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RF Exposure Evaluation Report

Report No.: CQASZ20250501043E-04
Applicant: SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Applicant: Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Equipment Under Test (EUT):
EUT Name: WIFI Visualizable Smart DoorBell
Model No.: XW160-X8, XW160-X9, XW160-WIFI-X10, XW160-D8, XW160-D9, XW160-D10, XW160-U8, XW160-U9, XW160-U10
Test Model No.: XW160-U9
Brand Name: N/A
FCC ID: 2AW97-U9
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2025-05-17
Date of Test: 2025-05-17 to 2025-06-03
Date of Issue: 2025-6-9
Test Result: **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By: Lewis Zhou
(Lewis Zhou)

Reviewed By: Timo Lei
(Timo Lei)

Approved By: Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20250501043E-04	Rev.01	Initial report	2025-6-9

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3 General Information

3.1 Client Information

Applicant:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Applicant:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Manufacturer:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Manufacturer:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen
Factory:	SHENZHEN XINWU TECHNOLOGY LIMITED
Address of Factory:	Floor 6, Building 2, Chungu Science park, Meisheng Huigu Science Park, 83 Dabao Road, Baoan District, Shenzhen

3.2 General Description of EUT

Product Name:	WIFI Visualizable Smart DoorBell
Model No.:	XW160-X8, XW160-X9, XW160-WIFI-X10, XW160-D8, XW160-D9, XW160-D10, XW160-U8, XW160-U9, XW160-U10
Test Model No.:	XW160-U9
Trade Mark:	N/A
Software Version:	XW160-U9-P0_V1.0
Hardware Version:	XW160-U9-P0_V1.2
EUT Power Supply:	Li-ion battery:DC 3.7V 3600mAh(2*1800mAh Li-ion battery), Charge by DC 5V for adapter

3.3 General Description of 433.92MHz

Operation Frequency:	433.92MHz
Modulation Type:	FSK
Number of Channel:	1
Sample Type:	☒ Mobile ☐ Portable
Antenna Type:	Copper antenna
Antenna Gain:	3dBi

3.4 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	Bluetooth Spec 4.2
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK
Number of Channel:	40
Transfer Rate:	1Mbps
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	☒ Mobile ☐ Portable
Antenna Type:	PCB antenna
Antenna Gain:	1.92 dBi

3.5 General Description of 2.4G WIFI Classic

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Type of Modulation:	802.11b: DSSS(CCK/QPSK/BPSK) 802.11g: OFDM(BPSK/QPSK/16QAM/64QAM) 802.11n : OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channel:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Transfer Rate:	802.11b: 1M/2M/5.5M/11M bps 802.11g: 6M/9M/12M/18M/24M/36M/48M/54M bps 802.11n: 7.2M/14.4M/21.7M/28.9M/43.3M/57.8M/65M/72.2M bps
Sample Type:	☒ Mobile ☐ Portable
Antenna Type:	PCB antenna
Antenna Gain:	1.92 dBi

Note:

The above parameters will directly affect the test results. The information is provided by the applicant.

4 MPE Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled 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
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission 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, 1 mW/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.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure

1) For BLE

Antenna Gain: 1.92dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.56 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	10.52	11.0±1	12	15.85
Middle(2440MHz)	11.91	12.0±1	13	19.95
Highest(2480MHz)	12.57	13.0±1	14	25.12

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
25.12	1.92	0.0077755144	1.0	PASS

Note: 1) Refer to report No. CQASZ20250100185E-02 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (25.12 \cdot 1.56) / (4 \cdot 3.1416 \cdot 20^2) = 0.0077755144$

2) For 2.4G WIFI

Antenna Gain: 1.92dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.56 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

11B mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	14.03	14.5±1	15.5	35.48
Middle(2437MHz)	14.50	14.5±1	15.5	35.48
Highest(2462MHz)	13.57	14.0±1	15	31.62

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
35.48	1.92	0.0109832060	1.0	PASS

Note: 1) Refer to report No. CQASZ20250100185E-03 for EUT test Max Conducted AV Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (35.48 * 1.56) / (4 * 3.1416 * 20^2) = 0.0109832060$

2) For 433.92MHz

Measurement Data

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm
 E_{Meas} is the field strength of the emission at the measurement distance, in dB μ V/m
 d_{Meas} is the measurement distance, in m

Frequency	EIRP (dB μ V/m)	EIRP (dBm)	EIRP (mW)
433.92MHz	54.36	-40.8	0.008

The worst case:

EIRP (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
0.008	0.0000015915	0.29	PASS

Note: 1) Refer to report No. CQASZ20250501043E-03 for EUT test Max EIRP Power value.

2) $P_d = (EIRP)/(4 * \pi * R^2) = (0.008)/(4 * 3.1416 * 20^2) = 0.0000015915$

Simultaneous transmission:

MPE ratios(BLE)+MPE ratios(2.4G WIFI)+MPE ratios(433.92MHz)

$= 0.0077755144/1 + 0.010983206/1 + 0.0000015915/0.29$

$= 0.018764208 \leq 1$

*** END OF REPORT ***