RF Exposure Report

Report No.: SA150203C07

FCC ID: TE7TGR1900

Test Model: TGR1900

Received Date: Feb. 03, 2015

Test Date: May 01 ~ May 29, 2015

Issued Date: Jun. 01, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
SA150203C07	Original release	Jun. 01, 2015

1 Certificate of Conformity

Product:	OnHub
Brand:	TP-LINK
Test Model:	TGR1900
Sample Status:	Prototype
Applicant:	TP-LINK TECHNOLOGIES CO., LTD.
Test Date:	May 01 ~ May 29, 2015
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D03 IEEE C95.1

The above equipment 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:** Jun. 01, 2015

Pettie Chen / Senior Specialist

Approved by :  , **Date:** Jun. 01, 2015

Ken Liu / Senior Manager

2 RF Exposure

2.1 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)
Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

2.2 MPE Calculation 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 31cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result Of Maximum Conducted Power

WLAN					
Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2.4GHz band					
1TX	22.24	2	31	0.022	1
3TX	28.92	8.77	31	0.486	1
5GHz Band					
1TX	21.93	5	31	0.041	1
3TX	29.51	7.77	31	0.443	1

EUT Function	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
BT LE	9.36	3.5	31	0.002	1
BT EDR	12.52	3.5	31	0.003	1
Zigbee	20.43	2	31	0.014	1

NOTE:
2.4GHz: 3TX: Directional gain = 10 log[($10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}$)/$N_{ANT}$] = 8.77dBi
5.0GHz: 3TX: Directional gain = 3dBi + 10log(3) = 7.77dBi

FREQUENCY BAND	MAX POWER (dBm)					TOTAL POWER (dBm)	POWER LIMIT (dBm)
	WLAN 2.4GHz (1TX)	WLAN 2.4GHz (3TX)	BT LE	BT EDR	Zigbee		
2.4GHz	22.24	-	9.36	-	-	22.46	30
2.4GHz	22.24	-	-	12.52	-	22.68	30
2.4GHz	22.24	-	-	-	20.43	24.44	30
2.4GHz	-	28.92	9.36	-	-	28.97	30
2.4GHz	-	28.92	-	12.52	-	29.02	30
2.4GHz	-	28.92	-	-	20.43	29.50	30

CONCULSION:

Both of the WLAN 2.4G & WLAN 5G can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4G (3TX) + WLAN 5G (3TX) = 0.486 + 0.443 = 0.929
WLAN 2.4G (3TX) + WLAN 5G (1TX) + Zigbee = 0.486 + 0.041 + 0.014 = 0.541
WLAN 2.4G (3TX) + WLAN 5G (1TX) + Bluetooth LE = 0.486 + 0.041 + 0.002 = 0.529
WLAN 2.4G (3TX) + WLAN 5G (1TX) + Bluetooth EDR = 0.486 + 0.041 + 0.003 = 0.530
WLAN 2.4G (1TX) + WLAN 5G (3TX) + Zigbee = 0.022 + 0.443 + 0.014 = 0.479
WLAN 2.4G (1TX) + WLAN 5G (3TX) + Bluetooth LE = 0.022 + 0.443 + 0.002 = 0.467
WLAN 2.4G (1TX) + WLAN 5G (3TX) + Bluetooth EDR = 0.022 + 0.443 + 0.003 = 0.468
WLAN 2.4G (3TX) + WLAN 5G (3TX) + Zigbee = 0.486 + 0.443 + 0.014 = 0.943
WLAN 2.4G (3TX) + WLAN 5G (3TX) + Bluetooth LE = 0.486 + 0.443 + 0.002 = 0.931
WLAN 2.4G (3TX) + WLAN 5G (3TX) + Bluetooth EDR = 0.486 + 0.443 + 0.003 = 0.932

Therefore, the maximum calculation of this situation is 0.943, which is less than the “1” limit.

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