



RF Exposure Evaluation Declaration

FCC ID: 2AQYK-WWTMXS

APPLICANT: Shenzhen WOWOTO Technology Co., Ltd.

Application Type: Certification

Product: Smart Projector

Model No.: WWT-M5S

Brand Name: WOWOTO

FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)

Test Procedure(s): KDB 447498 D01 General RF Exposure Guidance v06

Reviewed By:

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Approved By:

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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.

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Revision History

Report No.	Version	Description	Issue Date	Note
1910RSU009-U4	Rev. 01	Initial report	10-30-2019	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	Smart Projector
Model No.:	WWT-M5S
Serial Model No.:	WWT-M1S, WWT-M2S, WWT-M3S, WWT-M4S, WWT-M5S, WWT-M6S, WWT-M7S, WWT-M8S, WWT-M9S, WWT-S1S, WWT-S2S, WWT-S3S, WWT-S4S, WWT-S5S, WWT-S6S, WWT-S7S, WWT-S8S, WWT-S9S
Brand Name:	WOWOTO
Wi-Fi Specification:	802.11a/b/g/n
Bluetooth Specification:	v4.0 (BLE only)
Accessory	
Adapter #1:	Model No.: GQ36-120300-AX Input: 100-240V ~ 50/60Hz 1.0A Max Output: 12V = 3.0A
Adapter #2:	Model No.: KZ1203000 Input: 100-240V ~ 50/60Hz 1.0A Max Output: 12V = 3000mA
Adapter #3:	Model No.: GW48W-120300D Input: 100-240V ~ 50/60Hz 1.2A Output: 12V = 3.0A

Note: The different models are only for marketing different clients, others are the same.

1.2. Product Specification Subjective to this Report

Frequency Range:	<u>BLE:</u> Frequency Range: 2402~2480MHz <u>2.4GHz WiFi:</u> 802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11n-HT40: 2422 ~ 2452 MHz <u>5GHz WiFi:</u> For 802.11a/n-HT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40: 5190~5230MHz, 5755~5795MHz
Type of Modulation:	BLE: GFSK 802.11b: DSSS 802.11a/g/n: OFDM
Data Rate:	BLE: 1Mbps 802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps

1.3. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	TX Paths	Max Antenna Gain (dBi)		CDD Directional Gain (dBi)	
			Ant A	Ant B	For Power	For PSD
Wi-Fi Antenna						
FPC Antenna	2412 ~ 2462	2	3.44	2.92	3.44	6.45
	5150 ~ 5250	2	3.35	2.18	3.35	6.36
	5725 ~ 5850					
Bluetooth Antenna						
FPC Antenna	2402 ~ 2480	1	3.04		--	--

Note:

The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

Directional gain = $G_{ANT\ MAX} + \text{Array Gain}$, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$

- For power measurements on IEEE 802.11 devices,

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1500	30
1,500-100,000	--	--	1.0	30

f= Frequency in MHz

* = Plane-wave equivalent power density

Calculation Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	Smart Projector
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to Clause 1.3 of this report.

Test Mode	Frequency Band (MHz)	Maximum Total Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402 ~ 2480	-2.94	0.0002	1
802.11b/g/n	2412 ~ 2462	20.75	0.0522	1
802.11a/n	5180 ~ 5240	20.01	0.0431	1
	5745 ~ 5825	20.73	0.0509	1

CONCLUSION:

The Bluetooth and 2.4GHz WLAN or 5GHz WLAN can transmit simultaneously, and the 2.4GHz WLAN and 5GHz WLAN can't transmit simultaneously.

Therefore, the Max Power Density at R (20 cm) was calculated as below:

$$\text{Max Power Density at R (20 cm)} = 0.0002\text{mW/cm}^2 + 0.0522\text{mW/cm}^2 = 0.0524\text{mW/cm}^2 < 1\text{mW/cm}^2$$

So the EUT complies with the requirement.

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Appendix - EUT Photograph

Refer to "1910RSU009-UE" file.