

RF Exposure Evaluation Declaration

FCC ID : 2AXJ4D230
Applicant : TP-Link Corporation Limited
Application Type : Certification
Product : Tapo Video Doorbell Camera
Model No. : Tapo D230
Brand Name : tp-link
FCC Classification : Digital Transmission System (DTS)
FCC Rule Part(s) : Part 2.1091
Received Date : December 01, 2022

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Approved By : Chenz Ker
(Chenz Ker)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2212TW0107-U3	1.0	Original Report	2023-03-06	Valid

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General Information

Applicant	TP-Link Corporation Limited
Applicant Address	Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
Manufacturer	TP-Link Corporation Limited
Manufacturer Address	Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
Test Device Serial No.	<input type="checkbox"/> Production <input type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

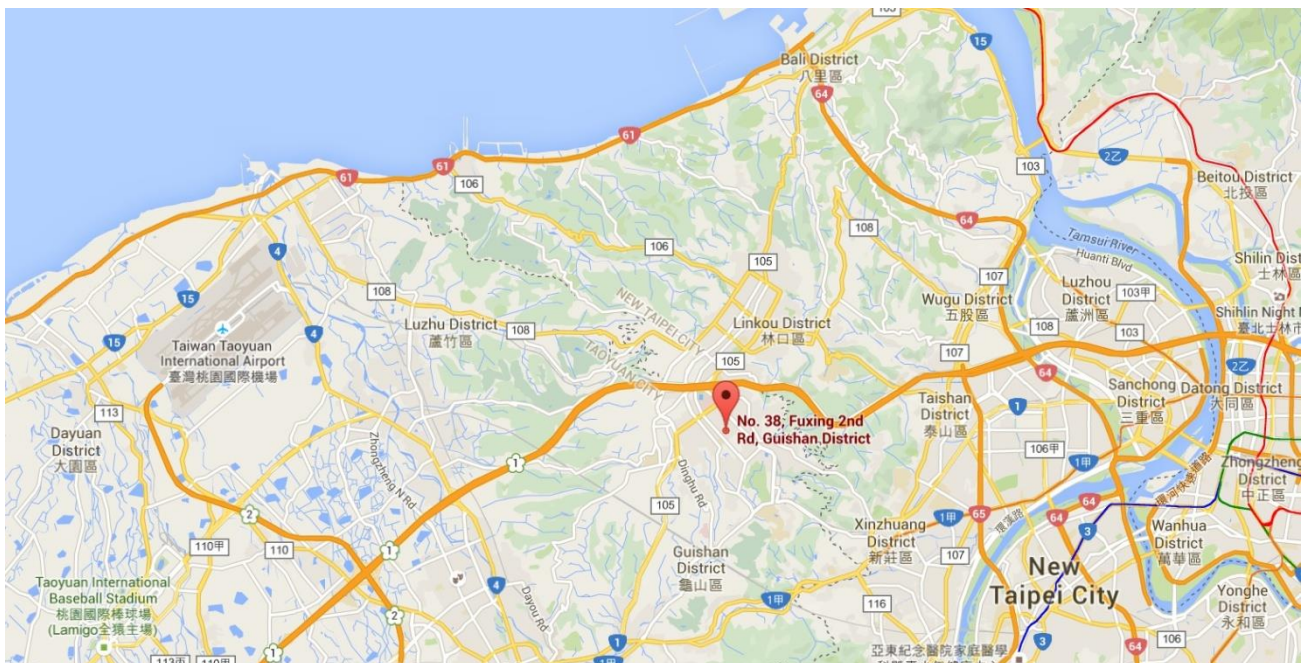
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	Tapo Video Doorbell Camera
Model No.:	Tapo D230
Brand Name:	tp-link
Radio Specification:	WLAN: 802.11b/g/n (1TX / 1RX) WPAN: Sub 1G
Accessories	
Adapter	Brand: Dongguan Aohai Technology Co., Ltd Model No: A8-501000 Input: AC 100-240V~0.2A, 50-60Hz Output: DC 5V, 1A
Battery	Brand: TP-Link Corporation Limited Model No: Tapo A100

2.2. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T _x Path	Max Antenna Gain (dBi)
IFA	2412 ~ 2462	1	0.0
IFA	920 ~ 923	1	-6.5

2.3. Device Classification

According to the user manual, the antenna of this device is at least 20cm away from the body of the user, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

2.4. 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

3. RF Exposure Test Exemptions

3.1. SAR-Based Exemption

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.

Accordingly, a RF source is considered an RF exempt device if its available maximum time averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements and is detailed in Appendix C

§ 1.1307(b)(3)(i)(B)

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:

$$P_{th}(mW) = \{ERP_{20cm} (d / 20cm)^x \quad d \leq 20cm$$

$$P_{th}(mW) = \{ERP_{20cm} \quad 20cm < d \leq 40cm$$

Where

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

and

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

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

Appendix C

(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.

3.2. Calculated Result

Product	Tapo Video Doorbell Camera
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up EIRP (dBm)
802.11b/g/n	2412 ~ 2472	21.18	21.68	0	21.68
Sub 1G	920.9 ~ 922.3	16.54	17.04	-6.5	10.54

Note: Tune-up power was declared by manufacturer.

For single RF source, Option B

Test Mode	R (m)	Tune-up Conducted Power (mW)	Tune-up ERP (mW)	Threshold ERP (mW)
802.11b/g/n	0.2	147.2	89.7	3060.0
Sub 1G	0.2	50.6	6.9	1878.6

Note 1: R is from user manual.

Note 2: $\text{Tune-up Conducted Power (mW)} = 10^{[(\text{Tune-up Conducted Power (dBm)} - 2.15) / 10]}$

Note 3: $\text{ERP (mW)} = 10^{[(\text{Tune-up EIRP (dBm)} - 2.15) / 10]}$

The EUT supports Wi-Fi 2.4GHz and SUB-1G simultaneous transmissions.

So the Max Simultaneous Transmission = $147.2 / 3060$ (DTS) + $50.6 / 1878.6$ (DTS) = $0.0750 < 1$

_____ The End _____