SETUP



##### FOR 6/26dB BANDWIDTH





## 3.1.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 19,17	May 18,18
Power Sensor	Keysight	U2021XA	MY55060018	May 19,17	May 18,18
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,17	Sep. 04,18
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 04,16	Nov. 03,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 17	Aug.07, 18
Spectrum Analyzer	Keysight	N9020A	MY55400499	Apr. 10,17	Apr. 09,18
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Dec.05, 16	Dec. 04, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.08, 17	Aug.07, 18
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A iuokjnm

**NOTE:**

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

## 3.1.4 TEST PROCEDURE

**FOR AVERAGE POWER MEASUREMENT**

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

**FOR 26dB BANDWIDTH**

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = RMS.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.



#### **FOR 6dB BANDWIDTH**

- 1) Set RBW = 100 kHz.
- 2) Set the video bandwidth (VBW)  $\geq 3$  RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Sweep = auto couple.
- 6) Allow the trace to stabilize.
- 7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### **3.1.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **3.1.6 EUT OPERATING CONDITIONS**

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



### 3.1.7 TEST RESULTS

#### OUTPUT POWER:

##### 802.11a

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
36	5180	13.85	24.00	PASS
40	5200	13.79	24.00	PASS
48	5240	13.97	24.00	PASS
149	5745	14.18	30.00	PASS
157	5785	14.05	30.00	PASS
165	5825	14.03	30.00	PASS

##### 802.11n (20MHz)

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
36	5180	13.34	24.00	PASS
40	5200	13.27	24.00	PASS
48	5240	13.29	24.00	PASS
149	5745	13.83	30.00	PASS
157	5785	13.91	30.00	PASS
165	5825	13.86	30.00	PASS

**802.11n (40MHz)**

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
38	5190	15.07	24.00	PASS
46	5230	<b>15.21</b>	24.00	PASS
151	5755	14.18	30.00	PASS
159	5795	14.06	30.00	PASS

**802.11ac (80MHz)**

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
42	5210	14.12	24.00	PASS
155	5775	<b>14.91</b>	30.00	PASS



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## 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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## **5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No modifications were made to the EUT by the lab during the test.

**---END---**